

# NURSE LEADER BEHAVIOR AND PATIENT SAFETY

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The incidence and significance of harm that occurs to patients while in the hospital setting continues to be alarming despite decades of efforts to produce safer healthcare systems. Leaders have a role in ensuring staff provide safe care to patients. The literature supports that certain leadership styles promote interactions with healthcare staff that produce work climates conducive to positive patient outcomes. It is not clear what types of activities conducted by nurse leaders have the most impact on nursing unit patient safety. The purpose of this study was to explore the relationships between nurse leader characteristics (nurse leader behavior, educational level, and experience level) and patient safety (perceived patient safety culture, Patient safety grade, Number of patient safety events reported, and patient safety event rates) in the acute care hospital. The objective of this study was to more clearly describe the types of observable, actionable, leadership behaviors that are perceived as most beneficial to patient safety.

Several existing data sources were combined to explore the relationships between nurse leader characteristics, leader patient safety behaviors, patient safety culture and patient safety events across a large health system in Eastern North Carolina. Nurse leader patient safety behavior was significantly associated with staff perceptions of patient safety culture. Nurse leader patient safety rounding was a safety behavior found to be associated with higher rating of patient safety culture including an improved culture of non-punitive response to error.

This study has implications for nurse leaders, educators, and researchers. The study adds valuable information about safety behaviors that are associated with nurse leadership practice. Specifically, this study will move the current literature forward by exploring observable, repeatable, and replicable behaviors of nurse leaders in acute care nursing units with lower levels of patient safety events.



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## **DEDICATION**

I dedicate my dissertation to the many people who inspired me and made this work possible. To my father, Dr. James E. Drake, who imparted on me the value of education and personal development through his individual pursuits and achievements in graduate and post-graduate theological studies. For my mother, Jean Drake, who, through her patience and dedication to see me improve in grade school, taught me that I could accomplish difficult achievements. For my six beautiful children, Hannah, Bethany, Sarah, Matthew, Elijah, and Liam who energized me every day through their love, hugs, and smiles. To my wonderful wife, Kim, without whom I could not have embarked upon or finished this journey. Thank you for your patience, love, words of encouragement, and personal sacrifices that made it possible for me to pursue this dream.

Finally, to all of the patients and families of patients who have experienced healthcare related harm from accidental error. This work is worthwhile if it helps to make care safer for even a single person so graciously entrusting us as nurses with their care.

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## **Chapter 1**

### **Introduction**

The number of people in America that die every year due to healthcare related error is equivalent to the number of deaths that could occur if a large passenger airplane crashed every other day (Jewell & McGriffert, 2009). Unlike the airline industry, the healthcare industry rarely has a significant level of public scrutiny associated with errors resulting in serious harm or death. Issues surrounding inadequate healthcare safety are not new. In 2000, the Institute of Medicine (IOM) issued a landmark report indicating that as many as 98,000 people die each year due to healthcare related errors (Kohn, Corrigan, & Donaldson, 2000). Since the 2000 report, the Centers for Disease Control (CDC) projected that nearly 99,000 people die from 1.7 million hospital acquired infections each year alone (Klevenes et al, 2007). Another study in 2000, alarmingly reported that U.S. healthcare is the third leading cause of death in the United States (Starfield, 2000).

Preventing patient harm is a fundamental priority and the foundation of all other nursing care (Banschbach, 2008). Nurses, and nurse leaders have a unique capability to impact healthcare safety due to their proximity with patients in nursing care units (Patrick, Laschinger, Wong, & Finegan, 2011; Richardson & Storr, 2010). Nurses are responsible for ensuring that hospitalized patients receive safe care and nurse leaders are responsible for setting priorities that shape safety culture and reduce adverse events. Leadership commitment to patient safety has been indicated among the top characteristics of reliably safe organizations (Clarke, Lerner, & Marella, 2012; Ginsburg et al. 2005).



## **Statement of the Problem**

Despite agreement that nursing leaders influence patient safety, there is limited research that describes specific leadership behaviors that support nurses in creating a safety culture that reduces adverse events in hospitals. Specifically, more research is needed to evaluate behaviors, actions, and competencies of nurse leaders that promote patient safety and quality. The actionable patient safety behaviors of leaders need to be understood in order to clearly educate current and future nurse leaders about the specific leadership interventions that promote safe patient care.

## **Background of the Problem**

### **Hospital Related Events of Harm**

Over the past two decades, several authors have estimated the rate of deaths in hospitals due to preventable causes. These estimates are established using a variety of techniques including hospital reported mortality and studies directly evaluating preventable death. In 2000 a report entitled “To Err is Human” estimated preventable hospital fatality using two earlier research reports conducted from chart reviews (Brennan et al., 1991; Thomas et al., 2000). Over the past twenty years estimates have put the number of American’s who die from preventable hospital error between 98,000 and 210,000 (James, 2013; Kohn, Corrigan, & Donaldson, 2000). Reported causes of these deaths include communication errors, acts of omission, wrong treatments, diagnostic errors, and failing to provide an adequate plan for the transitions of care between hospital and other environments (James, 2013). Nurses have indicated that there are particular patient outcomes that are most sensitive to nursing care. These include pressure ulcers, falls, wound infections, medication errors, and pain control (Schreuders, Bremner, Geelhoed, & Finn, 2012). These outcomes are considered nurse-sensitive because they are impacted by the

quality of nursing care. More importantly these outcomes are associated with nursing best practices aimed at promoting optimal health and preventing harmful events.

Despite efforts to improve patient safety, evidence suggests that little sustained progress in actual patient outcomes have occurred over the past two decades. In 2013, the rates of hospital associated preventable harm and death were updated. Authors reported that rates of preventable death had grown since the original estimates reported in the 2000 IOM report. They concluded that more than 210,000 people in America die from preventable causes in hospitals and the rate of serious non-fatal harm is ten to twenty times higher than the rate of preventable death (James, 2013).

### **Nursing Leadership's Influence on Patient Safety**

Nursing leadership has been discussed as an influence on patient safety for the past two decades. The 2000 Institute of Medicine (IOM) report recommended a focus on leadership's involvement in patient safety due to leaders' strong influence over normal performance practices and improvement strategies (Kohn, Corrigan, & Donaldson, 2000). In 2010, a report was released that indicated only moderate improvement in patient safety since a previous 2004 analysis. The 2010 report concluded that leadership involvement with safety had improved due to senior administrators focus on quality and safety (Wachter, R., 2010). In their most recent report entitled *The Future of Nursing*, the IOM indicated that high quality healthcare couldn't be achieved without strong nursing leadership. Specifically, they called for a transformation of nursing leadership from leadership styles that tell and delegate to those that are active partners in care quality (IOM, 2010). Studies have demonstrated that quality improvement is best when senior leaders, including CEOs and board members are actively engaged in patient care quality (Vaughn et al., 2006). Recently the American Association of Colleges of Nursing (AACN)

developed a new course of Masters curriculum aimed at developing clinical nurse leaders equipped to promote quality and safety. The AACN pointed towards failing quality in American healthcare as a reason for the development of new fields of nurse leadership education (American Association of Colleges of Nursing [AACN], What is CNL Certification, 2014; Harris, Stanley, & Rosseter, 2011).

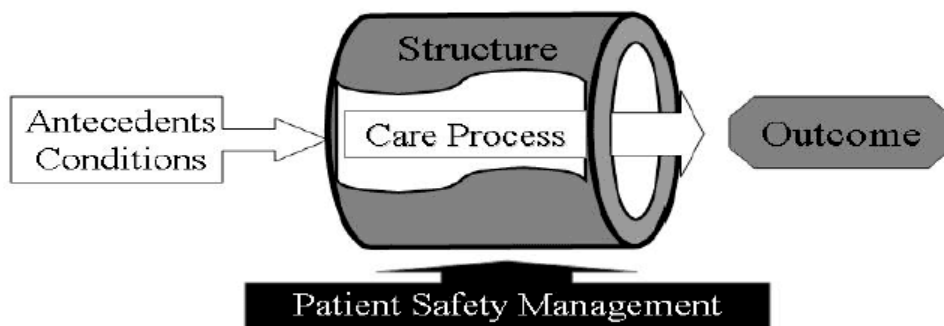
### **Purpose of the Study**

Nurse leaders need to know what leadership practices and behaviors reduce preventable harm to patients. Research aimed at discovering leadership interventions that promote patient safety is supported by the current literature. Findings that support the effectiveness of such interventions would lead to improved nurse leadership practices designed to support safe patient care. The purpose of this study was to explore the relationships between nurse leader characteristics (nurse leader patient safety behavior, educational level, and experience level) and patient safety (perceived patient safety culture, Patient safety grade, Number of patient safety events reported, and patient safety event rates) in the acute care hospital. The objective of this study was to more clearly describe the types of observable, actionable, behaviors that are perceived as most beneficial to patient safety.

### **Theoretical Framework**

The Donabedian model provides a useful theoretical framework for understanding the relationships among variables associated with patient safety outcomes in hospitals. Avedis Donabedian developed the Donabedian conceptual model while performing healthcare quality research in 1966. The original model described how healthcare quality is impacted by three related concepts; structure, process, and outcomes (Donabedian, 1966). The model portrays how outcomes are dependent upon processes that are in turn dependent upon structure. More recent

adaptations of the model also include antecedent conditions, which are explained as pre-existing factors that influence process and structure. Using this model, patient safety management is seen as an active, purposeful process requiring leadership interventions to guide safe nursing care. The order of dependency between the three concepts is often depicted by a unidirectional arrow drawn between them. Donabedian indicated that it may be difficult to determine the relationships between the three concepts. Validation of the model using structural equation modeling and confirmatory factor analysis have also included less linear arrangement of the concepts (Kunkel, Rosenqvist, & Westerling, 2007). The Donabedian Model has been accepted widely as a way of analyzing and categorizing attributes that impact healthcare quality (Baker, Gustafson, Beaubien, Salas, & Battles, 2005; Kobayashi, Takemura, & Kanda, 2011). The conceptual framework is used by the Agency for Healthcare and Quality (AHRQ) in their patient safety culture work (figure 1).



*Figure 1.* The Donabedian Model of Patient Safety (Baker, Gustafson, Beaubien, Salas, & Battles, 2005).

For the purposes of this research, Donabedian's model was used to conceptualize the factors explored within the research model. Donabedian's model is useful for categorizing the research factors using the theoretical taxonomy into antecedent, structural, process, or outcome variables.

## **Antecedents**

Antecedent variables are often uncontrollable and include conditions that are already present at the time care delivery. Despite the inability to directly influence antecedent conditions, nurses must nonetheless account for them and take measures to mitigate their impact to patient safety. Examples include patients that have pre-existing health compromises that increase the risk of developing hospital acquired conditions or succumbing to a safety event. Examples of patients with pre-existing antecedent conditions include those with comorbid conditions, chronic disease, low self-management, and inability to complete activities of daily living (Varitsakul, Sindhu, Sriyuktasuth, Viwatwongkasem, & Himmelfarb, 2013). Age, overall physical condition, and mental status impact the ability to care for oneself safely and increase the risks of certain patient safety events such as pressure ulcers and falls. Nurses routinely assess patients at high risk for skin breakdown and falls and take additional safety measures to decrease the patient risk of developing hospital-acquired conditions.

## **Structure**

Structure refers to factors describing the circumstances in which healthcare is rendered. These include the setting of care, facility layout and age, resources, equipment, policies, staff competency, and staff levels. Over the past twenty years, multiple reports have demonstrated relationships between staffing levels and nursing educational preparation with patient safety outcomes (Lin, 2013). Hospitals are complex organizations requiring many different types of costly equipment designed to promote life safety. Leaders have indicated that safety structures in hospitals begin with committed executive and board leaders who understand the need to invest in safety and quality (Bohan & Laing, 2012). Nursing leaders are responsible for making decisions

that impact safety structure. They determine staffing plans, set minimum competencies, write policy, and make hiring decisions that influence educational and skill mix.

## **Process**

Process items involve the manner in which care is delivered. Process attributes include the appropriateness of care, coordination, participation, and teamwork. Of particular importance to this study is the examination of how nurse leader's behaviors impact patient safety processes. Current literature suggests that leadership style is associated with patient outcomes including resonant leadership, authentic leadership, and transformational leadership (Cummings, Midozi, Wong, & Estabrooks, 2010).

Nurses perceive that authentic leaders facilitate trust and engagement, and promote speaking up for patient safety (Wong, Laschinger, & Cummings, 2010). Authentic leaders build leader-follower relationships based on high ethical standards, honesty, and integrity. Authentic leader actions are perceived as genuine and they produce strong relationships with their followers based on trust and shared values (Gardner, Coglisier, Davis, & Dickens, 2011). A second style, resonant leadership, includes attributes in which leaders with high emotional intelligence develop meaningful relationships with their employees to gain trust, demonstrate empathy, and collaborate towards mutual patient safety goals. These leadership attributes have also been associated with improved safety culture and patient outcomes (Squires, Tourangeau, Laschinger, & Doran, 2010).

Transformational leadership, the third and most prevalent style identified in the nursing literature, is associated with safe nursing care and positive nursing work environments (Clarke, 2013; Cummings et al., 2010; Tomlinson, 2012; Wong & Cummings, 2007). Transformational leadership is categorized as a leadership style in which leaders influence others by changing

beliefs and values as opposed to transactional leadership styles which produce outcomes by exchanges such as reward that occurs between the leader and follower (Cassida & Parker, 2011). Many of these leadership styles share similar attributes including trust, honesty, fairness, and strong relationships between the leader and follower.

**Outcomes**

Outcomes include intended and unintended results of structures and processes that impact patient safety. Patient care variables used to measure safety outcomes include survival rates, physiological parameters, health status, avoidance of adverse events, and perceived safety.

**Research Framework**

This study evaluates the association structure and process variables might have with safety outcomes. Figure 2 depicts the research variables within a research model using the Donabedian Theory as a framework.

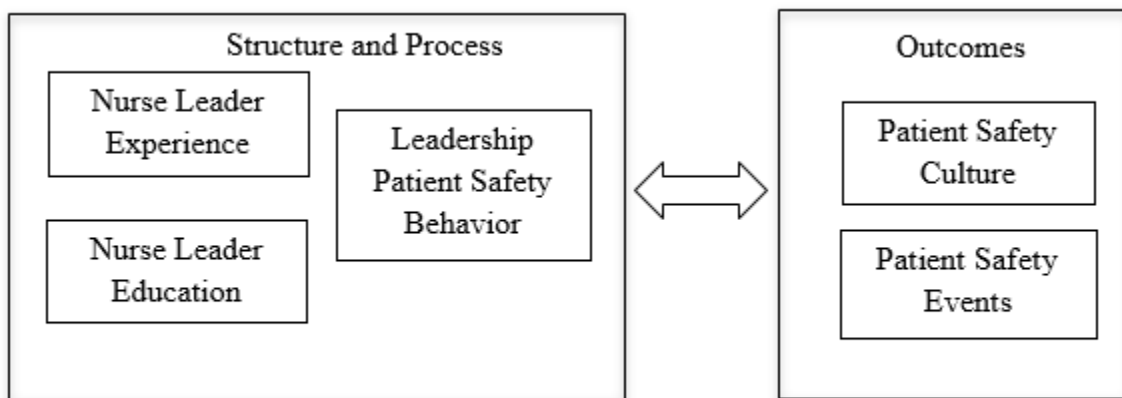


Figure 2. Proposed research model within the Donabedian framework.

**Structural Variables**

Structural variables included in this study include leadership educational level and experience. Nurse leaders are responsible for several structural elements that impact patient safety and outcomes. Structural domains influenced by nurse leaders include staff educational

level, certification, skill mix, staffing, and work environments. Nurse leaders make hiring decisions including minimum educational level and recruiting decisions based on their views of the importance of educational level and certification. The literature is clear that increased nurse educational level and staffing levels positively impact patient outcomes (Aiken et al., 2012; Kendall-Gallagher, Aiken, Sloane, & Cimiotti, 2011; Ridley, 2008). It is logical that nurse leaders might also then impact patient outcomes through their management of these resources and that their own educational and experience levels might also impact outcomes.

### **Process Variables**

The process variable measured in this study was staff perception of leadership patient safety behaviors that impact unit patient safety processes. These data were obtained from retrospective patient safety culture surveys completed by unit staff including registered nurses. The process measures included investigator developed survey items designed to determine specific leadership patient safety behaviors associated with the process of leadership safety rounding on inpatient nursing units.

### **Outcome Variables**

Two sets of outcomes variables were measured in this study. One set of outcomes examined was harm associated with hospital error and the potential for harm due to errors leading from near misses. These data on patient outcomes were obtained directly from hospital safety event databases and included both near miss events as well as harmful events. Near misses are events in which error occurred but the effect of the error did not reach the patient. A nurse finding that a wrong medication was ordered for a patient without the medication ever being administered is an example of a near miss. Nurses are encouraged to report near misses to help leaders develop processes that reduce their occurrences. Harmful events included errors that



cause temporary or permanent harm, or death to a patient. These are obviously the most significant types of hospital events caused by error.

The safety event data included outcomes that literature suggests are most associated with nursing care. These measures are often considered “nurse-sensitive” because nurses have the capability to positively impact them or prevent their occurrence. These include pressure ulcers, medication errors, patient mortality, restraint use, catheter use, infections, falls, and pain. (Castle & Decker, 2011; Cummings et al., 2010; Haaf, 2007; Merrill, 2011; Squires et al., 2010; Thompson, 2010; Tourangeau et al., 2007). While these errors are classified into categories, the combination of them reflected the overall measurement of patient safety event outcomes associated with processes and structures aimed at promoting safety in hospitals.

The second set of outcomes measured in this study involved staff perceptions of patient safety culture. These data were obtained from retrospective patient safety culture surveys completed by hospital staff. Four specific outcome variables were included as part of patient safety culture. These include frequency of event reporting, Overall perception of patient safety, number of events reported in the previous year, and nursing unit Patient safety grade.

### **Significance of the Study**

Nurse leaders, nurse educators, and policy makers need a clearer understanding of the role of the nurse in leading safety in the clinical hospital setting. While there is research to suggest that nurse leaders significantly influence patient safety outcomes, there is very little evidence that describes specific actionable leader behaviors that are associated with patient safety outcomes. Clarke (2013) suggested that leaders influence staff safety behaviors by encouraging subordinates to be actively engaged in safety measures and compliant with safety processes. Clarke also concluded that there is a lack of evidence describing the actual behaviors

within reported leadership styles that influence participation and compliance with patient safety processes.

Current studies have primarily focused on correlating perceived leadership attributes and styles to work culture and patient safety outcomes. Regardless of style, it is not clear what nursing leadership interventions, actions, or behaviors are most effective at improving safety in hospitals. Measuring styles alone does not produce evidence that is easily generalizable, teachable, or reproducible. While it is difficult to understand how to emulate perceptual leadership style or attributes, defined actions and behaviors could be taught to other leaders. Studies have concluded that most nurse leaders perceive themselves as having the necessary attributes that are associated with positively influencing patient care (Tsaloukidis et al., 2012). This study aims to move the field of study involving nurse leaders and patient safety forward toward exploration and understanding of more concrete, observable leadership behaviors that are associated with patient safety outcomes. It is possible that this research will document the reproducible actions of nurse leaders as they relate to leadership style. Conclusions that yield observable leadership actions and behaviors that impact patient safety in hospitals will fill in a missing element between “what” leaders know, “who” leaders are, and “what” leaders do to promote patient safety.

### **Research Questions**

The purpose of this study was to explore the relationships between nurse leader characteristics (nurse leader patient safety behavior, educational level, and experience level) and patient safety (perceived patient safety culture, Patient safety grade, Number of patient safety events reported, and patient safety event rates) in the acute care hospital. The objective of this study was to more clearly describe the types of observable, actionable, nursing unit leadership

behaviors that are perceived as most beneficial to patient safety. Specifically, the following research questions will be investigated:

- (1) What are the characteristics of the instruments, nursing units, nurse leaders, staff, perceived safety culture, and safety event reporting within the sample?
- (2) What are the relationships among nurse leader characteristics (nurse leader patient safety behavior, educational level, and experience level) and patient safety culture (patient safety culture survey dimensions, Overall perception of patient safety, Frequency of events reported, and Patient safety grade)?
- (3) What are the relationships among nurse leader characteristics (nurse leader patient safety behavior, educational level, and experience level) and patient safety events (self-reported number of patient safety events and documented unit level patient safety event rates)?
- (4) What are the differences in perceptions of patient safety culture between respondents and units based on the extent of leader patient safety behaviors?

### **Theoretical and Operational Definitions**

*Daily Safety Huddles* are nursing unit activities in which the unit leader conducts a safety pause on unit. Staff are expected to huddle and discuss safety over the past and future twenty-four hours.

