THE INFLUENCE OF PERCEIVED FAIRNESS AND RELATIONAL LEADERSHIP ON NURSING SAFETY CLIMATE AND WORK ENVIRONMENT

By

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A thesis submitted in conformity with the requirements for the degree of Doctor of Philosophy
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ABSTRACT

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Canadian statistics on patient safety in acute care hospitals are alarming. Hospital safety concerns are not isolated to patient safety. Occupational safety is also important. With increasing shortages of nurses, stress in the work place is growing. Nurses report high levels of absenteeism of 14.5 days per year. The importance of a just and fair culture and the role of nurse leaders have been emphasized in safety literature. Although deemed important, studies of nurse leaders and patient outcomes are limited. The influence of interactional justice in the workplace on nurse and patient safety has not been studied.

The purpose of this study was to test and refine a model developed from the literature which explains the impact of perceived interactional justice, relational leadership, and quality of nurse manager – clinical nurse relationships on the nursing work environment and ultimately patient and nurse safety outcomes.

The model was tested on a random sample of 266 Ontario acute care registered nurses. Findings indicated the model reasonably fit the observed data, however could benefit from further refinement. The addition of 2 pathways (span of control to nurses’ intent to leave and number of medication errors to nurse emotional exhaustion) and trimming of the insignificant paths improved the overall model fit.

The resulting model indicates that resonant leadership style and interactional justice improves the quality of nurse leader-nurse relationships which in turn improves quality of the nurses’ work environment and safety climate. A positive safety climate led to a decrease in the number medication errors and nurses’ intentions to leave their unit. A higher quality work environment predicted lower nurse emotional exhaustion. Additionally, higher
numbers of medication errors led to an increase in nurse emotional exhaustion. This suggests that distress may be associated with making a medication error or fear of consequences. As well, larger manager spans were associated with less nurse intent to leave. As the span increased, the number of support personnel also increased. Contrary to other research findings, this result suggests that supportive personnel may mitigate the effect of large manager spans of control on nurses’ intent to leave their units.
ACKNOWLEDGEMENTS

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CHAPTER I: INTRODUCTION AND STUDY PURPOSE

In this thesis, the influence of perceived fairness or interactional justice and the relationship nurse managers have with their staff on the quality of the work environment and safety climate in acute care hospitals are explored. The importance of this topic is highlighted and literature regarding the concepts of interactional justice, relational leadership, safety climate, and work environment outcomes are reviewed.

Introduction

Risk of injury to hospital personnel as well as patients from adverse events associated with patient care have both been featured in research and popular press. Internationally, hospitals are acknowledged as potentially high risk environments that are of public and professional concern (Kho, Carbone, Lucas & Cook, 2005; Hutchinson, Cooper, Dean, McIntosh, Patterson, Stride, Laurence & Smith, 2006).

The focus of media and researchers on patient safety has amplified since the Institute of Medicine of the National Academies (IOM) released its report, “To Err is Human” (Kohn, Corrigan, & Donaldson, 2000) in which it was stated that between 44,000 and 98,000 patients in the United States die from medical errors each year. Notably, a follow-up report from the Institute of Medicine (2003) recommended changes in the nursing practice environment to increase patient safety. While many Canadians believe that Canada’s health care system is one of the safest in the world, the Canadian safety statistics are equally alarming. The Canadian Adverse Events Study (2004) showed that an estimated 7.5% of patients admitted to acute care hospitals in Canada experienced one or more adverse events, and approximately 9,250 to 23,750 deaths from adverse events could have been prevented (Baker, Norton, Flintoff et al., 2004). Adverse events were defined as unintended injuries or complications resulting in death, disability or prolonged hospital stay that arise from health care management, such as medication errors, falls and pressure sores.

Hospital safety concerns are not isolated to patient safety as staff safety also requires attention. Safe patients, safe workers and safe systems are inter-related and interconnected (Goodman, 2004). Occupational injuries have significant impact on our ability to provide
safe patient care. It has been reported that nurses have the highest rate of back and other musculoskeletal injuries of all occupations resulting in a median loss of 5 days of sick time per episode (Trinkoff, Lipscomb, Geiger-Brown, & Brady, 2002). The National Survey of Work and Health of Nurses conducted by Statistics Canada and the Canadian Institute for Health Information (2006) reported that 48% of direct care nurses have experienced a needle-stick or sharps injury and 11% have had such injuries in the past year. Three quarters of the nurses that experienced activity-limiting pain attributed it to work-related factors. Additionally, nurses reported high levels of absenteeism with an average of 14.5 days per nurse. Given the current nursing shortage, the cost of absenteeism on the remaining nurses’ ability to provide safe quality care is alarming. Furthermore, the quality of work environments has been associated with absenteeism, emotional exhaustion and intent to leave (Riolli & Savicki, 2006; Stone, Du & Gershon, 2007) which further compounds the nursing shortage and respective ability to provide safe quality patient care.

In the current political environment, where there is increased focus on creating healthier practice environments for both nurses and patients, nursing leaders are tasked with meeting this mandate and ensuring high quality safe patient care (Wong & Cummings, 2007). Hence it has become even more important that we understand what is needed of nurse leaders to promote both safe patient care and safe work environments in which care is provided.

**Nursing Leadership**

In recent decades there has been considerable restructuring of health care that resulted in reductions to nursing resources including nursing leadership. As a result, front-line managers have larger spans of control and increased responsibilities that impede their ability to provide adequate leadership and support (Doran, McCutcheon, Evans et al., 2004; McCutcheon, Doran, Evans et al., 2009). These demands may hinder relationship building required for effective leadership (Tourangeau, Coghlan, Shamian & Evans, 2005).

Health Care leaders are accountable for safety of their staff and patients through mandates of boards, hospital associations, government agencies and accreditation bodies. While the mandate is clear, how to achieve a safe and healthy environment is not well understood. According to the IOM (2001), a fundamental shift in health care must occur if we are to
move from a culture of blame to a safety culture that makes every error or potential error, a learning opportunity to improve care and prevent harm. To date, there is limited empirical and theoretical research to inform nursing leaders of how this can be facilitated in their nursing units (Weingart & Page, 2004). It is extremely important that nurse manager behaviours and leadership styles are evidenced-based to positively impact the quality of work and safety of patient care on their nursing units.

While there is a large body of literature devoted to the study of leadership; research in health care is quite limited. Of the 155 research studies in health care leadership published over 30 years (1970 – 1999), twelve studies focused on the effects of leadership and only 2 included data on the association between leadership and patient outcomes (Vance & Larson, 2002).

A more recent systematic review provided further evidence that there is a dearth of research regarding the relationship between nursing leadership and patient outcomes with only seven high quality studies published since 1985 (Wong & Cummings, 2007). In these studies, the construct of leadership was measured as various practices, styles, behaviours and competencies (Wong & Cummings, 2007). While not implicitly stated the majority of these studies incorporated relational aspects of leadership such as influencing followers, sharing a vision, providing support and encouraging participation of subordinates. Through these relational aspects, nursing leadership influences patient outcomes by changing the work environment or supporting nurse behaviours that enhance patient care. Three of the seven studies looked specifically at adverse patient care events and noted positive relationship with leadership such as: relational leadership with decreased complications of immobility like pressure ulcers (Anderson, Issel & McDaniel, 2003); effective leadership with greater staff stability which was associated with decrease in patient falls and medication errors, (Houser, 2003); and nurse manager support with decreased patient mortality (Houser, 2003; Boyle, 2004).

Goleman, Boyatzis and McKee (2004) argue that this relational or emotional task of the leader is primal. When leaders motivate the emotions of followers in a positive way, they facilitate best practices. Goleman et al., call this effect resonance. How well leaders manage and direct the feelings of followers to promote group attainment of goals, depends on their
ability to create resonance. Resonant leaders are emotionally intelligent, concerned about their staff welfare, attuned to their concerns in building positive work environments, empathetic to other’s feelings and supportive of their subordinates’ success (Cummings, 2004). Resonant leadership has been reported as being able to mitigate the detrimental aspects of the nursing work environment and enhance safe patient care (Cummings, Hayduk & Estabrooks, 2005).

Literature beyond the discipline of nursing has also considered the effect of leadership on safety outcomes through work environment and safety climate. Researchers in these fields suggests that leaders play a pivotal role in influencing the workplace safety climate (Barling, Loughlin & Kelloway, 2002; Kelloway, Mullen & Francis, 2006). Some studies have shown relationships between staff perceptions of safety culture and quality of patient care (Shortell, Zimmerman, Rousseau et al., 1994), length of stay (Shortell et al., 1994), health and safety of workers (Lundstrom, Pugliese, Bartley, Cox and Guither, 2002; Barling et al., 2002) and compliance with safety work practices (Zohar, 2002).

Other studies have demonstrated that supportive leader communication and transformational leadership style positively influence relationships or exchanges between leader and follower (referred to as leader-member exchange [LMX]), which in turn influences task performance and organizational citizenship behaviours (Lee, 2005; Michael, Harris, Giles & Feild, 2005; Wang, Law, Hackett, Wang & Chen, 2005). This suggests that when supervisors show their employees consideration, respect and support through their actions and communication exchanges such as in resonant leadership, higher quality LMX relationships and trust are likely. High LMX will enable employees to strive toward the shared goal of safety and trust that will support a healthy climate in which errors and concerns can be reported, however this has yet to be studied.

**Safety Climate**

To avoid harm, it is essential that hospital leaders create a culture of safety among their staff (Nieva & Sorra, 2003). Safety climate is defined as shared perceptions of workers regarding the level of safety in their work environment (Zohar, 1980). Lundstrom and colleagues, (2002) identified six organizational dimensions of a hospital safety climate. The most
important of which are management commitment and safety performance feedback from managers and coworkers (Gershon, Karkashian, Grosch, et al., 2000; Lundstrom et al., 2002). Employees need to feel that administration cares about their safety, supports their safety efforts and uses problems and errors to improve the system and not for retribution (Lundstrom et al., 2002).

To achieve a safe environment for patients and nurses, psychological safety is essential, and this means the environment must be conducive for one to voice concerns and ask for help knowing that the response will always be respectful. Unless respect is the basic tenet of the culture, nurses will hesitate to voice a concern and avoidable harm will occur (Frankel, Leonard & Denham, 2006). An organization with a fair and just culture openly examines its weaknesses and learns from its mistakes. An essential element of this climate is that employees feel that they are supported and safe when voicing concerns (Marx, 2001). No studies have examined how leader fairness and justice influences a safety climate and nursing work environment in acute care hospitals.

**Nursing Work Environment**

Numerous psychosocial elements of nurses’ work environments have been linked to nurses’ health and well-being. Additionally, the work environment of nurses has also been closely linked to patient safety. Stressful environments can lead to emotional exhaustion and may increase the potential for error and decrease the overall safety of the environment (Laschinger & Leiter, 2006). Sixty-six percent of nurses have been reported as experiencing high emotional exhaustion in current hospital environments (Cho, Laschinger & Wong, 2006) and this presents an important occupational risk and safety outcome.

In a Canadian survey of nurses’ perceptions of patient safety in hospitals, the vast majority of nurses reported that their work environment was presenting increasing risk to their patients (Nicklin & McVeety, 2002). The IOM, in a report titled “Keeping Patients Safe: Transforming the work environment of nurses”, concluded that nurses’ work environments are characterized by serious threats to patient safety related to leadership, staffing, work design and the culture of the organization (IOM, 2003). While the report cautions that no single action will change the nursing environment to improve patient safety, it highlights the
importance of effective nursing leadership and an evidence-based management structure and processes. To improve understanding of effective nursing leadership in fostering a healthy nurse work environment and safety culture, more theoretical research is required.

**Conclusions**

In sum, safety in hospitals is a major concern to researchers, health care providers, and the public. The role of nursing leadership is pivotal to ensure an environment where individuals feel safe to voice concerns and report errors, rather than a culture of blame. Learning from our errors openly will facilitate the development of processes to improve safety. Both safety climate and nursing work environment are related to patient and nurse safety outcomes; therefore positively influencing these areas should result in improved outcomes for both patients and nurses. Despite evidence of a relationship between nursing leadership and patient care outcomes, research in this area is limited. Wong and Cummings (2007) argue that more research focusing on understanding the mechanisms in this area is warranted. In particular, the role of interactional justice and relational aspects of leadership such as resonant leadership and LMX need to be investigated in light of the importance of trust and psychological safety.

However, the hospital environment is a complex adaptive system, and as such the relationship of leadership and patient or nurse outcomes cannot be modeled by a simple set of bivariate relationships (Mark, Hughes & Bland Jones, 2004). The context of culture and health of the nursing work environment must be considered. The development and testing of a model that examines both indirect and direct influences of leadership on safety outcomes such as patient adverse effects, nurse emotional exhaustion, absenteeism and intent to leave is needed to better understand the influence of leadership on safety. Not only does this approach hold promise to provide interesting new insights to enrich safety knowledge and leadership theory, it allows for the opportunity to produce new knowledge that is useful to nurse managers and hospital administrators.
**Study Purpose**

The primary purpose for this study was to test and refine a model that explains the impact of perceived interactional justice, relational leadership, and quality of nurse manager – clinical nurse relationships on the nursing work environment and ultimately patient and nurse safety outcomes.
CHAPTER II: REVIEW OF THE LITERATURE AND THEORETICAL FRAMEWORK

Literature Review

This literature review examines theoretical and empirical studies of the effectiveness of nurse manager relational leadership, relationships with subordinates through leader-member exchange, and effects of interactional justice on this relationship. Additionally, it highlights how span of control impacts the leader or nurse manager’s ability to develop relationships with staff and thus influence nurses’ work environments and safety climate. Leadership effectiveness is commonly assessed by the attainment of intended goals (Yukl, 1998). Leadership is considered key to organizational effectiveness and is important for the well-being of employees and citizens (Hogan & Kaiser, 2005). Therefore, leadership is examined in light of its relationship with safety outcomes and the degree of healthy or quality work environments. While there is a relationship between safety climate and a healthy work environment, each have specific elements that are unique. Therefore, both concepts are considered in this study. Five safety outcomes (2 patient-related and 3 nurse-related), indicative of a safety climate and a quality work environment are studied, and are discussed in this chapter: medication errors, patient falls, nurse emotional exhaustion (the core dimension of burnout), nurse absenteeism and nurse intent to leave.

Literature Review Methods

The objectives of this review are to describe the current state of knowledge of how nursing leadership influences a safety climate and the quality of nurses’ work environments. Gaps in the research are identified. An explanation of how this study will address this gap as it pertains to the influence of nurse leaders’ relationship with nurses on patient and nursing safety outcomes is addressed. The literature review includes definitions, theory and outcomes of the following concepts: leadership, justice, span of control, safety climate and healthy/quality work environment. Relationships among concepts are proposed together with relational leadership and set the stage for the theoretical framework that was tested and refined in this study.
Leadership

Leadership Defined

Leadership has been defined and conceptualized in numerous ways; however four elements have been consistently acknowledged as part of the concept (Northouse, 2007):

a) Leadership is part of an interpersonal process whereby the leader affects and is affected by followers.

b) Leadership involves influence.

c) Leadership occurs within a group context in which the group has a formal common purpose.

d) Leadership involves striving to accomplish a goal.

For the purposes of this study, the Northouse (2007) definition of leadership is adopted: “leadership is a process whereby an individual influences a group of individuals to achieve a common goal” (p. 3). In this study of hospital nurses, leadership is a process whereby the clinical nurse manager through their behaviour and relationship with acute care nurses influences the attainment of patient and nurse safety outcomes. Given this definition and that the overall intent of the study is to examine the perspectives of registered nurses to determine the impact of nurse leadership has on the outcomes of clinical nursing care, a relational approach will be used as the lens to better understand this relationship.

Relational Leadership

Relational leadership is a relatively new term in the leadership literature. The definition is dependent upon the perspective taken: entity or relational. The entity perspective approaches relational leadership by focusing on the individual leader/follower and their perceptions, intentions, and behaviours relative to their relationship with others. Whereas the relational perspective does not focus on individuals but focuses on the social construction process in which the leader and follower are created (Uhl-Bien, 2006). This study is concerned with the perception of nurses in terms of manager justice and their relationship
with their manager thus, the entity perspective of relational leadership is used which focuses on leader-member exchanges and leader behaviour (i.e. resonant leadership).

**Leader-Member Exchange (LMX) Theory**

Originally called the Vertical-dyad linkage, leader-member exchange (LMX) theory is the most prominent relationship-based approach to leadership (Graen & Uhl-Bien, 1995; Uhl-Bien, 2006). It provides an ideal alternative to the traditional leadership approaches which focus solely on leader traits and behaviours. LMX theory conceptualizes leadership as a process whereby the interpersonal interaction between leaders and followers is the focal concept. Leaders develop different types of exchange relationships with followers, the quality of which influences leader and member actions and attitudes (Gerstner & Day, 1997).

LMX theory is grounded in social exchange and role making theories. The basic tenet of social exchange theory is that accepting something of value from another (i.e. leader), obligates the receiver (i.e. follower) to reciprocate in some manner of equal or greater value. According to LMX theory, to fulfill this obligation the follower eventually reciprocates in a way that is consistent with the leader’s values.

In general, these dyadic exchanges range in quality on a continuum from low to high. Over time and through a series of exchanges, interactions and work roles are negotiated and may develop into a valued high quality dyadic relationship which relies successively less on instrumental transactional exchanges and more on social transformational interactions (Graen & Uhl-Bien, 1995). Ultimately, when one member offers benefits to the other without any guarantee of reciprocation, responses that extend beyond the employment contract such as trust and respect become attributes of their high quality social exchange relationship. In comparison, low quality relationships show weaker trust, respect, loyalty and commitment such that the follower only meets the requirement of the job description and nothing more (Brower, Schoorman & Tan, 2000; Sanchez and Byrne, 2004). Trust in one’s leader has been reported to be a determinant of organizational commitment and intent to leave/stay (Gregory, Way, LeFort, Barrett & Parfrey, 2007) and hence is an important feature of an ongoing relationship. The quality of the relationship that develops is predictive
of individual, group and organizational outcomes. High quality leader-member (follower) relationships contribute to organizational effectiveness. They are likely to result in reciprocation beyond required in-role behaviours and increase organizational citizen behaviours in subordinates (Wayne, Shore, Bommer, & Tetrick, 2002).

The LMX theory provides description of how high or low quality working relationships develop. However, relatively few empirical studies have examined this. The theory proposes that both leaders and followers contribute to the exchange in order to develop a higher quality relationship. Followers contribute to the relationship through their performance and leaders by support of ‘self worth’ (Dansereau, 1995). Self-worth refers to the extent to which leaders show confidence in the follower’s ability and motivation, pay attention to their feelings and needs and support a follower’s ideas (van Breukelen, Schyns & La Blanc, 2006).

The nature and content of the exchange process, such as specific leader behaviours and the differential reactions by various followers warrants further study (van Breukelen et al., 2006). In particular, specific leader behaviours may foster or preclude the development of high quality relationships and need to be better understood. Only recently have researchers examined differences in leader behaviours and how this treatment is perceived and interpreted by followers in terms of fairness and justice (Van Breukelen, Konst, & Van Der Vlist, 2002). Very few have studied the effect of behaviours reflective of emotional intelligence in leadership (resonant leadership) on the quality of leader-member exchange (Dasborough & Ashkanasy, 2002; Gordon, 2007).

**Resonant Leadership**

Resonant leadership is behaviour of leaders who demonstrate a high level of emotional intelligence, are in tune with the emotions of those around them, use empathy, and manage their own emotions effectively to build strong, trusting relationships and create a climate of hope and optimism that inspire commitment (Boyatzis & McKee, 2005; McKee & Massimilian, 2006). The ability to understand the feelings of others or empathy is considered key to successful resonant leadership (Goleman et al., 2004).
Emotional intelligence (EI), originally defined by Salovey and Mayer (1990), is the ability to appraise, regulate and use one’s own and others emotions to guide thinking and action. In 1997, they added to this definition the ability to perceive and understand emotions (Vitello-Cicciu, 2002). Around the same time, Goleman’s model of EI was published which he later refined in the bestselling book entitled *Primal Leadership* (2004). In this model, EI consists of 4 closely intertwined domains which are basic ingredients of effective resonant leadership: self-awareness, self-management, social awareness and relationship management. Each domain consists of several areas that reflect 18 competencies which reflect emotionally intelligent behaviour. Self-awareness (emotional self-awareness, self-assessment, self confidence) and self-management (emotional self-control, adaptability, achievement, initiative, optimism, and transparency) domains reflect personal competence and refer to how well the leader understands and manages his/her own emotions (Goleman et al., 2004). Social competence is composed of the latter two domains. Social awareness (empathy, organizational awareness, service orientation) and relationship management (inspirational leadership, influence, catalyst for change, conflict management, teamwork, collaborations, developing others) domains reflect how well the leader recognizes and manages the emotions of others, builds relationships, and works in complex social systems (Goleman et al., 2004). These competencies have been reframed to reflect leadership competencies, which Goleman et al. use to distinguish 6 leadership styles/behaviours that are interchanged seamlessly and in different amounts depending on the situation. Four of these styles: visionary, coaching, affiliative (relationship management) and democratic, create resonance with followers and boosts performance. The other two styles (pacesetting and commanding) should only be used judiciously and in specific circumstances or they fail to demonstrate EI and result in dissonance (Goleman et al., 2004).

Goleman and colleagues claim that as tasks of leadership become more complex and collaborative, relationship skills become more pivotal. They argue that under the guidance of an emotionally intelligent leader, followers feel a comfort level that enables them to share ideas, learn from one another, make decisions collaboratively, and achieve goals. These features also describe characteristics found in interactional justice (Cropanzano, Goldman and Benson, 2005) and safety climates (Wallace, Popp & Mondore, 2006).
Emotions are at the core of the leader-member exchange. As such, leaders’ emotions, attempt to evoke emotion in their members, and the members’ reaction to these behaviours directly impact member behaviours and productivity (Dasborough and Ashkanasy, 2002). The limited amount of research conducted in this area suggests that leader EI is essential for effective healthcare leadership (Freshman & Rubino, 2002). Many of the attributes associated with effective nurse leaders such as communication, empathy, optimism, encouraging the heart, and relationship building (Herbert & Edgar, 2004) are closely aligned with resonant leadership styles.

Relational Leadership and Outcomes

Leader-follower exchange outcomes

In support of the LMX theory, based on meta-analytic evidence researchers have concluded that a significant positive correlation exists between the quality of the leader-follower relationship and followers’ task performance (Gerstner & Day, 1997) as well as citizenship behaviours (Ilies, Nahrgang & Morgeson, 2007). Ilies et al. argued that the results of their meta-analysis suggest that managers should pay close attention to interpersonal constructs and the quality of their relationships with subordinates, especially in “organizations in which cooperation, helping, and altruism are important for organizational effectiveness” (p. 274). These elements are important for effective patient care and a safe and healthy working environment.

In a cross-sectional study of a random sample of 201 research and development engineers in Singapore, Lee (2005) tested the applicability of behavioural and relational leadership in determining employees’ organizational commitment. Leader-follower relationship was measured using Liden and Maslyn’s (1998) LMX-MDM (multidimensional measure) scale comprised of 12 items reflecting dimensions of affect, loyalty, contribution and professional respect. He found that the four dimensions of LMX quality accounted for 42% and 31.4% of variance in affective and normative commitment, respectively. The quality of leader-follower exchange was also found to mediate the relationship between transformational leadership style and organizational commitment. This suggests that high quality
relationships embodying affect, respect and contribution create positive experiences for the follower, and in turn adds to their desire to comply with organizational expectations.

Similarly, Wang et al. (2005), in a sample of 162 dyads from a variety of organizations in China, noted that leader-follower relationships mediated the effects of transformational leadership. In their study, leader-follower exchange mediated the perceived transformational leadership behaviours on organizational citizen behaviours (OCBs), as well as on task performance. The results of structural equation modeling analyses demonstrated statistically significant and positive path coefficients from LMX to OCB and task performance, as well as a substantial path coefficient between OCB and task performance. However, to determine whether the results of these studies are generalizable to other professional groups such as nurses or to the western culture requires further research.

The influence of the leader-follower relationship on citizen behaviour such as safety actions has also been recently supported by a variety of researchers (Hofmann & Morgeson, 1999; Hofmann, Morgeson & Gerras, 2003; Michael, Guo, Weidenbeck & Ray, 2006). In a small study of 49 manufacturing supervisor-group leader dyads, Hofmann and Morgeson (1999) linked quality of the leader-follower relationship to safety behaviours (communication and commitment) and accidents. Results provided evidence that safety communication and commitment mediated the relationship between LMX and accidents. This suggests that employees with higher quality relationships and better communication with their supervisor are more likely to feel comfortable to raise safety concerns. This conclusion is also supported in a larger study of 598 manufacturing employees. Michael et al. (2006) found that the influence of leader-follower relationship was greater than safety communication in predicting safety-related events, emphasizing the value of leader-employee relationships. Additionally, Hofmann and colleagues (2003) examined subordinate safety citizenship behaviour in a high-risk military environment. When supervisors valued safety, they found that subordinates in high quality leader-follower relationships were more likely to engage in safety-related citizenship behaviours.

These results fit with the social exchange tenet of the LMX theory. Subordinates reciprocate in a manner that is consistent with the supervisor’s values. Additionally the results
emphasize the importance of supervisors/leaders and their potential role of their relationships with followers in fostering workplace safety. Study limitations include a restricted focus exclusive of health care environments. Health care has safety issues that go beyond occupational well being.

There is little research examining how leader-follower relationships or nurse manager-nurse relationships influence nurses’ safety behaviours and their impact on both occupational and patient safety outcomes. Only one study could be found that examines the effect of nurse leader-nurse relationship on outcomes. Laschinger, Purdy and Almost (2007) tested a theoretical model linking leader-follower exchange quality and empowerment with job satisfaction. Using a non-experimental, predictive design that included a random sample of 223 acute care nurse managers, they explored the quality of the relationship that managers had with their supervisors. They employed a self-administered questionnaire that included the LMX-MDM scale. The final sample consisted of 40 middle managers and 101 first-line managers (response rate of 63%). Their results supported an integration of empowerment with LMX theory. They reported that the quality of leader-follower exchange had a positive direct effect on structural empowerment, which in turn had a similar effect on psychological empowerment which has a direct effect on job satisfaction. This suggests that when managers have high quality relationships with their immediate supervisor, they are most likely to feel empowered to contribute meaningfully to workplace decisions (Laschinger et al., 2007). This study may not be generalizable to staff nurses given that managers are generally more empowered than their staff. A high quality relationship with one’s leader empowers subordinates. Empowerment enables confidence necessary to speak out and actively participate in open communication and decision making. These elements are essential to foster a healthy work environment (Heath, Johanson & Blake, 2004) and safety culture (Frankel et al., 2006). Speaking out about safety concerns comes with risk and the decision to assume this risk is likely enabled by the quality of the leader relationship and trust; trust that your leader will be supportive and respectful of what you have to say. Therefore, future research in work environment and safety climate should include influence of the nurse-nurse manager relationship and leader behaviours.
Resonant Leadership Outcomes

Given that resonant leadership is a new and developing concept; very few studies have examined the outcomes of resonant leadership or leaders with high levels of emotional intelligence (EI). Barling, Slater and Kelloway (2000) investigated the relationship between EI and transformational leadership. Forty-nine managers rated their EI using the EI Inventory while their subordinates (n = 187) provided rating of their managers’ leadership style on the Multifactor Leadership Questionnaire. Results suggest that EI is associated with three aspects of transformational leadership: individualized consideration, inspirational motivation and idealized influence. Additionally, leaders with high EI scores were perceived by their subordinates as having superior leadership skills. This relationship between components of transformational leadership, defined as effective leadership, and EI was also reported by Palmer, Walls, Burgess and Stough (2001).

McColl-Kennedy and Anderson (2002) in a survey of 121 pharmaceutical sales representatives in Australia tested a model where the emotions of optimism and frustration were considered as mediators between leadership and performance. The sample was composed of 58 men and 63 women with an average age of 39 and 34 respectively. The majority had completed university degrees (72 – 73%). Performance was taken from company records of territory quotas. The self-reported questionnaire included Likert-like response questions measuring frustration (frequencies of irritation, tenseness and frustration emotions) and optimism constructs (optimism, enthusiasm and excitement emotions). In addition, employee perceptions of the leadership behaviours of individualized consideration, intellectual stimulation, inspirational motivation and idealized influence, were measured. These items are associated with transformational leadership but also reflect EI resonant leadership styles (Barling et al., 2000) i.e. affiliative, democratic, coaching and visionary respectively. They found that a full mediation model had excellent overall fit ($X^2 = .912$, $df = 3$, $P=.82$; CFI = 1.00, SRMR=.023, AGFI=.987). Emotions were found to fully mediate the relationship between leadership style and employee performance. Based on this study, leader behaviour alone cannot account for the performance of followers. Followers’ perceptions of their relationship with their leaders, particularly the level of support they receive would also seem to influence performance (McColl-Kennedy & Anderson, 2002).
In an exploratory study, Wong and Law (2002) examined the relationship between leader EI and follower outcomes. A sample of 146 government administrators in Hong Kong were asked to complete a questionnaire evaluating their own EI using a study-developed measure and the in-role (i.e. job performance) and extra-role behaviours (i.e. OCB) of one of their direct reports. In addition, the direct report was asked by the administrator to complete a survey that included questions on employee EI, job satisfaction, job characteristics, and demographics. Hierarchical regression was used to analyze the data after controlling for job characteristics, employee EI and demographics. Results indicated that leader EI had a significant effect on employee job satisfaction and extra-role behaviours. No relationship of leader EI and job performance was found, however, it was concluded that this may be due to the culture of Chinese government officials to distort performance ratings of their subordinates (Wong & Law, 2002).

More recently, Gordon (2007) investigated whether EI was an antecedent of quality leader-follower relationship and leader effectiveness. A total of 60 managers and 234 subordinates from various fields such as marketing, information technology and security participated in the study. Emotional intelligence was measured using 3 scales from Wong-Law Emotional Intelligence Scale: emotional appraisal in others (empathy), self-awareness, and self-emotion regulation which also reflect characteristics of resonant leadership. The quality of the leader-follower relationship was measured from the perspective of the subordinate using the LMX7 scale. The effectiveness of the leader was measured by their direct supervisor’s response using a 9 point Likert-type scale to a single item, “how would you rate this manager’s effectiveness compared to other managers you have known?” Results indicated that leaders with high scores in emotional appraisal had significantly higher quality leader-follower relationships and were seen as more effective than leaders with low scores. Leaders with high scores in self-emotional appraisal also had higher quality leader-follower relationships but had no significant difference in leader effectiveness. There was no significant difference between leaders with high scores in emotion regulation and leaders with low score in either relationship quality or leader effectiveness. However the reliability coefficient of this subscale in their study was 0.64 which was well below the desired level of 0.80. The results are also limited by the EI self-reporting of managers. Of the three subscales, emotional regulation is the most behavioural and likely most visible to others.
However, lack of self-awareness regarding this behaviour by the managers may have decreased accuracy of their reporting of this subscale. Alternatively ratings of leader EI by subordinates may have provided a different result and hence had an impact on leader-follower relationships.

