

EVALUATING SAFE PATIENT HANDLING SYSTEMS:
IS THERE A BETTER WAY?

by

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A thesis submitted to the Victoria University of Wellington
in fulfillment of the
requirements for the degree of
Master of Nursing

Victoria University of Wellington

2008

ABSTRACT

The literature presented here shows that injuries suffered by staff and patients due to patient handling are preventable but patient handling injuries to health care workers and patients remain a costly problem to health care organizations in many countries. “No Lifting” patient handling policies have been adopted yet health care organizations currently sit amongst the top three worst performing industries in terms of disabling injuries to their employees. A factor that contributes to this situation is the lack of tools for evaluating patient handling systems including workplace culture and climate.

This observational study analyzes the responses of 38 nurses from two similar units that use different patient handling systems to test the reliability and validity of the Safe Patient Handling Survey™ (SPH Survey™), a perception survey and improvement tool for employees and employers. The survey contains 55 questions divided into 6 clusters, staff and patient injury and violence questions, and picture questions depicting unsafe techniques.

The data were analyzed to see how the SPH Survey™ scores correlate with incidents, and its ability to detect differences between the two units. The results of the Pearson and Cronbach’s alpha tests show strong reliability, validity and consistency of the SPH Survey™. ANOVA comparison of means and Spearman’s rho tests shows that higher (better) scores on the SPH Survey™ clusters correlate with lower numbers of patient injuries, lower reports of verbal and physical violence episodes, and lower staff injuries. Differences were detected between the units with Unit 2 scoring higher than Unit 1 in all SPH Survey™ clusters and scoring lower in staff and patient injuries and violence incidents. Although the analysis was limited by the small sample size, the study has created a sound basis for further investigation.

Health care organizations, unions, government bodies, insurers, educational institutions, and researchers must continue to reduce patient handling risk for both health care workers and for patients. The SPH Survey™ is shown to be an easy way to reliably

evaluate patient handling systems and workplace culture, target improvement initiatives, and continually monitor the level of patient handling risk in the workplace. Low-risk patient handling gives health care providers the means to focus on delivering high quality patient care, without endangering their own health and well-being.

KEY WORDS

Occupational health

System and climate/culture evaluation

Patient handling

Quantitative approach

ACKNOWLEDGEMENTS

This thesis would not exist without the assistance and support of several people. My deepest thanks to:

- Professors Jo Walton and Jan Duke for their guidance as my supervisors
- Nokuthaba Sibanda for patiently steering me through the statistical analysis
- Tony Roithmayr and Dianne Dyck for their friendship and generosity
- My family who has always supported my crusade whether by listening to my ideas, demonstrating safe patient handling, or marketing
- My daughter Caitlin for the beautiful artwork
- My husband Jon who is always there for me

I would also like to acknowledge the managers and staff of the two hospitals that made the study possible, and my gratitude to the nurses on both the units who participated. I hope this creates a better workplace for them and their patients.

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CHAPTER 1: INTRODUCTION

1.1 Introduction

Injuries suffered by staff and patients due to patient handling are entirely preventable yet patient handling injuries to health care workers and patients remain a costly problem to health care organizations in many countries (Accident Compensation Corporation, 2003; de Castro, 2004, Sources of Injury or cause; National Back Pain Association in collaboration with the Royal College of Nursing, 1999; Victorian WorkCover Authority, 2006; Yassi, Cohen et al., 2004; Yassi, Gilbert, & Cvitkovich, 2004). Health care consistently ranks in the top three or four worst performing industries when compared to all other industries, and up to 70% of the reported injuries result from patient handling (Alberta Human Resources and Employment, 2005; Langford, 1997; Victorian WorkCover Authority, 2006; Yassi, Gilbert et al., 2004). In New Zealand, the injury costs are estimated by the Accident Compensation Corporation to be over NZ\$30 million per year (Accident Compensation Corporation, 2003).

“No Lifting” patient handling policies have been adopted by the Royal College of Nursing in the United Kingdom (National Back Pain Association in collaboration with the Royal College of Nursing, 1999, Chapter 2), the Australian Nursing Federation (Victoria Branch) (Australian Nursing Federation [Victorian Branch], 2006) and Department of Labour guidelines in New Zealand (Accident Compensation Corporation, 2003).

The Australian Nurses Federation (Victorian Branch) states that No Lifting involves the elimination of manual lifting of patients; moving and transferring of patients with minimal force and exertion while providing the highest level of protection to nurses, patients and others; using mechanical handling aids to reduce risk; and encouraging patient independence and assistance in their own transfers. A patient needs and risk assessment forms the foundation of a No Lifting policy so that the lowest risk strategy can be used. To support No Lifting, the workplace must have appropriate equipment, techniques, adequate and knowledgeable staff, appropriate physical environment and

organizational support (Australian Nursing Federation (Victorian Branch), 2006; Collins, Wolf, Bell, & Evanoff, 2004). Culture change is a critical part of a No Lifting strategy to change the assumption that injury is an inevitable consequence for nurses (Victorian Government Department of Human Services Policy and Strategic Project Division, 2004).

Even with this knowledge, high risk patient handling continues and health care organizations consistently sit amongst the top three worst performing industries in terms of disabling injuries to their employees. A factor that contributes to this situation is the lack of tools for evaluating patient handling systems. Health care organizations require a strong evidence base to change common practices, especially where patient care is impacted. Organizations have relied on injury rates and audit scores to evaluate patient handling system elements, but these indicators are designed to measure outcome rather than system components themselves. In addition, audits and injury rates do not evaluate and monitor workplace culture (Victorian Government Department of Human Services Policy and Strategic Project Division, 2004).

Tony Roithmayr, a work performance specialist, and I developed the Safe Patient Handling Survey™ to provide an evaluation tool for patient handling systems including workplace culture. Leading indicators in the Safe Patient Handling Survey™ quantify workplace culture and climate factors and specific elements that are critical to successfully implementing low-risk patient handling systems. These indicators are based on employees' perceptions of their work and workplace, effectively creating a warning system to identify high risk and allow corrective action to be taken before injuries happen. The indicators provide the evaluative evidence that health care organizations need to make patient handling risk reduction a priority (Börner & Roithmayr, 2007).

The core business of health care organizations is to deliver quality and cost-effective health care services to patients. This requires staff with knowledge, ability, equipment, and system support to deliver these services. The health and safety of both patients and

staff is fundamental in determining if and how patient care activities are delivered. Low risk patient handling is consistent with quality care for patients, creating a safe workplace for staff, and legal requirements for employers to minimize workplace hazards for their employees (National Back Pain Association in collaboration with the Royal College of Nursing, 1999; New Zealand Department of Labour, 2002; Victorian WorkCover Authority, 2006).

Management leaders who recognize that staff and patient health and safety are at the core of their business and enforce and support a minimal risk approach for their employees enjoy excellent health and safety outcomes – improved staff retention, financial savings, and improved patient care outcomes (Collins, Nelson, & Sublet, 2006). Management leadership, commitment and communication set the expectations for a workplace culture that enables and supports health and safety. Where that commitment and communication is not consistently demonstrated, the default message, whether intended or not, is that health and safety is not important compared to other stated corporate priorities (Dyck & Roithmayr, 2004).

Safe patient handling is currently receiving attention worldwide as health care organizations face huge challenges: an aging health care workforce, high turnover of staff, demands to improve patient safety, high rates of health care worker musculoskeletal injury, staff shortages, bed shortages, and budgets that are struggling to keep up with demand (Börner & Roithmayr, 2007). The World Health Organization maintains that there is a global shortfall of more than four million health care workers, and has urged member states to examine health infrastructure to understand why workers leave and to find strategies to retain them ("Fresh threat to public health," 2006).

The American Nurses Association states that the occupational health and safety of caregivers is one of the important issues that affect the retention of health care workers with stress and overwork, disabling back injuries, needlestick injury, infectious disease,

and assault amongst the most common concerns reported by nurses (American Nurses Association, 2001).

The study presented in this thesis builds on the work done using Roithmayr's Performance Maximizer™ model which was the foundation for the Great Safety Performance™ (GSP) model used in the electrical industry to reduce injury (Dyck & Roithmayr, 2004). The Safe Patient Handling Survey™ evolved from the GSP™, and the results from early testing of the SPH Survey™ in New Zealand showed promise that the tool could reliably evaluate patient handling system elements (Börner & Roithmayr, 2007).

This study seeks to confirm the validity, reliability and sensitivity of the Safe Patient Handling Survey™ to provide evidence that it could be used to reduce staff and patient injury related to patient handling. This study has implications for nursing from two perspectives:

1. To improve occupational health nursing practice by contributing to the body of knowledge and methods for evaluating occupational health systems, specifically patient handling. Occupational health nurses will gain a tool to perform their assessment and evaluation roles.
2. To improve systems for nurses so that they are supported to deliver quality patient care in a workplace environment that is healthy, safe and energizing.

The research questions are:

1. How do scores on the Safe Patient Handling Survey™ correlate with incidents? Incidents are staff injuries, patient injuries, and verbal and physical violence directed to staff by patients. Although the reliability of injury rates is questionable, it is important to see if SPH Survey™ scores correlate negatively with incidents (the higher (better) the score, the lower the incident rate and vice versa). This would support the possibility of

diagnosing a work environment that is at risk of suffering an incident, *before* an incident happens.

2. Is the Safe Patient Handling Survey™ able to detect differences in the patient handling systems of two workplaces? If the Safe Patient Handling Survey™ is able to detect and quantify the differences between the two units, it is likely that it would also be able to detect the differences before and after an intervention on the same unit.

To conduct the study, the Safe Patient Handling Survey™ was used to collect the perceptions from nursing staff on two similar units from two different hospitals for a three month period. The units used two different patient handling systems – one that was a complete patient handling system, and the other with a partially operating system. This was done purposely to allow for the investigation of comparisons. The SPH Survey™ asked staff to rate how frequently they performed specific safe patient handling actions, how strongly they agreed or disagreed with statements about Knowing how to do safe patient handling, being Able to do it, Equipped to do it, Wanting to do it, and how their workplace culture or Interactions supported them to handle patients safely. Staff were asked how often they or their patients were injured during patient handling, and how often they had verbal or physical violence directed at them. The unit managers on each unit completed the employer portion. They were asked how many injuries had been reported to them for the time period, and these were compared with employee answers in order to get an idea of how well reporting systems were working.

This thesis is divided into the following sections:

Chapter 1 introduces the study, and ends with a definition of key terms.

Chapter 2 gives an overview of patient handling including definitions, and the complex factors that contribute to the current state of patient handling in health care organizations. I discuss my own experience with patient handling, and how patient handling fits in with the roles and priorities of the occupational health nurse and the

New Zealand legislative framework. The review of the current state presents the literature showing the past and current efforts to address patient handling injury, and the new research on factors that improve health and safety in workplaces.

Chapter 3 presents the framework of the Safe Patient Handling Survey™. This chapter reviews the factors that influence patient handling and justifies their inclusion into the tool. Factors presented are leading and lagging indicators, patient safety, employee safety, workplace culture, and the approach using perception surveys. The Safe Patient Handling Survey™ tool is explained and the results of the New Zealand pilot are presented.

Chapters 4 and 5 present the study design and method and study findings. These chapters detail the purpose, design, procedure, statistical analyses, and findings.

Chapter 6 is the discussion of the study and results and includes strengths and limitations, and recommendations for further study. The conclusion summarizes the relevance of the study findings to health care organizations, occupational health nursing practice, and nursing practice in general.

In summary, the study presented in this thesis investigated whether the Safe Patient Handling Survey™ is a reliable tool for quantifying the severity of patient handling risk in a workplace, targeting problem areas, evaluating improvement initiatives, allowing for comparison of results with other organizations and publishing the success stories, and generating the evidence necessary for patient handling risk reduction to become a priority at all levels.

1.2 Definitions

Presented here are key terms used in this thesis:

Patient: This term refers to any person one who is being handled and is interchangeable with other terms such as resident and client.

Patient handling: “any task that involves moving or supporting a patient including carrying, pushing, pulling, lifting and lowering” (Accident Compensation Corporation, 2003, p. 5).

No Lifting patient handling: “manual handling of patients is to be eliminated in all but exceptional or life-threatening situations. Patients are encouraged to assist in their own transfers and mechanical aids must be used whenever they can help to reduce risk. Methods and handling aids to move or transfer patients must provide the highest level of protection to nurses, patients and others...” (Australian Nursing Federation [Victorian Branch], 2006, p. 2).

System: “a set of interrelated parts that operate as a whole in pursuit of common goals” (Bartol & Martin, 1994, p. 55).

Patient handling injury: “an injury occurring during a patient handling task to either patients or staff” (Börner & Roithmayr, 2007, p. 638).

Performance Maximizer™ Model: “a model illustrating the nature of human performance in the workplace by describing all the factors that exist when successful human performance pertaining to any function occurs in the workplace. The model asserts that leaders and workers need to jointly create condition whereby everyone will:

- *Know* what to do
- Be *Able* to do it
- Be *Equipped* to do it

- *Want* to do it
- Have workplace *Interactions* that foster trust, respect, integrity, collaboration and accountability.” (Roithmayr & Dyck, 2007, p. 274)

(See diagram in Appendix 2).

Great Safety Performance™ Model: the application of the Performance Maximizer™ to create the leading indicators of occupational health and safety – Safe Work Actions, Know what to do to work safely, be Able to work safely, be Equipped to work safely, Want to work safely, and have the workplace Interactions that support safe work. (Roithmayr & Dyck, 2007, pp. 275-278). (See Appendix 2).

Safe Patient Handling Survey™ (SPH Survey™): based on the Performance Maximizer™ and adapted from the Great Safety Performance™ Model, it is “an online survey and analysis tool designed to be completed by health care workers who perform patient handling. It measures specific leading indicators that show that conditions are in place to enable staff to perform safe patient handling practices in the workplace” (Börner & Roithmayr, 2007, p. 638). It is made up of two sections: one for employee and one for their employer. (See Appendix 1).

Leading indicator of safety performance: “an index intended to forecast trends in safety performance” (Börner & Roithmayr, 2007, p. 638).

Lagging indicator of safety performance: “historical in nature, they are the results of past safety performance. Injury rates and lost time rates are examples” (Börner & Roithmayr, 2007, p. 638).

Organizational Climate: “employees’ perception of the organization's culture” (Gershon, Stone, Bakken, & Larson, 2004, p. 35).

Organizational Culture: “norms, values, and basic assumptions of a given organization” (Gershon et al., 2004, p. 35).

O'Shea No Lift System: a system of work developed by Louise O'Shea in Australia focusing on low risk handling of patients and materials. It addresses the “organizational, environmental, cultural, and staff and patient risk factors associated with patient handling with a tailored comprehensive program that moves the facility from training to accepted work practice” (O'Shea, 2008, para 7).

CHAPTER 2: OVERVIEW OF PATIENT HANDLING

2.1 Introduction

The overview section provides the reader with background information for understanding the complex issues surrounding patient handling. I start this section with my motivation for devoting considerable time, energy and money to creating safe workplaces for staff and patients. That leads into a brief outline of the occupational health nursing role to show how this tool can support their practice. A review of the New Zealand legislative framework shows the duties of employers and employees to maintain low-risk workplaces and how the full SPH Survey™ tool is consistent with those obligations. The review of the literature presents patient handling program evolution and how it has progressed to the current theory that the systems-based approach that incorporates workplace culture is the most effective at reducing the injury rates to staff and patients. The section finishes with the recognition that methods of evaluation that are limited to a review of injury rates are not adequate for wide evaluation and communication of patient handling system effectiveness.

2.2 My experience

In 1985, within the first four months of employment at my first nursing job, I suffered a thoracic back injury while moving a patient. The work culture at the time was such that injuries were part of the job, so, after treatment and time off, I returned to an unchanged workplace that demanded the same heavy work. I never fully recovered, and the injury continues to impact on my life. I now know that the injury that I experienced was entirely preventable and unnecessary and that my experience is common to too many others throughout the health care industry. I also know that at the core of quality patient care is a patient handling system that reduces the risk of injury to both staff and to patients.

After my injury, I returned to my unit for four more years and struggled to meet the heavy physical demands of cardiac nursing and a dysfunctional workplace culture. Burned out and feeling like a failure because I could not manage the required heavy weights, I left the hospital to complete my specialty in occupational health nursing. Occupational health allowed me to concentrate on injury and illness prevention activities which I found more logical and effective than focusing primarily on treatment. Practicing as an independent consultant, I was also able to choose my work tasks so that I did not have to risk further injury. I did not appreciate at the time what a rich and varied career had opened for me.

Much of my work over the past 17 years has been in industries other than health care- industrial, transport, office, city infrastructure, manufacturing- in large, medium, and small organizations. I have worked in, toured and observed work sites in Canada, Mexico, United States of America (USA), Costa Rica, New Zealand (NZ), Australia, Germany and the United Kingdom (UK). Working in different sectors and countries has given me valuable exposure to a range of health and safety philosophies. I have worked with all sorts of health and safety systems from completely integrated and effective (zero injuries) to piecemeal and chaotic (highest injury rates).

I observed that organizations with successful health and safety outcomes had health and safety systems integrated into the way people do their work in an environment of excellent leadership and supportive workplace culture. I noted that health and safety initiatives that were disconnected from the system of work, unsupported by leadership, or operated without regard for workplace culture were ineffective in protecting the health and safety of workers, visitors, or the external environment. I learned how my first employer might have corrected the system failures that had contributed to my injury.

I discovered that health care is an industry where change is very difficult and slow. My first patient handling project attempt was in 1992 in a Canadian hospital and illustrates a

common experience in trying to prevent patient handling injuries. My program improvement concept was met with enthusiasm by the hospital, but they declined to take part in the project because they feared that the increased awareness about the risks of patient handling would cause huge numbers of claimants to come forward and overwhelm the hospital injury management systems. The hospital continued to operate without addressing their high patient handling risks and two years later their fears were realized. I was then hired as part of a consulting team engaged to manage the large number of injured nurses. Our job was to help the hospital cut their massive workers' compensation levies by either returning their severely injured nurses to work or transferring them onto long-term disability benefits. However, heavy lifting was still in their job description so the injured nurses were unable to return to their pre-injury work. At the same time the flood of newly-injured nurses continued. It was devastating to witness highly educated and experienced professionals essentially crippled for life and relegated to a long term disability benefit when the cause of the injuries was totally preventable. Fifteen years later, this hospital (and the others in the region) continue to operate unchanged with very high injury rates, short staffing, and recruitment and retention issues.

When I moved to New Zealand in 2000, I worked at the Accident Compensation Corporation (ACC) in the Injury Prevention Unit. There I was able to confirm my impression that the working conditions for hospital nurses were similar internationally - same risks, same culture, same difficulty implementing injury prevention strategies. I initiated and co-wrote the *New Zealand Patient Handling Guidelines* (Accident Compensation Corporation, 2003). This project allowed me to meet with health care organization leaders in New Zealand, UK, and Australia, and specialist leaders in the area of patient handling. My goal was to create guidelines to assist health care employers to provide and maintain a sound patient handling "system" in their workplace. "System" is defined as "a set of interrelated parts that operate as a whole in pursuit of common goals" (Bartol & Martin, 1994, p. 55), and for patient handling this meant integrating policy, risk assessment, handling techniques, equipment, facility design, training and evaluation elements (Accident Compensation Corporation, 2003).

By combining my systems thinking with their expertise in patient handling, we were able to create best-practice guidelines for low risk patient handling systems. Under the Health and Safety in Employment Act and 2002 Amendments (New Zealand Department of Labour, 2002), an employer has a duty to manage the risks in a workplace. The *NZ Patient Handling Guidelines* drew attention to the obligation for health care employers to look at the patient handling risks for their staff.

A difficulty that surfaced early in my research for the *NZ Patient Handling Guidelines* was how to evaluate the effectiveness of patient handling and improvement initiatives that were happening worldwide. The only data available to me to assess the current state of patient handling systems were injury rates. While injury rates provide one measurement of outcome, they do not evaluate how well the structure and processes of a system are working or what interventions might reduce future injuries. In addition, injury statistics are generally collated at the end of a period (usually a year), which creates a significant time lag.

Injury rates are also influenced by the workplace culture and compensation processes. In my experience, workers who believe that injury is “part of the job” or fear losing their livelihood are less likely to report their injury. This under-reporting creates unreliable data. Health care employers know that patient handling injuries are under-reported, but the extent has not been reported in the literature. Compounding the problem is that different countries have different injury legislation and compensation systems. Since reporting of injury is also influenced by legislation and compensation processes, comparing patient handling system performance using injury data is next to impossible. For these reasons, an evaluation approach that bypasses injury data and evaluates actual patient handling system elements both domestically and internationally would be very useful to researchers, policy makers, and industry leaders.

The *NZ Patient Handling Guidelines* project reinforced for me the importance of having an evaluation tool for health care employers. Dyck (2007) states that evaluation involves continuous monitoring and checking of system results in order to:

- Promote stakeholder awareness for...goals, objectives and targets and align them with other business strategies and needs
- Help performance remain on target
- Know how much further there is to go to realize “success”
- Correct problems
- Provide feedback to those involved
- Promote accountability for workplace health and safety
- Increase likelihood of accomplishing program goals, objectives and targets. (p. 120)

Employers need to identify, measure and manage the workplace attributes that help to attract and retain staff. Aside from competitive pay, health care workers also want a supportive work environment that enables them to deliver quality patient care.

Fundamental to that is health and safety for both staff and patients. Employees will stay in jobs where they have low injury risk, where they are supported to deliver excellent patient care, where they are valued, and where they have some control over how their job gets done. Employers need to know how employees perceive their work environment, and how system elements are working for them. Tallying up injuries at the end of the year, or performing a health and safety audit needs to be augmented with adequate information on how the system as a whole is working, where problem areas are, and how employees feel about their workplace health and safety.

Dianne Dyck, a Canadian Occupational Health Specialist, reported her work at Enmax (described in Section 3.8) in Calgary with Tony Roithmayr, the developer of the Great Safety Performance TM (GSP) model. They had successfully reduced injuries in the electrical industry using the GSP model, and I immediately saw the potential for the application to patient handling (Dyck & Roithmayr, 2004). Early piloting of the Safe Patient Handling SurveyTM in New Zealand yielded promising results for evaluating patient handling system elements which is critical for quantifying, measuring, monitoring and solving the problem (Börner & Roithmayr, 2007).

I have presented my experience to show the effect of my patient handling injury on me and my career. While the outcome for me has been good, others have not been as lucky with severe, long-term consequences on their lives as a result of these preventable injuries. This, and my experience as an occupational health nurse, outlines my motivation for creating a tool to improve safety and workplace culture for the benefit of nurses, patients and the health care system. The next section provides further background on the roles and priorities of the occupational health nurse.

2.3 Role and priorities of the Occupational Health Nurse

Occupational health nurses working in the health care industry are ideally positioned to influence improvements in working conditions for health care workers, and bring health care organizations up to the standards required by health and safety legislation.

Occupational health nursing aims to protect workers, their families and the community from occupational hazards, and to promote employee wellness. The occupational health nurse acts as health care coordinator, program coordinator, advocate, mentor, coach, specialist, and health practitioner within the workplace environment for both employees and management. This involves all three levels of prevention - primary, secondary, and tertiary. Table 1, adapted from Pender (1987, pp. 39-41), summarizes occupational health nursing activities for each of the levels of prevention. Advanced level occupational health nurse specialists also conduct research, effect legislative and guideline changes, develop and manage occupational health loss control systems within a business structure, and/or act as medicolegal experts. In all activities documentation and recordkeeping is required to meet health and safety legislation and professional standards (Dyck, 2007).

Table 1: Levels of Prevention in Occupational Health Nursing Activities*

Level of Prevention	As it applies to Occupational Health Nursing (OHN)	OHN activities
Primary	Immunization	Eg. Tetanus, Hepatitis A&B, influenza, and others
	Hazard risk assessment	Eg. Noise, respiratory hazards, manual handling hazards, chemical hazards, radiation hazards, biological hazards, stress, environmental controls
	Lifestyle counseling	Eg. Cardiac risk factors, smoking cessation, obesity, diabetes assessment and counseling, family health, fitness, substance abuse, mental health
	Program evaluation	Eg. Health and safety auditing, surveys, analysis of injury data, analysis of incident data and investigation
	Health and Safety Systems	Assess, plan, implement, evaluate and continually improve the organization's health and safety systems.
Secondary	Health Assessment – Pre-employment and Annual monitoring -specific to workplace hazards	Lung function testing, drug testing, vision testing, hearing testing, urine testing, musculoskeletal tests, chemical exposure monitoring, and mental health/stress monitoring.
Tertiary	First-aid response and Emergency response	Planning, teaching, responding to first-aid, medical aid, and emergency incidents
	Triage of health or medical issues and referral for further treatment	Assessing workers with regard to health and injury complaints and referring them for appropriate treatment
	Modified work coordination	Evaluating treatment, communicating with treatment providers, insurers, and managers to support the safe return to work of injured/ill workers

(*Adapted from Pender, 1987, pp. 39-41)

Evaluation is a step in the nursing process (assess, plan, implement, evaluate) and is integral to the occupational health nurse role (Dyck, 2007). Important questions are: Are programs reducing injury and illness and promoting wellness? Are health and safety systems meeting intended outcomes? Assessment and evaluation activities are fundamental to the occupational health nurse role to provide evidence and justify health and safety system improvements. The SPH Survey™ intended as a tool to complement the occupational health nursing role by providing comprehensive data on the specific factors that impact workplace health and safety.

