

**University of Alberta**

Patient Safety Climate and Leadership in the Emergency Department

By

Somaia Al-Ahmadi

A thesis submitted to the Faculty of Graduate Studies and Research  
In partial fulfillment of the requirements for the degree of

Master of Science

in

Health Policy Research

Department of Public Health Sciences

©Somaia Al-Ahmadi  
Fall 2011  
Edmonton, Alberta

Permission is hereby granted to the University of Alberta Libraries to produce single copies of this thesis and to lend or sell such copies for private, scholarly or scientific research purposes only. Where the thesis is converted to or otherwise made available in digital form, the University of Alberta will advise potential users of the thesis of these terms.

The author reserves all other publication and other rights in association with the copyright in the thesis and, except as herein before provided, neither the thesis nor any substantial portion thereof may be printed or otherwise reproduced in any material form whatsoever without the author's prior written permission.

## **Abstract**

The purpose of this study was to explore the relationship between the four leadership archetypes identified using the Competing Values Framework and patient safety climate in the ED. We used an established patient safety-rating instrument, the Safety Attitudes Questionnaire, to assess the safety climate. The leadership archetypes were assessed using the Multifactor Leadership Questionnaire. Data were gathered using a survey tool approaching RNs from the Emergency Nurses Interest Group and the College and Association of the Registered Nurses of Alberta. Multivariate analyses were used to explore measures of patient safety climate and measures of the leadership archetypes using Pearson's correlation and OLS regression models. The findings provide particular support for a contingent relationship between employee-centered leadership and entrepreneurial leadership, and patient safety climate in the Emergency Department. Employee-centered and entrepreneurial leadership archetypes were found to be instrumental in fostering patient safety climate in the ED.

## **Acknowledgments**

This thesis could not have been completed without the support and encouragement of many people. First, I would like to thank my family and close friends for their endless support and generosity. They all have provided love and support for this journey in their own unique ways.

I would like to thank Dr. Kent Rondeau for his support and knowledge. This thesis would not have been produced without his insights and feedback.

Last but not least, I would like to thank the nursing staff who participated in this study. This process has provided me with renewed respect for your skills and passion for the work and an appreciation for the role we might play in supporting that work.

## Table of Contents

Abstract .....	3
Acknowledgments.....	4
List of Tables.....	7
List of Figures .....	7
List of Abbreviations.....	8
Chapter 1 .....	9
<i>Introduction and Literature Review</i> .....	9
I. Background .....	9
A. Patient Safety in Health Care Organizations .....	9
B. Medical Errors in the Emergency Department .....	10
C. Leadership Theories.....	13
D. Leadership and Safety in the Workplace .....	16
E. The Significance of Leadership on Patient Safety.....	17
F. The Nursing Leadership.....	19
<i>The Charge Nurse</i> .....	20
<i>The Nurse Unit Manager</i> .....	21
G. Nursing Leaders and Patient Safety.....	23
H. Safety Culture Measurement Tools .....	26
I. Safety Climate vs. Safety Culture.....	27
II. Leadership: The Competing Values Framework .....	29
III. Conceptual Framework and Hypothesis Development.....	38
Chapter 2 .....	40
<i>Methods</i> .....	40
I. Measuring Patient Safety Climate .....	40
II. Measuring Leadership Archetypes .....	41
III. Measures: Creation of the Survey Instrument.....	42
IV. Procedures: Web-based survey .....	43
V. Inclusion Criteria .....	43

## Table of Contents

VI. Testing the Instrument.....	44
VII. Privacy and Confidentiality.....	44
Chapter 3.....	46
<i>Results</i> .....	46
I. Statistical Analysis.....	46
II. Sample Statistics (Uni-variate).....	50
III. Bi-variate Correlational Analysis.....	57
IV. Ordinary Least Squares (OLS) Regression (Multivariate Analysis).....	61
Chapter 4.....	67
<i>Discussion</i> .....	67
Chapter 5.....	73
<i>Conclusion</i> .....	73
I. Strengths and Limitations of the Study.....	73
II. Practical Implications and Directions for Future Research.....	74
Bibliography.....	76
Appendices.....	87

## List of Tables

1. Table 1: Means, standard deviations and ranges for the Leadership Archetypes.....	46
2. Table 2: Difference on selected respondent and institutional characteristics between the two data sources.....	47
3. Table 3: Job functions reported by respondents.....	49
4. Table 4: Number of ED beds reported by respondents.....	49
5. Table 5: Reporting adverse events and near misses in the ED.....	50
6. Table 6: Work conditions in the ED reported by respondents.....	52
7. Table 7: Means, standard deviations and ranges for interval ratio control variables.....	53
8. Table 8: Nursing Leadership Archetypes in the Emergency Department.....	53
9. Table 9: Mean, SD scores, and inter-correlation of the 10 study variables.....	57
10. Table 10: OLS Regression Results for ED Patient Safety Climate Global.....	60
11. Table 11: OLS Regression Results for ED Patient Safety Climate Leadership...	61
12. Table 12: OLS Regression Results for ED Patient Safety Communication.....	62
13. Table 13: OLS Regression Results for ED Patient Safety Reporting.....	63

## List of Figures

1. Figure 1 – The Competing Values Framework .....	28
2. Figure 2- Leadership Archetypes based on the CVF.....	33

## **List of Abbreviations**

1. AHS: Alberta Health Services
2. CARNA: College and Association of the Registered Nurses of Alberta
3. CEO: Chief Executive Officer
4. CNO: Chief Nurse Officer
5. COO: Chief Operating Officer
6. CVF: Competing Values Framework
7. ED: Emergency Department
8. ENIG: Emergency Nurses Interests Group
9. HRO: High Reliability Organization
10. LRS: Learning and Reporting System
11. MaPSaF: Manchester Patient Safety Assessment
12. MD: Medical Doctor
13. MLQ: Multifactor Leadership Questionnaire
14. NUM: Nurse Unit Manager
15. OLS: Ordinary Least Squares
16. PASW: Predictive Analytics Software
17. R<sup>2</sup>: Coefficient of Determination
18. RN: Registered Nurse
19. SAQ: Safety Attitudes Questionnaire
20. SPSS: Statistical Package for Social Sciences
21. UK: United Kingdom
22. US: United States

## Chapter 1

### *Introduction and Literature Review*

#### **I. Background**

##### **A. Patient Safety in Health Care Organizations**

Creating an effective safety climate in health care organizations has attracted the attention of policy makers, health care providers and quality leaders. Two policy documents that have been particularly influential in this respect: *To Err is Human* published by the Institute of Medicine in the United States (Kohn et al., 2000), which estimated that as many as 98,000 deaths occur each year in the United States as a result of medical error, and *An organization With a Memory*, a policy document published by the UK Department of Health (Department of Health Expert Group, 2000). Both of these reports describe how organizational climate can influence the attitudes and behavior of individual employees and highlight the importance of a systems-based approach to facilitate the development of a climate that promotes safe practice in health organizations; yet, since these crucial reports, insufficient progress has been made. A recent report from the Consumers Union (2009) entitled “*To Err Is human; to Delay Is Deadly: Ten years later, a million lives lost, billions of dollars wasted*” notes: “despite a decade of work, we have no reliable evidence that we are any better off today.”(p.12)

In Canada, the issue of patient safety is continuing to gain attention and momentum with the release of various reports indicating that a high percentage of adverse events were preventable (Baker et al., 2004). As a response to these national and international reports as well as pressures from the public, medical institutions and



providers, the federal government announced in 2003 the creation of the Canadian Patient Safety Institute and the Health Council of Canada.

In the mid 1990s, Canadian hospitals underwent massive restructuring resulting in crucial organizational changes. These changes were fueled by pressures from the federal and provincial governments to be more efficient and responsive. One of the major changes was the merger of several hospitals which created dramatic changes to the work environment, including reductions in the number of clinical and management positions, particularly in nursing. The responsibilities of the nurse manager has increased significantly; nurse managers were put in charge of several units, sometimes with more than 150 staff members (McCutcheon, 2003).

## **B. Medical Errors in the Emergency Department**

Given the dynamic and critical role of the emergency department as the first point of contact in emergencies, patient safety is sometimes compromised. In an ED, there are no appointments, no plans of patient attendance or ambulance arrival and the ED must provide initial treatment for a wide range of injuries and illnesses, some of which may be life-threatening.

Triage is normally the first stage the patient passes through. Most patients will be assessed and then passed to another area of the department, or another area of the hospital, with their waiting time determined by their clinical need. However, some patients may complete their treatment at the triage stage, for instance if the condition is very minor and can be treated quickly, if only advice is required, or if the emergency department is not a suitable point of care for the patient. Conversely, patients with

evidently serious conditions, such as cardiac arrest, will bypass or move through triage quickly and go straight to the appropriate part of the department.

Health care providers in the emergency department have to work in situations involving disrupted sleep cycles, acute time constraints, multiple life and death crises, multiple interruptions (Chisholm et al., 2000), and patient overcrowding. Some important factors contributing to the rise of medical errors in the ED include; no continuity of care given patients' episodic visits, high volume of ED patients, wide range of patient conditions and ages, time and other distractions, and breakdown in communication between team members (Croskerry et al., 2004). A key study has reported that the primary contributing factor to medical errors is ED overcrowding, a factor which is pushing hospital-based emergency care to the breaking point (Thomas et al., 2000). In addition, the physical layout of the area allows for interruptions because it is often an open space.

In an Institute of Medicine report (2004), *Keeping Patients Safe: Transforming the Work Environment of Nurses*, 13 inefficiencies arising from interruptions and distractions associated with nursing tasks have been identified as aspects of nurses' work that pose a threat to patient safety (p. 13). Many studies have noted that nurses perceive interruptions and distractions as a primary reason for making errors (Gladstone et al., 1998).

Medication errors, the largest subset of medical errors, contributed to the loss of more than 7000 lives annually in the US (Kohn et al., 2000). Estimates for ED adverse medication error events range from 53% to 82% compared to estimates of 27% to 51% for hospital-wide adverse events (Fordyce et al., 2003). In 2002, a report by the Centers

for Disease Control (CDC) indicated that almost 2 million Americans acquire infections in the hospital in addition to an estimated 2% to 4% falls (670,000 and 1.3 million) with 2% to 6% of these falls resulting in injury. Medical errors can occur in every department within the health care organization, however, the conditions in the emergency department can make things even more complicated (Croskerry et al., 2004). Emergency medicine is characterized by a number of factors and conditions such as the care of multiple patients with a wide variety of medical conditions, illnesses and a large portion of those patients seen in an ED is acutely ill. Medication errors can occur in hospital EDs or pharmacies, and the error may be made by any of the staff involved in choosing or dispensing medications. Some examples of medication errors are: inappropriate medication; the wrong medication given for a disease, wrong medication; the patient gets the wrong medication despite the doctor prescribing the correct one, drug name mix-ups; several medications have similar-sounding names and can be mixed up by doctors or pharmacists, wrong medication combinations; and there are numerous types of medications that should not be mixed because of side effects and cross-reactions when combined. Other medical errors include; pathology lab errors, equipment failure errors, slow access/delivery of medication and treatment mistakes. Errors can occur. The key is to design the care delivery systems so that harm does not reach the patient.

Patients and their family members may be able to observe errors and adverse events that go unnoticed or unreported by health care providers. Family members often have a detailed knowledge of the patient's medical needs and functional status, and they often spend more time at the bedside than the doctor or nurse. However, there is a limited body of research looking to patients and their family members as a resource for quality

improvement. Weingart and colleagues (2005) conducted a prospective study interviewing 228 adult inpatients on a medicine unit of a Boston teaching hospital. Eight percent (8%) of patients experienced adverse events and 4% experienced near misses. Approximately one-half of the adverse events and one-third of the near misses were documented in the medical records, but none were found in the hospital event reporting system.

Fordyce and colleagues (2003) described errors occurring in the emergency department, reporting 18 errors for every 100 registered patients and 0.36 adverse events per 100 registered patients. Their report showed that the second most frequent area of emergency care subject to errors was pharmacotherapy (16%), second to diagnostic studies (22%).

The study of medical and medication errors has increasingly focused on systems of health care delivery rather than the people who work in these situations committing these errors as a result of poor system design and lack of leadership commitment to patient safety. Attention has been mainly focused on the use of state-of-the-art technology and systemic quick fixes such as electronic medical records through improving areas of care and minimizing medical error and near misses. However, an important factor that determines the success or failure of safety climate is leadership.

### **C. Leadership Theories**

Much has been written about leadership and many theories have been formulated about what describes a good leader, but what exactly is leadership? The Webster dictionary defines leadership as “The quality of character and personality giving a person the ability to gain the confidence of and lead others.” Other definitions of

leadership and nursing leadership include: an interpersonal process for influencing the actions of an individual or group toward accomplishing goals in a given situation; setting the pace and direction for change; facilitating innovative practice; and a vehicle through which health policy and nursing practice can be influenced and shaped (Feltner et al., 2008). Thus, leaders are people who are able to think and act creatively in non-routine situations and who set out to influence the actions, beliefs, and feelings of others; in this regard, being a “leader” is personal.

Research studies have found that a leadership style in a healthcare setting has a direct effect on job satisfaction and overall environment. In addition, these studies have concluded that hospital units with transformational leadership style managers had higher nursing job satisfaction and lower turnover rate (McCutcheon et al., 2004; Medley & Larochelle, 1995; Stordeur et al., 2000). Transformational leaders are able to inspire people, stimulate them to think differently and pay attention to their needs. They exert a significant positive impact on staff by providing support, encouragement, positive feedback, and individual consideration and promoting open communication. These leadership behaviours tend to generate favorable climate on the unit, characterized by increased co-operation, teamwork, and fewer interpersonal conflicts, all of which are important in ensuring quality and safe patient care. Bass (1998) recommended that organizations recruit and train managers in supportive and participative leadership styles, such as the transformational leadership style.

The Multifactor Leadership Theory has been described in the healthcare literature (Kanste et al., 2007). It proposes three distinct leadership styles: transformational leadership (based on charisma-inspiration), transactional leadership

(based on rewards and punishments), and laissez-faire leadership (lack of leadership). Transformational leadership has been proposed and supported as the most successful among the three leadership styles (Bass & Avolio, 2000)

Burns's (1978) ideas on transactional and transforming leadership in politics were taken up by Bass (1998) and applied to the study of leadership behaviors in organizations. Bass utilized the essence of Burns's model into four transformational dimensions (such as charisma, inspirational motivation, intellectual stimulation, and individualized consideration) and three transactional dimensions (such as contingent reward, management-by-exception, and laissez-faire). Transformational leadership and transactional leadership do not form a single behavioral continuum but rather represent different types of leadership behaviors (Yukl, 1998).

Likert (1976) has developed the Profile of Organizational Characteristics; that positions an organization as being one of four categories: autocratic, benevolent, consultative, or participative. In an autocratic system, very little cooperative teamwork is found; the usual information flow is downward and control is important. Staff tend to turn to the rumor mill for information, and would not trust the leader. The Profile of Organizational Characteristics developed by Likert is quite similar in concept to Bass and Avilio's transactional and transformational leaderships.

Two investigations were found that linked Chief Nurse Officer (CNO) to quality care and patient safety (Scott-Cawiezell et al, 2004; Burritt, 2005). The top three responses, in these two studies, regarding what facilitated good care and what interfered with providing good care were communication, staffing, and leadership.

Transformational leadership captured the interest of several investigators (Redmond,

1995: Dunham-Taylor, 1995: Leach, 2005). Although these studies were often framed to indicate a preference for a transformational style, the findings contend that leadership is complex and multidimensional.

Across studies of CNO leadership, the specific topics studied are much dispersed. As a result, it is difficult to make statements to guide practice. These studies illustrate that multiple styles of leadership may be operationalized concurrently. Evidence related to transformational leadership suggests that researchers need to consider multiple types of leadership and how the types work together, helping to limit bias created by studying only transformational leadership or advocating for transformational leadership as a superior style. The evidence simply does not support that view (Leach, 2005: Gresham, 1997: Knox , 1997).

#### **D. Leadership and Safety in the Workplace**

Substantial studies suggest that organizational leaders play a central role in influencing safety-related attitudes and actions in the workplace. Studies by Hofmann and Morgan (1999) indicated that efficient quality leaders contributed to improved safety communication and safety commitment, which in turn impacted reduced incidence of accidents. Cree and Kelloway (1997) found that employees were more willing to participate in safety programs when the management was more committed to safety. On the whole, the accumulated data suggest that when leaders actively promote safety, organizations experience better safety records and more positive safety outcomes (Hofmann et al., 1995: Shannon et al., 1997: Zohar, 1980). It is important to note that most research has examined the significance of effective safety leaders on safety outcomes. However an important question might not have been adequately addressed; the

question of “anti-safety” leaders as it is quite possible that in some cases leaders simply overlook safety concerns and outcomes (Kelloway et al., 2006).