Feather (2009) conducted a review of the literature on EI studies involving nursing leadership. Her review stressed the need for further research particularly on the impact of EI on nurses’ job satisfaction and its ability to affect turnover rates. This was also supported by a systematic review from 1990 to 2005 conducted by Akerjordet and Severinsson (2007) which revealed that research on EI and resonant leadership is scarce, particularly in the nursing literature. No articles were published before 1995. Only articles published in English with an empirical or philosophical focus and relevant to nursing were included. The final analysis included a total of 16 papers of which only five considered leadership and two studied nurses, one of which looked at both nurses and their managers (Cummings et al., 2005).

Cummings et al. (2005) used data from a survey of 6,526 acute care registered nurses in Alberta to test a theoretical model and determine whether resonant leadership styles would mitigate the negative effects of hospital restructuring on nurses. The survey examined: employment characteristics, quality work life as measured by the Revised Nursing Work Index (NWI-R), nurse burnout, staffing, details of last shift worked, quality of care (unmet patient needs), and nurse demographics. The data was sorted into 7 datasets based upon the nurse’s responses to 13 questions that represented the EI competencies of their leader. These datasets represented Goleman’s six leadership styles (4 resonant and 2 dissonant) and 1 mixed leadership style. Because effective leaders switch leadership styles to meet the circumstances (Goleman et al., 2004), if nurses’ responses fit the characteristics of two different leadership styles these responses were included in both datasets. This multiple classification occurred only among the four resonant leadership sets or the two dissonant styles, not between them. Each dataset/leadership style was analyzed separately. Results indicated that all nurses reported experiencing negative effects from restructuring, but at significantly different degrees depending on leadership style. Nurses working for resonant leaders had the lowest mean scores on the negative consequences. The results suggest that
resonant leadership styles mitigate the effect of restructuring on emotional exhaustion, emotional health, and unmet patient needs. Nurses working for resonant leaders had improved emotional health over the previous year compared to the deteriorating health experienced by those with dissonant leaders. This supports that resonant leadership can impact the quality of the work environment and the emotional well being of staff.

Only very recently have nurse researchers begun to link the role of EI leaders and safety. Combining a case study design with focus groups, interviews and observation, Smith, Pearson and Ross (2009) concluded that patient and worker safety are linked through emotions at work. These positive or negative emotions affect the organizational culture which in turn promotes or threatens safety or reduction of risk at work. They argued that key to the management of these emotions is effective emotionally intelligent leadership which listens and learns, and hence plays an important role in promoting patient and nurse safety. However further research linking EI leader behaviours to safety outcomes is required.

Young-Richie, Laschinger and Wong (2009) tested a model exploring the relationships among EI leadership behaviour, workplace empowerment and organizational commitment in a random sample of 206 emergency staff nurses. Using a predictive non-experimental survey design and structural equation modeling, their hypothesized model was supported ($X^2 = 2.3$, $df = 1$, $p > .05$; CFI = .99, IFI = .99, RMSEA = .08). They found that emotionally intelligent leadership behaviour has a strong effect on structural empowerment which in turn had a direct effect on commitment. This finding highlights that leaders who demonstrate EI behaviours empower their followers to speak out which is important for a healthy and safe work environment and organizational commitment, a key retention factor (Young-Richie et al., 2009).

In summary, resonant leadership promotes emotional resilience in followers. By using their emotional skills of empathy, relating, listening and responding to concerns to understand what their followers are feeling during challenging times, they build trust and quality leader-follower relationships. Leaders enable follower outcomes through the quality of their exchanges with them. The quality of this relationship promotes ‘in kind’ reciprocal behaviours by followers. High quality relationships influence positive outcomes (figure 1).
Outcomes such as task performance, safety behaviours, accidents, empowerment, OCB and job satisfaction have all been associated with leader-follower relationship (LMX). The latter three have also been reported with leader EI. Emotional health and resilience, productivity and attention to patient care have been associated with resonant leadership of nursing leaders. The increasing nursing shortage and its effect on the health and safety of the work environment signify the importance of research of nursing leader EI behaviours (Feather, 2009).

**Figure 1: Relational Leadership and Outcomes**

Despite a large body of empirical research, what makes leadership effective is not clear. Van Knippenberg, De Cremer and van Knippenberg (2006) asserted that this is likely due to the omission of important aspects, namely the role that trust and justice or fairness play in leadership effectiveness. The evolution to a higher quality leader-member relationship and the perception of leader trustworthiness are likely dependent upon the perceptions that previous interactions were just and fair. The concept of justice is important to understand how leaders influence work environment and safety climate. Therefore literature on organizational justice is next examined.

### Organizational Justice

#### Interactional Justice Defined

Organizational justice refers to perceptions of fairness in the workplace. Four types of perception of justice have been supported by empirical research (Colquitt, 2001; Sanchez and Byrne, 2004; Cropanzano, Goldman and Benson, 2005):

1) distributive justice refers to the overall reward and recognition system in an organization;
2) procedural justice refers to the fairness of the process used in determining outcomes and decisions;

3) informational justice refers to the perceptions of whether one has been provided with adequate, timely, honest, and complete information about a procedure or process and;

4) interpersonal justice refers to the perceptions that one is treated with respect and dignity during interactions and enactment of procedures.

Several researchers, however, have combined the latter two into one fairness concept called interactional justice (Masterson, Lewis, Goldman & Taylor, 2000; Cropanzano et al., 2005).

Theoretical explanations for attitudes of justice have been quite varied. However, for this study, the most relevant theory is the social exchange theory since both justice and LMX theory have their roots in social exchange (Sanchez & Byrne, 2004).

**Social Exchange Theory**

Social exchange theory is a conceptual framework that explains workplace behaviour and reactions to leadership. It is based on obligation to a series of interdependent transactions (Cropanzano & Mitchell, 2005). According to social exchange theory, organizations are forums for transactions ranging from the exchange of work for pay, to responding positively for supportive manager behaviour. Individuals form perceptions regarding the fairness of their transactions with a supervisor or organization. If the transaction is determined by the receiver to be just and fair, they are obligated to reciprocate toward the provider (organization or supervisor) of the fair transaction (Cropanzano, Prehar, and Chen, 2002).

Distributive and procedural justice types are generally determined through organizational processes. In the context of Canadian nursing, distributive justice (i.e. pay and benefits) and procedural justice (i.e. employee procedures) are usually determined through collective agreements specifying the obligation between the nurse and the organization. However, procedural justice may also include supervisory processes, such as a manager promoting voice and empowerment by involving subordinates in the development of procedures (van
Knippenberg et al., 2006). Whereas, interpersonal and informational justice (combined as interactional justice) occurs only via exchanges with one’s supervisor (Bies, 2005). Bies reconceptualized interactional justice as more interpersonal but a broader concept than interpersonal justice which had been previously limited to context when procedures are enacted. According to Masterson et al. (2000) this social exchange perspective allows us to specify beforehand which criterion variables will be related to the various types of justice. For example, reciprocation for interactional justice would be directed to the immediate supervisor/leader and be manifested within the workgroup.

Aryee, Budhwar and Chen (2002) examined the potential mediating influence of trust of supervisor and organization on the relationship between justice and reciprocation. Three justice types (distribution, procedural and interactional) and employee reciprocation through work attitudes and behaviours were examined. Data were collected from 179 employees in the public sector in India and their immediate supervisors (n = 28). The results indicated that all three justice types were partially mediated by trust in the organization. Distributive and procedural justices also have direct effects on organizational outcomes such as job satisfaction, turnover intentions, organizational commitment and OCB. Interactional justice was fully mediated through trust in the supervisor. While causality cannot be inferred due to the cross-sectional nature of the study, path analysis results provided support for the social exchange theory as a model to understand the motivational basis of employee work behaviours and attitudes.

This study focused on the influence of leadership, thus the following literature review was confined to procedural and interactional (combined informational and interpersonal) justice types.

**Justice Outcomes**

Based on the literature, it appears that leader-follower relationship and organizational justice share several common correlates (Sanchez & Byrne, 2004). In two separate meta-analyses, the perceptions of justice have been related to many of the same outcomes as leader-follower exchange including OCB, organizational commitment, trust, satisfaction and performance (Cohen-Charash & Spector, 2001; Colquitt, Conlon, Wesson, Porter & Ng,
Employee justice perceptions have important implications for their behaviour and attitudes, such as organizational citizenship behaviours (Bahl, 2005), work attitudes (Aryee, Budhwar and Chen, 2002), leader-member exchange (Roch and Shanock, 2006), supervisory trust (Ambrose and Schminke, 2003), and self-esteem (Colquitt, 2001). Lower justice perceptions have been related to self reported ill health, burnout (Riolli and Savicki, 2006) and absenteeism (Elovainio, Kivimaki and Vahtera, 2002).

With the exception of the more recent studies on interactional justice, the research has not primarily focused on leaders as sources of justice. Instead most research focused on an institutional perspective of distributive and procedural justice. Similarly, leadership research has not focused on justice (van Knippenberg, De Cremer, & van Knippenberg, 2006). Yet justice research proposes that the level of fairness followers perceived in their leaders’ actions is important to stimulate desirable follower behaviour and positive responses (De Cremer & van Knippenberg, 2003).

Overall there has been limited research on the effect of justice and nurses. A comprehensive review of the literature revealed only three studies (Laschinger & Finegan, 2005; Elovainio, Kivimaki & Vahtera, 2002; VanYperen, Hagedoorn, Zweers & Postma, 2000). This is surprising given that fairness has been noted to be an important element in work environments that support safety initiatives (IOM, 2003). Nurses who do not believe they will be treated fairly are less likely to trust and report concerns. Laschinger and Finegan (2005) surveyed a random sample of 273 medical-surgical and critical care nurses working in Ontario teaching hospitals. The questionnaire included measures of empowerment, interactional justice, respect, trust in management, job satisfaction and organizational commitment. Results supported a model that points to structural empowerment having a direct positive effect on interactional justice which in turn has a direct effect on both respect and trust which then mediates their effect on job satisfaction and then organizational commitment (Laschinger & Finegan, 2005). In a separate analysis of the same survey, Laschinger (2004) reported that the strongest predictor of perceptions of respect was interactional justice. The consequences of respect were lower emotional exhaustion and higher nurse ratings of quality of care.
In a study of 4076 Finnish health care providers, fifty percent of which were nurses, Elovainio, Kivimaki and Vahtera (2002) examined the contribution of procedural and relational (interactional) justice to employee health. Results indicated that after controlling for behavioural risks, workload, job control and social support; rates of absences due to sickness among health care workers who perceived low justice were 1.2 to 1.9 times higher than those who perceived high justice.

In another survey study of 244 Dutch female nurses, VanYperen, Hagedoorn, Zweers and Postma (2000) found that the more injustice nurses perceived, the more likely they were to respond to problematic situations in a destructive manner. This was particularly the case with interactional injustice, when they perceived they were being treated unfairly by their direct supervisor. They also reported that nurses were more likely to have intentions to leave when they perceived the unfair outcomes were related to both procedural and distributive injustice.

These studies support that interactional justice is related to outcomes of feelings of respect, satisfaction and better health (figure 2). Justice, therefore, is an important element to include in a model that links the influence of leadership exchanges with followers to healthy work environment and safety climate outcomes.

**Figure 2: Justice Outcomes**

![Justice Outcomes Diagram]

**Leader-follower Relationships and Justice**

Most researchers studying justice perceptions and leader-follower relationships suggest these concepts are related through mediation, but results are mixed regarding which is the mediator: leader-follower exchange or justice. Bahl (2006) surveyed 306 predominantly male Information Technology managers and professionals from 30 software companies in
India. Data were collected through a structured questionnaire that included measures of leader-follower exchange (LMX), procedural and interactional justice, and citizenship behaviour. Using regression, they found that both procedural and interactional justice fully mediated the relationship between the leader-member exchange and citizen behaviours.

Whereas, in a survey of 651 university employees designed to gather information on job-related attitudes and behaviours, management procedures and interactions, Masterson et al. (2000) found that 2/3 of respondents were female and that perceived interactional justice of leader, mediated by leader-member exchange, predicted task performance and OCB. In addition, procedural justice perceptions influenced organizational outcomes through perceived organizational support. This mediation of perceived leader justice by leader-follower exchange or relationship is also supported by Rupp and Cropanzano (2002). In a sample of 232 supervisor-employee dyads from a variety of organizations including human services, as well as health and athletics and general services, interactional justice predicted OCB and job performance through evaluations of the leader exchange relationship. In more recent studies, Roch and Shanock (2006) found that leader interactional justice and justice concerning informational adequacy predicted supervisor relationship quality (LMX). Similarly, Stinglhamber, DeCremer and Mercken (2006) found in a sample of 477 telecommunications employees that the relationship between interactional justice and trust in supervisor was mediated by perceived supervisory support (cf. leader-follower relationship).

These results suggest that a history of perceived fair interactions with one’s manager forms the basis of a high quality relationship which in turn drives employee’s attitudes and behaviours of reciprocation (figure 3).
The consequence of high quality relationships based on experiences of perceived fairness makes sense given both leader-member exchange and interactional justice are rooted in social exchange theory. Using this theory one could argue that if a supervisor has many employees there may be limited opportunity for interactions and hence demonstrations of justice or opportunities to be in tune with their emotions for resonant leadership. Nurse Managers with large spans of control have limited opportunities to interact with each nurse which limits their experience of just interactions with their manager. This would decrease the likelihood of positive reciprocation by the nurse.

**Span of Control**

Over the past decade, hospital restructuring has resulted in reductions in nursing leaders particularly at the front line. These reductions in nursing managers resulted in increasing responsibilities and wider spans of control for remaining nurse managers. The average number of direct reports for nurse managers in Canada is 70 staff (Doran et al., 2004; McCutcheon et al., 2009). Such wide spans of control may result in less manager time available for each nurse. Based on the social exchange theory, this limits the opportunity for personal exchanges between a manager and each nurse. Less contact time or communication frequency hinders the development of quality leader-member relationships and reciprocation through positive behaviours (Liden, Sparrowe & Wayne, 1997). Therefore, span of control is a crucial factor to consider when studying the influence of leader-follower relationships and interactional justice on safety outcomes.
Span of Control Defined

Span of control refers to the way organizations structure relations between leaders and subordinates (Meier & Bohte, 2003). Specifically, span of control is defined by the number of people supervised by a single manager, leader or supervisor (Spreitzer, 1996). Gulick (1937) identified three key elements that condition span of control relationships: diversity of function, time and space. Diversity acknowledges that when a supervisor needs to be responsible for diverse functions, the span of control should be decreased because the supervisor must interact with many different types of people. The element of time, in Gulick’s view focuses on the stability of organizational inputs. A stable environment with similar inputs allow for routinization which needs less direction and hence, could be managed within a greater span of control (Meier & Bohte, 2003). Similarly, in stable environments, managers may not need to focus as much of their time and energy on mentoring, supporting and overseeing new nurses. Given that experienced nurses are more familiar with their roles and need less supervision, the manager could supervise more staff. Space refers to the number of areas for which the manager has accountability. The more units a nurse leader manages, the less face-to-face interactions are possible. Gulick argues that these situations would require more supervision. This is extremely important in nursing given the restructuring of the 1990’s resulted in reductions of management positions with the remaining nurse managers being accountable for several units and often for more than 100 nurses many of which are inexperienced, novice nurses (McCutcheon, 2004). Additionally, nurse managers may have other disciplines such as physiotherapy, social work and others reporting to them. As a result the nurse manager roles of motivating and coaching (resonant leadership styles) had drastically reduced (Doran et al., 2004).

Span of Control Theory

Meier and Bohte (2000) developed and tested the first general theory on the span of control-performance relationship based on the principles of span of control proposed by landmark reviews by Gulick (1937) and Urwick (1956). Span of control was one of three principles of management proposed by Gulick (1937) and Urwick (1956) which included division of labour, span of control and unity of command. Both Gulick and Urwick theorized that these
management principles influenced effectiveness and strict adherence would improve organizational performance. Specifically, they postulated that as the number of direct reports increase, the more difficult it becomes to monitor the behaviour of subordinates. Instead they argued that supervisors should oversee a small number of employees to facilitate mentoring and monitoring. However there was no agreement on the ideal number of staff. In his seminal work on span of control, Gulick (1937) called for more research on the concept, however literature since has been sparse and this is likely related to Simon’s (1946) severe critique of these principles of management (Meier & Bohte, 2000).

Simon (1946) on the other hand argued in favour of increasing span of control to flatten hierarchal structures and provide better vertical communication. Large spans can delay timely feedback in organizations where vertical communication is not essential for performance. McCutcheon (2004) indicated that Simon’s argument did not seem valid in health care organizations as patient care units and nursing care teams rely primarily on horizontal communication.

Meier and Bohte’s (2000) theory proposes that the relationship between span of control and organizational effectiveness is curvilinear in nature. Initial increases in span of control produce an increase in operational performance, but at a decreasing rate of return. There is a certain size at which span of control reaches its maximum efficiency. Thereafter, any increase in span will decrease organizational effectiveness and will impede effective supervisor communication and coordination. Findings from their research on educational facilities (Meier & Bohte, 2000; Bohte & Meier, 2001; Meier & Bohte, 2003) suggest that spans of control have a statistically significant impact on performance outcome and warrant further attention. However, their analyses are incomplete because they only considered one outcome and did not examine the effect on supervisor-employee relationships and its consequences.

Span of Control Performance Outcomes

Aside from the aforementioned research, only six empirical studies were found that examined performance outcomes associated with span of control (Burke, 1996; Gittell, 2001; Hechanova-Alampay & Beerh, 2001; Theobald & Nicholson-Crotty, 2005) of which
only two were nursing studies (Altaffer, 1998; Doran et al., 2004). An additional nursing study that looked at the effect of span of control on EI leadership ability was also found (Lucas, Laschinger, & Wong, 2008).

Burke’s (1996) exploratory study in a large professional services firm looked at unit size, job satisfaction, unit morale and quality of service. Span of control was measured by unit size which ranged from 20 to 400 staff (mean = 169). While unit size was not related to job satisfaction and quality of service, Burke found that larger units reported lower integration, overall satisfaction, and unit morale. Gittell (2001) also found that a broad span of control (mean span = 34) in the airline industry was associated with lower group performance. Whereas, narrow spans of control (mean = 9) facilitated interactions between supervisor and staff and were associated with higher levels of group performance. Theobald and Nicholson-Crotty (2005) extended the work of Meier and Bohte using their dataset of school districts and same independent variables. These authors acknowledged that organizations generally have multiple goals, and therefore used several dependent outcome variables. They also controlled for additional influences on performance such as experience of leader (teacher). Findings suggest that initial increases in span of control could lead to decreases in performance of some goals. Hechanova-Alampay and Beerh (2001) examined the effects of leader span of control and employee safety behaviours in a chemical company with 531 staff from 24 teams in 3 different sites. Findings support that span of control was significantly correlated with both unsafe behaviours (r=.43, p<.05) and safety accidents (r=.44, p<.05).

Major strengths of all four of the cited studies are the large samples sizes and multiple outcome variables. Results highlight the importance of including span of control when examining the influence of leadership on outcomes including safety. However, they have limited applicability to nurses and patient safety outcomes given they were not conducted in health care environment. These researchers emphasize that organizations should aim for span of control that is optimal for the most important outcome. In health care one could argue this outcome should be patient safety and nurse managers’ spans of control should reflect that goal.
Only three nursing research studies examined the impact of the nurse manager’s span of control on outcomes (Altaffer, 1998; Doran et al., 2004; Lucas et al., 2008). Altaffer (1998) compared the span of control of a small sample of nurse (n= 24) and non-nurse managers (n = 20) with average spans of control of 49 and 44 respectively. She found that nurse managers with a higher span of control had slightly higher self-reported ratings for effectiveness than non-nurse managers. However, whether the groups statistically differed in terms of their span or their effectiveness rating was not stated. This study was further limited by effectiveness as a self-report.

This result was not replicated in Doran’s et al. (2004) much larger correlational study which examined the relationships between span of control, leadership style and outcomes including nurses’ job satisfaction, turnover and patient satisfaction. Forty-one nurse managers, 717 nurses and 680 patients from 51 units in 7 Ontario hospitals participated in the study. Findings support the proposed relationship on outcomes. Manager’s span of control (ranging 36 to 151 direct reports with mean of 77) was a significant predictor of patient satisfaction and unit turnover. Wider spans of control resulted in lower patient satisfaction and higher unit turnover. Additionally they found that span of control decreased the positive effects of transformational and transactional leadership styles on job and patient satisfaction and increased the negative effects of management-by-exception and laissez-faire leadership styles.

Lucas et al. (2008) tested a model that linked nurse manager’s span of control on the manager emotional intelligence/ nurse empowerment relationship using a descriptive correlational survey design. Two hundred and three hospital nurses from 2 community hospitals participated in the survey. Respondents were primarily female (97.6%), averaged 45 years of age, were diploma in nursing prepared (88.4%) and worked fulltime (55%) with the majority from medicine (35.6%), surgery (25.2%) and emergency(19.3%). Span of control was defined as the number of direct reports which ranged from 5 to 151 with a mean of 77.5 (SD = 38.56). Results indicated that as span of control increased, the effect of manager’s EI on nurse’s empowerment diminished. There was a significant moderating effect of span of control on the manager’s EI/staff nurse empowerment relationship. The researchers attributed this result to when spans of control are broad; managers rarely engage
or connect meaningfully with their staff. However they did not look at the leader-member relationship and it is possible that span of control influences the quality of this relationship, which then mediates the influence of manager EI behaviour on staff nurse outcomes.

Results from these studies indicate that wider spans of control may limit the time and energy managers have to invest in positive relationships with staff and hence employee outcomes may be influenced by span of control.

**Leader-Follower Relationship and Span of Control**

Only a few studies investigated whether span of control influenced the leader-member relationship on various outcomes, none of which were nursing studies (Cogliser & Schriesheim, 2000; Green, Anderson & Shivers, 1996; Schriesheim, Castro & Yammarino, 2000; Schyns, Paul, Mohr & Blank, 2005). Cogliser and Schriesheim (2000) examined work unit size as a measure of span of control. Due to small spans of only one employee, 29 work groups were deleted and the final sample consisted of 285 staff from 65 work groups, therefore unit size ranged from 2 to 26 with a mean size of 10 employees. Their hypothesis that work size would be negatively related to quality of leader-follower relationship was not supported. They found a negative but not significant relationship (r = -0.08, p>0.05).

Whereas Green et al. (1996) in their sample of 208 library staff from 42 libraries (work size mean = 6.4) found support for a negative relationship between span and the quality of leader-follower relationship. As the work group size increased, the quality of the leader-follower exchange was perceived to be lower (r = -0.22, p <0.05). However both these studies had very small spans of control. It may be that the groups were small enough to facilitate quality leader-follower relationships.

Schriesheim et al. (2000), however, found mixed results with a sample of 150 bank employees, span of supervision was examined as a moderator of relationship between leader-follower exchanges and subordinate performance and organizational commitment. This study was based on the assumption that managers with large spans of control would delegate and empower staff more, thereby increasing the quality of leader-follower relationship (exchange). They hypothesized that the quality of the leader-follower relationship would be positively related to performance and commitment under larger spans.
of supervision. This was only partially supported. While span of control moderated the leader-follower relationship and commitment under larger spans, the opposite was true for performance. Supervisor rated leader-follower exchange (LMX) and performance was moderated by span of control under low spans indicating managers with lower spans of control had leader-member relationships which influenced employee performance. Span, however was defined as the number of full time equivalents (FTE) per manager and this may not acknowledge the effect of numbers of actual direct reports. For example, three part-time employees may equate to one FTE.

Further support that span of control is an important leadership contingency variable was found more recently in the Schyns et al. (2005) study of 252 German subordinates from a variety of professions. Findings supported their hypothesis that span of leadership was negatively related to LMX ($r = -.14, p< 0.05$), indicating the more followers a leader has, the lower the employees rated the quality of the relationship with their leader.

Overall, these studies support that span of control affects the quality of relationships between leader and employees. Large spans of control limit time and energy to focus on staff needs. This ultimately affects the employee outcomes by limiting the opportunity for positive leadership styles such as resonant leadership and decreasing frequency of leader-member exchanges thus impacting the quality of the relationship between leader and employee (figure 4).

**Figure 4: Span of Control Effects on Leader-Follower Relationship**

This warrants particular attention when examining nursing leader relationships with nurses on safety outcomes. Time and energy is required for a leader to ensure just and fair interactions with all their employees. Staff nurses require sufficient opportunities to interact
with their supervisor to develop a quality relationship, which in turn may enhance perceptions about and commitment to safety in their work environment, and hence ultimately safety outcomes. These opportunities may be limited when managers have large spans of control and multiple competing responsibilities.

**Leadership and Safety**

As previously discussed, there is evidence to suggest that leaders play a pivotal role in influencing safety-related behaviours in the work place (Hechanova-Alampay & Beerh, 2001; Hofmann & Morgeson, 1999; Hofmann et al., 2003; Michael et al., 2006; Vogus & Sutcliffe, 2005). Leader-employee relationships are related to critical subordinate attitudes and work-related outcomes. These include: task performance, (Gerstner & Day, 1997), citizenship behaviours (Ilies, Nahrgang & Morgeson, 2007), organizational commitment (Lee, 2004), safety commitment and communication (Hofmann & Morgeson, 1999; Hofmann et al., 2003; Michael et al., 2006) and occupational accidents (Hofmann & Morgeson, 1999). In addition, resonant leadership has been reported to mitigate the consequences of negative work environment and hence impact patient safety by lessening the number of unmet patient needs (Cummings et al., 2004). Furthermore the perception of justice in leader-employee relationships have been related to trust (Stinglhamber et al., 2006), job performance (Masterson et al., 2000; Rupp & Cronpanzono, 2002) and citizenship behaviours (Bahl, 2006; Masterson et al., 2000).

There is no research on the potential influence of leader-employee relationships on patient safety or even on nurses’ general well being and occupational safety. The nursing leadership literature is quite limited in the area of safety outcomes (Wong & Cummings, 2007). Two studies, however, suggest that nursing leadership behaviours (Houser, 2003) and higher nursing leadership ratings (Pollack & Koch, 2003) are associated with patient safety outcomes. Houser (2003) used mixed methods in a study of the nursing care environment. The qualitative inquiry of 36 nurses revealed that leadership effectiveness was a key element affecting nursing staff. Subjects described effective leaders as approachable and available which “inspires good work” (from their staff). From the themes in this qualitative study, Houser then tested a model of care facilities in the United States. Leadership was assessed
using the Leadership Practices Inventory (LPI). Houser found that strong leadership was related to staff expertise which then was inversely related to negative patient outcomes.

Pollack and Koch (2003) examined relationships between infant outcomes and leadership practices with a sample of 522 infants and 218 nurses from 8 NICUs in Washington, D.C. Leadership and managerial practices were assessed using Shortell et al.’s (1994) questionnaire completed by NICU nurses. Risk-adjusted logistic and mixed linear models were used to assess the association of outcomes with caregiver ratings. They found that lower incidences of mortality and morbidity were associated with better scores for leadership and managerial practices ($p < .0001$).

The influence of leadership behaviours and relationship on safety outcomes is an important area of research for two reasons. First, safety in hospitals is a major concern. The theoretical and research literature previously cited demonstrates that through high quality relationships with their staff, nurse leaders using resonant leadership styles can create supportive and safe work environments. Secondly, there is evidence with findings of intervention studies to suggest that managers can be taught to improve their safety-oriented interactions. Teaching managers to be safety-oriented has resulted in significant changes in safety climate scores and workers’ safety behaviours (Zohar, 2002b; Zohar & Luria, 2003), as well as significant and stable changes in minor injury rate (Zohar, 2002b). Nursing leadership can play a lead role in changing the work environment from a culture of blame to one where nurses feel safe to voice concerns and report errors. Nursing leadership is pivotal to advance the agenda of creating positive safety climates and quality work environments (Wong & Cummings, 2007).

**Safety Climate Defined**

Values and assumptions that define the organizational safety culture are the foundation for the policy and procedures that influence safety climate. Safety climate is the current state of employees’ actions and behaviours that manifest the underlying safety culture. Safety climate reflects employees’ perceptions of the safety of policies, procedures and practices in use within an organization and acts as a frame of reference for their behaviour and attitudes.
Several studies have examined the effects of leadership behaviours on safety outcomes and found they have been mediated by safety climate (Barling et al., 2002; Kelloway et al., 2006; Zohar, 2002a). Others have found that not all leadership behaviours which influence safety participation are mediated by safety climate (Clarke & Ward, 2006).

In a report describing two separate studies of 174 restaurant employees and 164 youth workers, Barling et al. (2002) found support for a model in which perceptions of safety-specific transformational leadership and role overload were related to occupational injuries through the effects of the intervening variables of safety climate, safety consciousness and safety events. Zohar (2002a) also found that the effect of leadership on safety outcomes was mediated by safety-climate variables. Active leadership styles (transformational leadership and contingent reward) were associated with improved safety climate and reduced injury rates. In addition, he found passive styles or a lack of leadership, negatively impacted safety climate which contributed to increased incidence of injury.

Similar results were noted by Kelloway et al. (2006) who concurrently examined the effects on safety outcomes from two opposite leadership styles: transformational and passive leadership. In this study, transformational leadership had a positive effect and passive leadership a negative effect on safety climate, which in turn predicted safety events and injuries. This is of major importance in nursing where nurse managers have large spans of control that limit their ability to provide relational leadership to all nurses. Clarke and Ward (2006) examined the effect of leader influence tactics (consultation and inspirational appeals) on employee safety participation with mixed results. Consultation was partially mediated, but inspirational appeal was fully mediated by safety climate.

In general, based on results from these studies in addition to the previously cited relational leadership literature, it can be argued that leadership behaviours which engage employees and demonstrate concern, strengthen feelings of trust in management and enhance the safety climate through high quality leader-employee relationships. Findings from another safety climate study which examined management–employee relations as a foundation climate
provides some support for this argument (Wallace, Popp & Mondore, 2006). Wallace et al. (2006) found that management-employee relations were positively related to safety climate and negatively related to accidents. Therefore investigation of nurse leader-follower relationships’ influence on safety climate and effect on safety outcomes in health care is warranted.

As indicated, considerable safety climate research has been done in other industries with the focus solely on occupational safety. Health care, however, is faced with a dual responsibility: the safety of patients and the safety of employees. Therefore, research on safety-climate outcomes in both areas will be addressed.

**Safety Climate Outcomes**

*Patient Related Outcomes*

Despite a plethora of studies examining scales to measure safety climate in health care (Flin, 2007), an emerging body of literature has just begun to empirically link safety climate to patient outcomes (Vogus & Sutcliffe, 2007). Findings from industry research support that safety climate decreases occupational injuries. It is possible that similar effects exist in health care. Studies in health care that have investigated patient safety outcomes have predominantly studied medication errors (Hofmann & Mark, 2006; Naveh, Katz-Navon, & Stern, 2005; Vogus & Sutcliffe, 2007) or barriers to error reporting (Chiang & Pepper, 2006).