This summary of the role and priorities of the occupational health nurse shows how the Safe Patient Handling Survey™ was developed as a tool to inform the core evaluation component of the occupational health nurse role. Since all health and safety activities operate within the New Zealand occupational health and safety legislative framework, the next section provides a basic overview of the legislation.

2.4 New Zealand legislative framework

According to New Zealand's Health and Safety in Employment (HSE) Act 1992 and the HSE Amendment Act 2002 (New Zealand Department of Labour, 2002), it is management's legal responsibility to set the accepted level of minimal risk for their employees. They are required to follow the hierarchy of controls by first attempting to eliminate the risk, then isolate the risk from employees, and as a last resort minimize the risk through controls such as safe work practices, and personal protective equipment. It is the employee's legal responsibility to follow the policies and procedures set by management, and report back to management any problems that occur. Underpinning the health and safety system is a duty for employers "provide reasonable opportunities to employees to participate effectively in ongoing processes for improvement of health and safety in their place of work" (New Zealand Department of Labour, 2002, section 19B).

Although the *New Zealand Patient Handling Guidelines* (Accident Compensation Corporation, 2003) are voluntary, New Zealand health care employers were encouraged to use them to meet their legal responsibility to create a safe workplace. In the case of patient handling, elimination of unsafe patient care practices and the redesign of work processes that involve lifting are the first steps in controlling the risk. Reducing the number of patient transfers is an example. For patient handling tasks that cannot be eliminated, lifting equipment and no-lift safe work practices are used. An effective system and workplace culture is required to support no-lift safe work practices.

Although no-lifting sounds like a simple and easy solution to meeting the legal requirements for creating and maintaining a safe workplace, it is a relatively new and bold approach to patient care, and involves substantial change in workplace culture and infrastructure. Like any workplace initiative, employees must be involved and supportive for the changes to be successful and sustainable (Accident Compensation Corporation, 2003).

2.5 Review of current state

2.5.1 Introduction

Almost every patient care task involves patient handling. Over the last century, injuries from patient handling contributed to the vast majority of all injury and illness claims made by health care workers, and it continues to be the most common cause of staff injury in health care today. Although statistics are unavailable, the patient injury rate is likely to also be high because the patient handling techniques that are still in widespread use are high risk for both staff and patients (National Back Pain Association in collaboration with the Royal College of Nursing, 1999).

Past attempts to reduce patient handling injuries have been one dimensional, short term and unsuccessful in lowering injury risk. Today organizations are looking at system-based solutions that support health care workers to practice low risk patient handling (Victorian Government Department of Human Services Policy and Strategic Project Division, 2004). However, like other industries, the health care industry is missing an effective way to evaluate patient handling systems. Injury rates alone do not provide information on how effective system elements are, do not provide evidence of system improvements, and do not allow for systematic feedback from employees. Patient handling system evaluation is a critical component for managing patient handling risk to staff and patients (Accident Compensation Corporation, 2003; Victorian Government Department of Human Services Policy and Strategic Project Division, 2004). The World

Health Organization, in its *Worker's Health: Draft Global Plan of Action*, created a specific objective to require the provision of and communication of evidence for action and practice through improved strategies and tools for communication, such as national surveillance systems for assessing workplace risks and the burden of occupational injury and disease (World Health Organization, 2007b).

Legislation and compensation systems are crucial drivers for the adoption of patient handling strategies. They also affect the ability to compare injury rates, and evaluate the effectiveness of patient handling initiatives internationally (Yassi, Gilbert et al., 2004). For this reason, the legislative and compensation context must be taken into account when examining injury data. As an example, New Zealand has no fault injury coverage through the Accident Compensation Corporation. There is no requirement to prove wrongdoing in order to receive compensation for an injury. Premiums paid by employers partially cover the cost of employee injuries and there are various incentive schemes in place, such as the Partnership Programme, that allow employers to reduce their premiums. In contrast, the United Kingdom requires fault to be determined and the negligent party pays injury costs (National Back Pain Association in collaboration with the Royal College of Nursing, 1999). There are therefore different barriers and drivers that can affect the numbers of injuries reported and accepted and this causes problems when comparing the injury rates from one legal and compensation environment with another. However, even if they cannot be easily compared, it is evident when reviewing the literature that patient handling injuries feature as a common issue in the delivery of safe and quality patient care worldwide.

This section presents the patient handling literature from several countries within their legislative and compensation contexts. I also review the evolution of prevention strategies from single interventions to the current view that a systems approach is most effective. The Victorian Nurses Back Injury Prevention Project is presented as an example of a systems approach, and leads into a discussion of how to effectively evaluate patient handling systems. It is important to understand the extent of the patient handling problem globally and the evolution of improvement strategies to appreciate the

contribution that my study findings make to the progress towards safer health care workplaces.

2.5.2 Overview of current state

"Occupational health hazards associated with nursing have been well defined and include ergonomic, blood-borne pathogens, and psychosocial work stress" (Stone, Du, & Gershon, 2007, p. 50). Back injury and musculoskeletal injury make up the largest proportion of injury claims, most of which are related to patient handling tasks (Alberta Human Resources and Employment, 2005; Berthelette & Leduc, 2006; Collins et al., 2004; National Back Pain Association in collaboration with the Royal College of Nursing, 1999; Pyrek, 2006; Victorian Government Department of Human Services Policy and Strategic Project Division, 2002).

Despite gaining attention from researchers since the 1970s, (Buckle, 1987; Ferguson, 1970; Nicholls, 1977; Owen, 1989; Pheasant & Stubbs, 1992; Stubbs, Buckle, Hudson, Rivers, & Worringham, 1983) the information presented in Table 2 shows that patient handling injuries to health care workers and patients remains one of the most costly risks to health care organizations in many countries. The statistics presented here from Australia, United Kingdom, United States of America, Canada, and New Zealand consistently show that the vast majority (up to 70%) of the claims made by health care workers are as a result of patient handling. With under-reporting of injury a problem in the health care industry, this number is probably considerably higher.

In any case, the health care industry consistently ranks in the top three or four worst performers for injury claims when compared to all other industries in a jurisdiction. Both the frequency and severity of health care injuries are high compared with averages for other industries. For example, in Alberta, Canada lost time was 92 days per 100 full time health care employees compared with 65 for all other industries, 61.9% of injuries were classified as caused by "exertion or bodily reaction" which was 2.3 times higher than the national average (Alberta Human Resources and Employment, 2005, p. 23) and

67.1% were sprains and strains, 1.6 times higher than the national average (Alberta Human Resources and Employment, 2005, p. 13). Direct costs have been reported up to US\$37,000 per claim with indirect costs reaching US\$147,000 to US\$300,000 (Pyrek, 2006, para 3). Claimants unable to return to their pre-injury employment contribute to high turnover costs. New Zealand data show the average national turnover in hospitals is 40.3%, ranging from 13.83% to 82.74%: 2 nurses in 5 leaving every year (North & Tomkins, 2006, p. 5). Nursing turnover cost is estimated at NZ\$40,000 per nurse (North & Tomkins, 2006, p. 10). Assuming there are approximately 20,000 working registered nurses in New Zealand, the turnover costs alone could be estimated at NZ\$320 million, and assuming a full time salary of NZ\$50,000, that is equivalent to 6400 nurses per year. Creating systems of safe patient handling will go a long way to creating safety at work for health care professionals which “will have a positive impact on the retention and recruitment of qualified nurses to provide safe patient care” (Pyrek, 2006, para 6-7).

Patient handling injuries to staff cost the health care industry huge resources, but so do injuries to patients. Skin integrity is important for preventing infection, and skin tears and bruising can result from incorrect patient handling, for example when a patient is dragged along a surface. Infected wounds extend recovery time, and create complications especially in long-term care populations. Muscle and joint injuries impair mobility which can extend recovery time. Slips, trips and falls cause considerable damage to patients resulting in extended recovery time, complications and further treatment. The O’Shea No Lift website states that the “average health care cost of a fall injury to a person 72 or older is A\$19,440. This figure includes hospital, nursing home, emergency room, and home health care, but not physician services” (O’Shea, 2007, para 3). My literature review did not yield any publications which quantified patient injury rates due to patient handling. However, the United Kingdom has produced an analysis of the classic high risk patient handling techniques that cause patient injury (National Back Pain Association in collaboration with the Royal College of Nursing, 1999), and since these techniques are still in widespread use, it is likely that patient injuries are also widespread.

Although patient handling injuries create a huge drain on health care resources, there is also significant room for improvement. Victoria, Australia demonstrated a 24% reduction in claims, 41% reduction in lost time days and a A\$6.4 million saving with their Victorian Nurses Back Injury Prevention Program (VNBIPP) (Victorian Government Department of Human Services Policy and Strategic Project Division, 2004, p. ii) . As the program expands and uptake continues, the savings are expected to increase and compound (Victorian Government Department of Human Services Policy and Strategic Project Division, 2004). The VNBIPP is discussed later in more detail.

Table 2 summarizes the literature from Victoria, Australia, Canada, USA, UK and New Zealand with respect to injury rates, legislative and compensation contexts and other key drivers such as programs, and influential events that have occurred. In reviewing this information, it is important to notice several key points:

- Injury rates related to patient handling are high in all countries
- All countries have legislation that requires employers to reduce injury for their employees
- All countries have some type of enforcement and incentive to reduce injuries
- System-focused solutions appear to be the most effective and sustainable
- The only common tool to evaluate and compare the effectiveness of injury reduction initiatives between regions is injury rates. These are greatly influenced by compensation systems and laws, and the injury reporting culture making comparisons difficult.

Table 2: Summary of Patient Handling literature from Victoria, Australia, Canada, USA, UK and New Zealand with respect to injury rates, legislative and compensation contexts and other key drivers

Victoria, Australia

Patient Handling Injury/Illness Claims	Legislative and compensation context
<p>Survey by Langford (1997, p. 4): "nurses still have the greatest injury rate in the female workforce".</p> <ul style="list-style-type: none"> ▪ 70% back injuries ▪ 9% shoulder/arm injuries ▪ A small proportion reported occupational illnesses. Of those: 61% stress-related, 11% chemical exposures, and 11% workplace acquired infections <p>(Victorian WorkCover Authority, 2006, p. 1)</p> <p>2002 - 2005 workplace injury data for hospitals and nursing homes for Victoria:</p> <ul style="list-style-type: none"> ▪ musculoskeletal disease 73% as compared to 58% for all industries; ▪ back injuries 34% as compared to 24% for all industries; and ▪ manual handling-related injuries 61% as compared to 46% for all industries <p>(Victorian Government Department of Human Services Policy and Strategic Project Division, 2004, p. vi)</p> <p>Prior to the project, health care services paid more than \$50 million per year in Workers' Compensation insurance premiums. More than half of that amount was for back injuries experienced by the nurses.</p> <p>Through Victorian Nurses Back Injury Prevention Project participants had:</p> <ul style="list-style-type: none"> ▪ overall 24% reduction in back injury claims, ▪ 41% reduction in lost time days, ▪ saving of \$6.4 million per annum. <p>Continued improvement expected as more health organizations fully implement their No Lift systems of patient handling (Victorian Government Department of Human Services Policy and Strategic Project Division, 2004).</p>	<p>Legislation: 1990 National Standard for Manual Handling (Commonwealth of Australia National Occupational Health and Safety Commission, 1990b) and National Code of Practice for Manual Handling (Commonwealth of Australia National Occupational Health and Safety Commission, 1990a).</p> <p>2007 National Standard for Manual Tasks (Australian Safety and Compensation Council [ASCC], 2007b) and 2007 National Code of Practice for the Prevention of Musculoskeletal Disorders from Performing Manual Tasks at Work (Australian Safety and Compensation Council [ASCC], 2007a).</p> <p>Voluntary: No Lift policy by Australian Nursing Federation and Victorian Government (Australian Nursing Federation [Victorian Branch], 2006)</p> <p>Compensation: Legal process required to determine liability for compensation.</p> <p>Key drivers: "Buried but not Dead" (Langford, 1997) Victorian Nurses Back Injury Prevention Project (Victorian Government Department of Human Services Policy and Strategic Project Division, 2002, 2004).</p>

Canada

Patient Handling Injury/Illness Claims	Legislative and compensation context
<p>The <i>Trends in Workplace Injuries, Illnesses, and Policies in Health care across Canada</i> 2004 report (Yassi, Gilbert et al., 2004):</p> <p>National time-lost injury rate for health care:</p> <p>1997 - 4.1 injuries per 100 Full Time Equivalent (FTE)</p> <p>2002 - 3.7 injuries per 100 FTE (p. iii)</p> <p>Musculoskeletal injury consistently made up the majority of claims when compared to other injury types for all provinces with rates from 2.3 to 5 (p. iv)</p> <p>Health care workers: greater risk of musculoskeletal injuries compared with other occupations (p. vii)</p> <p>(Alberta Human Resources and Employment, 2005, p. 13)</p> <p>Alberta - between 2000 and 2004, 67.5% of the province's total lost-time claims experienced by Health Services workers were a result of sprains, strains, and tears.</p> <p>Duration of Injury Rate in the Health Services Industry was 92 days lost per 100 person-years as compared to the average rate of 65 days lost per 100 person-years experienced by other industries.</p> <p>2005 - Provincial lost time rate for the Health care industry was 4.0 compared to the overall industry average of 2.6 per 100 person-years.</p> <p>Yassi, Gilbert & Cvitkovich (2004, p. 3):</p> <p>24% to 60%: Upper body musculoskeletal injury prevalence for nursing personnel</p> <p>33% to 72%: Lower body musculoskeletal injury prevalence for nursing personnel</p> <p>70%: Lifetime back injury prevalence for nursing personnel.</p> <p>Job demands put nursing personnel at high risk that exceeds human physical limits, and safety recommendations guidance.</p> <p>British Columbia (WorkSafe BC, 2007, Table 1C)</p> <p>Injury rates: 1998 and 1999 - >6.0; 2004 - 3.8; 2005 - 4.2.</p> <p>(Back, 2006)</p> <p>British Columbia - ceiling track hoists reduced injuries by 20-60% with 20% of the high-risk beds fitted. The conclusion was that the ceiling track hoists were effective for some patient handling tasks where the hoists could be used, but did not reduce on-bed repositioning injuries where ceiling track hoists were not or could not be used. The on-bed repositioning tasks contributed to the high rate of remaining injuries.</p>	<p>Legislation: General health and safety legislation.</p> <p>Voluntary: Provincial guideline documents for safe patient handling.</p> <p>Compensation: No fault worker's compensation.</p> <p>Key drivers:</p> <p>1. Trends in Workplace Injuries, Illnesses, and Policies in Health care across Canada (Yassi, Gilbert et al., 2004) used as Canada wide research base for developing a. strategy to retain health care workers.</p> <p>2. The Occupational Health and Safety Agency for Health care (OHSAH) in British Columbia has put in place a voluntary program called Prevention & Early Active Return Safely (PEARS) which has helped to reduce days lost and compensation costs, largely through return-to-work programs. Health care organizations are encouraged to implement a musculoskeletal injury prevention (MSIP) program alongside the return to work program (Occupational Health and Safety Agency for Health care, 2007).</p> <p>3. Committee of Injured Nurses of Prince Edward Island (2007). Lobbying the Canadian government for legislation to support safe patient handling, and conducting research.</p>

United States of America (USA)

Patient Handling Injury/Illness Claims	Legislative and compensation context
<p>Thomas et al. (2006, p. 2): 69% of nonfatal events were caused by lifting and overexertion</p> <p>American Nurses Association (2004): patient handling is the “primary cause of musculoskeletal disorders in nurses” (p. 2).</p> <p>American Nurses Association (2001): Survey of 4,826 nurses in 2001: 59.4% feared disabling back injuries (p. 3) 83.0% continued to work despite experiencing back pain (p. 4) 53.9% of workplaces did not have lifting devices for patient handling available (p. 4) 87.9% said that "health and safety concerns influence decisions about the kind of nursing work performed and their continued practice in the field of nursing" (p. 6) 75.8% of nurses surveyed indicated that “unsafe working conditions interfered with their ability to deliver quality care” (p. 6) 70.5% listed the acute and chronic effects of stress and overwork in the top three of their health concerns. Overtime, staffing issues and fears of injury are listed as factors that create stress (p. 3) 76.7% “refuse to miss more than 2 days of work” (p. 4).</p> <p>Pyrek (2006): \$37,000 average per injury direct costs associated with occupational back injuries of Health Care Workers, indirect costs associated with back injuries can range from \$147,000 to \$300,000” per injury (para 3).</p>	<p>Legislation: General health and safety legislation. Specific patient handling legislation in five states. Federal patient handling legislation is pending. This is Bill HR 378, the Nurse and Patient Safety and Protection Act of 2007.</p> <p>Voluntary: National guideline documents for safe patient handling.</p> <p>Compensation: Most states have No Fault worker’s compensation insurance managed by third party insurers.</p> <p>Key drivers:</p> <ol style="list-style-type: none"> 1. The National Patient Safety Center of Inquiry, Veterans Health Administration and Department of Defense, developed the <i>Patient Care Ergonomics Resource Guide: Safe Patient Handling and Movement</i> revised in 2005. This guide has been adopted by the American Nurses Association, and the two government agencies - National Institute of Occupational Safety and Health (NIOSH), and the Occupational Safety and Health Administration. Lower risk patient handling. Some lifting included such as pivot transfers. (OSHA (National Institute for Occupational Safety and Health (NIOSH), 2006; VISN 8 Patient Safety Center of Inquiry, 2006). 2. Work Injured Nurses' Group (WING-USA) (2007). The Work Injured Nurses Group (WING-USA) is lobbying strongly for Bill HR 378, the Nurse and Patient Safety and Protection Act of 2007. Collaboration with the Australian Nurses Federation (Victorian Branch).

United Kingdom

Patient Handling Injury/Illness Claims	Legislative and compensation context
<p>Pheasant & Stubbs (1992): 37% annual prevalence of acute back pain onset for nurses working on general medical units compared to 1% for nurses working in administration. (National Back Pain Association in collaboration with the Royal College of Nursing, 1999, p. 32)</p> <p>Nurses had a significantly higher incidence and prevalence of back pain than the general population and that this was on the increase (National Back Pain Association in collaboration with the Royal College of Nursing, 1999, p. 76).</p> <p>Health and Safety Executive (2007b): In 2006-7, health and social sector had a higher than average prevalence rate of work-related illness</p> <p>1561 health services employees reported major injuries: 53% were a result of slips or trips, 15% were handling, lifting or carrying injuries, 11% resulted from physical assault.</p> <p>Of these, injuries lasting more than 3 days were due to: 51% handling, lifting, or carrying injuries; 18% slips or trips 15% physical assault.</p> <p>Mayor (2001): 2001- the National Health Service (NHS) introduced the National Patient Safety Agency to serve as an independent body responsible for collecting and analyzing information on patient adverse events. The idea was to "develop solutions designed to prevent harm, set out national goals for risk reduction, and establish mechanisms to track progress towards achieving the goals set" (p. 1013).</p> <p>Sari, Sheldon, Cracknell, & Turnbull (2006): Incident reporting system reviewed. Poorly identified patient safety incidents especially those resulting in harm. Case note review may have a useful role in surveillance of patient incidents.</p>	<p>Legislation: 1992 Manual Handling Operations Regulations ("Manual Handling Operations Regulations 1992. UK Government Statutory Instrument No. 2793," 1992) and guidance limiting lifting to 25 kgs in all industries (16 kg for women) (Health and Safety Executive, 2007a, p. 10).</p> <p>Voluntary: 5 editions of <i>Guide to the Handling of Patients</i> (National Back Pain Association in collaboration with the Royal College of Nursing, 1999)</p> <p>Compensation: Employees have to pursue employers legally for damages when filing an injury claim.</p> <p>Key drivers: National Back Pain Association, Royal College of Nursing, Back Exchange</p> <p>The Royal College of Nursing sponsors the Work-Injured Nurses Group (WING) which provides supports to nurses who have workplace or other injuries and illnesses (Work Injured Nurses' Group (WING), 2007).</p>

New Zealand

Patient Handling Injury/Illness Claims	Legislative and compensation context
<p>Accident Compensation Corporation (2007a): From 2001-2006, the average direct costs on health care claims per year was: \$7.6 million Indirect and direct costs amount to: \$30.4 million 2007 - Average injury cost of injury for first year: \$3466 and \$9747 for each year afterwards 2007 - Approx. 75% of claims are related to patient handling 79.6% of total claims last more than eight weeks. 36% of total claims last between 8 weeks and 26 weeks. 35% of total claims last between 26 weeks and 10 years. Only 20% of total claims last under 8 weeks (p. 24).</p> <p>(McNeil, 2004) McNeil from the New Zealand Department of Labour, Occupational Health and Safety evaluated the impact of the <i>NZ Patient Handling Guidelines</i>. Recommendations included standardizing training, developing processes for gathering data at regular intervals across the industry to allow for feedback on measures that are working and where improvements need to be made, evaluating the financial implications of implementation, and turning the commitment to safer patient handling into concrete results. “all industry figures agree that the cost, both in personal and financial terms, of back injury and pain is too great to be ignored and that safer patient handling is a priority”.</p>	<p>Legislation: General health and safety laws and regulations. Voluntary: New Zealand Patient Handling Guidelines 2003 (Accident Compensation Corporation, 2003) Compensation: No fault insurance through the Accident Compensation Corporation. Government and third party insurance. Key Drivers: New Zealand Patient Handling Guidelines; ACC Partnership Programme which allows employers who demonstrate a sound health and safety through an annual audit to case manage work-related injuries.</p>

Although there are limitations to using injury data to determine the extent of injury due to patient handling and compare data internationally, the statistics reported here indicate that patient handling is a serious issue. It should be noted that each of the five countries stated they had difficulty when collecting relevant and useful data for the purposes of evaluating and comparing patient handling systems.

In summary, patient handling injuries to both staff and patients are very frequent, and very costly. Comprehensive patient handling systems are available now that hold promise for significantly reducing injuries (Victorian Government Department of Human Services Policy and Strategic Project Division, 2002, 2004). The gains for health care organizations that institute sound safe patient handling systems are considerable - lower costs, better morale, lower turnover, better staff retention and improved patient outcomes. Despite these benefits, progress in implementing comprehensive patient handling systems has been slow. This is in part because of the limitations in using injury data to evaluate which patient handling systems work best.

2.5.3 Past efforts to reduce patient handling injuries

It is useful to look back at the culture of nursing to understand why patient handling injuries started and why they persist. In *Safe Patient Handling and Movement*, Collins & Menzel quote a 1906 nursing text from the Committee of the Connecticut Training-School for Nurses which states "Should a patient help himself? Not at all, if he is very ill. Never let him sit up or turn himself alone. Save his strength in every way" (Collins & Menzel, 2006, p. 5). This may have had some justification in the hospital systems of the late 1890s and early 1900s where hospitals were used for the critically sick only and most people were cared for in their homes. When care shifted from homes to the hospital, the amount of patient handling required increased as the number of patients per nurse increased. The increased number of heavy tasks combined with the persistent belief that a patient should not help himself caused patient handling injuries to rise. The cause of injury was attributed to the nurse who was blamed for lifting "incorrectly", rather than heavy work itself. Collins & Menzel quote a 1898 nursing text which

demonstrates the thinking that has persisted for more than a hundred years and today remains a major barrier to change: "Occasionally the complaint is made that a nurse has injured her back or strained herself in some way in moving a patient. This will generally be because she has failed to do the lifting properly" (Collins & Menzel, 2006, p. 5). The assumption here is that the task is safe and within human capability to start with (or at least the capability of the nurse), and the nurse's poor fitness, knowledge, or patient handling technique is at the root of the injury.