Kelloway and Mullen (2006) have studied the divergent effects of transformational and passive leadership on employee safety and have found that safety-specific passive leadership has had a direct negative and unique result on safety climate and safety consciousness. These effects are just about equal in degree and opposite in sign to the effects of safety-specific transformational leadership. Barling and Kelloway’s research (2002) has also shown that safety-specific transformational leadership is indirectly associated with occupational safety.

#### **E. The Significance of Leadership on Patient Safety**

Senior leaders have both the responsibility and the authority to position safety as a strategic priority in the organization. If safety is to be seen as a strategic priority for all staff, then leadership must make it a key focus of their attention. It has been suggested, “...the only thing of real importance that leaders do is to create and manage climate ....” (Schein, 1985, p. 20). In a sound safety climate, an individual would be expected to intercede if they saw a coworker about to commit an unsafe act. In a sound safety climate, leadership would be expected to monitor health of the safety climate, and reinforce and nurture it when required.

According to Jim Conway, Senior Fellow and former Executive Vice President and Chief Operating Officer of Dana-Farber Cancer Institute, “Leaders play an extraordinary role in patient safety.” First and foremost, he explains, leaders must “provide focus; make patient safety not just another ‘program de jour’ but a priority



corporate objective. You must make everyone in the institution understand that safety is part of his or her job description”.

The leadership of an organization has the primary responsibility for identifying the need for, and fostering, cultural change and for sustaining a sound safety climate once it is established. Kotier (1990) lists the following six key tasks that must be performed in any organizational change: 1) Establishing direction, 2) Aligning people, 3) Motivating and inspiring people, 4) Planning and budgeting, 5) Organizing and staffing, 6) Controlling and problem solving.

The first three tasks, which are intended to initiate change, are leadership tasks, and the latter three constitute the core of today’s management. The distinctive role of leadership is to establish the culture and value system in the organization; set strategic goals for activities to be undertaken; align efforts within the organization to achieve those goals; provide resources for the creation, spread, and sustainability of effective systems; remove obstacles to improvements for clinicians and staff; and require adherence to known practices that will promote patient safety. When leaders begin to change their responses to mistakes and failure, asking *what happened* instead of *who made the error*, the culture within their health care institutions will begin to change.

So many hospital leaders are clinicians who have been promoted into these positions, with little if any leadership training. A 2011 report by Kathleen Stanford “the case for nursing leadership development” indicated that when nurse leaders are asked how they transferred to a leadership position, the response would usually be "I was the only one who would take the job" (p. 23) or "I came to work one day and was told I was the new charge nurse " or "I was talked into it by my boss". These were the common

responses reported. However, the report mentions that the underlying reason is that they were excellent clinical nurses and thus it was assumed they would make excellent managers.

This reasoning is not unique to nursing or even to clinical fields. For years, other professions have also failed to recognize that management is a specialty with its own knowledge base and competencies. They have promoted individuals who, despite previous successes, are ill prepared or even unsuited for the realities of supervisory jobs. Clinical leaders require human-resource management skills because they manage and work with people. They also need to understand the business side of health care so they can support business goals that might, at least to some, seem to be at odds with quality and safety initiatives.

#### **F. The Nursing Leadership**

There are different levels of nursing leadership in a healthcare organization. The nursing leadership could be the Chief Nurse Officer; it could be the unit manager, unit supervisors, or the charge nurses. The nursing leadership could be a group of nurses at the managerial level (shared leadership) who work as a team representing a unit or a department in the hospital. Shared leadership occurs when two nurse managers share tasks and responsibility for a unit (Döös, 2003). An international perspective of shared leadership offers the opportunity to manage and develop a team by coaching the professionals to achieve full potential. It is an effective way to improve work environments, job satisfaction and reduction in turnover rates (McCallin, 2003; George, 1999). Shared leadership is an ongoing and fluid process which requires continuous evaluation in order to be flexible in the ever-changing health care settings (William et al.,

2002). For this specific study, the focus is more on the nursing leadership of the emergency department; whether it is the one leader such as charge nurse or a shared nursing leadership of the emergency department. In this study, we chose not to distinguish between leaders and managers. Our decision is based on the fact that management theories acknowledge leadership as an essential part of the managerial role (Hamlin, 2002).

### *The Charge Nurse*

Most commonly known as charge nurses, these key members of the hospital workforce serve in supervisory roles for a single shift on a single unit. The charge nurse is the true manager of the ED, resolving obstacles and eliminating barriers that frustrate both patients and staff. More often than not, charge nurses are also informal leaders, with a high degree of influence on their nursing colleagues. They have daily control over the use of hospital personnel, equipment, and supplies. They influence how other staff members feel about hospital management and new technology or processes occurring on the units. Their interpersonal skills affect personnel turnover. Yet in most hospitals, they are not considered part of the leadership team and have very little management education or information on the organization's goals.

### *The Nurse Unit Manager*

The Nurse Unit Manager (NUM) is a registered nurse in charge of a ward or unit in a hospital or community health setting. This first-line management role encompasses both clinical aspects (such as the co-ordination of patient services and clinical care) and managerial functions (including unit management and nursing staff management).

Importantly, whilst the NUM role demands significant management skills, in her study of Australian Nurse Unit Managers, Paliadelis ( 2008) found that few NUMs possessed formal management qualifications. Studies in Canada show that a decade of restructuring has resulted in the loss of 6,617 Unit Managers (2.8%) or nurse manager positions (Laschinger et al., 2003). A recent Australian study found that 64% of Nurse Unit Managers' tasks involve general management activities (such as budgeting and staff management), whilst a further 14% of tasks involved quality, safety and risk management. In contrast, only 16% of tasks were focused on patient care and 6% on leadership, where leadership is defined as involving activities such as 'empowering' staff members, maintaining professional standards, supervising staff, encouraging team work, mentoring and recognizing staff achievements (National Health Workforce Taskforce, 2009)

The responsibility of an organization to ensure safe, quality care to its patients has always been assigned to the senior leadership team. This responsibility is not novel, but increasingly complex because of the multiplying number of programs and measurement criteria, and the escalating pressure for performance and accreditation. A recent report (Draper et al., 2008) noted that "nurses are the key caregivers in hospitals [and] significantly influence the quality of care provided and, ultimately, treatment and patient outcome." In an answer to "who should lead the quality journey?" Disch (2008) noted, "As leaders within their organizations, [CNOs] (Chief Nurse Officers) have the background, perspective, and platform to help their organizations seriously tackle safety issues that jeopardize patient care and that face nurses and their colleagues daily."(p.2)

In a recent publication on governance in high-performing community health systems by Prybil and colleagues (2009), a key recommendation was that “community health system boards and their chief executive officers (CEOs) should reexamine their current size and composition [and] consider the appointment of highly respected and experienced nursing leaders as voting members of the board to complement physician members and strengthen clinical input in board deliberations’ (p.41). Effective nursing supervision plays a great role in handling work environment stressors, such as change and adaptation (Severinsson & Kamaker, 1999). A study, however, indicated that nurse managers may be unable to provide adequate supervision because of high supervision ratios and workload (Kimball & O’Neil, 2002).

Given that nurses make up the largest segment of healthcare providers, and that they deliver more individual patient care than any other provider, the potential impact of nurse staffing numbers on patient safety is very large. Nurses are the largest group of health care providers in the hospital, are generally closer to patients than other clinicians, and spend the most time in the patient care departments. Hence, they are the most likely to recognize workflow, physical plant, or communication-related issues that give rise to patient safety problems and also to identify possible solutions and work to implement them. In one well-known study, nurses were responsible for intercepting 86% of medication errors before administration, a rate far higher than at any other stage of the medication use process (Leape et al., 1995).

The truth of the matter is that very few nursing leaders are included in the hospital boardroom where decision making and strategic priorities such as patient safety are identified, developed and enforced. A 2007 report by Meyers stated that, in 10 top

healthcare organizations known for their quality, less than 2% of board positions were held by nurses.

### **G. Nursing Leaders and Patient Safety**

There is little research that has been done on the effect of nursing leadership on patient care safety in a healthcare setting. The first main comprehensive study linking safety and nursing leadership: *Organizational turnaround: the role of the nurse Executive* by Burritt (2005) linked CNO (Chief Nurse Officer) to fewer patient falls leading to less injuries and fewer nosocomial infections (hospital-acquired infections) and improved patient satisfaction with nursing care. The second study was by Scott-Cawiezell and colleagues (2004) entitled: “*Exploring nursing home staff’s perceptions of communication and leadership to facilitate quality improvement*”. This study examined correlations between leadership and communication to quality care in 15 nursing homes in 4 US states. Seventeen clinical staff identified three factors that were the same whether describing what facilitated, or hindered, providing good care: communication, staffing, and leadership. In 2004, a study by Ash and associates found that nurses are viewed as having the responsibility, but not the authority for ensuring patient safety. Another study by Cook and colleagues (2001) found that only 8 percent of physicians viewed nurses as key members of the decision-making team in their institutions. In addition they reported that 96 percent of nurses and more than 90 percent of all others viewed nursing as having primary responsibility for patient safety.

In the same study by Cook and colleagues, nurses were reluctant to discuss physicians errors with them because of nurses perceived lack of authority to question the physician, a desire to maintain collegial relationships with physicians, prior experience

with being rebuffed by a physician when the nurse questioned a medical practice, and a lack of support from administration when nurses do question or challenge physician practice. They reported that administrators felt the same way about questioning the physician because of their own lack of clinical expertise. The participants in the study by Cook and colleagues acknowledged that a lack of consensus about what constitutes an error leads to an underreporting of errors. As one nurse participant noted, “The physician told me it’s not an error, so we don’t need to file an incident report” (p. 40). Another important study by Rosenstein and O’Daniel (2005) that asked nurses and physicians about communication, found 75 percent of respondents had witnessed “disruptive behavior” by physicians, and 68 percent had witnessed such behavior by nurses. Furthermore, 17 percent reported that adverse events occurred as a result of the disruptive behaviors. Some of the participating physicians said that nurses’ reports of the patients’ conditions are sometimes frustratingly inadequate. On the other side, nurses reported that they will not call abusive physicians about their patients. Consider the following quotes from nurses in this study (Rosenstein, 2005, p. 61-62):

- Delays in patient receiving meds because RN was afraid to call the MD.
- Most nurses are afraid to call Dr. X when they need to, and frequently won’t call. Their patients’ medical safety is always in jeopardy because of this.
- Adverse event related to medical error because MD would not listen to the RN.
- RN did not call MD about change in patient condition because he had a history of being abusive when called. Patient suffered because of this.
- RN called MD multiple times with regard to deteriorating patient condition. MD upset with RN calling. Patient eventually had to be intubated.

- Poor communication post-op because of disruptive reputation resulted in delayed treatment, aspiration, and eventual demise.

The question then becomes: how can nurses be responsible for patient safety if they do not feel safe in challenging a physician's order? These are long-standing issues, but the current focus on patient safety provides nurses with the opportunity to call for, demand, and lead organizational and interdisciplinary changes that will put patients first.

In 2004, the Healthcare Leadership Alliance, which includes the American Association of Nurse Executives and other health care executives, identified a core set of competencies for executive leaders in health care. The identified core competencies for nurse executives in health care were: (a) leadership, (b) business skills and principles, (c) communication and relationship management, (d) professionalism, and (e) knowledge of the health care environment.

Rich (2008) has described the importance of effective leadership for promoting patient safety. In order to enhance patient safety, it is necessary to:

- a) "Address senior leadership's lack of professionalism and diminished respect in the workplace. Remember, it takes a village to change a culture.
- b) Provide leadership, direction, and passionate commitment for rapid response team implementation. Communicate successful outcomes to not only nursing and medical staff, but to all stakeholders. Take charge as a nurse executive to promote the successes.
- c) Be the moral conscience for the patient at the senior leadership table, especially if a balance of safety practices and financial imperatives is needed. Sometimes compromise is not acceptable when it concerns patient or nurse safety.



- d) Develop translational research mechanisms and business acumen to effectively articulate the business case for patient safety.
- e) Keep informed on technology and innovations in patient safety and support them vehemently if outcomes appear justified.
- f) Emulate authentic leadership traits using skilled communication messages of truth, trust, balance, respect, and confidentiality.” (p.7)

## **H. Safety Culture Measurement Tools**

There are a number of different questionnaires that have been developed to measure dimensions of safety culture in healthcare settings. They can be used to track the effects of safety interventions on the unit or organizational safety culture. The Safety Attitudes Questionnaire (Sexton et al., 2008) is the tool that has been used in more than 200 studies in the US, UK and New Zealand. It has been rigorously tested for internal reliability and validity, and has been found to have construct validity and consistency. It was decided to use this tool for these reasons. Other measurement surveys include:

*Hospital Survey on Patient Safety Culture:* (Sorra & Nieva, 2004) a 42-item questionnaire measuring 12 dimensions for both clinical and nonclinical staff, at unit and management levels in hospitals. This has been widely used in the USA and European countries with scientific reports beginning to emerge. Versions are available for different settings, such as hospital units. *MaPSaF Manchester Patient Safety Assessment Framework:* (Kirk et al., 2007) is another method of assessing safety culture; based on a card sorting and discussion task. It is designed for work teams to self-reflect on their culture.

## **I. Safety Climate vs. Safety Culture**

Promoting a culture of safety has become one of the pillars of the patient safety movement. For many years, we have heard about the impact of the organizational culture or climate on patient safety. But what is an organizational climate? How about culture? To begin, it is helpful to understand that culture and climate, although used synonymously, are different. We can compare organizational culture and climate to personality and mood. The former is enduring; the latter is temporary. We acquire our basic personalities early in life, but our moods can shift several times in one day.

Most definitions of safety culture capture beliefs, values, and attitudes that are shared by a group. Human behaviours (and thus at an individual level, safe or unsafe behaviours) are partly guided by personal beliefs, values, and attitudes (Fazio, 1986). Ostrom (1993) argues that a culture is comprised of social norms, which are unspoken rules of behaviour that, if not followed, result in sanctions. Reason (1997) argued that this norm will only develop under the conditions he deemed a ‘reporting culture’ – a culture in which workers feel free to report their errors and near misses to management without unjust punishment.

Zohar (1980) coined the term safety climate in an empirical investigation of safety attitudes in Israeli manufacturing, and defined it as ‘...a summary of molar perceptions that employees share about their work environments’ (p.96). The main differences in the definitions are that whereas safety culture is characterized by shared underlying beliefs, values, and attitudes towards work and the organization in general, safety climate appears to be closer to operations, and is characterized by day-to-day perceptions towards the working environment, working practices, organizational policies, and management

(Guldenmund, 2000). Thus, safety culture and safety climate appear to operate on different levels.