*Events of harm* are events occurring during hospital care that cause temporary or permanent harm including injury and death to a patient. It is not necessary that the harm was the outcome of error. An example would include the wrongful administration of a medication to patient that causes the need for a higher level of care, rescue, physical impairment, or death.

*Leadership rounds* are an expected activity of nursing leaders in the study sites in which nurse leaders are expected to round in their units every day involving staff and patients in patient safety activities.

*Leadership safety behaviors* are observable actions of leaders that influence patient safety culture, patient safety behaviors, and/or patient outcomes. In this study leadership safety behaviors include leadership rounding for patient safety activities.

*Leadership styles* are characteristics of leadership attributes that define a consistent pattern of behavior in how the leader directs and responds to employees and situations.

*Nurse leaders* are nurses with formal management responsibilities who is supervising personnel within a nursing department. A nurse who, within their formal role, influences the actions of other nurses and patient care staff.

*Non-harmful events* are patient safety events occurring during hospital care that reaches a patient but does not cause temporary or permanent harm to the patient. An example would include administering the wrong medication to a patient that has no harmful effect on the patient.

*Near misses* are unintended patient safety event that vary from expected or planned procedure that have the ability to negatively affect patient safety but does not reach the patient. An example would include a physician that orders a medication on the wrong patient but the error is caught and corrected prior to the medication administration.

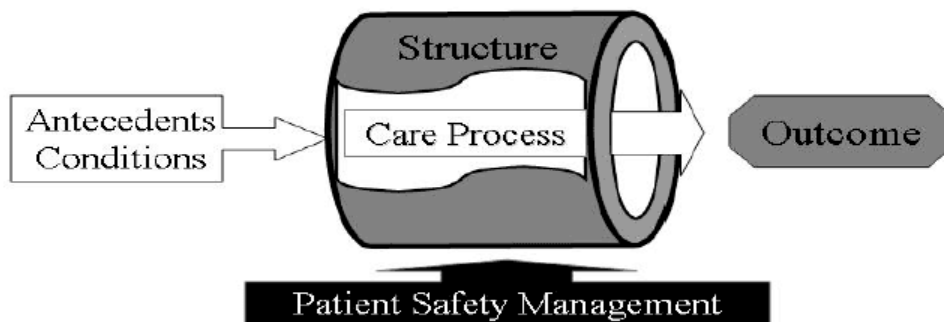
*Safety rounds* are leadership rounds in which the nurse leader focuses on high risk patients, staff safety procedures, and coordinates resources to promote safe patient care.

*Safety habits* are specific tools and procedures used by front line staff to reduce human error that leads to patient safety issues. One example is the use of phonetic clarification when confirming a medication order to ensure that communication has occurred correctly.

## Chapter 2

### Review of the Literature

The following chapter outlines the current literature concerning how nurse leaders influence others to achieve intended patient safety practices and patient care outcomes. The emergence of leadership as a key component of patient safety is evident in the growing body of patient safety literature (Mohr, Abelson, & Barach, 2002). Tappen simply defined leadership as the ability to influence others (Tappen, Weiss, & Whithead, 2004). Clearly, nurse leaders, by virtue of their roles in the healthcare system, are positioned to influence healthcare structures, processes, and outcomes. Hence the decision to organize this literature review around Donabedian's theoretical model of patient safety (Figure 3). The literature is organized describing how nurse leaders influence structural, process, and outcome domains.



*Figure 3.* The Donabedian Model of Patient Safety (Baker et al., 2005).

### Nursing Leadership and Safety

Nurses and nurse leaders have a unique capacity and responsibility to impact patient safety and patient outcomes due to their important role as healthcare providers and their proximity with patients (Patrick, Laschinger, Wong, & Finegan, 2011; Richardson & Storr, 2010; Thompson, Navarra, & Antonson, 2005). Nurse leaders are academically and practically oriented to the work that drives patient safety process. Mastal and colleagues conducted an

interview of seventy-three board chairs, chief executive officers, and chief nurse executives and found that nurse leaders were more familiar with landmark reports on patient safety and quality than were CEOs or board chairs (Mastal, Joshi, & Schulke, 2007). Nurse leaders are responsible for ensuring that the nurses they supervise deliver the intended care safely and efficiently.

Lucero and colleagues examined survey data from more than 10,000 registered nurses. The study found that nurses' alarmingly reported 26 to 74 percent of nursing care is left undone (Lucero, Lake, & Aiken, 2010). Nurse leaders are responsible for identifying and ensuring the completion of nursing processes most effective at keeping patient safe. To do this, nursing leaders must demonstrate support for safety improvement. Nurse leaders should understand how their leadership style and behavior influences patient safety processes in the areas they lead. Nurse leaders are also responsible for the nursing work and patient care environment. Nurse leaders must understand how to influence positive work environments and patient safety culture to achieve optimal patient safety. Finally, nurse leaders must understand, recognize, and develop measures to prevent human and system based errors that lead to patient safety problems (AACN, Nurse Manager Skills Inventory, 2006).

### **Structural Dimensions of Nursing Leadership and Safety**

There are several structural elements that impact safety on a unit. Those related to the influence of the nurse leader include: staffing levels, skill mix, educational level, certification, and the quality of the nursing work environment.

The American Organization of Nurse Executives (AONE) recommends that nurse leaders be minimally prepared at the baccalaureate level (The American Organization of Nurse Executives [AONE], Positions Statement, n.d.). Unfortunately there is not a large pool of nurses with advanced education in which to develop leaders. In the United States only 34.2% of nurses

are prepared at a baccalaureate degree or higher (Health Resources and Services Administration [HRSA], 2010). A 2008 analysis of the nursing workforce reported that an average of 11.8% of nurses with diploma or associate degrees had management roles compared to 15.3% of nurses with baccalaureate or higher education (HRSA, 2010). These figures indicate that nearly 44% of nurse leaders have education below the baccalaureate level.

Certification in nursing leadership is available through the AONE and the American Nurses Credentialing Center (ANCC) for three levels of nursing leadership. The AONE offers a Certification in Executive Nursing Practice (CENP) that requires a master's degree in nursing. They also offer a Certification in Nurse Management and Leadership (CNML) requiring a baccalaureate degree (AONE, Credentialing Center, n.d). The American Association of Colleges of Nursing (AACN) supports an academically oriented degree and subsequent certification entitled the Clinical Nurse Leader that also requires a master's degree (AACN, What is CNL Certification, 2014).

Nurse leaders are responsible for many different aspects of healthcare delivery. Nurses provide leadership from the bedside to the boardroom. Nurses leaders serve as board members, senior executives, administrators, managers, charge nurses, and are also viewed as leaders of multidisciplinary health teams and as front line providers of care. While all of these roles play a part in the safety of patients, this review focuses on the role of the unit level nurse manager; the leader closest to the activities directly related to patient care. Nurse leaders at this level are responsible for ensuring hiring and developing nurses using formal education, certification, and ongoing educational strategies. Also, nurse leaders themselves must ensure their own competency to promote patient safety and quality. Nurse leaders also determine staffing plans,

ensure adequate staffing based on patient acuity, and define the appropriate skill mix based on patient needs.

### **Nurse Leader Educational Level and Certification**

The Council on Graduate Education for Administration in Nursing (CGEAN) has pointed out that various educational differences exist for meeting the competencies associated with different nursing leadership roles (Yoder-Wise, Scott, and Sullivan, 2013). Nurse leadership does not exist only in formal nurse leader roles and hierarchical structures but is shared amongst many people (Thompson, Navarra, & Antonson, 2005). Nurse educational level and competency is a structural component of patient safety.

Several studies have reported associations between higher educational level and improved patient outcomes. In 2003 Aiken and colleagues explored outcome data from more than 230,000 patients in 168 hospitals. This landmark report showed that nursing educational level significantly predicted patient 30-day mortality. They found that each 10 percent increase in baccalaureate prepared nurses was associated with a 5 percent decrease in patient 30 day mortality and hospital failure to rescue rates (Aiken, Clarke, Cheung, Sloane, & Silber, 2013). Estabrooks and colleagues examined patient outcomes data from more than 18,000 patients in 49 Canadian hospitals. Among other things, they found that nurse educational level was a significant predictor of 30-day patient mortality (Estabrooks, Midodzi, Cummings, Ricker, & Giovannetti, 2005). Teng and colleagues found similar relationships between nurse certification level and patient outcomes in a smaller sample of patient in Taiwan (Teng et al., 2012). Kendall-Gallagher and colleagues also found an association between nursing certification, patient mortality, and failure to rescue. They analyzed data from more than 1.2 million patients and 28,000 nurses and found that nurse certification was significantly associated with decreased



patient mortality and failure to rescue. Interestingly, the positive association between nurse certification and patient outcome was not found in nurses with less than a baccalaureate degree (Kendall-Gallagher, Aiken, Sloane, & Cimiotti, 2011). Aiken and colleagues explored data from more than 1.2 million patients and 39,000 staff nurses in 655 hospitals to determine the relationships between nursing educational level, staffing, work environment, and patient outcomes. They found that every 10% increase in Baccalaureate prepared nurses was associated with a 4% decrease in patient death and failure to rescue (Aiken et al., 2012).

Ridley (2008) conducted an integrative review of twenty-four studies examining the relationship between nurse educational level and patient outcomes. The review showed that patient 30 day post hospital mortality, rates of inpatient pneumonia, postoperative infection, and urinary tract infection were lower in hospitals with more nursing time spent per patient (RN dose) and higher nurse to non-nursing staff (skill mix). Ridley also discussed the findings in three studies that increased nurse educational level has been shown to reduce failure to rescue and patient mortality. However, Ridley pointed out that many other studies exploring nurse staffing on patient outcomes did not sufficiently break down nurse education in way that it could be linked to patient outcomes. Ridley's review also demonstrated the multifactorial nature of understanding nurse staffing and demographical characteristics effects on patient outcomes citing nursing shortages and other effects over time (Ridley, 2008). Lin conducted a similar integrative review of the literature examining the influence of nurse staffing on quality in acute care settings. Lin's review examined twelve articles over a ten year span ending in 2012 and also found that lower nurse to patient ratios, more RN time, and higher skill mix were associated with improved patient care outcomes (Lin, 2013). Not all studies have found a significant relationship between patient safety and educational level. Durmus and colleagues had 134 nurses take the Malpractice

Tendency Scale in Nursing to determine characteristics in error tendency in nurses. In their study there was no significant difference in nurses self-reported error tendency by educational level (Durmus et al., 2013).

To date no studies have examined the relationship between educational level or certification of nursing leaders and patient safety outcomes. Given that relationships have been found between staff nursing educational levels and achievement of certification and patient safety, it might also be true for those nurses who lead and manage patient care units.

### **Nursing Work Environment**

The environment in which nurses work has been linked to patient outcomes. Structural nursing work environments include both the physical and social environments that influence process and outcomes. Environmental issues may pose risk directly or indirectly to patient safety. Examples of direct risk include hazards such as wet floors or inadequate lighting that may cause patient falls. Work environments may also indirectly lead to patient safety issues. For example, a nurse working in a noisy, busy, and stressful environment may suffer from mental and physical fatigue leading to poor work performance or inadequate attention to safety. Trinkoff and colleagues conducted a cross-sectional secondary analysis of survey data to determine how nursing work environment relates to patient outcomes. They found that deaths from pneumonia and pulmonary emboli were higher in hospitals where nurses also reported higher psychological demands and adverse work schedules (Trinkoff, et al., 2011).

Many studies have concluded that the nurse leader plays a pivotal role in creating an environment where nurses can voice concerns about patient safety. In one qualitative study, Garon, examined focus group interviews of registered nurses and found that nurses clearly indicate that nurse managers are important for ensuring workplace environments where nurses

can speak up for patient safety and leaders will act on their concerns (Garon, 2012). Attree conducted a study using a grounded theory approach with 142 registered nurses in acute care settings in England and found that they feared retribution and blame for reporting patient safety concerns. Nurses in this study also believed that the risk of reporting of patient safety issues did not warrant the experienced benefits (Attree, 2007). Wong also found that nurse leader style indirectly influences nurses speaking up for patient quality (Wong, Laschinger, & Cummings, 2010). Another qualitative study conducted with 16 nurses in Iranian hospitals also found that leadership commitment to safe care was a major theme that nurses associated with the provision of safety. The nurses indicated the nurse leaders significantly shape the workplace environment in a way that allows nurses to practice safety (Vaismoradi, Salsali, Turunen, & Bondas, 2012).

The ability of leaders to promote environments with open communication also impacts the important element of understanding and learning from error. Thompson and colleagues found an association between nursing leadership and nurses who reported improved capacity for non-punitive response and feedback about error (Thompson, et al., 2011). Patrick and colleagues explored the relationships between work environments considered to be “empowerment structures” and clinical leadership practices by surveying 480 registered nurses in Ontario. Examples of structurally empowering environments included those with adequate resources, information, and opportunities for growth. They found that environments with empowering work environments are best suited for the development of clinical leadership behaviors (Patrick, Laschinger, Wong, & Finegan, 2011).

Ginsburg and colleagues found that nurse leaders significantly shape patient safety culture around learning from error. They conducted a cross-sectional study of fifty-four patient safety officers and 282 patient care managers in Canadian hospitals. They found that leadership

support for safety significantly influences patient safety behavior including learning from patient safety events. Their findings were more pronounced in smaller hospitals (with fewer than 100 beds) and they concluded that this difference might be explained by more positive participation and visibility of leaders amongst front line staff in smaller organizations (Ginsburg et al., 2010).

The American Nurse Credentialing Center (ANCC) promotes the development of nursing work environments and practice that promote patient safety and quality. Hospitals may earn the ANCC's Magnet status in recognition of exhibiting standards associated with excellence in nursing practice. Magnet designated hospitals have also been associated with improved patient outcomes. Lake and colleagues examined outcomes data from more than 5000 nursing units and found that Magnet hospitals had lower patient falls rates than non-Magnet hospitals (Lake, Shang, Klaus, & Dunton, 2010). McHugh examined 564 hospitals and found that those with Magnet status reported improved working conditions and higher educated nurses. The study also showed that Magnet hospitals had 14% lower mortality 12% lower failure to rescue rates (McHugh et al., 2013). Kelly and colleagues analyzed data from more than 20,000 nurses in 567 hospitals to determine differences between nurse outcomes and work environment in Magnet and non-Magnet hospitals. They found Magnet hospitals had more highly educated nurses, better satisfied nurses, and improved work environments (Kelly, McHugh, & Aiken, 2011).

Not all studies have reported a positive difference in Magnet hospitals. Mills and Gillespie did not find a difference in pressure ulcers or failure to rescue between 80 matched Magnet to non-Magnet hospitals. One possible reason for finding no difference between the Magnet and non-Magnet hospitals is the growing acceptance of Magnet hospital practices irrespective of the achievement of Magnet status (Mills & Gillespie, 2013). Goode and colleagues had similar findings in comparing 54 Magnet and non-Magnet hospitals. They found

that while Magnet hospitals were associated with slightly better pressure ulcer rates, some other indicators such as infections and staffing levels were worse in Magnet hospitals. The apparent shrinking effect between Magnet designated hospitals and non-Magnet hospitals in some reports may again be related to more hospitals using Magnet practices without seeking Magnet designation (Goode, Blegan, Vaughn, Spetz, & Park, 2011).

Kelly and colleagues surveyed more than 3000 critical care nurses from 320 hospitals using a tool designed to measure work environment and found that positive nursing work environments were associated with lower rates of hospital acquired infections (Kelly, Lee, Lake, & Aiken, 2013). Aiken and colleagues found that work environment moderated the effectiveness of other factors. In their study, lower nurse to patient ratios were associated with decreased patient mortality in units with average to good work environments but had no effect on units with poor work environments (Aiken et al., 2012).

### **Process Elements of Nursing Leadership and Safety**

Leaders are responsible for many processes that impact patient safety. Nurse leaders are responsible for ensuring the patient care team delivers care that minimizes the chance for patient harm and maximizes healthcare quality and overall patient outcomes. Richardson and colleagues conducted a literature review of articles written between 1998 and 2008 and found eleven relevant articles for systematic review. Like others, they found that the literature supported the important role of leadership to patient safety. In their review they found that nursing leaders particularly influence staff engagement, communication, and decision making (Richardson & Storr, 2010).

Nurse leaders set unit goals, facilitate teamwork, and evaluate results. Nurse leaders are positioned, not only to influence patient safety, but to design patient care systems and processes

to drive patient safety results (Thompson, Navarra, & Antonson, 2005). The key processes by which nurse leaders influence patient care outcomes include unit communication, teamwork, compliance with procedures, and taking actions that demonstrate support for patient safety priorities.

### **Leadership Support for Performance Improvement**

Leadership support for improvement is an essential component of patient safety culture. Ginsburg conducted a prospective interventional study aimed at determining the impact of an educational intervention on nurse leader perception of safety culture. The study successfully demonstrated that educational programs do have a positive impact on perception of patient safety culture. Most important, the leader's support for performance improvement significantly impacted the variance in valuing for safety (Ginsburg, Norton, Casebeer, & Lewis, 2005). Feng and colleagues conducted a cross-sectional survey of 20 nurse manager and 228 staff nurses comparing the Manager Safety Commitment Scale (MSCS) and the Hospital Survey of Patient Safety Scale (HSPSC). They found that manager safety commitment was significantly associated with patient safety culture (Feng, Acord, Cheng, Zeng, & Song, 2011).

Leaders are responsible for ensuring sustained compliance with patient safety processes. Amin and colleagues specifically identified the need for leadership in sustaining processes such as the use of safety checklists in hospitals. Amin discussed the autonomous historical nature of medicine as a barrier to conforming to common safety process. Leaders are responsible for shaping new cultures and expectations around the use of tools that minimize human error and maximize patient safety (Amin, Grewcock, Andrews, & Halligan, 2012).

## **Leadership Support for Teamwork**

Healthcare requires the efforts of multidisciplinary teams. Leaders play an important role in forming, facilitating, and encouraging teams toward shared goals. Teamwork is critical to patient safety. One study surveyed staff in high-risk inpatient areas to determine the role teamwork plays in patient safety. In addition to valuing teamwork as a key patient safety competency, staff indicated confusion about the role of team leaders and suggested that team leaders impact the ability for team members to raise safety concerns (Kaissi, Johnson, & Kirchbaum, 2003). In the response for the need for improved clinical leadership, the AACN recently developed the Masters prepared Clinical Nurse Leader (CNL) role in an effort to bridge the gaps between traditional formal leaders and front line staff around the delivery of care and performance improvement strategies (Stanley et al., 2008).

## **Communication Processes**

Communication is often cited as a critical patient safety factor. Good communication is required for teams to pass vital patient information along the patient care continuum, engage patients and their families, and to openly raise concerns when patient safety is compromised. Donahue and colleagues conducted a prospective study evaluating the effectiveness of a leadership-driven communication program on patient safety as measured by the Agency for Healthcare Quality's (AHRQ) Patient Safety Culture Survey. The communication program was designed to empower staff to communicate patient care concerns and needs in a structured manner. Staff were surveyed before and after the implementation of the leader-driven communication program. Significant improvements in non-punitive response to error, perceptions of management's safety priorities, and communication with doctors were measured

after the implementation of the communication program (Donahue, Miller, Smith, Dykes, & Fitzpatrick, 2011).

## **Leadership Style**

Various taxonomies exist throughout the literature to categorize, describe, and define leadership styles. Several studies have examined the relationship between leadership style and patient safety. Castle and Decker categorized 4000 nursing home leaders into four types based on their leadership style and compared their styles with quality measures. They found that the majority of the patient safety indicators they examined were positively impacted when the nursing home leader exhibited a consensus style of management (Castle & Decker, 2011). Authentic leadership is a leadership style that has been positively associated with patient safety. Authentic leaders influence others by exhibiting integrity, honesty, and high moral standards. Through trust and belief in the leader's personal examples and attributes, followers develop an enhanced personal commitment to the work (Avolio, Gardner, Walumbwa, Luthans, & May, 2004). Wong examined the impact authentic leaders have on nurses speaking up and perceptions of care quality. Authentic leadership was significantly associated with positively influencing staff nurses trust in their manager and their work engagement (Wong, Laschinger, & Cummings, 2010). Wong and Giallonardo also examined the relationship between authentic leadership and nurse-assessed adverse events. They conducted a secondary analysis of data from a cross-sectional survey of 280 registered nurses in Ontario comparing results from the Authentic Leadership Questionnaire (ALQ) and nurse self-reported incidences of harm including medication errors, nosocomial infections, complaints, and falls. They concluded that authentic leaders strongly affect trust in the manager, which reduces adverse patient outcomes mediated through areas of work life (Wong & Giallonardo, 2013).