Hofmann and Mark (2006) utilized a broad view of safety climate which included openness and constructive responses to errors in their study of 1127 nurses from 81 medical-surgical units in 42 randomly selected acute care hospitals throughout the United States. Both nurse and patient outcomes were examined. Specifically, patient outcomes included medical errors that resulted in harm as well as urinary tract infections (UTIs), patient satisfaction, and perceptions of nurse responsiveness. They also measured patient complexity. Findings from this study suggested that the overall positive safety climate of the unit significantly predicted less medication errors ($\beta = -1.51, p < 0.05$) and UTIs ($\beta = -1.27, p < 0.05$) and higher patient satisfaction ($\beta = 0.27, p < 0.01$) and perceptions of nurse responsiveness ($\beta = 0.33,$
However, it was noted that the relationship between medication errors and safety climate was strongest when coupled with complex patient conditions. This underscores that creating a positive safety climate is even more important as patient needs become more complex (Hofmann & Mark, 2006). Naveh, et al. (2005), in two separate studies followed 241 nursing staff on 21 medical units and 218 nurses on 15 medical units, and reported that unit safety climate was related to decreased treatment errors only when the manager practiced safety as a priority.

Using a newly developed self-report measure designed to capture behaviours and perceptions that underlie a culture of safety (cf. safety climate), Vogus and Sutcliffe (2007) examined the association of safety climate with reported medication errors and patient falls. Participants were drawn from a convenience sample of 13 private, non-profit Catholic hospitals of various sizes and locations in the United States (urban to rural). A total of 1,685 Registered Nurses from 125 nursing units completed the survey which also included variables on trust in manager and organizational commitment. Medication errors and falls for each unit over a 6 month period were collected through incident reports. Findings revealed that theorized antecedents of trust and commitment were positively related to safety climate ($\beta = .164$ and $.295$ respectively, $p < 0.001$) and safety climate was negatively related to medication errors ($\beta = -.69$, $p < 0.001$) and falls ($\beta = -0.63$, $p < 0.001$). A major limitation in the three cited studies is they used different safety climate scales making comparisons a challenge, but generally findings support the role of safety climate in reducing adverse patient events.

**Occupational Safety Outcomes**

A number of outcome measures have been used to determine the effects of occupational safety climate including minor injuries not resulting in lost days (Zohar, 2000), injuries (Michael et al., 2005), safety compliance (Neal, Griffin & Hart, 2000), and safety participation (Hofmann et al., 2003). In health care, safety climate has been positively associated with nurse back injuries (Hofmann & Mark, 2006), bloodborne exposure incidents (Gershon, Karkashian, Grosch, et al., 2000) and needlestick injuries (Clarke, Rockett, Sloane & Aitken, 2002).
To develop a more comprehensive understanding of the underlying mechanisms of safety climate, Clarke (2006) performed a meta-analysis of 35 safety studies from industry but two hospitals in Australia were also included in the analysis. The analysis examined evidence of the relationship between safety climate and both employee safety participation and compliance (Clarke, 2006). Comparisons across studies were challenging, given most studies used different measures of safety climate, compliance and participation. In some cases, unique scales were developed for the specific study. Accidents and injuries were also measured differently both in data collection methods and time periods (prospective versus retrospective). Some analyses included limited sample sizes.

In summary, despite the aforementioned concerns, support was found for linking leadership, safety climate and safety performance which includes safety participation and safety compliance (figure 5).

**Figure 5: Safety Climate as Mediator**

There was limited support, however, for a model in which safety climate is fully mediated because subsequent links to accidents were weak indicating that alternative environmental factors were likely also influential. Features of the work environment such as staffing (Laschinger & Leiter, 2006) and role overload (Barling et al., 2002) have been noted to influence safety outcomes. These and other features of work environment may play a significant role in safety outcomes directly or indirectly, and should be explored.
Leadership and Work Environment

The goal of fostering healthy work environments is considered one of the most critical goals for nursing leaders. The importance of achieving a healthy work place has been acknowledged by health care accreditation bodies (Nicklin & Barton, 2007). Landmark reports (IOM, 2003) challenge nursing leadership to transform nursing units into healthy work environments as a means to improve nurse retention, recruitment, job satisfaction, emotional exhaustion, attendance and patient safety outcomes. The failure to foster a quality or healthy work place for nurses ultimately harms patients (Heath et al., 2004).

Quality Nursing Work Environment Defined

The concept of a healthy work environment has gained importance over the past few years and varied definitions have been proposed although there is no standardized and comprehensive definition (Shamian & El-Jardali, 2007). A healthy work environment is synonymous with a quality work environment. The Quality Worklife Quality Healthcare Collaborative (QWQHC) defines a quality work environment as ‘a work setting that takes a strategic and comprehensive approach to providing the physical, cultural, psychosocial and work/job design conditions that maximize health and wellbeing of health providers, quality of patient/client outcomes and organizational performance’ (QWQHC, 2007, p. 6). This is consistent with the definition of professional nursing practice environment: a setting that supports registered nurse control over the delivery of nursing care and the environment in which the care is provided. A professional practice environment is one that empowers nurses with opportunities of autonomy, accountability and job control (Hoffart & Woods, 1996). However, these definitions are philosophical approaches rather than descriptions useful for measurement of a quality nursing workplace for this study. In order to measure a quality workplace, the definition needs concrete characteristics.

While conceptualization and measurement of nursing work environment is complex, several core dimensions of a work environment have emerged from the early organizational literature (Lake & Friese, 2006). These dimensions have included quality of leadership, degree of decentralized decision-making, collaboration and cohesion among team members (Weisman, Alexander & Chase, 1981). Later researchers compared magnet hospitals, known
as great nursing places to work, to non-magnet hospitals, and found they were characterized as having good staffing levels, flexible scheduling, responsive leadership, recognition, participative management, professional development and collaborative nurse-physician relations (Sovie, 1984; Kramer & Schmalenberg, 1988a, 1988b, 1991a, 1991b; Scott, Sochalski & Aiken, 1999).

More recently, to determine the characteristics of a healthy quality workplace, Heath et al. (2004) used a focus group study of 24 nurses representing all levels of nursing. Thematic analysis revealed characteristics of healthy quality work environment include: caring practices, collaborative relationships, respect, teamwork and strong leadership that demonstrates open communication, fairness, trust and value for the contributions of others. Consistently each focus group described characteristics similar to those of a magnet environment as being the essence of a healthy work environment. This also strongly supports the key role of just leadership in creating and sustaining healthy workplaces. This is consistent with American Association of Critical Care Nurses standards for establishing and sustaining healthy work environments. The six essential standards are interdependent with one another as well as with clinical excellence and optimal patient outcomes (AACN, 2005). They include:

1. skilled communication through respectful and open two-way interaction
2. ongoing true collaboration with other disciplines, patients and families
3. effective decision making that includes participation at all levels of nursing
4. appropriate staffing to reflect patient needs and nursing competencies
5. meaningful recognition that values everyone’s contribution
6. authentic leadership committed to and functions as role models to the standards

Since leadership is hypothesized to influence the work environment, it cannot be included in the definition of a work environment. For the purposes of this study, a quality or healthy work environment is an environment that includes the following features: adequate staffing,
professional development opportunities, nurse communication/participation in decision making, collaborative relationships, and flexible scheduling.

Relational leadership and quality of nurse manager-nurse relationship are likely to impact specific aspects of the work environment, such as communication, participation in decision making, and collaboration. However, since interpersonal and informational justice influence the quality of relationships, the transparency and sharing of information may impact nurses’ perception of whether staffing is adequate and schedules flexible. Therefore all elements of the work environment will be considered.

**Outcomes of a Work Environment**

AACN standards and the QWQHC definition describe a healthy environment as being just and fair. Environments with perceived lower justice have been related to poorer self reported health, burnout (Riolli and Savicki, 2006) and absenteeism (Elovainio et al., 2002), indicating justice has important organizational consequences (Riolli & Savicki, 2006). This suggests that leadership and justice influence healthiness of the workplace environment through fair procedures, interactions, trust and respect.

Riolli and Savicki (2006) examined the effects of organization change on outcomes by comparing two units undergoing change that differed from work environment perspective. One unit incorporated education/training, information meetings, an engaged leader, and encouragement of employee participation and input (characteristics of a healthy work environment) and the other provided limited information about the change with no opportunity for employee involvement (cf unhealthy workplace). Significant differences in outcomes were found between the two units. The latter workplace characterized by leadership that demonstrated lower procedural justice had higher rates of burnout as indicated by emotional exhaustion, strain and turnover. Burnout and strain were affected by the joint action of organizational and supervisory variables. The work environment with lower justice also reported more absenteeism. Elovainio, Kivimaki and Vagtera (2002) in their study of Finnish hospital employees also found low justice environments experienced 1.2 to 1.9 times more absences due to sickness.
Stone, Du, and Gershon (2007) surveyed 2047 nurses (practical/licensed and registered) from 13 hospitals in New York State. The objective of the study was to determine the relationship between organizational climate (measured by perception of nursing work environment (PNWE)) and occupational health outcomes including absenteeism and burnout. Results indicated that a positive perceived work environment was negatively related to nurse injuries and burnout (p< 0.05). Therefore, nurses who were working in positive healthy work environments were less likely to experience injuries or burnout features such as emotional exhaustion.

Given that magnet hospitals possess characteristics of a healthy/quality work environment, magnet health care outcomes were also considered. In a nursing survey of 837 RNs from 39 Intensive Care Units (ICUs) in 23 hospitals, Stone and Gershon (2006) discovered that nurses working in ICUs within magnet accredited hospitals have significantly lower rates of musculoskeletal injury, blood and body fluid exposure, and any injury (p≤ .001) than nurses working in non-magnet hospitals.

Lowe, Schellenberg and Shannon (2003) analyzed correlates of healthy work environment perceptions of a nationally representative sample of 2,112 Canadian employees. The dependent variable was a single Likert-type question asking level of agreement to the statement ‘the work environment is healthy’. Results showed employee perceptions of a healthy workplace were related to higher job satisfaction, commitment, morale and lower absenteeism and intent to leave. Communication and supportive leader accounted for 27% of the variation in perceptions of a healthy work environment. A major limitation in this study is the use of a single question for the dependent variable which allowed respondents to make their own definition of a healthy work environment.

Given concerns about the nursing shortage and impact to safety outcomes, researchers have focused on the determinants of turnover intention and have found that aspects of a quality work environment influence nurses’ intent to leave such as work group cohesion and collaboration (Tourangeau & Cranley, 2006) and control over practice, autonomy and decision making (Beecroft, Dory & Wenten, 2007). Apart from nurse characteristics i.e. age
and years of employment, a poor work environment increases the likelihood that a nurse will intend to leave that organization.

These studies underscore the importance of studying healthy/quality work environments, which feature fair practices, excellent communication, collaboration, respect, teamwork and strong leadership, when developing and testing a model that examines leadership influences on nurse safety outcomes.

Various aspects of nurse working conditions have also been linked to patient outcomes. Conditions such as: nurse staffing has been associated with pressure ulcers (Blegen, Goode & Reed, 1998), infections (Needleman, Buerhoas, Mattke et al., 2002) and mortality (Tourangeau et al., 2002; Tourangeau, Doran, McGillis-Hall et al., 2007); interdisciplinary collaboration with readmission and mortality (Baggs, Schmitt, Muschlin et al., 1999); and positive unit culture with lower patient lengths of stay (Shortell, Zimmerman, Rousseau et al., 1994). Additionally, some researchers have noted that magnet status promotes positive work climates associated with positive patient outcomes (Aiken, Smith & Lake, 1994). On the other hand, in one of the most comprehensive studies of nurse working conditions to date, Stone, Mooney-Kane, Larson et al. (2007) did not find a significant relationship of patient outcomes to magnet hospital designation; however the numbers of designated hospitals in their study were quite small. In this observational study, they used risk adjusted data of 15,902 patients from 51 ICUs in 31 American hospitals. Data were collected from a variety of sources such as medicare files, infection data, administrative data and a registered nurse survey which included the Perceptions of Nurse Work Environment Scale. Aspects of administrative processes associated with working conditions such as RN hours per patient day and overtime were associated with each outcome measured. After risk adjustment, staffing was significantly associated with central line infections, ventilator acquired pneumonia, 30-day mortality and pressure ulcers; but was not significantly related to incidents of UTIs (Stone, Mooney-Kane, Larson et al., 2007). Increased overtime was associated with UTIs and pressure ulcers. However, the relationship between nurse perception of the work environment and patient outcomes was mixed. This may be due to the influence of other health care team members on patient outcomes, such as intensivist experience and pharmacist participation in patient care.
Most recently, Lowe (2008) used a survey design to study allied health care workers (4,347) from one Canadian province. The majority of which worked in hospitals (69%), although all had direct impact on patient outcomes along the healthcare continuum (administration etc were excluded from the sample). The primary focus of the research was to examine what specific features of the work environment contribute to a safety culture and influence work safety. Results indicated that teamwork, a learning environment, just/fair workplace processes, supportive and people-centred leadership contribute to a culture that values safety. Additionally, the safety culture itself was associated with positive quality of work life outcomes for employees. Results supported his model where work environment influence safety culture which in turn affected both patient and occupational safety outcomes. Lowe concluded that these key findings support the argument that high-quality work environments are the cornerstone of a healthcare safety culture.

Results from these studies demonstrated that work environments typified by good working conditions (adequate staffing, professional development opportunities, nurse communication/participation in decision making, collaborative relationships, and flexible scheduling), as well as supportive and visible leadership are likely to have positive effects on the safety climate as well as nurse and patient outcomes. Leadership can thus impact nurse and patient outcomes through fostering a healthy/quality nursing work environment and positive safety climate (figure 6).

**Figure 6: Relationship of Leadership, Safety Climate & Work Environment**
Summary of Literature Review

Research to date has generally not examined the influence of nursing leader-follower relationships or resonant leadership on patient and nurse outcomes. This review examines the effectiveness of leadership based on theoretical papers and empirical studies on leadership, justice, span of control, safety climate and nursing work environment and their respective outcomes.

Results of industry studies fit with the social tenet of the LMX theory and suggest that subordinates reciprocate high quality relationships by behaving in a manner that is consistent with supervisor’s safety values (Hofmann & Morgeson, 1999; Hofmann et al, 2003; Michael et al, 2006). Resonant leadership promotes emotional resilience in followers. By using their emotional skills of empathy, relating, listening and responding to concerns to understand what their followers are feeling during challenging times, they build trust and quality leader-member relationships. Nursing researchers have suggested that when nurses have high quality relationships with their supervisor, they are empowered to contribute meaningfully to their workplace (Laschinger et al., 2007). This empowerment creates the confidence to speak out about errors and concerns. Thereby enabling open dialogue and transparent shared decision making, which are basic elements of interactional justice and quality work environment. Manager span of control has been reported to influence the quality of the leader-employee relationship and employee performance (Green et al., 1996; Schyns et al., 2005; Schriesheim et al, 2000) by limiting the time and energy available to develop high quality relationships. In particular, large spans of control have been reported to be negatively related to safety performance (Hechanova-Alampay & Beerh, 2001). Studies on justice suggest that interactional justice is related to feelings of respect, satisfaction and better health (Elovainio et al, 2002; Laschinger, 2004; Rollio & Savicki, 2006; VanYperen et al, 2000). Employee justice perceptions have also been linked to citizenship behaviours, work attitudes, and trust (Cohen-Charash & Spector, 2001; Colquitt et al, 2001). Both leadership and justice literature provide support for the influence of leaders on the safety climate and quality of the work place.
Leader relationships which engage employees, demonstrate concern (such as resonant leadership), and strengthen feelings of trust in management, enhance a safety climate (Clarke & Wood, 2006). A safe climate mediates the association between leadership and safety outcomes (Barling et al., 2002; Zohar, 2002a; Kelloway et al., 2006). Safety climate is related to both occupational and patient safety events. Patient outcomes such as medication errors (Hofmann & Mark, 2006; Naveh et al., 2005; Vogus & Sutcliffe, 2007), UTIs (Hofmann & Mark, 2006) and falls (Vogus & Sutcliffe, 2007), as well as nurse outcomes of blood borne exposure, needle-sticks (Clarke et al., 2002) and back injuries (Hofmann & Mark, 2006) have been reported as consequences of negative safety climates.

A supportive leader with strong communication skills enhances both safety climate (Clarke & Wood, 2006) and quality of the work environment (Lowe et al., 2003). Heath et al. (2004) argue that leader failure to foster a healthy work environment for nurses ultimately harms patients.

The health of the work environment has also been predictive of patient and nurse safety outcomes. Work environments with lower justice and healthy workplace perceptions have been related to poorer employee health, emotional exhaustion (Laschinger & Leiter, 2006; Riolli & Savicki, 2006; Stone et al., 2007), absenteeism (Elovainio et al., 2002; Lowe et al., 2003), and intent to leave (Gregory et al., 2007). Just workplace processes, supportive and people-centred leadership have been associated with a high quality work environment and safety culture (Lowe, 2008). Magnet hospitals, known for their positive work environments, have been associated with lower incidents of injury, blood and body fluid exposure and general injuries (Stone & Gershon, 2006).

In sum, there is empirical support that just and fair nurse managers, who value safety and are empathetic and supportive of staff, develop high quality leader-employee relationships and hence are rewarded by the reciprocation of safety compliance which leads to positive outcomes. The proposed study postulates that this relationship, influenced by resonant leadership style, interactional justice and by span of control, fosters a quality work environment and positive safety climate. Through this exchange, ultimately, leadership is linked to nurse and patient safety outcomes. In order to improve the healthcare workplace, it is important to take a comprehensive systems approach, which emphasizes not only safety
issues, but also considers other workplace factors (Flin, Burns, Mearns, Yule & Roberston., 2006).

**Figure 7: Summary Model**

The theoretical framework is grounded in social exchange theory and based on integrating concepts previously described from LMX theory, span of control theory and the literature regarding justice, safety climate and nursing work environment. It connects justice and leadership to nurse and patient safety outcomes. The purpose of the study was to test and refine this model. Key study variables are defined and the relationship with these variables
and the five outcomes of pressure ulcers, medication errors, emotional exhaustion, absenteeism and intent to leave are hypothesized.

**Framework Description**

Based on the empirical and theoretical literature previously discussed, this research proposes that perceptions of interactional justice and resonant leadership styles enhance the quality of leader-member exchange which is further influenced by the leader’s span of control. Large spans of control negatively affect the ability to develop high quality relationships with subordinates. Leader-member exchange positively influences the quality of the work environment and safety climate respectively. Both work environment and safety climate influence nurse and patient safety outcomes and mediate the influence of leader-nurse relationships on these outcomes (figure 7). Based on these relationships, the following is hypothesized.

**Research Hypothesis**

The primary hypothesis is that:

1. The hypothesized model will demonstrate good fit with observed data drawn from a random sample of Ontario acute care nurses.

   Specifically, the following pathways in the model are hypothesized:

   1.1. Clinical nurse leader interactional justice will be positively related to quality of clinical nurse leader-nurse relationships.

   1.2. Clinical nurse leader span of control will be negatively related to the quality of clinical nurse leader-nurse relationships.

   1.3. Clinical nurse leader resonant leadership behavior will be positively related to perceived quality of clinical nurse leader-nurse relationships.

   1.4. Quality of clinical nurse leader- nurse relationships will be positively related to safety climates.
1.5. Quality of clinical nurse leader- nurse relationships will be positively related to quality of nursing work environments.

1.6. Safety climate will be negatively related to number of pressure ulcers.

1.7. Safety climate will be negatively related to number of medication errors.

1.8. Safety climate will be negatively related to level of RN emotional exhaustion.

1.9. Safety climate will be negatively related to RN absenteeism (number of sick hours).

1.10. Safety climate will be negatively related to level of RN intent to leave.

1.11. Quality of nursing work environment will be positively related to safety climate.

1.12. Quality of nursing work environment will be negatively related to number of pressure ulcers.

1.13. Quality of nursing work environment will be negatively related to number of medication errors.

1.14. Quality of nursing work environment will be negatively related to level of RN emotional exhaustion.

1.15. Quality of nursing work environment will be negatively related to RN sick-time (number of sick hours).

1.16. Quality of nursing work environment will be negatively related to level of RN intent to leave.
Study Variables

Conceptual Definitions

Leadership

Leadership is the process whereby a clinical nurse manager/leader influences clinical nurses to achieve a common goal (Northouse, 2007).

Resonant Leadership

Resonant Leadership is defined as the perceived behaviour of leaders who through high emotional intelligence, primarily use visionary, coaching, affiliative and democratic leadership styles to build strong, optimistic and trusting relationships that inspire commitment (Goleman et al., 2004).

Clinical nurse leader-nurse relationship

Clinical nurse leader-nurse relationship is the interpersonal interaction and reciprocation between nurse leader (immediate nurse manager) and their clinical nurse followers which ranges in quality from low to a valued high quality relationship (Graen & Uhl-Bien, 1995).

Interactional justice

Interactional justice is the nurse’s perception of fairness of their nurse manager in terms of the process used in determining outcomes and decisions, providing sufficient and timely information, and treating subordinates with respect and dignity during interactions (Masterson, et al., 2000; Cropanzano et al., 2005).

Span of Control (nurse reported)

Span of control is the breadth of responsibility for the nurse manager and is defined as the number of people supervised by a single manager, leader or supervisor (Spreitzer, 1996).
**Safety Climate**

Safety climate is the perception of the safety of policies, procedures and practices in use within an organization which are enacted through nurses’ behaviour and attitudes (Clarke, 2006; Mearns, et al., 2001; Zohar, et al., 2007).

**Quality Work Environment**

A quality work environment is the nature of a work setting that provides the physical, culture, psychosocial and work/job design conditions that maximize health and well being of nurses, quality of patient outcomes and organizational performs (QWQHC, 2007). As such it includes characteristics of adequate staffing, professional development opportunities, communication/ nurse participation in decision making, collaborative relationships, autonomy and flexible scheduling.

**RN Emotional exhaustion**

Emotional exhaustion is the inability of the nurses to give of themselves at a psychological level because of feelings of being emotionally spent or exhausted by one’s work environment (Maslach, Jackson & Leiter, 1996).

**Self-Reported RN Sick-time**

Absenteeism is the failure to work regularly scheduled shifts due to illness and is defined simply as unscheduled absences (Unruh, Joseph & Strickland, 2007).

**Self-Reported RN Intent to Leave**

Intent to leave is an individual’s behavioural intent and is the nurse’s subjective estimated probability that they are permanently leaving an organization (unit, hospital or profession) at some point in the near future (Vandenberg & Nelson, 1999; McCarthy, Tyrrell & Lehane, 2007).
**Self-Reported Medication Errors**

A medication error is considered a preventable error in medication or treatment that results in failure to provide any one of the five rights: right patient, right time, right route, right drug, and right dose.

**Self-Reported Pressure Ulcers (hospital acquired)**

A hospital acquired pressure ulcer is a generally preventable wound acquired during a patient’s hospitalization that is usually caused by unrelieved pressure on the skin. This pressure causes a prolonged loss of blood flow and oxygen to the tissues resulting in ulceration and is commonly known as bedsores, decubitus ulcers and pressure sores (IHI, 2003).

**Control Variables**

To rule out the influence of nurse and patient characteristics on the safety outcomes, these characteristics were included as control variables in the proposed model.

**Figure 8.** The proposed model represents the hypothesized relationships among the defined concepts that were empirically tested in this study.
Figure 8: The Proposed Theoretical Model

### Purposes and Objectives

The purpose of this research was to test and refine the aforementioned theoretical model (figure 8). The model explains the impact of perceived interactional justice, span of control, and resonant leadership on the quality of clinical nurse leader-nurse relationships and ultimately to patient and nurse safety outcomes in acute care hospitals.
Objectives of the study are to complete the following:

1. Survey nurses to obtain data to test the model.
2. Refine the model based on analyses of the data.
3. Disseminate knowledge acquired from the data analysis.
CHAPTER III: RESEARCH METHODS

Research Design

This study employed a cross-sectional probabilistic survey design to test and refine a model that explains the influence of leadership on nurse and patient safety outcomes. Specifically, the model included constructs of perceived interactional justice (fairness), resonant leadership and nurse manager-nurse relationship as well as nursing work environment and safety climate. Patient safety outcomes included frequency of medication errors and hospital acquired pressure ulcers. Nurse safety outcomes include emotional exhaustion, absenteeism and intent to leave.

A cross-sectional survey was chosen to ensure a representative sample of the population in question: acute care registered nurses. Data were collected from a sample of registered nurses working in Ontario acute care hospitals. The sample was drawn from the College of Nurses of Ontario 2007 registration list. The use of nurse surveys has been refined over the last decade and is considered a suitable means to assess nursing work environments and relationships (Lake & Friese, 2006). Mail surveys provide access to widely dispersed samples and respondents who might be for other reasons difficult to reach by phone or who do not have email access. Surveys also can be accomplished with minimal staff and infrastructure and therefore is relatively low cost compared to telephone surveys. Additionally, a mail survey enables the researcher to ask questions with long or complex responses categories, as well as a battery of similar questions which can occur with potentially related concepts such as work quality and safety climate.

This chapter describes the setting, methods and procedures used to implement the study. The sample, survey procedures, instruments, data analysis, limitations, ethical considerations and knowledge translation are also discussed.
Setting and Sample

Setting

Registered nurses who worked in acute care hospitals in the clinical areas of medicine, surgery or critical care were surveyed. These settings were selected because they are at high risk for preventable injuries associated with safety concerns (IOM, 2001).

Sample Description

The target population for this study is acute care registered nurses. The accessible population is Ontario nurses working in critical care, medicine and surgery. Registered nurses (RNs) were selected because they represent the largest group of health care providers within acute care hospitals and are the most common professional group with whom patients have contact. As such, they are most likely to be involved in safety concerns. A random sample of acute care RNs was drawn from the College of Nurses of Ontario (CNO) 2007 registration list. The unit of analysis was the individual nurse.

Inclusion and exclusion criteria

Only the names of nurses who indicated their willingness to participate in research on their annual registration form could be included in the pool of RNs for randomization. Additional participant inclusion criteria included:

1. Must be a registered nurse providing direct patient care;
2. Must be working in an acute care hospital in Ontario;
3. Must be working in either medicine, surgery or critical care settings;
4. Must have worked with their current manager for at least 3 months and;
5. Must work on either a full-time or part-time basis.

Casual nurses were excluded because they do not have a requirement to work a certain number of hours and therefore they may not have worked sufficient hours to develop a
relationship with a direct nurse manager. Managers, clinical educators and clinical nurse specialists were also excluded because typically they do not administer medications, or have direct care responsibilities, and generally report to a supervisor with small spans of control i.e. Vice President Nursing. As such they would have less direct effect on patient outcomes.

**Sample Size**

To test the fit of the hypothesized model with the data obtained from the sample, structural equation modeling (SEM) was performed. To test proposed relationships using SEM, a medium to large sample size is required. While there is no defined formula for sample size estimation in SEM (Bentler & Chou, 1987; Schumacker & Lomax, 2004), a large sample (exceeding 200 subjects) is preferred to maintain the accuracy of estimates and to ensure representativeness (Kline, 2005; Schumacker & Lomax, 2004). Alternatively, to consider the complexity or size of the model, a sample size of 10–20 cases per included measured variable is also appropriate (Bentler & Chou, 1987; Schumacker & Lomax, 2004). The model tested in this study had 19 measured variables that included work environment as one variable as well as each component (subscale) of the work environment as separate variables. This allowed the researcher to examine the impact of nurse manager-nurse relationships on work environment as a whole as well as on its various component parts. In addition, one patient characteristic (mobility) and two nurse characteristics (experience and years with their manager) were collected to control for their influence within the model.

Therefore, a minimum sample of 250 subjects was required. Hayduk (1987) suggests that sample sizes ranging 50–500 may be appropriate depending on the complexity of model being estimated. Others indicate that a sample of less than 100 is considered small and small samples increase likelihood of error and limit the statistical power of tests (Kline, 2005). Therefore, to ensure adequate power, a sample size of 200 subjects is preferred.

Previous nursing research using mail surveys of similar Ontario registered nurse samples support a response rate of approximately 60% (Laschinger, Finegan, Shamian & Almost, 2001; Tourangeau, Coglan, Shamian & Evans, 2005; Laschinger & Leiter, 2006). Given the researcher only had access to the previous year’s CNO registration list, it was expected that a further loss of potential participants by approximately 10% due to changes in home
addresses, employment situations etc would occur. As a result, an overall maximum usable response rate of 50% was anticipated. However, it was expected that some of the respondents would indicate a desire to not participate, therefore, a sample of 600 registered nurses was randomly selected from the CNO 2007 database to ensure an adequate size of usable questionnaires.

Survey and Survey Procedures

Participants were mailed a questionnaire package through Canada Post and asked to return completed questionnaires in an addressed and stamped return envelope. The paper-pencil questionnaire consisted of demographic questions and instruments that have been found to be valid and reliable. The survey was pilot tested with a convenience sample of 10 nurses to identify any issues with the data collection methods. In particular the pilot test respondents were asked whether the instructions were clear, whether the questions were clear, and finally whether there were any problems in providing answers to the questions (Fowler, 2002). Other than a few typos, this group indicated no problems with the survey. The survey was further refined based on this pilot test. Additionally the pilot group was asked to identify the time required to complete the entire survey. Completion time ranged from 20 to 30 minutes. The time required to complete the survey was included in the information letters (see appendix A) to ensure an accurate description of the process was provided to potential participants.

The Survey

The self-administered survey consisted of 6 valid and reliable instruments which measured the concepts of interest, and a study specific questionnaire measuring the remaining concepts of interest or control variables. In total there was 128 items, most requiring similar ordinal scoring responses (Likert-like scales). Questions designed for this study were either short fill-in-the-blank items requesting a number response i.e. age, medication errors, pressure ulcers and absenteeism; or forced-response items such as sex, employment status and type of nursing unit. It was estimated that the total survey would take approximately 30 minutes to complete.
**Study Specific Questionnaire**

The study specific questionnaire included questions developed by the researcher regarding nurse-respondent and setting demographics, estimated manager span of control, self-reported frequency of the dependent outcome variables (medication errors, pressure ulcers and sick-time) and three questions about intent to leave which were worded positively. Demographic data were collected to gain a fuller understanding of the nursing cohort who participated in the study and to control for their effects in the proposed model. Demographic variables included were: age, education, sex, years worked as a registered nurse, years with same direct supervisor/nurse manager, type of nursing unit, employment status (full-time or part-time), and schedule assignment. Setting questions were related to the patient population characteristics to control for their effects in the proposed model i.e. patient age, mobility and presence of co-morbidities. Measurements of medication errors, pressure ulcers and sick-time were obtained by asking nurses to recall their frequency over the preceding 4 months i.e. “how many days have you reported in sick over the last 4 months (indicate if 8 or 12 hour shifts)”. This recall period was chosen because it has been used effectively by other researchers (Stone et al., 2007). Given errors, pressure ulcers and absent days are relatively infrequent events you need several months for variation across respondents, however the longer the period of recall, the more likely the respondent may under or overestimate the frequency of the event, hence the period of recall was limited to 4 months. (Jenkins, Earle-Richardson, Slingerland & May, 2002). Self-reports of occupational health using survey methods is also deemed more accurate than institutional reports (Blegen, Vaughn, Pepper et al., 2004). Similarly due to issues of underreporting, anonymous self reports regarding medication errors and pressure ulcers may be more accurate than administrative reports.