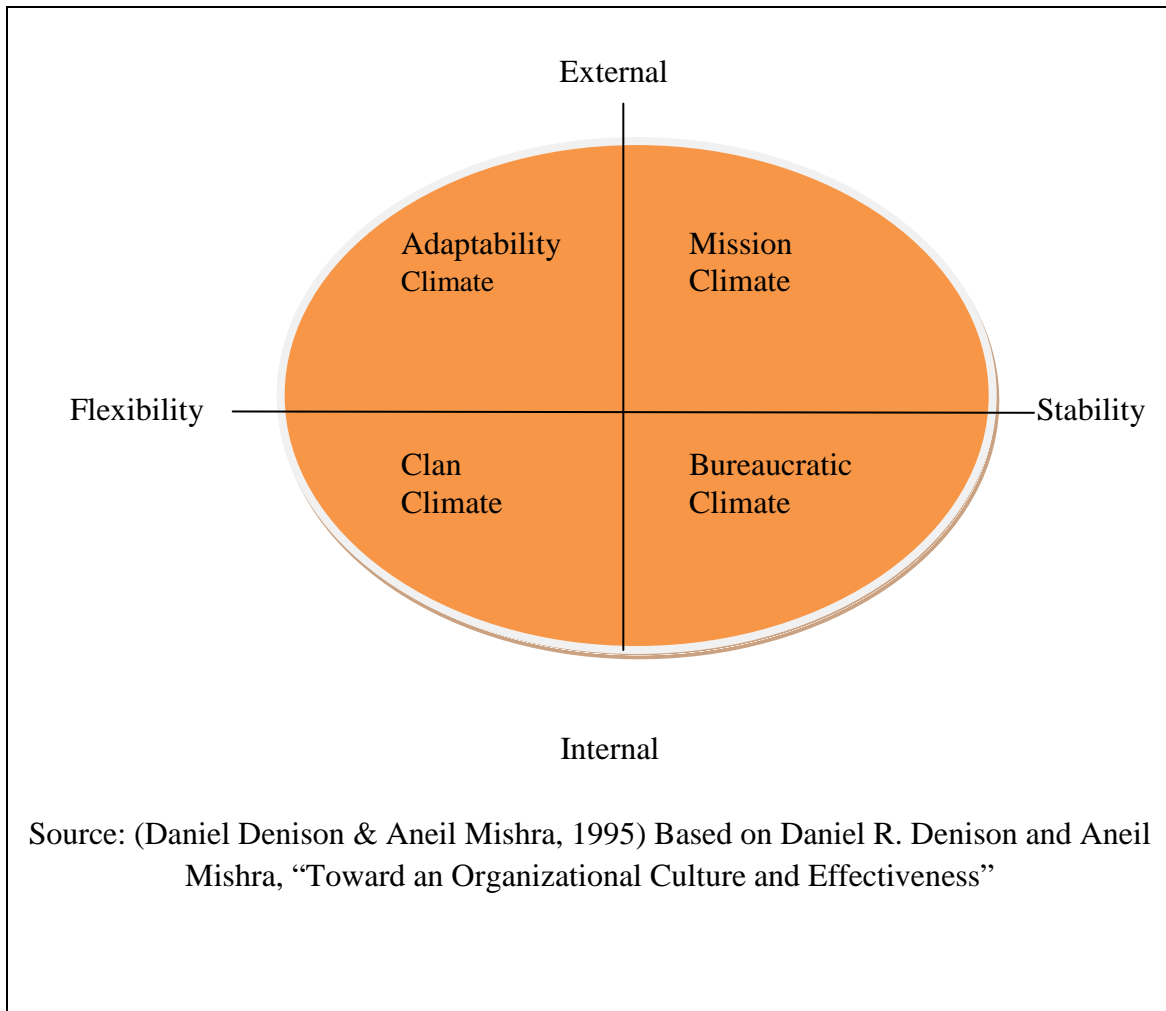
Climate is the label used to describe the dimensions of the work environment that can be measured with relative precision. A variety of factors determine the climate of an organization however leadership is the single most important determinant of organizational climate; specifically the day-to-day leadership. Some researchers assume that safety culture is a type of organizational culture. Both are related, but safety culture has distinctive peculiarities and possesses its own identity. A second approach suggests that safety culture is an expression or manifestation of a specific organizational culture, which is then crystallized into a safety management system (Glendon et al., 2000).

## **II. Leadership: The Competing Values Framework**

A diverse range of conceptual frameworks and models for understanding safety culture and culture change have been developed. A strong framework of organizational culture that is often applied in healthcare research is the competing values framework (Scott et al., 2003). Cameron and Quinn (1980) have developed an organizational framework built upon a theoretical model called the "Competing Values Framework." This framework refers to whether an organization has a predominant internal or external focus and whether it strives for flexibility and individuality or stability and control.

The competing values framework (CVF), one of the most influential frameworks in business adapted in this study, illustrates four historical models of effective organizations (Quinn et al, 1990). These four models are: adaptability climate, clan climate, mission climate, bureaucratic climate.

**Figure 1 – The Competing Values Framework**



Though the framework is most often thought of as a business tool, it has shown to have many important advantages. The CVF can be used for all aspects and levels in organizations. For example, it can be applied to personal style, yet the same framework can also be used to assess communication, leadership, organizational climate, core competencies, decision making, motivation, human resources practices, quality, employee selection, organizational capabilities, organizational change patterns, strategy, financial performance and many others. A person can use the language and concepts of

the competing values to work with people on issues at many different levels. This allows an organization to integrate its work around a common language and framework.

The figure above illustrates the fundamental concept of the CVF: a two-by-two figure with four quadrants. The horizontal axis contains control systems competing with flexible systems; while the vertical axis contains internally focused systems competing with externally focused systems. In each quadrant, two defined roles describe the behaviors that a leader in those roles might exhibit. Each role has an opposite or competing role from the exact opposite quadrant. A leader should be aware of the unseen (competing) values at the other end of the pursuant values. The two axes include flexibility versus stability, internal focus versus external focus (Hooijberg & Petrock, 1993). The values denoted by CVF 'compete' in the sense that scores in one direction on an axis are allocated at the expense of scores in the other direction. Nevertheless, organizations are not deemed simply to fall into one of the four cells. Rather, they are seen to exhibit competing values while nevertheless having a more or less strong tendency to one particular 'dominant' culture type (Scott et al., 2003). The CVF pays particular attention to the employee perspective, is consistent with a commitment-based management philosophy, and emphasizes transcending apparent paradoxes to identify win-win solutions. Rather than focusing on customer satisfaction or employee satisfaction, the CVF looks for ways to satisfy customers and employees while still addressing financial constraints and growth opportunities. The CVF also can be used to assess both the culture of the organization and the competencies of individual managers, thereby providing a clear link between strategy and implementation. The CVF also emphasizes the importance of the ends and means of achieving balance within each

action imperative (Quinn, 1988). The CVF is particularly appropriate for service organizations, such as hospitals, where the culture is based on group values (Obendhain and Johnson, 2004). Because the CVF can be used at multiple levels of analysis, it can be helpful in promoting the type of culture needed for successful quality improvement efforts (Bradley et al, 2003).

The CVF recognizes that managers often face situations that appear to require trade-offs. Organizations need to address the fundamental tensions between control and flexibility and between external issues and internal issues. Researchers in the healthcare industry have called for a variety of changes that reflect the need for hospitals to address all four of the CVF action imperatives. For example, Abernethy and Lillis (2001) state that for hospitals to compete effectively, organizational strategy must be changed to focus on innovation, flexibility, knowledge, and enterprise-based systems and that self-managed teams and a strategically designed management system must be implemented. CVF's main impact stems from its recognition that several management models can coexist in organizations, but also from its orientation towards diagnostic instrument development.

The CVF has been validated as an evaluation tool in various types of organizations. The framework has been used by Kaarst-Brown and colleagues (2004) to evaluate library cultures; by Obendhain and Johnson (2004) to assess organizational cultural types in service organizations; by Goodman, Zammuto, and Gifford (2001) to evaluate the relationship between organizational culture and the quality of work life in hospitals; and by Gifford and colleagues (2002) to create a survey to determine nurse retention factors.

The framework encompasses five questions referring to particular aspects of organizational life: overall character, leadership style, institutional bonding, strategic emphasis, and reward system. Our focus is the leadership styles or what I prefer to call “Leadership Archetypes”.

Various tools have been developed based on the CVF, and they are available through Competing Value Services ([www.competingvalues.com](http://www.competingvalues.com)). These tools can help an organization align its culture with its goals and help employees develop the skills needed to accomplish those goals. For example, instruments are available that enable organizations to understand their current culture in terms of the CVF and to project the type of culture that members of the organization prefer. By collecting this type of data from a sample of hospitals, comparisons can be made to help determine which type of culture appears to be most highly correlated with key quality-of-care measures such as mortality, morbidity, and medical errors.

Scott-Cawiezell et al (2004) reported that clan and cultures (employee-centered leadership) were important for successful improvement of care quality. On the other hand, Wicke et al (2004) found that working in a hierarchical, profit-making organizational culture (Bureaucratic Leadership) was a significant barrier to effective team working and quality of care.

Competing values such as caring in the context of technology, staffing levels or acuity produce frequent clinical and ethical decision-making dilemmas for nurses in relation to maintaining a caring, ethical stance in professional practice (Ebright et al., 2002). In this respect the CVF of an organization can be identified as:

- Clan: an organization that concentrates on internal maintenance with flexibility, concern for people, and sensitivity for customers.
- Bureaucracy: an organization that focuses on internal maintenance with a need for stability and control.
- Adaptability: an organization that concentrates on external positioning with a high degree of flexibility and individuality.
- Mission: an organization that focuses on external maintenance with a need for stability and control.

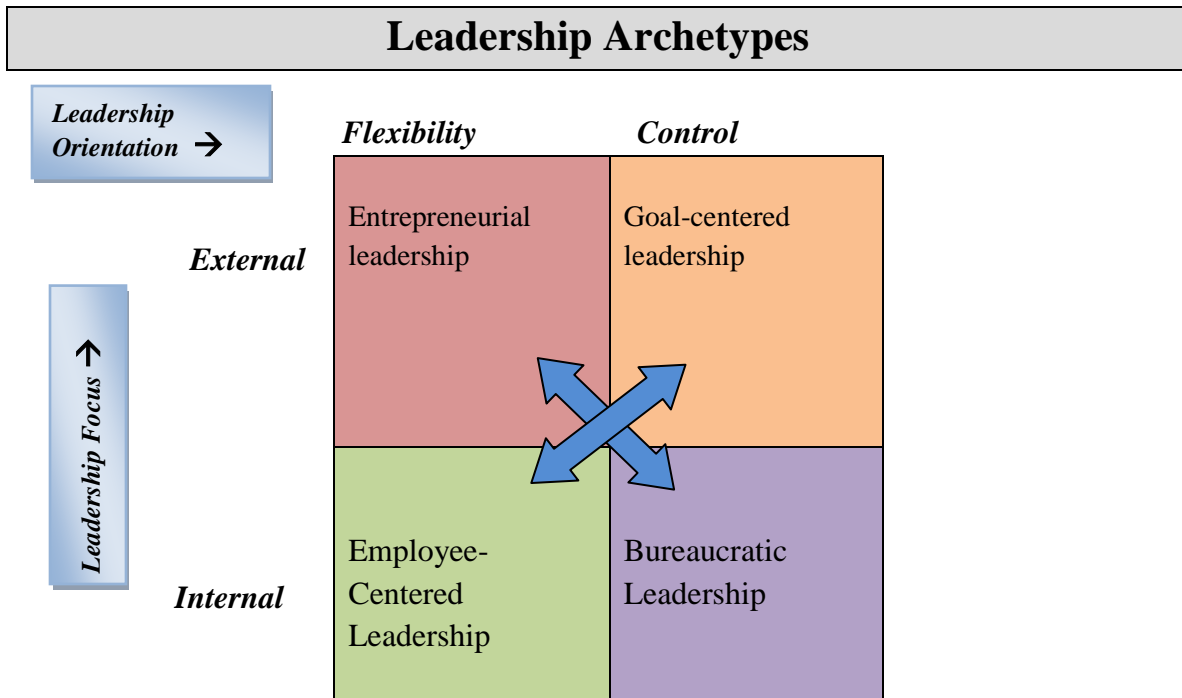
We are developing a competing values model for the study of leadership and patient safety climate through identifying a process very comparable to that Quinn used to build his competing values framework organizational model. The CVF provides an understanding of how a team is effective through the use of different roles and skills and adopts the need for a balanced approach to leadership. The process entails the following:

- 1) Identifying leadership archetypes similar to Quinn's organizational model
- 2) Designing a research instrument that would provide information about the relationship between each leadership archetype identified and patient safety climate for the emergency department
- 3) Analyzing results identifying the most effective and least effective leadership archetypes for superior patient safety climate

We have found it helpful to use adjectives as labels which can prompt leaders as to the kinds of activities that relate to value creation in each type.



**Figure 2- Leadership Archetypes based on the CVF**



The figure above has been a similar adaptation of Quinn’s Competing Values theory. The result is four competing leadership styles. Each section in the figure above has a competing opposite. For instance, the Employee-centered Leadership section emphasizes a flexible structure and an internal focus. Its exact opposite is the Goal-centered Leadership section that emphasizes a stable structure and an external focus. This example demonstrates the complexity that occurs for leaders. Leaders should value relationships within the organization and make certain that the organization is flexible to support these relationships. In contrast, results are an important element of any organization and maintaining a stable structure is a significant factor in producing results (Quinn et al., 1996). Below is a description of each leadership archetype:

- 1- *Goal-centered Leadership*: is characterized by a control orientation and a focus on the environment external to the unit and emphasizes setting and attaining goals.

- This leader is expected to motivate members to increase production and accomplish stated goals. In addition, this leader is expected to clarify expectations, define problems, establish objectives, generate rules and policies, and give instructions.
- 2- *Bureaucratic Leadership*: is characterized by a control orientation and a focus on the internal functioning of the unit and emphasizes monitoring and coordinating the work of the unit. This leader is expected to maintain the structure and flow of the system, coordinate the scheduling of staff efforts, handle crises, and attend to technical and logistical issues. In addition, this leader is expected to know what is going on in the unit, to see if people comply with rules and regulations, and to see whether the unit is meeting its quotas.
  - 3- *Employee-centered Leadership*: is characterized by a flexible orientation and a focus on the internal functioning of the unit and emphasizes mentoring subordinates and facilitating group process in the unit. This leader is expected to foster collective effort, build cohesion and teamwork, and manage interpersonal conflict. In addition, this leader is expected to develop people through a caring, empathetic orientation. In this role the leader is helpful, considerate, sensitive, open, approachable, and fair.
  - 4- *Entrepreneurial Leadership*: is characterized by a flexible orientation and a focus on the environment external to the unit and emphasizes developing innovations and obtaining resources for the unit. This leader is expected to pay attention to changes in the environment and to identify and facilitate adaptation to those

changes. In addition, this leader is expected to meet with people from outside his or her unit to represent the unit and negotiate and acquire resources for the unit.

These four leadership archetypes are important in fostering patient safety in healthcare settings. The Bureaucratic leader manages by the book which means everything must be done as outlined by the organizational policies and procedures. A bureaucratic leader enforces the rules. This leadership style is appropriate for work that involves serious patient safety risks. The Employee-centered leader plays an essential role in patient safety climate. This leader empowers staff to take responsibility and take initiatives towards promoting and ensuring positive patient safety outcomes. The Goal-centered leader could, as well, be a champion of patient safety strategic priorities through setting goals for employees to achieve goals such as reducing medical and medication errors and achieving better results for patient safety outcomes. The fourth leadership archetype; the Entrepreneurial leader creates a motivating and open environment where best practice and quality service are the standard. This leader encourages creativity and out-of-the-box thinking which enables employees to question assumptions, and promote new ways of responding to urgent safety patient problems. The Entrepreneurial leader accepts and seeks out challenges, adopting innovation early on. He or she challenges patient safety practice issues and uses benchmarks and research to support change or assure evidence-based practice for current patient safety practices.

### **III. Conceptual Framework and Hypothesis Development**

There are several advantages in using the Competing Values Framework, but perhaps the most important is that it explicitly incorporates the four dimensions of an organization's leadership archetypes which allow formulating targeted hypotheses in relating dimensions of leadership to patient safety climate or other organizational outcomes. Every ED assessed will be reflective of these four leadership archetypes to some degree. The Competing Values Framework allows one to assess where a particular organization stands with regard to these different dimensions. The below 4 hypotheses have been developed after the data migration and primary analysis. We started with a clean slate, general research questions and worked to find structure in our data and then analyzed its root cause. This gave us a working hypothesis which we can work to disprove.

#### ***Research Questions:***

1. What leadership archetype(s) best promote and instill patient safety in the Emergency Department?
2. Which leadership archetype(s) are needed to have others embrace a) leadership effectiveness for patient safety, b) communication for patient safety, c) error reporting for patient safety, d) global patient safety climate?

From the research questions, we developed the four hypotheses:

**Hypothesis 1:** The four leadership archetypes are simultaneously present, although to different degrees in each ED assessed.

**Hypothesis 2:** Each leadership archetype(s) will be positively associated to patient safety climate; fostering, enforcing and committing to it.

**Hypothesis 3:** Each leadership archetype(s) makes a positive contribution to patient safety climate.

**Hypothesis 4:** No individual leadership archetype contributes more to patient safety climate than any other leadership archetype.

In addition, the research will draw on the quantitative results to identify specific actions that healthcare decision-makers can take and the ones they should avoid concluded with a discussion of the findings and implications for further research in Alberta or even Canada and generalizability from the study, which is always limited.

## Chapter 2

### *Methods*

This study is based on 323 responses to the web-based survey and is an all RN study. We approached the Emergency Nurses Interest Group (ENIG) as a phase I strategy for achieving a large sample size. The ENIG has 149 ED nursing members, all RNs. Out of the 149 RNs, we have received 63 completed or partially completed surveys (42.3%). Phase II was to achieve a larger N through approaching the College and Association of the Registered Nurses of Alberta (CARNA). CARNA has 1150 registered ED nurses. Out of the 1150 members sent a survey, 260 ED nurses completed the survey with a response rate of 22.6%. The overall response rate from both groups, ENIG and CARNA, was 25%.