Germain and Cummings conducted a literature review exploring how nurse leaders influence nurses' performance. They systematically reviewed eight final articles and found five key themes that nurses associated with motivation and work performance. One key factor was leadership practices. They concluded that leaders who are engaging, participative decision makers motivate their followers and create higher levels of performance (Germain & Cummings, 2010).

Leadership style is often categorized as either transformational or transactional. Patient safety literature generally supports transformational leadership styles ability to positively impact patient safety. Transformational leaders depend on their relationships with their followers. Transformational leaders value individuals, actively listen and appreciate concerns promotes professional development, build confidence, and optimistically role models desired behaviors. As opposed to transformational leaders, transactional leaders are more task oriented. They tend to focus on the exchange of reward for objectives completed. Transactional leaders tend to value prescribed tasks required to achieve outcomes while transformational leaders encourage followers to explore individualized methods to achieve results (Clarke, 2013). While most patient safety literature has promoted transformational leadership, Clarke demonstrated through a meta-analytic review that transactional leadership continues to play an important role in safety literature concerning occupational injury. Clarke's findings agreed with patient safety literature that transformational leadership inspires participation with safety behaviors but also showed the importance of transactional leadership on ensuring safety compliance. Transactional leaders are focused on complying with safety rules and actions designed to achieve safety results. Clarke suggested that transformational leadership builds upon required actions and tasks made compliant first through transactional leadership and that both styles are important to overall

safety (Clarke, 2013). Bohan and Laing conducted a qualitative study interviewing chief and senior executives as well as board chairs exploring their experiences about the relationships between leadership behavior, quality, and safety. They concluded that behaviors reflective of transformational leadership styles were most associated with the achievement of patient safety and quality objectives. Specific behaviors that were identified by the subjects included being inclusive, good communications, empowering, trusting, and transparent (Bohan & Laing, 2012).

Wong and Cummings have conducted two literature reviews examining the relationships between leadership style and patient outcomes. The first review was conducted in 2007 and found seven studies examining nursing leadership and measured patient outcomes. Examples of patient outcomes measured in the reviewed studies included patient mortality, medication errors, pressure ulcers, falls, restraint use, adverse events, and patient satisfaction. Wong concluded that leader behavior improved patient satisfaction and decreased adverse events. In the first review transformational leadership styles were found to be most associated with significant positive influences on patient outcomes (Wong & Cummings, 2007). In the subsequent review the authors concluded that literature supported a positive relationship between patient outcomes and relational leadership styles (Wong, Cummings, & Duscharme, 2013).

Transformational leadership traits are often associated with relational leadership patterns since transformational leaders develop effective working relationships with their subordinates. Thompson and colleagues conducted a cross-sectional survey of more than seven hundred staff from thirty-four hospital departments. They used the Leader-Member Exchange (LMX) instrument to determine the types of leadership that are associated with improved perception of unit safety culture. Higher LMX scores reflect better leader-follower relationships. Higher LMX scores are conceptually tied to leadership traits that rely on relationships and transformational

leadership styles. They found that units that had leaders with higher LMX scores also had higher ratings of safety culture dimensions involving feedback, non-punitive response to error, and communication openness. Nurses in units with higher scoring LMX leaders also scored their leaders higher in the dimension of Supervisor expectations and actions promoting safety (Thompson et al., 2011). Leaders with high LMX scores have also shown to positively relate to employees work performance and employee altruism (Loi, Ngo, Zhang, & Lau, 2011).

Resonant leadership style has been identified with improved patient outcomes. Resonant leadership is based on high degrees of emotional intelligence in four domains including self-awareness, social awareness, self-management, and relationship management. Resonant leaders exhibit visionary, democratic, coaching, and affiliative styles. Resonant leaders are highly capable at empathy, support, and motivating their followers. Cummings and colleagues surveyed more than six thousand registered nurses in Canada to assess the relationships between resonant leadership, emotional health, collaboration, teamwork, and unmet patient needs. Among other findings, the authors reported that nurses who have resonant leaders are less likely to report unmet patient care needs. Nurses who reported working with dissonant leaders, as opposed to resonant leaders, reported three times higher unmet patient care needs (Cummings, Hayduk, & Estabrooks, 2005). AbuAlRub and colleagues also found that decentralized leadership styles were associated with higher perceptions of patient safety culture among a sample of 381 registered nurses surveyed in Jordan (AbuAlRub, Gharaibeh, Bashayereh, 2012). Singer and colleagues surveyed more than 18,000 senior managers, physicians, and other staff using tools exploring the relationships between patient safety and organizational culture. They also found that organizations with more hierarchical structures were associated with lower perceptions of patient safety culture (Singer et al., 2009). Squires and colleagues examined patient safety and

work climate data from 600 registered nurses and found that resonant leadership styles were associated with improved perceptions of work environment and patient safety (Squires, Tourangeau, Lachinger, & Doran, 2010).

Mannix conducted an integrative review of the literature and found ten research papers identifying characteristics of clinical leaders. The synthesis concluded that, in addition to clinical competence, effective clinical leaders exhibit effective communication skills and support for colleagues (Mannix, Wilkes, & Daly, 2013). The importance of leadership styles has been reported among various levels of nursing leadership. Tomlinson conducted qualitative interviews of 20 staff nurses in Scotland and found that nurses experienced higher levels of engagement and achievement of organizational goals when their charge nurses were perceived as having transformational and distributive leadership styles (Tomlinson, 2012).

A major gap in the literature exploring leadership style and patient safety involves the understanding of how leadership styles and traits are experienced through observable action. Derue examined seventy-nine studies to determine the theoretical integration of leadership traits and behaviors in the current literature. Derue found that leadership behaviors are more effective than leadership traits and proposed that leadership behavior mediates the relationship between theoretical leadership traits and observed effectiveness. A meta-analysis of the literature demonstrated that 31 percent of the variance in leadership effectiveness was explained by leadership trait and behavior (Derue, Nahrgang, Wellman, & Humphrey, 2011). Volckmann (2006) discussed the need to rethink the ways in which we instruct on leadership. He discussed the current literature on leadership principles as a necessary set of “shoulds”. Volckmann cautions however, that common leadership principles may not be fully actionable. He cites Argyris’ (2000) criteria for determining the utility of leadership principles on producing

actionable behavior (Argyris, 2000; Volckmann, 2006). When applied, these criteria reflect gaps in the current literature involving patient safety and leadership. Specifically, nurse leadership traits do not specify behaviors, leadership behaviors are not directly associated with patient safety results, the causal relationships between the actions and results are not clear, and it is unclear if the behaviors used to produce the results can be learned and replicated in repeated situations.

Leadership traits are also difficult to objectively assess using perceptual instruments. Tsaloukidis for example, surveyed thirty head nurses about their self-perceived leadership style and found that almost all of the nurse leaders surveyed believed that they exhibited leadership traits that can be associated with transformational leadership styles (Tsaloukidis, et al., 2012).

### **Patient Safety Outcomes Framed as Errors**

All processes are prone to defects due to systems, mechanical, and human error. The study of error in healthcare grew from previous work in the nuclear power and aviation industry. Error is reduced in complex organizations like healthcare by creating systems that lower and mitigate human error rather than expecting humans to be flawless. The goal of continuous process improvement is to reduce error and create highly reliable safety outcomes (Wilson, Fabri, & Wolfson, 2012). Medical error has been defined as “patient harm that occurs when healthcare personnel fail to provide the patient with standard procedures, lack necessary skills, or do not treat the patient at all” (Durmus et al., 2013, p. 225). Healthcare errors range from those that go undetected to those that cause permanent harm such as death. Errors that cause harm are considered adverse events. As part of regulatory standards, hospitals are required to have systems for measuring and addressing healthcare error and their associated adverse events. Current industry standards in hospitals include written and electronic error documentation and

reporting systems. Staff document error and associated harm in an effort to better understand how error occurs and how to prevent or mitigate adverse events.

The study of error originating from the aviation industry has led to taxonomical categorization of error and error based classification systems used by NASA and other complex organizations. Many of the error classification systems used today are based on Reasons 1990 Generic Error Modeling System (GEMS). The Human Factors Analysis and Classification System (HFACS) is a four-factor taxonomy based on the GEMS model. The four factors include organizational influences, unsafe supervision, preconditions for unsafe acts, and unsafe acts. Leadership is clearly indicated as a major category of error classification that impacts safety outcomes. Leadership errors are further classified using four sub-scales; inadequate supervision, planned inappropriate operations, failure to correct problems, and supervisory violations (Rantanen, Palmer, Wiegmann, & Musiorski, 2006).

Error classification is useful for categorizing and understanding how error occurs so that processes can be developed to mitigate future reoccurrences. Examples of processes that reduce the likelihood of human error include the use of checklists, reducing variation, reducing distractions, and creating mechanisms to catch and report error quickly so that it can be mitigated. Nurse leaders are responsible for ensuring that processes designed to reduce error are reliably followed. The five rights of medication administration has been a simple long-standing type of mental checklist for nurses to ensure that right patients get the right medication, right dose, and right route at the right time. Hewitt conducted a literature review of the causes of medication errors and found that nurses' failure to follow the five rights was the second leading cause of reported medication errors (Hewitt, 2010). Learning from error is a critical component of improving safety. Fear of punitive response significantly reduces reporting and learning from

error. Leaders who are participative, promote patient safety, and create open communication about patient safety foster an environment in which learning from error occurs (Chaung, Ginsburg, & Berta, 2007).

Error reducing safety processes are often actionable behaviors that can be observed for ensured compliance. Examples include the use of phonetic clarification of physicians' orders given verbally, the correct use of safety checklists, and the use of visual aides to notify caregivers about patient risk such as falls. Some authors have found that these behaviors can be improved with the use of staff specifically charged with monitoring and providing feedback about these actions. Dickerson and colleagues introduced a safety coaching program in a radiology department and found that it positively increased error reporting and reduced harmful safety events (Dickerson, Koch, Adams, Goodfriend, & Donnelly, 2010).

Patient safety is slowly evolving as an academic discipline. The literature lacks sufficient research reports exploring patient safety interventions that impact patient safety outcomes. It is surprising that more literature does not exist considering the significant work that has been done over the past decade in hospitals to create safety programs and processes designed to improve specific patient outcomes such as urinary tract infection, pressure ulcers, and falls. Morath and colleagues discussed the evidence that is beginning to emerge in patient safety literature and some of the reasons that the progress has been slow. Reasons for the lack of literature in the field include competing priorities in the clinical environment, lack of time, and lack of incentives associated with publication in the non-academic environment. Morath also discussed the evolving non-traditional information sharing methods that hospitals are engaging to create collaborative networks to share best practices and data (Morath, Hain, Deshpande, Gitlin, &

Churchwell, 2009). Authors of current literature report leadership's impact on patient outcomes by primarily measuring adverse events and staff perceptions of patient safety.

### **Adverse Events**

Adverse events may result in temporary or permanent patient harm. The incidence of adverse events in U.S. hospitals ranges from three to twenty percent. The wide estimate is due to inconsistency with measuring and reporting methods. Fear of punitive action may also contribute to under-reporting of adverse events (Stegman, 2009). As part of the Centers for Medicaid (CMS) inpatient payment program, the U.S. federal government has created a listing of adverse events entitled Hospital Acquired Conditions (HACs). CMS identified HACs as part of reporting hospital quality and funding adjustments based on its Value Based Purchasing (VBP) model. Examples of HACs include retained foreign bodies after surgery, air embolism, pressure ulcers, falls with injury, hospital acquired infections, and deep vein thrombosis acquired while in the hospital (Levinson, 2010; Stegman, 2009).

The cause of adverse events is multifactorial. Adverse events may occur due to omission of care such as missing a medication, incorrect application of care such as a medication overdose or misidentified patient, or for unpreventable reasons such as unwanted but potential complications of surgery. Lucero, Lake, and Aiken conducted a study examining survey data from more than 10,000 nurses in 168 acute care hospitals. The researchers were interested in understanding the relationships between adverse events and unmet nursing care. Nurses reported a range of 26 to 74 percent of unmet nursing care. Unmet nursing care was significantly associated with nurse reported adverse events (Lucero, Lake, & Aiken, 2010).

Adverse events are typically recorded either through voluntary self-reporting mechanisms or through billing claims based records that are coded to hospital-acquired conditions (Schade,



Ruddick, Lomely, & Bellamy, 2008). Classen and colleagues undertook a more robust method of screening patient charts using a trigger tool that intentionally looked for adverse events regardless of whether they had been reported. They found ten times more errors than were reported using traditional adverse event reporting (Classen et al., 2011).

Patient care outcomes and events of harm in the nursing literature naturally center upon indicators that are most related to nursing care. These are often described as nurse-sensitive indicators because nurses have the most influence over their outcome. Studies have examined the influence of nurse leaders on nurse sensitive indicators and have generally found that nurse leaders indirectly impact these outcomes. Caste & Decker examined the influence nursing home leaders and found that those leaders with a consensus style were associated with nursing homes with lower pressure ulcers, better pain management, and decreased urinary catheter utilization (Castle & Decker, 2011).

Most current studies exploring the relationships between nursing leadership and patient safety outcomes are cross-sectional and lack measuring actual patient outcomes. MacDavitt and colleagues conducted a literature review of twenty studies examining organizational safety culture and patient care outcomes. They found that the current literature supports organizational culture impacts nurse outcomes more so than patient outcomes. Examples of nurse outcomes include nurse burnout, intent to leave, occupational injury, nurse turnover, and job satisfaction. They concluded that difficulty obtaining consistent and accurate patient outcome data is reflected in the lack of literature examining actual patient outcomes (MacDavitt, Chou, & Stone, 2007).

Many studies also measure self-reported or perceptions of patient outcomes rather than actual measurable incidence of harm or outcomes of care. One example includes Wong's exploration of leadership's influence on nurses speaking up to improve care quality. The study

found that authentic leadership indirectly influenced unit care quality through the mediating variables of trust in the manager and work engagement (Wong, Laschinger, & Cummings, 2010). Wong also explored authentic leadership's influence over nurse self-reported adverse patient events and found that leadership style was related to adverse events through the moderating variables of trust in the manager and areas of work life (Wong & Giallonardo, 2013). Squires and colleagues found that resonant leadership styles influenced patient safety culture through improved work environment (Squires, Tourangeau, Laschinger, & Doran, 2010). Though these studies are valuable at describing the multifactorial nature of leaderships influence on patient safety, they do not describe the repeatable, observable behaviors by which leaders accomplish translating their traits into action.

### **Perceptions of Safety and Leadership**

Much of the patient safety literature explores the perceived state of safety using various survey instruments. Leadership is included in most of the instruments as a key domain of patient safety interest. Cala examined the current instruments used in patient safety culture and found that eight of nine instruments examined included instrument items specifically designed to evaluate the impact of leadership on patient safety culture (Cala, Bracken, Kinney, & Weeks, 2005).

The perception of safety culture in hospitals is important in many ways. First, safety culture is an indicator of the experiences, beliefs, and attitudes of staff providing care about the extent of safety in their area. These beliefs and attitudes influence behaviors that create and shape patient safety culture. One study demonstrated that nurses' perceptions of their manager's leadership practices influenced their behaviors (Patrick, Laschinger, Wong, & Finegan, 2011). There is also evidence that supports the perception of care as a moderating effect on actual

outcomes. Yen and Lo found that perceived quality of nursing care had a moderate effect on patients' comfort (Yen & Lo, 2004).

It is also useful to understand patient safety perception with regards to the likelihood that people are engaged and will act upon safety issues. Chaboyer and colleagues found that there were discrepancies between staff and leader's perception of safety in Australian intensive care units. Nurse leaders were more likely to rate patient safety higher than front line staff. They concluded that this discrepancy might be reflective of leaders' participation in safety processes (Chaboyer et al., 2013). This discrepancy has been found in other studies. Feng and colleagues also found that staff nurses score patient safety culture significantly lower than their managers (Feng, Acord, Cheng, Zeng, & Song, 2011). It is concerning that leaders may have a more positive opinion of patient safety than their staff leading to difficulty appreciating and acting upon safety concerns of front line staff

Patient safety culture survey studies report similar findings with regard to the lowest ranking patient safety items. Frequently, working conditions and hospital leadership are among the lowest scoring items in regards to staff's concerns about patient safety (Chaboyer et al., 2013). Wagner and colleagues conducted a comparison of 45 patient safety culture surveys from United States, Netherland, and Taiwan hospitals and found that communication around handoffs' and transitions of care was the lowest common scoring item between the countries (Wagner, Smits, Sorra, & Huang, 2013). El-Jardali and colleagues surveyed sixty-eight hospitals with over six thousand respondents and also found that leadership, communication, staffing, and event reporting were significant predictors of patient safety culture (El-Jardali, Dimassi, Jamal, Jaafar, & Hemadeh, 2011).

## Summary

Findings from the literature clearly support the notion that nurse leaders significantly impact patient safety in acute care settings. There is a growing body of literature examining the roles of nurses and nurse leaders in patient safety work. Almost all of the nursing research in this field is currently cross-sectional in nature and often relies on perceptual and self-reported indicators.

Nurse leaders have a significant ability to promote and improve patient safety that influences patient safety structure, process, and outcomes. Nurse leaders primarily influence patient safety structure by hiring and developing nurses that have higher levels of education, skill, and competency leading to improved patient care outcomes. Nurse leaders influence patient safety processes through the use of transformational and authentic leadership styles that build the types of leader-follower relationships that foster patient safety. Nursing leaders also influence safety process by demonstrating support for improvement, ensuring appropriate work environments, and creating conditions in which error is understood and learning from error results in improvement. Nursing leaders influence nurse-sensitive patient outcomes primarily through indirect moderating factors such as work environment and perceived safety culture. Nurse leadership style has been associated with the reduction of adverse events and improvements in patient safety. The literature is unclear how nursing leadership style or leadership traits manifest themselves in leadership practice in a way that those behaviors can be developed into replicable error prevention strategies. Leadership involves a dynamic and multifactorial interdependent relationship between the leader and the follower (Kean & Haycock-Stuart, 2011). Economic conditions are pressing hospitals to achieve better results with fewer resources. Nurse leaders are being expected to produce measurable improvements in

patient safety and quality and simultaneously take on larger scopes of responsibility. Westphal reported a recent 30 percent decline in the number of nurse leaders over a 16-year period of time (Westphal, 2012). It is becoming more important for nurse leaders to clearly understand the best leadership practices that deliver the highest levels of patient safety performance.

## **Chapter 3**

### **Methods**

The purpose of this study was to explore the relationships between nurse leader characteristics (nurse leader patient safety behavior, educational level, and experience level) and patient safety (perceived patient safety culture, Patient safety grade, Number of patient safety events reported, and patient safety event rates) in the acute care hospital. The objective of this study was to more clearly describe the types of observable, actionable, behaviors that are perceived as most beneficial to patient safety. This study utilized a cross-sectional design with retrospective data analysis of pre-existing survey and demographical data of staff in nursing units within tertiary and community hospitals covering a large geographical region in Eastern North Carolina.

### **Population and Sample**

The study was conducted with staff in an eight-hospital health system in Eastern North Carolina. The health system included one 900 bed tertiary medical center and seven rural community hospitals geographically serving twenty-nine rural North Carolina counties. The health system employed 12,000 staff. This study focused on data from inpatient nursing units within the health system. In March of 2014, 7063 staff members voluntarily completed the Hospital Survey on Patient Safety Culture (HSOPSC). The survey response rate was 67% for all employees and 82% for full time employees. The sample included 42 nursing units within the patient safety culture survey. Inpatient nursing units were the most appropriate areas to focus this study due to the nature of the relationships between nurse-sensitive patient safety events and the interest in understanding nurse leader behavior on those units. Patient safety outcomes data and leadership demographical information for these nursing units was also collected.

## **Protection of Human Subjects**

The research proposal was approved as an exempt research study by the East Carolina University Institutional Review Board (IRB) prior to beginning the data collection (Appendix A). The study involved pre-existing data in which all identifiable information was removed. No patient or staff identifiers were collected as part of the study. In order to blind the identity of staff and leaders, the primary investigator received pre-existing data in which the name of the nursing unit and nurse leader was de-identified. As part of the IRB review process, permission was obtained from senior nursing leadership at each of the eight hospitals included in the study.