Injury prevention strategies based on this thinking include back schools, health screening, fitness classes, warm up for work and stretching sessions, and even use of weight belts for nurses to support their backs. Rehabilitation strategies consistent with this belief are additional training in anatomy and physiology of the spine, biomechanics, techniques to improve the biomechanics of lifting, and strength exercises. Injured nurses then return back to the unchanged heavy lifting demands of their work. Nurses unable to continue lifting are found unfit for the job, and move to other employment, in many cases outside nursing. The end result is work that remains high risk, staff and patients who remain at risk of injury, loss of experienced staff, and time and money spent on disability management and training that does nothing to reduce the risk of injury in the job (Victorian Government Department of Human Services Policy and Strategic Project Division, 2004).

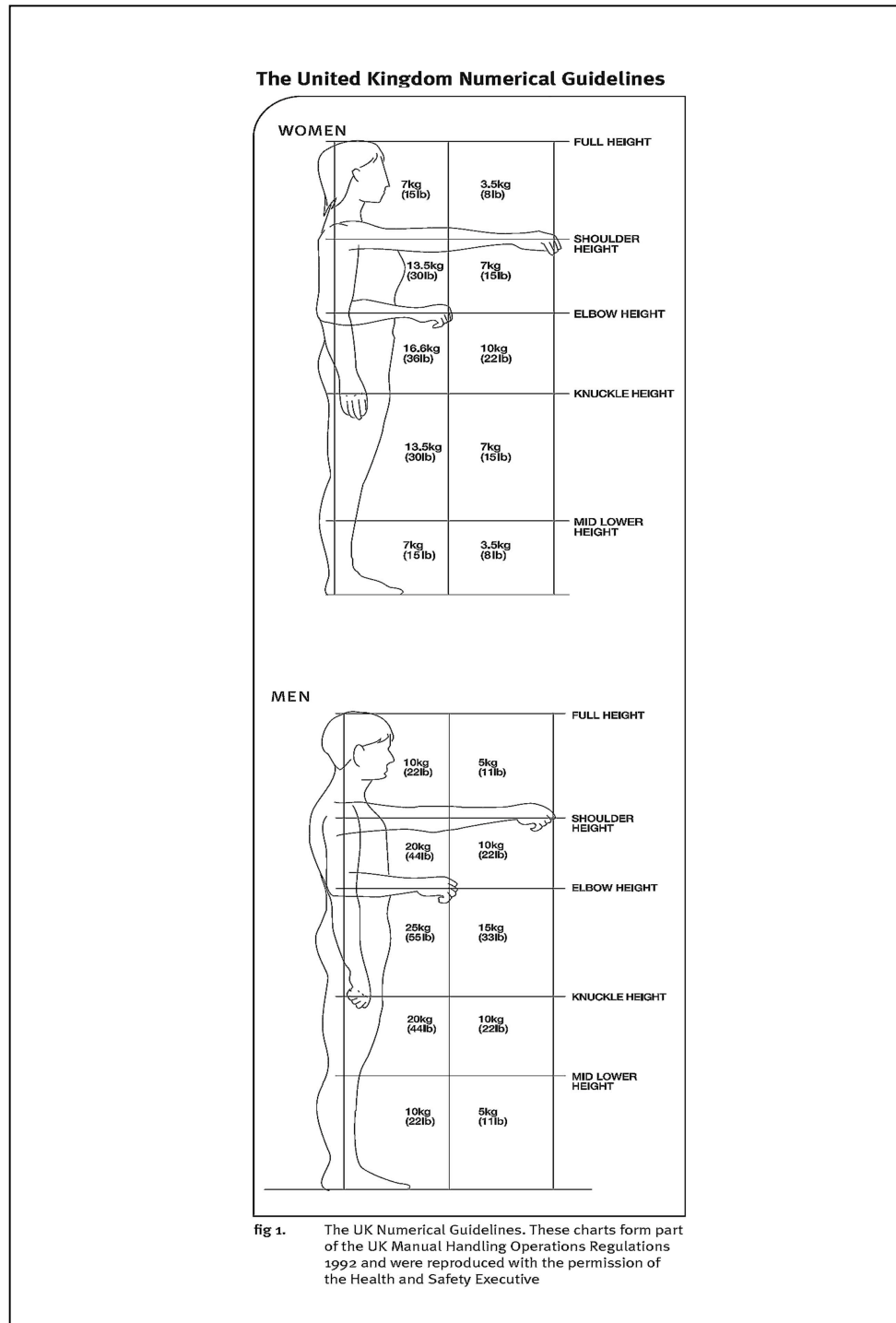
I experienced this personally with my injury, but also professionally in my practice as an occupational health nurse. I was contracted by health care employers to "screen out" prospective employees by deeming unfit those with a history of back injury, workers compensation claims, and those that were unable to perform pain-free range of motion and strength exercises. Some organizations established Bona Fide Occupational Requirements (BFOR) for the job as the basis for pre-employment testing. The candidate was evaluated on their ability to push, pull and lift 40 kg, considerably less than the average weight of an adult. These tests themselves did not come close to simulating real patient handling where much more weight was handled in sub optimal conditions. Even so, this practice was eventually abandoned because so few people

managed to pass the physical tests, many experienced people were being found unfit, and injuries continued to rise anyway. It should be noted that those organizations still have not reduced the lifting required by staff, even though they have the BFORs and test experience to show just how risky their lifting procedures are.

Australia and the United Kingdom were the first to suggest that the problem may not lie with the people doing the manual handling, but rather in the way they are expected to handle the forces involved. The Australian National Standard for Manual Handling and National Code of Practice for Manual Handling were established in 1990 (Commonwealth of Australia National Occupational Health and Safety Commission, 1990a, 1990b) and revised in 2007 (Australian Safety and Compensation Council [ASCC], 2007a, 2007b). For all employment, weights greater than 16 kgs are considered to be high risk and equipment is recommended to handle weights greater than this. A risk assessment paradigm was created for all manual handling.

At the same time, the United Kingdom passed national legislation, the 1992 Manual Handling Operations Regulations, for all workplaces ("Manual Handling Operations Regulations 1992. UK Government Statutory Instrument No. 2793," 1992). The Health and Safety Executive (1992; Health and Safety Executive, 2007a) created a guidance document to support the Regulations that included recommended numerical guidelines on weight limits for manual handling applicable to all industries. These numerical guidelines limited weights that were allowed to be handled in the course of any work to under 16.6 kg for women and 25 kg for men. It is important to note that there were different weight limits for different body positions (see Figure 1).

Figure 1. The United Kingdom numerical guidelines*



*Reprinted from the *New Zealand Patient Handling Guidelines* with permission from Accident Compensation Corporation. (Accident Compensation Corporation, 2003, p. 10).

The UK numerical guidelines forced an evaluation of classic patient handling techniques, and most of these were found to be too high risk for both the patient handlers and the patients and were banned. These are listed in the fourth edition of the *Guide to The Handling of Patients* (National Back Pain Association in collaboration with the Royal College of Nursing, 1999) and include: the drag lift, the Orthodox lift, lifting with the patient's arms around the nurse's neck, the use of poles and canvas, using a sling to lift, through arm lifts, shoulder lifts, pivot transfer, bear hug, transfer belt hold, rocking transfer, flip turn, pulling a patient out of the chair by the hands, and any physical linking of the nurse and patient. In addition, any maneuvers where the nurse uses one hand for lifting while the other hand does another task such as position a bedpan, clean, or adjust clothing were banned. The regulations and guidelines helped to ease rising trend of injuries, but patient handling injuries continue.

The USA and Canada focused on installation of ceiling track hoists, purchasing electric beds, or using lifting teams. These initiatives resulted in slight and temporary reductions in injuries. There is currently a very new emphasis in North America on improving the entire system of patient handling including workplace culture (Nelson et al., 2007; Yassi, Cohen et al., 2004).

Victoria, Australia took a wide view at the whole system to reduce injury risk. This began with Elizabeth Langford's "Buried But Not Dead" (1997) report which summarized her survey conducted on 170 injured/ill nurses in Victoria, Australia. The report identified the types of "illnesses and injuries nurses sustained in the course of their work, and how they are dealt with by the various agencies they come into contact with once injured" (p. 3 of 14). The report called for a major overhaul of health care - government, employer, and nurses' attitudes towards the acceptability of high rates of injury, compensation systems and resources for injured nurses, prevention of injury, staffing and wage conditions, codes of safe practice, and rehabilitation programs. The report was publicized in the media, and that coverage pressured the government to move. Langford, the nurses' union (Australian Nurses Federation [ANF]-Victorian Branch), and the Victorian government worked with Louise O'Shea, an occupational

health nurse specializing in manual handling, to develop a No Lift policy for the ANF. The Department of Human Services and WorkSafe in Victoria then provided funding for organizations that implemented a safe patient handling system of work that met No Lift principles and program support criteria. The results of the extensive independent evaluations published in 2002 and 2004 showed both reduced injury rates and positive feedback from nurses (Victorian Government Department of Human Services Policy and Strategic Project Division, 2002, 2004). In 2003 Elizabeth Langford was awarded the Order of Australia for her work in preventing patient handling injuries and her work is now being widely recognized ("Nurse awarded Order of Australia," 2003).

The statistics of the frequency and severity of patient handling injuries to both staff and patients from these five countries demonstrate that the problem is widespread and the challenges in attempting to improve the situation are common. Researchers in these countries are now recognizing that a systems approach to the issue holds the greatest promise for success.

2.5.4 A systems approach for patient handling

A systems approach means that all components that make up a system work together. Policy, risk assessment, training, equipment, facility design, evaluation, communication and culture make up a comprehensive patient handling system (Accident Compensation Corporation, 2003; Nelson et al., 2007). Single interventions, such as introducing a new type of equipment or new training, are not effective long term because they are introduced without doing a risk assessment, updating the policy, without training, or without the maintenance and laundering systems to support it. Most importantly, they are often introduced without regard to the culture of the organization (Börner & Roithmayr, 2007; Victorian Government Department of Human Services Policy and Strategic Project Division, 2004). It is interesting to note that workplace culture elements exist whether or not they are consciously identified by management or staff, and heavily influence the success or failure of an intervention. It is logical that interventions that address all system elements achieve consistent and long term success.

A systems approach to health and safety has been successfully used in other high risk industries such as the aviation and nuclear power industries. The nuclear power industry, in a response to the Chernobyl crisis, put forward a document in 2002 as guidance to improve safety cultures. While deficiencies in safety in the nuclear power industry can lead to catastrophic events, their observations apply to universally to health and safety programs in any industry, including health care:

Lack of systematic approach: this deficiency can affect all aspects of an organization's activities. It makes an organization prone to repeated crises, and some of these may have serious safety consequences. The presence of this deficiency is evidenced by unclear accountabilities, poor decision making processes, and lack of reliable information and general limited understanding of process. From the safety perspective, it is revealed in the weakness of risk assessment processes. Organizations that adopt a systematic approach do not assess their effectiveness solely on attaining goals, but also judge effectiveness on its ability to acquire inputs, process the inputs, channel the outputs, and maintain stability and balance. In the case of safety culture, a systematic approach would be indicated by the existence of improvement plans, clear goals and accountabilities, monitoring of progress and allocation of adequate resources. Another indication of a lack of a systematic approach is the absence of a process to manage change. (International Atomic Energy Agency, 2002, p. 52)

The difference between a program and a system is illustrated by anecdotal accounts of a common outcome in patient handling projects. I discovered during my research on the *New Zealand Patient Handling Guidelines* that there were several organizations in New Zealand that had reported patient handling injuries close to zero for several years. Unfortunately, the programs relied heavily on one person within the organization to drive, research, design, set up, run (including all training), evaluate, and manage the attitudes of health care workers and the senior management. In all cases the programs collapsed when the primary people became burned out and left the organizations. A truly systemic approach to patient handling is not reliant on one person: it continues

whether that person is there or not because it is *the* way that patient handling is carried out. If safe patient handling is truly embedded in the system, in the way work is carried out and in the workplace culture, the departure of the co-ordinator will not be fatal to the program.

Successful patient handling improvement strategies have gone beyond focusing on the task or the nurse or a piece of equipment and provide system integrity. All system elements are part of the problem, and improving them all is the solution. A good illustration of this is the Victorian Nurses Back Injury Prevention Project where the O'Shea No Lift System™ is used by most participants.

2.5.5 Victorian Nurses Back Injury Prevention Project

To understand the effectiveness of a patient handling systems approach, it is worthwhile taking a deeper look at how the *Victorian Nurses Back Injury Prevention Project (VNBIPP)* was set up, managed, and evaluated. This section summarizes the *VNBIPP* as discussed in the Victorian Government Department of Human Services Policy and Strategic Project Division reports of 2002 and 2004.

Elizabeth Langford from the Injured Nurses Support Group conducted a survey in 1996 which examined the impact of injury on nurses, the industry, and the community. This provided the impetus for the Injured Nurses Support Group to collaborate with the Australian Nursing Federation (ANF) - Victoria branch, to lobby the Government of Victoria for funding for “no lift” patient handling initiatives in the state. This early buy-in of industry stakeholders was critical to the VNBIPP's success (Victorian Government Department of Human Services Policy and Strategic Project Division, 2004).

The Victoria Nurses Back Injury Prevention Project started in 1998. The aims of the project were:

1. To assist facilities to implement back injury prevention programs based on no lifting principles

2. To facilitate long term cultural change in health care organizations and among nursing staff. By encouraging new attitudes, the project aims to eliminate unsafe practices that have traditionally led to a high risk of injury among nurses.
3. To assist health care organizations to implement effective procedures for risk identification, assessment and control of patient handling injuries among nurses. (Victorian Government Department of Human Services Policy and Strategic Project Division, 2002, p. iii)

The advisory committee was formed and included representatives from the Injured Nurses Support Group, the ANF, clinical nurses, insurers, and occupational health and safety consultants. The funding was for health care organizations to implement “no lift” systems of work, which had to:

- Be based on “no lift” principles;
- Be consistent with the Manual Handling Regulations (1999);
- Be based on a risk management approach. Programs that only taught about safe manual lifting techniques, back care and/or exercises did not qualify for funding;
- Promote that the health and safety of staff and patient/residents were equally important;
- Commit to encourage nurses to participate fully in implementing and sustaining programs;
- Include consultative mechanisms to allow nurses to report concerns and needs to their employer;
- Determine the effectiveness of training through assessing competency across a range of skills including equipment operation, hazard identification, risk assessment and control, and patient care without performing hazardous manual handling;
- Have senior management commitment for adequate resource in the program;
- and

- Provide resources for programs such as adequate patient transfer equipment, adequate space to store and operate equipment and a dedicated staff member to coordinate the program. (Victorian Government Department of Human Services Policy and Strategic Project Division, 2002, p. 9)

Additional program principles that were desirable included:

- Commitment to the elimination of manual lifting wherever possible and training in the use of patient transfer equipment;
- Commitment to changing the culture where lifting patients was acceptable to a culture where nurses no longer considered these risks acceptable; and
- Establishment of procedures to identify manual handling hazards, assess the risk and develop alternative work strategies. (Victorian Government Department of Human Services Policy and Strategic Project Division, 2002, p. 9)

The funded facilities also had to agree to ongoing monitoring and evaluation, to identify and solve problems, and be accountable for the use of the public funding (Victorian Government Department of Human Services Policy and Strategic Project Division, 2002).

Eighty-two percent of the organizations that enrolled in the first round of funding used the O'Shea No Lift System TM of patient handling. This system was developed by Louise O'Shea, and is a comprehensive risk management system that contains all the required elements for funding. The results from the first round of funding showed that the level of acceptance by the nurses was very high with 88% of them choosing to use "no lift" techniques to move a patient (Victorian Government Department of Human Services Policy and Strategic Project Division, 2002).

In the first round of funding, there were difficulties in data collection and evaluators were unable to determination of the extent to which injuries were reduced (Victorian Government Department of Human Services Policy and Strategic Project Division, 2002).

In the second round of funding, 92% of the organizations used the O'Shea No Lift System™. After one year of use, they experienced injury reductions of 48% when compared to the injury rates experienced one year before the system was implemented, and 43% when comparing with the injury rates two years before implementation. Back injuries were reduced by 40%. Days lost were reduced by approximately 74% with the related injury claim costs reduced by 54%. It is important to note here that the program evaluators recommended that the above data be verified 30 months after implementation to account for lags in the injury reporting and claims system. Ninety-one percent of nurses reported avoiding manual lifting, 75% reported that they had a hazard identification procedure implemented in their workplace, and 75% reported that they were able to work through patient handling solutions (Victorian Government Department of Human Services Policy and Strategic Project Division, 2002).

By way of constructive feedback, the nurses suggested that system improvements could be made by:

- The provision of adequate storage for equipment;
- The availability of more patient handling equipment; and
- Increasing the available time, money, and staff for patient handling. (Victorian Government Department of Human Services Policy and Strategic Project Division, 2002, p. 23)

After the initial government funding, 23 of the 25 organizations committed their own funding to roll-out the program to the rest of their organizations (Victorian Government Department of Human Services Policy and Strategic Project Division, 2002).

On the successes reported in the 2002 evaluation, more funding was provided by the Victorian government and the 111 organizations that receiving funding were evaluated again in 2004 by the Victoria Department of Human Services with the following results:

- 24% reduction in back injury claims;
- 41% reduction in days lost at a cost savings of A\$6.4 million per annum; and

- A reduction of 23% in mean workdays lost. (Victorian Government Department of Human Services Policy and Strategic Project Division, 2004, p. 1)

It was noted by the researchers that the injury statistics were collected for the whole organization, even if they had only partially implemented their No Lift programs. This attenuated the results and as participants complete the installations throughout their organizations these rates are expected to continue to decrease (Victorian Government Department of Human Services Policy and Strategic Project Division, 2004).

The conclusions of this comprehensive evaluation of over 100 health care organizations in the State of Victoria were that the Victorian Nurses Back Injury Prevention Program (VNBIPP) was effective in reducing the injuries related to patient handling, and created an excellent return on investment. They recommended that the VNBIPP be implemented in all organizations within Victoria. In order to achieve this, they recommended adequate funding, equipment, resources, and an easy and inexpensive method for monitoring program progress and evaluating outcomes (Victorian Government Department of Human Services Policy and Strategic Project Division, 2004).

WorkSafe Victoria has adopted elements of the O'Shea No Lift System™ in their guideline called *Transferring People Safely*. In this document, they state that patient handling injuries remain a major occupational health and safety issue in Victoria. Although the number of patient handling injuries has decreased in the facilities that have implemented the O'Shea No Lift System, overall the 2002 - 2005 workplace injury data indicates that for hospitals and nursing homes, the injury rates are still high:

- musculoskeletal disease 73% as compared to 58% for all industries;
 - back injuries 34% as compared to 24% for all industries; and
 - manual handling-related injuries 61% as compared to 46% for all industries.
- (Victorian WorkCover Authority, 2006, p. 1)

WorkSafe Victoria has also developed additional guidelines which are available on their website (www.workcover.vic.gov.au/wps/wcm/resources) including designing health

and aged care facilities that allow space for patient handling, choosing floor coverings, and overhead tracking devices.

The Victorian Back Injury Prevention Project continues with government support and funding. The 2004 evaluation that was conducted was comprehensive, but very costly and time-consuming as it included analysis of five years of injury data and an organizational survey sent to 92 organizations with follow up by telephone (Victorian Government Department of Human Services Policy and Strategic Project Division, 2004). The 2004 evaluators reported that there were many changes over the five year period that made the longitudinal analysis difficult: reclassification of job titles, injury codes, and even changed names of organizations. The evaluators recommended a tool to easily and cheaply measure the impact of the interventions. Effective and economical ways to assess and monitor the overall workplace environment for safety as a preventive measure, and valid and reliable data to measure the impact of patient handling improvement initiatives are critical to initiating and sustaining change (Victorian Government Department of Human Services Policy and Strategic Project Division, 2004).

2.5.6 Evaluating patient handling systems

Evaluation of safe patient handling programs and initiatives is a common problem identified by countries committed to reducing injuries related to patient handling. As shown in section 2.5.2 Overview of the Current State, Victoria in Australia, United Kingdom, Canadian provinces, New Zealand, and the USA have developed patient handling guidelines, passed patient handling legislation, or have provided funding for patient handling equipment and initiatives. They are seeking better data collection and outcome measurement tools to determine if the actions taken are making a difference. If health care organizations could compare systems, programs and interventions locally and internationally, they would be able to determine which initiatives work for employees, patients and employers, and provide health care organizations with data to support their lobbies for legislative change and funding. An evaluation tool that provides

leading indicators would also allow health care employers to improve deficiencies before any injuries happen (Börner & Roithmayr, 2007).

The Work Injured Nurses Group in the United States (WING-USA) (2007), for example, is asking on their website for nurses to submit their personal experiences with patient handling injuries to strengthen their lobby to support Bill HR 378, the Nurse and Patient Safety and Protection Act of 2007. If they had data specifically about health care worker perceptions showing how inadequate patient handling systems are, and how many injuries they and their patients are experiencing, they would be able to support those individual stories and put themselves in a much stronger position to argue for the Bill. In addition, patient handling specialists and researchers form a small community worldwide, and often exchange ideas and solutions. It would be very useful for them to be able to evaluate the effectiveness of these solutions and effectively bypass flawed injury data by using a standardized technique.

Comparing program outcomes across different jurisdictions is currently a challenge. There are differences in definition of injury, injury classifications, industry type, and profession/job title. Currently program measurement across a jurisdiction relies on injury data collected by workers' compensation/insurance agencies which use different performance measures and eligibility criteria for claims, different definitions of injury, and different compensation schemes (Yassi, Gilbert et al., 2004). Canada and New Zealand, for example, have no-fault workers compensation, whereas in Victoria, Australia and the UK, workers are required to file a legal claim for compensation. This skews the data and makes international comparisons using compensation claims data difficult.

Workers' compensation agencies often change their injury and industry classifications according to legislative changes, making comparisons for the same organization difficult from year-to-year, and as well as across jurisdictions. For example, to determine a rate of return on investment, direct and indirect claims costs need to be collected. These costs are heavily influenced by the different compensation systems and penalties which

affect the amount of money spent on each claim (Yassi, Gilbert et al., 2004). In New Zealand for example, industries are not assessed a levy on their experience but on their business type and payroll (Accident Compensation Corporation [ACC], 2007), whereas in Alberta, Canada businesses are experience-rated, and effectively carry the cost of an injury to one of their employees for three years (Workers' Compensation Board Alberta, 2005).

The injury reporting and claims processes themselves make injury rates an unreliable indicator. I know from experience that for an injury to count a worker has to recognize the injury, seek medical assistance, have the medical practitioner diagnose and classify the injury so that the system recognizes it as a work injury, have the employer recognize, classify and accept the injury, make a claim, file the claim, and in many cases, have the claim accepted, classified, and processed by some kind of workers' compensation system (sometimes requiring a legal process). It is astounding to me that given all of the steps that have to occur, the official injury rates are as high as they are. To complicate matters further, under-reporting by health care workers can be high due to improper completion of forms; fear of reporting; a preference by employers to mask the injury rate by paying nurses sick time for injuries (Shamian, O'Brien-Pallas, Thomson, Bruce, & Sale, 2002); and encouragement to take a few days off after injury to prevent a time-lost claim (Badii, Keen, Yu, & Yassi, 2006). In a study exploring the influence of the hospital safety climate on reporting safe work practices and incident rates, Gershon et al. (2000) found that for exposure incidents only 71% of needlestick incidents were reported, 21% of contacts with open wounds, and 33% cut with sharp objects.

My experience with compensation systems in Canada and New Zealand is that employers, the medical community, and insurance systems create significant barriers to reporting and lodging a claim. This encourages many injured nurses to take sick time, leave without pay, use different insurance schemes that won't reflect on their work record (short-term or long-term disability), and self-treat or seek treatment from colleagues at work. I have also observed that health care workers under-report because

of include inadequate reporting systems, organizational cultural pressures that discourage reporting, not wanting to let colleagues down, and the belief that pain is part of the job.

Injury rates are sensitive to changes in work climate and work culture. As an occupational health practitioner, I expect an increase in injury reporting soon after a new program is put in place. Reasons for this are improved injury reporting systems, and raised awareness about how to report those injuries. In addition, new employer-driven system improvements communicate the message that it is now acceptable for workers to report an injury. For this reason, injury rates tend to increase before they decrease with a new intervention (Badii et al., 2006).

The difficulties with comparing improvement initiatives is illustrated in a review by Martimo, Verbeek, Karpinnen, Furlan, Takala, Kuijer, Jauhianen and Viikari-Juntura (2008) entitled the “Effect of training and lifting equipment for preventing back pain in lifting and handling: systematic review”. The Cochrane Back Group’s specialized register and protocols were used to evaluate the quality of 3611 research studies relating to the effectiveness of training and educational programs in preventing back pain. Only 11 studies were ultimately included in the review. Using the results of those 11 studies, Martimo et al. converted data into odds ratios to compare effectiveness of training and education. They found that some studies reported that the “intervention increased knowledge but not in significant improvement in lifting and handling technique” (Martimo et al., 2008, p. 4). However, there were no differences in the back pain rates as a result of having had training and education. They listed the use of injury rates as an outcome measure as a limitation because the rates varied hugely – 1.28 back injuries per 100 person years in the USA study, 7.4 back related injuries per 100 person years in Canada, and 70 self-reported back pain per 100 person years in the Netherlands (Martimo et al., 2008, p. 5). Martimo et al. recommend “more and high quality research with standardized outcome measurement, appropriate power, and adjustment for the cluster effect...directed at a ‘no lifting policy’” (p. 6) to enable useful evaluation of back pain prevention efforts.