Independent variables of interactional justice, resonant leadership, nurse manager-nurse relationships, safety climate, work environment, and the dependent variable of emotional exhaustion were measured using valid and reliable instruments. The following six instruments were included in the survey: Interactional Justice Scale (Roch & Shannock, 2006), Resonant Leadership (Cummings, 2008), Leader-Member Exchange – LMX 7 (Graen & Uhl-Bien, 1995), Safety Climate Survey (Sexton & Thomas, 2003), Perceived Nursing Work Environment (Choi, Bakken, Larson, Du & Stone, 2004) and the emotional
exhaustion subscale of the Maslach Burnout Inventory – MBI (Maslach, Jackson, & Leiter, 1996).

Concept Measurements

**Interactional Justice**

The interactional justice scale developed by Roch and Shanock (2006) was used to measure interactional justice based on Bies’ reconceptualization. The scale reflects the day to day interactions and includes the four content areas of interactional justice proposed by Bies (derogatory judgments, deception, invasion of privacy and disrespect). This instrument consists of 17 statements about the respondents supervisor (4 from each of the content areas and one general item i.e. “my supervisor treats me fairly”) using a 5 point Likert-like response format ranging from 1 (strongly disagree) to 5 (strongly agree). Scoring is the total response of all 17 questions. Some questions were reversed coded i.e. “my supervisor is rude to me” prior to summation so that higher point value indicated positive interactional justice and fair treatment.

Psychometric properties have been described by Roch and Shanock (2006). Evidence of content validity was assured by independently writing multiple items intended to assess each of Bies’ content areas. All items were reviewed by both researchers and then 4 items which best represented each content area were selected. Sample items include: “my supervisor misrepresents my performance to others” (derogatory judgments); “my supervisor keeps his or her promises” (deception); “my supervisor can be trusted to keep a matter confidential” (invasion of privacy); and “my supervisor is rude to me” (disrespect). Factor analysis indicated the 17 items formed a single factor as indicated with an eigenvalue accounting for 48.84% of the variance. All items loaded above the cut off necessary for retention with the lowest factor loading of 0.48. The internal consistency reliability of the measure was 0.96.

**Resonant Leadership**

The concept of resonant leadership was measured by Cummings’ (2008) Resonant Leadership Scale. This 10 item scale reflects four resonant leadership styles and associated behaviours. Respondents were asked to consider the formal leader of the area where they
work the majority of their time and indicate their level of agreement to each statement. Response format was a 5-point Likert-like scale ranging from 1 (strongly disagree) to 5 (strongly agree). Respondents were also able to choose the response “unable to determine”. The leader’s resonant leadership score is the average value of the ratings of completed individual items.

Initial psychometrics is very promising (Cummings, personal communication, 2008). In a sample of 453 health care professionals (nurse, physicians, managers, educators, pharmacists and rehabilitation therapists), the scale demonstrated a high reliability coefficient (alpha = 0.94). Correlations between variables were above 0.5 with most being above 0.6. Factor analysis revealed a single factor solution that explained 68.1% of the variance. More recently, the scale was used as a sub-scale in the creation of a larger survey designed to measure organizational context. The resonant leadership scale was used as the leadership subscale. Psychometrics of the subscale were reported as a single factor with a high internal reliability coefficient of .914 (Estabrooks, Squires, Adachi, Kong & Norton, 2008).

Content validity is evidenced by each statement aligning with the behaviours of Goleman’s four resonant leadership styles: visionary (e.g. “engages me in working toward a shared vision”), coaching (e.g. “actively mentors and coaches individual and team performance”) affiliative (e.g. “actively listens, acknowledges, and then acts on requests and concerns”), and democratic (e.g. “allows me freedom to make important decisions in my work”).

**Span of Control**

Manager span of control was measured by two questions developed for this study. The first question asked about the number of staff that reported to the manager: “along with you, how many people report to your direct supervisor/nurse manager?” Since the time and energy related to span of control could be limited or enhanced by the supports in place for the manager, the second question provided a list of support staff and asked the respondent to estimate numbers to the question: “how many other positions on your unit support your direct supervisor/nurse manager?”
**Nurse Leader-Nurse Relationships**

The quality of clinical nurse leader-nurse relationships were measured using the leader-member exchange scale: LMX7 (Graen & Uhl-Bien, 1995). This instrument consists of 7 items that ask the respondent to describe their relationship with their direct supervisor. For each of the items, the respondent was required to indicate the degree to which they think the item was true by choosing one of the responses on a scale of 1 to 5. The anchors assigned to these ratings differed based on the question i.e. 1 (rarely) to 5 (very often), or 1 (not at bit) to 5 (a great deal) etc. The instrument score is obtained by summing responses to each of the 7 items. The theoretical range for the instrument is 7 to 35. A score of 30 to 35 indicates a very high quality relationship, a score of 25 – 29 indicates a high quality relationship, and a score of 20 – 24 indicates a moderate quality relationship, whereas a score 15 – 19 and 7 – 14 indicate a low and very low quality relationship respectively (Northouse, 2007).

There are several LMX instruments that are used to measure this concept from 2-item to 14-item scales. However, Gerstner and Day’s (1997) meta-analysis, which compared instruments and aggregated reliability results, found the LMX 7 measure appeared to provide the soundest psychometric properties of all available LMX measures. The mean reliability coefficient for the LMX7 (0.89) was reported higher than the mean reliability coefficient of all the other measures of 0.83. Gerstner and Day recommended that the LMX7 be used in studies that examine overall exchange quality. They also suggested that LMX is best measured from a member’s perspective as opposed to the leaders’ perspective.

In addition, the LMX 7 demonstrates content validity because its’ items appropriately capture the three important dimensions of LMX: trust, respect and obligation (Graen & Uhl-Bien, 1995). The instrument assesses the degree to which the leader and subordinate have mutual respect for the other’s capabilities, feel a sense of reciprocal trust and have a strong sense of obligation to each other (Northhouse, 2007). For example, one statement evaluated by respondents was: “I have enough confidence in my leader that I would defend and justify his/her decision if he or she was not present to do so”.

**Safety Climate**

Safety climate was measured using the safety climate survey (SCSu) developed by Sexton and Thomas (2003). The safety climate survey is a 21 item instrument which takes approximately 5 minutes to complete. It consists of questions that originated from subscales of a larger Safety Attitudes Questionnaire developed by Sexton et al (Kho et al., 2005). Respondents were asked to indicate their agreement to each item on a 5-point scale using ranging from 1 (disagree strongly) to 5 (agree strongly). Negatively worded statements were reversed scored so higher values are indicative of more positive safety climate perceptions. Total safety climate score is the sum of all 21 questions and the theoretical range is from 21 to 105.

A variety of researchers have reported strong psychometrics for this instrument with test-retest reliability ranging from 0.85 to 0.92 and internal consistency reliabilities ranging from 0.75 to 0.88 (Kho et al., 2005; Pronovost & Sexton, 2005). Content validity is evidenced by the endorsement of the Institute for Health Care Improvement, which upon review of the scale, provided support for use of this scale to assess safety climate in hospital environments. Furthermore, items reflect safety actions of performance feedback, blameless approach to errors, self-reporting, communication and learning from errors which were all identified in landmark safety reports (IOM 2001, IOM 2003, Baker et al., 2004). Sample items include: “the culture of my clinical area makes it easy to learn from the mistakes of others” and “I am encouraged by my colleagues to receive appropriate feedback about my performance”. Kho et al. used this instrument in 4 Canadian university affiliated ICUs and concluded the safety climate survey was also a reliable measure in a Canadian context.

**Nursing Work Environment**

The work environment quality was measured using the Perceived Nursing Environment Scale (PNWE) (Choi, Bakken, Larson, Du & Stone, 2004). This scale is a recent adaptation from a family of scales which originated from Kramer & Hafner’s (1989) Nursing Work Index (NWI). The original 65 item NWI was developed from investigation of magnet hospitals’ success in retaining nursing staff. Later the basic structure of the NWI was redesigned into the 57-item NWI-R containing new subscales that were conceptually or
Empirically derived to measure work environment attributes supportive of nursing practice. However, the NWI-R substantive domains were not supported empirically and its length was burdensome (Lake, 2002). This resulted in Lake’s version of the instrument, a 48 item survey with 5 subscales known as the Practice Environment Scale (NWI-PES). Around the same time in Canada, through factor analysis of the NWI-R, Estabrooks et al. (2002) developed a one-dimensional 26-item instrument called the Practice Environment Index (PEI). More recently, Choi et al. (2004) argued that it is essential that measures of work environment evolve to address the changing nature of the nursing work environment and capture its salient elements. These researchers responded to this need and developed the PNWE scale.

The PNWE is a 42-item instrument with seven subscales: professional practice, staffing and resource adequacy, nursing management, nursing process, nurse-physician collaboration, nursing competence and positive scheduling climate. Respondents were asked their perception of their work environment on a 4 point Likert-like scale, ranging from 1 (strongly disagree) to 4 (strongly agree). Higher scores indicate positive perceptions. A composite score can be obtained by summing the subscale scores. Since this study was interested in the entire concept of work environment without the leadership aspects which were captured with the justice, leader-nurse relationship and resonant leadership concepts, the composite score (not including the nurse management subscale) was used to represent nurses’ perceptions of their work environment. In addition, each subscale was examined independently. High scores indicated positive or quality workplace. Unique to this adaptation of the NWI is the subscale on scheduling which differs from staffing and resource adequacy. Based on this researcher’s experience, scheduling issues are of high importance for nurses today. Given this study’s concept of work environment includes characteristics of adequate staffing, professional development, communication/participation in decision making, collaborative relationships, and flexible scheduling, this adaptation of the NWI was deemed most appropriate.

Psychometrics for the PNWE has been reported by Choi et al. (2004). Exploratory factor analysis indicated that no item loaded on more than one factor and the composite scale explained 53.2% of the total variance with a high internal reliability coefficient of 0.95. Six
of the seven subscales exhibit moderate to high Cronbach alphas of: 0.91 (professional practice), 0.88 (nursing management), 0.84 (nurse-physician collaboration), 0.83 (staffing and resource adequacy), 0.72 (nursing competence), 0.70 (nursing process) and 0.56 (scheduling climate). The lower reliability of the scheduling subscale may be attributed to the small number of items (3). For the purposes of this study an additional question regarding scheduling was also asked: “staff nurses are able to schedule time off as requested”. Construct validity is evidenced by the ability to differentiate nurses from non-magnet and magnet hospitals. Nurses from magnet hospitals (c.f. from quality work environments) had significantly higher mean composite scores (Choi et al., 2004).

Hospital Acquired Pressure Ulcers

Respondents were asked to estimate the number of hospital acquired pressure ulcers they had seen in the previous 4 months. To assist them in determining this number, they were provided with the direction to consider the Braden scale which is the pressure ulcer assessment tool used in Ontario acute care hospitals.

Medication Errors

Nurses were asked two questions related to medication errors. First, they were asked to estimate the number of medication errors that they had encountered in the past 4 months. Second, since medication errors have been the focus of many studies that examined safety climate, nurses were also asked to indicate the number of medication errors they formally reported to administration during the same time period.

Emotional Exhaustion

Emotional exhaustion was measured using the emotional exhaustion subscale of the Maslach Burnout Inventory – Human Services Survey (MBI-HSS) which was designed for use with people working in the human services and health care. The MBI-HSS is a 22 item questionnaire, comprised of 3 subscales: emotional exhaustion (9 items), depersonalization (5 items) and personal accomplishment (8 items). Emotional exhaustion refers to the inability of the respondents to ‘give of themselves at a psychological level’ which occurs because of feelings of being emotionally spent and exhausted by one’s work environment.
Depersonalization refers to a loss of concern or detachment toward one’s clients or patients. Personal accomplishment is the feelings of success, achievement and competence in one’s work. The items are framed as statements of job-related feelings (i.e. “I feel burned out from my work,”). Responses are rated on a 7-point frequency of feeling that way scale ranging from 0 (never) to 6 (daily). Subscales are scored separately by totaling items associated with the subscale and can be compared to normative data. There is no total score. Burnout is reflected by higher mean scores on emotional exhaustion and depersonalization and lower scores on personal accomplishment. Typically each subscale is categorized into low, medium or high, but to avoid losing information by reducing interval data into an ordinal scale, for testing the model the data were analyzed as a continuous measure (Stone et al., 2007). However for descriptive purposes, the results were also reported by category.

A variety of researchers have reported that the MBI is a reliable and valid measure of burnout and its subscales also being reliable and valid. Maslach et al. (1996) reported a reliability coefficient of .90 (emotional exhaustion), .79 (depersonalization) and .71 (personal accomplishment). Additionally they noted test-retest reliability coefficients of .82 for emotional exhaustion, .60 for depersonalization, and .80 for personal accomplishment. All were significant beyond the .001 level (Maslach et al., 1996). Others reported reliability coefficients in a similar population reported as 0.90, 0.69 and 0.80 for emotional exhaustion, depersonalization and personal accomplishment respectively (Glasberg, Eriksson & Norberg, 2007). Discriminant validity was supported by comparing MBI to other psychological constructs of burnout such as job satisfaction. Negative correlations were found with both emotional exhaustion (r = -.23) and depersonalization (r = -.22) to job satisfaction, and a positive correlation with personal accomplishment (r = .17) (Maslach et al., 1996). Personal accomplishment, however, has been noted to be the most unstable of the subscales (Kalliath et al., 2000). Emotional exhaustion is considered the core dimension of burnout (Glasberg et al., 2007). Therefore for the purposes of this study only the emotional exhaustion subscale was used. The aforementioned concepts and instruments used to measure them are summarized in Table 1.
**Sick-time**

Nurses were asked to report the number of days they reported in sick over the past 4 months. Since nurses in Ontario typically work 8 or 12 hours shifts, they were asked to specify these days in terms of the number of 8 and/or 12 hours sick days (i.e. “How many days have you reported in sick over the past 4 months? … indicate either 8 or 12 hour shifts”). The reported number of specific shifts was then converted into number of sick hours for further analysis.

**Intent to Leave**

Nurses were asked to indicate their level of agreement on a range from strongly disagree (1) to strongly agree (5) to statements about their intent to remain employed in their unit, their employing hospital, and the profession (i.e. “I intend to remain on my present unit for 2 or more years”) (see Appendix B). The intent to leave questions were then reverse coded so that a higher rating would reflect a greater intent to leave.

**Data Collection Procedures**

Given the sample size, a mailed survey was deemed appropriate. To maximize response rates, a modified Dillman (2007) procedure was used. This methodology involved sending out a survey mail-out, a reminder notice and a second mail-out with final reminder letter (Appendix B). Included in the initial mail out package was a cover letter describing the study and assuring complete anonymity, the survey, a stamped and addressed return envelope, and a contact number should participants have any questions. A reminder/thank you letter was mailed two weeks following the first survey mailing to non-respondents. Two weeks after the thank you note, the second round of surveys was mailed to the non-respondents with a final letter of reminder (see appendix B).
Table 1: Variables and Instruments of Measurement

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<td>7</td>
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<tr>
<td>Work environment</td>
<td>PNWE</td>
<td>42</td>
</tr>
<tr>
<td>Safety Climate</td>
<td>Safety Climate Survey</td>
<td>21</td>
</tr>
<tr>
<td><strong>Dependent Outcome Variables</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Medication errors</td>
<td>4 month recall question</td>
<td>1</td>
</tr>
<tr>
<td>Pressure ulcers</td>
<td>4 month recall question</td>
<td>1</td>
</tr>
<tr>
<td>Sick hours</td>
<td>4 month recall question</td>
<td>1</td>
</tr>
<tr>
<td>RN emotional exhaustion</td>
<td>MBI subscale emotional</td>
<td>9</td>
</tr>
<tr>
<td>Intent to Leave</td>
<td>Survey specific questions</td>
<td>3</td>
</tr>
</tbody>
</table>

**Data Management**

Once the randomized list of names and addresses of potential nurse participants was received from the College of Nurses of Ontario, each potential participant was provided with a participant number. All survey packages were coded with this participant code so that nurses who returned their survey could be tracked and reminders sent only to non-respondents. A code book was developed and used to list each variable, possible respondent values, scoring for scales etc. All decisions regarding the survey were recorded in the code book.

Once surveys were returned, data from each survey were entered into SPSS 17.0 ® software program for data cleaning and analysis. Data were also exported to AMOS17.0 ® software program for structural equation modeling. Data coding and entry were double checked by a
second coder to detect and correct any error prior to analysis. All data were screened for missing data. Only one respondent missed more than 15% of the questions in the survey having failed to answer the latter part of the survey (last 4 pages were stuck together). Because this respondent failed to answer 44.7% of the survey, it was deleted from further analysis. The method chosen to deal with missing data should be based on the pattern of data that were missing (Kneipp & McIntosh, 2002).

Missing value analysis, therefore, was conducted on the entire remaining data set to determine how much data were missing and whether there was a random or systematic pattern to the missing data. Eighty-three (66.4%) of the variables (questions in the survey) were missing one or more responses with no discernable pattern. Only one variable had missing values in excess of 10% and was missing 13.9% of the responses. This question explored span of control and asked the nurse to report on the number of sites for which their manager was accountable. While this variable was included to describe the construct of span of control, it was not used in further analysis. Of the 266 cases, 175 (65.8%) missed one or more questions. However, of the overall values (variables x cases), only 1.6% were missing. Based on visual review and Little’s MCAR test conducted on the entire data set, findings supported that the missing values were missing completely at random (Chi-square = 14763.675, DF = 14814, Sig = .614). However, each study construct measurement was also reviewed separately and found to have significant Little’s MCAR tests. With the exception of ‘emotional exhaustion’, each construct was missing some item level responses although not by the same respondents. These respondents did not deviate in any systematic way from those without missing values and hence the data was determined to be missing at random (Kneipp & McIntosh, 2002).

To deal with the missing data, list-wise deletion was not chosen because there was a risk that the measurement for each construct could represent a different group of participants in the sample (Kneipp & McIntosh, 2002). Single mean imputation was also not chosen because it understates the data’s true variance (Duffy, 2007). Alternatively, maximum likelihood estimation (MLE), which does not delete cases with incomplete records or impute missing observations, picks estimates that have the maximum likelihood of reproducing the observed data while retaining all cases in analysis (Kline, 2005). However, MLE does not create a
complete data set and would not have enabled the use of modification indices which allow for a more systematic viewing of different relationships in structural equation analysis. Therefore, maximum likelihood estimation was also not selected to manage missing data.

On the other hand, multiple imputation methods correct for the many problems associated with single imputation by replacing each missing value with a set of plausible values. These predicted values (called imputes) are based on important data relationships from variables with and without missing data within the dataset. Substituting missing values with imputes forms one complete dataset. This predictive approach is repeated several times to create multiple imputations and several complete data sets. The entire process involves 3 steps: creation of several simulated complete versions of the dataset, analysis of each individual set, and pooling the results from the analysis (Squires & Tourangeau, 2009). Multiple imputation adds sources of variability into the data, corrects problems associated with single imputation and provides a full complete data set. Multiple imputation is a more robust and flexible method to manage incomplete data compared to other traditional methods (Schafer & Graham, 2002; McKnight, McKnight, Sidani & Figueredo, 2007). Therefore, multiple imputation was the method selected to manage missing data in this study.

**Data Analysis**

Sample and setting demographic characteristics were analyzed using descriptive statistics (mean, SD and confidence intervals, as well as frequency and percentages for categorical data). Descriptive analysis of each study construct measure included mean, SD and internal consistency reliability using the Cronbach’s alpha coefficient. Additionally, each construct was standardized out of 100 to facilitate description of the participating nurses. Since unidimensional scales were treated as observed constructs in the structural equation model, they were also examined using exploratory factor analysis with principal component method to test their unidimensionality. Exploratory factor analysis was chosen because it clearly shows how well items load on non-hypothesized factors and it is considered more appropriate than confirmatory factor analysis in the analysis of relatively new scales (Kelloway, 1995). An exploratory factor analysis was not conducted on the PNWE because it is a multidimensional construct and a latent variable within the theoretical model.
Therefore as part of the measurement model, its structure is confirmed using confirmatory factor analysis within the structural equation analysis.

To enhance the description of the study sample, groups (i.e. medicine, surgery and critical care) were compared using independent sample t-tests and one-way ANOVA. For variables that showed significant between-group differences, a Tukey test or Dunnett’s T3 was performed to determine which pair differed.

Missing data were replaced by multiple imputations using a Fully Conditional Specification in 5 iterations which created 5 separate data sets that were pooled for analysis. Since the fraction of missing data was not large, it is sufficient to do a small number of iterations, typically no more than 5 (Rubin & Schenker, 1991; Schafer & Graham, 2002; Schunk, 2008). Total scores were computed for each of the construct measures first with missing values and again after missing values were imputed to ensure the final results are not distorted by imputed values (Duffy, 2006). Data were imputed at the item level for scale variables and final scale scores were calculated after imputation of the items. These final imputed scores represented the values obtained for the variables of interest and were included in the statistical analysis to test the hypothesis. A complete data set was randomly selected from the 5 imputed data sets and used for further SEM analysis. This approach has been used in other studies (Boltz, Capezuti, Bowar-Ferres, Norman, Secic et al., 2008).

Structural equation modeling (SEM) with maximum likelihood estimation was used to test the hypothesis, examine the relationships between concepts of interest as proposed in the hypothesized theoretical model and to refine the hypothesized model. The proposed framework (figure 8) represents the study’s theoretical underpinnings as described in the literature review, and exemplifies the hypothesis.

SEM program AMOS 17 was used to analyze the data. SEM is useful to test a theoretical model (Munro, 2005). SEM techniques examine the covariance structure and relationships between and among latent variables. SEM allows researchers to use multiple measures of theoretical constructs and removes measurement error from the relationships between theoretical constructs. Estimate of measurement error are included in SEM models. SEM does not assume variables are accurately measured. SEM examines the effects of direct,
indirect, reciprocal and spurious causal relationships. Therefore, SEM is a more robust and precise test of theories (Munro, 2005).

SEM can test two models simultaneously: the theoretical model (model of hypothesized relationships) and the measurement model (measurements of the theoretical constructs). Valid tests of the theoretical model depend on the fit of the measurement model to the data (Munro, 2005).

Prior to analysis using SEM, the measurement model for the latent variable of work environment as measured by the PNWE, was analyzed separately through confirmatory factor analysis (CFA). CFA was used to ensure the indicators sorted themselves into factors as proposed by the instrument. When the measurement model did not demonstrate strong psychometric properties, the scale was modified using AMOS ® and factor analysis repeated until the measurement fit the construct. Anderson & Gerbing (1988) and Kline (2005) urge researchers to use this two-step model and always test the pure measurement model underlying a full structural equation model first, and when the fit of the measurement model is found acceptable, then to proceed to the second step of testing the structural model by comparing its fit with that of data.

Fit indexes were used to evaluate goodness of fit between the hypothesized model and observed data. Diagnostics were considered to revise the model accordingly. Kline (2005) recommends a minimal set of fit indexes should be reported and interpreted when reporting results of SEM analyses. This minimal set includes: model chi-square, root mean square error of approximation (RMSEA) with its 90% confidence interval, comparative fit index (CFI), and standardized root mean square residual (SRMR). However there is no consensus by researchers on just what indexes should be reported (Meyers, Gamst & Guarino, 2006).

*Model chi-square* tests whether the observed model and the hypothesized model differs. A significant $X^2$ relative to the degrees of freedom indicates the two models differ. As $X^2$ increases in size, the model fit worsens (Kline, 2005), therefore a small non-significant $X^2$ is desired. Chi-square statistic is very sensitive to sample size, as the sample size increases ($N > 200$) it has a tendency to indicate a significant probability level (Schumacker & Lomax, 2004). Therefore, chi-square statistic should not be considered in isolation when looking at
goodness of fit. As a result researchers have developed additional fit indices that take a pragmatic approach to the model-fitting process and are used as adjuncts to the $X^2$ statistic (Byrne, 2010). $RMSEA$ approximates a non-central chi-square distribution and takes into account the error of approximation, which means it does not assume the model fit with the population to be perfect. It is less affected by sample size. Close approximate fit is indicated by an RMSEA of $\leq .05$ (Schumacker & Lomax, 2004). Values between .05 and .08 indicate a reasonable fit and those 1.0 or more indicate a poor fit. A confidence interval can be calculated for this statistic. Ideally the lower value of the 90% confidence interval includes or is very near to zero ($< 0.05$) and the upper value does not exceed 1.0 (Kline, 2005). In addition to reporting the confidence interval around RMSEA, Byrne (2010) recommends you test for the closeness of fit (PCLOSE). $PCLOSE$-value is a "p value" for testing the null hypothesis that the population RMSEA is no greater than .05. If PCLOSE is less than .05, we reject the null hypothesis and conclude that the computed RMSEA is greater than .05, indicating lack of a close fit. It has been suggested the PCLOSE value should be $> .50$ (Byrne, 2010). $Comparative fit index (CFI)$ indicates the relative improvement in fit between the researcher’s model and the baseline model. A good fit is demonstrated by values greater than 0.90 (Kline, 2005). Finally, $SMSR$ is the standardized difference between the observed model and the hypothesized model, the overall difference between observed and predicted correlations. A value of zero indicates perfect fit, however values less than 0.10 are considered a good fit (Kline, 2005).

Goodness of fit tests indicate whether the model being tested should be accepted or rejected. These overall fit tests do not establish that particular paths within the model are significant. If the model is accepted, the researcher then proceeds with interpreting the path coefficients in the model. In this study, the following fit indexes were used: model chi-square, RMSEA (with confidence interval and PCLOSE), CFI, and SRMR.

**Ethical Considerations**

Ethical approval was obtained from the Health Sciences Ethics Review Office at the University of Toronto after the proposed study had been approved by the thesis committee. To maintain confidentiality, participants were assigned a study identification number.
Respondent names did not appear on any study materials. Neither respondent nor non-respondent names were known to the researcher. The researcher identified only the assigned participant numbers. Anonymity and confidentiality was assured in all communication with potential participants (see appendix B). Information about the study was provided with the survey (see appendix B). No deception was used.

A gift certificate from Tim Horton’s coffee was provided with the survey regardless of whether the nurse participated in the study. Nurses who chose to participate did so voluntarily and were able to refuse to answer any question(s) in the survey. Respondents completed the survey on their own time and in a location of their choosing. Return of a completed survey was considered indication of each participant’s informed consent. All surveys were kept in a locked cabinet in the Lawrence S. Bloomberg Faculty of Nursing at the University of Toronto. Electronic data files were kept in the researcher’s computer that was password protected. Only the study investigator, the investigator’s supervisor, and thesis committee (as appropriate) were able to access the raw data. All completed surveys will be kept until the end of the study and will then be destroyed within one year of study completion.

**Risks and Benefits**

There are no known risks associated with the study. Given the voluntary nature of the survey, nurses did not participate unless they wished to and were able to skip any question. Benefits of the study relate to the increased understanding on how leadership and justice influence the work environment of nurses and its safety climate. This understanding will serve to help administrators and managers address issues of leadership that can make the work place healthier and safer for nurses and patients alike.
CHAPTER IV: RESULTS

In this chapter, the study findings are presented in several sections. First, the demographic characteristics of the sample and setting are described. Sample characteristics are also reported for each of the three clinical settings (medicine, surgery and critical care). Then descriptive findings of the exogenous and endogenous variables of the proposed model are provided followed by results of the structural equation modeling analysis which was used to test the hypothesis and refine the hypothesized model.

In this study, a cross-sectional probabilistic survey design was used to test and refine a model that explains the influence of leadership on nurse and patient safety outcomes. Specifically, the model included constructs of perceived interactional justice, resonant leadership, manager span of control and clinical nurse leader-nurse relationship, as well as nursing work environment and safety climate. Patient safety outcomes included nurses’ recall of the frequency of medication errors and hospital acquired pressure ulcers. Nurse safety outcomes included nurses’ perceptions of their emotional exhaustion, sick time and intent to leave. The initial mailing of the survey consisted of 600 questionnaires to acute care nurses across Ontario with follow-up mailings as recommended by Dillman (2007). Seven questionnaires were returned by Canada Post indicating mailing addresses were incorrect and 12 were returned with the box checked that indicated they did not want to participate. An additional 41 respondents were excluded because they failed to meet the inclusion criteria i.e. did not work in medicine, surgery or critical care or had not worked with their current manager for at least 3 months. Of the 552 potential participants, a total of 267 nurses who met the inclusion criteria responded (48.4% response rate). However, one respondent was deleted from further analysis because of a high percentage of missing data (44.7%).

The survey consisted of six reliable and valid scales, as well as specific questions about nurse-respondent demographic characteristics, characteristics of patients of the clinical setting, manager span of control, respondent intentions to leave employment, and nurse-reported frequency of medication errors, pressure ulcers and absent days (see Appendix A). Demographic characteristic variables included were: age, education, sex, years worked as a
registered nurse, years with the same direct supervisor/nurse manager, type of nursing unit, employment status, and usual schedule assignment.

Sample and Setting Demographic Characteristics

In this section the demographic characteristics of nurse respondents and their workplace are described. Characteristics including age, sex, nursing experience including years with current manager, education, residence and employment status are described. Descriptive findings regarding nurse respondents work settings are then reported including area of work, work schedule, and patient characteristics (age, co-morbidities, and mobility).

Sample Demographics Characteristics

Sex and Age

Respondents were 95.9% female, which is similar to percentage observed in the provincial population of nurses of 95.4% (CNO, 2008). Of the 266 nurses who completed the survey, 262 provided their age. The average age of the nurses in this sample of acute care nurses working in medicine, surgery and critical care was 43.35 years (SD = 10.317) with a range of 23 to 68 years. This was slightly younger that the mean age of 46.1 years for all registered nurses (RNs) in Ontario (CNO, 2008). Specific data on age of the provincial population of acute care nurses by workplace setting (medicine, surgery and critical care) was not available. Sample age distribution was also similar to the population of Ontario RNs as reported by the CNO (see table 2).
Table 2: Age Distribution of Study Sample compared to CNO (2008) data

<table>
<thead>
<tr>
<th>Age</th>
<th>Sample frequency</th>
<th>Percent</th>
<th>CNO %</th>
</tr>
</thead>
<tbody>
<tr>
<td>18-24</td>
<td>3</td>
<td>1.1</td>
<td>2</td>
</tr>
<tr>
<td>25-29</td>
<td>22</td>
<td>8.2</td>
<td>7</td>
</tr>
<tr>
<td>30-34</td>
<td>41</td>
<td>15.4</td>
<td>9</td>
</tr>
<tr>
<td>35-39</td>
<td>32</td>
<td>12.0</td>
<td>12</td>
</tr>
<tr>
<td>40-44</td>
<td>42</td>
<td>15.7</td>
<td>14</td>
</tr>
<tr>
<td>45-49</td>
<td>38</td>
<td>14.2</td>
<td>15</td>
</tr>
<tr>
<td>50-54</td>
<td>44</td>
<td>16.5</td>
<td>16</td>
</tr>
<tr>
<td>55-59</td>
<td>25</td>
<td>9.4</td>
<td>15</td>
</tr>
<tr>
<td>60-65</td>
<td>13</td>
<td>4.9</td>
<td>8</td>
</tr>
<tr>
<td>65+</td>
<td>2</td>
<td>.7</td>
<td>3</td>
</tr>
</tbody>
</table>

Education

Nurses were asked to indicate all educational levels that applied. Therefore, nurses may have had more than one qualification (i.e. both a diploma in nursing and a bachelor’s degree or specialty certificate). Overall the majority (73.3%) reported they were educated at the diploma level with smaller percentages having higher nursing and non-nursing credentials. Only 31.1% possessed a baccalaureate degree in nursing and 2.3% reported completing a graduate nursing degree. In addition, 15% indicated they also held a specialty certificate in nursing. There were 13 (4.9%) nurses who reported that they held a non-nursing baccalaureate degree and two nurses (0.9%) reported holding non-nursing graduate education.