## **Instruments**

### **Hospital Survey on Patient Safety Culture (HSOPSC)**

The eight research sites conduct the Hospital Survey on Patient Safety Culture (HSOPSC) every two years (Appendix B). The most recent assessment occurred in March of 2014. The creation of the HSOPSC was funded by the Agency for Healthcare Research and Quality (AHRQ) to determine patient safety culture in hospitals. In 2004, the AHRQ released the instrument after satisfactory psychometric analysis was completed. The final instrument included forty-two items in twelve dimensions using five-point Likert-scale responses ranging from strongly disagree to strongly agree and never to always. The instrument is administered on paper or electronically and survey respondents anonymously self-report their perception on a range of statements pertaining to patient safety. Additional demographical information is solicited such as years of work experience, position type, involvement in direct care, and hours worked per week. The instrument, training materials, and guides for use are made freely available by the AHRQ on their website (Agency for Healthcare Research and Quality [AHRQ], n.d.). Hospitals are encouraged to voluntarily submit their data and the AHRQ has published a comparative

aggregate summary of the data for benchmarking purposes since 2008. Participating hospitals typically conduct the survey every one to two years and the average response rate is fifty-three percent. Intended participants include all hospital staff including staff not involved in direct patient care. The expressed interest in having all staff complete the survey flows from the AHRQ's position that all staff influence organizational patient safety culture. As of 2012 there were 1128 hospitals representing 567,703 respondents in the database (AHRQ, 2012). Analysis of the survey data is conducted by examining mean scores or percent of positive responses for individual item or subscale comparisons. Stratification of data can be accomplished using several demographical and categorical responses included in the survey.

**Survey development.** Researchers under contract with the AHRQ began the HSOPSC instrument development by conducting a literature review and examining psychometric properties of organizational culture surveys in healthcare and other industries. The pilot version of the HSOPSC was derived from the analysis of two existing healthcare safety culture instruments. The Medical Event Reporting System for Transfusion Medicine (MERS-TM) and the Veterans Health Administration Patient Safety Questionnaire had a combined 7106 existing respondents from 213 hospitals. Initial psychometric analysis of those two instruments was used to develop the resulting pilot version of the HSOPSC (Sorra & Nieva, 2004).

Cognitive interviews were conducted to determine content validity resulting in a pilot survey included seventy-nine items measuring fourteen safety culture dimensions. Twenty-one hospitals were purposefully selected for the original pilot to obtain data from a large geographic area and across hospitals with different sizes and different academic affiliations. Sampling methods varied across the twenty-one facilities and included both random and purposeful sampling to achieve an adequate mixture of staff positions and responsibilities. The pilot survey



resulted in a twenty-nine percent response rate or 1437 respondents (AHRQ users guide appendix A and B, 2004; Sorra & Nieva 2004).

**Identification of subscale dimensions.** Exploratory factor analysis using principle component extraction and varimax rotation was used to initially explore dimensional components and construct validity. Researchers initially found fourteen components with Eigenvalues greater than 1 explaining 64.5 percent of the cumulative variance. Confirmatory factor analysis was subsequently conducted and researchers eliminated items not significantly loading on the twelve factors resulting in a final survey with forty-two items measuring twelve dimensions meeting goodness of fit indices (AHRQ users guide appendix A and B, 2004; Sorra & Nieva, 2004). The final twelve dimensions included ten safety culture dimensions and two outcome dimensions. There are two additional single item outcome variables measuring number of safety events self-reported in the previous twelve months and Patient safety grade rated on a five point scale from A to E.

Table 1 outlines the fourteen perceptual measures included in the HSOCP. There are two dimensions specifically measuring leadership's role in patient safety. The Management support for patient safety dimension is a three-item measure of organizational level patient safety leadership while the supervisor/manager expectations and actions promoting patient safety dimension is a four item measure of unit level patient safety leadership actions. Four of the measures are considered to be outcome measures. These include Frequency of event reporting, Overall perception of patient safety, Patient safety grade, and Number of events reported. The Frequency of events reported dimension uses three items that ask about how often events are reported based on the potential harm associated with the event while number of events reported asks the respondent to choose a category indicating how many events they have reported in the

previous twelve months. The Overall perception of patient safety dimension combines four items measuring the perception of patient safety while the Patient safety grade asks the respondent to choose a letter grade that is indicative of the overall safety of their work unit (AHRQ 2015).

**Reliability and validity.** Internal consistency for the HOPSC was originally measured using item correlations between resulting twelve dimensions. All twelve dimensions were determined to have acceptable reliability with Cronbach alpha reliability coefficients ranging from .63 to .84 (Sorra & Nieva, 2004). Reliability was measured two ways. First, mean composite scores between dimensions were correlated to ensure that they were moderately related. All inter-dimensional correlations ranged from .23 to .60 indicating that they had moderate relationships without measuring the identical constructs. Next, the researchers compared correlations between the dimensions and four single survey items intended to measure singular construct. The outcome variables included Overall perception of safety, Patient safety grade, Frequency of event reporting, and Number of events reported in the last year. All of the inter-correlations were high with the exception of number of events reported in the last year indicating satisfactory construct validity. Finally one-way analysis of variance (ANOVA) was conducted on the twelve safety culture dimensions within and between hospitals to determine the similarity and differences in responses. The results satisfactorily indicated that the instrument measured similarly within and differently between hospitals indicating the instruments ability to differentiate patient safety culture performance characteristics between groups (Sorra & Nieva, 2004).

Table 1

*Hospital Survey on Patient Safety Culture (HSOPSC) Dimensions, Items, and Scales*

Dimension	Number of Items	Scale
Teamwork within units	4	5 choices, strongly disagree to strongly Agree
Supervisor/manager expectations and actions promoting patient safety	4	5 choices, strongly disagree to strongly Agree
Organizational learning and continuous improvement	3	5 choices, strongly disagree to strongly Agree
Management support for patient safety	3	5 choices, strongly disagree to strongly Agree
Overall perception of patient safety	4	5 choices, strongly disagree to strongly Agree
Feedback and communication about error	3	5 choices, never to always
Communication openness	3	5 choices, never to always
Frequency of events reported	3	5 choices, never to always
Teamwork across units	4	5 choices, strongly disagree to strongly Agree
Staffing	4	5 choices, strongly disagree to strongly Agree
Handoffs and transitions	4	5 choices, strongly disagree to strongly Agree
Non-punitive response to error	3	5 choices, strongly disagree to strongly Agree
Patient safety grade	1	5 choices, A (excellent) to E (failing)
Number of events reported	1	6 choices, 1-2 events to 21 or more events

**Current adoption and subsequent validation of the survey.** The HSOPSC has demonstrated stability, internal consistency, and overall results in several languages including Chinese, Japanese, Taiwanese, Dutch, Turkish, and Farsi. (Bodur & Flitz, 2010; Feng et al., 2011; Moghri, et al., 2012; Shinya et al., 2011; Smits, Christiaans-Dingelhoff, Wanger, Van Der Wal, & Groenewegen, 2008; Wagner et al., 2013). A follow up psychometric analysis using three hospitals and 454 respondents was performed in 2009 supporting the instruments validity and reliability for all the dimensions except staffing (Blegan et al., 2009). Another psychometric analysis using 2,267 hospitals and 50,513 respondents was published in 2010 indicating continued support for the original twelve factor model (Sorra & Dyer, 2010). Several studies have been published using the survey to describe safety culture in hospitals. In a review of quantitative studies of healthcare safety culture the HSOPSC survey was determined to have met more psychometric criteria than other similar instruments due to its repeated use and stable internal structure (Flin, Burns, Mearns, Yule, & Robertson, 2006). Reported studies often correlate study items and subscale dimensions with inter-study outcomes measures. In one study researchers used bivariate correlations finding strong relationships between patient safety culture dimensions and self-reported survey outcomes measures such as overall safety grade (El-Jardali, et al., 2011). Most published studies involving the HSOPSC are similar in methods correlating dimensions to existing self-reported outcomes variables internally present in the survey. The HSOPSC lacks sufficiently published studies assessing objective criterion-related validity. Future studies examining the relationships between HSOPSC self-reported outcome variables and measurable patient outcomes would be beneficial for determining criterion-related validity (Sorra & Dyer, 2010).

## **Investigator Developed Instrument Measuring Leader Patient Safety Behavior**

In 2006, the study sites implemented education and expectations for all leaders to use four key leadership practices regularly. They termed these four practices the “Leadership Safety Bundle”. The daily leadership practices include conducting a huddle to check in on safety practices, rounding to ensure safety habits are being followed, fairly managing performance, and using 90 day plans to prioritize work and drive results. The first three concepts involve observable leader behavior and therefore served as the basis for five additional investigator developed items included in the March 2014 AHRQ patient safety culture survey at the study sites. At the time of the survey, leadership at the health system wished to explore the perceptions of staff regarding their leader’s use of the leadership bundle. The development of the five additional questions satisfied mutually beneficial goals between the investigator and the health system for the purpose of identifying observable leadership behaviors that were not currently assessed in the AHRQ patient safety culture survey. Five questions were developed measuring concepts within the leadership safety behavior bundle (Appendix C). These five questions were tested using ten nurses and nurse leaders to ensure clarity and to determine face validity. The five leadership patient safety behavior items were included into the Hospital Survey on Patient Safety Culture during the March 2014 survey period at the study sites.

## **Hospital Patient Safety Event Database**

The study sites utilized a common web-based database in which front line staff and leaders entered patient safety events. Safety events include a commonly used harm level taxonomy that was recorded with every safety event entry. Safety events included those that never reached the patient (near misses) and those that reached the patient and required

intervention. The harm scores ranged from 1 to 9 with 1 being an unsafe condition that did not affect the patient and 9 being death. Scores above 5 indicated the presence of physical harm related to the event. Safety events are further categorized by the event type (falls, medication errors, delays of treatment, pressure ulcers, etc.).

At the time of the study more than 67,000 events had been entered into the event database since the study sites began using the database in November of 2007. Additionally, all events recorded in the system go through a review process by leadership, risk management, and the quality office to ensure that the event harm score has been reported correctly. This database is used as a starting point for additional investigation of events and the development of safety performance improvement. A subset of this data is categorized for event reporting on the hospital's quality scorecard. All safety event data from the 42 included inpatient nursing units was collected from one year prior to the survey completion. The patient safety event data was aggregated at the unit level and did not contain patient or staff names or any identifiable information.

### **Event Rates Based on Volume**

The number of patient days for each unit was obtained from hospital administrative data. The administrative data included inpatient days and adjusted inpatient days which included the outpatient volume present on the inpatient unit. Adjusted patient days was used to ensure that all patients present on the units were accounted for in rate basing the patient safety events. Patient safety events were divided by adjusted patient days to obtain an event rate in order to adjust for differing unit patient volumes. The rate was then multiplied by 10,000 to determine the rate based events per 10,000 adjusted patient days for each unit included in the study.

## **Nurse Leader Educational Level and Experience**

The study sites maintain documentation of employee demographical information including years of experience, certification, and educational level using a human resource database. This data was blinded so that the unit name, nor the nurse leaders name and identifiable information were provided. The data was utilized to determine the nurse leader's educational and experience level as well as their level of certification. Table 2 summarizes the types of data and data sources used for this study.

### **Inclusion and Exclusion Criteria**

Units that had less than a 60% response rate on the HSOPSC were excluded to ensure an adequate unit level representation of patient safety culture perceptions. Kramer and colleagues suggests that a response rate of at least 40% yields reliable data from nursing units (Kramer, Schmalenberg, Brewer, Verran, & Keller-Unger, 2009). The research focused primarily on the responses of registered nurses perceptions of unit patient safety culture but also included other unit staff such as nursing assistants, and unit secretaries that constitute the care team in which the nurse leader is responsible. HSOPSC responses from staff other than nurses, nursing assistants, and unit secretaries were excluded from the study.

Nursing units with leaders with less than one year of leadership experience on that unit were also excluded. This exclusion was intended to ensure that the patient safety event data collection periods matched the time period that the nurse leader was involved in leading the nursing unit.

Table 2

*Summary of Research Variables*

Theoretical Dimension	Variable	Definition	Data Source
Structural Variables	Leadership Experience	# Years current unit # Years total	Human Resource Database
	Leadership Educational Level	Highest nursing educational level	Human Resource Database
Process Variables	Perceived Leadership Safety Behavior	Supervisor/Manager Expectations Subscale Score	HSOPSC
		Leader Patient Safety Behavior	Investigator Developed Leader Patient Safety Behavior Items (5) included during HSOPSC survey
Outcomes Variables	Patient Safety Events	Rate of reported events	Hospital Patient Safety Event Database
		Self-reported number of reported safety events	HSOPSC
		Patient Safety Overall Rating	HSOPSC
		Patient Safety Grade	HSOPSC
		Patient Safety Culture Dimensions	HSOPSC



## **Data Collection Procedure**

Data collection and analysis began after Institutional Review Board and hospital organizational approval. Data was obtained from three pre-existing sources of hospital data. The data sources included a human resource database, patient safety events database, and results from the most recently completed HSOPSC. Additionally each units adjusted patient volume data was obtained for the year preceding the HSOPSC. All data was be collected from the same period of time extending from one year from the start of the most recent HSOPSC survey.

All of the data was initially delivered to a person identified by the health system to assist in blinding the data. A data key was created linking the data for each nursing unit while allowing the unit and leader's names to be de-identified. The final key only contained a number for each unit and whether that unit was a community hospital unit or a tertiary hospital unit. The data was then delivered to the investigator and entered into SPSS version 22 in a way that linked the three sets of data together into one set of data that could be used to analyze respondent and unit level variables. Negatively worded items on the HSOPSC were recoded to ensure directional uniformity and subscale dimension scores for each of the HSOPSC dimensions were computed. Variables were created to calculate patient safety event rates per 10,000 adjusted patient days. Filters were created to select the nursing unit staff.

## **Data Analysis**

Scores for each HSOPSC item, patient safety event, and nurse leadership educational and experience level were collected at the nursing unit level for all nursing units included in the analysis. The following analytical methods were used to explore the research questions.

## **Research Question 1**

What are the characteristics of the instruments, nursing units, nurse leaders, staff, perceived patient safety culture, and reported safety events within the sample?

Multiple data sets were compiled to create one set of data measuring cross-sectional variables associated with the one year study time period of March 2013 to February 2014. The data existed in two levels. One level involved the individual respondent level data associated with the AHRQ Patient Safety Culture Survey conducted in March of 2014. The other level of data involved the unit level information including safety event rates and leader demographics occurring one year prior to the administration of the Patient Safety Culture Survey in March of 2014. Forty-seven nursing units across eight hospitals were identified in the study. Five nursing units either had no currently identified nursing leader or did not have a nursing leader with at least one year of experience on that unit at the time of the Patient Safety Culture Survey. These five units were excluded in the analysis leaving forty-two nursing units across eight hospitals that were included in the final analysis. In March of 2014, 7063 staff members voluntarily completed the HSOPSC patient safety culture survey. The survey response rate was 67% for all employees and 82% for full time employees. The survey included 1862 total respondents in the 42 units. The respondents were then filtered to include only the traditional nursing unit staff that report to the nursing unit leader including nurses, nursing assistants and unit secretaries. The final sample yielded 1460 staff in 42 nursing units across eight hospitals. Each of the 42 units had a response rate greater than 60% and collectively had a response rate of 78.4%.

Each of the 42 instrument items along with the investigator added leaders safety behavior items were entered into SPSS version 22. Five point scale responses ranged from never to always and from strongly disagree to strongly agree. Negatively worded questions were recoded to

appropriately reverse the scale. “Patient safety grade” was converted from a letter grade to a five point numeric scale to approximate the other five-point Likert-type scales with higher scores being desirable. Internal consistency of the instrument was evaluated using Cronbach’s alpha.

Descriptive statistics were used to analyze the sample characteristics and response rates. Mean scores and percent positive responses were computed for HSOPSC subscale items and used to explore overall patient safety culture findings from the survey. Percentage of positive responses were determined by calculating the percentage of respondents rating each HSOPSC item the most positive two Likert-type responses. The most positive responses were either agree and strongly agree or most of the time and always. Negatively worded items were reverse coded so that disagreement (strongly disagree/disagree and never/rarely) indicated positive responses. The total number of positive responses for all items in each dimension were divided by the total number of responses in each dimension to calculate each dimensions total percent positive response. Frequencies, percentages, standard deviations, and ranges were used to examine nurse leader and staff qualifications. Inter-item correlations were conducted to examine the relationships between the five investigator added leader patient safety behavior items.

## **Research Question 2**

What are the relationships among nurse leader characteristics (nurse leader patient safety behavior, educational level, and experience level) and patient safety culture (patient safety culture survey dimensions, Overall perception of patient safety, Frequency of events reported, and Patient safety grade)?

Average mean scores for each of the HSOPSC dimensions, Patient safety grade, and leader patient safety behavior were calculated for each unit. Correlations were then conducted to determine the relationships between HSOPSC dimensions mean scores. Two primary dimensions

within the Hospital Patient Safety Culture Survey measured the perception of unit level leader safety behavior. One was the supervisor/manager expectations for safety dimension and the other was the investigator added leader safety behavior dimension mean score computed from responses on five items assessing the perception that the unit leader never, rarely, sometimes, most of the time, and always conducts patient safety processes. Mean scores for these two dimensions were correlated along with the remaining HSOPSC dimension mean scores and Patient safety grade. Additionally, inter-item correlation from each individual item within these two dimensions was conducted to explore the relationships between unit average mean scores for each item directly pertaining to unit leadership's role in patient safety. Results were presented using correlation matrices that display the correlative values and statistical significances of the correlations.

Nurse leaders were separated into two groups based on their level of education. T-tests were conducted exploring the differences in HSOPSC dimension mean scores and Patient safety grade between units led by nurse leaders with associate degree or lesser and baccalaureate degree and higher education. Correlations were conducted examining the relationships between nurse leader experience level and HSOPSC patient safety culture dimensions along with Patient safety grade.

### **Research Question 3**

What are the relationships among nurse leader characteristics (nurse leader patient safety behavior, educational level, and experience level) and patient safety events (self-reported number of patient safety events and documented unit level patient safety event rates)?

The relationship between nurse leader characteristics and patient safety events was examined using two levels of data. Unit safety events were explored using respondent level data

and unit level data. This approach was necessary because the self-reported number of safety events item was a categorical response with ranges for each category and could not be recoded into a continuous variable. The rate of documented safety events however was recorded at the unit level as a continuous variable. Respondents were separated into three groups based on the frequency in which they reported safety events over the previous twelve months. Analysis of variance was used to analyze the differences in HSOPSC dimension, Patient safety grade, and leader safety behavior mean scores between the three groups and presented in an ANOVA table. Levene's test of equity of variance revealed that the variance of mean scores between the three groups were not homogeneous. Therefore the Welch statistic was used to report the significance level to account for the unequal variances. Post-hoc comparisons were conducted using Tukey HSD to determine which of the mean differences were significant. Eta squared calculations were used to examine the effect sizes between the groups for each dimension. Correlations were conducted to determine the relationships between documented patient safety event rates, HSOPSC dimensions, Patient safety grade, and leader patient safety behavior.

Nurse leaders were divided into groups based on their educational level. T-tests were conducted examining the differences in documented unit patient safety event rates between leaders with baccalaureate and higher and lesser than baccalaureate degree educational preparation. Correlations were conducted to examine the relationships between documented unit patient safety event rates and nurse leader experience level.

#### **Research Question 4**

What are the differences in perceptions of patient safety culture between respondents and units based on the extent of leader patient safety behaviors?

The purpose of this research question was to determine if there were differences in perceived patient safety culture between units with more or less consistently performed leader patient safety activity. The extent of leader patient safety behavior was analyzed at the unit ( $N=42$ ) and respondent level ( $N=1460$ ) using several types of analysis. The different types of analysis used were chosen to explore and present the associations with and differences between higher and lower perceived frequencies of leader safety rounding with other variables measuring patient safety culture.

Units were categorized by the percent positive value (most of the time or always) as indicated by respondents on the five leader patient safety behavior items. Units were then divided into two groups, those in which 80% or more respondents rated perceived leader behavior as occurring most of the time or always and those with less than 80% of respondents rating leader behavior as occurring most of the time or always.

Respondents were also divided into those that indicated leader patient safety behavior occurred most of the time or always and those that indicated that leader patient safety behavior occurred never to sometimes. Patient safety culture dimension mean scores were compared using T-test for both of the analysis. Eta squared was calculated for to determine the effect size for differences in each HSOPSC dimension including Patient safety grade.

Correlations were conducted comparing the associations between mean scores indicating leader rounding behavior and mean patient safety culture scores in both tertiary and community nursing units. Chi-square was used to determine the presence of significant differences in the

proportion of respondents that rated Patient safety grade an A or B compared to the proportion that rated leader rounding as occurring most of the time or always.

Finally, chi-square analysis was conducted to determine the differences between unit leader rounding and other leader behavior stressed in the HSOPSC survey. Percent positive responses on individual leader safety behavior items in the HSOPSC were correlated with respondents based on their agreement that leader rounding occurred most of the time or always. Table 3 describes the statistical plan related to variables associated with each research question.