#### **I. Measuring Patient Safety Climate**

Safety culture surveys used in the aviation industry investigate attitudes towards stress, hierarchy, teamwork and error. Researchers have found that these items are relevant to understanding error (Helmreich, 1998). The most commonly used and rigorously validated tool to measure safety culture is the safety attitudes questionnaire (SAQ) (Pronovost et al., 2006). Higher scores on this questionnaire are associated with lower rates of nurse turnover, catheter related bloodstream infections, postoperative sepsis, decubitus ulcers and inpatient. The SAQ has been administered in a variety of inpatient and outpatient settings in over 200 sites across the US, UK and New Zealand (Sexton et al., 2006). Unlike many other safety climate scales, the SAQ has undergone comprehensive psychometric testing and has been shown to have good construct validity and internal consistency (Colla et al., 2005; Pronovost, 2005).

The SAQ is a 60-item survey, with several versions developed for different healthcare settings. All versions consist of 30 identical core questions, eliciting caregiver attitudes through six subscales or domains: ‘teamwork climate’, ‘safety climate’, ‘perceptions of management’, ‘job satisfaction’, ‘working conditions’ and ‘stress recognition’, using a 5-point Likert scale (Sexton et al, 2006). It was decided to base the survey on four core questions; ‘safety climate’, ‘leadership effectiveness to patient safety’, ‘communication as part of the working condition’ and ‘error reporting’ because our study’s focus is more related to the relationship between leadership and patient safety climate than the outcomes of patient safety and the incidents reported. In addition we believe that nurses would be more likely to complete a shorter questionnaire.

## **II. Measuring Leadership Archetypes**

There are many general leadership surveys but often limited information is provided on their reliability and validity. Most of them have not been systematically tested in relation to patient safety climate or outcomes. The first set of 12 questions in our questionnaire (see Appendices) has been drawn from the Multifactor Leadership Questionnaire; a 45- item questionnaire with four dimensions; Transformational, Transactional, Laissez-Faire Leadership and Outcomes of Leadership, such as Effort, Effectiveness and Satisfaction using a 5-point scale (Bass and Avilio, 1998). The Multifactor Leadership Questionnaire (MLQ) is a well established instrument that shows strong evidence for validity; the MLQ has been used in over 300 research programs, doctoral dissertations, and master’s theses, along with several constructive outcomes for transformational leadership. Reliability scores for the MLQ subscales ranged from moderate to good.

### **III. Measures: Creation of the Survey Instrument**

Respondent information was collected using a 67- item questionnaire administered online (Appendix A). This questionnaire was developed using questions taken from two research surveys that have been previously validated; the (SAQ) Safety Attitudes Questionnaire and the (MLQ) Multifactor Leadership Questionnaire. The survey instrument consisted of basic patient safety components and employed closed ended questions structured on a 5-point Likert type scale with a grade 8.3 comprehension level. The questions were related to the main research questions and hypotheses as well as to the broad areas depicted in the conceptual framework.

The first 12 questions were about the four leadership archetypes that we have identified using the Competing Values Framework. The nurses were asked to agree or disagree with the values that may characterize their ED and the style of the nursing person or persons who lead their ED. The second set of 9 questions addressed issues of patient safety in the ED. The nurses were asked to indicate the level of their agreement or disagreement with the statements about the work conditions in the ED. Next were leadership and patient safety practices, and communication and patient safety in the ED. The next set of four questions addressed the reporting of adverse events and near misses which led to quality outcomes in the ED questions. The last set of questions was our control variables that consisted of the institutional characteristics and the respondent characteristics; questions about: the geographical location of the ED, perceptions of the busyness within the ED, years of experience as an ED Nurse, hours of work/week, and position held.



#### **IV. Procedures: Web-based survey**

The survey instrument was distributed to participants through Survey Monkey (surveymonkey.com, Palo Alto, California) which is survey software and a questionnaire tool. The list of emails was provided by CARNA and ENIG. Participants were solicited through an information sheet and an introductory letter that outlined the research study, inclusion criteria and terms and conditions of participation as well as provided a direct link to the survey website. The participants were informed in writing that completion and submission of the survey instrument was indicative of their consent to participate. The survey was open for 6 weeks for the ENIG group. Subsequently, the survey was open for the CARNA group for 5 weeks. Each group was sent 3 reminder emails. Ethics approval was obtained the above from the Health Research Ethics Board (HREB).

#### **V. Inclusion Criteria**

Inclusion criteria for participation in the study are: 1) an RN, Charge nurse, Nurse Unit Manager. 2) Working in the Emergency Department. 3) The Emergency Department is in Alberta, Canada.

#### **VI. Piloting the Instrument**

Prior to distribution to final survey, pre-testing was performed with 4 ED nurses similar to the target population. The nurses were introduced to the research student; Somaia Al-Ahmadi, the purpose of the pilot test and voluntary participation. After completing the survey, the nurses were asked to discuss any problems with the survey questions, omissions, readability or comprehensibility. The pilot testing led to some

minor changes in sentence structure. The purpose of the pre-test was to identify words, phrases, terms, sentences, response categories and definitions that were ambiguous, unknown or irrelevant to the participants.

## **VII. Privacy and Confidentiality**

Survey responses were anonymous. No identification information was collected or used in any way on the survey. Participation and information received was solicited based on the conditions of anonymity. In addition there were no questions that could have led to personal identification when used in conjunction with already public knowledge. Survey Monkey was not programmed to collect or access information regarding IP addresses (a numerical number that the receiving computer uses to identify the computer sending the information).

Survey results were held in an electronic format with no paper copies of the survey in their entirety. Only aggregated data will be used in printed form. All disk and other electronic data receptacles will remain locked in a filing cabinet in the Department of Public Health Sciences, and will be kept for five years. Those with access to this information include the research student, Somaia Al-Ahmadi, the thesis advisor, Dr. Kent Rondeau and Prof. Gian Jhangri.

## Chapter 3

### *Results*

#### **I. Statistical Analysis**

We employed a survey methodology to collect data used to test our research hypotheses, using the Emergency Department as the unit of analysis. Data was analyzed using (SPSS) Statistical Package for the Social Sciences version 18.0 (PASW) Predictive Analytics Software. Data analysis consisted of descriptive analyses and multivariate modeling. Means, standard deviations and frequencies were used for describing the characteristics of the sample, early responders from the ENIG and late responders from CARNA and also for describing how the sample scored on each of the measurements administered. Multivariable modeling was used for determining factors associated with patient safety.

Crude relationships between variables were examined with Pearson correlation coefficients for continuous measures; chi-square tests for associations between categorical measures; and t-tests and analysis of variance (ANOVA) were assessed for associations between continuous and categorical measures.

Multiple linear regression was employed for analyzing patient safety and the four leadership archetypes indicated in question A of the survey. Four models were constructed:

1. One was built with the patient safety climate global score as the dependent variable.
2. The second model was built with the patient safety leadership effectiveness score as the dependent variable.

3. The third model was built with the patient safety communication score as the dependent variable.
4. The fourth and last model was built with patient safety reporting score as the dependent variable.

The explanatory variables included four independent variables: ED patient volume score, ED patient acuity score, ED location and ED patient trauma unit. ED size was not included in the analysis or in the regression model because the data is unreliable, unrealistic and may have been misinterpreted by the respondents. More than 35% of the data indicated an ED size containing more than 40 beds which is larger than most EDs in Alberta. As such, this item has not been used in further analyses. Crude models were built as an initial step to guide the selection of variables that would be included in the multiple linear regression analyses. The decision to include variables that were not statistically significant in the regression model was made based on the potential logical contribution to explain the variance in the four dependent variables. Furthermore, the variables were evaluated in light of other variables included in the model. Decisions regarding whether to exclude any variables from the final model were made on the basis of its judged importance to the model.

The Cronbach's alpha scale reliability values for the four leadership archetypes explained in questions 1 to 12 consisted of a range of 0.77 to 0.87, which is beyond the minimum acceptable level of 0.60 for exploratory research (Flynn et al., 1990) and 0.70 for general research (Nunnally and Bernstein, 1994).

**Table 1: Means, standard deviations and ranges for the Leadership Archetypes**

Leadership Archetypes	N	Internal Consistency ( $\alpha$ )	Mean	SD	Range (Min-Max)
Employee-centered	322	0.87	2.95	1.01	(1-5)
Entrepreneurial	322	0.83	3.22	0.93	(1-5)
Bureaucratic	322	0.77	3.47	0.81	(1-5)
Goal-centered	322	0.77	3.63	0.76	(1-5)

\* See table (8) for leadership specific questions.

We used Harman's one-factor test to check for the presence of common method bias (Podsakoff and Organ, 1986). We have entered 4 factors into an exploratory factor analysis of which the first factor accounted for about 33%. Because a single factor did not occur (less than 50%) and no factor accounted for most of the variance, the single method of data collection was an acceptable risk. Since the questionnaire contains positively as well as negatively worded items, the negatively formulated items were first recoded to make sure that a higher score always means a more positive response.

We compared early respondents (ENIG) to late respondents (CARNA) to address non-response bias. We compared early and late respondents on demographic variables, such as gender, if the respondents is a nurse manager or not and if the ED that they work in had a recognized trauma unit. As shown in table 2, there are no significant differences in these respondent characteristics ( $p > .05$ ) which dismisses non-response bias.

**Table 2: Difference on selected respondent and institutional characteristics between the two data sources**

Respondent Characteristic	% of early and late responders		<i>p-value</i>
	ENIG (early respondents) (n=63)	CARNA (late respondents) (n=260)	
Females	91.1	90.2	0.84
Nurse Managers	15	13.2	0.71
Recognized trauma unit	38	46	0.26

\* % reported based on known numbers

A series of variables entered our model as control variables, selected because of prior knowledge and their potential to impact the patient safety climate score. These included respondent characteristics: respondent gender (1=female and 0=male), number of years worked in the ED (1=0-2 years, 2=3-5 years, 3=6+ years), number of hours worked per week in this ED and work function (acute care, fast track, mental health, triage, nurse management). The institutional characteristics included: the geographic location of the ED/hospital {1=Rural (less than 1000 residents), 2=Town (1000 to 10000 residents), 3=Small city (10000 to 100000 residents), 4=Large city (100000 to 500000 residents), 5=Metropolitan (greater than 500000 residents)}; numbers of beds in the ED, recognized trauma centre (0=no, 1=yes); degree of ED “busyness” during most busy periods(1=Not busy, 2=Somewhat not busy, 3=Moderately busy, 4=Quite busy, 5=Extremely busy); degree of ED “busyness” during least busy periods(1=Not busy, 2=Somewhat not busy, 3=Moderately busy, 4=Quite busy, 5=Extremely busy), speed of response to least acutely-ill ED patients(1=Not quickly, 2=Somewhat not quickly, 3=Moderately quickly, 4=Somewhat quickly, 5=Very quickly), acuity-percentage of ED

patients who are truly urgent, and acuity-percentage of ED patients arriving by ambulance.

## **II. Sample Statistics (Uni-variate)**

Descriptive statistics, including frequencies, means, standard deviations, and ranges, were used along with histograms whenever appropriate, to assess for outliers and test the normality assumptions. Descriptive statistics for some of demographic variables are presented in Table 3. Most of the participants were females (90%). An overwhelming majority of ED nurses from both data sources ENIG and CARNA (57%) lived and worked in a metropolitan city (> 500,000 residents) with only 2% living in a rural area (less than 1,000 residents). As for whether the hospital that the ED nurses worked in had a recognized trauma unit or not, 55% did not have a recognized trauma unit and 44% had a recognized trauma unit.

When nurses were asked about the years of experience as an ED nurse, more than half of the respondents (53%) had worked in the ED for more than six years. As for the function(s) and job responsibilities as an ED nurse, an overwhelming majority (98%) had experience or worked in the area of acute care. 85% had experience in fast track, 60% had worked in mental health, and 80% had experience in triage. Most of the respondents worked in a nursing function that was non-managerial (86%). The rest (13%) had worked as nurse managers or in a managerial position in a healthcare setting. Nearly one-fifth of the sample (20%) worked 40 hours per week in the ED. Almost 16% worked 30 hours per week in their ED. Nearly one-third of the sample (30%) said that in a typical day in the ED, they would treat up to 20% of patients arriving via ambulance. When ED nurses

were asked what percentage of patients they treat were truly urgent, more than half cited (10%-20%). In addition, when they were asked how quickly patients were seen who have the least urgent medical needs, 42% cited not quickly.

**Table 3: Job functions reported by respondents**

<b>Respondent Characteristics (functions in ED)</b>	<b>% of respondents job function in ED</b>
1. Acute care	97.2
2. Fast track	85.1
3. Mental health	60.8
4. Nursing management	13.5
5. Triage	79.2

**Table 4: Number of ED beds reported by respondents**

<b>Institutional Characteristic (number of beds in ED)</b>	<b>% respondents reporting ED Size</b>		
	Less than 10 beds	10 to 40 beds	40+ beds
Number of beds in your ED	8.1	56.3	35.6

\* ED size was not included in the analysis or in the regression model because the data is unreliable, unrealistic and may have been misinterpreted by the respondents.



An overwhelming majority, 90% submitted 0-3 reports in the past 12 months; see table 5. Reporting errors is fundamental to error prevention and although our research is not interested in patient safety outcomes and reporting of adverse events and near misses, 0-3 reports per year is considered low compared to the actual patient adverse events and deaths occurring because of medical mistakes. When we compared the geographical location to the number of adverse events reports submitted, it was clear that the larger the institution was, the more the reports that were submitted by ED nurses.

**Table 5: Reporting adverse events and near misses in the ED**

Reporting Adverse Events, n=323	% of adverse events reported per year				
	None	1-3	4-6	7-9	10+
In the past 12 months in your ED, how many adverse event reports have you submitted?	38.5	50.2	9.4	1.3	0.7
	How often mistakes were reported				
	Never	Rarely	Sometimes	Mostly	Always
When a mistake is made, but is caught and corrected before affecting the patient, how often is it reported?	13.2	45.3	29.4	11.1	1.0
When a mistake is made, but has no potential to harm the patient, how often is it reported?	8.7	35.8	31.1	20.1	4.3
When a mistake is made that could harm the patient, how often is this reported?	1.7	7.0	25.0	45.7	20.7

Errors that occur either do or do not harm patients and reflect numerous problems in the system; they are either reports of errors that harm patients, errors that occur but do

not result in patient harm, and errors that could have caused harm but were mitigated in some manner before they ever reached the patient. Reporting near misses (such as an event/occurrence where harm to the patient was avoided), which can occur 300 times more frequently than adverse events, can provide invaluable information for proactively reducing errors (Barach and Small, 2000). As shown in table 5, when the mistake actually happens, the probability of submitting a report is generally higher; more than 60% submitted adverse event reports when harm has been done to the patient. However, surprisingly enough, almost 10% indicated that they never or rarely submitted an adverse events report when the patient had been actually harmed or affected by the medical error. When the respondents were asked about how often they submitted the reports if a mistake is made but is caught and corrected before affecting the patient, almost 50% never or rarely submitted a report. These numbers are alarming and can never give a complete picture of all sources of risk and patient harm because near misses are never or rarely reported.

For many ED nurses working in today's health care environment, work is a stressful part of their lives especially given the restructuring of their work in the current health care system in Alberta. However, stress perception is highly subjective, and so the complexity of nursing practice may result in variation between nurses in their identification of sources of stress. As found in table 6, almost 70% indicated that the job stress in their ED is either high or very high. This is not surprising as the nurse's role has long been regarded as stress-filled based upon the physical labor, human suffering, work hours, staffing, and interpersonal relationships that are central to the work nurses do. Workload was high (70%). Higher rates of absenteeism can directly impact on work

schedules, service delivery, overtime and cost to an organization. They can also have an indirect impact on staff morale and work-related stress. When the respondents were asked about ED nursing absenteeism, 40% cited high or very high. The 2005 Labour Force Survey indicated that Canadian full-time employees were absent from work an average of 9.6 days- this is 5.9 days less than the average absent days for regulated nurses which is 14.5 days annually.