Experience

Sample nurses reported a wide range of years of nursing experience (see table 3) from 1 to 42 years with the mean of 17.85 years (SD = 10.78). Similarly, respondents’ experience with present nurse manager also ranged from 0.25 to 34 years with a mean of 4.28 years (SD = 4.63). Five nurses did not specify the length of their tenure with current manager.
Table 3: Distribution of Nursing Experience

<table>
<thead>
<tr>
<th>Experience Range</th>
<th>Nursing Experience</th>
<th>Experience with Current Manager</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>Percent</td>
</tr>
<tr>
<td>.25- 5 years</td>
<td>43</td>
<td>16.3</td>
</tr>
<tr>
<td>6-10</td>
<td>47</td>
<td>17.8</td>
</tr>
<tr>
<td>11-15</td>
<td>33</td>
<td>12.4</td>
</tr>
<tr>
<td>16-20</td>
<td>39</td>
<td>14.6</td>
</tr>
<tr>
<td>21-25</td>
<td>29</td>
<td>10.9</td>
</tr>
<tr>
<td>26-30</td>
<td>35</td>
<td>13.1</td>
</tr>
<tr>
<td>31-35</td>
<td>26</td>
<td>9.7</td>
</tr>
<tr>
<td>35-40</td>
<td>12</td>
<td>4.5</td>
</tr>
<tr>
<td>40+</td>
<td>2</td>
<td>.7</td>
</tr>
<tr>
<td>Missing</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>266</td>
<td>100</td>
</tr>
</tbody>
</table>

Location of residence

Nurses from all over the province participated in the study. Based on postal code descriptors, Ontario regions included: Northern Ontario (e.g. North Bay, Sault Ste Marie, Thunder Bay and Timmins), South Western Ontario (e.g. Brantford, Guelph, Kitchener, London, and Windsor), Eastern Ontario (e.g. Belleville, Brockville, Cornwall, Kingston, and Ottawa), South Central Ontario (e.g. Barrie, Burlington, Hamilton, Newmarket, Oshawa, and St. Catherines) and Greater Toronto Area (GTA). The lowest percentage of study nurses came from Northern Ontario at 7.12% (n = 19) and South Central Ontario accounted for the largest percentage of respondents at 35.34% (n = 94). Additionally, 20.23% (n = 54) of the
sample resided in Eastern Ontario, 23.60% (n= 63) in South Western Ontario, and 13.48% (n = 36) lived in the GTA. Although comparable provincial data on the Ontario nurse population is only available by Local Health Integration Network (LHIN) regions, the two northern LHINs that are located in the geographic area of Northern Ontario account for the smallest percentage of nurses (8.1% combined) in the population (College of Nurses, 2008).

Employment Status

In this study, the majority of the nurses worked full-time (63.5%). Only one respondent did not respond to the question about employment status. This is similar to the percentage of full-time nurses in the nursing population across the province of Ontario reported by the CNO (2008) as 64.7%.

Overtime: Paid versus Unpaid

Overtime may contribute to fatigue, and nurse fatigue may also be a safety risk. Therefore, the frequency of worked paid and unpaid overtime was examined. Participants were asked how frequently they worked paid and unpaid overtime on a 4-point scale: 1 indicated a response of “never”, 2 indicated “couple of times per month”, 3 indicated “at least weekly”, and 4 indicated “almost every shift”. The scores were then standardized out of 100 so that a score of 0 would mean never and 100 would indicate “almost every shift”. Thirty three and 67 corresponded to a couple of times a month and at least weekly, respectively.

The range for both paid and unpaid overtime was 0 to 100 with a mean of 29.78 (SD=23.93) for paid overtime. The mean unpaid overtime was 30.78 (SD= 34.62). The majority of nurses (56%) indicated they worked paid overtime a couple of times per month, whereas the majority (47%) indicated they never worked unpaid overtime.
Table 4: Frequency of Overtime

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Paid Overtime Frequency</th>
<th>Paid Overtime Percent</th>
<th>Unpaid Overtime Frequency</th>
<th>Unpaid Overtime Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Never</td>
<td>75</td>
<td>28.2</td>
<td>125</td>
<td>47.0</td>
</tr>
<tr>
<td>Monthly</td>
<td>149</td>
<td>56.0</td>
<td>57</td>
<td>21.4</td>
</tr>
<tr>
<td>Weekly</td>
<td>31</td>
<td>11.7</td>
<td>53</td>
<td>19.9</td>
</tr>
<tr>
<td>Every shift</td>
<td>8</td>
<td>3.0</td>
<td>26</td>
<td>9.8</td>
</tr>
<tr>
<td>Missing</td>
<td>3</td>
<td>1.1</td>
<td>5</td>
<td>1.9</td>
</tr>
<tr>
<td>Total</td>
<td>266</td>
<td>100</td>
<td>266</td>
<td>100</td>
</tr>
</tbody>
</table>

Group Comparisons of Sample Demographics

For descriptive purposes, the sample was analyzed using a one-way ANOVA to determine if there were differences in sample characteristics by clinical settings (medicine, surgery and critical care). There were no significant differences by clinical settings in age \([F(4, 257) = .654; p > .625]\), years of experience \([F(4, 261) = .500; p > .736]\) and years working with same manager \([F(4, 256) = .539; p > .707]\).

Setting Characteristics

**Clinical Work Setting**

This sample was selected from all Ontario nurses working in acute care hospitals in the clinical areas of critical care, medicine or surgery. Of those who met the selection criteria, 38.3% worked in critical care, 24.1% worked in medicine and 25.2% worked in surgical units. In addition, 10.5% worked in combined medical-surgical units and a small percentage (1.9%) listed their work area as other. Of those who listed their work place as ‘other’, most (4 of 5) stated specific units such as cardiology, recovery room and orthopedics which also fit one of three main areas of interest i.e. medicine, critical care and surgery, respectively. A similar distribution of workplace is also noted in the provincial population. In 2008, the CNO reported a total of 21,376 acute care hospital nurses working in critical care, medicine,
surgery from which the random sample was drawn. Of this larger population, 37.8% worked in critical care, 32.2% worked in medicine and 30% worked in surgery.

*Nurse Schedule*

Nurses were provided a choice of seven typical work schedules and were asked to indicate the schedule they primarily worked. The two most common schedules were the traditional alternating 12 hour days and nights schedule (36.7% of sample) and the newer 12 hour schedule of four consecutive shift ‘day-day, night-night’ (21.4% of the sample). The remaining schedules were reported by 41.9% of respondents (see table 5).

**Table 5: Frequency and Distribution of Usual Nursing Schedules**

<table>
<thead>
<tr>
<th>Schedule</th>
<th>Sample frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>12 hour rotating Day &amp; Night</td>
<td>98</td>
<td>36.8</td>
</tr>
<tr>
<td>12 hour day, day then night-night</td>
<td>57</td>
<td>21.4</td>
</tr>
<tr>
<td>Schedule varies by employer</td>
<td>42</td>
<td>15.8</td>
</tr>
<tr>
<td>Combination of 8,10 or 12 hour</td>
<td>18</td>
<td>6.8</td>
</tr>
<tr>
<td>Day shifts Monday – Friday</td>
<td>18</td>
<td>6.8</td>
</tr>
<tr>
<td>8 hour rotation of 2 shifts</td>
<td>18</td>
<td>6.8</td>
</tr>
<tr>
<td>8 hour rotation of 3 shifts</td>
<td>7</td>
<td>2.6</td>
</tr>
</tbody>
</table>

**Patient Characteristics of Clinical Setting**

To further understand the setting in which nurse respondents worked, nurses were asked about the about their patients’ ages, problems and their mobility.

*Patient Age*

Respondents were asked to indicate the average age of the patients for whom they provided care by checking off one of four categories: less than 50 years, 50 – 65 years, 66 to 79 years and over 80 years of age. In total, 8.6% of the nurses reported their patients were less than 50 years old, 24.1% specified 50 to 65 years, and 4.5% indicated the average age of their
patients was over the age of 80 years. The majority (58.3%) reported their patients were between 66 and 79 years old. Twelve nurses (4.5%) did not respond to this question.

*Patient Comorbid Conditions*

The vast majority of the nurses (91.4%) reported that, in general, patients in their work settings had multisystem problems. Only 7.5% felt the patients they cared for had single system problems. Three nurses (1.1%) did not respond to this question.

*Patient Mobility*

Most respondents reported that, in general, their patients required nurse assistance to mobilize or move. Only 4.9% described their patient population as independent, 26.3% stated their patient population required the assistance of one nurse, 47.4% reported patients required the assistance of 2 nurses and 18.7% indicated their patients were completely bedridden. Seven nurses (2.6%) did not respond to this question. Given the large variability noted in this patient characteristic variable, mobility was selected for inclusion as a patient characteristic within the theoretical model.

*Summary of Sample and Setting Characteristics*

In summary, nurses who participated in this study worked in Ontario acute care hospitals in clinical areas of medicine, surgery or critical care. Most were female, middle aged, and diploma educated and had worked with their current manager for approximately four years. The typical sample nurse worked on a full-time basis and worked paid overtime on a monthly basis. The average nurse respondent had 18 years of experience in nursing. Characteristics of this study cohort are relatively similar to those reported for all Ontario nurses (CNO, 2008). In addition, patients in respondents’ clinical work settings were generally between 66 and 79 years of age, had multi-system problems and required the assistance of two nurses to mobilize.
Descriptive Findings

The results of the descriptive analysis of each study construct are presented in this section. These analyses were performed to gain a better understanding of the major concepts of interest and include mean, standard deviation, and range as well as comparison across nurses working in medicine, surgery and critical care. Cronbach’s alpha for internal consistency was measured to determine the reliability of each scale. Since unidimensional scales were treated as observed constructs in the structural equation model, they were also examined using exploratory factor analysis with principal component method to test their unidimensionality. If required, the scale was refined to ensure the measure accurately reflected the construct of interest.

Additionally both the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy and the Bartlett’s test of sphericity (BTS) were conducted to assess appropriateness of factor analysis. KMO is an indicator of how adequate the correlations are for factor analysis. A value of .70 or more is considered adequate (Meyers et al., 2006). BTS is a test of the null hypothesis that none of the variables are correlated. This test should be significant (< .05) prior to proceeding with the factor analysis (Meyers et al., 2006).

Exogenous Variables

Resonant Leadership

The resonant leadership scale included 10 items with a response option from 1 to 5. Six of these items had very small numbers of missing values but none exceeded two missing responses (0.8%). Of the 266 respondents, five were missing data. A response of ‘unable to determine’ was also treated as missing. Missing values were imputed using multiple imputations procedures which are described in detail in chapter three. Total scale scores were then calculated by summing values of all 10 items. There was wide variability in total scores ranging from a minimum of 10 (reflecting nurses who strongly disagreed that their manager displayed resonant leadership tendencies) to a maximum score of 50 (indicating strong agreement). The mean raw score was 34.96 (SD = 8.59) and when standardized out of 100 was 62.41 (SD = 21.48). Once imputed, the pooled mean and standardized mean were
35.45 and 63.63 respectively. All 10 items were moderately correlated with one another and the internal consistency reliability (Cronbach’s alpha) of the measure was 0.93. The test for KMO measure of sampling adequacy resulted in an acceptable value of .93 and the BTS was significant at the level < .001 \([X^2(45) = 1515.36]\) indicating the factor consisted of appropriate attributes. Therefore, factor analysis was conducted.

The exploratory factor analysis using Principal Components Analysis identified that the 10 items formed only one factor with an eigenvalue greater than one. This one factor accounted for 57.98% of variance. All items loaded above the cut off (.40) necessary for retention with the lowest factor loading of 0.62.

**Interactional Justice**

Of the 17 items in this scale, 8 were missing a few values. The item missing the highest number was missing 3 responses (1.1%). The majority of participants responded to all items in this scale. Only 7 nurses were missing some values. Response options were 1 to 5. Items were summed and then standardized to be out of 100. Raw total scores with missing values ranged from 26 to 85 with a mean of 64.51 (SD = 12.45) and standardized mean of 69.86 (SD = 18.30). Pooled and standardized mean after missing values were imputed by multiple imputation procedures were 64.21 and 69.43 respectively. The internal consistency reliability of the measure was 0.95. KMO indicated an acceptable value of .95 and the BTS was significant at the level of <.001 \([X^2(136) = 3036.15]\) indicating a good factor with appropriate attributes. Therefore, factor analysis was conducted.

The exploratory factor analysis using Principal Components Analysis identified that the 17 items formed one single factor with an eigenvalue greater than one. This single factor accounted for 54.91% of variance. All items loaded above the cut off (.40) necessary for retention with the lowest factor loading of 0.58.

**Span of Control**

Span of control, defined as the number of direct reports of a manager, was measured by asking participants to report how many people directly reported to their manager, including themselves. Eleven nurses did not respond to this question. Of those who did respond, the
number of direct reports ranged from 2 to 300 people with a mean of 70.7 (SD=44.42), which is similar to what has been previously reported as the national average (Doran et al., 2004) and by other researchers (Laschinger, Wong, Richie et al., 2008; McCutcheon et al., 2009). The pooled imputed mean was 71.14. Twenty one percent of respondents reported large spans of control of over 90 individuals per manager. However, these managers were not without supports. Nurses reported their managers had support of various personnel such as a charge nurse, a clinical educator and a clerical support person (see table 6).

Table 6: Span of Control: Description of Support Personnel

<table>
<thead>
<tr>
<th></th>
<th>CN with no assignment</th>
<th>Clinical educators</th>
<th>APN/CNS</th>
<th>Co-ordinators</th>
<th>Clerical</th>
<th>Co-manager</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>264</td>
<td>264</td>
<td>262</td>
<td>263</td>
<td>264</td>
<td>264</td>
</tr>
<tr>
<td>Mean</td>
<td>1.35</td>
<td>.87</td>
<td>.31</td>
<td>.39</td>
<td>1.59</td>
<td>.15</td>
</tr>
<tr>
<td>SD</td>
<td>1.58</td>
<td>.56</td>
<td>.85</td>
<td>.58</td>
<td>1.45</td>
<td>.42</td>
</tr>
<tr>
<td>Minimum</td>
<td>.00</td>
<td>.00</td>
<td>.00</td>
<td>.00</td>
<td>.00</td>
<td>.00</td>
</tr>
<tr>
<td>Maximum</td>
<td>10.00</td>
<td>3.00</td>
<td>9.00</td>
<td>3.00</td>
<td>8.00</td>
<td>3.00</td>
</tr>
</tbody>
</table>

N= number of respondents; SD= standard deviation; CN= charge nurse; APN = advanced practice nurse; CNS= clinical nurse specialist

To further understand this construct, respondents were also asked to report the number of units and sites for which the manager was accountable. On average, managers were responsible for almost two units (M = 1.87, SD = 1.08) and generally at one site (M=1.07, SD=.32). Nurses appeared less able to report on sites as reflected by the high percentage of missing values. Forty nurses (15%) did not indicate how many sites were assigned to their manager (see table 7). Since nurses appeared to understand the variable reflecting the number of direct reports better, this was used as the indicator for the concept Span of Control in hypothesis testing.
Endogenous Variables

**Clinical Nurse Leader-Nurse Relationships**

Clinical nurse leader–nurse relationships were measured using the Leader-Member Exchange 7 (LMX7) scale. Missing values analysis of this scale indicated that of the 7 items in the scale, four items were missing small numbers of responses ranging from 0.4 to 0.8%. Only three participants were missing data. Findings indicated the raw total scores for this scale ranged from 7 to 35 with a mean score of 22.45 (SD = 5.94). When standardized out of 100, the mean score was 55.17 (SD 21.20). Once missing values were imputed by multiple imputation methods, the pooled mean was 22.39 and pooled standardized mean was 54.96. To understand the quality of the relationship between clinical nurse leader and nurse, unstandardized scores were categorized using Northouse (2007) guidelines. Relationships are categorized as very low quality when the total scale score is 7 to 14, low if total score is 15 to 19, moderate if total score is 20 to 24, high if score totals 25 to 29, and very high when

---

**Table 7: Span of Control: Units and Sites Description**

<table>
<thead>
<tr>
<th>Number of Units</th>
<th>Units frequency</th>
<th>Units %</th>
<th>Sites frequency</th>
<th>Sites %</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>111</td>
<td>41.7</td>
<td>210</td>
<td>78.9</td>
</tr>
<tr>
<td>2</td>
<td>84</td>
<td>31.6</td>
<td>14</td>
<td>5.3</td>
</tr>
<tr>
<td>3</td>
<td>33</td>
<td>12.4</td>
<td>2</td>
<td>.8</td>
</tr>
<tr>
<td>4</td>
<td>13</td>
<td>4.9</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>1</td>
<td>.4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>3</td>
<td>1.1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>1</td>
<td>.4</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Missing</strong></td>
<td>20</td>
<td>7.5</td>
<td>40</td>
<td>15.0</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>266</td>
<td>266</td>
<td>100</td>
<td></td>
</tr>
</tbody>
</table>
total LMX7 scale score is 30 to 35 (figure 9). The relationship categories were then compared by clinical areas using cross tabulations. There were no significant differences in LMX7 scores across clinical areas (see table 8).

**Figure 9: Nurse Leader-Nurse Relationship – Categories**

![Bar chart showing relationship categories](image)

**Table 8: Nurse Leader- Nurse Relationship Categories by Work Areas**

<table>
<thead>
<tr>
<th>Work Area</th>
<th>Nurse Leader-Nurse Relationship Category</th>
<th>Very High % (N)</th>
<th>High % (N)</th>
<th>Moderate % (N)</th>
<th>Low % (N)</th>
<th>Very Low % (N)</th>
<th>X²</th>
<th>df</th>
<th>SIG</th>
</tr>
</thead>
<tbody>
<tr>
<td>Medicine (64)</td>
<td>Very High %</td>
<td>17.2 (11)</td>
<td>23.4 (15)</td>
<td>39.1 (25)</td>
<td>12.5 (8)</td>
<td>7.8 (5)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Surgery (67)</td>
<td>Very High %</td>
<td>13.4 (9)</td>
<td>23.9 (16)</td>
<td>32.8 (22)</td>
<td>20.9 (14)</td>
<td>9.0 (6)</td>
<td>6.82</td>
<td>6</td>
<td>.557</td>
</tr>
<tr>
<td>Critical Care (102)</td>
<td>Very High %</td>
<td>10.8 (11)</td>
<td>27.5 (28)</td>
<td>27.5 (28)</td>
<td>19.6 (20)</td>
<td>14.7 (15)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total (233)</td>
<td>Very High %</td>
<td>13.3 (31)</td>
<td>25.3 (59)</td>
<td>32.2 (75)</td>
<td>18.0 (42)</td>
<td>11.2 (26)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Cronbach alpha reliability of the LMX7 was .93. The test for KMO measure of sampling adequacy resulted in an acceptable value of .92 with a significant BTS [< .001, $X^2(21) = 1330.86$]. Factor analysis using Principal Component Analysis with Kaiser normalization was used to confirm the underlying dimensional structure. Only one single factor was found with an eigenvalue greater than one. This single factor explained 70.21% of variance.

**Nurse Work Environment**

The 42-item perceived nursing work environment (PNWE) instrument (response options of 1 to 4) was used to measure the quality of the nursing work environment. Review of the responses revealed that 24 items in the PNWE scale had missing values. The largest number of missing responses per item was 14 (5%) responses. Review of respondents indicated that 40 nurses failed to respond to one or more items in this scale. Mean and standard deviation for each subscale, the total scale and the adapted total scale (excluding the subscale associated with nursing management) are reported in table 9. The pooled mean and standardized means after missing values were imputed by multiple imputation method are also reported in table 9. Internal consistency (Cronbach’s alpha) was examined for each subscale as well as for both the total PNWE scale and adapted PNWE. Subscales exhibited moderate to high internal consistency with exception of the positive scheduling climate subscale ($\alpha = .60$). This is similar to what was reported by Choi et al (2004) and was attributed to the subscale having only 3 items. Overall, the total work environment scale exhibited high internal consistency of .96. When the PNWE was adapted to exclude the nursing management subscale, internal consistency remained high at .93. Given that this study is examining the influence of leadership on the work environment, an adapted PNWE that did not include the nursing management subscale was used in further analyses. A factor analysis was not conducted. The rationale is that this is a multidimensional construct and a latent variable within the theoretical model. Therefore as part of the measurement model, its structure is confirmed using confirmatory factor analysis within the structural equation analysis found later in this chapter.

Based on standardized mean scores, the nurses in the study rated the quality of RN/MD collaboration [$t(256) = 7.28, p < .001$] and Nursing Competence [$t(265) = 8.70, p < .001$]
significantly higher than the quality of any other aspect of the work environment. When the total adapted PNWE score was compared across nursing work areas using a one-way ANOVA, there were no statistically significant differences among groups.

Table 9: Nursing Work Environment Measure (PNWE) Description

<table>
<thead>
<tr>
<th>Subscale</th>
<th>#items</th>
<th>Mean (SD)</th>
<th>Pooled mean</th>
<th>Standardized mean</th>
<th>Range</th>
<th>Alpha (α)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Professional practice</td>
<td>13</td>
<td>32.81(7.76)</td>
<td>33.03</td>
<td>51.35</td>
<td>16 – 52</td>
<td>.92</td>
</tr>
<tr>
<td>Staff/resource adequacy</td>
<td>5</td>
<td>12.45(3.14)</td>
<td>12.44</td>
<td>49.57</td>
<td>5-20</td>
<td>.78</td>
</tr>
<tr>
<td>Nursing process</td>
<td>6</td>
<td>15.49(3.41)</td>
<td>15.46</td>
<td>52.55</td>
<td>6-24</td>
<td>.68</td>
</tr>
<tr>
<td>RN/MD collaboration</td>
<td>4</td>
<td>11.84(2.69)</td>
<td>11.81</td>
<td>65.10</td>
<td>4-16</td>
<td>.89</td>
</tr>
<tr>
<td>Nursing competence</td>
<td>6</td>
<td>17.66(2.90)</td>
<td>17.67</td>
<td>64.81</td>
<td>9-24</td>
<td>.65</td>
</tr>
<tr>
<td>Scheduling climate</td>
<td>3</td>
<td>6.85(2.34)</td>
<td>6.86</td>
<td>42.91</td>
<td>3-12</td>
<td>.60</td>
</tr>
<tr>
<td>Nursing management</td>
<td>5</td>
<td>13.15(3.45)</td>
<td>13.18</td>
<td>54.54</td>
<td>5-20</td>
<td>.85</td>
</tr>
<tr>
<td>PNWE total</td>
<td>42</td>
<td>110.15(20.0</td>
<td>110.44</td>
<td>54.32</td>
<td>57-160</td>
<td>.95</td>
</tr>
<tr>
<td>PNWE total (adapted)*</td>
<td>37</td>
<td>96.97(17.26)</td>
<td>97.26</td>
<td>54.29</td>
<td>52-140</td>
<td>.93</td>
</tr>
</tbody>
</table>

*Note: PNWE (adapted) refers to the PNWE scale without nursing management subscale

Safety Climate

Safety climate was measured by summing the responses of a 21 item, 5-point Safety Climate Survey scale. Almost all items were missing a few values. The largest percentage of missing values for any item was 1.1%. As well, 14 participants did not respond to at least one item of this scale. Scale totals ranged from 51 to 104 with a mean of 77.46 (SD = 11.27) and a standardized mean score of 67.21 (SD = 13.41). After multiple imputation methods were
used to replace missing values, the pooled mean and standardized mean were 77.88 and 67.72 respectively. Comparisons across work areas using a one-way ANOVA did not reveal any statistically significant differences. Cronbach alpha for the safety climate scale was .89. KMO indicated an acceptable value of .88 and the BTS was significant \([<.001, \chi^2(210) = 1,883.11]\) indicating a good factor with appropriate attributes. Therefore, factor analysis was conducted.

The Principal Components Analysis with varimax rotation identified that the 21 items comprised of five factors with an eigenvalue greater than 1.0 that accounted for 57.54% of the variance. However, some items did not load on any factor with a minimum loading of .40, and several items cross loaded on more than one factor by at least .40. When forced into one factor, the 21 items accounted for only 31.18% of the variance with very low communalities. Therefore, items that did not load onto this factor by .40 or had communalities less than .30 were removed from the scale. Items 42, 49, 51, 53, 54, 57, 60, 61 and 62 were removed (see appendix A). A repeat Principal Components Analysis revealed a single factor solution consisting of the 12 items with an eigenvalue greater than one. This one factor explained 42.9% of variance. The revised scale included indicators reflective of the construct definition of safety climate used in the hypothesized theoretical model ("Safety climate is the perception of the safety of policies, procedures and practices in use within an organization which are enacted through nurses’ behaviour and attitudes"). Cronbach’s alpha for this scale was indicative of high internal reliability \((\alpha = 0.88)\). Once standardized out of 100, the mean of this scale was slightly below the original standardized scale \((M= 64.75; SD = 16.25)\). The revised scale was used in subsequent analyses.

**Outcome Variables**

**Pressure Ulcers**

Hospital acquired pressure ulcers were measured by nurse self-report making it difficult to compare to reported Canadian acute care prevalence rates of 25.1% (Woodbury & Houghton, 2004). Nurse respondents were asked to respond to a question asking them to recall the number of hospital-acquired pressure ulcers they had encountered among patients over the previous 4 months. Responses varied between 0 to 50 pressure ulcers with a mean
of 3.12 (SD = 5.3). Nineteen nurses (7.1%) did not respond to this question. When multiple imputation procedures were used to replace missing values, the pooled mean number of pressure ulcers was 3.36. Only 73 participants (27.2%) reported that they had not encountered any pressure ulcers in the preceding four months.

To fully understand this variable, further analyses were conducted. An independent t-test was used to see if the results would differ between full-time (M = 3.27, SD = 4.82) and part-time nurses (M = 2.86, SD = 6.04). Findings indicate that the groups were not significantly different [t (245) = -.59; p = .556]. A one-way ANOVA was used to compare frequency of pressure ulcers across clinical work areas of medicine, surgery and critical care (medical-surgical and other were not included). Not surprising, the number of pressure ulcers varied by the work area of the nurse (see table 10). Dunnett’s T3 post-hoc procedure (Levene Statistic indicated that variances were not equal) indicated that critical care nurses reported more pressure ulcers than surgery nurses. However, the effect size of .03 was small (Cohen, 1988).

Table 10: One Way ANOVA Examining Pressure Ulcers by Work Area

<table>
<thead>
<tr>
<th>Work Area</th>
<th>N</th>
<th>Mean (SD) (95% CI)</th>
<th>F</th>
<th>Sig</th>
<th>Effect size $\eta^2$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Medicine</td>
<td>59</td>
<td>4.32 (7.92) (2.26 -6.39)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Surgery</td>
<td>58</td>
<td>1.81 (2.31) (1.20 – 2.42)</td>
<td>3.17</td>
<td>.044</td>
<td>.03</td>
</tr>
<tr>
<td>Critical Care</td>
<td>99</td>
<td>3.20 (4.83) (2.24 – 4.17)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>216</td>
<td>3.13 (5.46) (2.40 – 3.87)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Medication Errors**

A positive safety climate functions on the premise that individuals both identify and report errors. A climate of safety encourages reporting not as a mechanism to blame but rather to
identify opportunities for improvement. Therefore, participants were asked two questions about medication errors. First, they were asked to indicate the number of medication errors they had encountered in the last 4 months. Secondly, participants were also asked how many medication errors were reported by them in the same time frame. Thirteen and fifteen nurses respectively did not respond to these two questions. All nurses who did not respond to the question on the number of errors encountered were also missing a response to the question regarding the number reported. An additional two nurses provided a response to the number of medication errors encountered but did not respond to the question on number of medication errors reported. One of these respondents reported having encountered only one error and the other reported encountering 15 errors.

Overall, nurses in this sample reported encountering an average of 3.05 (SD = 4.42) medication errors (pooled imputed mean = 3.12) in the previous 4 months. There was wide variability among respondents (see table 11) ranging from 0 to 40 medication errors encountered. However, over the same time period respondents indicated that they only reported an average of 1.78 (SD = 2.56) medication errors (pooled imputed mean = 1.8) with a range of 0 to 20 reported errors. A dependent t-test was performed comparing the means of encountered medication errors with reported medication errors. Results indicated that the number of errors encountered was significantly higher than the number of errors reported over the four month time frame \[ t (250) = 6.32, p< .001, d = .40 \]. Using Cohen’s (1988) conventions for effect sizes for dependent samples, the effect size \( d \) of .40 corresponds to almost a medium effect in practice and indicated that the number of errors encountered was .40 standard deviations higher that those errors reported.

<table>
<thead>
<tr>
<th># of errors</th>
<th># nurses who encountered (% of respondents)</th>
<th># nurses who reported (% of respondents)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>70 (26.3)</td>
<td>101 (38.0)</td>
</tr>
<tr>
<td>1 – 3</td>
<td>113 (42.5)</td>
<td>108 (40.6)</td>
</tr>
<tr>
<td>4 – 6</td>
<td>43 (16.2)</td>
<td>32 (12.0)</td>
</tr>
<tr>
<td>7 or more</td>
<td>27 (10.1)</td>
<td>10 (3.8)</td>
</tr>
<tr>
<td>Missing</td>
<td>13 (4.9)</td>
<td>15 (5.6)</td>
</tr>
<tr>
<td>Total</td>
<td>266 (100)</td>
<td>266 (100)</td>
</tr>
</tbody>
</table>
Given the difference found between the numbers of medication errors that were encountered versus the number reported, another variable called “error gap” was computed to use in further analyses with safety climate and work environment. Gap in error reporting was computed as the difference between the number of medication errors encountered and the number reported. Ideally, the gap should be zero indicating the nurses reported all errors encountered. The higher the value of the error gap, the greater is the lack of reporting. Interestingly, some nurses reported more errors than they had personally encountered which may indicate second-hand reporting. Results indicated that there was a wide variation in the error gap ranging from -7 (indicating reports of more errors than the number encountered) to 23 with a mean gap of 1.24 (SD = 3.09).