Table 3

*Summary of Research Questions, Variables, and Statistical Analysis*

Research questions	Variables	Data sources	Statistical plan
Question 1: What are the characteristics of the instruments, nursing units, unit level patient safety culture, safety events, nurse leader, and staff qualifications within the sample?	Patient safety culture	HSOPSC	Means, ranges, frequencies, percentages, standard deviations, mean score correlations, and Cronbach's alpha
	Patient safety events	Hospital patient safety event database	
	Nurse leader qualifications	Human resource database: Nurse leader educational and experience level	
	Staff qualifications	HSOPSC: Staff experience level and position	
	Unit patient volume	HSOPSC: Direct and indirect patient care roles Hospital volume data: Unit adjusted patient days	Used to create volume adjusted patient event rates
Question 2: What are the relationships among nurse leader characteristics and patient safety culture?	Nurse leader characteristics	Survey: Leader patient safety behavior	Mean scores and inter-item correlations
		Human Resource Database: Nurse leader educational and experience level	T-tests and correlations
	Patient safety culture	HSOPSC: All dimensions, Overall perception of safety, Frequency of events reported, and Patient safety grade	Mean scores and correlations

Table continued on next page



Table 3 – continued

*Summary of Research Questions, Variables, and Statistical Analysis*

Research questions	Variables	Data sources	Statistical plan
Question 3: What are the relationships among nurse leader characteristics and patient safety events?	Nurse leader characteristics	Survey: Leader patient safety behavior	Mean scores and mean score correlations
		Human resource database: Nurse leader educational and experience level	Analysis of variance and correlations
	Patient safety events	HSOPSC: Self-reported patient safety events	Analysis of variance and correlations
		Documented unit safety event rates	Correlations
What are the differences in perceptions of patient safety culture between respondents and units based on the extent of leader patient safety behaviors?	Leader patient safety behavior	HSOPSC: All survey dimensions and patient safety grade	Mean scores, t-tests, correlations, and Chi-square
		Survey: Leader patient safety behavior (5 investigator added items)	

**Methodological Limitations**

Methods in this study had several limitations. First, the study was cross-sectional and non-experimental limiting the understanding of causality between study variables. The study also utilized pre-existing data which limited the study to the parameters of previously collected information.

## Chapter IV

### Findings

This chapter contains descriptions of the sample and the results of statistical analysis for each of the four research questions in this study. Analyses that involve survey respondent characteristics are conducted using individual respondent level data. These include nurses, nursing assistants, and nursing unit secretaries responses on the safety culture survey ( $N = 1460$ ). Analyses that represent unit level characteristics are conducted using unit level data from the 42 units included in the study. Data were compiled from various sources into one database using SPSS version 22. Data included respondent level data from the AHRQ Hospital Survey on Patient Safety Culture and unit level data from the hospital patient safety event database. Additional unit level data was also collected on nurse educational and experience level.

#### Research Question 1

What are the characteristics of the instruments, nursing units, nurse leaders, staff, perceived safety culture, and safety event reporting within the sample?

**Unit level characteristics.** Table 4 describes the characteristics of the 42 nursing units included in the final sample. . There were equal numbers of community hospital and tertiary hospital units. On average, tertiary nursing units had more staff than community hospital units creating a larger overall sample of staff that worked in the tertiary setting compared to those in the community setting. General medicine units and intensive care units (ICU) comprised the majority of unit types, however other units such as obstetrics, surgery, pediatrics, and behavioral health were also included in the sample. Eleven percent of respondents indicated that they were in a non-specified unit.

Table 4

*Characteristics of Nursing Units (N = 42)*

Characteristic	<i>n</i>	%	<i>M</i>	<i>SD</i>	<i>Range</i>
Tertiary (academic) hospital	21	50.0			
Survey participant sample	1111	68.6			
Average unit staff size			52.9	19.5	12.0-97.0
Community (rural) hospital	21	50.0			
Survey participant sample	349	31.4			
Average unit staff size			16.6	5.47	11.0-28.0
Type of nursing unit					
Medical nursing units	13	31.0			
Intensive care nursing units	11	26.2			
Obstetric nursing units	6	14.2			
Surgical nursing units	3	7.1			
Behavioral health nursing units	2	4.8			
Rehabilitation nursing units	1	2.4			
Pediatric nursing units	1	2.4			
Non-specified (other) nursing units	5	11.9			
Unit nurse leader education					
PhD	1	2.4			
MSN	10	23.8			
BSN	15	35.7			
ADN	15	35.7			
LPN/Diploma	1	2.4			
Leaders with at least one certification	14	33.0			
Nursing unit leader experience					
Overall professional experience (years)			22.3	8.49	5.6-42.0
Experience on the study unit (years)			6.5	6.56	1.1-34.5

The majority of nursing leaders had a baccalaureate or higher degree. One third of nursing unit leaders had at least one specialty certification. Leaders of the 42 selected units had at least one year of unit experience and an average of 6 years of total unit experience. The leaders of units averaged 22 years of nursing professional experience.

**Respondent level characteristics.** Table 5 summarizes the individual respondent characteristics within the 42 selected nursing units. Forty-two inpatient nursing units and 1460 respondents from unit staff who completed the HSOPSC survey were included in the study. Three quarters of staff respondents were registered nurses. Other staff included staff who typically report to the nursing unit leader such as unit secretaries and nursing assistants. The majority of participants had five years of professional, hospital, and unit years of service. Ninety-five percent of respondents indicated that they had direct interaction with patients.

Table 5

*Characteristics of Survey Respondents (N = 1460)*

Characteristic	<i>n</i>	%
Staff position		
Registered nurse	1108	75.9
Licensed practical nurse	12	0.8
Unit secretary	87	6.0
Nursing assistant	253	17.3
Staff years of service within current profession		
Less than one year	149	10.2
1 to 5 years	538	36.8
6 to 10 years	315	21.6
11 to 15 years	151	10.3
16 to 20 years	121	8.3
21 years or more	175	12.0
Staff years of service at the hospital		
Less than one year	191	13.1
1 to 5 years	608	41.6
6 to 10 years	321	22.0
11 to 15 years	147	10.0
16 to 20 years	90	6.2
21 years or more	92	6.4
Staff years of service on the nursing unit		
Less than one year	236	16.2
1 to 5 years	690	47.3
6 to 10 years	292	20.0
11 to 15 years	106	7.3
16 to 20 years	64	4.4
21 years or more	62	4.2
Staff with direct interaction with patients	1388	94.9

**Patient safety culture instrument dimensions, internal consistency, and characteristics.** Table 6 describes the results of Cronbach's alpha for each of the twelve dimensions for the study sample compared to published results. The current study sample was analyzed to determine internal consistency. Individual responses from 1460 nursing unit staff across 42 nursing units were entered into SPSS version 22. Individual patient safety culture survey instrument scores for the twelve survey dimensions, overall safety grade, and number of events reported were computed for each survey respondent. Additionally, five investigator-authored questions were also used to create the Leader Safety Behavior Subscale score for each respondent. Internal consistency for the study sample was established using Cronach's alpha for each survey dimension including the investigator added Leader Safety Behavior Dimension. All of the subscale scores demonstrated adequate internal consistency with Cronbach's alpha results between 0.65 and 0.89. All of the dimensions except two demonstrated equal to or better than the originally published internal consistency by the AHRQ (AHRQ, users guide appendix A and B, 2004). Teamwork across units and Management support for patient safety had slightly lower Cronbach alpha results compared to the originally published figures. Only the dimension involving staffing yielded a Cronbach's alpha level less than the desired 0.7 however it was slightly higher in this sample compared to published results that have been determined acceptable (Pallant, 2007; AHRQ, users guide appendix A and B, 2004). The 5 investigator added leader safety behavior questions also yielded acceptable internal consistency ( $\alpha = 0.93$ ).

Table 6

*Hospital Survey on Patient Safety Culture (HSOPSC) Internal Consistency (N=1460)*

Dimension	No. of items	Cronbach's $\alpha$	
		Current Sample (N=1460)	Published Results* (N=1437)
Teamwork Within Units	4	.89	.74
Supervisor Manager Expectations & Actions Promoting Safety	4	.88	.75
Organizational Learning	3	.81	.76
Management Support for Patient Safety	3	.81	.83
Overall Perceptions of Patient Safety	4	.75	.74
Feedback and Communication About Error	3	.85	.78
Communication Openness	3	.75	.72
Frequency of Events Reported	3	.89	.84
Teamwork Across Units	4	.78	.80
Staffing	4	.65	.63
Handoffs and Transitions	4	.82	.80
Non-punitive Response to Errors	3	.83	.79
Leader Safety Behavior Mean Score (added items)	5	.93	—

\* *Note:* Published results from AHRQ, users guide appendix A and B, 2004.

Table 7 provides mean scores for the 42 units on the Hospital Patient Safety Culture Survey dimension and five investigator added leader safety behavior items. Table 7 also includes the average positive percentage for each dimension representing the average percent of staff that scored that dimension for the two most positive Likert-scale responses for items in each dimension (agree and strongly agree or most of the time and always). Patient safety culture dimension scores ranged from 3.30 to 3.97 on a possible five point scale. The safety culture dimensions with the lowest means scores were Non-punitive response to error, Handoffs and transitions, Staffing, and Teamwork across units. The dimensions with the highest means scores were the combined investigator added leader patient safety behaviors, Frequency of events reported, and Teamwork within units. Similarly Non-punitive response to error, Handoffs and transitions, and Staffing dimensions had the lowest percent positive scores. Teamwork within units, Supervisor/manager expectations for safety, and Organizational learning had the highest percent positive scores amongst the 42 nursing units in the sample.

**Investigator added leader patient safety behavior characteristics.** Table 8 summarizes the mean scores and percent positive responses (most of the time and almost always) for the five item measuring leader safety behavior items amongst the 42 units included in the sample. Manager conducting safety huddles and addressing issues fairly had the highest percent positive responses. Manager making daily safety rounds and identifying high risk patient had the lowest percent positive scoring. The overall unit average percent positive responses for the five leader patient safety behavior items combined was 69.9%.



Table 7

*Hospital Survey on Patient Safety Culture Dimension Mean Scores (N = 42 Units)*

Dimension/variable	<i>Positive Responses</i> %	<i>M</i>	<i>SD</i>	<i>Range</i>
Teamwork within units	80.2	3.90	0.38	3.05-4.54
Supervisor/ manager expectations and actions promoting safety	75.3	3.88	0.35	3.07-4.65
Organizational learning	75.8	3.81	0.27	3.17-4.28
Management support for patient safety	66.5	3.59	0.31	2.83-4.23
Overall perceptions of patient safety	61.7	3.48	0.29	2.81-4.02
Feedback and communication about error	66.6	3.82	0.32	3.14-4.49
Communication openness	59.8	3.61	0.30	2.87-4.19
Frequency of events reported	70.2	3.92	0.26	3.24-4.53
Teamwork across units	57.9	3.42	0.24	2.75-3.84
Staffing	56.2	3.37	0.36	2.60-3.86
Handoffs and transitions	52.5	3.30	0.29	2.52-3.89
Non-punitive response to error	42.2	3.09	0.31	2.52-3.71
Patient safety grade*	72.8	3.85	0.37	3.12-4.43
Leader patient safety behavior	69.9	3.97	0.42	2.87-4.70

*Note:* \* Patient safety grade coded from 1-5 with E being 1 and A being 5

Table 8

*Investigator Added Leader Patient Safety Behavior Item Percent Positive and Mean Scores  
(N = 42 Units)*

Measure	<i>Positive Responses %</i>	<i>M</i>	<i>SD</i>	<i>Range</i>
My department manager ensures staff conduct daily safety huddles	76.1	4.14	0.43	3.08-4.93
My department manager makes daily safety rounds that include spending time with patients and staff discussing patient safety	59.6	3.77	0.50	2.63-4.67
During leadership rounds, my department manager helps identify high-risk patients and safety priorities	66.4	3.95	0.46	2.64-4.70
During leadership rounds, my department manager discusses safety habits that improve safety and reduce error	68.4	3.96	0.44	2.71-4.69
When mistakes or safety events occur, my department manager addresses the issue fairly considering both system and human issues that led to error	75.4	4.08	0.43	3.07-4.81
Leader patient safety behavior five item dimension	69.9	3.97	0.42	2.87-4.70

Table 9 describes inter-correlations between the five leader behavior survey items. Inter-item correlations between the five investigator added leader behavior items were statistically significant. The average inter-item correlation was 0.73 and all of the items demonstrated strong inter-item correlation. The lowest correlation occurred between the perceptions of addressing issues fairly and ensuring daily safety huddles and the strongest correlation was between the manager discussing safety habits and the manager identifying high-risk patients.

Table 9

*Intercorrelations of Leader Patient Safety Behavior Items (N = 42)*

Item	1	2	3	4	5
1. My department manager ensures staff conduct daily safety huddles	—				
2. My department manager makes daily safety rounds that include spending time with patients and staff discussing patient safety	.68	—			
3. During leadership rounds, my department manager helps identify high-risk patients and safety priorities	.74	.93	—		
4. During leadership rounds, my department manager discusses safety habits that improve safety and reduce error	.79	.92	.98	—	
5. When mistakes or safety events occur, my department manager addresses the issue fairly considering both system and human issues that led to error	.67	.87	.92	.92	—

*Note:* All coefficients are significant at  $p < .01$   
Average inter-item correlation = .73

**Characteristics of patient event reporting.** Characteristics of patient safety event reporting are described at the individual respondent level ( $N = 1460$ ) and the unit level ( $N = 42$ ). Table 10 describes the frequencies of self-reported patient safety events during the twelve months preceding the survey. Seventy-eight percent of respondents indicated that they had reported two or less events in the previous twelve months. Twenty-one percent indicated that they had reported three to twenty events. Less than one percent indicated that they had reported twenty-one or more events in the twelve months prior to the survey.

Table 10

*Hospital Survey on Patient Safety Culture Number of Events Reported (N = 1460)*

Number of Events Reported in Past 12 Months	<i>n</i>	%
None	583	40.2
1-2 events	544	37.5
3 to 5 events	211	14.6
6 to 10 events	83	5.7
11 to 20 events	23	1.6
21 or more events	5	0.3

Table 11 describes the number of documented events per 10,000 patient days in the nursing units included in the sample in the twelve months prior to the survey. The 42 units collectively reported 4,794 safety events. Eighty four percent of these safety events were near misses meaning the events did not reach the patient. The average rate of events that reached the patient in which some action was necessary (harm score 5 to 9) was 36.6 events per 10,000 patient days.

Table 11

*Documented Unit Patient Safety Event Reporting (N = 42)*

Safety event reports per 10,000 patient days	<i>M</i>	<i>SD</i>	<i>Range</i>
All patient safety events	231.25	118.39	91.8-535.9
Safety events with a harm score of 5 or greater	36.6	31.42	0-166.2

## **Research Question 2**

What are the relationships among nurse leader characteristics (nurse leader patient safety behavior, educational level, and experience level) and patient safety culture (patient safety culture survey dimensions, Overall perception of patient safety, Frequency of events reported, and Patient safety grade)?

**Nurse leader patient safety behavior and patient safety culture.** Inter-item correlations between the Hospital Survey on Patient Safety Culture dimension mean scores are presented in Table 12. The majority of items demonstrated moderate to strong statistically significant correlations amongst the survey dimensions. Two of the three outcome variables (Patient safety grade and Overall perception of patient Safety) had statistically significant correlations with all of the patient safety culture survey dimensions and the leader patient safety behavior mean score. The single item Patient safety grade had a slightly higher average inter-item correlation (0.64) compared to the Overall perception of patient safety dimension (0.60). The Supervisor expectations and actions promoting patient safety dimension had statistically significant correlations with eight of the other eleven patient safety culture dimensions, Patient safety grade, and the investigator added leader behavior mean score. The Management support for patient safety had a statistically significant correlation with the leader behavior dimension but did not correlate with the Supervisor expectations and actions promoting patient safety dimension. The mean score for the five items in the investigator added leader behavior dimension statistically correlated with nine of the twelve patient safety culture dimensions and Patient safety grade. All correlations between leader patient safety behavior, patient safety culture dimensions, and Patient safety grade were positive indicating that units with higher

perceived leader patient safety behavior were associated with units with higher perceived positive patient safety culture.

Table 13 summarizes inter-item correlations between the individual item mean scores in the supervisor/manager expectations and actions promoting patient safety dimension and the investigator added leader safety behavior items. All inter-item correlations were statistically significant and demonstrated moderate to large relationships between the items. All of the items in the supervisor/manager patient safety dimension as well as the leader safety behavior dimension produced strong correlations with the Patient safety grade with the exception of one moderate correlation between Patient safety grade and the leader safety behavior item measuring the leader ensuring daily safety rounds.

**Nurse leader educational level and patient safety culture.** An independent samples t-test was conducted to compare HSOPSC dimension scores and Patient safety grade for units with leader educational levels of BSN or higher and units with leader educational levels of ADN or diploma. The only statistically significant difference was on scores for Management support for patient safety culture where BSN or higher led units had a higher mean score ( $M = 3.70$ ,  $SD = 0.34$ ) compared to ADN or diploma led units ( $M = 3.42$ ,  $SD = 0.24$ ;  $t(40) = -3.17$ ,  $p = .003$  (two-tailed). The magnitude of the mean difference (mean difference =  $-0.28$ ) was large (eta squared =  $.201$ ).

**Nurse leader experience level and patient safety culture.** No statistically significant correlations were found between safety culture survey dimensions and leader total years of experience or unit years of experience. One moderate negative correlation was found between leader unit years of experience and the mean score for the investigator added leader safety

behavior items ( $r = -0.31$ ,  $n = 42$ ,  $p = .05$ ). There was no statically significant correlation between leader experience and Patient safety grade.

Table 12

*Intercorrelations for Hospital Survey on Patient Safety Culture Dimensions, Leader Safety Behavior, and Patient Safety Grade (N = 42)*

Dimensions	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. Teamwork within units	—													
2. Supervisor/manager expectations and actions promoting safety	.65**	—												
3. Organizational learning, continuous improvement	.77**	.77**	—											
4. Management support for patient safety	.34*	.21	.59**	—										
5. Feedback and communication about error	.54**	.69**	.76**	.45**	—									
6. Communication openness	.69**	.67**	.78**	.40**	.83**	—								
7. Teamwork across units	.52**	.33*	.58**	.48**	.36*	.37*	—							
8. Staffing	.70**	.30	.48**	.41**	.21	.32	.38	—						
9. Handoffs and transitions	.62**	.24	.50**	.40**	.14	.42**	.62**	.62**	—					
10. Non-punitive response to errors	.74**	.48**	.60**	.49**	.40**	.61**	.47**	.65**	.57**	—				
11. Leader safety behavior	.45**	.84**	.70**	.37*	.68**	.65**	.25	.16	.21	.36*	—			
12. Frequency of events reported <sup>1</sup>	.33*	.60**	.51**	.40**	.59**	.43**	.27	.11	.13	.33*	.55**	—		
13. Overall perceptions of patient safety	.75**	.53**	.77**	.65**	.52**	.51**	.58**	.73**	.53**	.66**	.44**	.37*	—	
14. Patient safety grade	.82**	.75**	.84**	.47**	.63**	.62**	.55**	.62**	.54**	.60**	.57**	.54**	.82**	—

Note: \*\* correlations are significant at  $p \leq .01$ ; \* correlations are significant at  $p \leq .05$ ; 1. Frequency of events reported is a HSOPSC dimension mean



Table 13

*Intercorrelations for Four HSOPSC Supervisor/Manager Expectations and Actions Promoting Safety Dimension Items, Five Leader Safety Behavior Items, and Patient Safety Grade (N = 42)*

Dimensions	1	2	3	4	5	6	7	8	9	10
1. My supervisor says a good word when he or she sees a job done according to established patient safety procedures	—									
2. My supervisor/manager seriously considers staff suggestions for improving patient safety.	.86	—								
3. Whenever pressure builds up, my supervisor/manager wants us to work faster, even if it means taking shortcuts (reversed)	.74	.82	—							
4. My supervisor/manager overlooks patient safety problems that happen over and over (reversed)	.53	.73	.83	—						
5. My department manager ensures staff conduct daily safety huddles	.50	.55	.52	.58	—					
6. My department manager makes daily safety rounds that include spending time with patients and staff discussing patient safety	.72	.73	.70	.61	.68	—				
7. During leadership rounds, my department manager helps identify high-risk patients and safety priorities	.79	.80	.77	.66	.74	.93	—			
8. During leadership rounds, my department manager discusses safety habits that improve safety and reduce error	.77	.78	.71	.62	.79	.92	.98	—		
9. When mistakes or safety events occur, my department manager addresses the issue fairly considering both system and human issues that led to error	.86	.90	.79	.70	.67	.87	.92	.92	—	
10. Patient safety grade	.73	.71	.68	.53	.46	.56	.55	.59	.55	—

*Note:* All correlations are significant at  $p \leq .01$ ,

### **Research Question 3**

What are the relationships among nurse leader characteristics (nurse leader patient safety behavior, educational level, and experience level) and patient safety events (self-reported number of patient safety events and documented unit level patient safety event rates)?