An important question to ask about evaluation is: Do injury statistics alone inform how well a program is really working? Currently patient handling systems are assessed and evaluated predominantly by using injury statistics, with audit data sometimes used to demonstrate that specific program elements are in place or in compliance with legislation. The problem with these evaluation strategies is that they overlook system fundamentals: they have limited value for assessing where the problems and/or strengths are in system process and structure, and do not create the opportunity for systematic feedback from the majority of people who are in the work environment every day - the employees. In addition, injury rates and audits are lagging indicators that show what has already happened and therefore cannot be used to forecast and quantify the risk of injury (Börner & Roithmayr, 2007).

The health care industry is large and complex and a standardized tool that gives meaningful feedback would be a sensible next step in creating safe patient handling environments worldwide. A valid and reliable way of evaluating the impact of back schools, for example, would have shown them to be ineffective early on and would have prevented numerous back injuries in jurisdictions that persisted with them. In addition, successful programs such as the O'Shea No Lift System TM could be evaluated and compared with other strategies to inform the decision to use it (Börner & Roithmayr, 2007).

2.6 Summary

In the Overview of Patient Handling section, I provided the context for my study through a review of my experience with patient handling, the occupational health nurse role, and how it all fits with the legislation in New Zealand. The review of the literature on patient handling injury rates and program evolution clearly shows that patient handling remains a significant risk to health care professionals and a threat to the quality of health care outcomes. I reviewed the current theory that the systems-based approach that incorporates workplace culture is the most effective at reducing the injury rates to

staff and patients. The section finishes with the recognition that methods of evaluation that are limited to a review of injury rates are not adequate for wide evaluation and communication of patient handling system effectiveness. The next section shows how the Safe Patient Handling Survey™ was designed to gather meaningful, specific and proactive feedback about systems of patient handling that can be used to target improvements.

CHAPTER 3: SAFE PATIENT HANDLING SURVEY™ FRAMEWORK

3.1 Introduction

Evidence from the literature indicates that the systems approach to patient handling is being implemented internationally. Methods for evaluating the effectiveness of these systems are currently focused on injury rates. Moreover Chapter 2 showed that injury rates do not accurately evaluate the effectiveness of patient handling systems. Injury rates are reactive lagging indicators – by definition an injury has to occur before any action is taken. They can only reflect what has happened in the past, and not what may happen in the future. This section explains how the Safe Patient Handling Survey™ was developed as a way to proactively measure patient handling systems.

3.2 What does the Safe Patient Handling Survey™ measure?

The Safe Patient Handling Survey™ gathers meaningful and specific feedback about systems of patient handling that can be used to target improvements. It is made up of an Employee Survey and an Employer Survey. It was chosen as a tool for this study because it is anonymous, easy and quick to administer, includes built-in capability for descriptive data analysis and it:

- generates leading indicators and tracks them with lagging indicators to create a complete picture
- allows for data collection on patient injuries and safety related to patient handling
- allows for data collection on staff injuries and safety related to patient handling
- allows for data collection of incidents of verbal and physical violence directed at staff by patients
- contains an organizational climate/culture survey
- is a perception survey which allows input from the employee's perspective

- is adapted from the Great Safety Performance Model™ which has been shown to be a valid and reliable tool in other industries
- was piloted and tested in the New Zealand health care sector
- contains questions specifically for patient handling that are supported by evidence and industry best practice. (Great Safety Performance, 2008)

I found no other tool in my literature search that allowed for a comprehensive evaluation of patient handling systems. The following sections discuss in more detail the types of data that are collected and their importance in evaluating patient handling systems.

3.3 Leading and lagging indicators

Like most industries, health care organizations tend to manage safety reactively because they have to rely on lagging indicators (such as lost-time injury frequency and severity rates, incident investigations, audit results, turnover, absenteeism) in order to evaluate the effectiveness of their patient handling and other systems. There is currently no other practical way for organizations to monitor how well patient handling systems are functioning on a regular basis (Börner & Roithmayr, 2007).

Focusing narrowly on safety results means that organizations are always looking into the past. They react according to the frequency and severity of injuries that have already occurred. They try to prevent recurrence of injury events by generating recommendations through accidents/incident investigations so by definition an injury has to occur before any action is taken. Unfortunately, incident investigations rarely include a holistic system review or widespread employee feedback and involvement (Börner & Roithmayr, 2007).

Evaluations that produce useful data for improving patient handling practices and preventing injuries require the assessment of the entire organization system that surrounds patient handling activity. Data should be available *before* any injuries occur (Roithmayr & Börner, 2006). The evaluators in the Victorian Nurses Back Injury

Prevention Project (VNBIPP) Evaluation Report in 2004 for example, had the same experience as I did when reviewing the literature: They found mostly descriptive evaluations and short-term evaluations on specific issues rather than long-term holistic system reviews.

Holistic system reviews are currently costly and time-consuming to execute and become substantial research projects and are therefore undertaken infrequently. The VNBIPP evaluations undertaken in 2002 and 2004 were part of a longitudinal study to look at the outcomes of the VNBIPP program launched in 1998. The evaluation methods used in 2002 were different from 2004 and this created difficulties for comparison: in 2002, injury data were collected directly from the units within the hospital that implemented a No Lift system, whereas in 2004, the injury data for the whole health care organization were used regardless of whether or not they had implemented the No Lift systems throughout, thereby causing dilution of the results. The researchers also noted difficulties with ambiguous and inconsistent injury data, and time lags. Importantly the VNBIPP evaluations were based only on injury rates for staff, and did not include patient injuries, violent incidents, culture measurement, or how well specific No Lift system elements were actually working for employees. In addition, for health care organizations to monitor progress toward a full implementation of a system of safe patient handling, evaluation data is needed in “real time” at least every three months – something that is not feasible as a large system review. Ongoing monitoring once the system is in place is recommended every six months to yearly (Roithmayr & Börner, 2006).

Leading indicators of safety performance are used to forecast outcomes and therefore enable organizations to be proactive in their safety management. Leading indicators correlate directly to the safety practices of caregivers and the safety-related outcomes of their actions on the job. They provide comprehensive data from the employee’s perspective about the extent to which they are truly enabled by the total organization system to keep them and their patients safe during patient handling (Roithmayr & Börner, 2006).

Safety audits are currently considered by employers to be effective indicators, and many compensation and insurance agencies run premium reduction incentive programs for employers based on audit results (Accident Compensation Corporation, 2007b; Workers' Compensation Board Alberta, 2005). Safety audits are widely used in health and safety to check evidence that system elements are in use. However, as discussed later, there are real limitations to using audits as the sole method of evaluation.

It is important to note that lagging indicators still have a useful role in creating a meaningful picture of how the organization is performing in terms of patient handling. Leading indicators alongside injury rates, audit results, turnover, absenteeism, return on investment and leading indicator results create a balanced evaluation of the widespread effects of system changes (Pulliam, 2002).

This study examines the relationship between leading indicators which form the six clusters of the Safe Patient Handling Survey™ and lagging indicators (injury rates for patients and staff). Using leading indicators to predict what the lagging indicators will be enables organizations to measure, monitor, and manage safety in a proactive manner - an extremely powerful way of looking at the whole picture.

3.4 Patient Safety

One important benefit of safe patient handling systems is the reduction of injury to patients. “The average health care cost of a fall injury to a person 72 years or older is A\$19,440. This figure includes hospital, nursing home, emergency room, and home health care, but not physician services” (O'Shea, 2008, Return on Investment page).

Skin tears, musculoskeletal injury, and falls are the common patient handling injuries and are all greatly reduced with a “no lift” system of patient handling (Accident Compensation Corporation, 2003; O'Shea, 2008, Preventable Injuries page). Due to the risks of injury for both patients and health care workers, New Zealand, the UK, and

Victoria, Australia have banned several common and long-standing patient handling techniques that run a high risk of injury (Accident Compensation Corporation, 2003; National Back Pain Association in collaboration with the Royal College of Nursing, 1999; Victorian WorkCover Authority, 2006).

Data on the extent of patient injuries from patient handling are not generally available. Occasionally, they are collected by health care organizations privately, but are not captured by government systems. There is currently a significant international drive to improve patient safety in health care (Joint Commission International Center for Patient Safety, 2007; National Patient Safety Foundation (USA), 2007; World Health Organization, 2007a), the focus of which is mainly on medication and surgical errors with only a few issues involving patient handling such as falls (Yates et al., 2005). The Safe Patient Handling Survey™ allows employees and employers to enter patient injury due to handling which including Skin tears and Bruises; Muscle Strain and Joint strain; Fractures; Slip/Trip; Fall; and Fatality. It is expected that once the extent of patient injury is known, patient safety initiatives will specifically target patient handling systems as a way to improve patient care.

The literature presented here shows that patient injuries occur when unsafe patient handling is practiced. The rate and types of patient injuries are important indicators that are included in the SPH Survey™.

3.5 Employee safety

Most of the patient handling injury research relates to nursing back pain and nursing back injuries. This creates a problem when comparing data in different jurisdictions because body parts and injury types are classified differently (Yassi, Gilbert et al., 2004). In order to be consistent with the definition of patient handling, injuries to any part of the body (not just the back) are included in the SPH Survey™ as long as they have been caused by patient handling.

The severity and frequency of injuries are both important measures. Frequency refers to the number of injury events, and severity to the amount of time lost for an injury event. To determine the severity and frequency of injury in this study, respondents count up their injuries over the previous three months and enter that number into the appropriate field on the Employee SPH Survey™. The employer will also enter their injury data into the Employer SPH Survey™. Comparing the Employer SPH injury data with the Employee SPH injury data will give an idea of the extent of injury under-reporting.

The injuries classifications on the SPH Survey™ are listed below, and are consistent with classifications commonly used by organizations:

- First Aid: Self-treated minor injuries with an immediate return to work.
- Medical Aid: Treatment by a health professional AND an immediate return to work.
- Lost Time: Treatment by a health professional AND time off work for recovery
- Amount of time lost: Number of shifts lost in the previous three months.

Although organizations classify their injuries as First Aid, Medical Aid and Lost Time injuries, many First Aid and Medical Aid injuries are not captured in the employer's injury reporting system. First Aid and Medical Aid injuries have been included in the SPH Survey™ because they are important early indicators.

Incidents of patient violence directed to staff also occur during patient handling. With the use of a risk assessment and no lift techniques, violent incidents are reduced (Collins et al., 2004). For this reason, episodes of verbal and physical violence are included in the SPH Survey™.

3.6 Organizational Culture/Climate in Health care

In recent years health and safety theory has begun to focus on culture and climate in organizations as a key determinant of health and safety outcomes. The SPH Survey™ incorporates culture and climate measurements because they largely control the success or failure of workplace health and safety systems. In fact, one of the main aims of the Victorian Back Injury Prevention Program was to “facilitate long term cultural change in health care organizations and among nursing staff to eliminate workplace practices associated with high risk of injury...resistance to change in values, attitudes and skills of the nursing culture have been argued to impede attempts to change manual handling practices” (Victorian Government Department of Human Services Policy and Strategic Project Division, 2002, p. 8).

Following is a summary of the most recent research on culture and climate theory and research findings together with a summary of my literature search for culture and climate tools that are designed for use in health.

3.6.1 Theory and findings

Gershon, Stone, Bakken, & Larson (2004) state that the definitions of culture and climate are not clearly defined across the literature. I have adopted their definitions for the purposes of my research study: organizational climate is the "employees' perception of the organization's culture" (p. 35) and the organizational culture is the "norms, values, and basic assumptions of a given organization" (p.35).

The importance of organizational climate and culture on workplace safety was first recognized in the industrial setting where it was observed that injury and events and absence decreased when the safety climate level was high. Following on from this, the first culture measurements for health care were developed in an effort to improve patient

safety by reducing the frequency of patient adverse events (Zohar, Livine, Tenne-Gazit, Admi, & Donchin, 2007).

The concept was extended to employee safety. A study by Stone et al. (2007) looked at the effect of organizational climate on nursing injuries and burn-out in 13 New York City hospitals. The results showed a significant association between climate factors and any injury, musculoskeletal injury, and burn-out. The authors concluded that strategies which embrace a holistic systems approach and emphasize both safety and improvements in organizational climate factors would likely benefit both patients and workers. They also projected that improving organizational climate could reduce employee turnover.

Yassi, Cohen et al. (2004) investigated the factors associated with staff injuries in four British Columbia intermediate care facilities. Their hypothesis was that facilities with low numbers of injuries prioritize communication, information-sharing, participation, and meaningful input with front-line staff. This creates high levels of job satisfaction through fairness, support from all levels including management, co workers and unions, and quality delivery of patient care. Through telephone interviews, focus groups, ergonomic analyses, and analysis of the individual worker's injury rates, they found that "organizational culture and climate variables were significantly related to injury rates, pain, burnout, self-reported health, and job satisfaction" (p. 93) with the low injury rate facilities having a better organizational culture and climate than high injury rate facilities.

Yassi, Cohen et al. (2004) summarize the social justice and fairness work of several authors to explain the importance of organizational culture and climate. They point out that the work environment is "an implied employment contract in which the employees' commitment and labour is exchanged for the employer's promises to provide clear duties, a healthy psychosocial environment, a safe physical environment, a safe system of work, fair treatment, and a reasonable workload, as well as basic courtesy and

respect” (p. 94). They state that a “no lift” policy is one way that health care employers fulfill this contract.

Yassi, Cohen et al. (2004) report that their results:

support the idea that fairness, social justice, and efforts to fulfill the employment ‘promise’, essentially, creating a match between what caregivers are expected to provide and what they can provide, are associated with safe work environments. The Low Injury-Rate Facilities seem to honor the spoken and unspoken contracts (promises) concerning quality care, equitable treatment, compassionate responses, open communication, supportive action, and personal safety by providing the necessary tools, mechanisms, and supports... (p. 94)

The authors also note that this link between "organizational effectiveness and injury rates" has been found in other studies, and that the National Institute for Occupational Health and Safety in the United States (NIOSH) research has observed that they are not only associated but also reinforce each other (Yassi, Cohen et al., 2004).

3.6.2 Tools

Measuring organizational culture and climate in health care has presented a challenge for researchers. Scott, Mannion, Davies & Marshall (2003) and Gershon, Stone, Bakken & Larson (2004) reviewed the literature to find psychometrically valid instruments that are currently being used in health care settings. Scott et al. (2003) concluded:

There is a range of instruments with differing characteristics available to researchers interested in organizational culture, all of which have limitations in terms of their scope, ease of use, or scientific properties. The choice of instrument should be determined by how organizational culture is conceptualized by the research team, the purpose of the investigation, intended use of the results, and availability of resources." (p. 923)

These authors state that culture assessment is important for "assessing the receptiveness to, and impact of, organizational change, particularly where it is aimed at quality improvement" (p. 942). However, the tools discussed were designed for research purposes and were unwieldy for practical use by employers.

Yates et al. (2005) describe a USA program to reduce events of harm to both patients and employees. This involved an annual culture index measure (described as a leading measure), in combination with monthly real-time measures that included culture indicators on a behavioral level. They attribute specific and regular feedback to staff, which they term "constant vigilance", as critical for making changes in culture. The feedback is used to reinforce behaviours and manage accountability for results which they state is "90% of the effort and the ultimate key to success in creating a culture of safety" (p. 687). Interestingly part of their initiative included a program to reduce patient falls, one element of patient handling. They report a reduction in falls resulting in injury by 39.8% over three years.

Gershon et al. (2004) reviewed 12 psychometrically valid instruments that could be used in health care. This was in response to a task force that was conducted in the USA which identified working conditions that were likely to improve the overall quality of health care and found these to be: "1. The physical work environment, 2. Work hours and staffing levels, and 3. Organizational culture and climate." (p.33).

Gershon et al. (2004) found that the 12 instruments were cited 920 times in the literature with 202 relating to health care. All but one used a Likert scale, and the number of items in each instrument ranged from 18 to 120. The instruments were checked against five major dimensions (leadership, group behaviors and relationships, communications, quality of work life- structural attributes, health care worker outcomes). None of the 202 studies investigated all five dimensions and unfortunately health care worker outcomes did not include worker health and safety.

Gershon et al. (2004) state that it is important to measure organizational culture and climate in the health care setting because they affect worker morale, work stress, accident rates, burnout rates, turnover, and adverse events related to patient quality of care issues. They state that when "cultural aspects are articulated to employees, the more cohesive and stable the workers collective behavior will be" (p. 37). They observe that organizational leaders can influence the culture and the climate if they know and understand what is going on in their organization. Leaders could then measure the beliefs and positions that they communicate to employees. "To effectively communicate the cultural aspects of an organization, the organization must both communicate and demonstrate its commitment to any particular attribute through both *word and deed*" (p. 38).

My review of climate and culture instruments for health care yielded a number of available instruments, but most measure general aspects of overall culture/climate, and do not ask what the employee's perception is on specific workplace issues (Gershon et al., 2004; Scott et al., 2003). Instruments that do focus on specific issues include Dov Zohar's Nursing Climate Scale consisting of 50 items (20 relating to the hospital climate, and 30 relating to the unit climate) and looks at health care organizational climate with respect to medication errors (Zohar et al., 2007). The research report by Yates et al. (2005) shows how culture surveys were used to measure the progress of programs to reduce adverse events, but the survey itself was not discussed in-depth. Yassi et al. (2004) explores the associations between specific organizational culture factors and injuries. None of the instruments included patient handling elements.

The literature reinforces the importance of including organizational culture/climate measures in a tool to evaluate the status of patient handling system effectiveness. The Safe Patient Handling Survey™ includes items that seek to indicate the status of both culture and climate. Climate is evaluated by asking employees their perception of how well their organization provides and supports the system of safe patient handling. For example, under *Equipped* the item "My organization has a safe patient handling policy and plans" and under *Want to do it* the item "Management responds quickly and

decisively to improve unsafe conditions and/or practices". The *Interactions* section provides a culture survey: "In my work or workplace people usually ...Treat each other with respect and fairness; Are honest and trustworthy; Take pride in their work; Take responsibility for what they do and say." These questions measure both the culture and climate of a health care workplace, and tie them specifically to safe patient handling elements.

My study will contribute to the literature by validating the Safe Patient Handling Survey™ as a new climate/culture measurement tool that includes safe patient handling elements. The aim of the Safe Patient Handling Survey™ is to determine the extent to which the health care organization supports its employees to practice patient handling that is safe for themselves and their patients. When making improvements and creating interventions, the climate/culture can either create a barrier, or indeed facilitate the process. It is therefore important to both create interventions that positively impact culture/climate, and evaluate and feedback those culture/climate changes as interventions are implemented.

3.7 Perception surveys

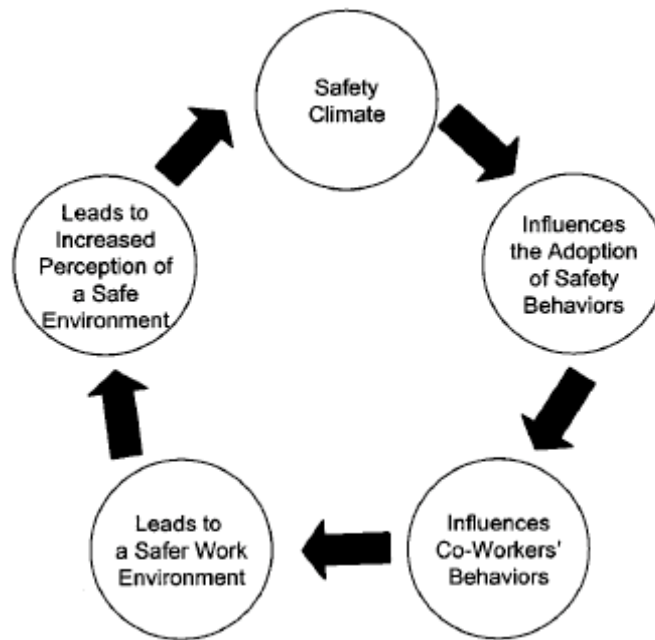
There are many ways to evaluate program effectiveness in the workplace. A common way for organizations to get a snapshot of the extent of program implementation is through the health and safety audit. Audits generally consist of documentation review of policies and procedures, observation for evidence of policies in practice, and interviews of a sample of employees. Employers show the auditors that they have the required elements as listed in an audit tool, and auditors search for proof of the existence of the elements. Perception surveys, on the other hand, are used to measure the respondent's opinions on a topic, for example customer satisfaction questionnaires.

In her unpublished Master's thesis, Novak (2006) compared the effectiveness of perception surveys with the effectiveness of audits in reducing injury rates. She found a correlation between perception survey scores and injuries, and little relationship

between audit scores and injury rates. Although it was a small study, it does support what I have observed as both a health and safety practitioner and auditor. In my experience, the main driver for employers to do a health and safety audit is to pass it, not necessarily to create robust health and safety systems. There is usually a flurry of activity prior to an audit in order to clean up the workplace, "create" the required document trails, and to carefully pick the sample of employees who will be interviewed. Employers should receive full marks for preparing for the audit, rather than the soundness of their health and safety systems for the other 364 days of the year. Audits are usually done because they are relatively easy to do and also because the results can be made available relatively quickly. Audits are very often linked to incentive programs, such as the Workplace Safety Management Practices in New Zealand where employers earn a discount on their workplace insurance premiums for meeting the audit requirements (Accident Compensation Corporation, 2007b). Audits are also used in advertising to show that a certain standard has been "reached" such as ISO standards.

Health and safety audits verify the existence of system elements. In contrast, perception surveys are widely used in order to measure how well the organization has been able to communicate their commitment to safety, and also their ability to adopt and maintain safe work practices (Gershon et al., 2000). Capturing this perception information is necessary because it quantifies the safety climate that influences the adoption of safety behaviors and creates a positive feedback loop as shown in Figure 2:

Figure 2: Influence of safety climate*



(*Reproduced by permission from Gershon et al., 2000, p. 212).

Most countries have minimum requirements for employers to seek employee input on health and safety matters embedded in their health and safety legislation. Traditionally this has been done through joint management and employee health and safety committees, toolbox meetings, suggestion boxes, communication book, and staff meetings. While these activities form a useful and important part of the health and safety program, I have observed that they do have limitations such as lack of anonymity, vulnerability to politics, and limiting representation to the vocal minority. Their effectiveness is also dependent on the culture of the organization. The health and safety committee, for example, can only be as effective as its senior management allows it to be. This is because funding for projects or improvements must be approved by senior management, and if they are only giving health and safety lip service, approval for health and safety resources are rarely granted. Committee members may begin to feel that the health and safety committee is futile and a waste of time.

How senior management reacts to suggestions or recommendations largely determines the workplace health and safety culture. This underscores the importance of conducting

perception surveys to evaluate the message employees are actually receiving from senior management. Perception surveys can be done on the entire workplace population, therefore ensuring that everyone in every job and on every shift is heard. It is easier for senior management to ignore one outspoken employee than the entire workforce. In essence, perception surveys become an evaluation of leadership.

The Safe Patient Handling Survey™ used in this research is a perception survey. It asks staff their perceptions of how well they are supported to perform patient handling safely.

3.8 Adaptation of the Great Safety Performance model to Patient Handling

The Safe Patient Handling Survey™ structure has a sound theoretical base. The SPH Survey™ is adapted from the Great Safety Performance™ model which has proven to be a reliable and valid tool in measuring workplace performance (Dyck & Roithmayr, 2004). This section presents the field testing of the Great Safety Performance™ model as reported by Dyck & Roithmayr (2004), and the development of the SPH Survey™ to illustrate its strengths and better understand my study design, methods and results.