**Table 6: Work conditions in the ED reported by respondents**

Quality Outcomes in ED, n=323	% reported the work conditions in the ED				
	Very low	Low	Neither High nor Low	High	Very High
Adverse medical errors	17.7	38.1	38.8	5.0	0.3
Adverse "near miss" errors	6.4	36.1	48.2	8.7	0.7
Nurse job stress	0.3	4.0	26.2	42.1	27.5
Nurse turnover	3.3	13.2	32.5	30.1	20.9
Nurse workload	0.0	1.7	27.7	45.5	25.1
Nurse job satisfaction	13.0	25.4	40.5	18.4	2.7
Patient care quality	2.3	6.7	42.5	42.1	6.4
Patient satisfaction with care	2.0	8.0	54.8	30.2	5.0
Nurse absenteeism	2.0	9.4	46.5	34.1	8.0
Operational efficiency	3.7	15.1	51.8	26.4	3.0

As shown in table 7, the average score on the percentage of patients ED nurses treat who are truly urgent was 29.2% of possible ranges of 2 to 100, with a score of 20% being the most common. The average score on the percentage of patients ED nurses treat

who arrive via ambulance was 22.2% with a score of 10% being the most common (17%).

**Table7: Means, standard deviations and ranges for interval ratio control variables**

<b>Interval ratio control variables</b>	<b>N</b>	<b>Mean</b>	<b>SD</b>	<b>Range (Min-Max)</b>
In a typical week, how many hours do you work in your ED?	288	29.2	11.4	(1-55)
In a typical day in your ED, what percentage of the patients that you treat are truly urgent?	286	26.3	18	(2-100)
In a typical day in your ED, what percentage of the patients that you treat arrive via ambulance?	286	22.2	15	(1-75)

Table 8 summarizes the frequencies reported for each of the four leadership archetypes of the person or persons leading the ED department.

**Table 8: Nursing Leadership Archetypes in the Emergency Department**

Leadership archetype questions, n=323	% agree or disagree with the statement				
	Strongly Disagree	Disagree	Neither Agree Nor Disagree	Agree	Strongly Disagree
<b>Employee-centered Leadership</b>					
This ED is a very personal place. Its nursing leaders really value the employees who work here	9.3	21.5	18.4	41.1	9.7
The glue that holds this ED together is employee loyalty and trust. Respect for employees is demonstrated by its nursing leaders.	12.5	21.6	25.6	31.6	8.8
This ED emphasizes its human resources. Nursing leadership is focused on employee's wellbeing.	13.7	36.1	24.3	23.7	2.2
<b>Entrepreneurial Leadership</b>					
This ED is a very dynamic and innovative place. Its nursing leaders stress being creative in solving problems.	6.8	18.9	18.3	43.8	12.1
The glue that holds this ED together is commitment to innovation and development. Having innovative ED programs and services is pursued by its nursing leaders.	5.9	23.7	26.5	33.3	10.6
This ED emphasizes growth through developing new ideas. The Nursing leadership is focused on being innovative.	5.1	23.5	29.2	36.2	6.0
<b>Bureaucratic Leadership</b>					
This ED is a very formal and structured place. Its leaders really stress the need to follow established rules and procedures.	1.6	15.0	21.6	47.8	14.1
The glue that holds this ED together is formal rules and procedures. Its nursing leaders value following established protocols in order to get things done.	2.5	14.4	17.6	53.9	11.6
This ED emphasizes stability and routines. The nursing leadership is focused on establishing policies and procedures and enforcing rules.	3.1	18.4	25.0	46.2	7.2
<b>Goal-centered Leadership</b>					
This ED is a production-oriented place. Its nursing leaders stress getting good results and outcomes.	0.6	8.7	19.3	51.1	20.2
The glue that holds this ED together is an emphasis of goal and task achievement. Its nursing leaders value getting the best possible outcome.	1.6	11.2	24.1	46.6	16.6
This ED emphasizes outcomes and achievements. The nursing leadership is focused on achieving excellence.	1.9	15.2	28.0	43.2	11.8

Descriptive statistics for the four leadership archetypes explained by the first 12 questions of the survey are presented in table 1. The mean of the Goal-centered leadership was higher than the three other leadership archetypes which explains that ED nurses perceive their ED leadership to be characterized by a control orientation and a focus on the environment external to the unit (patients) and emphasizes setting and attaining goals. Although the distribution appears to be similar between the four leadership archetypes, ED nurses perceived their leadership to be less employee-centered which means less flexible to employees needs and more controlling over policies and procedures.

### **III. Bi-variate Correlational Analysis**

A correlation matrix was constructed to examine the strength and significance of our study variables. The results can be found in table 9. The analysis of the correlation matrix indicates that most of the observed relationships were very strong excluding ED patient volume score and ED patient acuity score. The exceptionally high correlations were those between the employee-centered leadership archetype and the ED safety climate leadership score ( $r = .77$ ) and between employee-centered leadership and entrepreneurial leadership archetypes ( $r = .75, p < .001$ ). This means that the employee-centered leadership is more likely to produce a safety climate leadership in the ED. In addition, it means that if the ED leadership is employee-centered, it is more likely to be entrepreneurial as well. Entrepreneurial leadership was positively and significantly correlated with the safety climate leadership score ( $r = .73$ ). These results also suggest that although positively correlated amongst the four leadership archetypes, employee-centered and entrepreneurial leadership produce more patient safety climates ( $r = .63$ ) and ( $r = .60$ )

than the goal-centered and bureaucratic leadership archetypes. There is little or no association between reporting of ED adverse events and goal-centered leadership ( $r=.25$ ) and bureaucratic leadership ( $r=.19$ ). Although weak, there is a positive correlation between reporting of ED adverse events and employee-centered and entrepreneurial leadership archetypes ( $p<.001$ ).

Patient acuity is a concept that is very important to patient safety. Presumably, as acuity rises, more nursing resources are needed to provide safe care. Very little research has actually been conducted; however, to verify this premise. In the ED, patient acuity is related to the classification of patients according to the medical needs that place them in the “emergent” category. We have asked three questions about employee’s perception of patient acuity in the ED. These are: 1) In a typical day in your ED, how quickly are patients seen who have the least urgent medical needs?; 2) In a typical day in your ED, what percentage of the patients that you treat in the ED are truly urgent? ; 3) In a typical day in your ED, what percentage of the patients that you treat in the ED arrive via ambulance?

The results of the correlation matrix show that there is a weak negative relationship between patient volume and the four leadership archetypes depicted by the first 12 questions of the survey instrument. ED patient volume is inversely related with employee-centered leadership archetype ( $p<.001$ ) suggesting that busy emergency departments are less likely to have employee-centered leaders which is not surprising considering the pressure the ED receives on a daily basis to achieve goals, admit more patients and reduce wait times yet focus less on employee’s well-being. ED patient volume is inversely related with the ED Safety climate score ( $p<.001$ ) and ED Safety

climate communication score ( $p < .001$ ) suggesting that busy emergency departments are associated with a lower global safety climate and a lower safety climate communication. This is not surprising, because when emergency departments become very busy, safety climate may be compromised. In addition, ED patient acuity is inversely related with ED safety climate score ( $p < .01$ ), suggesting that EDs with more acutely-ill patients report a lower global safety climate.



**Table 9: Mean, SD scores, and inter-correlation of the 10 study variables (n=323)**

	Pearson's Correlation									
	1	2	3	4	5	6	7	8	9	10
<b>Study Variables</b>										
1. Employee-centered leadership archetype		.75**	.53**	.20**	.63**	.77**	.61**	.33**	-.19**	-.09
2. Entrepreneurial leadership archetype			.61**	.18**	.60**	.73**	.59**	.35**	-.07	-.06
3. Goal-centered leadership archetype				.42**	.39**	.59**	.45**	.25**	.02	-.03
4. Bureaucratic leadership archetype					.18**	.33**	.22**	.19**	.00	.08
5. ED safety climate score						.73**	.65**	.45**	-.19**	-.12*
6. ED safety climate leadership score							.71**	.45**	-.10	-.03
7. ED Safety climate communication score								.38**	-.13*	-.11
8. ED Adverse events reporting score									-.03	-.06
9. ED Patient volume score										.33**
10. ED Patient acuity score										
	Mean (SD)									
<b>ED location<sup>a</sup></b>										
- Rural (less than 1000 residents), n=5	3.07 (.95)	2.93 (1.23)	3.27 (0.43)	3.00 (0.47)	2.98 (0.80)	3.08 (0.84)	2.88 (0.71)	3.13 (1.12)	5.00 (1.73)	30.40 (32.13)
- Town (1000 to 10,000 residents), n= 36	3.24 (.88)	3.23 (0.84)	3.53 (0.79)	3.17 (0.77)	2.98 (0.60)	3.24 (0.65)	3.31 (0.71)	3.10 (0.57)	8.39 (4.60)	31.19 (18.44)
- Small city (10,000 to 100,000 residents), n=60	2.98 (1.02)	3.24 (0.78)	3.63 (0.73)	3.41 (0.85)	2.93 (0.61)	3.23 (0.74)	3.18 (0.61)	2.80 (0.75)	11.92 (4.54)	40.92 (20.31)
- Large city (100,000 to 500,000 residents), n= 23	3.16 (1.02)	3.20 (1.05)	3.90 (0.60)	3.79 (0.85)	2.93 (0.78)	3.47 (0.72)	3.18 (0.72)	3.08 (0.88)	14.18 (5.88)	48.23 (27.41)
- Metropolitan (> 500,000 residents), n= 160	2.85 (1.05)	3.24 (0.99)	3.65 (0.80)	3.54 (0.79)	2.96 (0.67)	3.29 (0.72)	3.03 (0.65)	2.97 (0.78)	13.83 (4.96)	55.12 (25.50)
<b>P-value</b>	<b>0.25</b>	<b>0.97</b>	<b>0.33</b>	<b>0.02</b>	<b>1.00</b>	<b>0.63</b>	<b>0.13</b>	<b>0.32</b>	<b>&lt;0.001**</b>	<b>&lt;0.001**</b>
<b>ED trauma unit<sup>b</sup></b>										
- No, n= 159	2.99 (1.01)	3.18 (0.90)	3.63 (0.75)	3.51 (0.75)	2.98 (0.65)	3.25 (0.71)	3.15 (0.65)	2.99 (0.76)	11.44 (5.03)	42.11(21.32)
- Yes, n= 129	2.93 (1.03)	3.30 (0.96)	3.67 (0.80)	3.44 (0.87)	2.90 (0.66)	3.33 (0.72)	3.04 (0.67)	2.92 (0.77)	14.09 (5.27)	55.65 (28.06)
<b>P-value</b>	<b>0.70</b>	<b>0.35</b>	<b>0.65</b>	<b>0.03</b>	<b>0.70</b>	<b>0.74</b>	<b>0.96</b>	<b>0.96</b>	<b>0.70</b>	<b>&lt;0.001**</b>

<sup>a</sup>coded as 1=rural to 5=metropolitan

<sup>b</sup>dummy coded as 1=yes, 0=no

\*p<.01; \*\*p<.001

#### **IV. Ordinary Least Squares (OLS) Regression (Multivariate Analysis)**

Multivariate analysis was used to further explore potential relationships between variables in this research. Ordinary least squares (OLS) regression was employed to estimate the unique effect of a variable on another, controlling for the influence of other variables. Regression analysis provides two important coefficients, the proportion of variance explained by the independent variables, ( $R^2$ ) and the multiple regression coefficient, showing the direction and size of the effect of each independent variable on the dependent variable, represented by either the standardized "b" or standardized "B". The closer the value of  $R^2$  to 1.00, the more the independent variables "explain" changes in the dependent variable.

The results of the OLS regression analyses are presented in tables 10, 11, 12, and 13. As indicated in table 10, the contribution of the explanatory variables patient volume, patient acuity, location and if the ED had a recognized trauma unit is minor explaining only 3.9% of the variance in ED patient safety climate global score. Employee-centered and entrepreneurial leadership archetypes explained between 38% and 34% of the criterion variance in the model. This is consistent in all four models entered in the regression analysis. Table 11 shows that employee-centered leadership and entrepreneurial leadership archetypes explained a major percentage between 50% and 60% for the outcome variable patient safety climate leadership. When we entered goal-centered and bureaucratic leadership archetypes to the models, the impact of these study variables on patient safety global score is not so large explaining between 2% and 14% of the variance. It is noteworthy to mention that goal-centered leadership is slightly higher

than bureaucratic leadership considering that employees described the overall leadership style in their EDs to be more goal-centered.

Nevertheless, we can see that the differential contribution of each of the models on the dependant variables is positive and significant for the four leadership archetypes. Patient acuity score as a control variable was not significant in any of the four models depicted. Consistent with all the four models, when patient safety communication was our outcome variable, employee-centered and entrepreneurial leadership archetypes explained the largest percentage of the variable although less than the first two models (34%-35%). ED patient safety reporting of adverse events and near-misses was found to be the weakest model, see table 12. ED location did not have any significant impact on the equation.

These results indicate that all of the leadership archetypes were associated with patient safety global score and the subsequent three additional elements of patient safety. It is also important to demonstrate that employee-centered and entrepreneurial leadership contribute incrementally to the prediction of patient safety climate.

**Table 10 OLS Regression Results for ED Patient Safety Climate Global**

	<u>Base</u>	<u>Model A</u>	<u>Model B</u>	<u>Model C</u>	<u>Model D</u>
<u>ED Leadership archetypes</u>					
A. Employee-centered leadership		.40*** (.03)			
B. Entrepreneurial leadership			.41*** (.03)		
C. Goal-centered leadership				.32*** (.05)	
D. Bureaucratic leadership					.13* (.05)
<u>ED Control variables</u>					
ED patient volume score	-.02** (.00)	-.01 (.00)	-.01* (.00)	-.02** (.00)	-.02** (.00)
ED patient acuity score	-.00 (.00)	-.00 (.00)	-.00 (.00)	-.00 (.00)	-.00 (.00)
ED location <sup>a</sup>	.06 (.03)	.07 (.03)	.03 (.03)	.04 (.03)	.04 (.03)
ED patient trauma unit <sup>b</sup>	-.00 (.08)	-.04 (.06)	-.09 (.06)	-.03 (.07)	.01 (.08)
Constant	3.15*** (.11)	1.71*** (.15)	1.78*** (.16)	2.01*** (.21)	2.73*** (.20)
Adjusted R <sup>2</sup> (%)	3.9	41.2	38.2	17.9	6.2
Δ R <sup>2</sup> (%)	----	38.3	34.3	14.0	2.3
F statistic	3.78*	39.89***	35.26***	13.08***	4.68***

Regression coefficient with standard errors in parenthesis. \* p<.01; \*\* p<.005; \*\*\* p<.001 <sup>a</sup>coded as 1=rural to 5=metropolitan <sup>b</sup>coded as 1=yes; 2=no

**Table 11 OLS Regression Results for ED Patient Safety Climate Leadership**

	<u>Base</u>	<u>Model A</u>	<u>Model B</u>	<u>Model C</u>	<u>Model D</u>
<u>ED Leadership archetypes</u>					
A. Employee-centered leadership		.54*** (.02)			
B. Entrepreneurial leadership			.54*** (.03)		
C. Goal-centered leadership				.54*** (.04)	
D. Bureaucratic leadership					.28*** (.05)
<u>ED Control variables</u>					
ED patient volume score	-.02 (.00)	-.00 (.00)	-.01 (.00)	-.02* (.00)	-.02* (.00)
ED patient acuity score	-.00 (.00)	.00 (.00)	.00 (.00)	.00 (.00)	-.00 (.00)
ED location <sup>a</sup>	.06 (.04)	.08** (.02)	.03 (.03)	.02 (.03)	.02 (.03)
ED patient trauma unit <sup>b</sup>	.14 (.09)	.09 (.05)	.03 (.06)	.10 (.07)	.18 (.08)
Constant	3.29*** (.16)	1.34*** (.14)	1.51*** (.15)	1.38*** (.20)	2.41*** (.21)
Adjusted R <sup>2</sup> (%)	1.8	60.1	51.5	35.9	11.8
Δ R <sup>2</sup> (%)	----	58.3	49.7	34.1	10.0
F statistic	2.27	84.41***	59.87***	31.***	8.40***

Regression coefficient with standard errors in parenthesis. \* p<.01; \*\* p<.005; \*\*\* p<.001 <sup>a</sup>coded as 1=rural to 5= metropolitan <sup>b</sup>coded as 1=yes; 2=no