**Nurse leader patient safety behavior and patient safety events.** The relationships between nurse leader patient safety behavior and patient safety events were explored at the respondent level (N = 1460) using self-reported number of events in the past twelve months and unit level (N = 42) documented patient safety events. Table 14 summarizes the differences in patient safety culture dimension mean scores between survey respondents that indicated that they reported no safety events, one to five safety events, and more than five safety events in the year preceding the patient safety culture survey. Dimensions that demonstrated significant differences between the three groups included Teamwork within units, Management support for safety, Feedback and communication about error, Frequency of events reported, Teamwork across units, Staffing, Non-punitive response to error, and the leader behavior mean score. Post hoc analysis was conducted using Tukey HSD to determine the statistical differences in means between the three groups. Respondents with five or more self-reported safety events had higher mean scores for Teamwork within units, Staffing, and Non-punitive response to error. Respondents with no reported safety events had higher mean scores for Management support for patient safety, Feedback and communication about error, Frequency of events reported, Teamwork across units, and leader behavior. All of the items yielded small effect sizes.

Table 14

*One-Way Analysis of Variance Comparing Safety Events Reported in Past Twelve Months on HSOPCS Dimension Mean Scores*

Variable	No Events			1 to 5 Events			> 5 Events			F	P*	$\eta^2$
	M	SD	N	M	SD	N	M	SD	N			
Teamwork within units	3.87 <sup>a</sup>	0.86	583	3.97	0.78	544	4.03 <sup>a</sup>	.98	322	3.95	.028	.01
Supervisor/manager expectations and actions promoting safety	3.92	0.83	578	3.86	0.81	541	3.89	1.06	321	0.74	.428	.00
Organizational learning, continuous improvement	3.84	0.72	583	3.85	0.69	544	3.82	0.91	322	0.17	.870	.00
Management support for patient safety	3.76 <sup>a</sup>	0.85	580	3.63 <sup>a</sup>	0.87	544	3.47 <sup>a</sup>	1.06	321	10.87	<.001	.02
Overall perceptions of patient safety	3.58	0.79	582	3.51	0.80	544	3.46	0.97	322	2.38	.107	.00
Feedback and communication about error	4.01 <sup>ab</sup>	0.83	581	3.84 <sup>a</sup>	0.78	543	3.77 <sup>b</sup>	0.99	322	10.18	<.001	.01
Communication openness	3.68	0.86	582	3.60	0.78	543	3.70	1.02	322	1.47	.220	.00
Frequency of events reported	4.05 <sup>a</sup>	0.91	568	3.94 <sup>b</sup>	0.85	542	3.76 <sup>ab</sup>	0.97	321	10.24	<.001	.01
Teamwork across units	3.49 <sup>a</sup>	0.69	579	3.40	0.70	544	3.29 <sup>a</sup>	0.96	322	7.23	.002	.01
Staffing	3.31 <sup>a</sup>	0.75	583	3.40 <sup>b</sup>	0.73	544	3.65 <sup>ab</sup>	0.85	322	19.90	<.001	.03
Handoffs and transitions	3.30	0.81	580	3.30	0.79	544	3.19	0.93	321	1.95	.192	.00
Non-punitive response to errors	3.03 <sup>a</sup>	0.87	581	3.13 <sup>b</sup>	0.95	544	3.30 <sup>ab</sup>	1.17	322	8.58	.001	.01
Patient safety grade	3.95	0.92	574	3.88	0.91	530	3.82	1.08	315	2.09	.149	.00
Leader safety behavior	4.09 <sup>a</sup>	0.94	581	3.93 <sup>a</sup>	0.92	540	3.94	1.11	320	4.77	.007	.01

Note: \* *p* values reported from Welch robust tests of equality of means; <sup>ab</sup> same letters represent mean differences were significant at the .05 (Tukey HSD)

The relationships between nursing unit level safety events were examined two ways. The percentage of respondents in each unit that reported three or more events in the past year was correlated with HSOPSC patient safety culture dimensions, leadership safety behaviors, and the percentage of respondents that rated the Patient safety grade positively (grade of A or B). There were no statistically significant correlations when all 42 units were combined. However, there were statistically significant differences in correlations between these variables when the tertiary units and community nursing units were examined separately. In tertiary units Communication openness ( $r=0.46$ ,  $n=21$ ,  $p=.036$ ), Frequency of events reported ( $r=0.531$ ,  $n=21$ ,  $p=.013$ ) and percent positive Patient safety grade ( $r=0.463$ ,  $n=21$ ,  $p=.034$ ) had moderate correlations. In community units only Non-punitive response to error ( $r= -0.471$ ,  $n=21$ ,  $p=.031$ ) was moderately correlated with the percent of respondents that reported three or more safety events in the previous year.

Documented unit level safety event rates were also correlated with Patient safety grade and twelve dimensions within the hospital survey on patient safety culture. Two patient safety culture dimensions correlated statistically with total unit safety event rates. These included Feedback and communication about error ( $r= -0.35$ ,  $n=42$ ,  $p=.02$ ) and Handoffs and transitions ( $r=.47$ ,  $n=42$ ,  $p=.002$ ). Analysis revealed no statistical correlations between leader patient safety behavior ( $r=0.186$ ,  $n=42$ ,  $p=0.238$ ), or supervisor/manager expectation for safety ( $r=.055$ ,  $n=42$ ,  $p=0.730$ ) and safety event rates for the 42 units.

**Nurse leader educational level and patient safety events.** There were no statistically significant differences in documented safety event rates between units with differing degrees of nurse educational level.

**Nurse leader experience level and patient safety events.** There were no statistically significant correlations between documented safety event rates and nurse leader professional or unit experience.

**Research Question 4**

What are the differences in perceptions of patient safety culture between respondents and units based on the extent of leader patient safety behaviors?

Units were categorized by the percent positive value (most of the time or always) as indicated by respondents on the five leader patient safety behavior items. Units were divided into two groups, those in which 80% or more respondents rated the perceived leader behavior as occurring most of the time or always and those with less than 80% of respondents rating leader behavior as occurring most of the time or always. Table 15 describes the mean score differences in the combined five perceived leader behavior items in units with less than 80 percent and units with 80 percent or more positive responses. There were eight units with greater than 80% of respondents rating leaders safety behavior at most of the time or always (percent positive) and 34 units that fell below 80% percent positive. There were statistically significant differences between units that had more than 80 percent of respondents indicate that leader safety behavior activities occurred almost all the time or always.

Table 15

*Leader Patient Safety Behavior Mean Scores in Units Based on 80% Positive Responses*

Leader Safety Behavior Percent Positive	<i>n</i>	<i>M</i>	<i>SD</i>	<i>Range</i>
Units with $\geq$ 80% average positive responses	8	87.9	5.67	80.6-95.3
Units with $<$ 80% average positive responses	34	64.8	13.60	26.9-79.5

Table 16 summarizes the differences in HSOPSC dimensions and Patient safety grade between units with differing levels of perceived leader safety behavior. Seven of twelve HSOPSC dimension mean scores were significantly higher in units when eighty percent or more staff perceived leader safety behavior occurred most of the time or always. Six of the seven had a large magnitude of difference reaching an eta square of at least 0.14 and one had a medium magnitude. The difference in Patient safety grade was also statistically significant between the groups and produced a large effect.

Similar statistically significant findings were evident when respondents are grouped into those that indicated that leadership safety rounds occurred most of the time or always. Table 17 summarizes the differences in hospital patient safety culture mean scores based on respondents that indicated safety rounds occurred less than most of the time and most of the time or always. There were statistically significant differences in mean scores for all of the dimensions when respondents indicated the leadership patient safety rounds occurred most of the time or always. Mean differences in mean scores between the groups produced two small effects (eta squared  $\geq$  .01), four medium effects (eta squared  $\geq$  0.06) and six large effects (eta  $\geq$  0.14). There was also a large effect size in the difference in Patient safety grade mean score. Mean scores for patient safety culture dimensions and Patient safety grade were statistically associated with respondents that indicated leadership safety rounds occurred most of the time or always.

The association between leader rounding and patient safety culture was also explored in tertiary and community nursing units independently. Supervisor/manager expectations and support for safety was positively associated with leader safety rounding behavior in both tertiary and community nursing units. However, the strength of association between leader rounding and

supervisor/manager expectations and support for safety was much larger in community nursing units ( $r=.84$ ,  $n=21$ ,  $p<.001$ ) compared to tertiary nursing units ( $r= 0.48$ ,  $n=21$ ,  $p=.028$ ).

Table 16

*Differences in Hospital Survey on Patient Safety Culture Survey Mean Dimension Scores Between Units Based on 80% Positive Responses (N = 42)*

Dimension	< 80% Leader Behavior		≥ 80% Leader Behavior		<i>df</i>	<i>t</i>	<i>p</i>	$\eta^2$
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>				
Teamwork within units	3.82	0.37	4.23	0.27	40	-2.98	.005	0.18
Supervisor/manager expectations and actions promoting safety	3.77	0.27	4.35	0.20	40	-5.56	<.001	0.44
Organizational learning, continuous improvement	3.75	0.25	4.10	0.10	40	-3.97	<.001	0.28
Management support for patient safety	3.58	0.28	3.64	0.26	40	-0.53	.600	0.01
Overall perceptions of patient safety	3.44	0.29	3.64	0.26	40	-1.80	.080	0.08
Feedback and communication about error	3.75	0.30	4.12	0.22	40	-3.30	.002	0.21
Communication openness	3.54	0.28	3.92	0.16	40	-3.59	.001	0.24
Frequency of events reported	3.89	0.26	4.11	0.17	40	-2.32	.026	0.12
Teamwork across units	3.40	0.28	3.52	0.26	40	-1.18	.244	0.03
Staffing	3.36	0.36	3.43	0.32	40	-0.50	.621	0.01
Handoffs and transitions	3.29	0.32	3.35	0.12	40	-0.48	.642	0.01
Non-punitive response to errors	3.03	0.28	3.32	0.37	40	-2.46	.018	0.13
Patient safety grade	3.78	0.34	4.16	0.30	40	-2.87	.007	0.17



Table 17

*Differences in Hospital Survey on Patient Safety Culture Dimension Mean Scores Between Units Based on Respondent's Indication of Leader Rounds Occurring Most of the Time or Always. (N = 1460)*

Dimension	Never to Sometimes		Most of the Time to Always		<i>df</i>	<i>t</i>	<i>p</i>	$\eta^2$
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>				
Teamwork within units	3.58	0.96	4.17	0.72	1431	-13.18	<.001	0.11
Supervisor/manager expectations and actions promoting safety	3.36	0.91	4.24	0.67	1422	-21.18	<.001	0.24
Organizational learning, continuous improvement	3.47	0.87	4.08	0.56	1431	-16.35	<.001	0.16
Management support for patient safety	3.23	0.93	3.92	0.80	1427	-14.97	<.001	0.14
Overall perceptions of patient safety	3.17	0.87	3.76	0.72	1430	-13.93	<.001	0.12
Feedback and communication about error	3.52	0.99	4.21	0.45	1427	-19.56	<.001	0.21
Communication openness	3.18	0.85	3.95	0.75	1428	-18.10	<.001	0.19
Frequency of events reported	3.52	0.99	4.21	0.75	1414	-14.84	<.001	0.14
Teamwork across units	3.14	0.74	3.58	0.72	1428	-11.21	<.001	0.08
Staffing	3.22	0.74	3.54	0.78	1431	-7.65	<.001	0.04
Handoffs and transitions	3.05	0.83	3.42	0.81	1427	-8.47	<.001	0.05
Non-punitive response to errors	2.80	0.96	3.34	0.93	1430	-10.58	<.001	0.07
Patient safety grade	2.79	0.96	3.34	0.93	1402	-16.88	<.001	0.17

A chi-square goodness-of-fit test indicated that there were significant differences between the proportion of respondents based on their Patient safety grade rating and perception of the frequency of leader safety rounding. Seventy-two percent of respondents indicating a Patient safety grade of A or B also indicated their leader conducted safety rounds most of the time or always while 31.9% respondents that rated Patient safety grade a C or less indicated that leader rounding occurred most of the time or always  $X^2 (1, n=1404) = 195.01, p<.001$ .

Table 18 describes the proportion of respondents with positive responses on eight HSOPSC items that focus on safety activities associated with leadership based on respondent's indication of unit leader rounding reliability. There was a significantly higher proportion of respondents with positive responses when leader rounding was indicated most of the time or always for all eight leadership safety items. Ninety percent of staff that reported their leader made daily rounds most of the time or always also agreed that their leader said a good word when safety procedures were followed. Similarly, eighty-nine percent of staff that indicated their leader made daily rounds most of the time or always agreed or strongly agreed that their supervisor seriously considers staff suggestions for improving patient safety compared to 54.5 percent who agreed when their leader rounded less than most of the time. More staff agreed that management prioritize and provide a climate of patient safety when leader rounding occurs most of the time or always. Staff that indicated more highly reliable unit leader rounding also were more likely to disagree or strongly disagree that their mistakes are held against them or that event reporting is punitive.

Table 18

*Proportion of Respondents with Positive Responses to HSOPSC Leader Related Safety Items Based on Respondents Indication of Leader Rounding Occurring Never to Sometimes (N=550) and Most of the Time or Always (N=883)*

HSOPSC Item (agree/strongly agree or most of the time or always)	Leader Rounding Never to Sometimes		Leader Rounding Most of the Time or Always		$X^2(1)$	$p$
	$n$	%	$n$	%		
My supervisor says a good word when he/she sees a job done according to established safety procedures (agree/strongly agree)	315	57.7	794	90.4	209.47	<.001
My supervisor/manager seriously considers staff suggestions for improving patient safety (agree/strongly agree)	298	54.9	779	89.0	213.92	<.001
Hospital management provides a work climate that promotes patient safety (agree/strongly agree)	342	62.6	750	85.4	97.45	<.001
The actions of hospital management show that patient safety is a top priority (agree/strongly agree)	315	57.7	741	84.3	124.26	<.001
We are given feedback about changes put into place based on event reports (most of the time/always)	230	42.0	671	76.3	171.29	<.001
Staff feel free to speak up if they see something that may negatively affect patient care (most of the time/always)	3322	58.7	755	86.0	136.39	<.001
Staff feel like their mistakes are held against them (disagree/strongly disagree)	191	34.9	471	53.5	46.95	<.001
When an event is reported, it feels like the person is being written up, and not the problem (disagree, strongly disagree)	214	39.1	495	56.2	39.31	<.001

## Chapter V

### Discussion, Conclusions, Implications, and Recommendations

The purpose of this study was to explore the relationships between nurse leader characteristics (nurse leader patient safety behavior, educational level, and experience level) and patient safety (perceived patient safety culture, Patient safety grade, Number of patient safety events reported, and patient safety event rates) in the acute care hospital.

A retrospective design using multiple pre-existing data sources was used to explore the relationships between nurse leader characteristics and patient safety culture within eight acute care hospitals. Data from 1460 nursing unit staff and 42 nursing units were combined into one database containing cross-sectional variables corresponding to patient safety culture perceptions, unit and leader characteristics, and patient safety events over a one year period of time (February 1, 2013 – February 28, 2014) preceding a patient safety culture survey in March of 2014.

There were four research questions designed around the exploration of nurse leader characteristics and patient safety. Question one examined the descriptive characteristics of nursing unit patient safety culture, staff, safety event rates, and leaders within the survey sample. Question two explored the relationships between nurse leader characteristics and patient safety culture. Question three examined the relationships between nurse leader characteristics and patient safety event reporting. Finally, question four examined the differences in patient safety culture between units that had higher and lower perceived nurse leader patient safety behavior.

#### Discussion of Findings

**Sample.** Units with less than a 60% response rate and those with a unit leader with less than one year of unit leadership experience were excluded from the study. Forty-two nursing units from eight acute care hospitals were included in the study. Nursing unit staff including

nurses, nursing assistants, and unit secretaries were selected from within each of the 42 units to make up 1460 staff that responded to the AHRQ Hospital Survey on Patient Safety Culture in March of 2014. A variety of nursing units including adult, pediatric, intensive care, obstetric, medical, surgical, and behavioral health comprised the sample. Equal numbers of rural community hospital nursing units and tertiary nursing units were included. The tertiary facility was a large teaching hospital with nearly 900 beds while the smaller community hospital sizes ranged from 6 to 117 beds. Each of the 42 nursing units had a manager with at least one year of experience as the unit leader. Nursing leaders had a variety of educational background ranging from diploma to doctorate. The majority of nurse leaders had either an associate degree or baccalaureate degree.

**Research question 1.** What are the characteristics of the instruments, nursing units, nurse leaders, staff, perceived safety culture, and safety event reporting within the sample?

The average survey respondent was a registered nurse with five years of professional, hospital, and unit level experience who provided direct patient care. The average nursing unit leader had a baccalaureate degree with six years of experience on the unit and twenty-two years of professional experience. All leaders including those with an associate degree had high levels of experience that may have reduced the differences found between units with higher and lower educationally prepared leaders.

All of the academic medical center nursing leaders had a baccalaureate degree or higher. The academic medical center was Magnet Nursing designated in 2013. American Nurse Credentialing Center (ANCC) Magnet designation requires, among many other things, that nurse leaders have, at minimum, a baccalaureate degree (American Nurses Credentialing Center [ANCC], organizational eligibility requirements, 2014). There were significant numbers of

nursing units, especially in rural hospital settings with associate degree preparation. Thirty-eight percent of nurse leaders had an associate degree or less. Currently there is no mandatory educational standard for practicing as a nurse leader (Yoderwise, Scott, & Sullivan, 2013). The mixed pattern of educational preparation amongst nurse leaders in this study was indicative of national trends. According to a 2008 national workforce survey, slightly more frontline nursing managers reported having an associate or lesser degree than those reporting a baccalaureate degree or higher (HRSA, 2010). In addition to the ANCC, several other significant national organizations have endorsed advancing nursing education for nurse leaders. The American Organization of Nurse Executives (AONE) and the Council of Graduate Education for Administration in Nursing (CGEAN) have both endorsed a baccalaureate degree as the minimum educational preparation for nurse leaders (AONE, n.d.; Council of Graduate Education for Administration in Nursing [CGEAN], 2011). The Institute for Medicine (IOM) has suggested that at least 80% of the registered nurse workforce should be baccalaureate prepared by the year 2020 (Institute of Medicine [IOM], 2011). The findings in this study indicate that reaching the 2020 goal will be difficult.

Fifty-nine percent of respondents indicated that they had reported at least one event in the past year. The range in documented patient safety rates events suggests a wide variation in actual event reporting from unit to unit. Eighty-four percent of documented patient safety events had a harm score that did not require intervention suggesting that staff are aware of the importance of reporting events despite consequences or patient harm. The lack of literature producing normative safety event data is likely a result of inconsistent event reporting taxonomies across organizations and a reluctance to transparently publish harm event data. Authors of one study reported 86 to 91 percent of safety events as near misses, a similar percentage to the ratio of non-

harmful to harmful events in this study (Woolever, 2005). Evidence that the majority of safety events reported at the study site were non-harmful may be evidence that the organization has a mature event reporting culture. Borg (2002) suggests that the ratio of near misses to actual events is evidence of organizational safety event reporting culture and that organizations that have a higher ratio of near miss reporting compared to harmful events are more likely to be aware of safety issues. Borg describes the difference between low frequencies of near miss event reporting and actual event rates as a “blind spot” for leaders (Borg, 2002, p. 11). In this study the number of events that reached patients requiring some type of intervention were five times less than those that either did not reach the patient or did not cause harm. Barach and Small (2000) found that the ratio of near-misses to actual events in non-medical safety literature ranges from 3 to 300 near misses for every harm producing safety event.

Overall, patient safety culture survey scores were positive. The exception was the Non-punitive response to error dimension that had less than half (42%) of respondents rating it positively. The results of the Hospital Survey on Patient Safety Culture in this study were similar to national results. When compared to the 2014 AHRQ user comparative database, all of the HSOPSC dimension percent positive scores fell within the 25<sup>th</sup> and 75<sup>th</sup> percentile with most falling near the 50<sup>th</sup> percentile. Similar to this study, less than 50% of respondents in the comparative database rated the Non-punitive response to error dimension positively (AHRQ, user comparative database report, 2014). The number of events self-reported in the past twelve months was the exception when comparing this study to recent AHRQ benchmarks. In the 2014 AHRQ comparative database, 55 percent of respondents reported no events in the previous twelve months compared to 40% in this study. Ten percent fewer respondents in the comparative database reported one to two events in the previous twelve months placing the study

site in the 90<sup>th</sup> percentile for reporting one to two events (AHRQ, user comparative database report, 2014).