The Great Safety Performance™ model was developed by Tony Roithmayr as a tool to assess stressful work environments and improve them (Dyck & Roithmayr, 2004). It was first applied to workplace safety at an Alberta electric utility company, Enmax, in 2000 as part of a project to:

- Shift the focus of safety management from lagging to leading indicators of safety performance
- Demonstrate a predictive relationship between leading and lagging indicators of safety performance
- Provide data to monitor system risks and to drive injury and illness prevention using the leading indicators
- Provide leaders in the company with a focus and an agenda for their safety improvement in culture change efforts

- Raise the bar on safety performance by significantly improving the company safety results. (Dyck & Roithmayr, 2004, p. 513)

Leading Indicators - conditions required to work safely - were defined and used to improve health and safety performance within the company. This system of Leading Indicators was organized into five Conditions for Great Safety Performance. Safe Work Actions are included as a sixth Leading Indicator to measure on-the-job behaviour. Employees completed a 55 item survey and the results were summarized into a “dashboard” of information that shows the degree to which they:

- *Know What to do* (to work safely),
- are *Able to do it*,
- are *Equipped to do it*,
- *Want to do it*,
- are supported by *Interactions* that foster trust, respect, integrity, collaboration and accountability, and,
- are performing *Safe Work Actions* on the job. (Dyck & Roithmayr, 2004, pp. 516-518)

Early in the development of the Great Safety Performance™ methodology, employees were also asked how important they thought each item was for enabling them to perform safe work actions. This validated the survey items (Dyck & Roithmayr, 2004).

The results were significant - both for the business and statistically from a research perspective. Before the interventions, one occupational group was experiencing five times more injuries than the average rate of the rest of the company. By applying the Great Safety Performance™ improvement strategies, they were able to bring the injury rate to zero within 13 months, the lowest rate in the company (Dyck & Roithmayr, 2004).

Statistical analyses of the results showed that Great Safety Performance™ data collection and measurement methods are “impressively reliable. The five (5) Conditions for Great Performance (Know What to do, Able to do it, Equipped to do it, Want to do it and Interactions) are statistically significant predictors of on-job performance [emphasis in original]” (Dr. L.M. Sulsky, School of Business and Economics, Wilfrid Laurier University – quoted from Enmax survey reports). Dr. Sulsky found that correlation analysis yielded Pearson correlation values of .447 to .726 with significance at $\geq .001$ (Independent variables = each of the 5 *Conditions for Great Safety Performance*; dependent variable = *Safe Work Actions*). After repeated applications of the model with the same results, Great Safety Performance™ proved to be a predictive model that enabled Enmax to identify, monitor and improve leading indicators that drive workplace performance (Dyck & Roithmayr, 2004).

Dyck & Roithmayr (2004) attributed the decreased injuries, and the significant cultural change from ‘learned helplessness’ to ‘empowerment’ to the structured approach using the Great Safety Performance™ survey and model. It also became clear to them that “safety can only be maximized when all the enabling conditions are considered, planned for, measured and managed as interdependent elements” (p. 519).

The Safe Patient Handling Survey™ and Analysis Tool™ is adapted from the Great Safety Performance™ model and is designed specifically to evaluate patient handling in the health care industry, targeting specific factors that are known to impact patient handling injury rates. The Safe Patient Handling Survey™ captures feedback directly from staff about their work experiences. All relevant risks, including organizational cultural determinants, are monitored using the dashboard of leading indicators allowing for corrective action to be taken before accidents happen. The data can be analyzed according to the demographics, results can be trended over time, and a return on investment is calculated that shows the economic benefits of safe patient handling over time (Börner & Roithmayr, 2007).

Organizational leaders work with employees and use the data to cooperatively maximize patient handling safety. It can be run frequently enough to monitor and guide the implementation of programs and steer improvement (Börner & Roithmayr, 2007). Creating an environment of safe patient handling creates considerable savings in money and time, improves workplace culture (and staff retention), and improves patient care outcomes (Accident Compensation Corporation, 2003; American Nurses Association, 2001; National Back Pain Association in collaboration with the Royal College of Nursing, 1999; Victorian Government Department of Human Services Policy and Strategic Project Division, 2004).

3.9 Safe Patient Handling Survey™ Pilot in New Zealand

In 2004, I tested an early version of the Safe Patient Handling Survey™ and analysis tool in the long term care sector in Wellington, New Zealand. One hundred and forty-one caregivers from different organizations across New Zealand in attendance at a conference session on safe patient handling voluntarily completed the paper-based, 55 item questionnaire which included items about their conditions of work, and how important they felt each item was to performing safe patient handling. The purpose of the pilot was to determine if the Safe Patient Handling Survey™ items based on the Great Safety Performance™ model were valid and reliable (Börner & Roithmayr, 2007).

Analysis of the Wellington data showed the same levels of reliability and validity as in the Enmax industrial application of the GSP model using Pearson correlations. As well as having strong correlations to Safe Patient Handling Actions, the five Conditions for Performance were strongly correlated to each other. Table 3 shows the Pearson correlations ranged from 0.345 to 0.749 and all were significant at 0.000. This shows that each element was important in enabling safe handling practices and developing a culture of patient handling safety. It also demonstrated that the five conditions for safety performance are also highly interdependent, indicating that they form an interrelated system (Börner & Roithmayr, 2007).

Table 3: Wellington (New Zealand) Pilot: Pearson Correlations

Leading Indicators	Correlations of Average Mean Scores for Leading Indicators				
	Know What to do	Able to do it	Equipped to do it	Want to do it	Inter- actions
Know What to do		.749	.554	.468	.421
Able to do it	.749		.644	.511	.421
Equipped to do it	.554	.664		.634	.388
Want to do it	.468	.511	.634		.405
Inter- actions	.421	.421	.388	.405	
Safe Handling Actions	.550	.623	.579	.551	.345

All correlations are significant at the 0.000 level (1-tailed). N =139
(Börner & Roithmayr, 2007, p. 658)

Table 4 summarizes how caregivers rated their own safe patient handling practices (Patient Handling Actions), and how well their workplace supported them to perform safe handling of patients (Know, Able, Equipped, Want, Interactions).

Table 4: Wellington Pilot of SPH Survey™: Leading Indicator Mean Scores

Leading Indicator cluster	Performance	Importance
Patient Handling Actions	75	95
Know what to do	84	94
Able to do it	77	95
Equipped to do it	84	97
Want to do it	78	96
Interactions	81	98

(Börner & Roithmayr, 2007, p. 658)

The overall mean scores are shown on a 0-100 scale. Survey items responses were on a 6 point Likert scale from “Strongly Disagree” to “Strongly Agree”. "Performance"

represents caregivers' perceptions of their workplace. "Importance" represents how important respondents feel the survey items are for handling patients without injuring themselves or their patients. From the Enmax experience, we know that scores approaching 90 in all clusters are considered to be very good and are predictive of safe outcomes. Scores rated below 80 need improvement. This strongly reinforces the notion that all aspects of the system need to be working well for optimal risk management. It is not yet known where this threshold is for patient handling as the pilot survey did not ask respondents to enter the number and type of injuries they had experienced. However, the results do show that respondents thought that all of the items in the survey were very important (valid) to handling patients safely (Börner & Roithmayr, 2007).

The results of the Safe Patient Handling Survey™ and Analysis Tool™ pilot were later presented to the management group representing the respondents. The managers were surprised they had been given low scores. However, looking closer at each item, they could see that their efforts in providing safe patient handling had been reflected in the highest scored items. By examining the low scores, they were able to see where they had not yet provided adequate system elements to truly enable safe patient handling practices. The results gave them something tangible to discuss with their employees, and a good idea of the elements they needed to target for improving their system (Börner & Roithmayr, 2007). Table 5 lists the highest and lowest scored item in each SPH Survey™ cluster.

Table 5: Highest and lowest scored items in each SPH Survey™ cluster

Safe Patient Handling Actions (12 items)	
Highest	<ul style="list-style-type: none"> ▪ I get help when I need it to be sure I and my patient stay safe. ▪ I determine if the patient is able to help with the task: that is, the patient can do as I say, and is physically able to help. ▪ I report it when patient care is affected because of lack of staff, patient handling equipment or training.
Lowest	<ul style="list-style-type: none"> ▪ I choose only the lowest risk "no-lift" practices for handling the patient safely, which means that I only lift, pull, push, or lower loads (people or objects) that weigh less than 16 kilograms. ▪ I write the patient handling method, equipment, and help that is needed from other caregivers onto the patient's care plan. ▪ I ensure that all patient handling tasks occurring on morning, evening and nighttime shifts have risk assessments that are documented. ▪ I perform the chosen "no-lift" practices without harming the patient or injuring myself.
Know What to do (5 items)	
Highest	<ul style="list-style-type: none"> ▪ I am aware of and understand my organization's policies and plans regarding the safe handling of patients. ▪ I know what the consequences of unsafe practices would be to myself, my family, my colleagues and my patients.
Lowest	<ul style="list-style-type: none"> ▪ I am clear on what are effective "no-lift" ways to carry out patient handling safely ▪ I am clear on how my patient handling practices will be measured.
Able to do it (6 items)	
Highest	<ul style="list-style-type: none"> ▪ When I am unsure what to do, I can quickly get help. ▪ I am able to use patient-handling equipment safely.
Lowest	<ul style="list-style-type: none"> ▪ I am able to do risk assessments and patient handling care plans. ▪ I have the skills to perform "no-lift" safe patient handling practices. ▪ I can physically perform 'no lift' patient handling practices.

Table 5 cont'd

Equipped to do it (14 items)	
Highest	<ul style="list-style-type: none"> ▪ There is an effective system in place for recording and reporting patient handling incidents and injuries. ▪ I have proper footwear and clothing for safe patient handling. ▪ My organization has a safe patient handling policy, and plans. ▪ The way we do our work keeps caregivers and patients safe.
Lowest	<ul style="list-style-type: none"> ▪ The workload and pace allows me to carry out patient handling practices safely. ▪ Areas where I carry out patient handling have adequate space and are free of hazards (clutter, slippery floor etc.). ▪ Properly designed & maintained patient handling equipment is available & accessible for me to use. ▪ I am expected to change unsafe conditions or stop unsafe work.
Want to do it (7 items)	
Highest	<ul style="list-style-type: none"> ▪ I am held responsible for how safely I handle patients.
Lowest	<ul style="list-style-type: none"> ▪ I get specific, positive feedback about my safe handling of patients. ▪ I am recognized for the part I play in handling patients safely. ▪ I get helpful, corrective feedback when I don't handle patients safely.
Interactions (11 items)	
Highest	<ul style="list-style-type: none"> ▪ People usually take pride in their work.
Lowest	<ul style="list-style-type: none"> ▪ People usually are honest and trustworthy. ▪ People usually accept others who work and communicate in a different way. ▪ People usually treat each other with respect and fairness. ▪ People usually listen to others with understanding and empathy.

(Börner & Roithmayr, 2007, pp. 660-661)

The New Zealand pilot showed that the Safe Patient Handling Survey™ was highly reliable and valid. Based on the feedback received from the pilot, the SPH Survey™ has been developed further to include staff and patient injuries, and incidents of verbal and physical violence directed by patients to staff. Picture questions were also added to measure the prevalence of use of unsafe techniques in order to validate and clarify some of the safe patient handling actions items. An Employer Survey was developed to capture the injury data reported to them which allows for comparisons between employer and employee reports of injury. This helps employers have some idea of the

levels of injury under-reporting. These revised Employee and Employer SPH Surveys™ were the used in my study.

3.10 Summary

This section describes the background of the Safe Patient Handling Survey™ used in my research study. Lagging indicators that have traditionally been used to measure the effectiveness of health and safety systems are reactive and do not provide a complete picture of the effectiveness of a system of patient handling. The leading indicators generated by the Safe Patient Handling Survey™ allow for proactive measurement of the elements that affect the health care worker's ability to carry out safe patient handling: Knowing what to do, being Able to do it, being Equipped to do it, Want to do it and having positive workplace Interactions that support them to do it. Quantifying worker's perceptions about how often they are getting injured at work, how often their patients get injured, as well as how often they experience violence means that these issues can be proactively managed and monitored. The picture questions are patient handling techniques that have been determined in the literature to be too high risk for regular use. They were included in order to specify which techniques staff are actually using. This information will allow the creation of an improved workplace culture and climate. The Safe Patient Handling Survey™ is the only tool currently available that measures these critical elements for a successful patient handling system.

The next sections present my study design using the SPH Survey™ with aim of investigating the validity and reliability of the SPH Survey™, the correlations between leading and lagging indicators, and the sensitivity of the SPH Survey™ in picking up differences in patient handling systems.

CHAPTER 4: STUDY DESIGN AND METHOD

4.1 Introduction

My thesis so far has shown how patient handling injuries are a longstanding, universal problem whenever people are moved. The consequences of a poorly functioning patient handling system for both staff and patients are costly in financial and human terms. Interventions have been attempted, but only recently has the view been embraced that a sound system of patient handling is required which includes a supportive and functional workplace culture. The problem now is that health care organizations rely on lagging indicators such as injury rates to evaluate patient handling strategies and initiatives for improvement rather than evaluating the whole system and its effectiveness. The Safe Patient Handling Survey™ is the only published method available which evaluates all the elements critical for safe patient handling.

This chapter outlines the study design and methods to examine the reliability and validity of the SPH Survey™, the correlations between leading and lagging indicators, and the sensitivity of the SPH Survey™ in picking up differences in patient handling systems.

4.2 Purpose and aims

The purpose of my study is to answer my research questions:

1. How do scores on the Safe Patient Handling Survey™ correlate with incidents?

Incidents are staff injuries, patient injuries, and verbal and physical violence directed to staff by patients. Although the reliability of injury rates is questionable, I wanted to see if SPH scores correlate negatively with incidents (the higher [better] the score, the lower the incident rate and vice versa). This would support the possibility of diagnosing a work environment that is at risk for suffering an incident, *before* an incident happens.

2. How sensitive is the Safe Patient Handling Survey™ for comparing different patient handling systems in two workplaces?

In this study, both employers reported that they had zero First Aid, Medical Aid and Lost time injuries for the survey period and using this traditional method of evaluation, they could be considered equal. Could the Safe Patient Handling Survey™ evaluate and quantify the differences between the two units in which the study took place? Which unit is higher risk? Could problem areas and strengths be diagnosed? Unit 1 was running a patient handling system that had been developed in-house in 2001, and the champion had left the organization some years prior. Unit 2 had implemented the O'Shea No lift System in 2005, and therefore knew that in 2006 80% of their staff were competent and compliant with the no lift system. I purposely chose two units because they were different and this would allow the investigation of comparisons.

4.3 Design

The study design was observational and used correlations to test the association between injury and Safe Patient Handling Survey™ scores. Injury data were collected via both parts of the SPH Survey™: the Employee Survey and the Employer Survey (see Appendix 1). Demographics provide context and include age, shift length, shift type, number of years as an employee, employment status, and time spent at other employment.

4.4 Subjects

SPH Survey™ respondents were recruited from two New Zealand District Health Boards from the equivalent unit type. Unit 1 had 27 staff (20 FTEs) and used a system designed in-house in 2001. Unit 2 had 27 staff (18 FTEs) and was recruited because it had been running the O'Shea No Lift System since 2005. All staff on the units who

handle patients (including those on leave) were invited to complete the SPH Survey™ using their work experience in the three months prior to completing the survey. Staff on a leave due to injury longer than three months answered according to their experience in the three months prior to their injury. Students and relief staff were included in the invitation to participate.

The survey respondents for the Employee Survey was from a population made up of nursing and carer staff, volunteers, and students on the two units who voluntarily completed the anonymous survey. The Employer Survey was completed by the two nursing unit managers.

4.5 Procedure

Expedited ethics approval to conduct the research was obtained from the Central Regions Ethics Committee. The occupational health departments in each district health board were approached with the invitation to participate in the study. One district health board required a locality agreement to be signed, and the other required a signed agreement to conduct the research. For both district health boards, it was important to maintain the confidentiality of the organization and their staff in publications, in the event that the survey results attract adverse publicity¹. Both organizations requested that they be given the results to disseminate within their own organizations.

In both cases the Nurse Unit Manager discussed the research with staff and invited them to participate. An information poster was placed on the survey collection box (Appendix 3). I was invited to give a briefing to the staff in Unit 1. Up to one Continuing Education hour was earned by respondents who participated, and this counted towards the Professional Development Recognition Programs running in both district health boards.

¹ The ethics approval letter is not included in the Appendix in order to maintain the confidentiality of the district health boards and units that participated in the study.

Each unit was given paper-based Safe Patient Handling Surveys™. Although the survey can be completed online, both district health boards declined to arrange for online access to the SPH Survey™ for their staff, but did state that this would be possible for a larger survey. Each survey was supplied with an envelope for sealing on completion. Respondents were instructed to place their completed surveys into a collection box and put their name on a list in order to receive the continuing education certificate. In order to maintain anonymity, there is no way to identify how individual respondents replied. At the end of the three-week period, the surveys were collected by the Nurse Unit Managers and sent to me. The data were entered into the online survey system so that each organization could access their own results online for analysis.

4.6 Statistical analysis method

The first part of the statistical analysis is to verify the reliability and validity of the SPH Survey™ as a tool to measure safe patient handling systems.

The second part of the analysis involved answering the study questions:

1. How do scores on the Safe Patient Handling Survey™ (employee survey) correlate with incidents (employer survey)? Incidents are staff injuries, patient injuries, and verbal and physical violence directed to staff by patients. This would support the possibility of diagnosing a work environment where employees are at risk for suffering an incident, *before* an incident happens.
2. How sensitive is the Safe Patient Handling Survey™ for detecting differences in patient handling systems in two workplaces? In my study, both employers reported that they had zero First Aid, Medical Aid and Lost time injuries for the survey period and using this traditional method of evaluation, they could be considered equal. Can the Safe Patient Handling Survey™ evaluate and quantify the differences between the two units? Which unit is higher risk? Can problem areas and strengths be detected?

4.6.1 Descriptive analysis

I used Chi-square analysis to determine if the whole sample of respondents could be combined for the descriptive analysis. There were no significant differences between the two units with respect to the following demographics: sex, age, job title, time in current job, time in organization, FTE, type of shift, and length of shift, and frequency of patient handling. In addition, the size of the unit, number of patients seen, number of beds, and number of staff members were approximately the same for both units. There was a difference in the number of patients per nurse on each Unit (11.65 vs 17.90) and, given the similarity in the admissions per bed (11.65 vs 10.10), this would indicate that nurses in Unit 2 have a higher patient load than Unit 1. Because the two units were demographically similar, I was able to combine the responses from both units to describe the sample group of respondents, analyze the relationship between SPH clusters and safe patient handling actions, SPH clusters and high risk practices, and perform the correlation between SPH clusters and injuries and violence incidents. Differences in patient load are taken into consideration when interpreting the results.

4.6.2 Relationship between the 6 SPH Survey™ clusters

I used all responses to examine the relationship between the six clusters on the Safe Patient Handling Survey™. This was done to test the validity and reliability of the SPH Survey™ as a tool. First I calculated the means for each cluster: Patient Handling Actions (PHAm_{mean}), Know what to do (Knowm_{mean}), Able to do (Ablem_{mean}), Equipped to do it (Equipm_{mean}), Want to do it (Wantm_{mean}), and Interactions (Intm_{mean}). Then each of the cluster means was tested for a normal distribution of responses using a histogram and Q-Q testplot. This showed I was able to proceed with the Pearson correlation to test the relationship between the SPH cluster means.

I completed an additional Pearson correlation of the 12 Patient Handling Actions with each SPH cluster. A positive correlation would suggest that the higher the SPH scores,

the more often respondents perform the safe Patient Handling Actions. If the Patient Handling Actions listed in the survey correlate strongly with the work conditions in the Know, Able, Equipped, Want and Interactions clusters, it would confirm that the internal validity of the SPH Survey™ is strong.

To measure internal consistency of the tool Cronbach's alpha was calculated for each of the six individual clusters, and all six clusters combined. A value of Cronbach's alpha greater than 0.7 was taken to indicate internal consistency.

4.6.3 Relationship between the Patient Handling Actions and high risk patient handling practices

To measure the internal consistency for these questions, I calculated a Cronbach's alpha for both the Picture Questions alone and with the cluster questions. A value of Cronbach's alpha greater than 0.7 was taken to indicate internal consistency.

As a further analysis of the reliability and validity of the SPH Survey™, I used all responses to examine the relationship between the Patient Handling Actions and the high risk techniques shown in the Picture Questions. For the statistical analysis, the answer choices for the Picture Questions were reclassified into "No" (Almost never, Very infrequently) and "Yes" (Infrequently, Frequently, Very frequently, Almost always). This is a conservative classification to identify if employees use any high risk techniques. The reliability of the PHA score would be indicated by a higher PHA score for "No" responses.

I used an analysis of variance (ANOVA) to compare Patient Handling Action means with use or non use of the unsafe techniques depicted in the Picture Questions.

ANOVA was also used to compare patient handling action mean scores with "Yes" and "No" classifications for question 8.7: How often do you alone lift, lower, restrain, push or pull using more than 16kg (35 lbs) of force? A Bonferroni correction for eight tests was applied to adjust for multiple testing.

4.6.4 Relationship between SPH Survey™ clusters and injuries and violent incidents

My first study question involved analyzing the relationship between SPH Survey™ clusters and incidents. I was unable to use employer injury and incident data because they reported zero injuries. I therefore used employee-reported injuries and incidents.

On the SPH Survey™, respondents were asked a two-part question regarding incidents including staff injury, patient injury and verbal and physical violence. First they were asked whether or not they had experienced the incident, and in the second part they were asked how often that event had occurred.

For the first part of the question, I used an ANOVA test to analyze the difference in the Patient Handling Action means of respondents who answered “Yes” or “No” to whether they had experienced First Aid, Medical Aid, or Lost Time injuries. I used the same test for respondents answering “Yes” or “No” to patient injury, and verbal or physical violence episodes.

For the second part, I used Spearman's rho (2 tailed) to analyze the correlation between all SPH Survey™ cluster means and the number of incidents.

There were some difficulties with entering the numbers of incidents reported by staff for both verbal and physical violence incidents. Respondents had been asked to write the number of incidents onto the SPH Survey™, but in 11 cases they did not provide a clear response. The data were therefore interpreted as follows: 10 was entered where the respondent indicated a high number (“numerous”, “too many to count”). The highest number stated was entered when a range was written (“5-6”, “10-15”, “10+”). 2 was entered for “a few” and “occasionally”. Completing the SPH Survey™ online would increase accuracy by forcing the respondent to choose a number, rather than allow them to write a comment.

Employee-reported injuries included first-aid, medical aid and lost time injuries, episodes of verbal and physical aggression toward staff by patients, and total patient injuries. I was unable to analyze the correlation between Patient Handling Action means and employer- reported injuries because both employers reported zero first aid, medical aid and lost time staff injuries. Both employers reported injuries to patients, but the numbers were too low to carry out a correlation analysis.

The point of testing the correlation is this: assuming the injury reporting is reliable, if SPH cluster means correlate highly with injury rates then it may be possible to predict injury rates from the SPH cluster scores. That is, higher SPH scores mean lower injury rates and vice versa. It was therefore important to have a range of high and low SPH Survey™ responses. In this study, Unit 2, which had reported 80% competence and compliance with the O'Shea No Lift System, is expected to have higher scores than Unit 1. The combined responses from both units therefore should create a range of high and low answers useful for the correlation calculation.

4.6.5 Comparisons between units

I compared the two units in order to answer my second study question about whether the SPH Survey™ could detect the differences between the two units and deficiencies in their patient handling systems.

The two units used different systems of patient handling - one was the O'Shea No Lift System and the other was a system developed in-house. I expected the scores for the O'Shea No Lift System to be higher because built into the system are key performance indicators that report how many staff are competent and compliant with "no lift" practices. These indicators are an integral part of the O'Shea system. Prior to my study, this unit had demonstrated 80% competence and compliance. The other unit relied on the injuries formally reported to the employer to evaluate their system. Both unit managers said they had zero injuries reported to them for the survey time period. Both unit managers had identified that their patient handling system needed improving. Both

units stated that keeping up with training when the turnover of staff was high created a real problem for them in keeping the patient handling system running.

Given the differences between the two patient handling systems, and because both units had reported zero lost-time patient handling injuries prior to my study, I was interested to see if the SPH Survey™ was able to detect any differences between the units with respect to their SPH Survey™ scores, staff-reported injury rates, high risk patient handling techniques, and verbal and physical aggression toward staff. I also wanted to see what deficiencies the SPH Survey™ was able to diagnose in both units.

I used the ANOVA one-way test to determine differences between the two organizations in terms of their cluster scores and staff and total patient injuries. I used the chi-square for comparing the organizations with respect to episodes of verbal and physical aggression, and use of high risk patient handling techniques.

I used the Mann-Whitney test to analyze whether there was a statistical difference between the two units for Question 2.4 which is fundamental to safe patient handling: “I only lift, pull, push or lower loads (people or objects) that weigh less than 16 kilograms (35 pounds)”.

4.7 Summary

This chapter outlined the study design and methods to examine the reliability and validity of the SPH Survey™, the correlations between leading and lagging indicators, and the sensitivity of the SPH Survey™ in picking up differences in patient handling systems. The next chapter presents the study findings.