**Table 12 OLS Regression Results for ED Patient Safety Communication**

	<u>Base</u>	<u>Model A</u>	<u>Model B</u>	<u>Model C</u>	<u>Model D</u>
<u>ED Leadership archetypes</u>					
A. Employee-centered leadership		.38*** (.03)			
B. Entrepreneurial leadership			.42*** (.03)		
C. Goal-centered leadership				.40*** (.04)	
D. Bureaucratic leadership					.18*** (.04)
<u>ED Control variables</u>					
ED patient volume score	-.01 (.00)	.00 (.00)	-.00 (.00)	-.01 (.00)	-.01 (.00)
ED patient acuity score	-.00 (.00)	-.00 (.00)	.00 (.00)	-.00 (.00)	-.00 (.00)
ED location <sup>a</sup>	-.03 (.037)	-.02 (.030)	-.05 (.029)	-.05 (.033)	-.05 (.036)
ED patient trauma unit <sup>b</sup>	-.05 (.08)	-.09 (.06)	-.14* (.06)	-.08 (.07)	-.02 (.08)
Constant	3.49*** (.14)	2.10*** (.16)	2.09*** (.16)	2.10*** (.20)	2.92*** (.20)
Adjusted R <sup>2</sup> (%)	1.9	35.8	36.9	22.4	6.4
Δ R <sup>2</sup> (%)	----	33.9	35	20.5	4.5
F statistic	2.35	31.89***	33.43***	16.98***	4.79***

Regression coefficient with standard errors in parenthesis. \* p<.01; \*\* p<.005; \*\*\* p<.001 <sup>a</sup>coded as 1=rural to 5= metropolitan <sup>b</sup>coded as 1=yes; 2=no

**Table 13 OLS Regression Results for ED Patient Safety Reporting**

	<u>Base</u>	<u>Model A</u>	<u>Model B</u>	<u>Model C</u>	<u>Model D</u>
<u>ED Leadership archetypes</u>					
A. Employee-centered leadership		.26*** (.04)			
B. Entrepreneurial leadership			.29*** (.04)		
C. Goal-centered leadership				.24*** (.06)	
D. Bureaucratic leadership					.16*** (.06)
<u>ED Control variables</u>					
ED patient volume score	-.00 (.01)	.00 (.00)	.00 (.00)	-.00 (.01)	.00 (.01)
ED patient acuity score	-.00 (.00)	-.00 (.00)	-.00 (.00)	-.00 (.00)	-.00 (.00)
ED location <sup>a</sup>	.02 (.04)	.03 (.04)	.00 (.04)	.00 (.04)	-.00 (.04)
ED patient trauma unit <sup>b</sup>	-.05 (.09)	-.07 (.09)	-.11 (.09)	-.07 (.09)	-.03 (.09)
Constant	3.03*** (.17)	2.08*** (.22)	2.08*** (.22)	2.17*** (.26)	2.53*** (.24)
Adjusted R <sup>2</sup> (%)	-.8	10.9	11.2	4.9	1.7
Δ R <sup>2</sup> (%)	----	11.7	12.0	5.7	2.5
F statistic	.45	7.78***	8.02***	3.850***	1.97***

Regression coefficient with standard errors in parenthesis) \* p<.01; \*\* p<.005; \*\*\* p<.001 <sup>a</sup>coded as 1=rural to 5=metropolitan <sup>b</sup>coded as 1=yes; 2=no

## Chapter 4

### *Discussion*

Four hypotheses were tested and accepted:

**Hypothesis 1:** *The four leadership archetypes are simultaneously present, although to different degrees in each ED assessed.*

In terms of the results confirming or refuting the first hypothesis, the findings seem to be plausible and the null hypothesis is not rejected. The findings suggest that all four leadership archetypes represent an important contextual feature of nurse practices that may influence the attitudes of nurses towards patient safety in the ED in which they work. Thus, a positive safety climate based on standard safety rules and regulations might co-exist with a cultural orientation towards developing human resources and innovation.

**Hypothesis 2:** *Each leadership archetype(s) will be positively associated to patient safety climate; fostering, enforcing and committing to it.*

**Hypothesis 3:** *Each leadership archetype(s) contributes to patient safety climate.*

Hypotheses 2 and 3 should be accepted because there is a strong, positive and significant relationship between patient safety global score, patient safety leadership, patient safety communications, patient safety adverse events reporting and each of the leadership archetypes defined by the Competing Values Framework. The four leadership archetypes are important in fostering patient safety in the ED.

**Hypothesis 4:** *No individual leadership archetype contributes more to patient safety climate than any other leadership archetype.*

The results provide particular support for a contingent relationship between leadership and patient safety. Although each of the four multivariate models is



independent of the others, comparing results across these models provides a more complete picture of how the four leadership archetypes are predictive of specific dimensions of patient safety climate, patient safety leadership, patient safety communications and adverse event reporting. For example, employee-centered and entrepreneurial leadership archetypes explained almost half of the variance in the four models compared to goal-centered and bureaucratic leadership archetypes in association with patient safety climate scores. As such, we should reject hypothesis 4 suggesting that when leaders, CEOs, CNOs and ED leaders want to foster patient safety and encourage patient safety practices that lead to reduced medical errors and close-calls, they should reinforce elements of their leadership that emphasize the well-being of their staff and openness and adaptive climate of the ED.

The findings from this study have important implications for healthcare leaders and providers. It provides empirical support that the employee-centered leadership and entrepreneurial leadership archetypes foster patient safety climates, suggesting that EDs desiring to make patient safety improvements need to focus their attention on hiring ED leaders with these specific styles. Healthcare CEOs and ED leaders interested in improving patient safety climates in their EDs should actively seek feedback on their leadership styles as a critical first step. This involves not only enhancing their ED leaders' style, but also using these two archetypes (employee-centered leadership and entrepreneurial leadership) to create a culture of safety.

In the ED, it is likely that complex behaviours form the basis of relationships between leaders and followers and patients. Entrepreneurial leaders are open and flexible and therefore able to identify mistakes and deviations from good performance and

conditions that may endanger the patients' safety before they manifest as accidents. Employee-centered leaders, on the other hand, engage and provide positive verbal feedback for actions (that is, for capturing errors, reporting near misses, and speaking up). As the maintenance of high safety performance is commonly attributed to teamwork and the concept of safety climate emphasizes shared goals, it is feasible that employee-centered leaders could elicit safety performance beyond expectations by transcending personal safety targets and encouraging the buy in of employees to department or organisational level goals. As such, it is also likely that the balance of behaviours for senior healthcare leaders should be in favour of the entrepreneurial and employee-centered behaviours in emergency department healthcare settings that are characterized by the unplanned nature of patient attendance, the prioritization of cases based on clinical need, and great pressures to over-test and over-treat to make fast decisions on life-and-death cases. The challenge then becomes training the leadership behaviours and archetypes that will improve patient safety beyond current levels.

In contrast, the bureaucratic leaders are leaders by the book and they are most effective when performing routine tasks over and over which is less appropriate for an ED setting. They ask subordinates to do what is expected of them and no more. Goal-centered leaders are adamant about setting goals and priorities which could be effective in any healthcare setting. In the ED, setting goals and achieving results and higher production levels is important but is seen, in this study, as less effective than employee-centered and entrepreneurial leadership archetypes for this particular healthcare setting in fostering patient safety climates.

As a human resources manager looking to recruit ED nurse leaders who will improve and foster a patient safety climate, one should incorporate coded leadership styles and values into the interviewing process taking into consideration the employee-centered and entrepreneurial values. They should look for leaders who lead and support staff, involve staff in the decision-making process, encourage teamwork and open communication, and provide resources to share and learn.

The US Joint Commission has exerted considerable pressure and placed a great deal of emphasis on the improvement of patient safety in hospitals. In fact, hospital accreditation has been increasingly tied to patient safety outcomes. The Joint Commission developed a new leadership standard, effective in 2009, that recognizes developing a culture for quality and safety begins at the top. The standard requires hospital boards, executives, and medical and nursing staff to work together to foster and sustain a hospital culture that supports the delivery of quality, safe health care.

Although tentative, the results of this research provide practical guidance for both leaders and researchers in addressing this very important national issue. Similar trends have been shown in research in such diverse work domains as health care and in the offshore oil and gas industry. It appears that entrepreneurial and employee-centered leadership promote employees' compliance to safety rules and regulations, and they encourage employees' involvement in working in a safe manner.

This study represents an advance over previous studies on the relationship between safety climate and leadership archetypes by examining those leaders who are essential to the patient safety climate in emergency department health care settings. It is

essential for employee-centered and entrepreneurial leaders to work collaboratively in order to not only enhance health care environments but also make it safer for patients.

Nevertheless, there is an understandable difference between High Reliability Organization and safety. Many studies have compared HRO to healthcare and have presented evidence of appropriate leadership behaviours for healthcare safety from other industries which can be misleading. It is unwise to compare healthcare to the aviation industry in particular. Aircraft accidents are not as common as healthcare accidental and deadly mistakes, they are highly visible and may include the lives of the aircraft crew themselves (Rosenthal and Sutcliffe, 2002). Aviation accidents result in extensive investigation into causal factors however medial errors and near misses rarely receive national publicity. Professional operations in both industries are quite different as well. To be a physician or a medical consultant, one has to have longer training and hands-on practical learning compared to simulation to train pilots and maintain their skills.

Patients are more complex than airplanes. A perfect example is ED patients. The health of patient is influenced by social and economic factors, cost and access to healthcare as well as genetic determinants. As such, proposing a leadership style that works for aviation might not work for healthcare. This means adaptation of aviation safety approaches to healthcare should be done with care and should be applied in a thoughtful manner. Adopting HRO safety methods should not be approached blindly and without further comprehensive research.

Finally, in an era of turbulence and uncertainty in the healthcare sector, leaders cannot afford to ignore the role of leadership in favor of technologies that focus only on

the systematic and technical errors and overlook the bigger picture and the complexity of the human factor in relation to patient safety. Indeed, our results may suggest that changing a leadership culture to clan and developmental, in addition to promoting patient safety efforts as strategic priorities in the ED, should constitute the key approach to fostering an effective patient safety climate. However, there are major complexities associated with the measurement of both leadership and patient safety, and thus statements about the overall importance of leadership in patient safety require several caveats.

## Chapter 5

### *Conclusion*

#### **I. Strengths and Limitations of the Study**

Although no formal power analysis was conducted, the relatively large sample size means that the power of the study to detect associations is acceptable. Using well-developed psychometrically tested measures of safety climate is a strength. The internet has potential to play an important role in the way future research is conducted. With more web-based research and less paper and pen surveys comes the ability to quickly and efficiently solicit information from a large number of people. It also provides quick, efficient, and green data preparation for analysis; we did not have to print off any single survey. As such, it is an excellent tool to use on large population-based studies as well as long-term studies that are meant to continuously collect data and monitor population trends. In order to facilitate this, barriers such as limited internet access, low survey response rates and researcher access to web-related resources first need to be addressed. In regards to the potential common method variance issue, the application of Harman's one-factor test (Podsakoff et al., 2003) reported here suggests that the single method of data collection is an acceptable risk.

It should be noted that the study has a number of limitations. First, because many of these measures used are subjective and perceptual in nature, the data suffers from the potential for personal biases and distortions. Second, these findings emerge from cross-sectional work. This clearly limits presumptions of causality that would be better substantiated through longitudinal studies. Fourth, some characteristics of this work make

it difficult to affirm the adequacy of this model for studying safety climate. A theoretical reason could arise from the fact that the competing values framework was initially developed in the field of organisational effectiveness and later adapted to leadership and organisational culture. Furthermore, another possible methodological limitation is the response scale used which is a 5-point Likert scale adapted from the Safety Attitude Questionnaire. Likert scale of seven points could facilitate responses to the questionnaire and permit the statistical analyses needed at this stage. Finally, the generalizability of the findings to other settings or to other organizations within the same setting remains problematic as the data is drawn from a single healthcare organization (Alberta Health Services). Although results were derived from a publicly funded Canadian system, there is no compelling reason to believe that results would be dissimilar in a privately-funded healthcare organization.

## **II. Practical Implications and Directions for Future Research**

By demonstrating an association between leadership archetypes and patient safety, this study opens the door to further exploration in a number of areas given that improving patient safety has become a national priority. First, further research needs to be conducted to discover which leadership archetype is appropriate for each of the leadership and management functions within the ED such as nurse supervisors, nurse senior leaders, nurse middle managers, nurse team leaders, and quality managers. Another area that requires further investigation is the question of how to initiate and maintain safety climate as a practical part of daily work brought forward by ED nurse leaders. This study only chose important and explicit factors of safety climate and

leadership styles to test, there are still many indicators that affect safety performance and safety climate.

Future testing of models should incorporate nurse performance as one of many potential mediating variables between specific leadership archetypes and patient safety. Perhaps peer ratings as well as measures of actual performance of leaders should be incorporated in future studies.

To date, the primary source of information regarding safety issues in Alberta Health Services has been an online reporting system (Learning and Reporting System) for all types of risk occurrences, such as those involving staff, environmental and patient safety. AHS has focused on retrospective surveillance of patient outcomes, typically injuries reported via the LRS, as an indicator of the success of risk management programmes with less focus on leadership and chain of organisational action in their search for safety data, focusing on outcomes in preference to structures and processes. However, new values have been initiated which include safety and learning.

To conclude, the results of this study indicate that the characteristics of employee-centered and entrepreneurial leaders are associated with the creation and fostering of a climate of safety, which includes making safety a top priority and devoting the necessary resources to patient safety initiatives in order to realize maximal improvements in the ED.



## Bibliography

1. Abernethy, M., Lillis, A. (2001). Inter-dependencies in organization design: A test in hospitals. *Journal of Accounting Management Research*, 13, 107-129.
2. American Organization of Nurse Executives. (2005 Feb). A one nurse executive competencies. *Nurse Leader*, 3(1), 15-21.
3. Ash, J., Berg, M., Coiera, E. (2004). Some unintended consequences of information technology in health care: the nature of patient care information system related errors. *J Am Med Inform Assoc*, 11(2), 104-112.
4. Baker, G., Flintoft, V., Balis, R., et al. (2004). The Incidence of Adverse events among hospitalized patients in Canada. *Canadian Medical Association Journal*, 170(1678-86).
5. Barach, P., Small, SD. (2000). Reporting and preventing medical mishaps: lessons from non-medical near-miss reporting system. *BMJ*; 320:759-63.
6. Barling, J., Loughlin, C., Kelloway, E. (2002). Development and test of a model linking safety-specific transformational leadership and occupational safety. *Journal of Applied Psychology*, 87(488-496) doi:10.1037//0021-9010.87.3.488.
7. Bass, B. (1998). Transformational leadership: Industrial, military, and educational impact. *Mahwah, NJ: Lawrence Erlbaum Associates In.*
8. Bass, B., Avolio, B. (2000). MLQ Multifactor leadership questionnaire: Sampler set technical report, leader form, rater form, and scoring key for the MLQ form 5x-short. 3rd Ed. *Mind Garden, Inc., Redwood City, CA.*
9. Berwick, D. (1991). Controlling variation in health care: A consultation from Walter Shewhart. *Medical Care*, 1212-1225(29(12)).

10. Boge, J., & Kristoffersen, K. (2002). Elderly patients want to be as independent as possible the first postoperative weeks, and they want to be nursed and massaged by caring nurses with humour [Norwegian]. *Nordic Journal of Nursing Research & Clinical Studies / Vård i Norden*, 22(1), 47-51.
11. Bradley, E., Holmboe, J., Mattera, S., Roumanis, M., Radford, M., Krumholz, A. (2003). The roles of senior management in quality improvement efforts: What are the key components?. *Journal of Healthcare Management*, 48(1), 15-29.
12. Burns, J. M. (1978). *Leadership*. New York: Harper & Row.
13. Burritt, J. (2005). Organizational turnaround. The role of the nurse executive. *Journal of Nursing Administration*, 35(11).
14. Cameron, K. S., Quinn, R. E. (1999). Diagnosing and changing organizational climate.
15. Chisholm, C., Collison, E., Nelson, D., et al. (2000). Emergency department workplace interruptions: are emergency physicians "interrupt-driven" and "multitasking" *Ac*, 7(1239-1243).
16. Colla, J., Bracken, A., Kinney, L., Weeks, W. (2005). Measuring patient safety climate: a review of surveys. *Qual Saf Health Care*, 14, 364-366.
17. Conaway, J. "Health Care Leaders Leading: A Dana-Farber Cancer Institute Executive Describes the Crucial Role of Leadership in Driving Patient Safety." Online information retrieved from:  
<http://www.ihl.org/IHI/Topics/PatientSafety/MedicationSystems/Literature/HealthCareLeadersLeadingADanaFarberCancerInstituteexecutivedescribesthecrucialroleofleadershipindriv.htm>

18. Consumers Union. (2009). To Err is Human – To delay is deadly: Ten years later, a million lives lost, billions of dollars wasted. *Safe Patient Project*.
19. Cook, A., H. H. (2001). Voices from the margins: a context for developing bioethics-related resources in rural areas. *Am J Bioeth, 1*(4).
20. Cook, A., Hoas, H., et al. (2004). An error by any other name. *Am J Nur, 104*(6), 32-43.
21. Cree, T., & Kelloway, E. K. (1997). Responses to occupational hazards: Exit and participation. *Journal of Occupational Health Psychology, 2*(304–311).
22. Croskerry, P., Shapiro, M., Campbell, S. (2004). Profiles in patient safety: medication errors in the emergency department. *Acad Emerg Med, 11*(3), 289-299.
23. Denison, D., Mishra, A. (1995). Toward a theory of organizational climate and effectiveness. *Organization Science, 6*(204-223).
24. Disch, J. (2008). Who should lead the patient safety/quality journey? *Agency for Healthcare Research and Quality Publication.6*(2).
25. Döös, M., W. L. (2003). Shared leadership. (323-344).
26. Draper, D., Felland, E., Liebhaber, A., Melichar, L. (2008). The Role of nurses in hospital quality improvement. *Washington, DC: The Center for Studying Health System Change, Research Brief 3*.
27. Dunham-Taylor, J., K. K. (1995). Identifying the best in nurse executive leadership. Part 1, questionnaire results. *Journal of Nursing Administration, 25*(6).