The five investigator-added leader patient safety behavior items were also rated positively by survey respondents. There was significant variability between units in patient safety culture survey results and leader patient safety behavior as reflected by the differing ranges in mean scores between units. Leader patient safety behavior had moderate to strong inter-item correlation and also produced a significant range of mean score responses between units. The strength of relationships between variables as well as the range in scores and differing characteristics between units was sufficient to explore the relationships and differences using the retrospective data combined in the study.

**Research question 2.** What are the relationships among nurse leader characteristics (nurse leader patient safety behavior, educational level, and experience level) and patient safety culture (patient safety culture survey dimensions, Overall perception of patient safety, Frequency of events reported, and Patient safety grade)?

The perception of patient safety culture varied across nursing units. Three of the lowest scoring patient safety culture domains were associated with organizational level leader responsibilities. These included Staffing, Teamwork across units, and Non-punitive response to error. Two of the highest scoring patient safety culture domains also involved unit specific leader accountability including leader patient safety behavior and teamwork on the unit.

Of the three measured nurse leader characteristics (safety behavior, educational level, and experience), differences in unit nurse leader patient safety behavior was most associated with differences in perceptions of patient safety culture. Units with higher levels of leader patient safety behavior also showed associations with higher unit patient safety scores. There were



significant differences in perceptions of nurse leader's patient safety behavior as evidenced by the range in leader patient safety items mean scores. The lowest scoring unit had an average leader patient safety behavior score of 2.87 while the highest scoring unit had an average score of 4.70. While these leadership behaviors are an established expectation in these organizations, the variability among units suggests that they are either not consistently performed or that staff have varying degrees of awareness of the leader's performance of patient safety behaviors.

A major goal of this study was to test the viability of actionable items that leaders could do to promote a culture of patient safety. To that end the investigator added five items that could be demonstrated and measured. These five leadership patient safety behaviors correlated strongly with the Hospital Survey on Patient Safety Culture (HSOPSC) dimensions measuring unit supervisor/manager expectations and actions promoting patient safety. This was an expected finding since all of the items measure actions the unit leader takes to support patient safety. The five leader patient safety behavior items had moderate to large correlations with Patient safety grade. The strength of association among the leader patient safety behavior items, supervisor/manager expectations, actions supporting patient safety items, and Patient safety grade suggests that the leader patient safety behavior items successfully measure unit leader actions related to patient safety culture. The important distinction between the native items measuring supervisor expectations and actions within the HSOPSC and the newly added items measuring leader patient safety behavior is that all five of the leader patient safety behavior items are reproducible and actionable. This offers organizations the opportunity to train leaders to behave in ways that promote a patient safety culture and it offers nurse managers insight into what they can do to improve patient safety on the units they lead.

There was a strong relationship between nurse leader educational level and the HSOPSC Management support for patient safety dimension. The Management support for patient safety dimension is considered an organizational level dimension while the supervisor/manager expectation and actions supporting patient safety dimension is considered a unit level dimension. The relationship between Management support for patient safety and nurse leader educational level suggests that units in organizations with higher educationally prepared nurse leaders also have staff that rate Management support for patient safety more positively. Neither nurse leader educational level nor experience level had significant associations with patient safety culture in this study. There was also no difference in leader patient safety behaviors between nurses with differing educational levels. This finding suggests that the leader patient safety behaviors that are an expectation at the study sites are not dependent upon nurse leader educational level, rather it is built into the culture of how the organization promotes safety. The finding supports the notion that these types of leadership behaviors, which are associated with positive patient safety culture, can be effective as a purposeful process aimed at improving patient safety training for nursing unit leaders regardless of educational and experience levels.

**Research question 3.** What are the relationships among nurse leader characteristics (nurse leader patient safety behavior, educational level, and experience level) and patient safety events (self-reported number of patient safety events and documented unit level patient safety event rates)?

While there were statistically significant differences in patient safety culture between respondents with differing frequencies of patient safety events, the effect sizes were small. Positive responses to feedback about error was associated with units with lower documented patient safety event rates and less self-reported patient safety events. The three items in the

Feedback and communication about error dimension ask about the likelihood that feedback and communication occur. They do not indicate that the feedback or communication is a positive experience. It is possible that respondents report less safety events in units where it is more likely that negative feedback and communication about error occur. Another finding that affirms this possibility is units with higher self-reported events also reported more positively on a culture of Non-punitive response to error. There was no association between documented unit patient safety event rates and leader safety behavior. Nurse educational level and experience were also not associated with safety event reporting or documented unit safety event rates.

Other statistically significant differences become apparent when tertiary and community units are examined separately. In tertiary units, increased indication of self-reported safety events was positively correlated with Communication openness and the percent of respondents that rated the unit Patient safety grade most positively. Interestingly, these associations were not present in the community nursing units. In community nursing units increased reporting of safety events was associated with lower perception of Non-punitive response to error.

**Research question 4.** What is the difference in perceptions of patient safety culture between respondents and units based on the extent of leader patient safety behaviors?

There were significant differences in patient safety culture between units with higher and lower levels of perceived leader patient safety activity as measured by the investigator added leader patient safety behavior items. Units were categorized into two groups based on the percentage of respondents that indicated leader patient safety behavior occurred most of the time or always. Although leader safety activities are an expectation for all nurse leaders at the study sites, only 24% of units had 80% or more respondents that indicated leader patient safety behaviors occurred consistently. This finding suggests that either the leader patient safety

activities are not occurring as expected or the majority of respondents are not aware of the activities. There were also greater ranges of responses in units with lower perceived leader patient safety behavior suggesting that there is greater variability in leader patient safety behavior in units where those activities occur less consistently.

Units with more than 80% of respondents agreeing that leader patient safety behavior occurred most of the time had more positive perceptions of seven out of the twelve patient safety culture dimensions. Units with higher leader patient safety behavior had significantly higher mean scores in the supervisor/manager expectations and actions supporting patient safety, Organizational learning and continuous improvement, Communication openness, and Feedback about error dimensions. This is an important finding because it suggests that consistently performed leader patient safety actions contribute to the perceptions of patient safety culture that are important to a work climate that fosters learning and improving from mistakes (Chuang, Ginsburg, & Berta, 2007; Karga, Kiekkas, Aretha, & Lemonidou, 2011).

Leader rounding is a critical component of the leader behaviors examined in this study. Two of the examined leader behaviors (identifying high risk patients and discussing safety habits) take place during, and are dependent on leader rounding. Respondents who indicated that leader rounding occurred most of the time or always had significantly higher mean scores on every patient safety culture dimension and Patient safety grade. Supervisor/manager expectations and actions supporting patient safety, Feedback and communication about error, Organizational learning, and Communication openness were significantly higher in units with staff who indicated that leader patient safety behavior occurred most of the time or always. The strength of association between leader rounding and perception of manager expectations and actions promoting patient safety were considerably stronger in community units suggesting that leader

rounding behavior has a greater relationship with perception of leadership support in smaller units with potentially fewer resources.

Leader rounding was also positively associated with HSOSPC items that are related to leadership safety behaviors. Respondents that indicated their leader rounded most of the time or always were more likely to agree that their leader also positively reinforced safety procedures and considered staff suggestions for improving safety. They also agreed that hospital management prioritized patient safety and reinforced a culture conducive to patient safety. Respondents that indicated unit leaders rounded most of the time also indicated that they were more frequently given feedback about error and feel more comfortable speaking up about things that might negatively impact patient safety. Finally, respondents that indicated more reliable leader rounding also rated items associated with non-punitive response to error more positively.

**Key findings.** One key objective of this study was to determine what actionable nurse leader behaviors were associated with patient safety in nursing units. The most substantial finding in this study involves the significance found between nurse leader rounding behavior and the perception of patient safety by nursing unit staff. Nursing staff in this study who indicated their leader conducted daily safety rounds most of the time or always rated overall patient safety culture and Patient safety grade more highly. Forty-five percent more staff rated patient safety and A or a B when leader safety rounding occurred most of the time or always compared to those that said leader rounding occurred never to sometimes. Similar positive results were found between HSOPSC items that are related to leadership safety when respondents indicated that daily leader rounding occurred reliably. Respondents that indicated daily leader safety rounding occurred most of the time were more likely to agree that there was improved Management support for patient safety, Feedback about safety, and Non-punitive response to error. These

findings are significant considering the lack of research examining the impact of nurse leader rounding on patient safety outcomes. Relatively few studies have formally examined nurse leader rounding on patient safety. Other studies have also suggested that leader rounding and attributes associated with leader presence are important to nursing care quality. One study has suggested that leadership visibility itself is an important component of nursing leadership (Anderson, Manno, O'Conner, & Gallagher, 2010). Others studies have indicated the positive value of nurse leader rounding on patients perceptions of care (Winter & Tjiong, 2015; Shuller, 2014, Setia & Meade, 2009). Others have also suggested that leadership rounding passively enhances the way that staff regularly conduct their own patient care rounds (Hutchins, Ward, & Bloodworth, 2013). This study adds value to existing literature through a broader approach to examining nurse leader behaviors and affirming that leadership rounding is an important leader behavior among others that shape patient safety culture.

In this study, manager expectations and actions promoting safety were significantly associated with unit perceptions of patient safety culture. Leadership safety activities examined through the investigator-added leader patient safety behavior items were associated with the perception of manager support for patient safety and unit patient safety performance. Units with higher leader patient safety behavior including daily leader rounding were associated with more positively perceived patient safety culture regardless of the frequency of safety events or nurse leader educational or experience level. Consistent application of the daily unit leader patient safety actions were associated with improved perception of a safety culture. Thus, emulation of these leader behaviors on a unit should become a best practice model promoted by nursing. This offers evidence to support the adoption of these five actions to promote safety culture in hospital nursing units and could be taught in baccalaureate and master's programs as critical skill sets.

The variability in patient safety culture scores between units in the same health care system suggests that the unit structure, including the unit leader, is an important component of a micro-culture within the larger organization. The value of examining findings within both respondents (across units and organizations) and within units was also affirmed in this study though findings that suggested tertiary and community units exhibit differences in associations between the frequency of reported safety events and perception of safety culture including Non-punitive response to error.

Neither self-reported nor documented patient safety events were associated with nurse leadership characteristics and the majority of patient safety events were near misses. These findings suggest that either staff are not aware of safety event rates on their unit or the frequency of safety events do not impact staff perception of patient safety culture. While the range of responses by nursing staff was sufficient to support the analysis in this study, nursing unit staff generally rated patient safety culture positively. The significant exception was a predominately negative rating of Non-punitive response to error. A work environment that fosters a non-punitive response to error is important to promoting patient safety through encouraging identification of error and learning from mistakes (Karga, Kiekkas, Aretha, & Lemonidou, 2011). The negative rating of Non-punitive response to error in this study is indicative of responses found nationally in the HSOPSC (AHRQ, user comparative database report, 2014). Fear of punishment for reporting adverse events continues to be a reality despite national efforts to improve transparency and encourage safety reporting (Vogelsmeier & Scott-Cawierzell, 2007). Just culture has been recognized as an essential component of safety improvement for almost two decades since the term was used by James Reason (1997) to describe an environment that encouraged employees to share safety concerns. Organizational leaders, including nurse

leaders, are responsible for ensuring a consistent balance between managing at risk employee behavior and recognizing non-deliberate mistakes and errors due to flaws in processes and system designs (American Nurses Association [ANA], 2010).

One final finding of concern was the number of associate degree prepared nurse leaders in the study. This indicates a continued opportunity for degree advancement within nurse leaders, especially in rural healthcare settings. With the IOM report on the Future of Nursing calling for an increased capacity for nursing to lead and with the growing complexity of health systems, advancing the educational level of nurse managers is imperative regardless of geographic location (IOM, 2010). The American Nursing Association (ANA) offered its first position paper on the baccalaureate degree as the minimum degree for entry into nursing practice in 1965. In 1978 the ANA recommended the baccalaureate degree as the entry for nursing practice at a date no later than 1985 (ANA, Nursing education, 2013). Thirty years later, a significant portion of registered nurses and their leaders continue to lack baccalaureate or higher degree preparation. There are ample opportunities for all nurses, including nurse leaders to obtain baccalaureate and higher degrees. According to the American Nurse Credentialing Center (ANCC) there are 692 baccalaureate and 159 masters nursing advancement programs in the United States offering various campus and online opportunities (ANCC, degree completion programs for registered nurses, 2014).

### **Relationship of Findings to Conceptual and Research Models**

The theoretical and research frameworks associated with this study propose that patient safety outcomes are dependent upon patient safety structure and processes. In this study, structural variables included nurse leader education and certification levels. Neither of these were found to be significantly associated with process or outcomes variables. The processes



associated with daily nurse leader patient safety activities were found to be significantly associated with the outcomes of perceived patient safety culture and Patient safety grade. They were not however found to be associated with the outcomes associated with patient safety events. Nurse leader rounding was a key process found to be associated with patient safety culture outcomes.

In this study, the Donabedian model was useful for identifying and exploring the research variables conceptually associated between nurse leader characteristics and patient safety. Due to the cross-sectional nature of this study, the Donabedian model could not be used to demonstrate causality between significant associations between nurse leader safety behavior and patient outcomes. The Donabedian model be useful for conceptualizing the causative relationships between nurse leader safety interventions and patient safety in future longitudinal experimental designed studies.

### **Strengths and Limitations**

This study had several strengths and limitations. One strength included the examination of patient safety culture in a large hospital system and included both tertiary and rural based hospital nursing units. The study combined multiple data sources to examine the relationships between nurse leader characteristics and patient safety culture. This offers new possibility for combining data collected for one purpose in ways to foster outcome research. Another strength was the collection and examination of documented patient safety events at the nursing unit level in a health system with a robust system of documenting patient safety events by level of harm. Finally, the study examined five specific, actionable, observable, leader behaviors that were found to be significantly associated with the perception of patient safety culture by a large sample of staff throughout the health system.

The study also had several important limitations. The study relied upon pre-existing data that limited several variables of interest. For example, survey respondents were not asked about the shifts they work therefore it was not possible to examine the prevalence of leader patient safety behavior based on shifts such as nights, or weekends, when leaders may be less likely to be present. The data did not include the staff's educational level therefore it was not possible to determine if nursing staff educational level was associated with the perception of patient safety culture. The retrospective design of the study limited the ability to determine causal relationships between the study variables or findings. The patient safety culture findings were dependent upon perceptual data rather than observed and measured phenomena. Finally, there were many uncontrollable factors associated with patient safety such as nurse turnover, fluctuations in staffing levels, and patient acuity level that were uncontrollable in the retrospective study design.

### **Implications and Recommendations for Education, Practice, and Research**

**Education.** The findings in this study have implications for education. While nurse leader educational level was not found to be significantly associated with patient safety culture in this study, the findings suggest that there continues to be variability in formal education amongst nurse leaders. In this study, all of the leaders that had less than a baccalaureate education worked in rural hospital settings. This suggests that there is an opportunity for a better understanding of the barriers to recruitment of baccalaureate and higher prepared nurse leaders, especially in rural health settings. Educational programs should also examine the availability of baccalaureate educational degree advancement programs specifically aimed at nurse leaders. Rural nurse executives should consider incentives and career ladder programs that promote educational advancement. In 2013 there were 400 nursing education programs offering online options for nurses to obtain their baccalaureate degree (ANCC, degree completion programs for registered

nurses, 2014). Considering the increasing online educational opportunity for nurses, there is little excuse not to formally require a baccalaureate or higher degree for nurse leaders.

This study affirmed that specific nurse leader behaviors are associated with improved patient safety culture. The leader behaviors examined in this study are trainable and nurse educators should consider including actions such as nurse leader patient safety rounding in nurse leadership curricula. Nurse leadership programs should include actionable behaviors such as those examined in this study along with the leadership traits that they animate in leadership curricula. Leadership actions examined in this study included daily leader safety rounding, identifying high risk patients, ensuring safety huddles and error prevention safety habits, and addressing issues fairly. This author suggests that these examples represent leadership actions that are trainable, repeatable, and observable manifestations of transformational leadership styles. These types of nursing leadership activities could be included in simulation training and integrated into leadership classes in all levels of nursing leadership curricula including advanced practice nursing. Finally, all nurse educational programs should include awareness of the importance of patient safety actions and cultures that reduce error. Chiefly among these is the importance of a patient safety culture inclusive of a non-punitive response to error. Graduate nurses should expect, and even demand that they, and their patients, are afforded an environment that fairly encourages safety reporting.

**Practice.** This study affirmed that nurse leader rounding is associated with positive perceptions of patient safety culture. The variability in perceptions of the reliability of daily nurse leader rounding between nursing units in this study are concerning. Only 19% of nursing units explored in this study had more than 80% agreement by respondents that daily nurse leader rounds occurred at least most of the time. This study also affirmed that nurse leader behavior is a

relevant and important component of patient safety culture within nursing units. Understanding the importance of the nurse leader's actions on patient safety, hospital leaders should examine the required competencies and expectations of nurse leaders. Hospital senior leaders should inspect the fidelity of nurse leader activities aimed at reducing error, improving unit safety, and fostering a culture of safety on their units. A significant finding in this study is that nurse leader rounding is one leader safety behavior that is significantly associated with the perception of patient safety in nursing units. Hospital leadership should set clear expectations for the expected daily patient safety activities including safety rounding. Hospital leaders should provide nurse leaders the time and resources necessary to achieve those activities.

Practicing nurses should expect to work in a climate of transparency and non-punitive response to error. Considering the relatively low perception that nursing staff had in this study to non-punitive response to error, nurse leaders should develop transparent processes aimed at ensuring all employees are treated equitably and fairly when mistakes happen.

**Research.** More research is needed to understand the role of nurse leaders in ensuring and improving patient safety. Longitudinal studies that test the effects of nurse leader actions such as safety rounding on measurable patient safety outcomes are needed to determine which nurse leader behaviors and actions are most impactful for reducing error and improving safety on nursing units. This study strongly supports nurse leader daily safety rounding as a behavior that is positively associated with nursing unit patient safety culture. Future studies should explore and define specific best practices associated with nurse leader rounding. While this study explored staff perceptions that nurse leader rounding occurred regularly, more research is needed to understand the best techniques used during rounding to maximize the value of rounding activities on patient safety performance.

Studies are also needed to determine the best ways to provide feedback to nurses about relevant patient safety events that occur on their unit without eliciting feelings of punishment. Qualitative studies examining nurses' experience with feedback about error may be beneficial at determining the barriers associated with learning from mistakes. Considering the small proportion of units that reported consistently occurring leader safety activities, future studies that examine the barriers to performing daily safety activities would be beneficial to understand how senior leaders can better support unit nurse managers. More research is needed to understand why nurses perceive response to error punitively despite efforts and actions intended to promote a just culture in healthcare. There continues to be a disconnect between the processes intended to promote fair response to error and how nurses experience response to error. Future research around aspects of hospital patient safety should include the nurse leader as an important aspect of unit patient safety culture.

### **Conclusion**

Patient safety continues to be a significant problem in the healthcare industry. Findings in this study suggests that nurse leader patient safety activities are associated with how nursing staff perceive the capability of their organization and unit to produce safe patient care. This study explored the associations between nurse leader characteristics including leadership patient safety behavior and patient safety culture in acute care nursing units. Nurse leader patient safety behavior was found to be significantly associated with patient safety culture, Overall perception of patient safety, and Patient safety grade in a large sample of nursing unit staff.

Keeping patients safe requires active, purposeful processes aimed at reducing and mitigating error. This study explored actionable, reproducible nurse leader activities designed to impact unit level patient safety. Nurse leadership style alone, in the absence of actions that define

and animate them are difficult traits in which to base consistent safety processes. There are likely leadership characteristics, such as transformational leadership styles, that are more conducive to successful implementation of leader led unit safety activities. However, this study focused on the actions themselves in an effort to promote their importance in the daily practice of nurse leadership.