CHAPTER 5: STUDY FINDINGS

5.1 Introduction

This chapter presents the study findings according to the study design and methods described in Chapter 4. The characteristics of the 38 respondents are described, followed by the analysis of the correlations between the leading and lagging indicators. The differences between the two units that were detected by the SPH Survey™ complete the chapter.

5.2 Descriptive analysis

38 responses to the Safe Patient Handling Survey™ were returned from the same type of unit from two New Zealand acute care hospitals. 17 responses came from Unit 1 (63% return rate) and 21 from Unit 2 (78% return rate). Unit 1 reported having 20 FTE² positions, 20 inpatients beds and 233 patient admissions (11.65 patient admissions per bed, 11.65 patients per FTE) in the three month period. Unit 2 reported 13 FTE positions and 5 care assistants (18 FTE in total), 32 inpatient beds, and 323 patient admissions in the 3 month period (10.1 patient admissions per bed, 17.9 patients per FTE). Both units had identified patient handling as a significant risk for their staff and patients, and both unit managers stated that improvements to their patient handling systems on their units were needed because of high numbers of new staff. Unit 1 was using parts of a system developed in-house in 2001, and Unit 2 had been using the O'Shea No Lift System since 2005. It is important to note that the respondents from both units reported similar frequency of patient handling: 94.2% (Unit 1) and 95.2% (Unit 2). Table 6 presents the contextual information for both units.

² Full Time Equivalent

Table 6: Contextual information for both units combined for Survey period June1-September 1, 2007

June 1-September 1, 2007	Unit 1	Unit 2
SPH Survey™ Response rate	17 (63%)	21 (78%)
FTE	20	18
Inpatient beds	20	32
Patient admissions	233	323
Patient admissions per bed	11.65	10.1
Patients per FTE	11.65	17.9
Percentage of staff respondents who frequently, very frequently, or almost always do patient handling.	94.2%	95.2%
Patient handling system	In house since 2001	O'Shea No Lift since 2005
Turnover	24%	Unknown
Absenteeism	7%	8%

The SPH Survey™ collected data on 13 demographics: job title, length of time at current job, length of time at current organization, total working hours per week as a Full Time employee, full-time equivalent if Part Time employee, regular hours per week if Casual/Relief employee, type of shift, length of shift, more than one job, total hours per week at all jobs combined, sex, age, and how often the respondent handles patients during a work shift. These demographics for the two units were not significantly different when compared using chi-square analysis. I therefore present the characteristics of the total group of respondents, which is summarized in Table 7.

Table 7: Characteristics of the combined respondent sample

Demographic		Frequency (n=38)	Percent (100%)
Sex	Female	34	89.5
	Male	3	7.9
	Not Selected	1	2.6
	Total	38	100.0
Age	18-24 years	10	26.3
	25-30 years	2	5.3
	31-35 years	5	13.2
	36-40 years	7	18.4
	41-45 years	6	15.8
	46-50 years	4	10.5
	51-55 years	1	2.6
	56-60 years	1	2.6
	Not Selected	2	5.3
	Total	38	100.0
Job Title	Registered Nurse	31	81.6
	Physiotherapist	3	7.9
	Nursing Assistant/Aide	2	5.3
	Caregiver/Carer	1	2.6
	Other	1	2.6
	Total	38	100.0
Shift Length	8 hours	34	89.5
	12 hours	1	2.6
	Other	2	5.3
	Not Selected	1	2.6
	Total	38	100.0
Shift type	"All 3 – days, nights and evenings "	21	55.3
	Days and Evenings	7	18.4
	Days only	4	10.5
	Days and Nights	2	5.3
	Evenings only	1	2.6
	Nights and Evenings	1	2.6
	Nights only	1	2.6
	Not Selected	1	2.6
	Total	38	100.0
FTE	Full time - 37.5 - 40 hours/week	19	50.0
	0.7 - 0.9	12	31.6
	0.4 - 0.6	5	13.2
	0.1 - 0.3	2	5.3
	Not Selected	0	0
	Total	38	100.0

Table 7: Characteristics of the combined respondent sample (con't)

Time in Organization	1 year or less	16	42.1
	2-4 years	3	7.9
	5-7 years	6	15.8
	8-10 years	3	7.9
	11-15 years	2	5.3
	16-20 years	4	10.5
	21+ years	2	5.3
	Not Selected	2	5.3
	Total	38	100.0
Time in job	1 year or less	20	52.6
	2-4 years	5	13.2
	5-7 years	5	13.2
	8-10 years	5	13.2
	11-15 years	1	2.6
	16-20 years	1	2.6
	21+ years	1	2.6
Frequency of patient handling	Almost Always		52.6
	Very Frequently		31.6
	Frequently		10.5

89.5% of respondents were female, 81.6% were registered nurses, 89.5% worked an 8 hour shift, 81.6% worked 0.7 FTE or more, 84.2% indicated that one of their shifts was a day shift, and approximately half were in their job and organization for one year or less. 26% were 18-24 years of age, and 92.1% were working at one job. Importantly, 94.7% responded that they frequently, very frequently, or almost always handle patients in a work shift.

When analyzing the different demographics against total unit scores, those working one year or less at their current job in both units tended to score lower on all SPH clusters compared with the total unit and the difference was significant for the Patient Handling Actions cluster (Fisher's exact test $p=0.028$). This would support both unit managers' observations that turnover of new staff was high during the survey period and there were inadequate resources to keep up with the training of new staff. They both stated that this situation negatively impacted the effectiveness of their safe patient handling systems.

5.3 Relationship between the 6 SPH Survey™ clusters

The Pearson correlation test of the six SPH clusters showed that they correlated strongly with each other and these were statistically significant as shown in Table 8. The strong correlations suggest that employees need to Know what to do, be Able to do it, be Equipped to do it, Want to do it, and have positive Interactions with their co-workers in order to carry out safe Patient Handling Actions. Employers who want their staff to perform better patient handling, therefore should be targeting improvements in knowledge, ability, equipment, motivation *and* workplace culture. This reinforces the importance of addressing all system elements for improving safe patient handling rather than focusing on a single intervention.

Correlations for each of the 12 Patient Handling Actions (see Figure 3) with the means of each workplace condition (SPH clusters) are also presented in Table 8. All of the Actions show positive correlations with the SPH cluster scores, and most of them are statistically significant. This supports the view that the more support employees feel they get from their work place, the more often they perform the safe Patient Handling Actions. This also demonstrates the strong internal validity of the SPH Survey™.

Table 8: Pearson correlations (1-tailed) showing the correlations between SPH cluster means and the cluster means and 12 PH Actions

	PHAm	Knowm	Ablem	Equipm	Wantm	Intm
PHAm	1	.605**	.692**	.667**	.654**	.595**
Knowm		.000	.000	.000	.000	.000
Ablem		1	.723**	.485**	.424**	.303*
Equipm			.000	.002	.007	.043
Wantm			1	.705**	.600**	.518**
Intm				.000	.000	.001
PHA2.1				1	.823**	.714**
PHA2.2					.000	.000
PHA 2.3					1	.710**
PHA 2.4						.000
PHA 2.5						1
PHA 2.6	.694**	.574**	.568**	.451**	.517**	.422**
PHA 2.7	.000	.000	.000	.004	.001	.007
PHA 2.8	.607**	.478**	.322*	.358*	.280	.357*
PHA 2.9	.000	.002	.034	.021	.057	.021
PHA 2.10	.800**	.676**	.575**	.383*	.324*	.280
PHA 2.11	.000	.000	.000	.014	.033	.057
PHA 2.12	.671**	.352*	.492**	.476**	.581**	.342*
PHA 2.13	.000	.022	.002	.003	.000	.026
PHA 2.14	.571**	.174	.253	.443**	.559**	.450**
PHA 2.15	.000	.166	.078	.005	.000	.004
PHA 2.16	.480**	.265	.478**	.411**	.222	.241
PHA 2.17	.002	.068	.002	.009	.107	.088
PHA 2.18	.580**	.466**	.474**	.339*	.137	.295*
PHA 2.19	.000	.003	.003	.027	.223	.048
PHA 2.20	.800**	.210	.466**	.475**	.566**	.461**
PHA 2.21	.000	.120	.003	.003	.000	.003
PHA 2.22	.536**	.347*	.415**	.361*	.043	.309*
PHA 2.23	.001	.024	.008	.020	.405	.040
PHA 2.24	.751**	.500**	.630**	.499**	.493**	.390*
PHA 2.25	.000	.002	.000	.002	.002	.012
PHA 2.26	.791**	.428**	.458**	.547**	.630**	.478**
PHA 2.27	.000	.006	.004	.000	.000	.002
PHA 2.28	.858**	.572**	.577**	.655**	.663**	.738**
PHA 2.29	.000	.000	.000	.000	.000	.000

** Correlation is significant at the 0.01 level (1-tailed).

* Correlation is significant at the 0.05 level (1-tailed).

Table 9: Individual questions in the Patient Handling Actions cluster

PHA2.1: I check if the task creates high risk or increased risk to myself or to the patient
PHA2.2: I determine if the patient is able to help with the task: that is, the patient can do as I say, and is physically able to help
PHA2.3: I choose only the lowest risk 'no-lift' practices for handling the patient safely
PHA2.4: I only lift, pull, push or lower loads (people or objects) that weigh less than 16 kilograms (35 pounds)
PHA2.5: I write the patient handling method, equipment, and help that is needed from other caregivers onto the patient's care plan
PHA2.6: I get help when I need it to be sure I and my patient stay safe
PHA2.7: I carry out the chosen "no-lift" practices without causing harm to the patient or injuring myself
PHA2.8: When the patient's condition changes, I reassess the patient handling risk and write the handling changes onto the care plan
PHA2.9: I report all patient handling incidents, issues or concerns
PHA2.10: I report it when patient care is affected because of lack of staff, patient handling equipment or training
PHA2.11: I report changes in my own ability to carry out patient handling tasks safely

The Cronbach's alpha for each of the six clusters and for the six clusters taken together shows internal consistency for each cluster and for all clusters combined. These are presented in Table 10. Although these results are promising as they are greater than 0.7, they should be interpreted with caution due to the small sample size and large numbers of survey items. These findings do, however, support the Pearson correlation test findings which showed strong and statistically significant correlations between clusters.

Table 10: Cronbach's alpha for each SPH cluster and all SPH clusters combined

Cluster	Cronbach's alpha*	Number of Items
Patient Handling Actions	.894	12
Know what to do	.813	5
Able to do it	.655	6
Equipped to do it	.868	14
Want to do it	.895	7
Interactions	.978	14
All 6 clusters	.971	58

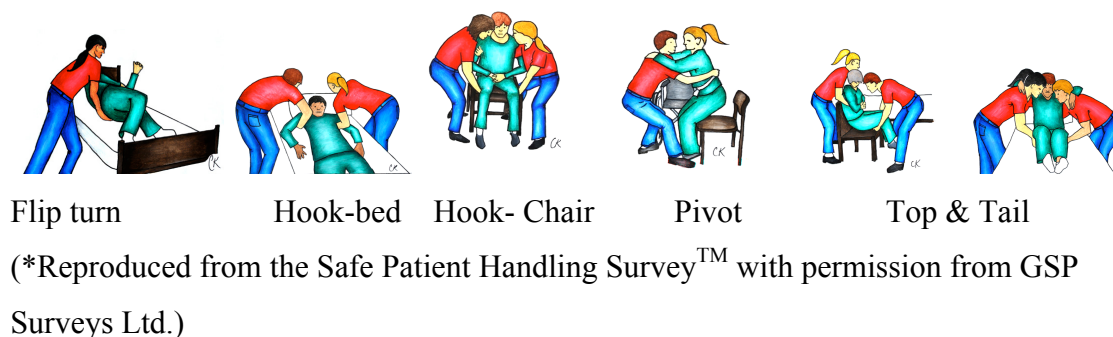
*Cronbach's alpha greater than 0.7 indicates internal consistency

The strong positive correlations shown here mean that conditions in the workplace (as defined and quantified by the Know what to do, Able to do it, Equipped to do it, Want to do it and Interactions clusters) are *all* necessary to make it possible for the employee to perform the safe Patient Handling Actions. The Cronbach's alphas calculated for the six clusters show that there is strong internal consistency for each cluster as well as all clusters combined. Although the sample size is small and the number of items is large, this suggests that the SPH Survey™ tool is consistent in the way it measures the patient handling environment in the two units.

5.4 Relationship between the Patient Handling Actions and high risk patient handling practices

In the Picture Question section, respondents were asked whether or not they used certain techniques to handle their patients. The pictures describe and depict six unsafe and high risk techniques that are known to persist even in workplaces that have a comprehensive patient handling system in place. These techniques have been taught for decades and were considered safe until the 1990s (Accident Compensation Corporation, 2003; National Back Pain Association in collaboration with the Royal College of Nursing, 1999; Victorian WorkCover Authority, 2006). Many patient handlers and employers still believe that they are acceptable, and therefore they may have been incorporated into current patient handling systems. It is important for employers to know if staff are still using these unsafe techniques in order to work towards the lowest risk environment possible for both staff and patients. They are shown in Figure 3.

Figure 3: Unsafe patient handling techniques depicted in the Picture Questions*



I calculated a Cronbach's alpha for the Picture Questions alone, and for the Picture Questions and the six SPH clusters combined. There was internal consistency shown by the value greater than 0.7 for both the Picture Questions alone and combined with all the other clusters. This is shown in Table 11.

Table 11: Cronbach's alpha for Picture Questions alone, and combined with all SPH clusters

Cluster	Cronbach's alpha*	Number of Items
Picture Questions	.898	7
6 SPH clusters plus Picture Questions	.962	65

*Cronbach's alpha greater than 0.7 indicates internal consistency

I was interested to see how Patient Handling Actions (PHA) mean scores varied with usage of these techniques. It was not necessary to test all SPH clusters because Know, Able, Equip, Want and Interactions correlate strongly with the Patient Handling Actions. I expected that those saying "No" to using the techniques would have higher Patient Handling Action mean scores than those who said "Yes". The ANOVA comparison of means is presented in Table 12.

Table 12: ANOVA comparison of Patient Handling Action (PHA) means for those not using (No) and those using (Yes) high risk techniques.

Question	No	Yes	P-value
	Number, PHA mean, (CI)	Number, PHA mean, (CI)	
8.1 Flip turn	N=7, 5.57 (5.13-6.02)	N=29, 4.2 (3.90-4.50)	.000*
8.2 Hook Bed	N=20, 4.60 (4.16-5.14)	N=16, 4.30 (3.83-4.76)	.323
8.3 Hook Chair	N=24, 4.46 (4.04-4.89)	N=12, 4.48 (3.99-4.97)	.950
8.4 Pivot	N=27, 4.39 (4.01-4.77)	N=9, 4.69 (4.10-5.29)	.396
8.5 Top & Tail bed	N=24, 4.47 (4.05-4.89)	N=12, 4.47 (3.97-4.97)	.982
8.6 Top & Tail chair	N=25, 4.58 (4.23-4.93)	N=11, 4.21 (3.51-4.90)	.258
8.7 more than 16 kg	N=12, 4.60 (4.03-5.17)	N=20, 4.29 (3.87-4.71)	.354

*Bonferroni corrected significance level of .00625

N=36

Best score on PHA is 6.

As expected, those not using 8.1 (Flip turn) had a higher mean score on the safe Patient Handling Actions than those who use it, and this was statistically significant. PHA means for those not using 8.2 and 8.6 were also higher. Those saying they did not handle more than 16 kg had a higher PHA mean than those that do. Unexpectedly, however, for 8.3, 8.4 and 8.5 those not using the techniques scored lower in PHA means than those who do use them, although differences were not statistically significant.

The results here are interesting because of the high numbers (N) of respondents who said they use the unsafe techniques, and those who said they handle greater than 16 kg. *If* the patient handling techniques being taught to staff as part of the patient handling system are indeed low risk and no lift, I would have expected the number of respondents (N) using the unsafe techniques to be lower. I would also have expected much lower Patient Handling Action means for respondents who use the unsafe techniques. Instead, the PHA responses show that respondents *believe* they are using safe patient handling techniques, and the picture questions show that the techniques they are actually using are the unsafe ones. It would seem, therefore, that staff believe that these old techniques are still safe for themselves and for their patients.

Taken altogether, the correlations from the Picture Questions section indicate that higher scores on the SPH Survey™ are associated with handling lighter (lower risk) loads. Using the Bonferroni corrected significance level is a conservative approach and coupled with the small sample size means that only very large differences would be detected. This analysis should be repeated with a larger sample size.

However, the data shows that the use of unsafe techniques persists, likely because staff believe that they are still safe. The unit managers can use this information to replace these unsafe techniques with lower risk practices.

5.5 Relationship between SPH Survey™ clusters and injuries and violent incidents

5.5.1 Employee-reported Patient injuries

On the SPH Survey™, the respondents were asked a two-part question about the injuries their patients experienced in the three month survey period during patient handling. First they answered “Yes” or “No” to whether or not their patients had experienced an injury, and in the second part, they were asked to write in the number of times the injury type occurred.

For the first part of the question, respondents answering that their patients had experienced injury (“Yes”) had a lower mean score on the Patient Handling Actions cluster than those saying “No” (Table 13). This supports the theory that safe patient handling practices reduce the risk of injury to patients.

Table 13: ANOVA comparison of means for respondents saying “Yes” or “No” to patient injuries

Injury Type	No	Yes	P-value
	Number, PHA mean, (CI)	Number, PHA mean, (CI)	
Patient Injury	N=29, 4.51 (4.16-4.87)	N=6, 4.15 (3.24-5.07)	.393

For the second part of the question, the correlations between all SPH cluster means and total patient injuries (sum of the number of skin tears and bruises, muscle strain and joint strain, fractures, slip, trip and fall, and fatalities) were negative for all clusters with significant correlations noted with Able, Equip, and Want clusters (see Table 14). This suggests that the higher (better) the scores on the SPH clusters, the lower the injuries to patients due to patient handling. This is useful information to have for promoting patient safety, and the quality of patient care.

Table 14: Spearman's rho correlations between SPH Clusters and Staff- reported Total Patient Injuries

			Total Patient injuries
Spearman's rho	PHAmean	Correlation Coefficient	-.124
		Sig. (2-tailed)	.472
		N	36
	Knowmean	Correlation Coefficient	-.156
		Sig. (2-tailed)	.349
		N	38
	Ablemean	Correlation Coefficient	-.365(*)
		Sig. (2-tailed)	.024
		N	38
	Equipmean	Correlation Coefficient	-.406(*)
		Sig. (2-tailed)	.011
		N	38
	Wantmean	Correlation Coefficient	-.349(*)
		Sig. (2-tailed)	.032
		N	38
	Intmean	Correlation Coefficient	-.295
		Sig. (2-tailed)	.072
		N	38

* Correlation is significant at the 0.05 level (2-tailed).

5.5.2 Employee-reported Staff injuries

On the SPH Survey™, respondents were asked a two part question about the injuries they experienced in the three month survey period. First they answered “Yes” or “No” to whether or not they had experienced a first-aid, medical aid, or lost time injury during patient handling during the three-month survey period. In the second part, they were asked to write in the number of times these injuries occurred.

As expected, respondents answering that they had experienced First Aid injury (“Yes”) had a lower mean score for Patient Handling Actions than those saying “No” (Table 15). For question PHA2.4 which asks how often respondents handle loads less than 16 kg, those saying “Yes” to First Aid injuries had a lower PHA mean than those saying “No” (Yes: N=10, mean 3.20, CI (1.99-4.41) versus No: N=26, mean 4.08, CI (2.69-4.00)

p=0.812). This suggests that those experiencing First Aid injuries tend to lift weights that are too high. This is supported by the findings in the Picture Questions, which suggest that staff continue to use unsafe techniques believing that they are safe. For Medical Aid injuries, the same pattern emerged, however there was only one respondent who reported a Medical Aid injury, so it is not possible to draw any conclusions from this finding. There were no Lost Time injuries reported by staff.

It is important to keep in mind that the optimal score on the SPH Survey™ clusters is higher than 5.4 (90%), and zero use of unsafe techniques. Repeating this analysis on a larger group of patient handlers with a broader range of highest and low scores could result in findings that support the theory that staff with higher scores suffer fewer injuries.

Table 15: ANOVA comparison of means for respondents saying “Yes” or “No” to staff injuries

Injury Type	No	Yes	P-value
	Number, PHA mean, (CI)	Number, PHA mean, (CI)	
First Aid	N=26, 4.75 (4.00-4.71)	N=10, 4.36 (4.06-5.45)	0.248
Medical Aid	N=35, 4.45 (4.13-4.76)	N=1, 5.17 (-)	0.445
Lost Time	0	0	0

The second part of the injury question asking how many injuries respondents who answered “Yes” had experienced was analyzed using the Spearman’s rho correlation test between the numbers of First Aid and Medical Aid injuries reported and scores on all the SPH Survey™ clusters. As shown in Table 16, staff injuries (medical aid and first-aid) did not correlate with SPH cluster score means. However, there were differences between the two units with Unit 1 reporting more First Aid and Medical Aid injuries than Unit 2. This suggests that higher SPH cluster scores may indeed correlate with lower injury rates and warrants further study with a larger sample size. This is discussed further when comparing the two units in the next section.

Table 16: Spearman’s rho correlations between SPH cluster score means and Staff-reported First Aid and Medical Aid injuries

			Staff First Aid	Staff Medical Aid
Spearman's rho	PHAm	Correlation Coefficient	.236	.171
		Sig. (2-tailed)	.165	.319
		N	36	36
	Knowm	Correlation Coefficient	.038	.106
		Sig. (2-tailed)	.824	.527
		N	37	38
	Ablem	Correlation Coefficient	.026	-.038
		Sig. (2-tailed)	.880	.823
		N	37	38
	Equipm	Correlation Coefficient	.090	.255
		Sig. (2-tailed)	.597	.122
		N	37	38
	Wantm	Correlation Coefficient	.129	.278
		Sig. (2-tailed)	.448	.091
		N	37	38
	Intm	Correlation Coefficient	.093	.173
		Sig. (2-tailed)	.583	.300
		N	37	38

5.5.3 Employee-reported Violence

On the SPH Survey™, respondents were asked a two-part question about the verbal and physical violence they experienced from patients in the three month survey period. First they answered “Yes” or “No” to whether or not they had experienced a verbal and physical violence incident during patient handling. In the second part, they were asked to write the number of times these incidents occurred.

Respondents answering that they had experienced a verbal or physical violence incident (“Yes”) had a lower mean score on the patient handling actions cluster than those saying “No”, and this is shown in Table 17. This finding supports the theory that safer patient handling results in fewer episodes of verbal and physical violence for staff. The

sample size is small, however, and the total number of staff reporting violent incidents is high (verbal=69.4% and physical=75%). A sample that had a broader variation of scores may produce a clearer result.

Table 17: ANOVA comparison of Patient Handling Action means for respondents saying “Yes” or “No” to violence incidents.

Incident Type	No	Yes	P-value
	Number, PHA mean, (CI)	Number, PHA mean, (CI)	
Verbal violence	N=11, 4.61 (3.96-5.27)	N=25, 4.40 (4.03-4.77)	0.540
Physical violence	N=9, 4.75 (3.96-5.54)	N=27, 4.37 (4.03-4.72)	0.288

The second part of the violence question asking how many incidents respondents who answered “Yes” had experienced was analyzed using the Spearman’s rho correlation test between the numbers of verbal and physical violence reported and scores on all the SPH Survey™ clusters.

There was a negative correlation between all SPH cluster scores and numbers of physical violence episodes reported by respondents. This supports the findings in the first part of the violence questions and the theory that safer patient handling results in lower numbers of physical violence episodes. The correlations between the number of verbal violence episodes and SPH cluster scores were also negative for three clusters. The correlations were not statistically significant, probably due to the small sample size (Table 18).

Table 18: Spearman's rho correlations between SPH cluster score means and numbers of verbal and physical violence incidents

			verbal	physical
Spearman's rho	SWAmean	Correlation Coefficient	.028	-.118
		Sig. (2-tailed)	.871	.492
		N	36	36
	Knowmean	Correlation Coefficient	.004	-.075
		Sig. (2-tailed)	.981	.655
		N	38	38
	Ablemean	Correlation Coefficient	.089	-.084
		Sig. (2-tailed)	.595	.614
		N	38	38
	Equipmean	Correlation Coefficient	-.101	-.144
		Sig. (2-tailed)	.547	.390
		N	38	38
	Wantmean	Correlation Coefficient	-.129	-.220
		Sig. (2-tailed)	.441	.184
		N	38	38
	Intmean	Correlation Coefficient	-.189	-.234
		Sig. (2-tailed)	.255	.158
		N	38	38

The findings from the violence questions support the theory that safer patient handling results in fewer incidents of verbal and physical violence directed at staff by patients. This could be because safer patient handling involves a risk assessment which takes patient factors into account, and low force techniques that are less painful and invasive than lifting techniques.