28. Kelloway, K., Mullen, J., Francis, L. (2006). Divergent effects of transformational and passive leadership on employee safety. *Journal of Occupational Health Psychology, 11*(76–86) doi:10.1037/1076-8998.11.1.76.
29. Ebright, P., Patterson, E., Render, M. (2002). The ‘new look’ approach to patient safety: a guide for clinical nurse specialist leadership. *Clin Nurs Spec, 16*, (247-253).
30. Fazio, R. H. (1986). How do attitudes guide behavior? *New York: Guilford Press*, (204-243).
31. Feltner, A., Mitchell, B., Norris, E., Wolfle, C. Nurses’ views on the characteristics of an effective leader. *AORN Journal*. 2008; 87(2):363-372.
32. Flynn B.B., Sakakibara S., Schroeder R.G., Bates K.A. and Flynn E.J. (1990), Empirical research methods in operation management. *Journal of Operations Management, 9*, 25-284.
33. Fordyce, J., Blank, F., Pekow, P., et al. (2003). Errors in a busy emergency department. *Ann Emerg Med, 42*(3), 324-333.
34. George, V. (1999). An organizational case study of shared leadership development in nursing. Dissertation. *Michigan: UMI Dissertation Services*.
35. Gifford, Zammuto, E., Goodman, Hill, S. (2002). The relationship between hospital unit culture and nurses' quality of work life. *Journal of Healthcare Management, 47*(1), 13-26.
36. Gladstone, J. (1995). Drug administration errors: A study into the factors underlying the occurrence and reporting of drug errors in a district general hospital. *Jr Adv Nus., 22*(4), 628-63.

37. Glendon, A.I., Stanton, N.A. (2000). Perspectives on safety culture. *Saf. Sci.*, 34, 193-214.
38. Goodman, Gifford, G. (2001). The competing values framework: Understanding the impact of organizational culture on the quality of work life. *Organization Development Journal*, 19(3), 58-68.
39. Gresham, J. (1997). Supervision. How satisfied are middle nurse managers? *Nurse Management*, 28(1).
40. Guldenmund, F. W. (2000). The nature of safety culture: a review of theory and research. *Safety Science*, 34(1), 215-257.
41. Hamlin, R.G. (2002). A study and comparative analysis of managerial and leadership effectiveness in the National Health Service: An empirical factor analytic study within an NHS Trust hospital. *Health Services Management Research*, 15(4), 245-263.
42. Helmreich, R. (1998). Culture at work in aviation and medicine: national, organisational and professional influences. *Ashgate, Aldershot*.
43. Hofmann, D. A., Morgeson, F. P. (1999). Safety-related behavior as a social exchange: The role of perceived organizational support and leader–member exchange. *Journal of Applied Psychology*, 84(286–296).
44. Hofmann, D. A., Jacobs, R., & Landy, F. (1995). High reliability process industries: Individual, micro, and macro organizational influences on safety performance. *Journal of Safety Research*, 26(131–149).

45. Hooijberg, R., Petrock, F. (1993). On cultural change: using the competing values framework to help leaders execute a transformational strategy. *Human Resource Management, 32*(1), 29-50.
46. Kaarst-Brown, Nicholson, M., Stanton, J. (2004). Organizational cultures of libraries as a strategic resource. *Library Trends, 53*(1), 33-53.
47. Kanste, O., Miettunen, J., Kyngas, H. (2007). Psychometric properties of the multifactor leadership questionnaire among nurses. *Journal of Advanced Nursing, 57*(2), 201-212.
48. Kimball, B., O'Neil, E. (2002). Health care's human crisis: The American nursing shortage. *Princeton, NJ: The Robert Wood Johnson Foundation.*
49. Kirk, S., et al (2007). Patient safety culture in primary care: developing a theoretical framework for practical use. *Quality and Safety in Health Care, 16*, 313 - 320.
50. Knox, S. (1997). Nurse Manager perceptions of healthcare executive behaviors during organizational change. *Journal of Nursing Administration, 27*(11).
51. Kohn L., Corrigan, M., Donaldson, S. (2000). To err is human: Building a safer health system. *Washington, DC: National Academy Press.*
52. Kotier, J. P. (1990). A force for change: How leadership differs from management. *New York: The Free Press.*
53. Laschinger, H., Almost, J. Tuer-Hodes, D. (2003). Workplace empowerment and magnet hospital characteristics: making the link. *Journal of Nursing Administration, 33*, 410-422.

54. Leach, L. (2005). Nurse executive transformational leadership and organizational commitment. *Journal of Nursing Administration*, 35(5).
55. Leape, L., Bates, D., Cullen, D., Cooper, J., Demonaco, H., Gallivan, T. (1995). Systems analysis of adverse drug events. *Journal of the American Medical Association*, 274(1). (35-43).
56. Likert, R. (1976). *New Ways of Managing Conflict*. New York: McGraw-Hill.
57. McCallin, A. (2003). Interdisciplinary team leadership: a revisionist approach for an old problem? *Journal of Nursing Management*, 11, 364-370.
58. McCutcheon, A. (2003). Quality work environments: For nurse and patient safety. Toronto: Jones & Bartlet Publishers,93-104.
59. McCutcheon, A., Doran, D., Evans, M., MacMillan, K., McGillis, H., L, Pringle, D. (2004). Impact of the manager's span of control on leadership and performance. *The Canadian Health Services Research Foundation*.
60. Medley, F., Larochelle, D. (1995). Transformational leadership and job satisfaction. *Nursing Management*, 26(64JJ-LL).
61. Meyers, S. (2008). A different voice: nurses on the board. *Trustee, American Hospital Association*; 61, 10-13.
62. National Health Workforce Taskforce. (2009). Health workforce in Australia and factors for current shortages.
63. Nunnally, J. C., & Bernstein, I. H. (1994). *Psychometric theory* (3rd ed.). New York: McGraw-Hill.

64. Obendhain, A., Johnson, W. (2004). Product and process innovation in service organizations: The influence of organizational culture in higher education institutions. *Journal of Applied Management and Entrepreneurship*, 9(3), 91-113.
65. Ostrom, L., Wilhelmsen, C., & Kaplan, B. (1993). Assessing safety culture; Nuclear Safety. 34(2), 163-172.
66. Page, A. (2004). Keeping patients safe: Transforming the work environment of nurses. *Washington, DC: National Academy Press*,
67. Paliadelis, P. (2008). The working world of nursing unit managers: responsibility without power. *Australian Health Review*, 32, 256-264.
68. Pisano, G. (1994). Knowledge, integration, and the locus of learning: An empirical analysis of process development. *Strategic Management Journal*, 15(85).
69. Podsakoff, P.M., & Organ, D. W. (1986). Self-reports in organizational research: Problems and prospects. *Journal of Management*, 12(2): 531-544.
70. Pronovost, P., Miller, M., Wachter, R. (2006). Tracking progress in patient safety: an elusive target. *JAMA*, 296(6), 696-699.
71. Pronovost, P. (2005). Assessing safety culture: guidelines and recommendations. *Qual Saf Health Care*, 14(4), 231-233.
72. Prybil, L., Levey, S., Peterson, R., et al. (2009). Governance in high performing community health systems: A report on trustee and CEO views. *Health Research and Educational*.
73. Quinn, R. (1988). Beyond rational management: Mastering the paradoxes and competing demands of high performance. *San Francisco: Jossey-Bass*



74. Quinn, R., Faerman, S., Thompson, M., and McGrath. R., (1996). Becoming a master manager: A competency framework. *New York John Wiley & Son.*
75. Reason, J. (2000). Human error: Models and management. *British Medical Journal*, 320 (7237)(768-70).
76. Reason, J. (1997). Managing the risks of organisational accidents. *Aldershot: Ashgate.*
77. Redmond, GM. (1995). "We don't make widgets here." Voices of chief nurse executives". *Journal of Nursing Administration*, 25(2).
78. Rich VL. (2008). Creation of a patient safety culture: A nurse executive leadership Imperative. *Agency for Healthcare Research and Quality*, Chapter 20.
79. Quinn, R., Hildebrandt, R., Rogers, P., & Thompson, M. (1990). Effective management communications: A competing values Framework.
80. Rosenthal, M., and Sutcliffe, K. (2002). Medial error, what do we know, what do we do? *Jossey-Bass*, (217-230).
81. Rosenstein, A. (2005). Disruptive behavior and clinical outcomes: perceptions of nurses and physicians. *Am J Nur*, 105, 54-64.
82. Schein, E. (1985) *Organizational Culture and Leadership*, (p.20).
83. Scott, T., Mannion, R., Marshall, M., Davies, H. (2003). Does organizational culture influence health care performance? A review of the evidence. *Journal of Health Services Research & Policy*, 82, 105-117.
84. Scott-Cawiezell, J., Schenkman, M., Moore, L. (2004). Exploring nursing home staff's perceptions of communication and leadership to facilitate quality improvement. *Journal of Nurse Care Quality*, 19(3).

85. Severinsson, E. I. and Kamaker, D. (1999). Clinical nursing supervision in the workplace —effects on moral stress and job satisfaction. *Journal of Nursing Management*, 7(2)(81-90).
86. Sexton, J., Helmreich, R., Neilands, T., Rowan, K., Vella, K., Boyden, J., et al. (2006b). The safety attitudes questionnaire: psychometric properties, benchmarking data, and emerging research. *BMC Health Serv Res*, 6(1), 44.
87. Shannon, H. S., Mayr, J., & Haines, T. (1997). Overview of the relationship between organizational and workplace factors and injury rates. *Safety Science*, 26(201–217)
88. Sorra, J. & Nieva, V. (2004) Hospital survey on patient safety culture. (Report AHRQ 04-0041 to Agency for Healthcare Research and Quality). Washington: AHRQ.
89. Statistics Canada. (2006) “Work Absences,” Perspectives on labor and income. Statistics Canada catalogue no. 75-001-XIE.
90. Stordeur, S., Vandenberghe, C., and D’Hoore, W. (2000). Leadership styles across hierarchical levels in nursing departments. *Nursing Research*, 49(37-43)
91. Thomas, EJ., Studdert, DM., Burstein, HR., et al. (2000). Incidence and types of adverse events and negligent care in Utah and Colorado. *Med Care*, 38, 261-271.
92. Vill, P. B. (Jossey Bass Inc.). *Spirited leading and learning: Process wisdom for a new age.* (1998).

93. Wakefield, BJ., Wakefield, DS., Uden-Holman, T., Blegen, MA. (1998). Nurses' perceptions of why medication administration errors occur. *Medsurg Nurs.*, 7(1), 39-45.
94. Webster Dictionary. Leadership. Available at: <http://www.webster-dictionary.net/definition/Leadership>. Accessed January 13, 2010.
95. Weingart, SN., Pagovich, O., Sands, DZ. (2005). What can hospitalized patients tell us about adverse events? *J Gen Intern Med*, 20(830-6).
96. Wicke, D., Coppin, R., Payne, S. (2004). Teamworking in nursing homes. *Journal of Advanced Nursing*, 452, 197-204.
97. Williams, T., Sims, J., Burkhead, C., Ward, P. (2002). The creation, implementation, and evaluation of a nurse residency program through a shared leadership model in the intensive care setting. *Dimensions of Critical Care Nursing*, 21, 154-161.
98. Yukl, G. (1998). Leadership in organizations. (4th Ed.) Englewood Cliffs, NJ: Prentice Hal.
99. Zohar, D. (1980). Safety climate in industrial organizations: Theoretical and applied implications. *Journal of Applied Psychology*, 65(96-102).

## **Appendices**

**PATIENT SAFETY CLIMATE AND LEADERSHIP  
IN THE EMERGENCY DEPARTMENT**

**Directions:** Please respond to the following questions in a way that you believe best describes the practices in your emergency department. Please be assured that your responses are voluntary and will remain confidential.

**A. Nursing Leadership in the ED**

The following statements describe types of values that may characterize your emergency department (ED). Please indicate the extent to which each statement describes the styles of the nursing person or persons who lead your emergency department.

1. This ED is a very personal place. Its nursing leaders really value the employees who work here.

1	2	3	4	5
Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree

2. This ED is a very dynamic and entrepreneurial place. Its nursing leaders stress being creative in solving problems.

1	2	3	4	5
Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree

3. This ED is a very formal and structured place. Its leaders really stress the need to follow established rules and procedures.

1	2	3	4	5
Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree

4. This ED is a production-oriented place. Its nursing leaders stress getting good results and outcomes.

1	2	3	4	5
Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree

5. The glue that holds this ED together is employee loyalty and trust. Respect for employees is demonstrated by its nursing leaders.

1	2	3	4	5
Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree

6. The glue that holds this ED together is commitment to innovation. Having innovative ED programs and services is pursued by its nursing leaders.

1	2	3	4	5
Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree

7. The glue that holds this ED together is formal rules and procedures. Its nursing leaders value following established protocols in order to get things done.

1	2	3	4	5
Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree

8. The glue that holds this ED together is an emphasis of goal and task achievement. Its nursing leaders value getting the best possible outcomes.

1	2	3	4	5
Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree

9. This ED emphasizes its human resources. Nursing leadership is focused on employee well-being.

1	2	3	4	5
Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree

10. This ED emphasizes growth through developing new ideas. The nursing leadership is focused on being innovative.

1	2	3	4	5
Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree

1. This ED emphasizes stability and routines. The nursing leadership is focused on establishing policies and procedures and enforcing rules.