**RN Emotional Exhaustion**

Nine items from the Maslach Burnout Inventory were used to calculate nurse emotional exhaustion on a 7-point Likert-like scale. Response options were 0 to 6. There were no missing values across the nine scale items. All 9 items were summed to create a score for emotional exhaustion for each participant. Raw total scores ranged from 0 to 54 with a mean of 22.24 (SD = 12.83). According to Maslach et al. (1996), a score of 22.24 is indicative of moderate burnout. Emotional exhaustion scores were also standardized to be out of 100. The mean standardized score was 41.19 with a SD of 23.76. The Cronbach’s reliability coefficient for this scale was .94. KMO indicated an acceptable value of .92 and the BTS was significant at the level greater than .001 \(X^2(36) = 2035.60\) indicating a good factor with appropriate attributes. Therefore, factor analysis was conducted. The exploratory factor analysis using principal components analysis identified that the nine items formed one single factor with an eigenvalue greater than 1.0 that accounting for 68.08% of the variance. All items loaded above the cut off (.40) necessary for retention with the lowest factor loading at 0.76.

To further understand the study sample with respect to this variable, unstandardized scores were transformed into a variable that reflected Maslach’s categories: high emotional exhaustion for scores greater than 27, moderate for a score of 17 to 26 and low for a score of 0 to 16. Findings indicated the majority of nurse respondents reported moderate or greater
levels of emotional exhaustion. A total of 100 (37.6%) nurses reported high emotional exhaustion, 60 (22.6%) nurses reported moderate levels and 106 (39.8%) nurses reported they experienced low levels of emotional exhaustion. When the nurses were compared across the three clinical work areas, findings indicated significant differences (see table 12).

Table 12: Emotional Exhaustion Categories by Work Area

<table>
<thead>
<tr>
<th>Work Area (N)</th>
<th>Emotional Exhaustion Category</th>
<th>% (N)</th>
<th>Moderate % (N)</th>
<th>Low % (N)</th>
<th>X²</th>
<th>DF</th>
<th>SIG</th>
</tr>
</thead>
<tbody>
<tr>
<td>Medicine (64)</td>
<td>High</td>
<td>40.6</td>
<td>28.1</td>
<td>31.3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Moderate</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Low</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Surgery (67)</td>
<td>High</td>
<td>50.7</td>
<td>16.4</td>
<td>32.8</td>
<td>13.76</td>
<td>4</td>
<td>.008</td>
</tr>
<tr>
<td></td>
<td>Moderate</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Low</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Critical Care (102)</td>
<td>High</td>
<td>26.5</td>
<td>22.5</td>
<td>51.0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Moderate</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Low</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total (233)</td>
<td>High</td>
<td>37.3</td>
<td>22.3</td>
<td>40.3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Moderate</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Low</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

A one-way ANOVA comparing total scale means across work areas also indicated that there were significant between-group differences \[F (2,230) = 4.25, p < .05\]. A post-hoc comparison using Tukey’s test was performed to determine which work areas differed on emotional exhaustion. Critical care nurses experienced significantly less emotional exhaustion than nurses who worked in medicine or surgery. The results of the post-hoc comparison are presented in Table 13.

Table 13: Tukey’s Comparisons of Work Area and Emotional Exhaustion

<table>
<thead>
<tr>
<th>Comparison</th>
<th>Mean Difference</th>
<th>Std error</th>
<th>Sig</th>
</tr>
</thead>
<tbody>
<tr>
<td>Medicine</td>
<td>Surgery</td>
<td>-0.11</td>
<td>4.00</td>
</tr>
<tr>
<td>Medicine</td>
<td>Critical care</td>
<td>8.87*</td>
<td>3.65</td>
</tr>
<tr>
<td>Surgery</td>
<td>Medicine</td>
<td>-0.11</td>
<td>4.00</td>
</tr>
<tr>
<td>Surgery</td>
<td>Critical Care</td>
<td>8.76*</td>
<td>3.60</td>
</tr>
<tr>
<td>Critical care</td>
<td>Medicine</td>
<td>-8.87*</td>
<td>3.65</td>
</tr>
<tr>
<td>Critical care</td>
<td>Surgery</td>
<td>-8.76*</td>
<td>3.60</td>
</tr>
</tbody>
</table>

*The mean difference is significant at .05 level*
**RN Sick time (sick hours)**

Participants were asked to indicate how many days they had booked off work for reason of illness in the preceding four months in either 8 or 12 hour shifts. In all, 264 nurses responded to this question. Their responses were converted into hours for ease of comparison and description. One hundred and four nurses (39.1%) indicated they did not have any sick hours in the previous four months and 45.1% (119) reported 8 to 24 hours. Sick time hours ranged from 0 to 240 hours with a mean of 17.68 hours (SD=31.03). After imputation using multiple imputation methods, the imputed pooled mean was 17.79 hours.

When the mean was prorated to an annual average, it equated to 53.04 hours or 7.1 (eight-hour) shifts per year. This was compared to the national nursing sick-time average using a one-sample t-test. Participants in this study were sick significantly fewer hours than the reported national average of 14.5 days or 108.8 hours per year (Statistics Canada, 2006) \[ t(263) = -9.20, p<.001 \text{ (2–tailed)}, d = -.57 \].

Comparison of reported sick time by work areas was investigated using one-way ANOVA. No statistically significant differences were found \[ F (2,228) = .41, p > .05 \] between primary work areas of medicine (M = 18.9 hours, SD = 22.79), surgery (M= 20.54, SD = 43.12) and critical care (M=16.04, SD= 29.30). However, when comparing reported sick time by full-time versus part-time nurses, there was a statistically significant difference \[ t (262), p<.05, d = - 2.84 \] between full-time (M= 21.94, SD = 35.23) and part-time nurses (M= 10.35, SD = 20.13). Full-time nurses on average reported more than twice the sick time of part-time nurses.

**RN Intent to leave**

Intent to leave was explored by asking 3 questions about respondent intentions with respect to their unit, hospital and professions. Each question was worded as intent to remain question, for example: “I intend to remain on my present unit for 2 or more years”. The question was then reverse coded so that high score would indicate a stronger intent to leave. The results were then standardized out of 100 so that the range would be 0 indicating it was
very unlikely they intended to leave to a score of 100 indicating it was very likely they would leave. A score of 50 implied a neutral intent.

Findings indicated that on average respondents were unlikely to leave their unit (M = 34.19, SD = 33.04) hospital (M = 26.14, SD = 30.32) or profession (M = 17.23, SD = 26.37). When missing values were imputed using multiple imputation procedures, the means slightly increased for unit (34.26), hospital (26.24) and profession (17.27). The means of all three intent to leave variables were compared using paired t-tests. Results indicated they were significantly different (see table 14). Intent to leave the unit was significantly more likely than intent to leave the hospital or profession. Given clinical nurse leader-nurse relationships would most likely impact one’s commitment to their unit, the intent to leave their unit variable was selected for further analysis.

Table 14: Paired Samples T – Test: Intent to Leave the Unit, Hospital & Profession

<table>
<thead>
<tr>
<th>Paired Differences</th>
<th>Mean</th>
<th>SD</th>
<th>SE</th>
<th>95% CI of the Difference</th>
<th>Lower</th>
<th>Upper</th>
<th>T</th>
<th>Df</th>
<th>Sig. (2-tailed)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 intent to leave unit - intent to leave hospital</td>
<td>8.08</td>
<td>20.35</td>
<td>1.25</td>
<td>5.61 - 10.55</td>
<td>6.44</td>
<td>262</td>
<td>&lt;.001</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 intent to leave unit - intent to leave profession</td>
<td>16.95</td>
<td>27.13</td>
<td>1.67</td>
<td>13.67 - 20.24</td>
<td>10.15</td>
<td>263</td>
<td>&lt;.001</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3 intent to leave hospital - intent to leave profession</td>
<td>8.94</td>
<td>19.32</td>
<td>1.19</td>
<td>6.59 - 11.28</td>
<td>7.50</td>
<td>262</td>
<td>&lt;.001</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Summary of Descriptive Findings

In summary, the scales used to measure study constructs had sound psychometric properties. Only the safety climate survey required some revision to adequately reflect the construct. Overall, the study sample did not report having high quality relationships with their immediate nurse leaders (standardized M = 55.17). When responding to questions of interactional justice and manager behaviour, the sample perceived that their immediate nurse leaders demonstrated moderate levels of interactional justice (standardized M = 69.86) and resonant leadership style (standardized M = 62.41). Their leaders were reported as having
very large spans of control and on average were accountable for almost 2 units with more than 70 direct reports. The reported work environment (standardized M = 54.29) and safety climate (standardized M = 64.75) indicated opportunities for improvement.

Safety outcomes examined in this study had wide variability. Nurses in this sample encountered an average of 3 pressure ulcers and 3 medication errors in the preceding four months. Medical, surgical and critical care nurses were very similar in most aspects. They differed only in the number of pressure ulcers reported (medicine was higher) and levels of emotional exhaustion experienced (critical care was lower). On average, nurses reported experiencing moderate emotional exhaustion. Despite this, reported sick time was significantly less than their Canadian counterparts and they reported being unlikely to leave their unit (standardized M = 34.19).

**Findings Related to Hypothesis Testing**

In the following section, the hypothesis and each sub-hypotheses reflecting each pathway in the hypothesized model are restated and then results reported. Relevant findings regarding support for the hypothesis or lack thereof are described.

**Hypothesis Restated**

1. The hypothesized model will demonstrate good fit with observed data drawn from a random sample of Ontario acute care nurses.

   Specifically, the following pathways in the model are hypothesized:

   1.1. Clinical nurse leader interactional justice will be positively related to quality of clinical nurse leader-nurse relationships.

   1.2. Clinical nurse leader span of control will be negatively related to the quality of clinical nurse leader-nurse relationships.

   1.3. Clinical nurse leader resonant leadership behavior will be positively related to perceived quality of clinical nurse leader-nurse relationships.
1.4. Quality of clinical nurse leader- nurse relationships will be positively related to safety climates.

1.5. Quality of clinical nurse leader- nurse relationships will be positively related to quality of nursing work environments.

1.6. Safety climate will be negatively related to number of pressure ulcers.

1.7. Safety climate will be negatively related to number of medication errors.

1.8. Safety climate will be negatively related to level of RN emotional exhaustion.

1.9. Safety climate will be negatively related to RN absenteeism (number of sick hours).

1.10. Safety climate will be negatively related to level of RN intent to leave.

1.11. Quality of nursing work environment will be positively related to safety climate.

1.12. Quality of nursing work environment will be negatively related to number of pressure ulcers.

1.13. Quality of nursing work environment will be negatively related to number of medication errors.

1.14. Quality of nursing work environment will be negatively related to level of RN emotional exhaustion.

1.15. Quality of nursing work environment will be negatively related to RN sick time (number of sick hours).

1.16. Quality of nursing work environment will be negatively related to level of RN intent to leave.

To test this hypothesis, which is depicted in the proposed theoretical model (figure 8), structural equation modeling (SEM) using AMOS 17® was conducted. As recommended by Kline (2005), a two-step approach to SEM was used. First, the measurement model for
latent variables underlying the structural model was tested. Second, assessment of the proposed structural model was completed. The first step allows the researcher to ensure that observed indicators adequately represent latent variables within the model. Prior to testing the model, data were reviewed for normality. Evidence of kurtosis is detrimental in SEM analyses (Byrne, 2010).

In this study, work environment is a latent variable consisting of six factors. The measurement model for work environment (as measured by subscales of the PNWE) was tested using confirmatory factor analysis (CFA) prior to analysis of the full structural model. The chi-square ($X^2$) statistic was used to test adequacy of the measurement model and the overall structural equation model. It is used to explore the fit between the hypothesized model and observed real world data. Since the findings of a well-fitting model where the chi-square statistic is non-significant has proven unrealistic in most SEM research (Byrne, 2010), additional fit indices were also reviewed to determine adequacy of fit including standardized root mean square residual (SRMR), comparative fit index (CFI), root mean square error of approximation (RMSEA) with its 90% confidence interval, and the closeness of fit (PCLOSE).

**Confirmatory Factor Analysis of Measurement Model**

Prior to testing the measurement model, all model variables were assessed for normality and outliers. Individual kurtosis values of all items in the PNWE scale were less than 7.0 indicating reasonable normality (Byrne, 2010). Additionally the squared Mahalanobis distance, a multivariate outlier statistic, showed minimal evidence of serious multivariate outliers. The initial measurement model (figure 10) for work environment indicated an ill fitting model ($X^2 = 1274.7$ (614); SRMR = .071; CFI = .847; RMSEA = .064 (.059 - .069); PCLOSE = .000). Therefore, some modification was deemed necessary to identify a model that better represented sample data and still represented the theoretical construct.

A review of the modification indices for factor loadings (regression weights) of PNWE items revealed that several items cross-loaded on more than one factor. Items that cross-loaded were removed individually in order of the highest impact to lowest impact modification indices and then followed by a review of model fit. Prior to deleting any item,
the content of the item was reviewed to ensure that the meaning was still captured by remaining factor indicators. For example, item 66 “physicians and nurses having good working relationships” was removed due to cross loading on another factor, but its essence was captured by the other items in this factor i.e. item 82 “a lot of team work between nurses and physicians”. Twelve items (items 65, 66, 67, 69, 71, 74, 81, 88, 90, 92, 99 and 105) were removed from the model (figure 11). The fit of the resulting work environment measurement model was significantly improved ($X^2 = 438 (260)$, $p<.001$; $\text{SRMR} = 0.50$; $\text{CFI} = .930$; $\text{RMSEA} = .051 (0.042 - 0.059)$; $\text{PCLOSE} = .425$). This revised measurement model was used for further analysis in the full structural equation model.
Figure 10: Work Environment Measurement Model for Confirmatory Factor Analysis
Figure 11: Final Work Environment (PNWE) Measurement Model
Structural Model

Prior to testing the structural equation model, all variables were assessed for normality and outliers. The following variables demonstrated varying degrees of severe positive kurtosis and skew: medication errors, pressure ulcers, sick hours, span of control and years with manager. One recommended method to remedy univariate non-normality of positive skew is by mathematically transforming variables into square roots or logarithmic function prior to further analyses (Kline, 2005). In this study, span was converted to square root and all the others were changed to log values because a square root transformation did not completely rid the variables of kurtosis. With these changes, kurtosis and skew were within normal limits and squared Mahalanobis distances showed minimal evidence of serious multivariate outliers. Table 25 lists the results of the mathematical remedies.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Skew</th>
<th>Kurtosis</th>
<th>Remedy</th>
<th>New skew</th>
<th>New kurtosis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Medication errors</td>
<td>3.46</td>
<td>18.91</td>
<td>Log</td>
<td>.36</td>
<td>-.53</td>
</tr>
<tr>
<td>Pressure ulcers</td>
<td>3.97</td>
<td>24.30</td>
<td>Log</td>
<td>.53</td>
<td>-.34</td>
</tr>
<tr>
<td>Sick hours</td>
<td>4.76</td>
<td>29.08</td>
<td>Log</td>
<td>-.09</td>
<td>-1.44</td>
</tr>
<tr>
<td>Years with manager</td>
<td>2.57</td>
<td>9.06</td>
<td>Log</td>
<td>.58</td>
<td>-1.12</td>
</tr>
<tr>
<td>Span of control</td>
<td>2.05</td>
<td>5.49</td>
<td>Sq root</td>
<td>1.01</td>
<td>1.78</td>
</tr>
</tbody>
</table>

Each endogenous variable in the proposed structural model was also examined for multicollinearity. Multicollinearity may occur when correlations among variables are greater than .85 or when the squared multiple correlation between each variable and all the rest is greater than .90. Table 26 lists the correlation coefficients among model variables. Not all variables were correlated and those that were correlated did not exceed .85 indicating multicollinearity was not a concern. Additionally, squared multiple correlation for endogenous variables ranged from .01 (sick hours) to .68 (leader-member relationship [LMX]) and indicated no evidence of multicollinearity.
**Table 16: Correlations among Major Study Variables**

<table>
<thead>
<tr>
<th>Variable</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Interactional justice</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Span of control</td>
<td>.03</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Resonant leadership</td>
<td></td>
<td>.80&quot;</td>
<td>-.05</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Leader-nurse relationship</td>
<td></td>
<td></td>
<td>.75&quot;</td>
<td>-.04</td>
<td>.79&quot;</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Safety climate</td>
<td></td>
<td></td>
<td></td>
<td>.54&quot;</td>
<td>-.013</td>
<td>.57&quot;</td>
<td>.53&quot;</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Work environment</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>.39&quot;</td>
<td>.03</td>
<td>.42&quot;</td>
<td>.42&quot;</td>
<td>.68&quot;</td>
<td></td>
</tr>
<tr>
<td>7. Pressure Ulcers</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>.04</td>
<td>.04</td>
<td>.01</td>
<td>.02</td>
<td>-.04</td>
</tr>
<tr>
<td>8. medication errors</td>
<td>-.03</td>
<td>-.13*</td>
<td>-.12</td>
<td>-.06</td>
<td>-.22&quot;</td>
<td>-.16*</td>
<td>.10</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9. emotional exhaustion</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>-.23&quot;</td>
<td>-.09</td>
<td>-.29&quot;</td>
<td>-.22&quot;</td>
<td>-.43&quot;</td>
</tr>
<tr>
<td>10. sick hours</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>-.10</td>
<td>-.01</td>
<td>-.07</td>
<td>-.10</td>
</tr>
<tr>
<td>11. Intent to leave</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>-.10</td>
<td>-.03</td>
<td>.02</td>
</tr>
</tbody>
</table>

*correlation is significant at the .05 level (2-tailed); **correlation is significant at the .01 level (2-tailed)

Once variables were examined and transformed as described above, the initial structural model delineating the hypothesized direct and indirect relationships was developed (figure 12). Error terms were assigned to each endogenous variable. Error terms represent measurement errors and estimate the adequacy of indicator variables. Error terms represent all unmeasured causes not included in the model (Kline, 2005; Byrne, 2010). All latent variables (including error terms) must have their scales determined. This can be accomplished by initially assigning an arbitrary value (typically 1 in AMOS 17®) to each error term. With the measurement scale set, the model can be identified and coefficients of the error terms can be determined (Byrne, 2010).
Figure 12: Structural Model of Theoretical Model

The fit of the hypothesized structural model with the observed sample data was then tested. Other than chi-squared, the fit indices supported a reasonable fitting model \([X^2 = 221.3 (131), \ p<.001; \ SRMR = .052; \ CFI = .940; \ RMSEA = .051 (.039 - .062); \ PCLOSE = .431]\). Examination of the modification indices and parameter change statistics for the regression weights indicated that the addition of two paths would provide a better model fit. Modification indices must be considered along with parameter change statistics and should be theoretically sound prior to making changes to the model (Byrne, 2010). Kline (2005) recommends that model testing be guided by theoretical rather than empirical considerations. Therefore, the recommended two additional pathways were reviewed from a theoretical perspective to ensure they made substantive sense prior to proceeding. First, modification indices (M.I.) advised that adding a pathway from medication errors to emotional exhaustion would lead to significant improvement in overall model fit. The
parameter change statistic (Par Change) for this pathway was 40 fold larger than any other variable (MI = 5.24; Par Change = 4.30). Second, based on a high parameter statistic (MI = 5.68; Par Change = -1.92), a pathway from span of control to intent to leave was also recommended.

Figure 13: Initial Structural Model Results

The recommended addition of a pathway from medication errors to emotional exhaustion made theoretical sense. As the burden of more medication errors increases, distress and frustration could ensue. Frequent frustration would, in turn, lead to emotional exhaustion as noted in item 115 of the emotional exhaustion scale: “I feel frustrated by my job”. Therefore this pathway was added to test a second version of the model. The resulting fit indices of
model 2 demonstrated an improved fit [$X^2 = 215.6$ (13), $p<.001$; SRMR = .051; CFI = .943; RMSEA = .050 (.038 - .061); PCLOSE = .494].

The addition of the second pathway of span of control to intent to leave was initially thought to be related to decreased manager contact which could result in nurse intent to leave the unit. However, this pathway had a negative regression coefficient. Initially, this did not make theoretical sense. Guided by social exchange theory, the theory underpinning this model, a recipient of benefit would feel obligated to reciprocate (Gakovic & Tetrick, 2003). Span of control (number of direct reports) was significantly correlated with a corresponding increase of additional support personnel ($r = .32; p<.01$). As the number of direct reports increased so did the number of additional supports such as charge nurses, clinical educators and advanced practice nurses. These supports are also of direct benefit to clinical nurses, who in turn would be more likely to remain in the current working environment and have less intent to leave. As a result, this pathway was added in the third version of the model. Fit indices of model 3 indicated a further improvement in fit [$X^2 = 209.8$ (129), $p<.001$; SRMR = .049; CFI = .946; RMSEA = .049 (.036 - .060); PCLOSE = .562].

A review of the modification indices indicated potential correlations between error terms and between observed variables and error terms. Correlation among error terms suggest that indicators have common unmeasured causes that are not included in the model (Kline, 2000). These changes, however, could not be justified from a theoretical perspective and no further pathway modifications were made to the model.

Several hypothesized pathways were found to be non-significant. In the interest of parsimony, Byrnes (2010) suggests that a final model should be estimated with non-significant pathways deleted from the model. Once trimmed of all non-significant pathways, the fit of the final model (figure 14) was even further improved [$X^2 = 217.6$ (138), $p<.001$; SRMR = .054; CFI = .947; RMSEA = .047 (.034 - .058); PCLOSE = .670].
The standardized total, direct and indirect effects are presented in table 27. Indirect effects involve a mediator variable and are calculated by multiplying the path coefficients of the independent variable to mediator and mediator variable to dependent variable. The total effect is the sum of the indirect and direct effects (Meyers et al., 2006).
### Table 17: Final Model Variables’ Standardized Effects (Total, Direct* and Indirect*)

<table>
<thead>
<tr>
<th>Variable</th>
<th>Resonant leadership</th>
<th>Span of control</th>
<th>Interactional justice</th>
<th>Leader-Nurse relationship</th>
<th>Work environment</th>
<th>Safety climate</th>
<th>Medication errors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Leader-RN relationships</td>
<td>.52 (.52/--)</td>
<td>.33 (.33/--)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Work environment</td>
<td>.24 (-/ .24)</td>
<td>.15 (-/ .15)</td>
<td>.46 (.46/--)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Safety climate</td>
<td>.28 (-/ .28)</td>
<td>.18 (-/ .18)</td>
<td>.53 (.23/.30)</td>
<td>.66 (.66/--)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Medication errors</td>
<td>-.06 (-/ .06)</td>
<td>-.04 (-/ .04)</td>
<td>-.12 (-/ .12)</td>
<td>-.15 (-/ .15)</td>
<td>-.22 (-/ .22--)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Emotional exhaustion</td>
<td>-.12 (-/ .12)</td>
<td>-.08 (-/ .08)</td>
<td>-.24 (-/ .24)</td>
<td>-.51 (-/ .49/.-02)</td>
<td>-.03 (-/ .03)</td>
<td>.14 (.14/-)</td>
<td></td>
</tr>
<tr>
<td>Intent to leave Unit</td>
<td>-.10 (-/ .10)</td>
<td>-.14 (-/ .14)</td>
<td>-.06 (-/ .06)</td>
<td>-.18 (-/ .18)</td>
<td>-.23 (-/ .23)</td>
<td>-.34 (-/ .34--)</td>
<td></td>
</tr>
<tr>
<td>Schedules</td>
<td>.12 (-/ .12)</td>
<td>.08 (-/ .08)</td>
<td>.23 (-/ .23)</td>
<td>.51 (-/ .51/-)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nursing competence</td>
<td>.14 (-/ .14)</td>
<td>.09 (-/ .09)</td>
<td>.27 (-/ .27)</td>
<td>.59 (-/ .59/-)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Professional practice</td>
<td>.19 (-/ .19)</td>
<td>.12 (-/ .12)</td>
<td>.37 (-/ .37)</td>
<td>.81 (-/ .81/-)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Staffing adequacy</td>
<td>.14 (-/ .14)</td>
<td>.09 (-/ .09)</td>
<td>.27 (-/ .27)</td>
<td>.59 (-/ .59/-)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nursing process</td>
<td>.14 (-/ .14)</td>
<td>.09 (-/ .09)</td>
<td>.26 (-/ .26)</td>
<td>.58 (-/ .58/-)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RN-MD collaboration</td>
<td>.18 (-/ .18)</td>
<td>.11 (-/ .11)</td>
<td>.34 (-/ .34)</td>
<td>.74 (-/ .74/-)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Direct and Indirect effects are identified in parentheses (direct/indirect) below the total effects value*

Based on Cohen’s effect size interpretation, standardized path coefficients with absolute values of less than .30 is considered small, .30 to .50 medium and greater than .50 is large
Of the major variables in the final model, four had large effect sizes: the relationship between resonant leadership style and the quality of nurse leader-nurse relationship (effect size = .52); relationship between the quality of nurse leader-nurse relationship and safety climate (effect size = .53); relationship between work environment and safety climate (effect size = .66); and the relationship between work environment and emotional exhaustion (effect size = -.51). Three relationships had medium effect sizes: between interactional justice relationship and nurse leader-nurse relationship (effect size = .33); between nurse leader-nurse relationship and work environment (effect size = .46); and the relationship between safety climate and intent to remain (effect size = -.34).

The final model (figure 14) provided partial support for the hypothesis. Specifically, while interactional justice and resonant leadership style positively influenced leader-nurse relationship quality, manager’s span of control did not. The leader-nurse relationship also positively influenced both safety climate and work environment. However, safety climate and work environment did not affect all of the hypothesized outcomes. Safety climate negatively influenced the number of medication errors and intention to leave but indirectly influenced emotional exhaustion. Work environment had a negative large effect on emotional exhaustion and safety climate but was only indirectly related to medication errors and intent to remain. Neither safety climate or work environment influenced nurses’ absenteeism or pressure ulcers. Safety climate did not have a direct effect on emotional exhaustion. Work environment did not have a direct effect on medication errors or intent to leave but did have an indirect effect through safety climate.

Equivalent Models – It is suggested that after a final SEM model has been determined, mathematically equivalent models should be considered (Kline, 2005). Since mathematically equivalent model models have identical goodness of fit indices to the final model, the choice among them must be based on theoretical not statistical grounds (Kline, 2005). In the discussion chapter (chapter 5), theoretical reasons for preferring the final model are discussed.
Summary

This chapter presented the findings of several statistical analyses conducted to address the study hypothesis. Firstly, the demographics of the sample and setting were described including comparison of groups of nurses working in three clinical areas (medicine, surgery and critical care). In general the sample is similar to but slightly younger and reporting less sick time than the population of medical, surgical and critical care nurses working in Ontario acute care hospitals.

Descriptive findings of the exogenous and endogenous variables in the proposed model were provided followed by hypothesis testing. Results of statistical analysis, SEM conducted to answer the hypothesis was presented. Findings for the sub-hypotheses (each hypothesized pathway in the model) were mixed and are summarized in table 18. A two-step SEM analysis with AMOS 17® was used to test the hypothesized model using $X^2$, SRMR, CFI, RMSEA and PCLOSE indices to assess goodness of fit. Path coefficients were assessed for significance probabilities less than .05. Results indicated the hypothesized model had a reasonable fit with the observed data. A priori theoretical and empirical considerations supported revisions to the model which provided a better fit to the data and provided a more comprehensive understanding of the nursing work environment and safety climate. The final result yielded acceptably high goodness of fit indices and indicated the revised model had an improved fit with the observed data. Since several non-significant pathways were removed from the revised model in the interest of parsimony, the hypothesis was only partially supported.

In summary, higher levels of resonant leadership style and interactional justice was related to higher quality of nurse leader-nurse relationships which in turn predicted an improved quality of the nurses’ work environment and safety climate. A positive safety climate was related to decreases in the number medication errors and nurses’ intent to leave their unit. Higher quality work environment negatively affected nurse emotional exhaustion. Additionally, higher numbers of medication errors positively affected nurse emotional exhaustion. As a manager’s number of direct reports increased so did their support personnel which may have influenced less nurse intent to leave their unit.
### Table 18: Parameter Estimate of Final Model and Hypothesis Summary

**Hypothesis:** The hypothesized model will demonstrate good fit with observed data drawn from a random sample of Ontario acute care nurses.

<table>
<thead>
<tr>
<th>Sub-hypothesis</th>
<th>Estimate</th>
<th>Standard Error</th>
<th>Critical Ratio Value</th>
<th>Standard Regression Weights</th>
<th>Sub-hypothesis Supported by SEM?</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.1. Clinical nurse leader interactional justice will be positively related to quality of clinical nurse leader-nurse relationships.</td>
<td>.16</td>
<td>.03</td>
<td>5.64</td>
<td>.33</td>
<td>Yes</td>
</tr>
<tr>
<td>1.2. Clinical nurse leader span of control will be negatively related to quality of clinical nurse leader-nurse relationships.</td>
<td>-.11</td>
<td>.09</td>
<td>-1.22</td>
<td>-.04</td>
<td>No</td>
</tr>
<tr>
<td>1.3. Clinical nurse leader resonant leadership behaviour will be positively related to perceived quality of clinical leader-nurse relationships.</td>
<td>.38</td>
<td>.02</td>
<td>8.84</td>
<td>.52</td>
<td>Yes</td>
</tr>
<tr>
<td>1.4. Quality of clinical nurse leader-nurse relationships will be positively related to safety climate.</td>
<td>.30</td>
<td>.06</td>
<td>4.83</td>
<td>.23</td>
<td>Yes</td>
</tr>
<tr>
<td>1.5. Quality of clinical nurse leader-nurse relationships will be positively related to quality of nursing work environments.</td>
<td>.10</td>
<td>.02</td>
<td>6.91</td>
<td>.45</td>
<td>Yes</td>
</tr>
<tr>
<td>1.6. Safety climate will be negatively related to # of pressure ulcers.</td>
<td>-.00</td>
<td>.01</td>
<td>-10</td>
<td>-.01</td>
<td>No</td>
</tr>
<tr>
<td>1.7. Safety climate will be negatively related to # of medication errors</td>
<td>-.01</td>
<td>.00</td>
<td>-3.65</td>
<td>-.22</td>
<td>Yes</td>
</tr>
<tr>
<td>1.8. Safety climate will be negatively related to RN emotional exhaustion</td>
<td>-.18</td>
<td>.16</td>
<td>-1.13</td>
<td>-.11</td>
<td>No</td>
</tr>
<tr>
<td>1.9. Safety climate will be negatively related to RN sick hours.</td>
<td>-.00</td>
<td>.01</td>
<td>-.29</td>
<td>-.03</td>
<td>No</td>
</tr>
<tr>
<td>1.10 Safety climate will be negatively related to RN intent to leave.</td>
<td>-1.44</td>
<td>.24</td>
<td>-5.94</td>
<td>-.34</td>
<td>Yes</td>
</tr>
<tr>
<td>1.11. Quality of nursing work environments will be positively related to safety climates.</td>
<td>3.86</td>
<td>.37</td>
<td>10.32</td>
<td>.66</td>
<td>Yes</td>
</tr>
<tr>
<td>1.12. Quality of nursing work environment will be negatively related to # of pressure ulcers.</td>
<td>-.01</td>
<td>.03</td>
<td>-.29</td>
<td>-.03</td>
<td>No</td>
</tr>
<tr>
<td>1.13. Quality of nursing work environment will be negatively related to # of medication errors.</td>
<td>-.01</td>
<td>.03</td>
<td>-.47</td>
<td>-.06</td>
<td>No</td>
</tr>
<tr>
<td>1.14. Quality of nursing work environment will be negatively related to RN emotional exhaustion.</td>
<td>-4.68</td>
<td>.62</td>
<td>-7.53</td>
<td>-.49</td>
<td>Yes</td>
</tr>
<tr>
<td>1.15. Quality of nursing work environment will be negatively related to RN sick hours.</td>
<td>-.05</td>
<td>.06</td>
<td>-.83</td>
<td>-.09</td>
<td>No</td>
</tr>
<tr>
<td>1.16. Quality of nursing work environment will be negatively related to RN intent to leave.</td>
<td>-.231</td>
<td>2.67</td>
<td>-.09</td>
<td>-.01</td>
<td>No</td>
</tr>
</tbody>
</table>
CHAPTER V: DISCUSSION, IMPLICATIONS and CONCLUSIONS

The purpose of this research was to test and refine a theoretical model that explains the impact of perceived interactional justice, span of control, and resonant leadership on the quality of clinical nurse leader-nurse relationships and, ultimately, on patient and nurse safety outcomes in acute care hospitals. The hypothesis was partially supported. In the final model higher perceived levels of interactional justice (fairness) and higher levels of resonant leadership behaviours resulted in higher quality clinical nurse leader-nurse relationships and ultimately to positive safety climates and higher quality work environments.