5.6 Comparison between Unit 1 and Unit 2

Demographically both units are similar, except for the number of patients per FTE (Unit 1 reported 11.65 vs 17.9 for Unit 2). The O'Shea No Lift System includes a measurement of competence and compliance so Unit 2 knew they had reached 80% staff compliance and competence with no lift patient handling after the implementation of their system. However, the unit manager felt that high turnover of new graduates during

the survey period had probably eroded this. Unit 1 used injury rates only to measure the effectiveness of their patient handling system. The managers of both units stated that their staff had reported no First Aid injuries, no Medical Aid injuries, and no Lost Time injuries. Both units said that they wish to improve their patient handling systems, and that high turnover of staff made keeping up with training difficult.

I was interested see whether the SPH Survey™ data supported the observation that the O’Shea No Lift System performs well in providing a complete system of patient handling, especially since both employers said they had no staff injuries. I was also interested in efficiently diagnosing and advising the units where they could improve their patient handling systems. Both unit managers expressed that being able to target and remedy trouble spots, and monitor and evaluate those improvements were important to them.

5.6.1 SPH Survey™ Scores

SPH Cluster Scores:

Unit 2 scored better than Unit 1 on all SPH Survey™ clusters. The differences for Able, Equipped, and Want cluster means were statistically significant. This is shown in Table 19. (Also presented in Figure 4).

Table 19: SPH Survey™ Cluster Score

SPH Cluster	% score Unit 1	% score Unit 2
PH Actions	65.4	72.5
Know	75.5	84.4
Able	68.5	81.4
Equipped	62.6	73.2
Want	46.9	64.2
Interactions	53.8	63.8

ANOVA - comparison of means

Mean Unit 1	Mean Unit 2	Significance p-value
4.30	4.63	0.250
4.78	5.22	0.074
4.42	5.07	0.005**
4.13	4.66	0.019*
3.34	4.21	0.02*
3.69	4.19	0.257

Fisher’s Exact Test * p<0.05 ** p<0.01

The six SPH clusters contain 58 questions. When comparing the means of the responses for each question, Unit 1 scored lower than Unit 2 on all but three questions, suggesting that the patient handling system on Unit 2 is functioning better than on Unit 1 across all SPH Survey™ items.

These findings suggest that Unit 2 which is using the O'Shea No Lift System is performing markedly better than Unit 1, however both units need to implement system improvements to reach over 90% to achieve a low-risk patient handling environment. Given that both unit managers had reported zero injuries, this supports the observation that injury rates alone are not adequate to measure system effectiveness, nor can they offer any information on the level of risk in the work environment. The SPH Survey™ seems to be able to detect and quantify patient handling system elements that require improvement.

5.6.2 Question PHA2.4

The whole point of safe patient handling systems is to provide a low risk environment for staff to care for patients. The lowest risk patient handling involves pushing, pulling, lifting, lowering light loads with low force. This approach was simplified on the SPH Survey™ by asking respondents whether or not they handle loads more than 16 Kg, although this would still be a high risk load in reach, overhead, or crouch positions. I therefore wanted to analyze how respondents scored on question PHA2.4 (I only lift, push, pull or lower loads (people or objects) that weigh less than 16 kg (35 pounds)). The best answer would be “Almost always”. The remaining SPH Survey™ questions evaluate how well employees feel they are supported and enabled to carry out this lower load and safer approach to patient handling.

For both units, the scores for PHA2.4 ranked in the lowest-scored 10 items. Unit 1 scored only 30% (Very infrequently) while Unit 2 scored better at 59% (Frequently) but well short of the optimal 90% (Almost always). The difference was statistically different as shown in Table 20. (Also presented in Figure 7).

Table 20: Mann-Whitney test of difference in responses to 2.4 for each Unit

	Unit	N	Mean Rank	Sum of Ranks	P-value
2.4	1.00	16	13.38	214.00	.008*
	2.00	20	22.60	452.00	
	Total	36			

*A p-value ($p < 0.05$) indicates a significant difference between the two groups.

As a check that PHA2.4 was correctly interpreted by respondents, a second opposite question was asked in 8.7 “How often do you alone lift, lower, restrain, push or pull using more than 16kg (35 lbs) of force?”. The best answer here would be “Almost never”. The responses were reclassified into “Yes” (infrequently, frequently, very frequently or almost always) and “No” (Almost never, very infrequently) answers. Unit 1 reported that 73.5% say “Yes” they lift more than 16 kg, and Unit 2 said “Yes” they do this 55% of the time. The fact that the responses for question 8.7 were consistent with question 2.4 demonstrates strong internal reliability and validity.

The other question which is important is 2.9 (“I report all patient handling incidents, issues or concerns”) because it shows to what degree staff say they report incidents. Both units scored “Very Frequently” on this question (80% and 81%) which means that staff say they use the existing reporting system, which allows for lost time injury reports only. The additional injury data collected by the SPH Survey™ is First Aid, Medical Aid, Patient injury and violence incidents, which is valuable information for both units in order to create a safe work environment.

The findings here suggest that the SPH Survey™ was able to identify statistically significant differences between Unit 1 and Unit 2 with respect to safer patient handling, even though both employers reported zero injuries and Unit 2 was busier than Unit 1. Scores indicate that staff on Unit 2 handle lower risk loads “Frequently” compared with staff on Unit 1 who handle lower risk loads “Very Infrequently”. Handling lower loads results in fewer injuries to both staff and patients. Both units are advised to improve

their systems so that staff score higher than 90% which means that they are “Almost Always” handling lower loads.

Repeating this analysis with a larger sample size, and conducting SPH Survey™s before and after an improvement intervention would be helpful in reinforcing these findings and confirming the sensitivity of the tool.

5.6.3 Picture Questions







With respect to the use of the techniques in the Picture Questions, there was a difference between organizations with Unit 1 using the unsafe techniques less often than Unit 2 and for the 8.2 underarm hook (bed), 8.4 pivot transfer, and 8.5 top and tail lifts this difference was significant (see Table 21).

The data from the picture questions depicting high risk patient handling techniques showed that the techniques are still in use in both units to varying degrees. If the units had completely transitioned to No Lift patient handling practices, the numbers of staff using these techniques would be close to zero percent. It is particularly surprising to see so many of the Unit 2 staff using these techniques because O’Shea No Lift includes low risk practices that replace these old techniques. The unit manager thought that perhaps new staff had not yet received training in the O’Shea techniques, a theory supported by the fact that 52% of respondents had been on the unit one year or less, scored lower in each SPH cluster than the average for the total organization, and used the unsafe techniques more than the total organization. It would be interesting to see what techniques the nursing schools are teaching their students.

It is interesting to see the responses to questions PHA2.4 and 8.7 which asked how often respondents work with loads greater than and less than 16 Kg. Handling more than 16 Kg loads is associated with higher rates of injury, and this was supported by findings in this study discussed in Chapter 2. Unit 1 respondents reported higher injury rates for staff First Aid and Medical Aid, violence incidents, and patient skin tears and bruises

than Unit 2, and 73% of Unit 1 respondents said they handled loads greater than 16 Kg (compared to 55% for Unit 2). This finding was confirmed by their answers regarding how often they use loads less than 16 kg (30% for Unit 1 and 59% for Unit 2). These findings are presented in Table 21.

Table 21: Comparison of Picture Question SPH Scores

Unsafe Technique	% Unit 1 Using	% Unit 2 Using	Notes
	88.2	76.0%	
	23.6%	61.9%	Significant (Fisher's Exact Test $p < .05$).
	17.7%	42.8%	
	5.9%	42.8%	Significant (Fisher's Exact Test $p < .05$).
	5.9%	52.4%	Significant (Fisher's Exact Test $p < .05$).
	17.7%	38.1%	
8.7: How often do you move loads greater than 16 Kg during patient handling?	73.5%	55.0%	Percentage of respondents saying they infrequently, frequently, very frequently or almost always lift more than 16 kg.
2.4: How often do you move loads less than 16 Kg during patient handling?	30.0%	59.0%	Percentage of respondents saying they almost never or infrequently move loads less than 16 kg.

The data from the Picture Questions provide rich insight into what staff are actually doing during patient handling. Although both unit managers reported zero injuries for the survey period, the SPH Survey™ revealed strong indications of high risk practices that are likely to result in injury to both staff and patients. Addressing this situation immediately would prevent injury to both staff and patients. If the patient handling system was evaluated using injury data only, it would not be possible to discover that high-risk practices are commonplace. The problem with using solely injury rates is that by definition an incident investigation occurs only after an injury is reported. The ensuing incident investigation is a reaction to the injury event, and is usually limited to the causes of the single incident rather than a wider system evaluation. If no injuries are reported, the employer assumes that the patient handling system is functioning well and no further evaluations are done. The SPH Survey™ seems to clearly identify high risk patient handling and therefore allows the opportunity for targeted and proactive improvements to be implemented.

5.6.4 Verbal and physical violence

Using injury rates alone, it is not possible to evaluate the amount of verbal and physical violence that patients direct at staff. The O'Shea No Lift System includes a risk assessment which takes into consideration the patient's ability to comprehend and co-operate with the patient handling task. In addition, the O'Shea No Lift techniques are less likely to cause painful injuries to patients, which makes the interaction between staff and patient more gentle. I compared the SPH Survey™ data from the two units to see if it was able to detect differences between the units, expecting that Unit 2 would score better than Unit 1.

For Unit 1, 82% answered “yes” to experiencing acts of verbal aggression (swearing, threats, yelling, sexual harassment etc) in the 3 month survey period. This is considerably higher than the 57% on Unit 2. The number of times verbal incidents occurred was higher for Unit 1 than for Unit 2 (76% reported 1-5 incidents for Unit 1 compared to 38% for Unit 2), and this was a statistically significant difference. The

number of respondents answering “yes” to experiencing acts of physical aggression (pinching, hitting, spitting, biting, grabbing, kicking etc) by patients was significantly higher in Unit 1 than in Unit 2 (94% versus 52%), and the number of physical aggression incidents reported by Unit 1 was significantly higher than Unit 2 at 77% of Unit 1 reporting 1-5 incidents compared with 48% of Unit 2 respondents. The findings are presented in Table 22. (Also presented in Figure 5).

Table 22: Comparison of Units 1 and 2: staff reports of verbal and physical violence

	Unit 1	Unit 2	Significance Fisher’s exact test
Verbal incident in past 3 months (swearing, threats, yelling, sexual harassment etc)	Yes: 82%	Yes: 57%	p=0.071
Number of verbal incidents	1-5: 76% 6-10: 6%	1-5: 38% 6-10: 10%	p=0.039*
Physical incident in past 3 months (pinching, hitting, spitting, biting, grabbing, kicking etc)	Yes: 94%	Yes: 52%	p=0.012*
Number of physical incidents	1-5: 77% 6-10: 12%	1-5: 48% 6-10: 5%	p=0.005**

* p<0.05

** p<0.01

The findings seem to indicate that staff on both units are exposed to high amounts of verbal and physical violence directed to them by patients, and staff on Unit 1 reported higher amounts than Unit 2. The findings support the use of the SPH Survey™ to evaluate levels of verbal and physical violence during patient handling and are consistent with reports in the literature that that No Lift patient handling techniques create less stress for both staff and patients because they are not painful, are less invasive of personal space, and create distance between the handler and the patient. These findings also support the correlations in section 5.5.3 that suggest that the lower scores on the SPH Survey™ are associated with higher verbal and physical violence incidence.

This situation needs to be addressed urgently on both units to create safety for both staff and patients. It is not surprising that staff turnover is high when violence is commonplace at work. In addition, it would be important to investigate why patients feel they need to use violence towards staff.

5.6.5 Injury rates

5.6.5.1 Staff injuries

Under-reporting of injuries is a common problem in health care which is why using only injury data to evaluate a patient handling system is not reliable. In this study, both organizations reported zero injuries, and I wanted to see how the staff reports of injury on the SPH Survey™ compared with the employer reports. I also wanted to compare the two units with respect to the level of injuries as reported by staff. The O'Shea No Lift Systems are known to result in fewer injuries, and I was expecting that the staff report injury rate for Unit 2 would be lower than Unit 1.

Respondents were asked how often they were injured during handling of patients. In the SPH Survey™, First Aid injuries were defined as “injuries you looked after yourself and then went back to work right away. This might be a scratch, bruise, or musculoskeletal pain”. Medical Aid injuries were defined as “injuries where you needed treatment by a health professional AND you were **able to return to work** for your next scheduled shift after the injury”. Lost time injuries were defined as “injuries where you needed treatment by a health professional AND needed to **take time off work** to recover from the injury”.

The rate of injury is based on 200,000 hours worked. This is the number of hours per year worked by 100 full-time employees and is a common rate used. In this study, First Aid injury during patient handling reported by employees for Unit 1 was 328 injuries per 200,000 hours worked compared to 146 injuries per 200,000 hours worked for Unit 2. Unit 2 staff reported zero Medical Aid injuries, whereas the rate of Medical Aid injury for Unit 1 was 205 injuries per 200,000 hours worked. In contrast, both

employers reported zero First Aid and Medical Aid injuries. The reason that the employers reported zero for First aid injuries is because they do not collect that data. Medical aid injuries should have been collected by the employer because they generally trigger a compensation claim to pay the medical costs. Medical aid injuries are serious and can lead to worsening of symptoms and lost time if not managed well. It is possible that employees self-treat, take sick leave, or pay their own medical aid. First aid and Medical Aid data is useful for employers to collect as shown here in this study where there is a high frequency of First Aid and Medical Aid injuries: the staff in Unit 1 are reporting more than three First Aid and more than two Medical Aid injuries each in a three-month period. Unit 2 employees reported half the injury rate for First Aid injuries, and no Medical Aid injuries. The SPH Survey™ was able to detect that the unit using the O'Shea No Lift System performed better in creating an environment of lower First Aid and Medical Aid injuries.

Both units showed under-reporting with Unit 1 more than Unit 2. This may be because the reporting systems do not exist, are not used, or the culture of reporting is unhealthy. The findings are presented in Table 23. (Also presented in Figure 6).

Table 23: Staff injury rate per 200,000 hours worked as reported on the SPH Survey™

Injury rate	Unit 1 employee	Unit 1 employer	Unit 2 employee	Unit 2 employer
First aid	328	0	146	0
Medical aid	205	0	0	0

5.6.5.2 Patient injuries

Patient injuries related to handling are rarely collected by health care employers. I wanted to see if the SPH Survey™ could detect levels of patient injury (as reported by staff) related to handling. I expected that Unit 2 would perform better than Unit 1 because the O'Shea No Lift System has been shown to reduce patient injury.

Respondents were asked whether their patients had been injured during patient handling, and how many times each injury occurred: skin tears and bruises; muscle strain, joint strain; fractures; slip, trip; fall; and fatalities.

There was under-reporting of patient injuries as shown where employees reported more patient injuries on the SPH Survey™ than employers had on record. This could be because of time lags in their data collection systems, or that employers do not have adequate systems in place for reporting patient injury. On the SPH Survey™, the employees and employers reported the findings shown in Table 24.

Table 24: Patient injury rate as percentage of patient admissions

Patient Injury	Unit 1 employee	Unit 1 employer	Unit 2 employee	Unit 2 employer
Skin tear, bruises	1.7%	0.9%	0.6%	0.6%
Muscle or joint strain	0	0	0	0
Fractures	0	0	0.6%	0
Slip trip fall	0.9%	3.4%	1.9%	0
Fatalities	0	0	0	0

Unit 2 had better patient injury rates than Unit 1. The O'Shea No Lift system includes a risk assessment for the patient's ability to assist with a patient handling task, and is known to reduce patient injury.

The results suggest that the SPH Survey™ was able to detect differences in patient injury in five different injury categories. It would be interesting to analyze SPH Survey™ results for a larger sample size, and compare pre-and post intervention responses.

5.7 Summary

The statistical analyses were performed in order to verify the validity and reliability of the SPH Survey™ as a tool to measure safe patient handling systems, analyze the correlation between SPH Survey™ scores and rates of patient and staff injury and

violence incidents, and determine if the tool was able to detect differences in the patient handling systems used by the two units.

The results showed that the SPH Survey™ had strong internal validity and reliability as a tool to measure safe patient handling systems.

Although the sample was small, a trend was evident that higher SPH cluster scores correlated with lower patient and staff injuries and incidents. This observation was supported by the comparison of the units, where the comprehensive O'Shea No Lift System on Unit 2 had higher scores and also lower patient and staff injuries and violence incidents than Unit 1. I had expected that Unit 2 would have higher cluster scores and lower staff and patient injuries and violence incidents given that it was using the O'Shea No Lift System and had demonstrated and 80% compliance and competence.

The SPH Survey™ was able to detect considerable differences in the two systems of patient handling, even though both units had official reports of zero staff injuries. In addition, high risk practices and techniques were detected on both units which are likely to result in injury to both staff and patients. Both units now have specific target areas for improvement, and should be able to achieve the minimum of 90% in all SPH clusters, which would be evidence of a work environment that supports staff stay well and to deliver safe patient care.

Unit 2 scored higher on all but 3 items on the SPH Survey™, showed lower incidence of verbal and physical violence towards staff, and had lower staff and patient injuries. It was also interesting to note that Unit 2 scored considerably better than Unit 1 even with a much higher patient load per FTE (Unit 1:11.65 vs Unit 2:17.9). This suggests that effective patient handling systems may boost productivity as well as lower the risk to staff and patients.

The findings from the statistical analysis suggests that the SPH Survey™ is a valid and reliable way to easily detect both strengths and deficiencies in patient handling systems.

It may also be possible to evaluate and monitor the level of injury risk to both patients and staff.

CHAPTER 6: DISCUSSION AND CONCLUSIONS

6.1 Introduction

This is a small observational study that was conducted on two equivalent acute-care hospital units using two different patient handling systems. The purpose was to verify the validity and reliability of the SPH Survey™, determine if a correlation could be established between SPH Survey™ scores and injury rates, and if the SPH Survey™ is a valid way to evaluate patient handling systems. The findings suggest that there could be a correlation between SPH Survey™ scores and injury rates, and that the SPH Survey™ is able to detect differences in patient handling systems and help to diagnose problem areas. The findings support the view that the SPH Survey™ is a valid and reliable way to measure and monitor the effectiveness of patient handling systems.

6.2 Validity and reliability of the SPH Survey™

The Cronbach's alpha test of internal consistency of both the independent clusters (Patient Handling Actions, Know, Able, Equipped, Want, Interactions and Picture Questions) and all clusters combined should be interpreted with caution due to the small sample size and large numbers of items. However, all but one were higher than 0.7 indicating that there was internal consistency of the SPH Survey™ tool. This is expected given the strong Pearson correlations found between SPH Survey™ clusters (Table 8).

The findings from the statistical analysis shows that the SPH Survey™ tool has strong positive correlations between SPH clusters which suggests that there is strong internal validity and reliability within the SPH Survey™. This also supports the view that staff are more likely to perform safe patient handling actions when they are adequately supported. The SPH clusters are there to measure whether employees Know what to do, are Able to do it, are Equipped to do it, Want to do it, and have supportive and positive

workplace Interactions to do the safe patient handling actions expected of them. The statistical analysis shows that these elements are strongly correlated, which means that they are valid elements of a total system.

The Patient Handling Actions were developed using current best practice, and these were tested on participants who do patient handling on a regular basis. In previous testing, patient handlers rated these actions as important (over 90%) for handling patients safely. This demonstrates that the SPH Survey™ also has strong face validity.

The picture questions are patient handling techniques that have been determined in the literature to be too high risk for regular use. They were included in order to specify which techniques staff are actually using. It was interesting to note that Unit 2 reported handling lower weights although they reported using unsafe techniques more often. It is virtually impossible to do those techniques with weights less than 16 kg, therefore it seems that staff still believe that the unsafe techniques are actually safe. When reporting back the results to staff, it would be interesting to clarify this finding.³

Attempting to discover a correlation between SPH cluster scores and injuries to staff and patients is difficult because the sample size was small and injury rates are inherently unreliable. This is shown with a comparison of the number of injuries reported by employees and employers where it is evident that there is considerable under-reporting of injuries to the employer. Employees reported more injuries on the SPH Survey™ than they had to their employers, both of whom reported zero first-aid, medical aid, and lost time injuries, and lower patient injuries.

It is possible that employees under-reported incidents on the SPH Survey™ as well, especially since they were asked to remember their experience over the previous three months. For this reason, injury rates are not reliable indicators of system status within an organization, and this makes attempting a correlation between cluster scores and injury rates difficult.

³ It was not part of the study design for me to do a follow up presentation to staff. The unit managers disseminated the results according to their organizational policy.

This is why I suggest that solely using injury rates to determine improvements in patient handling systems is not valid or reliable. This is supported in the literature, where injury rates will actually increase after an intervention, only because people learn how to report injuries and it becomes more culturally acceptable. It is therefore unclear whether system improvements have made the situation worse, or whether reporting is more efficient. The findings in this study suggest that the SPH Survey™ does measure valid system elements, and is sensitive enough to diagnose where system deficiencies are independent of injury rates. Further study with a larger sample size, and perhaps pre and post intervention SPH Surveys™ would be a good way to test this further.

6.3 Answering the study questions

My study questions were:

1. How do scores on the Safe Patient Handling Survey™ correlate with incidents?
Incidents are staff injuries, patient injuries, and verbal and physical violence directed to staff by patients. Although the reliability of injury rates is questionable, I wanted to see if SPH scores correlate negatively with incidents (the higher (better) the score, the lower the incident rate and vice versa). This would support the possibility of diagnosing a work environment that is at risk for suffering an incident, *before* an incident happens.
2. How sensitive is the Safe Patient Handling Survey™ for detecting differences in patient handling systems in two workplaces? In my study, both employers reported that they had zero First Aid, Medical Aid and Lost time injuries for the survey period and using this traditional method of evaluation, they would be considered equal. Could the Safe Patient Handling Survey™ evaluate and quantify the differences between the two units? Which unit is higher risk? Could problem areas and strengths be diagnosed?

With respect to answering the first question, a negative correlation between cluster scores and patient injuries was found, indicating that a better system of patient handling

will lead to fewer injuries for patients. This suggests that SPH cluster scores are a leading indicator for proactively improving practices in order to protect patients from injury related to patient handling. The same negative correlation is anticipated with SPH cluster scores and staff injuries, and perhaps this will be seen with a larger sample size that can achieve reasonable statistical power.

The second question looks at the two systems of patient handling in the two organizations. Unit 2 seems to have a system that is functioning much better than Unit 1, although both units score lower than the 90% level demonstrating optimal systems functioning. There were differences in the patient handling action means with those reporting higher numbers of incidents of verbal aggression and physical aggression having lower PHA scores. There were also significant differences between the two units with respect to episodes of verbal and physical violence. Unit 2 using the O'Shea No Lift System reported significantly fewer episodes of verbal and physical violence directed to their staff compared to Unit 1. This is likely to be because of better risk assessment, and knowledge of gentler no lift techniques and practices.

Both organizations have specific areas to work on with respect to improving their systems. It is interesting to note that both organizations score highest on “Know what to do”, followed by “Able to do it” clusters. This reflects the focus on equipment training and techniques that traditionally part of patient handling education. The lowest scores for both organizations are the “Want to do it” and the “Interactions”. “Want to do it” measures how well the organization supports their employees to carry out safe patient handling – are employees given useful feedback about their patient handling? Are they motivated to do safe patient handling? “Interaction” is a culture measure which shows what working in the organization is like. A positive and supportive work place is associated with carrying out desirable work practices. It can also indicate stress and strain that employees may be under at work. Engaging with the employees to find out what is at the source of these lower scores is an important strategy in improving the workplace.

It is also interesting to see that employees score their own patient handling actions at about 10-12% lower than the Know and Able clusters. This could be because the organization's patient handling education is not in line with current "No Lift" practices. Or, they do not have adequate equipment or a supportive enough workplace culture to actually do the safe patient handling that they Know they should be doing. This would be a good way to engage the staff into an improvement plan – "What is preventing you from performing "No Lift" patient handling? A second survey after improvement interventions are embedded would be useful to measure progress.

Unfortunately turnover rates were not available for each unit, but for the entire organization for Unit 1, the turnover rate is 24%. Absenteeism for both organizations was at approximately 7-8%. These are lagging indicators which can show improvements as the patient handling and reporting systems improve.

The findings from this study support the use of the SPH Survey™ as a way to quantify factors that we know impact the success of health and safety programs such as workplace culture, alignment of patient care priorities and safety, communication, compliance, competency, risk assessment, and commitment to quality care and safety. The scores generated provide leading indicators that identify high risk patient handling, and therefore allow managers to proactively improve the workplace before injury occurs. The SPH Survey™ is designed to be used often as a way of monitoring these leading indicators to ensure that patient handling stays low risk.