1	2	3	4	5
---	---	---	---	---

Strongly disagree    Disagree    Neither agree nor disagree    Agree    Strongly agree

2. This ED emphasizes results and achievements. The nursing leadership is focused on achieving excellence.

1	2	3	4	5
---	---	---	---	---

Strongly disagree    Disagree    Neither agree nor disagree    Agree    Strongly agree

**B. Safety Climate in the ED**

*The following statements address issues of safety climate in your ED. Please indicate the level of your agreement or disagreement with the following statements about the work conditions in your ED.*

1. In my ED, we have sufficient staff to handle the workload.

1	2	3	4	5
---	---	---	---	---

Strongly disagree    Disagree    Neither agree nor disagree    Agree    Strongly agree

2. In my ED, staff feels their mistakes are held against them.

1	2	3	4	5
---	---	---	---	---

Strongly disagree    Disagree    Neither agree nor disagree    Agree    Strongly agree

3. In my ED, mistakes have led to positive changes.

1	2	3	4	5
---	---	---	---	---

Strongly disagree    Disagree    Neither agree nor disagree    Agree    Strongly agree

4. In my ED, we have too many patients for the number of staff.

1	2	3	4	5
---	---	---	---	---

Strongly disagree    Disagree    Neither agree nor disagree    Agree    Strongly agree

5. In my ED, when an adverse event is reported it feels like the person is being written up, not the problem.

1	2	3	4	5
---	---	---	---	---

Strongly disagree    Disagree    Neither agree nor disagree    Agree    Strongly agree

6. In my ED, getting the work done quickly is seen to be more important than patient care quality.

1	2	3	4	5
---	---	---	---	---

Strongly disagree    Disagree    Neither agree nor disagree    Agree    Strongly agree

7. In my ED, internal policies and procedures are good at preventing errors and near misses from happening.

1	2	3	4	5
---	---	---	---	---

Strongly disagree    Disagree    Neither agree nor disagree    Agree    Strongly agree

8. In my ED, we work in “crisis mode” trying to do too much too quickly.

1	2	3	4	5
---	---	---	---	---

Strongly disagree    Disagree    Neither agree nor disagree    Agree    Strongly agree

9. In my ED, I am actively engaged in its patient safety efforts.

1	2	3	4	5
---	---	---	---	---

Strongly disagree    Disagree    Neither agree nor disagree    Agree    Strongly agree

**C. Leadership and Patient Safety Practices**

*The following statements address issues of safety climate practices in your ED. Please indicate your agreement or disagreement with each statement.*

1. In this ED, there are many persons who champion patient safety practices.

1	2	3	4	5
---	---	---	---	---

Strongly disagree    Disagree    Neither agree nor disagree    Agree    Strongly agree

2. I feel comfortable raising patient safety issues with ED nursing management.

1	2	3	4	5
---	---	---	---	---

Strongly disagree    Disagree    Neither agree nor disagree    Agree    Strongly agree

<p>3. The ED nursing leadership overlooks patient safety problems that happen over and over.</p> <table border="1" style="width: 100%; border-collapse: collapse; margin-bottom: 5px;"> <tr> <td style="width: 20%; text-align: center;"><b>1</b></td> <td style="width: 20%; text-align: center;"><b>2</b></td> <td style="width: 20%; text-align: center;"><b>3</b></td> <td style="width: 20%; text-align: center;"><b>4</b></td> <td style="width: 20%; text-align: center;"><b>5</b></td> </tr> <tr> <td style="text-align: center;">Strongly disagree</td> <td style="text-align: center;">Disagree</td> <td style="text-align: center;">Neither agree nor disagree</td> <td style="text-align: center;">Agree</td> <td style="text-align: center;">Strongly agree</td> </tr> </table> <p>4. ED nursing leadership seems interested in patient safety only after an adverse event happens.</p> <table border="1" style="width: 100%; border-collapse: collapse; margin-bottom: 5px;"> <tr> <td style="width: 20%; text-align: center;"><b>1</b></td> <td style="width: 20%; text-align: center;"><b>2</b></td> <td style="width: 20%; text-align: center;"><b>3</b></td> <td style="width: 20%; text-align: center;"><b>4</b></td> <td style="width: 20%; text-align: center;"><b>5</b></td> </tr> <tr> <td style="text-align: center;">Strongly disagree</td> <td style="text-align: center;">Disagree</td> <td style="text-align: center;">Neither agree nor disagree</td> <td style="text-align: center;">Agree</td> <td style="text-align: center;">Strongly agree</td> </tr> </table> <p>5. ED nursing leadership is visibly engaged in patient safety.</p> <table border="1" style="width: 100%; border-collapse: collapse; margin-bottom: 5px;"> <tr> <td style="width: 20%; text-align: center;"><b>1</b></td> <td style="width: 20%; text-align: center;"><b>2</b></td> <td style="width: 20%; text-align: center;"><b>3</b></td> <td style="width: 20%; text-align: center;"><b>4</b></td> <td style="width: 20%; text-align: center;"><b>5</b></td> </tr> <tr> <td style="text-align: center;">Strongly disagree</td> <td style="text-align: center;">Disagree</td> <td style="text-align: center;">Neither agree nor disagree</td> <td style="text-align: center;">Agree</td> <td style="text-align: center;">Strongly agree</td> </tr> </table> <p>6. ED nursing leadership encourages and recognizes the reporting of adverse events and near misses.</p> <table border="1" style="width: 100%; border-collapse: collapse; margin-bottom: 5px;"> <tr> <td style="width: 20%; text-align: center;"><b>1</b></td> <td style="width: 20%; text-align: center;"><b>2</b></td> <td style="width: 20%; text-align: center;"><b>3</b></td> <td style="width: 20%; text-align: center;"><b>4</b></td> <td style="width: 20%; text-align: center;"><b>5</b></td> </tr> <tr> <td style="text-align: center;">Strongly disagree</td> <td style="text-align: center;">Disagree</td> <td style="text-align: center;">Neither agree nor disagree</td> <td style="text-align: center;">Agree</td> <td style="text-align: center;">Strongly agree</td> </tr> </table> <p>7. ED nursing leadership provides the tools and training to nurses to improve patient safety.</p> <table border="1" style="width: 100%; border-collapse: collapse; margin-bottom: 5px;"> <tr> <td style="width: 20%; text-align: center;"><b>1</b></td> <td style="width: 20%; text-align: center;"><b>2</b></td> <td style="width: 20%; text-align: center;"><b>3</b></td> <td style="width: 20%; text-align: center;"><b>4</b></td> <td style="width: 20%; text-align: center;"><b>5</b></td> </tr> <tr> <td style="text-align: center;">Strongly disagree</td> <td style="text-align: center;">Disagree</td> <td style="text-align: center;">Neither agree nor disagree</td> <td style="text-align: center;">Agree</td> <td style="text-align: center;">Strongly agree</td> </tr> </table> <p>8. The nursing leadership in my ED is patient-centered.</p> <table border="1" style="width: 100%; border-collapse: collapse; margin-bottom: 5px;"> <tr> <td style="width: 20%; text-align: center;"><b>1</b></td> <td style="width: 20%; text-align: center;"><b>2</b></td> <td style="width: 20%; text-align: center;"><b>3</b></td> <td style="width: 20%; text-align: center;"><b>4</b></td> <td style="width: 20%; text-align: center;"><b>5</b></td> </tr> <tr> <td style="text-align: center;">Strongly disagree</td> <td style="text-align: center;">Disagree</td> <td style="text-align: center;">Neither agree nor disagree</td> <td style="text-align: center;">Agree</td> <td style="text-align: center;">Strongly agree</td> </tr> </table> <p>9. The nursing leadership in my ED supports the staff, encouraging the highest level of performance.</p> <table border="1" style="width: 100%; border-collapse: collapse; margin-bottom: 5px;"> <tr> <td style="width: 20%; text-align: center;"><b>1</b></td> <td style="width: 20%; text-align: center;"><b>2</b></td> <td style="width: 20%; text-align: center;"><b>3</b></td> <td style="width: 20%; text-align: center;"><b>4</b></td> <td style="width: 20%; text-align: center;"><b>5</b></td> </tr> <tr> <td style="text-align: center;">Strongly disagree</td> <td style="text-align: center;">Disagree</td> <td style="text-align: center;">Neither agree nor disagree</td> <td style="text-align: center;">Agree</td> <td style="text-align: center;">Strongly agree</td> </tr> </table> <p>1. The nursing leadership in my ED acknowledges the high risk and error-prone nature of healthcare</p>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree	<p style="text-align: center;">and the demands of patient safety and satisfaction.</p> <table border="1" style="width: 100%; border-collapse: collapse; margin-bottom: 5px;"> <tr> <td style="width: 20%; text-align: center;"><b>1</b></td> <td style="width: 20%; text-align: center;"><b>2</b></td> <td style="width: 20%; text-align: center;"><b>3</b></td> <td style="width: 20%; text-align: center;"><b>4</b></td> <td style="width: 20%; text-align: center;"><b>5</b></td> </tr> <tr> <td style="text-align: center;">Strongly disagree</td> <td style="text-align: center;">Disagree</td> <td style="text-align: center;">Neither agree nor disagree</td> <td style="text-align: center;">Agree</td> <td style="text-align: center;">Strongly agree</td> </tr> </table> <p>2. The nursing leadership in my ED is in complete control and no one is permitted to make any suggestions or offer any opinions.</p> <table border="1" style="width: 100%; border-collapse: collapse; margin-bottom: 5px;"> <tr> <td style="width: 20%; text-align: center;"><b>1</b></td> <td style="width: 20%; text-align: center;"><b>2</b></td> <td style="width: 20%; text-align: center;"><b>3</b></td> <td style="width: 20%; text-align: center;"><b>4</b></td> <td style="width: 20%; text-align: center;"><b>5</b></td> </tr> <tr> <td style="text-align: center;">Strongly disagree</td> <td style="text-align: center;">Disagree</td> <td style="text-align: center;">Neither agree nor disagree</td> <td style="text-align: center;">Agree</td> <td style="text-align: center;">Strongly agree</td> </tr> </table> <p>3. The nursing leadership in my ED strives towards performance monitoring, targets, resource allocation, results-oriented; staffing all aligned to patient safety.</p> <table border="1" style="width: 100%; border-collapse: collapse; margin-bottom: 5px;"> <tr> <td style="width: 20%; text-align: center;"><b>1</b></td> <td style="width: 20%; text-align: center;"><b>2</b></td> <td style="width: 20%; text-align: center;"><b>3</b></td> <td style="width: 20%; text-align: center;"><b>4</b></td> <td style="width: 20%; text-align: center;"><b>5</b></td> </tr> <tr> <td style="text-align: center;">Strongly disagree</td> <td style="text-align: center;">Disagree</td> <td style="text-align: center;">Neither agree nor disagree</td> <td style="text-align: center;">Agree</td> <td style="text-align: center;">Strongly agree</td> </tr> </table> <p style="text-align: center;"><b>D. Communication and Patient Safety</b></p> <p>1. In my ED, we freely speak up if we see something that may negatively affect patient care.</p> <table border="1" style="width: 100%; border-collapse: collapse; margin-bottom: 5px;"> <tr> <td style="width: 20%; text-align: center;"><b>1</b></td> <td style="width: 20%; text-align: center;"><b>2</b></td> <td style="width: 20%; text-align: center;"><b>3</b></td> <td style="width: 20%; text-align: center;"><b>4</b></td> <td style="width: 20%; text-align: center;"><b>5</b></td> </tr> <tr> <td style="text-align: center;">Strongly disagree</td> <td style="text-align: center;">Disagree</td> <td style="text-align: center;">Neither agree nor disagree</td> <td style="text-align: center;">Agree</td> <td style="text-align: center;">Strongly agree</td> </tr> </table> <p>2. In my ED, we are informed about errors that have occurred.</p> <table border="1" style="width: 100%; border-collapse: collapse; margin-bottom: 5px;"> <tr> <td style="width: 20%; text-align: center;"><b>1</b></td> <td style="width: 20%; text-align: center;"><b>2</b></td> <td style="width: 20%; text-align: center;"><b>3</b></td> <td style="width: 20%; text-align: center;"><b>4</b></td> <td style="width: 20%; text-align: center;"><b>5</b></td> </tr> <tr> <td style="text-align: center;">Strongly disagree</td> <td style="text-align: center;">Disagree</td> <td style="text-align: center;">Neither agree nor disagree</td> <td style="text-align: center;">Agree</td> <td style="text-align: center;">Strongly agree</td> </tr> </table> <p>3. In my ED, we are given feedback about changes put into place based on event reports.</p> <table border="1" style="width: 100%; border-collapse: collapse; margin-bottom: 5px;"> <tr> <td style="width: 20%; text-align: center;"><b>1</b></td> <td style="width: 20%; text-align: center;"><b>2</b></td> <td style="width: 20%; text-align: center;"><b>3</b></td> <td style="width: 20%; text-align: center;"><b>4</b></td> <td style="width: 20%; text-align: center;"><b>5</b></td> </tr> <tr> <td style="text-align: center;">Strongly disagree</td> <td style="text-align: center;">Disagree</td> <td style="text-align: center;">Neither agree nor disagree</td> <td style="text-align: center;">Agree</td> <td style="text-align: center;">Strongly agree</td> </tr> </table> <p>4. In my ED, we discuss ways to prevent errors from happening again.</p>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>																																																																																																																															
Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree																																																																																																																															
<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>																																																																																																																															
Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree																																																																																																																															
<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>																																																																																																																															
Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree																																																																																																																															
<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>																																																																																																																															
Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree																																																																																																																															
<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>																																																																																																																															
Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree																																																																																																																															
<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>																																																																																																																															
Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree																																																																																																																															
<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>																																																																																																																															
Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree																																																																																																																															
<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>																																																																																																																															
Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree																																																																																																																															
<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>																																																																																																																															
Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree																																																																																																																															
<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>																																																																																																																															
Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree																																																																																																																															
<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>																																																																																																																															
Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree																																																																																																																															
<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>																																																																																																																															
Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree																																																																																																																															
<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>																																																																																																																															
Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree																																																																																																																															

<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree

1. In my ED, staff are afraid to ask questions when something does not seem right.

<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree

2. Hospital units do not coordinate well with each other and with the ED to provide the best care for patients.

<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree

3. In my ED, things “fall between the cracks” when transferring patients from the ED to other units.

<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree

4. In my ED, important patient care information is often lost during shift changes.

<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree

**E. Reporting Adverse Events**

1. In the past 12 months in your ED, how many adverse event reports have you submitted?

<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
None	1-3 reports	4-6 reports	7-9 reports	10+ reports

2. When a mistake is made, but is caught and corrected before affecting the patient, how often is it reported?

<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
Never	Rarely	Sometimes	Mostly	Always

3. When a mistake is made, but has no potential to harm the patient, how often is it reported?

<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
Never	Rarely	Sometimes	Mostly	Always

4. When a mistake is made that could harm the patient, how often is this reported?

<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
Never	Rarely	Sometimes	Mostly	Always

**F. Quality Outcomes in the ED**

*I would like to ask you to assess the overall quality of patient care in your ED. Please indicate the degree to which the following indicators are low or high in your ED.*

1. Adverse medical errors in your ED:

<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
Very low	Low	Average	High	Very high

2. Adverse “near miss” errors in your ED:

<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
Very low	Low	Average	High	Very high

3. Nurse job stress in your ED:

<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
Very low	Low	Average	High	Very high

4. Nurse turnover in your ED:

<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
Very low	Low	Average	High	Very high

5. Nurse workload in your ED:

<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
Very low	Low	Average	High	Very high

6. Nurse job satisfaction in your ED:

<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
Very low	Low	Average	High	Very high



Patient care quality in your ED:

<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
Very low	Low	Average	High	Very high

8. Patient satisfaction with care in your ED:

<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
Very low	Low	Average	High	Very high

9. Nurse absenteeism in your ED:

<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
Very low	Low	Average	High	Very high

10. Operational efficiency of your ED

<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
Very low	Low	Average	High	Very high

**G. Institutional Characteristics**

A. Geographic Location of your ED / Hospital

- Rural (less than 1,000 residents) \_\_\_\_\_
- Town (1,000 to 10,000) \_\_\_\_\_
- Small city (10,000 to 100,000) \_\_\_\_\_
- Large city (100,000 to 500,000) \_\_\_\_\_
- Metropolitan (greater than 500,000) \_\_\_\_\_

B. Number of beds in your ED

\_\_\_\_\_ ED beds

C. Does your hospital have a recognized trauma unit?

\_\_\_\_\_ yes      \_\_\_\_\_ no

D. In a typical day in your ED during times you are most busy, how would you characterize the overall "busyness" of your ED?

<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
Not busy	Somewhat not busy	Moderately busy	Quite busy	Extremely busy

E. In a typical day in your ED during times you are least busy, how would you characterize the overall "busyness" of your ED?

<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
Not busy	Somewhat not busy	Moderately busy	Quite busy	Extremely busy

F. In a typical day in your ED, how quickly are patients seen who have the least urgent medical needs?

<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
Not quickly	Somewhat not quickly	Moderately quickly	Somewhat quickly	Very quickly

G. In a typical day in your ED, what percentage of the patients that you treat in the ED are truly urgent? (please estimate)

\_\_\_\_\_ % of ED patients truly urgent

H. In a typical day in your ED, what percentage of the patients that you treat in the ED arrive via ambulance? (please estimate)

\_\_\_\_\_ % of ED patients arrive via ambulance

**H. Respondent Characteristics**

1. How long have you worked in this ED?

\_\_\_\_\_ 0-2 years      \_\_\_\_\_ 3-5 years      \_\_\_\_\_ 6+ years

1. In a typical week, how many hours do you work in your ED?

\_\_\_\_\_ hours worked / week

3. What is your gender?

\_\_\_\_\_ female      \_\_\_\_\_ male

4. What positions have you worked in the ED in the past year? (Check all that apply)

- Acute \_\_\_\_\_
- Fast track \_\_\_\_\_
- Mental health \_\_\_\_\_
- Nurse manager \_\_\_\_\_
- Triage \_\_\_\_\_

*Thank you for completing this survey. Be assured that your responses will remain confidential at all times.*