Overall, there are four key study findings. Firstly, these findings demonstrate the importance of the nurse leader-nurse relationships in fostering high quality and safe nursing work environments. The environment and safety climate, in turn, predicted improved safety outcomes such as lower medication errors, intentions to leave and emotional exhaustion. Secondly, the findings support the hypothesis that interactional justice and resonant leadership style enhance the quality of nurse leader-nurse relationships. Thirdly, while the sub-hypothesis that manager span of control affects this leader-nurse relationship was not supported, the findings from the SEM analysis suggest that manager span of control may have a direct and inverse relationship with nurses’ intentions to leave. Higher spans of control were associated with lower nurse intentions to leave their unit in this study. Lastly, findings support the hypothesized relationship between work environment and safety climate with outcomes. Nursing work environments and safety climates had direct and indirect effects on nurse and patient outcomes. In this study, the quality of the work environment had a direct effect on nurses’ emotional exhaustion. However, the work environment influenced medication errors and intentions to leave only when mediated through safety climate. This highlights the importance of a positive safety climate within nursing work environments. This finding suggests if the nursing work environment has a positive safety climate, there will be less medication errors and nurses will have less intention to leave their units. Interestingly, it was also found that medication errors mediate the influence of safety climate on nurse emotional exhaustion. Higher medication errors predicted higher levels of nurse emotional exhaustion.
This is the first study to find an inverse relationship between managers’ span of control and nurses’ intentions to leave their units. As well, it is the first to report that safety climate mediates the influence of the work environment quality on medication errors and nurses’ intent to leave.

In this chapter, an interpretation of study results and their relationship with previously developed findings will be provided through a detailed discussion of each pathway in the hypothesized model. Study limitations, practical implications for nursing leaders and recommendations for future research are discussed. This chapter is then concluded with a description of the knowledge translation plan and final summary conclusions.

**Discussion and Interpretation of Results**

**The Effect of Interactional Justice on Leader-Nurse Relationships and Outcomes**

The hypothesized model proposed that nurse perceptions of interactional justice would predict higher quality nurse leader-nurse relationships. Interactional justice was defined as nurse perceptions of their nurse leader’s fairness in terms of the process used in determining outcomes and decisions, providing sufficient and timely information, and treating subordinates with respect and dignity. Based on social exchange theory, it was hypothesized that if nurses perceived they were routinely treated in a just and fair manner, they in turn would feel obligated to reciprocate. These ongoing positive interchanges would enhance the quality of the nurse leader-nurse relationship (Cropanzano, Prehar, & Chen, 2002).

Overall, nurses in this study reported a moderate level of interactional justice. Nurses who perceived high levels of interactional justice also experienced higher quality relationships with their clinical nurse leader. Relationships between nurses and their clinical nurse leaders were positively influenced by perceptions of fairness in their interactions. Mediated by the nurse leader-nurse relationships, interactional justice, indirectly influenced outcomes such as medication errors, intent to leave and emotional exhaustion.

This finding is consistent with other studies that reported a high level of perceived interactional justice was associated with supervisory trust (Ambrose & Schminke, 2003), higher quality leader-member exchange (Sanchez & Byrne, 2004; Roch & Shanock, 2006).
and mutual respect (Laschinger & Finegan, 2005). Furthermore, study findings also suggest that the quality of the leader-nurse relationship mediates the influence of interactional justice on outcomes. This is different than what was reported by Bahl (2006) who found interactional justice mediated the influence of the leader-member relationship on outcomes. But this finding is consistent with results reported by other researchers in which leader-member exchange mediated the effect of interactional justice on task/job performance and organization citizenship behaviours (Masterson et al., 2000; Rupp & Cropanzano, 2002).

Study results support the underlying theory of social exchange. Findings suggest that a history of perceived fair interactions with one’s clinical nurse leader forms the basis of trust and respect which are essential in a high quality relationship. This relationship, in turn, drives nurse attitudes and behaviours of reciprocation such as safety attitudes and behaviours that support a commitment to the nurse’s unit and a decrease in medication errors. Unit commitment is demonstrated by a decreased intention to leave. Similarly, other researchers found that interactional justice influenced turnover intentions (Aryee et al., 2002) and emotional exhaustion (Riolli & Savicki, 2006). There is no research linking leader interactional justice to medication errors. However, several researchers found that interactional justice predicted performance (Cohen-Charash & Spector, 2001; Colquitt et al., 2001) and VanYperen et al. (2000) reported the more injustices nurses perceived, the more likely they were to respond in a destructive manner.

The Effect of Manager Span of Control on Nurse Leader–Nurse Relationships

Span of control, defined as the number of direct reports for which the leader is accountable, was hypothesized to be related to a decrease in quality of nurse leader-nurse relationship. This hypothesis was based on the assumption that larger spans of control limit the time and energy the leader would have to spend on exchanges with followers. Less time would decrease frequency of leader-member exchanges thus impacting quality of the relationship between leader and employee.

Study findings did not support this component of the hypothesis. There was no relationship found between span of control and clinical nurse leader-nurse relationship quality. Previous research has found mixed results. The results of this study are consistent with the findings of
Cogliser and Schriesheim (2000) who also found no significant relationship. Yet, Green et al. (1996), Schyns et al. (2005), and McCutcheon et al. (2009) found support for a negative relationship between manager span and the quality of leader-follower relationship. On the other hand, Schriesheim and colleagues (2000) found mixed but significant results. They reported that managers with smaller spans of control had leader-member relationships which influenced employee performance and managers with larger spans of control had leader-member relationships which influenced commitment. Given the inconsistent results across studies, it is possible that the number of direct reports does not adequately represent the entire construct of span of control and may incorrectly estimate the impact of other competing responsibilities assigned to the leader such committee meetings, budget, scheduling etc. Span of control includes an element of diversity (Meier & Bohte, 2003). The diversity of the manager’s role may not be accurately reflected in span when defined only by the number of direct reports. Furthermore, this study used clinical nurse’s recall of their manager’s direct reports. This method may have been inaccurate although the reported span (70.7) was very similar to that reported by others (Doran et al., 2004; Laschinger et al., 2008; McCutcheon et al., 2009) supporting validity of these results.

An additional and unexpected finding in this study was that manager span of control had a direct but negative path coefficient to nurses’ intent to leave their units. Large spans of control predicted lower intentions to leave. Initially this result seemed to run contrary to the underpinning theory of social exchange. A close review of the descriptive data revealed that as span of control increased, so did the number of other nursing supports such as clerical support, clinical nurse educators, and advanced practice nurses. A possible explanation is these roles not only enable the manager to free up the time necessary to develop relationships with clinical nurses, but they also provide support to clinical nurses directly. Nurses may directly benefit from access to these resources. Based on social exchange theory, it could be argued that these benefits would then be reciprocated by nurses’ organizational commitment resulting in decreased likelihood to leave their unit. These results are not congruent with the findings of Doran et al. (2004) and McCutcheon et al. (2009) who reported a relationship between manager span and nurse turnover. They reported that larger manager spans were associated with higher nurse turn over, however span was not associated with nurse job satisfaction. Job satisfaction has been reported to be a
determinant of nurses’ intentions to remain employed (Tourangeau & Cranley, 2006). Furthermore, McCutcheon et al (2009) noted that units that had a larger number of staff categories reporting to the manager had higher patient satisfaction but did not have a significant effect on nurses’ job satisfaction. Similarly, Cathcart, Jeska, Karnas et al., (2004) found that as the manager’s number of direct reports increased, employee engagement scores consistently declined.

The present study is the first to report an inverse relationship between leader’s span of control and nurses’ intent to leave. This suggests that infrastructure which supports both clinical nurse leaders and the professional practice of clinical nurses may be important to nurse retention.

**The Effect of Resonant Leadership on Leader-Nurse Relationships and Outcomes**

Resonant leadership was defined as the style of leaders who demonstrate a high level of emotional intelligence, are in tune with the emotions of those around them, use empathy, and manage their own emotions effectively to build strong, trusting relationships and create a climate of hope and optimism that inspire commitment (Boyatzis & McKee, 2005; McKee & Massimilian, 2006). It was hypothesized that by demonstrating this approach, nurse leaders would promote emotional resilience in nurse followers. By using their emotional skills of empathy, relating, listening and responding to concerns, they would better understand what their subordinates are feeling and thus build trust and quality leader-follower relationships. Leaders enable follower outcomes through the quality of their exchanges with them. The quality of this relationship promotes follower ‘in-kind’ reciprocal behaviours that ultimately lead to a positive and safe working environment.

Study findings support this aspect of the hypothesis. Nurses who perceived that their leaders demonstrated high levels of resonant leadership also indicated they had higher quality relationships with their nurse leader. This relationship mediated the effect of resonant leadership on outcomes of medication errors, intent to leave and nurse emotional exhaustion.

Since resonant leadership is a new and developing concept; very few studies have examined the outcomes of resonant leadership or leaders with high levels of emotional intelligence
Studies that have examined this construct have reported findings consistent with the results of this study. Followers’ perceptions of leader behaviours that are reflective of resonant leadership have been reported to influence: performance (McColl-Kennedy & Anderson, 2002); the quality of leader-follower relationships (Gordon, 2007); and employee job satisfaction and extra-role behaviours (Wong & Law, 2002). Resonant leadership has also been reported to mitigate negative consequences of restructuring such as emotional exhaustion and unmet patient needs (Cummings et al., 2005). Furthermore, there is evidence that EI leadership behaviour has a strong effect on structural empowerment which in turn affects commitment (Young-Richie, Laschinger & Wong, 2009). Empowerment enables confidence necessary to speak out. This suggests that leaders who demonstrate EI behaviours empower their followers to speak out. This is essential for a healthy and safe work environment needed to promote organizational commitment, a key retention factor (Young-Richie et al., 2009). Smith, Pearson and Ross (2009) argued that key to the management of emotions is effective emotionally intelligent leaders who listen and learn and thereby play an important role in promoting patient and nurse safety.

The results of these earlier studies along with the current study suggests that resonant leadership impacts the quality of the work environment and emotional well being of nurses by enhancing the quality of the clinical nurse leader-nurse relationships. Resonant leaders nurture and enhance their relationships with subordinates by using their emotional skills to create a supportive empowering exchange. This obligates the subordinate to reciprocate by trusting the manager and using open dialogue, which further increases the quality of the relationship, enhances the work environment, and ultimately leads to safety behaviour and attitudes (cf. safety climate).

**The Pivotal Role of the Clinical Nurse Leader-Nurse Relationships**

Nurses in this study reported a wide range of perceived quality relationships with their immediate clinical leader. These relationships mediated the influence of leadership style (resonant leadership) and interactional justice on the work environment and safety climate. Furthermore, these relationships were significantly related to both perceived quality work environment and positive safety climate. Both safety climate and work environment, in turn,
mediated the influence of this relationship on outcomes such as medication errors, emotional exhaustion and intention to leave.

This is consistent with previous meta-analytic evidence, which concluded that a significant positive correlation exists between the quality of the leader-follower relationship and followers’ task performance (Gerstner & Day, 1997), as well as citizenship behaviours (Ilies, Nahrgang & Morgeson, 2007). Specifically, Lee (2005) found that leader-follower relationship quality accounted for variance in organizational commitment and Wang et al. (2005) found leader-follower relationships mediated the relationship between leadership style and task and organizational behaviours. This indicates that high quality relationships embodying support, respect and contribution create positive experiences for the follower, and in turn adds to their desire to comply with organizational expectations. Laschinger et al. (2007) tested a theoretical model linking nursing leader-follower exchange quality and empowerment with nurse job satisfaction. Their results support an integration of empowerment theory with LMX theory. They reported quality of leader-follower exchange had a positive direct effect on structural empowerment that subsequently had a similar effect on psychological empowerment which had a direct effect on job satisfaction. This suggests that when followers have high quality relationships with their immediate leader, they are most likely to feel empowered to contribute meaningfully to workplace decisions (Laschinger et al., 2007). Speaking out and actively participating in open communication and decision making are essential to foster a quality work environment (Heath, Johanson & Blake, 2004) and safety culture (Frankel et al., 2006). Speaking out about safety concerns comes with risk and the decision to assume this risk is enabled by trust that your leader will be supportive and respectful of what you have to say, which is reflective of a high quality leader-nurse relationship.

These results fit with the social exchange tenet of the LMX theory. Subordinates reciprocate in a manner that is consistent with the supervisor’s values. Additionally the study results emphasize the importance of clinical nurse leaders and the pivotal role their relationships with nurses play in fostering a positive and safe work environment.
The Influence of Clinical Nurse Leader-Nurse Relationships on Safety Climate

Study findings support the hypothesis that clinical nurse leader-nurse relationships significantly influence perceptions of a positive safety climate. In addition, findings also supported that safety climate mediated the effect of clinical nurse leader-nurse relationships on some safety outcomes such as medication errors. Safety climate reflects employees’ perceptions of the safety of policies, procedures and practices in use within an organization and acts as a frame of reference for their behaviour, actions and attitudes (Clarke, 2006; Mearns, Flin, Gordon & Fleming, 2001; Zohar, Livne, Tenne-Gazit, et al., 2007).

The result that leader-nurse relationship influences and predicts safety actions and behaviours is also consistent with findings of several non-nursing studies (Hofmann & Morgeson, 1999; Hofmann, Morgeson & Gerras, 2003; Michael, Guo, Weidenbeck & Ray, 2006). In these studies, leader-follower relationships were linked to safety communication and commitment, which in turn mediated the influence of leader relationships on outcomes. Similarly, Wallace et al. (2006) found that management-employee relationships were positively related to safety climate and negatively related to accidents. Additionally, positive nursing leadership behaviours (Houser, 2003) and higher nursing leadership ratings (Pollack & Koch, 2003) have been reported to be inversely associated with adverse patient safety outcomes. This suggests that employees with higher quality relationships and better communications with their leaders are more likely to feel comfortable to raise safety concerns (positive safety climate) and engage in safety-related citizenship behaviours (i.e. safe medication administration practices).

The finding that safety climate mediates the effect of leader-nurse relationships on safety outcomes is similar to results reported outside of healthcare. These researchers examined the effects of relational leadership behaviours (transformational leadership) on safety outcomes and also found they were mediated by safety climate (Barling et al., 2002; Kelloway et al., 2006; Zohar, 2002a). However, Clarke and Ward (2006) examined the effect of leader influence tactics (consultation and inspirational appeals) on employee safety participation with mixed results. Consultation was partially mediated, but inspirational appeal was fully mediated by safety climate.
In general, results from this study and others suggest that leadership behaviours which engage employees and demonstrate concern strengthen feelings of trust in the leader and enhance the safety climate through high quality leader-employee relationships. Nursing leadership can play a lead role in changing the work environment from a culture of blame to one where nurses feel safe to voice concerns and report errors. Nursing leadership is critical to advance the agenda of creating safety climates and quality work environments (Wong & Cummings, 2007).

**The Relationship between Leader-Nurse Relationships and Work Environment**

In this study, it was hypothesized and found that high quality clinical nurse leader-nurse relationships also affected the quality of the work environment. A quality work environment was defined as an environment with characteristics of adequate staffing, professional development opportunities, communication/nurse participation in decision making, collaborative relationships, autonomy and flexible scheduling. Previous research included an element of leadership as part of the work environment construct. In order to study the influence of leadership directly on the work environment, this study removed elements associated with leadership typically found in measures of the work environment. While no study could be found that looked at how leader relationships influenced perceptions of the work environment, magnet hospital literature supports the importance of visible, supportive leadership to the provision of a work environment conducive to professional practice (Lundmark, 2008). Furthermore nursing leadership, through facilitation of environmental factors such as structural empowerment, has been reported to account for 46% of the variance in positive nursing practice behaviours such as the ability to establish and maintain therapeutic relationships with patients, exhibit autonomy and control over practice, and enter into collaborative relationships with physicians (Manojlovich, 2005).

**The Influence of Work Environment on Safety Climate**

Given that a quality work environment, often typified as a magnet environment, supports professional practice, it was also hypothesized that work environment influences nurse perceptions of safety climate. This component of the hypothesis was supported by study findings: ratings of high quality work environments influenced perceptions of positive safety
climates. These findings are consistent with Lowe’s (2008) study of allied health workers where specific features of the work environment were found to be related to safety culture. In particular, teamwork/collaboration, learning, fair processes and supportive leadership contributed to a culture of safety. Others have found that the perception of patient safety is directly influenced by personal control over work conditions (Ramanujam, Abrahamson & Anderson, 2008). Similarly, Armstrong and Laschinger (2006) found that a combination of structural empowerment and magnet hospital characteristics was a significant predictor of nurses’ perceptions of safety climate.

In this present study, safety climate was also found to mediate the effect of the work environment on the safety outcomes of medication errors and nurses’ intentions to leave their unit. Safety climate and medication errors also partially mediated the influence of work environment on emotional exhaustion. This result is different from those found in a retail industry study by DeJoy, Schaffer, Wilson et al. (2004). They found that although environmental conditions predicted safety climate and perceptions of safety outcomes at work, the role of safety climate as mediator could not be supported. Together these findings support the argument that high quality work environments are the cornerstone of a positive safety climate (Lowe, 2008).

**Outcomes**

*Work Environment Outcomes*

The sub-hypotheses that high quality work environments would negatively influence the five following safety outcomes resulted in mixed results: pressure ulcers, medication errors, absenteeism, emotional exhaustion and intentions to leave the unit. In this study, work environment directly and indirectly influenced emotional exhaustion. Work environment influenced medication errors and intent to leave only when mediated through safety climate. There was no significant relationship between work environment and pressure ulcers or absenteeism found.

The findings of this study are inconsistent with that of other research. There has been substantial evidence that supports the relationship of work environment attributes with a
variety of safety outcomes. A literature review conducted by Lundstrom et al. (2002) found studies that supported the influence of work environment factors on worker performance and ultimately patient outcomes. Features of the work environment such as staffing adequacy (Laschinger & Leiter, 2006) and role overload (Barling et al., 2002) have been noted to influence safety outcomes. Aspects of quality nursing work environments have been inversely associated with medication errors (Wilkins & Shields, 2008), pressure ulcers (Blegan et al., 1998; Stone, Mooney-Kane, Larson et al., 2007), absenteeism (Elovaino et al., 2002; Lowe, Schellenberg, & Shannon, 2003) and intention to leave (Lowe et al., 2003; VanOyen Force, 2005; Tourangeau & Cranley, 2006). However, research findings about the impact of work environment on safety outcomes have been inconsistent. Manojlovich and DeCicco (2007) found that ICU nurses’ perceptions of their work environment did not predict self-rated medication errors, catheter-related sepsis or ventilator-associated pneumonia. On the other hand, consistent with this present study, several other researchers have reported that perceptions of poor work conditions influenced higher levels of burnout and emotional exhaustion (Stordeur, D’hoore, & Vandenberghe, 2001; Clarke & Aiken, 2003; Leiter & Laschinger, 2006; Riolli & Savicki, 2006; Stone, Du & Gershon, 2007).

Differences in findings may be related to inconsistent measurement tools and settings used across studies (Lundmark, 2008). Despite this, findings of the present study underscore the importance of creating a high quality work environment to stave off nurse emotional exhaustion and ensure a healthy work environment for nurses and patients to enhance safety climate outcomes. Improving nurses’ working conditions will most likely promote nurse and patient safety (Stone et al., 2008)

**Safety Climate Outcomes**

It was hypothesized that safety climate would directly and inversely influence pressure ulcers, medication errors, nurse emotional exhaustion, absenteeism and intentions to leave. Findings provided mixed support. A positive safety climate directly predicted less medication errors and intentions to leave the unit. Safety climate also influenced nurse emotional exhaustion indirectly through medication errors. There was no significant relationship found between safety climate and pressure ulcers or nurse absenteeism. This
may be related to the lack of nurse recall around the number of ulcers encountered in the previous 4 months. The question regarding absenteeism may have been too restrictive. Nurses were asked to recall the number of shifts they did not attend work due to illness. One could speculate that these nurses may not have included days taken for non-certified illness such as for fatigue, emotional exhaustion, or a ‘mental health day’. In addition to the potential impact of seasonal trends, this may influence why this sample reported significantly less sick days than the population of Canadian nurses.

The emerging body of literature has just begun to establish an empirical link between safety climate and patient outcomes (Vogus & Sutcliffe, 2007). Industry research supports the role of safety climate in reducing occupational injuries and associated time off work (Gershon, Karkashian, Grosch, et al., 2000; Barling et al., 2002; Clarke, Rockett, Sloane & Aitken, 2002; Hofmann & Mark, 2006). Evidence of relationships between safety climate and both employee safety participation and compliance has been demonstrated through meta-analysis (Clarke, 2006). Studies in health care that have investigated patient safety outcomes have predominantly studied medication errors (Hofmann & Mark, 2006; Naveh, Katz-Navon, & Stern, 2005; Vogus & Sutcliffe, 2007) or barriers to error reporting (Chiang & Pepper, 2006).

Although safety climate was hypothesized to directly influence emotional exhaustion, the present study found that this influence was indirect and mediated by medication errors. Although a weak association, higher numbers of medication errors was a significant predictor of higher emotional exhaustion. This additional pathway was unexpected. Based on this finding it could be argued that an increase in medication errors creates an increase in moral distress or stress related to fear of consequences and emotional burden which results in greater emotional exhaustion.

Only recently have researchers studied the relationship between medication errors and emotional exhaustion (Laschinger & Leiter, 2006; Fahrenkopf, Sectish, Barger et al., 2008; Halbesleben, Wakefield, Wakefield & Cooper, 2008; West, Tan, Habermann et al., 2009). Findings from these studies were mixed. Fahrenkopf found no relationship between burnout and an increased rate of medical errors. The present study result is consistent with findings
of Laschinger and Leiter (2006) who found a significant relationship between emotional exhaustion and self-reported adverse events in a large sample of Canadian nurses. However, they reported a pathway from emotional exhaustion to adverse events with emotional exhaustion mediating the influence of the work environment. West and colleagues (2006), using a prospective longitudinal design, looked at the magnitude and direction of the association between medical errors and distress in medical residents. They found that self-perceived medical errors were associated with a subsequent worsening in all domains of burnout including emotional exhaustion. More recently, Halbesleben et al. (2008) reported that nurse burnout was only negatively associated with reporting errors that did not lead to negative consequences. Cummings, Estabrooks, Midodzi et al. (2007) reported that increased emotional exhaustion led to higher rates of nurse and patient adverse events. Adverse events in their study included medication errors, falls, nosocomial infections and patient complaints. Whereas, West et al. (2009) found that emotional exhaustion of medical residents was independently associated with an increased risk of self-perceived major medical errors.

In general, while comparisons across studies are challenging because of the use of different measures for safety climate and adverse events, findings to date support the role of a positive safety climate in reducing adverse patient events such as medication errors. When considered with previous studies that demonstrated an association between emotional exhaustion and medical errors, medication errors represent an important contributor to nurse emotional exhaustion. However, this relationship needs further study. It may be that when care providers do not have the emotional and mental energy for careful monitoring and surveillance, adverse events result. Or as in the case of the present study, a safety climate which is not conducive to safe practices leads to increased medication errors which in turn cause provider distress and subsequent emotional exhaustion. Taken together, this suggests that perceived errors and distress may be related in a reciprocal cycle.

**Study Limitations**

This study has several limitations. Given the self-report nature of these data and that both independent and dependent variables were obtained from the same person (acute care RNs),
there was a risk of common method variance also referred to as mono-method bias. Common method variance (CMV) occurs when variance is attributable to the method of measurement rather than to the constructs being measured and thus introduces systematic error variance into the measure constructs (Podsakoff, MacKenzie, Lee & Podsakoff, 2003). Additionally, common method variance has been purported to influence relationships between measures and can inflate or deflate observed true relationships between measurements of different constructs (Doty & Glick, 1998; Podsakoff, MacKenzie, Lee & Podsakoff, 2003). If such influence exists, this systematic measurement error is problematic because it threatens internal study validity and provides an alternative explanation for the observed relationships independent of the hypotheses (Podsakoff et al., 2003). This may be a possible cause for the unexpected finding between manager span of control and nurses intentions to leave.

The concern for CMV is generally raised when self-report, cross-sectional studies are used (Spector, 2006). However, the extent to which CMV influences empirical results has been debated by several researchers. Cote and Buckley (1987) and Williams, Cote and Buckley (1989) argued CMV was a significant problem that accounts for up to 27% of variance reported by researchers. In contrast, a number of researchers contend that the CMV problem is overstated (Spector, 1987; Crampton & Wagner, 1994; Spector 1994). Spector (1987) reviewed 10 multitrait-multi-method (MTMM) studies and concluded there was little evidence that supported CMV as a biasing problem. Crampton and Wagner (1994), compared mono-method with multi-method correlations on the same variables using a large meta-analysis of over 40,000 correlations from 581 articles. Of the 143 variable pairs they could compare, 62.2% of the pairs showed no significant difference. Therefore, they concluded that while CMV can influence some findings, it does not have the universal comprehensive effect cited by critics of self-report method. More recently, Doty and Glick (1998) used structural equation modeling and meta-analysis to assess the level of CMV in 28 MTMM correlation matrices from 25 studies. They found that the level of CMV was fairly high (inflated by more than 26.4%), but the problem of method bias was not as great as initially feared. Accordingly, they concluded that “common method bias does affect the estimates of correlations among substantive constructs, but not so frequently as to invalidate all research findings” (p398). The results of these studies support that CMV alone is not
sufficient to bias all results. However, effort to avoid this bias is important to increase internal validity of study results. Spector (2006) claims the lack of consistent findings in such studies implies the concern of mono-method bias in cross-sectional self report surveys is based more on urban legend then fact. However, Spector acknowledged that biases are real and endemic across research designs. Addressing potential bias using a variety of approaches will help establish validity of mono-method studies (Spector, 2006). The approach used to minimize bias should be tailored to match the research setting (Podsakoff et al., 2003).

There are two primary ways to control for method biases: through the design of the study procedures by limiting sources of bias or through statistical controls (Podsakoff et al., 2003). Sources of bias include: common rater effects such as social desirability; item characteristic effects such as common scale formats, anchors and item priming effects; and measurement context effects. To minimize CMV, this study design incorporated a number of strategies. Anonymity in addition to highlighting in the instructions that there were no right or wrong answers were used to minimize common rater effects of social desirability or the tendency to respond as a result of social acceptability or demanded by leaders. Item characteristic effects of different scale formats and anchors were used to limit potential co-variation as a result of consistency in scale properties. Negatively worded items reduced potential effects of report pattern biases. Predictor and criterion questions were also separated in the context of the questionnaire to avoid item priming effects. Measurement effects were limited by using different measurement approaches.

Secondly, given the cross-sectional nature of the study, although causality is hypothesized it cannot be assured because the data were collected at one point in time. Findings must be viewed with caution suggesting the importance to repeat this study using a longitudinal design. A longitudinal study could be conducted and items measured at different intervals. However, the effect time and turnover of leaders and staff may influence results and may limit the ability to measure all the variables across time. Other limitations of this study include non-response bias, other influencing variables and small sample size.
Non-response bias is related to the voluntary nature of the respondents. Non-response bias has the potential to affect survey data by skewing the results of statistical inferences and estimates drawn from the collected data (Dillman, Eltinge, Groves, & Little, 2002). Nurses who responded to this study may have perceived leadership differently than those who did not respond. Unfortunately, there is no way to compare characteristics of nurses who responded to characteristics of non-responders. It is not known whether nurses in this study were inherently different from nurses who did not agree to participate or who were not randomly selected to participate in the study.

Additionally, not all influencing variables were included in the hypothesized model tested in this study. There may be other unknown and not measured variables that may influence the dependent outcomes, such as job satisfaction influence on nurses’ intentions to leave. As well, not all potential outcomes of a safety climate were included such as nosocomial infections. Further research is needed to consider the impact of these other variables.

Finally, sample size is another limitation. The sample size was relatively small from a single province and although randomized, it may not be representative of the entire population of acute care nurses in Canada. The low response rate of 48.4% can create potential selection bias that limits generalizability of findings. However, the sample was generally representative of the population of acute care nurses in Ontario, Canada. Patel, Doku and Tennakoon (2003) argue that a response rate above 70% is required for a study sample to be considered as representative of the total population.

Implications for Use of Study Results

Implications for Nursing Leadership

Findings from this study support the argument that hospital environments are complex adaptive systems, and as such the relationship of leadership and patient or nurse outcomes cannot be modeled by a simple set of bivariate relationships (Mark, Hughes & Bland Jones, 2004). Findings confirm that safe patients, safe nurses and safe systems are inter-related and interconnected (Goodman, 2004). Given hospitals are potentially high risk environments (Kho, Carbone, Lucas & Cook, 2005; Hutchinson, Cooper, Dean, McIntosh, Patterson,
Stride, Laurence & Smith, 2006), transforming nursing work environments will benefit patients and nurses alike.

This study sheds light on the importance of nursing leaders’ relationships with nursing staff in fostering a healthy work environment and positive safety climate that ultimately improves nurse and patient outcomes. Autocratic organizations that avoid open meaningful dialogue and frank discussion, and lack supportive infrastructure need to be transformed. To advocate for safe patient care, leadership practices and decisions need to be transparent and just. This, along with incorporating resonant leadership skills of empathy, relating, listening and responding to concerns creates an atmosphere of trust and respect that facilitates development of quality relationships between nurse leaders and their subordinates. To achieve a safe environment for nurses and patients, psychological safety is essential, and this means the environment must be conducive for nurses to voice concerns and ask for help knowing that the response will always be respectful. Unless respect is the basic tenet of the leader-nurse relationship, nurses will hesitate to voice a concern and avoidable harm may occur (Frankel, Leonard & Denham, 2006).