A major goal of this study was to determine actionable behaviors of nurse leaders that are associated with patient safety. This study affirmed that nurse leader safety behavior is associated with the perception of patient safety in nursing units. Nurse leader safety rounds was significantly associated with patient safety culture and Patient safety grade. Findings in this study supporting the importance of nurse leader rounds are significant in several ways. First, these findings underscore the need for nurse leaders to conduct safety rounds reliably in an effort to improve patient safety culture on their units. Findings in this study also affirm the value of unit nurse leader daily safety rounding provide a basis for continued research into the positive influences that nurse leaders have on patient safety. These findings provide foundations amongst many patient safety variables to consider for future research involving nursing leadership and patient safety. Chiefly among these, these findings fill a deficit in current literature surrounding the associations between nurse leader rounding and patient safety culture. Finally, the positive relationships between nurse leader rounding behavior and patient safety culture suggest that the highly reliable nurse leader safety rounding could significantly sustain the preservation of patient safety culture on nursing units between patient safety culture survey periods.

Every patient deserves the highest level of safety. Humans are prone to error, however highly reliable safety processes should significantly reduce the likelihood that patients are affected by healthcare errors. Nurse leaders are accountable for the safety of patients under the

care of the nursing staff they support. Hence, nurse leaders at all levels should understand, and embrace their leadership role as an evolution of their basic nursing practice; that is the practice of nursing leadership as an important component of safe patient care. This study affirms that there are relatively simple, yet affective daily nurse leader practices that are associated with how their staff perceive their ability to keep patients safe. This study suggests that nurse leader patient safety rounding is an important component of patient safety culture. The findings of this study suggest that the trainable, repeatable, actionable, observable behavior of nurse leader rounding alone may make a significant impact on perceptions of patient safety in acute care nursing units. While there are many confounding variables that impact patient safety, leadership patient safety behaviors, like the ones examined in this study, should be considered as a fundamental aspect of hospital patient safety and as an essential role of hospital nursing leaders.

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## Appendices

### Appendix A

#### Institutional Review Board (IRB) Study Approval Notification



**EAST CAROLINA UNIVERSITY**  
**University & Medical Center Institutional Review Board Office**  
4N-70 Brody Medical Sciences Building · Mail Stop 682  
600 Moye Boulevard · Greenville, NC 27834  
Office 252-744-2914 · Fax 252-744-2284 · [www.ecu.edu/irb](http://www.ecu.edu/irb)

### Notification of Exempt Certification

From: Social/Behavioral IRB  
To: [Daniel Drake](#)  
CC: [Elaine Scott](#)  
Date: 7/21/2014  
Re: [UMCIRB 14-001176](#)  
Nurse Leadership and Patient Safety Outcomes

I am pleased to inform you that your research submission has been certified as exempt on 7/21/2014 . This study is eligible for Exempt Certification under category #4 .

It is your responsibility to ensure that this research is conducted in the manner reported in your application and/or protocol, as well as being consistent with the ethical principles of the Belmont Report and your profession.

This research study does not require any additional interaction with the UMCIRB unless there are proposed changes to this study. Any change, prior to implementing that change, must be submitted to the UMCIRB for review and approval. The UMCIRB will determine if the change impacts the eligibility of the research for exempt status. If more substantive review is required, you will be notified within five business days.

The UMCIRB office will hold your exemption application for a period of five years from the date of this letter. If you wish to continue this protocol beyond this period, you will need to submit an Exemption Certification request at least 30 days before the end of the five year period.

The Chairperson (or designee) does not have a potential for conflict of interest on this study.

Appendix B

Agency for Healthcare Research and Quality (AHRQ) Hospital Survey on Patient Safety Culture Instrument. Reprinted with permission from the AHRQ (Appendix D).

# Hospital Survey on Patient Safety

## Instructions

This survey asks for your opinions about patient safety issues, medical error, and event reporting in your hospital and will take about 10 to 15 minutes to complete.

If you do not wish to answer a question, or if a question does not apply to you, you may leave your answer blank.

- An **"event"** is defined as any type of error, mistake, incident, accident, or deviation, regardless of whether or not it results in patient harm.
- **"Patient safety"** is defined as the avoidance and prevention of patient injuries or adverse events resulting from the processes of health care delivery.

### SECTION A: Your Work Area/Unit

In this survey, think of your "unit" as the work area, department, or clinical area of the hospital where you spend **most of your work time or provide most of your clinical services.**

What is your primary work area or unit in this hospital? Select ONE answer.

- a. Many different hospital units/No specific unit
- b. Medicine (non-surgical)
- c. Surgery
- d. Obstetrics
- e. Pediatrics
- f. Emergency department
- g. Intensive care unit (any type)
- h. Psychiatry/mental health
- i. Rehabilitation
- j. Pharmacy
- k. Laboratory
- l. Radiology
- m. Anesthesiology
- n. Other, please specify:

Please indicate your agreement or disagreement with the following statements about your work area/unit.

Think about your hospital work area/unit...	Strongly Disagree ▼	Disagree ▼	Neither ▼	Agree ▼	Strongly Agree ▼
1. People support one another in this unit.....	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
2. We have enough staff to handle the workload .....	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
3. When a lot of work needs to be done quickly, we work together as a team to get the work done.....	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
4. In this unit, people treat each other with respect.....	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
5. Staff in this unit work longer hours than is best for patient care.....	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5

**SECTION A: Your Work Area/Unit (continued)**

	Strongly Disagree ▼	Disagree ▼	Neither ▼	Agree ▼	Strongly Agree ▼
Think about your hospital work area/unit...					
6. We are actively doing things to improve patient safety.....	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
7. We use more agency/temporary staff than is best for patient care .....	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
8. Staff feel like their mistakes are held against them .....	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
9. Mistakes have led to positive changes here .....	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
10. It is just by chance that more serious mistakes don't happen around here.....	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
11. When one area in this unit gets really busy, others help out .....	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
12. When an event is reported, it feels like the person is being written up, not the problem.....	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
13. After we make changes to improve patient safety, we evaluate their effectiveness.....	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
14. We work in "crisis mode" trying to do too much, too quickly.....	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
15. Patient safety is never sacrificed to get more work done .....	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
16. Staff worry that mistakes they make are kept in their personnel file.....	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
17. We have patient safety problems in this unit .....	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
18. Our procedures and systems are good at preventing errors from happening .....	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5

**SECTION B: Your Supervisor/Manager**

Please indicate your agreement or disagreement with the following statements about your immediate supervisor/manager or person to whom you directly report.

	Strongly Disagree ▼	Disagree ▼	Neither ▼	Agree ▼	Strongly Agree ▼
1. My supervisor/manager says a good word when he/she sees a job done according to established patient safety procedures.....	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
2. My supervisor/manager seriously considers staff suggestions for improving patient safety .....	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
3. Whenever pressure builds up, my supervisor/manager wants us to work faster, even if it means taking shortcuts .....	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
4. My supervisor/manager overlooks patient safety problems that happen over and over.....	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5

**SECTION C: Communications**

How often do the following things happen in your work area/unit?

	Never ▼	Rarely ▼	Some- times ▼	Most of the time ▼	Always ▼
Think about your hospital work area/unit...					
1. We are given feedback about changes put into place based on event reports .....	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>	<input type="checkbox"/> <sub>3</sub>	<input type="checkbox"/> <sub>4</sub>	<input type="checkbox"/> <sub>5</sub>
2. Staff will freely speak up if they see something that may negatively affect patient care .....	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>	<input type="checkbox"/> <sub>3</sub>	<input type="checkbox"/> <sub>4</sub>	<input type="checkbox"/> <sub>5</sub>
3. We are informed about errors that happen in this unit .....	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>	<input type="checkbox"/> <sub>3</sub>	<input type="checkbox"/> <sub>4</sub>	<input type="checkbox"/> <sub>5</sub>
4. Staff feel free to question the decisions or actions of those with more authority .....	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>	<input type="checkbox"/> <sub>3</sub>	<input type="checkbox"/> <sub>4</sub>	<input type="checkbox"/> <sub>5</sub>
5. In this unit, we discuss ways to prevent errors from happening again .....	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>	<input type="checkbox"/> <sub>3</sub>	<input type="checkbox"/> <sub>4</sub>	<input type="checkbox"/> <sub>5</sub>
6. Staff are afraid to ask questions when something does not seem right ...	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>	<input type="checkbox"/> <sub>3</sub>	<input type="checkbox"/> <sub>4</sub>	<input type="checkbox"/> <sub>5</sub>

**SECTION D: Frequency of Events Reported**

In your hospital work area/unit, when the following mistakes happen, how often are they reported?

	Never ▼	Rarely ▼	Some- times ▼	Most of the time ▼	Always ▼
1. When a mistake is made, but is <i>caught and corrected before affecting the patient</i> , how often is this reported? .....	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>	<input type="checkbox"/> <sub>3</sub>	<input type="checkbox"/> <sub>4</sub>	<input type="checkbox"/> <sub>5</sub>
2. When a mistake is made, but has <i>no potential to harm the patient</i> , how often is this reported? .....	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>	<input type="checkbox"/> <sub>3</sub>	<input type="checkbox"/> <sub>4</sub>	<input type="checkbox"/> <sub>5</sub>
3. When a mistake is made that <i>could harm the patient</i> , but does not, how often is this reported? .....	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>	<input type="checkbox"/> <sub>3</sub>	<input type="checkbox"/> <sub>4</sub>	<input type="checkbox"/> <sub>5</sub>

**SECTION E: Patient Safety Grade**

Please give your work area/unit in this hospital an overall grade on patient safety.

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
A	B	C	D	E
Excellent	Very Good	Acceptable	Poor	Failing

**SECTION F: Your Hospital**

Please indicate your agreement or disagreement with the following statements about your hospital.

	Strongly Disagree ▼	Disagree ▼	Neither ▼	Agree ▼	Strongly Agree ▼
Think about your hospital...					
1. Hospital management provides a work climate that promotes patient safety .....	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>	<input type="checkbox"/> <sub>3</sub>	<input type="checkbox"/> <sub>4</sub>	<input type="checkbox"/> <sub>5</sub>
2. Hospital units do not coordinate well with each other .....	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>	<input type="checkbox"/> <sub>3</sub>	<input type="checkbox"/> <sub>4</sub>	<input type="checkbox"/> <sub>5</sub>
3. Things "fall between the cracks" when transferring patients from one unit to another .....	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>	<input type="checkbox"/> <sub>3</sub>	<input type="checkbox"/> <sub>4</sub>	<input type="checkbox"/> <sub>5</sub>
4. There is good cooperation among hospital units that need to work together .....	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>	<input type="checkbox"/> <sub>3</sub>	<input type="checkbox"/> <sub>4</sub>	<input type="checkbox"/> <sub>5</sub>

**SECTION F: Your Hospital (continued)**

Think about your hospital...

	Strongly Disagree ▼	Disagree ▼	Neither ▼	Agree ▼	Strongly Agree ▼
5. Important patient care information is often lost during shift changes.....	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
6. It is often unpleasant to work with staff from other hospital units .....	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
7. Problems often occur in the exchange of information across hospital units .....	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
8. The actions of hospital management show that patient safety is a top priority .....	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
9. Hospital management seems interested in patient safety only after an adverse event happens .....	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
10. Hospital units work well together to provide the best care for patients.....	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
11. Shift changes are problematic for patients in this hospital.....	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5

**SECTION G: Number of Events Reported**

In the past 12 months, how many event reports have you filled out and submitted?

- |  |  |
|--|--|
| <input type="checkbox"/> a. No event reports     | <input type="checkbox"/> d. 6 to 10 event reports    |
| <input type="checkbox"/> b. 1 to 2 event reports | <input type="checkbox"/> e. 11 to 20 event reports   |
| <input type="checkbox"/> c. 3 to 5 event reports | <input type="checkbox"/> f. 21 event reports or more |

**SECTION H: Background Information**

This information will help in the analysis of the survey results.

1. How long have you worked in this hospital?

- |  |  |
|--|--|
| <input type="checkbox"/> a. Less than 1 year | <input type="checkbox"/> d. 11 to 15 years   |
| <input type="checkbox"/> b. 1 to 5 years     | <input type="checkbox"/> e. 16 to 20 years   |
| <input type="checkbox"/> c. 6 to 10 years    | <input type="checkbox"/> f. 21 years or more |

2. How long have you worked in your current hospital work area/unit?

- |  |  |
|--|--|
| <input type="checkbox"/> a. Less than 1 year | <input type="checkbox"/> d. 11 to 15 years   |
| <input type="checkbox"/> b. 1 to 5 years     | <input type="checkbox"/> e. 16 to 20 years   |
| <input type="checkbox"/> c. 6 to 10 years    | <input type="checkbox"/> f. 21 years or more |

3. Typically, how many hours per week do you work in this hospital?

- |   |  |
|---|--|
| <input type="checkbox"/> a. Less than 20 hours per week | <input type="checkbox"/> d. 60 to 79 hours per week    |
| <input type="checkbox"/> b. 20 to 39 hours per week     | <input type="checkbox"/> e. 80 to 99 hours per week    |
| <input type="checkbox"/> c. 40 to 59 hours per week     | <input type="checkbox"/> f. 100 hours per week or more |

**SECTION H: Background Information (continued)**

4. What is your staff position in this hospital? Select ONE answer that best describes your staff position.

- |  |   |
|--|---|
| <input type="checkbox"/> a. Registered Nurse                             | <input type="checkbox"/> j. Respiratory Therapist                       |
| <input type="checkbox"/> b. Physician Assistant/Nurse Practitioner       | <input type="checkbox"/> k. Physical, Occupational, or Speech Therapist |
| <input type="checkbox"/> c. LVN/LPN                                      | <input type="checkbox"/> l. Technician (e.g., EKG, Lab, Radiology)      |
| <input type="checkbox"/> d. Patient Care Asst/Hospital Aide/Care Partner | <input type="checkbox"/> m. Administration/Management                   |
| <input type="checkbox"/> e. Attending/Staff Physician                    | <input type="checkbox"/> n. Other, please specify:                      |
| <input type="checkbox"/> f. Resident Physician/Physician in Training     | <input type="text"/>  |
| <input type="checkbox"/> g. Pharmacist                                   |   |
| <input type="checkbox"/> h. Dietician                                    |   |
| <input type="checkbox"/> i. Unit Assistant/Clerk/Secretary               |   |

5. In your staff position, do you typically have direct interaction or contact with patients?

- a. YES, I typically have direct interaction or contact with patients.
- b. NO, I typically do NOT have direct interaction or contact with patients.

6. How long have you worked in your current specialty or profession?

- |  |  |
|--|--|
| <input type="checkbox"/> a. Less than 1 year | <input type="checkbox"/> d. 11 to 15 years   |
| <input type="checkbox"/> b. 1 to 5 years     | <input type="checkbox"/> e. 16 to 20 years   |
| <input type="checkbox"/> c. 6 to 10 years    | <input type="checkbox"/> f. 21 years or more |

**SECTION I: Your Comments**

Please feel free to write any comments about patient safety, error, or event reporting in your hospital.

**THANK YOU FOR COMPLETING THIS SURVEY.**

## Appendix C

### Investigator-added Survey Items Measuring Unit Leader Patient Safety Behavior

In this survey, think of your "unit" as the work area, department, or clinical area of the hospital where you spend most of your work time or provide most of your services.

How often do the following things happen in your work area/unit?

1. My department manager ensures staff conduct daily safety huddles.

Never      Rarely      Sometimes      Most of the time      Always  
                       

2. My department manager makes daily safety rounds that include spending time with patients and staff discussing patient safety.

Never      Rarely      Sometimes      Most of the time      Always  
                       

3. During leadership rounds, my department manager helps identify high risk patients and safety priorities.

Never      Rarely      Sometimes      Most of the time      Always  
                       

4. During leadership rounds, my department manager discusses safety habits that improve safety and reduce error.

Never      Rarely      Sometimes      Most of the time      Always  
                       

5. When mistakes or safety events occur, my department manager addresses the issue fairly considering both system and human issues that lead to error.

Never      Rarely      Sometimes      Most of the time      Always



## Appendix D

### Copyright Permission to Reprint the AHRQ Donabedian Research Model and Hospital Survey on Patient Safety Culture Instrument

#### **Drake, Dan**

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**From:** "Lewin, David (AHRQ)" <David.Lewin@ahrq.hhs.gov> <David.Lewin@ahrq.hhs.gov>  
**Sent:** Wednesday, December 10, 2014 12:23 PM  
**To:** Drake, Daniel J  
**Cc:** Kathryn (AHRQ) (AHRQ Contractors) Ramage; Randie A. (AHRQ) Siegel; Sandra K. (AHRQ) Cummings  
**Subject:** RE: Request to Use Research Materials [Reference #141201-000004]

Mr. Drake,

That was the figure I thought you were interested in. You have permission from AHRQ to use in your thesis and any professional publications arising from it:

"Figure 2. The Donabedian Model of Patient Safety" from Baker DP, Gustafson S, Beaubien J, and others. *Medical Teamwork and Patient Safety: The Evidence-based Relation*. (AHRQ Publication No. 05-0053). Rockville, MD: Agency for Healthcare Research and Quality. July 2005. (Accessible at: <http://www.ahrq.gov/research/findings/final-reports/medteam/index.html>).

In addition, you have permission to reprint the Hospital Survey of Patient Safety Culture survey form and the document from the HSOPS User's Guide explaining the survey dimensions as appendixes to your thesis. For professional publications, you have permission to include the links (URLs) to these two documents, but not to reprint the entire survey form or explanation of survey dimensions. If you feel that a journal article or book chapter needs to reprint these in full, please contact me or Ms. Siegel.

Sincerely,

---

**From:** Daniel Drake [mailto:ddrake@vidanthealth.com]  
**Sent:** Tuesday, December 09, 2014 8:38 AM  
**To:** Lewin, David (AHRQ)  
**Subject:** Re: Request to Use Research Materials [Reference #141201-000004]

Mr. Lewin,

Thank you for your assistance.

The model I am referring to is on the URL at <http://www.ahrq.gov/research/findings/final-reports/medteam/figure2.htm> and is illustrated as Figure 2. The AHRQ Depiction of the Donabedian model .

The instrument I am referring to is the Hospital Survey on Patient Safety Culture (HSOPSC) located at <http://www.ahrq.gov/professionals/quality-patient-safety/patientsafetyculture/hospital/resources/hospscanform.pdf> and the document explaining its dimensions located at <http://www.ahrq.gov/professionals/quality-patient-safety/patientsafetyculture/hospital/userguide/hospdim.pdf>

Thank you again. Please let me know if I can clarify further.

Dan

>>> "Lewin, David (AHRQ)" <David.Lewin@ahrq.hhs.gov> 12/8/2014 5:03 PM >>>

Dear Mr. Drake:

After reviewing the materials that you want to reprint in your thesis, I noticed that the AHRQ Web site has several variant diagrams of Donabedian's Theoretical Framework. Which one are you requesting permission to reprint?

Regarding reprinting one of the [AHRQ Surveys on Patient Safety Culture](#), which one are you asking to reprint? You have permission to reprint whichever is relevant to your work, as an appendix to your thesis. Please let me know (by sending the URL) if you have another document in mind. In either case, you must note the source on the form and in your references.

Once you clarify these questions for me, I will be able to grant permission to use the items you have in mind via email. Let me know if you need a signed permission letter.

Sincerely,

David I. Lewin, M.Phil.  
Health Communications Specialist/Manager of Copyrights & Permissions  
Office of Communications and Knowledge Transfer  
Agency for Healthcare Research and Quality  
540 Gaither Road  
Rockville, MD 20850

+1 301-427-1895 phone  
+1 301-427-1873 fax  
<[david.lewin@ahrq.hhs.gov](mailto:david.lewin@ahrq.hhs.gov)> email

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#### Contact Information

Email Address: [ddrake@vidanthealth.com](mailto:ddrake@vidanthealth.com)

First Name: Daniel

Last Name: Drake

Type:

Title:

---

#### Reference #141201-000004

Summary: Request to Use Research Materials

Rule State: AHRQ routing

Category Level 1: Research Tools & Data Category Level 2: Publications & Products

Date Created: 12/01/2014 04:27 PM

Last Updated: 12/02/2014 07:13 AM

Status: Unresolved

Assigned:

Name: Daniel Drake

Telephone Number:

Mailing Address

2

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Discussion Thread

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Customer By Web Form (Daniel Drake) - 12/01/2014 04:27 PM Hello, I am a Phd Student at the College of Nursing at East Carolina University. I am writing a dissertation about patient safety outcomes and nurse leader behaviors. The organization I am studying uses the AHRQ patient safety climate survey. I would like permission to reprint and use two AHRQ related items in my dissertation. One is the AHRQ representation of the Donabedian Theoretical Framework that is displayed on the AHRQ website. The purpose of using this model is to demonstrate a figure of the theoretical framework guiding my research. The second is the AHRQ patient safety climate instrument. I would like to print the instrument as an appendix for the purpose of informing the reader about the survey tool used for part of the data collection. In both cases I will create citations and reference the AHRQ. Please let me know the process to ask approval for the use of those two items. Thanks Daniel Drake

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