Following health care restructuring in the late 1990s, front-line managers have large spans of control and increased responsibilities that were hypothesized to impede leader’s ability to provide adequate support (Doran, McCutcheon, Evans et al., 2004) and hinder relationship building necessary for effective leadership (Tourangeau, Coghlan, Shamian & Evans, 2005). Contrary to that hypothesis, this study suggests that large spans of control may not hinder positive safety outcomes as expected. If large spans empower and support nurses in their practice, study findings suggest this may have a positive influence over nurse retention. Consideration needs to be given to increasing personnel which support nurses in their professional practice in order to overcome the negative effects of large manager spans of control. It is, therefore, essential that nursing leaders work collaboratively with nurses to understand their concerns and needs in order to create supportive professional practice environments that improve safety climate in hospitals.

Based on a systematic review, Cummings, Lee, MacGregor et al. (2008) suggest that leadership can be developed through educational activities. Social exchange theory suggests
that investment in relational leadership will be rewarded through reciprocal nurse behaviour that results in creating quality work places conducive of professional practice and safety. Through these trusting and respectful relationships, study findings suggest that nurse and patient outcomes can ultimately improve, mitigating nurse distress and enhancing nurse retention. Given the current and growing shortage of nurses, promoting nurse retention is critical for nurse leaders to address safety climate and quality of work environment using all evidenced-based practices at their disposal. Teaching nurse leaders to use resonant leadership style and just practices may lead beneficial to creating safe work environments.

Finally, by addressing environmental issues that enhance safety climate and reduce medication errors, the emotional burden of nurses may be lessened. This, in turn, may further improve patient safety outcomes and thus inhibit a potentially vicious cycle of adverse patient events leading to nurse distress leading to adverse patient events. Findings suggest the self-identified medication errors are not uncommon. Emotional exhaustion is associated with increases in medication errors. Formal programs are necessary to support nurses in dealing with distress associated with medication errors (West et al., 2006). Further research is warranted to determine what programs would best meet this need.

**Areas for Future Research**

Findings from this study support social exchange theory as a theoretical lens to look at leadership strategies to improve the safety of today’s nursing work environment. Overall, the revised model with some additional pathways had a good fit with the observed data. This initial study begins to highlight the pivotal influence of nursing leadership in promoting safe working environments. For further understanding of this role and mechanisms that will improve safety outcomes, recommendations for future research methods, designs and analyses are provided in this section.

The main focus of this current study was to test and refine a model that linked nursing leadership to nurse and patient safety outcomes. Although findings support causal connections, many researchers would argue that due to the cross-sectional nature of the study causality cannot be established. Testing the model using a longitudinal design to examine causal influence of leader-nurse relationship on work environment safety outcomes
may help to reduce this concern. Longitudinal analysis would allow the researcher to examine the dynamic nature of the work environment by measuring changes over time and the impact of these changes on nurse and patient outcomes. In particular, a longitudinal study, which examines the association between emotional exhaustion and medication errors, as well as other nurse sensitive outcomes over time would be beneficial in determining whether this relationship is reciprocal.

Since nurses are grouped within units, units within hospitals, and each unit is assigned a clinical leader, using multi-level approaches may better link nurse, leader, and environment with unit outcomes and provide a more comprehensive test of the model. Mick and Mark (2005) argued that “more attention must be given to the multilevel nature of patient care and the application of appropriate statistical techniques to identify the simultaneous influences of different organizational levels on patient care processes and outcomes” (page 321). In addition, this approach would allow for control of potential confounding variables such as support infrastructure, interdisciplinary team composition, skill mix and experience. Furthermore, comparing the outcomes of leaders with high resonant and interactional justice styles with those who do not possess these characteristics will further clarify the impact of interactional justice and resonant leadership styles on clinical nurse leader-nurse relationships.

Thirdly, the data in the present study were based on self-report and may not accurately reflect true outcome rates such as in case of pressure ulcers and nurse absenteeism. Retesting using objective data collected from sources other than nurse self-reports will lessen the impact of potential response bias. Expanding the variety of safety outcomes studied to include outcomes that have standardized and objective measures, such as nosocomial infections and hand hygiene compliance which have provincial standardized measurement strategies, may help with comparisons across nurse, unit and time.

Finally, subsequent follow-up research using an interventional quasi-experimental design where leaders are taught resonant leadership skills and interactional justice techniques and outcomes compared pre and post educational intervention would provide valid evidence of causality and more practical and concrete advice for nursing administration. Using multiple
post-testing after the intervention would determine whether any changes associated with education programs are sustainable.

In summary, future research is needed to: a) better establish causal relationships between leadership and outcomes; b) ensure and include accurate safety outcomes using objective measures; and c) incorporate the influence of the infrastructure of health care organizations. As such, a longitudinal design using objective data may identify any reciprocal relationships across time and strengthen the validity of the findings.

**Knowledge Translation**

This research focuses on leadership and safety in acute care hospitals and is of interest to a broad range of stakeholders. Because knowledge gained from this research should in the long term enhance the safety climate and quality of the nursing workplace in the acute care practice environments, results will be disseminated broadly using the Lavis, Roberston, Woodside, et al. (2003) framework for knowledge transfer.

The following elements are considered in the knowledge transfer plan: key messages, target audience, knowledge transfer processes, and knowledge transfer evaluation strategies. Messages that will be communicated will be based on study results. The results of this study will be shared at the individual, professional and system/policy levels. Methods or processes used to communicate study results will include: a summary report of study results for participants that will be available on the study website; national and international presentations at relevant scholarly conferences via poster and oral presentations; and a minimum of two publications in peer-reviewed journals within two years of study completion.

**Final Summary Conclusions**

This study has provided interesting new knowledge which has enriched the body of safety and leadership theories. This was accomplished by testing a theoretical model derived from the literature. The purpose of this research was to test and refine a theoretical model that explains the impact of perceived interactional justice, span of control, and resonant leadership on the quality of clinical nurse leader - nurse relationships and ultimately on
patient and nurse safety outcomes in acute care hospitals. This is the first study to examine how leader interactional justice, resonant leadership style and span of control influence safety climate and nursing work environment in acute care hospitals through the quality of clinical nurse leader-nurse relationships.

Consistent with the hypothesized model, findings indicated that higher levels of resonant leadership style and interactional justice resulted in improvement of the quality of nurse leader-nurse relationships which in turn improved the quality of the nurses’ work environment and safety climate. A positive safety climate predicted a decrease in the number of medication errors and nurses’ intentions to leave their unit job. A higher quality work environment led to a more positive safety climate and lower nurse emotional exhaustion. However, a relationship between work environment or safety climate and the number of pressure ulcers and sick time was not found. Additionally, findings supported the addition of two pathways to the originally proposed model. Two additional pathways were added because they were consistent with the underlying theory. First, a direct and positive path from higher numbers of medication errors to increased nurse emotional exhaustion and second, a direct and inverse pathway between higher manager span of control and lower nurse intentions to leave their unit were added to the model.

Although several study limitations were present, the study findings have practical implications for nursing leadership. Limitations in the study design along with study results have also generated recommendations for new research methods and areas for investigation. Further review of the associations between medication errors and emotional exhaustion, and between manager span of control, support infrastructure and nurse retention are warranted.

In conclusion, this study begins to provide new insights that are useful to nursing managers and hospitals administrators about the mechanisms by which leadership may transform the nursing work environment to improve nursing and patient safety outcomes.
REFERENCES


Gershon, R.R.M., Karkashian, C.D., Grosch, J.W., Murphy, L.R., Escamilla-Cejudo, A., Flanagan, P.A. et al. (2000). Hospital safety climate and its relationship with safe


Upper Saddle River, NJ: Prentice Hall


APPENDICES
Appendix A

The Survey
When you answer this survey please think of the unit or manager that you work with most frequently. If you do not provide direct patient care at an acute care hospital in the areas of medicine, surgery or critical care, OR have not worked with your current manager for at least 3 months please check here _______. This survey does not apply to you so please return your blank questionnaire in the addressed, stamped envelope so that we will not bother you with additional reminders. If you do work in these areas, we invite you to complete this important survey.

1. Primary clinical work area of nursing (check ✓ one)
   - _____ medical
   - _____ combined med-surg
   - _____ surgical
   - _____ other
   - _____ critical care

2. In general, what is the average age of the patients in your nursing unit?
   - _____ less than 50 years
   - _____ 50 to 65 years
   - _____ 66 to 79 years
   - _____ 80 years or more

3. In general, do the patients in your unit have single or multi-system problems?
   - _____ single system i.e. cardiac only
   - _____ multiple co-morbidities

4. In general, how mobile are the patients on your unit?
   - _____ independent
   - _____ need minimal assistance (1 nurse assist)
   - _____ need a lot of assistance (2 or more nurses)
   - _____ bed-ridden

The following questions contain items that ask you to describe your relationship with your direct supervisor/Nurse Manager of the clinical program or unit where you work the majority of your time. For each of the items, indicate the degree to which you think the item is true for you by circling one of the responses that appear below the item.

5. Do you know where you stand with your manager and do you know how satisfied your manager is with what you do?
   - Rarely
   - Occasionally
   - Sometimes
   - Fairly
   - Often

6. How well does your manager understand your job problem and needs?
   - Not a bit
   - A little
   - A fair amount
   - Quite a bit
   - A great deal
<table>
<thead>
<tr>
<th></th>
<th>Question</th>
<th>Options</th>
</tr>
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<tbody>
<tr>
<td>7.</td>
<td>How well does your manager recognize your potential?</td>
<td>Not at all  A little  Moderately  Mostly  Fully</td>
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<td></td>
<td></td>
<td>1  2  3  4  5</td>
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<td>8.</td>
<td>Regardless of how much formal authority he or she has built into his or her position, what are the chances that your manager would use his or her power to help you solve problems in your work?</td>
<td>None  Small  Moderate  High  Very High</td>
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<td></td>
<td></td>
<td>1  2  3  4  5</td>
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<tr>
<td>9.</td>
<td>Again, regardless of the amount of formal authority your manager has, what are the chances that he or she would “bail you out” at his or her expense?</td>
<td>None  Small  Moderate  High  Very High</td>
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<td></td>
<td></td>
<td>1  2  3  4  5</td>
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<tr>
<td>10.</td>
<td>I have enough confidence in my manager that I would defend and justify his or her decision if he or she were not present to do so.</td>
<td>Strongly Disagree  Neutral  Agree  Strongly Agree</td>
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<td></td>
<td></td>
<td>1  2  3  4  5</td>
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<tr>
<td>11.</td>
<td>How would you characterize your working relationship with your manager?</td>
<td>Extremely Ineffective  Worse than average  Average  Better than average  Extremely effective</td>
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<td></td>
<td></td>
<td>1  2  3  4  5</td>
</tr>
<tr>
<td>12.</td>
<td>My manager is visible and available to me.</td>
<td>Strongly Disagree  Neutral  Agree  Strongly Agree</td>
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<td></td>
<td></td>
<td>1  2  3  4  5</td>
</tr>
<tr>
<td>13.</td>
<td>Along with you, how many people, units and sites report to your direct supervisor/nurse manager? (Indicate approximate total number).</td>
<td>___ # people (nurses &amp; other disciplines)  ___ # units  ___ # sites (hospitals)</td>
</tr>
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</table>
14. How many other positions on your unit support your direct supervisor/nurse manager in his/her role in managing your unit and staff? (indicate the number of all that apply)

- Charge Nurse(s) without assignment
- Clinical Educator/Instructor
- APN/CNS
- Coordinator
- Scheduling clerks/admin secretary
- Other co-manager that share the unit

Please indicate your level of agreement about your direct supervisor/nurse manager on a range from strongly disagree (1) to strongly agree (5), for each of the following statements

<table>
<thead>
<tr>
<th>Statement</th>
<th>Strongly disagree</th>
<th>Disagree</th>
<th>Neutral</th>
<th>Agree</th>
<th>Strongly agree</th>
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<tr>
<td>15. My supervisor does not tell others private information about me</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
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<td>16. My supervisor is rude to me.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
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<td>17. My supervisor sometimes lies to me.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
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<td>18. My supervisor gives a fair description of my performance to others.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
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<td>19. My supervisor is truthful in his or her dealings with me.</td>
<td>1</td>
<td>2</td>
<td>3</td>
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<td>20. My supervisor misrepresents my performance to others.</td>
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<td>21. My supervisor treats me fairly.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
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<td>22. My supervisor keeps his or her promises.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
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<td>23. My supervisor has made wrongful or unfair accusations at work.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
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<td>24. I would not trust my supervisor with a secret.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
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<td>25. My supervisor does not “bad-mouth’ me.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
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<td>26. My supervisor's criticisms are fair.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
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<td>27. My supervisor can be trusted to keep a matter confidential.</td>
<td>1</td>
<td>2</td>
<td>3</td>
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<td>5</td>
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<td>28. My supervisor does not keep his or her word.</td>
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<td>29.</td>
<td>My supervisor gives me a timely answer when I ask him/her a question or for some information.</td>
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<td>30.</td>
<td>My supervisor requires me to do things that make me feel uncomfortable.</td>
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<td>31.</td>
<td>My supervisor asks me improper questions regarding my personal life.</td>
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<td></td>
<td>Please indicate your level of agreement with the following statements.</td>
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<td></td>
<td>The manager in my clinical program or unit …</td>
<td>Strongly disagree</td>
<td>Disagree</td>
<td>Sometimes disagree</td>
<td>Agree</td>
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<tr>
<td>32.</td>
<td>Looks for feedback even when it is difficult to hear.</td>
<td></td>
<td></td>
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<td>33.</td>
<td>Acts on values even if it is at a personal cost.</td>
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<tr>
<td>34.</td>
<td>Focuses on successes rather than failures.</td>
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<td>35.</td>
<td>Supports teamwork to achieve goals/outcomes.</td>
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<td>36.</td>
<td>Calmly handles stressful situations.</td>
<td></td>
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<td>37.</td>
<td>Actively listens, acknowledges, and then acts on requests and concerns.</td>
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<tr>
<td>38.</td>
<td>Actively mentors or coaches performance of others.</td>
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<td>39.</td>
<td>Effectively resolves conflicts that arise.</td>
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<td>40.</td>
<td>Engages me in working toward a shared vision.</td>
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<td>41.</td>
<td>Allows me freedom to make important decisions in my work.</td>
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<td></td>
<td>The following items are about the area/unit where you primarily work the majority of your time. Please indicate how much you agree from strongly disagree (1) to strongly agree (5), for each of the following statements. Indicate 6 if the item does not apply to you.</td>
<td></td>
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<td></td>
<td>The culture of my unit makes it easy to learn from the mistakes of others.</td>
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<td></td>
<td>Medical errors are handled appropriately in my unit.</td>
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<td></td>
<td>The senior leaders in my hospital listen to me and care about my concerns.</td>
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<tr>
<td></td>
<td>The nurse supervisor of my unit listens to me and cares about my concerns.</td>
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<td></td>
<td>Leadership is driving us to be a safety-centered institution.</td>
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</tr>
<tr>
<td>47. My suggestions about safety would be acted upon if I expressed them to management.</td>
<td>1 2 3 4 5 6</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>48. Management/leadership does not knowingly compromise safety concerns for productivity.</td>
<td>1 2 3 4 5 6</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>49. I am encouraged by my colleagues to report any patient safety concerns I may have.</td>
<td>1 2 3 4 5 6</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>50. I know the proper channels to direct questions regarding patient safety.</td>
<td>1 2 3 4 5 6</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>51. I receive appropriate feedback about my performance.</td>
<td>1 2 3 4 5 6</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>52. I would feel safe being treated here as a patient.</td>
<td>1 2 3 4 5 6</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>53. Briefing nurses before the start of a shift (i.e. to plan for possible contingencies) is an important part of patient safety.</td>
<td>1 2 3 4 5 6</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>54. Briefings are common here.</td>
<td>1 2 3 4 5 6</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>55. I am satisfied with availability of clinical nursing leadership.</td>
<td>1 2 3 4 5 6</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>56. I am satisfied with availability of clinical medical leadership.</td>
<td>1 2 3 4 5 6</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>57. I am satisfied with availability of clinical pharmacy leadership.</td>
<td>1 2 3 4 5 6</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>58. This institution is doing more for patient safety than it did one year ago.</td>
<td>1 2 3 4 5 6</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>59. I believe most adverse events occur as a result of multiple system failures, and not attributable to one individual’s actions.</td>
<td>1 2 3 4 5 6</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>60. The nurses in his unit take responsibility for patient safety.</td>
<td>1 2 3 4 5 6</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>61. Nurses frequently disregard rules or guidelines that are established for this unit.</td>
<td>1 2 3 4 5 6</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>62. Patient safety is constantly reinforced as the priority in this unit.</td>
<td>1 2 3 4 5 6</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>63. In your experience, how many medication errors have you encountered (yours and others) in the last 4 months? (estimate)</td>
<td>_____ # medication errors encountered _____ # medication errors formally reported</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>64. In your experience, how many hospital acquired pressure ulcers have you seen in the last 4 months? <em>Hint – consider tools such as the Braden scale.</em></td>
<td>_____ # pressure ulcers encountered (estimate)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Please indicate the extent to which you agree that the following items are present in your workplace from strongly disagree (1) to strongly agree (4).

<table>
<thead>
<tr>
<th></th>
<th></th>
<th>Strongly Disagree</th>
<th>Somewhat Disagree</th>
<th>Somewhat Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>65.</td>
<td>Adequate support services allow me to spend time with my patients.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>66.</td>
<td>Physicians and nurses having good working relationships.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>67.</td>
<td>A good orientation program for newly employed nurses.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>68.</td>
<td>A supervisory staff that is supportive of the nurses.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>69.</td>
<td>A satisfactory salary.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>70.</td>
<td>Active staff development or continuing education programs for nurses.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>71.</td>
<td>Career development/clinical ladder opportunity.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>72.</td>
<td>Opportunity for staff nurses to participate in policy decisions.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>73.</td>
<td>Support for new and innovative ideas about patient care.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>74.</td>
<td>Enough time and opportunity to discuss patient care problems with other nurses.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>75.</td>
<td>Enough registered nurses on staff to provide quality patient care.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>76.</td>
<td>A nurse manager or immediate supervisor who is a good manager and leader.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>77.</td>
<td>Flexible or modifiable work schedules.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>78.</td>
<td>Enough staff to get work done.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>79.</td>
<td>Praise and recognition for a job well done.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>80.</td>
<td>The opportunity for staff nurses to consult with clinical nurse specialists or expert nurse clinicians/educators.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>81.</td>
<td>A senior nursing administrator equal in power and authority to other top level hospital executives.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>82.</td>
<td>A lot of teamwork between nurses and physicians.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>83.</td>
<td>Physicians who give high quality medical care.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>84.</td>
<td>Opportunities for advancement.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>85.</td>
<td>Nursing staff are supported in pursuing further education in nursing.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>Working with nurses who are clinically competent.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>---</td>
<td>-------------------------------------------------</td>
<td>---</td>
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<td></td>
</tr>
<tr>
<td>86.</td>
<td>A manager or supervisor who backs up the nursing staff in decision making, even if the conflict is with a physician.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>87.</td>
<td>Administration that listens and responds to employee concerns.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>88.</td>
<td>An active quality assurance program.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>89.</td>
<td>Staff nurses are involved in the internal governance of the hospital.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>90.</td>
<td>Collaboration between nurses and physicians.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>91.</td>
<td>A preceptor program for newly hired RNs.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>92.</td>
<td>Staff nurses have the opportunity to serve on hospital and nursing committees.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>93.</td>
<td>Contributions that nurses make to patient care are publicly acknowledged.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>94.</td>
<td>Nurse managers or clinical supervisors consult with staff on daily problems and procedures.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>95.</td>
<td>Written, up-to-date nursing care plans for all patients.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>96.</td>
<td>Staff nurses do not have to float from their designated unit.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>97.</td>
<td>Staff nurses actively participate in developing their own work schedules.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>98.</td>
<td>Each patient care unit determines its own policies and procedures.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>99.</td>
<td>Working with experienced nurses who ‘know’ the hospital system.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>100.</td>
<td>Use of nursing diagnosis.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>101.</td>
<td>Nursing care plans/report verbally transmitted from nurse to nurse.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>102.</td>
<td>Use of problem-oriented medical record.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>103.</td>
<td>Team nursing as the nursing delivery system.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>104.</td>
<td>Standardized policies, procedures and ways of doing things.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>105.</td>
<td>Floating, so that staffing is equalized among units.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>106.</td>
<td>Staff nurses are able to schedule time off as requested.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>
### Indicate the number (from 1 to 4) that best indicates how frequently you work the following

<table>
<thead>
<tr>
<th></th>
<th></th>
<th>Never</th>
<th>A couple of times per month</th>
<th>At least weekly</th>
<th>Almost every shift</th>
</tr>
</thead>
<tbody>
<tr>
<td>108.</td>
<td>Paid overtime.</td>
<td></td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>109.</td>
<td>Unpaid overtime.</td>
<td></td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
</tbody>
</table>

### The following are questions of job-related feelings. Please read each statement carefully and decide if you ever feel this way about your job. If you have had this feeling, indicate how often you feel it by indicating the number (from 1 to 6) that best describes how frequently you feel that way.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th>Never</th>
<th>A few times a year or less</th>
<th>Once a month or less</th>
<th>A couple of times per month</th>
<th>At least weekly</th>
<th>Every day</th>
</tr>
</thead>
<tbody>
<tr>
<td>110.</td>
<td>I feel emotionally drained from my work.</td>
<td></td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>111.</td>
<td>I feel used up at the end of the workday.</td>
<td></td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>112.</td>
<td>I feel fatigued when I get up in the morning and have to face another day on the job.</td>
<td></td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>113.</td>
<td>Working with people all day is really a strain for me.</td>
<td></td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>114.</td>
<td>I feel burned out from my work.</td>
<td></td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>115.</td>
<td>I feel frustrated by my job.</td>
<td></td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>116.</td>
<td>I feel I work too hard on my job.</td>
<td></td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>117.</td>
<td>Working with people directly puts too much stress on me.</td>
<td></td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>118.</td>
<td>I feel like I’m at the end of my rope.</td>
<td></td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>119.</td>
<td>How many days have you reported in sick over the past 4 months? (indicate either 8 or 12 hour shifts)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
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<td></td>
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<td></td>
<td></td>
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</tr>
<tr>
<td>120.</td>
<td>Employment status (please check one)</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
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<td></td>
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<td></td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>
| 121. | Which schedule do you primarily work? | _____ varies as scheduled by employer  
_____ DDNN rotation  
_____ alternate D and N 12 rotation  
_____ 8 hour rotation of 2 shifts  
_____ 8 hour rotation of 3 shifts  
_____ Monday to Friday day shifts  
_____ combination of 8, 10 or 12 hour shifts |
| 122. | How many years (indicate total number) | _____ years  
_____ years |
| 123. | Education Completed (please check all that applies): | NURSING  
_____ Diploma  
_____ baccalaureate  
_____ baccalaureate  
_____ Masters/PhD  
_____ Masters/PhD  
_____ specialty  
_____ certificate  
NON |
| 124. | Sex (please check one) | _____ Male  
_____ Female |
| 125. | What year were you born? | 19____ |

Please indicate your level of agreement to the following statements about your intent to remain employed on a range from strongly disagree (1) to strongly agree (5)

| 126. I intend to remain on my present unit for 2 or more years. | Strongly disagree | Disagree | Neutral | Agree | Strongly agree |
| 127. I intend to remain in my present hospital for 2 or more years. | Strongly disagree | Disagree | Neutral | Agree | Strongly agree |
| 128. I intend to remain in the nursing profession for 2 or more years. | Strongly disagree | Disagree | Neutral | Agree | Strongly agree |
Appendix B

Letters of Information
Appendix B1: Initial Introductory Letter and Offer to Participate

On Letterhead

Influence of Fairness and Relational leadership on Nursing Safety Climate and Work Environment

Date

Dear Nursing Colleague

My name is Mae Squires, a Registered Nurse completing doctoral studies at the Lawrence S. Bloomberg Faculty of Nursing, University of Toronto under the supervision of Dr. Ann Tourangeau. We would like to invite you to participate in a doctoral research project about the influence of fairness and relational leadership on the nursing work environment and safety climate. Your name was randomly selected from the College of Nurses of Ontario’s database. If you are a registered nurse working in acute care hospital for at least 4 months, please consider participating in this important study by completing the enclosed survey.

This survey contains questions regarding your perspective of the relationship you have with your manager, his/her fairness in your interactions, your work-life and safety concerns such as perception of medication errors, pressure ulcers, and your health and stressors. These questions are critical to understanding the nursing perspective on issues of patient and nurse safety. The results of this study will assist the nursing profession to gain a better understanding of factors that influence the quality of nursing work environments and safety climate.

You can help by completing the enclosed survey which will take approximately 30 minutes of your time. Your participation is entirely voluntary. You may refuse to participate, refuse to answer any question or withdraw from the study at any time without negative consequences. Completion and return of your survey indicates your consent to participate. All responses will be kept confidential and your name will not be known to the researcher. You will only be identified by a study number. This study number is important to keep track of who has returned a completed or blank survey. The master code list will be kept in a filing cabinet separate from the questionnaires. Your name will never be identified in any report or presentation of the study and only grouped information will be reported. Individual responses will only be seen by Dr. Tourangeau and Mae Squires, who will enter the responses into a computer file that is password protected. Questionnaires will be locked in a filing cabinet at the Lawrence S. Bloomberg Faculty of Nursing and then will be shredded within one year of the study’s completion. If you wish to view the study results, you will be able to access them on Dr Tourangeau’s website under Squires Study Results at http://www.atourangeau.nursing.utoronto.ca.

There are no known risks to participate in this study. Your participation will provide opportunity to share information useful to creating healthy and safe environments for nurses and patients. If you have any questions about this study, do not hesitate to contact us directly using the email or phone numbers listed below. If you have questions about your rights as a research participant, please contact Jill Parsons, Health Sciences Ethics Review Officer, Ethics review Office, University of Toronto, at 416-946-5806 or by email: jc.parsons@utoronto.ca.
Please find enclosed a coupon for Tim Horton’s coffee, our way of saying thank you and is yours to keep whether or not you choose to participate in the study. If you choose to participate please use the pre-addressed, stamped envelope to return your completed survey. If you do not wish to participate in the survey, we encourage you to return your blank survey. This way, you will not be sent an additional follow-up survey. Thank you for considering our request.

Sincerely

Mae Squires, R.N.  
Doctoral Candidate  
mae.squires@utoronto.ca  
613-547-3268

Ann Tourangeau, RN, PhD  
Associate Professor  
anntourangeau@utoronto.ca  
416-978-6919
On Letterhead

Influence of Fairness and Relational leadership on Nursing Safety Climate and Work Environment

Date

Dear Nursing Colleague:

Approximately two weeks ago a survey was mailed to you seeking your perspectives on how fairness in the workplace and your relationship with your manager influences the safety and quality of your work life. Your name was randomly drawn from the College of Nurses of Ontario database.

If you have already completed and returned the survey to us, please accept our sincere gratitude. If not, please consider doing so today. Your help will be invaluable. It is only by asking for the viewpoints of clinical nurses such as you, that we can gain a greater understanding of factors that influence nurse and patient safety outcomes in acute care. This is very important in order to develop processes and leadership styles that will ensure a healthy and safe workplace. The survey was sent only to a small, but representative, sample of Ontario nurses working in acute care hospitals. It is therefore, important that your input be included in the study so that the results can accurately reflect the perspectives of all Ontario nurses.

If you did not receive a survey or it was misplaced, please contact us at the phone or email addresses provided below and we will ensure you receive another copy in the mail that day. If you have any questions about your rights as a research participant, please contact Jill Parsons, Health Sciences Ethics Review Officer, Ethics Review Office, University of Toronto, at telephone number 416-946-5806 or by email at jc.parsons@utoronto.ca.

Thank you for considering our request.

Sincerely,

Mae Squires, R.N.  
Doctoral Candidate  
mae.squires@utoronto.ca  
613-547-3268

Ann Tourangeau, RN, PhD  
Associate Professor  
anntourangeau@utoronto.ca  
416-978-6919
Appendix B3: Final Letter of Information

On Letterhead

Influence of Fairness and Relational leadership on Nursing Safety Climate and Work Environment

Date

Dear Nursing Colleague

About six weeks ago, we invited you to participate in a survey that asked questions regarding your perspective of the relationship you have with your manager, his/her fairness in your interactions, your work-life and safety concerns such as perception of medication errors, pressure ulcers, and your health and stressors. If you have already completed the survey please accept our sincere appreciation. We are writing again because of the importance that your survey has for helping us get accurate results. Based on the responses received to date, we believe the survey will be very useful to creating safe and healthy work places. It is only by hearing from nearly everyone surveyed that we can be sure it truly captures Ontario clinical nurses’ perspectives on their work environment and its effect on nurses’ and patients’ well-being. In the event your survey has been misplaced, a replacement is enclosed.

This survey contains questions regarding your perspective of the relationship you have with your manager, his/her fairness in your interactions, your work-life and safety concerns such as perception of medication errors, pressure ulcers, and your health and stressors. These questions are critical to understanding the nursing perspective on issues of patient and nurse safety. You can help by completing the enclosed survey which will take approximately 30 minutes of your time.

Your participation is entirely voluntary. You may refuse to participate, refuse to answer any question or withdraw from the study at any time without negative consequences. Completion and return of your survey indicates your consent to participate. All responses will be kept confidential and your name will be known to the researcher. You will only be identified by a study number. This study number is important to keep track of who has returned a survey. The master code list will be kept in a filing cabinet separate from the questionnaires. Your name will never be identified in any report or presentation and only grouped information will be reported. Individual responses will only be seen by Dr Tourangeau, thesis supervisor and Mae Squires, doctoral student, who will enter the responses into a computer file that is password protected. Questionnaires will be locked in a filing cabinet at the Lawrence S. Bloomberg Faculty of Nursing and then will be shredded within one year of the study’s completion. If you wish to view the study results, you will be able to access them on Dr Tourangeau’s website under Squires Study Results at http://www.atourangeau@nursing.utoronto.ca.

There are no known risks to participate in this study. By completing this survey, you will have contributed to an increased understanding of the nursing work environment in Ontario. This
information can then be used to create healthier work places that are safer for both nurses and patients. If you have any questions about this study, do not hesitate to contact us directly using the email or phone numbers listed below. If you have questions about your rights as a research participant, please contact Jill Parsons, Health Sciences Ethics Review Officer, Ethics review Office, University of Toronto, at 416-946-5806 or by email: jc.parsons@utoronto.ca.

We hope you will consider our request. If you choose to participate please use the pre-addressed, stamped envelope to return your completed survey. If you do not wish to participate in the survey, we encourage you to return your blank survey. Thank you for again for your time and consideration of our request.

Sincerely,

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