As shown in the literature, the injury rates to health care employees are still high, health care workers are difficult to recruit and retain, and costs for patient care are spiraling upward. Elizabeth Langford said that patient handling is the highest occupational risk of injury for women (Langford, 1997), and sadly this situation continues in most countries. Safe patient handling is one way to improve the recruitment and retention of staff, reduce the risk of injury to staff and to patients, improve productivity, boost morale, and improve the quality of patient care. Safe patient handling has been an issue for over 100 years, and many interventions have been tried. Evidence strongly suggests that the

answer to reducing injuries for staff and patients lies in having a complete system of patient handling, and we now have a way to evaluate and monitor health care workplaces so that there is no longer any excuse for tolerating high risk patient handling. Nursing schools, caregiver training programs, workplaces, governments, insurers and compliance agencies must act to improve health care workplaces, or continue losing and discouraging professionals from pursuing careers in health care.

6.4 Strengths and limitations

My study was designed to be within the constraints of a Masters thesis. The SPH Survey™ was conducted on two units in two acute-care hospitals within New Zealand, each using a different patient handling system. The SPH Survey™ was run once and employees were asked about the time period covering June 1 to September 1, 2007. Employees completed the paper-based SPH Survey™ during September 1- 26, 2007, and the employers returned their injury data by November, 2007. I entered all responses onto the online SPH Survey™ to allow for data analysis. Data were cross-checked twice. SPSS was the statistical program used to analyze the data.

Findings from the statistical analysis showed that the SPH Survey™ yields valid and reliable data for health care employers to diagnose and monitor improvements to their patient handling systems in order to create safe work environments for both staff and patients. The information from the SPH Survey™ seems to be more specific and reliable than using injury data only.

6.4.1 Interpretation of results

The results of this study need to be interpreted with caution because it is a small study with a large number of statistical tests. The tests were used because there were many aspects of the tool that required investigation.

Some limitations in conducting the statistical consistency, correlation and comparison analyses were:

- The sample size is small and this impacts the significance calculations, especially where data are divided into many answers and groupings. A much larger sample is required so that there are larger numbers of reports of injuries and violence incidents. This would improve significance.
- The time period was three months which coincides with the financial quarter year, and this may contribute to the smaller number of injuries/incidents reported. Taken over a whole year, injury rates would be higher.
- Under-reporting of injuries/incidents is always a consideration, and it is likely that reporting would also be better with improvements to the whole patient handling system. Under-reporting is evidenced in this study by comparing the number of injuries/incidents reported by staff on the SPH Survey™ employee portion compared to the numbers reported by the employers on the employer portion of the SPH Survey™. The employees reported injuries up to three times more often on the SPH Survey™ than they had reported to their employers. (See Table 23).
- If the employers in my study had tracked all types of injuries, I could have used that information to carry out the correlation analysis between injuries and SPH Survey™ scores. However, the SPH Survey™ is designed to compare the injury data collected by employers with that reported by employees. The results revealed that there is under-reporting on both units, and this concurs with the literature about the high degree of under-reporting in health care organizations.

6.4.2 Sample

Even with a small sample size, the analysis showed some significant differences between the scores on the two units. A larger sample would have increased the

significance. The findings suggest that Unit 2 is performing better than Unit 1 in terms of the patient handling system. This is consistent with the perceptions of the unit managers prior to the study. On viewing the results, the unit managers were not surprised by the overall SPH cluster scores, and found the individual question scores helpful for opening the dialogue with staff for planning improvements.

It is important when performing the SPH Survey™ to achieve as close as possible to surveying 100% of the population. This is to reduce the chance that one respondent will skew the scores if they were to give excessively low or high answers. In my study the response rates were 63% and 78%, which is high for a survey study, but short of the preferred 100%. Repeating the study in one hospital with a view of comparing before and after an intervention that has involved the staff may increase the response rate.

The sample size did not allow for a determination of the threshold SPH for absolute risk, which is the SPH Survey™ scores needed to bring the risk of injury from patient handling to zero. The study by Roithmayr and Dyck suggests that the optimal score is 90% or higher, and a larger study is needed to determine that this is also the case for the SPH Survey™. The results here show promise that the SPH Survey™ is a tool that could quantify this threshold. This study shows that the tool can still be used to quantify improvements.

The participation of the units and respondents was not random. The units were purposely chosen in order to obtain a broad range of answers to the SPH Survey™ questions which allowed the correlation tests to be performed. Because I wanted to see how the SPH Survey™ could detect differences in patient handling systems, the two units were chosen because they were likely to have different responses. This sets a strong foundation for further investigation using the SPH Survey™ for monitoring improvements before and after implementing interventions.

6.4.3 Accessing employee and employer data

The employee data were gathered using the paper-based version of the Employee portion of the SPH Survey™. The employees scored each question by circling an answer on the paper-based survey, or by writing an answer into a box. The point of the survey was to gather employees' perceptions about patient handling in their workplace. Employees selected the appropriate demographics to describe themselves, for example age, job title, years worked. The drawback to using a paper-based version was that respondents were not forced to make a choice, and this was a problem especially when reporting injuries. Eleven out of 38 respondents did not enter a number but rather wrote in a comment such as "too many to count". The online SPH Survey™ restricts the field to numbers only which would provide a clearer answer. In addition, extra measures were needed to preserve the anonymity of respondents completing the paper-based survey, such as putting the completed surveys into a sealed box. This would not be necessary using the online SPH Survey™.

The employer data were gathered using the Employer portion of the SPH Survey™. Employer data is fact-based, and the injury rates for staff and patients, turnover and absenteeism rates, and numbers of staff and patients on the unit during the three month period were not readily available for the unit managers to access. The costs related to injury, and program costs were not collected because the unit managers had no access to that information. Surveying the entire organization as opposed to one unit would make collecting the employer data easier.

6.4.4 Recall bias

Employees were asked to look back over the previous three-months and remember what their experience was. For the Safe Patient Handling Survey™ pilot in New Zealand, employees were asked to recall their experience over the previous two years. The feedback was that this was too long a time period to remember accurately. For this study, employees were asked their experience from June 1 to September 1, 2007, and completed the survey over three weeks in September. This minimized the time span

between the experience of employees and answering the survey questions and no complaints were received that they could not remember. Recall bias remains a possibility, however.

6.4.5 Gaining access to the Units

Once ethical approval was obtained from the region, there was still a process of approval to complete which was different for each organization. The research liaison nurses in each organization were pivotal in assisting me to navigate the approval processes. One organization required the approval of both the outgoing health and safety manager, and the Director of Nursing and the other required only the approval of the Director of Nursing. Once that process was completed, the nursing unit managers were integral in ensuring that staff participated in the study by making time for staff to complete their survey, organizing the certificates of participation, and communicating the findings.

6.5 Targeting Improvements

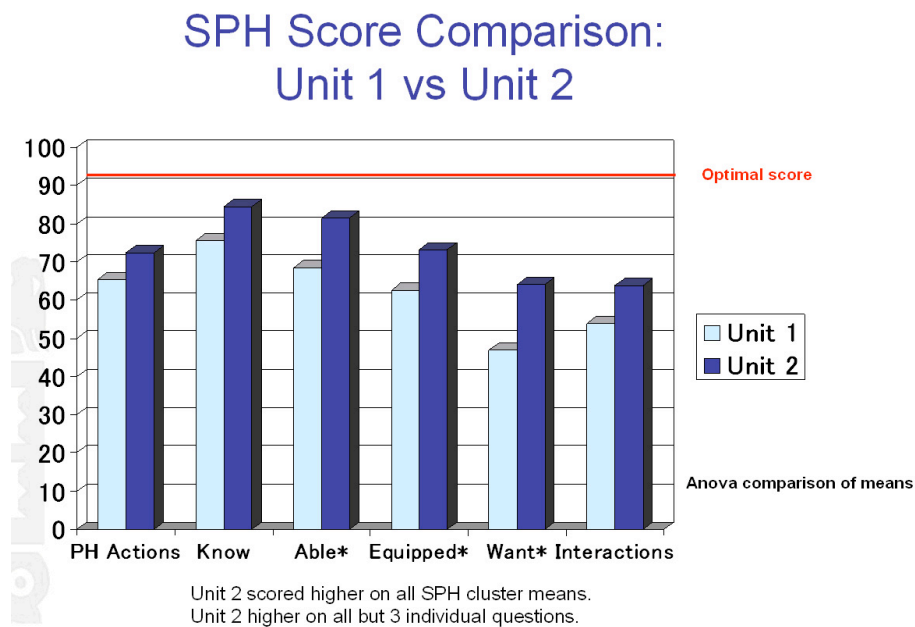
From GSP Surveys™ done in other industries, we know that scores over 90% in all clusters reflect a solid health and safety system that is protecting employees. Further research using the SPH Survey™ on larger sample sizes might be able to show a "safe score" or threshold score that means low risk. In this study, the 90% level is used. As both units were well below 90%, it is recommended that both work on improving their systems. Figure 4 shows the results obtained for both units compared with the optimal score of 90 (these results were also presented in Table 19).

Both units had the highest cluster scores in “Know” which reflects an emphasis by the organization on training. This training did not transfer into safe patient handling actions, however, as shown by the lower cluster score for PH Actions. This suggests that although staff feel they know what to do, they are not always doing it. The answer to why they do not carry out the safe patient handling actions can be found in the "Want"

and "Interactions" clusters where both units had the lowest scores. This reflects that managers could be better at supporting their staff to carry out safe Patient Handling Actions.

For both units, I would recommend going through the results for each item and opening a dialogue with staff to engage them in actively participating in improvement solutions. For example, "Want to do it" is about providing the motivation to safely carry out patient handling practices. This includes having management respond quickly to remedy unsafe conditions or practices, giving positive feedback to staff when they handle patients correctly and giving them helpful corrective feedback when they don't, and recognizing staff for the part they play in handling patients safely. How these things are done is specific to the workplace and requires staff buy-in. The best way to do that is to ask staff how they would like feedback, how they would like to be recognized, and how they would like to communicate with management to ensure unsafe conditions are promptly addressed.

Figure 4: Unit SPH Survey™ scores compared with optimal score



Both units had high incidences of verbal and physical violence directed at staff. Very often this is related to patient handling techniques that hurt or invade the personal space of patients. The units are therefore encouraged to look at the unsafe techniques that their staff are performing, and equip and support them with knowledge, processes, equipment, and time to change techniques to lower risk no lift patient handling. Measuring again with the SPH Survey™ will allow for frequent monitoring of this issue. Figure 5 shows the high percentage of staff reporting violence episodes. This data is also presented in Table 22.

Figure 5: Percentage of staff reporting one episode of verbal or physical violence on the SPH Survey™ during the 3 month survey period.

Comparison of Units 1 and 2: Staff reports of verbal and physical violence

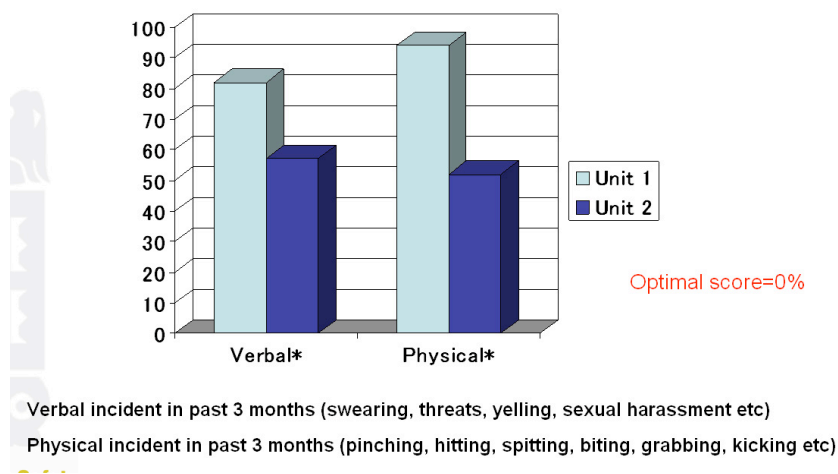
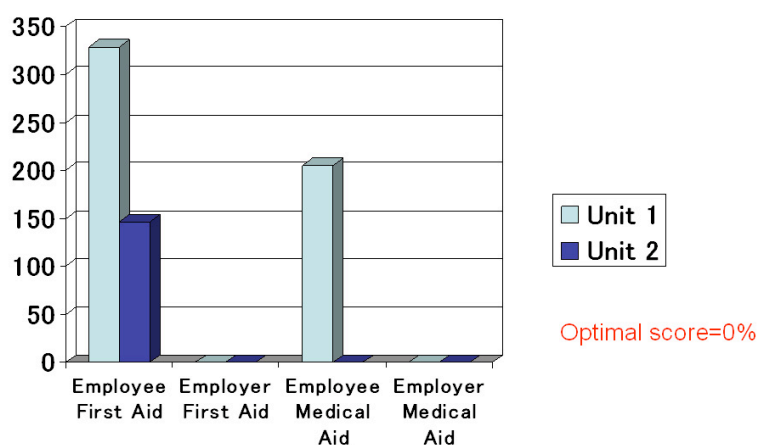


Figure 6 shows the discrepancy between staff's perception of injury events compared to the employers' record of injury events. This data is also presented in Table 23. Both units had high employee-reported first-aid injuries, and Unit 1 also had high medical aid injuries, but the employers were not aware of them. A formal reporting system that captures First Aid and Medical Aid incidents should be implemented.

Figure 6: Staff injury rate per 200,000 hours worked as reported by employees on the SPH Survey™ vs Employer reports

Staff injury rates: Employee vs employer for both units

Staff injury rate per 200,000 hours worked as reported on the SPH Survey.



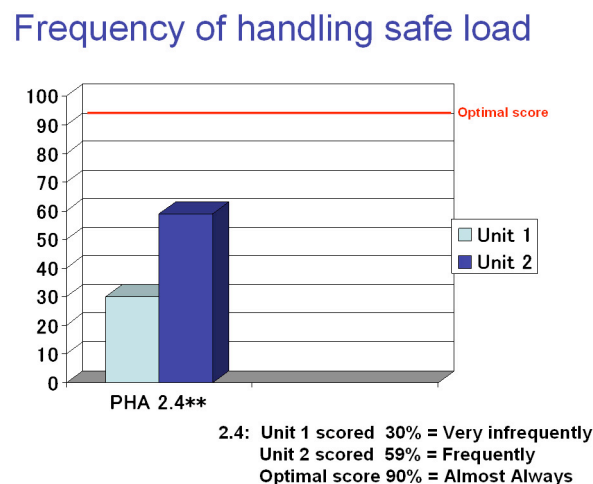
In general employees reported more patient injuries than the employers knew about. In terms of quality of patient care, staff need to be reporting these and they should be monitored. Replacing high-risk patient handling practices with lower risk No Lift practices should reduce the rate of patient injury.

The SPH Survey™ scores for the O'Shea No Lift System were considerably higher than the system used in Unit 1, and the injuries and violence incidents reported were considerably lower. This is even though the staff in Unit 2 cared for considerably more patients each (17 vs. 11). Staff of other units using the O'Shea No Lift System have

reported less fatigue, more efficiency, and less stress which seems to be in line with the findings in Unit 2 (O'Shea, 2008, Testimonials). It is helpful to see these differences quantified in order to make an informed decision before investing in a new patient handling system.

Both units need to improve their scores on question 2.4: Unit 1 said 30% of the time they lift, pull, push or lower loads weighing less than 16 kg (see Figure 7). This is validated by a separate question where 73% said that they use more than 16 kg of force. It has been well established that using more than 16 kg of force is very high risk. Unit 2 was somewhat better, but should be at 90% which would indicate that staff are "Almost Always" using lower loads.

Figure 7: Question 2.4: Staff reporting handling safe loads



Both units are advised to look at how all the SPH questions were answered to find the strengths and weaknesses that will help them to target improvements that will create a low-risk patient handling environment.

6.6 Foundation for future study

The structure and statistical analysis methods used in this study create a good foundation for future larger studies. One type of study would be a pre-and post intervention

measurement. To do this, I would repeat the statistical analysis and compare SPH Survey™ scores before and after an improvement intervention for an entire hospital. This would demonstrate the sensitivity of the SPH Survey™ for detecting improvements in the same facility. Evaluation of a hospital with a variety of departments such as long-term care and home care that have unique challenges with respect to safe patient handling would be included so that family members and volunteers who provide care have the opportunity to voice their experience with patient handling using the SPH Survey™.

An important study would be to compare the SPH Survey™ of employees in different types of health care organizations, such as acute care, long term care and home care. Typically home care and long-term care are not as well resourced as acute care, and the SPH Survey™ would help to quantify the assistance needed for staff in those organizations to also have low risk patient handling systems. In a home care setting, families provide a considerable amount of care, and they too need to know about safe patient handling, be able to do it, be equipped to do it, be motivated to do it, and have the support from the health care providers to maintain it. Despite government policies that encourage families to care for their relatives, very little research has been done in this area to date.

I would also be very interested in conducting a study on nursing educational programs. The SPH Survey™ results showed that respondents in the 18-24 year age band, who had been working less than one year at the job scored lower on all SPH clusters, and higher on the unsafe techniques than all other respondents. The unit managers said they found it difficult to keep up with training for new staff because the turnover was very high. If those new nurses had learned safe techniques in nursing school, they would not be performing them in the workplace. Given that low risk patient handling involving weights of less than 16 kg are the New Zealand national guidelines, educational institutions should be promoting no lift techniques rather than sticking with the old unsafe techniques.

Another type of study would be to compare geographical regions. For example, the SPH Survey™ scores from New Zealand could be compared with Victoria, Australia, the United Kingdom, the USA and Canada. The SPH Survey™ is built to analyze large amounts of data, and this would yield interesting data to inform government, union, insurance, and legislative bodies that are attempting to reduce the risk of patient handling injury.

Further statistical study could include measurement properties of the scale with larger sample sizes, perhaps as part of the Pre testing in an intervention study. For example, confirmatory factor analysis to detect structure within the variables would confirm whether or not the SPH clusters are the best clusters to use to organize the SPH items. This type of testing is standard when developing a scale for widespread use.

6.7 Conclusion and Recommendations

This was a small observational study about researching the effectiveness of the SPH Survey™ for health care organizations and for occupational health practitioners to evaluate and monitor the risk level of patient handling in health care organizations.

The literature review demonstrated that unsafe patient handling results in a high rate of injury to staff and to patients. Patient handling has been a known risk to health care workers for more than 100 years and many interventions have been attempted. It has only been since the 1990s that it was recognized that handling loads greater than 16 kg is actually beyond the capability of most people and therefore is unacceptably high risk. The most recent and the most effective interventions involve aligning all systems within a health care organization to support no lift and low-risk patient handling practices. The problem has been a lack of evidence to show which approaches are effective in reducing patient handling risk and which are not. Health care organizations desperate to recruit and retain quality staff are scrambling to create low risk patient handling environments, but they do not have the means to easily evaluate and monitor whether an intervention is successful. For that reason they tend to use lagging indicators such as injury rates and

health and safety audits. This information cannot detect where deficiencies in the patient handling system lie, and cannot give an indication of the level of risk within the workplace. The SPH Survey™ was developed to create leading indicators and allow health care organizations to monitor and quantify the level of risk from patient handling for their staff and patients.

This study used the SPH Survey™ to collect the perceptions of how well employees felt that their patient handling systems were working for them. Data were collected from employees and employers on two different units in two different hospitals using two different patient handling systems. The purpose of the study was to verify the validity and reliability of the SPH Survey™ as a way to evaluate and monitor patient handling systems, to determine the correlations between SPH Survey™ scores and injury rates, and see if the SPH Survey™ was able to detect differences between the two systems of patient handling.

Overall, the unit that was using the O'Shea No Lift System scored higher than the in-house system, and had fewer patient injuries, staff injuries, and violent incidents directed at staff. This finding was not surprising given the comprehensive nature of the O'Shea No Lift System and the evaluations that show it to be effective in reducing patient handling injuries (Victorian Government Department of Human Services Policy and Strategic Project Division, 2004).

Scores on the Safe Patient Handling Survey™ correlated negatively with the number of patient injuries, which makes it a valuable tool for determining patient handling risk to patients. Further research with a larger sample size is needed to examine the correlations between SPH Survey™ scores and injury rates to staff, but the findings here suggest that the SPH Survey™ tool can be used for predicting the risk of staff injuries as well.

Constant change is a fact of life in health care systems, and turnover disrupts the continuity of systems so this needs to be taken into account when developing strategies and when initiating change. This was shown with the lower scores for all staff that had

been working for one year or less on their unit. Both units had statistically significant lower scores, and Unit 1 was lower than Unit 2. High staff turnover has a serious impact on all systems and continuity, and this makes it imperative to embed safe patient handling into work practices rather than have it as an add-on driven by one person.

It was interesting to note that more than half of the study participants had been in their jobs one year or less, and 42% had been in their organization one year or less. 26% of these respondents were 18-24 years old, and it is likely that a number of these are new graduates. Given that the *New Zealand Patient Handling Guidelines* have been in place since 2003, I would have expected that nursing schools would have been teaching lower risk patient handling techniques. The data in this study does not seem to support that expectation. It is important therefore to conduct an SPH Survey™ throughout all nursing and caregiver training organizations to evaluate the level of knowledge and ability of low risk patient handling.

Data were returned to the participant organizations and feedback was that the SPH Survey™ was very helpful in identifying problem areas and strengths. Both organizations want to do their improvement interventions and follow up with another SPH Survey™ to evaluate those improvements.

Health care organizations, unions, government bodies, insurers, educational institutions, and researchers must continue to reduce patient handling risk for both health care workers and for patients. The human and financial costs of the injuries and fear created by high risk patient handling practices must stop. With comprehensive and effective patient handling systems such as the O'Shea No Lift System, there are simply no longer any excuses for not creating low-risk patient handling environments. The SPH Survey™ is an easy way to reliably evaluate patient handling improvement initiatives, and to continually monitor the level of patient handling risk in the workplace. Low-risk patient handling gives health care providers the means to focus on delivering high quality patient care, without endangering their own health and well-being.

APPENDICES

Appendix 1: Safe Patient Handling Survey™

Appendix 2: Performance Maximizer™ and Great Safety Performance™ Models

Appendix 3: Invitation and information for participants

Appendix 4: Permissions

Appendix 1: Safe Patient Handling Survey™

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EMPLOYEE SURVEY FOR PERIOD: June 1 to September 1, 2007

You have been asked to complete this survey because your organization is interested in improving the safety of patient handling activities for both patients and employees.

Your organization needs your opinion on how things are working for you in your workplace.

What is patient handling?

You are performing a patient handling activity any time you lift, lower, push, pull, reposition, prop, restrain, stabilize, support or turn a patient (or their limb or other body part).

This is your chance to let your organization know how things are going for you and for your patients!

The questions are about how you feel and what you do - there are no right or 'good' answers. For your feedback to be helpful your responses need to be accurate and honest.

ALL your responses are anonymous and confidential

Your answers will be grouped with the answers of numerous other employees. Small groups (less than 5 respondents) will be combined with another group to preserve anonymity. There is no way for anyone to know how any one person has answered the questions. To keep it this way, **DO NOT** write your name into any of the answers. The grouped information is then reported back to your organization. Your responses are held in a confidential database that can be used by safety researchers.

The survey will be processed by *Great Safety Performance Ltd* including monitoring for reliability and validity as approved by our Research Advisor at the School of Business and Economics, Wilfred Laurier University, Canada.

Please note: if during the course of your normal work you NEVER have occasion to handle patients, please DO NOT complete this survey.

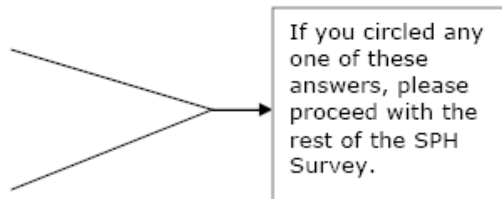
This survey takes about **20 minutes** to complete. Thank you for your assistance - your feedback is very important, and appreciated!

1.1 How often in a work shift do you handle patients? (This means lifting, lowering, pushing, pulling, repositioning, propping, stabilizing, or restraining patients or their limbs.)

Circle one:

1. Never : If you circled "1. Never" you have completed the Safe Patient Handling Survey. Thank you.

- 2. Very infrequently**
- 3. Infrequently**
- 4. Frequently**
- 5. Very frequently**
- 6. Almost always**





Safe Patient Handling Survey

EMPLOYEE SURVEY FOR PERIOD: June 1 to September 1, 2007

Below is a list of safe patient handling questions for you to answer. To answer the questions, use your own experience for the period shown above:

If you do not know what the question means select "Almost Never".

Circle the number that best describes how **frequently** you perform these practices. Use the following scale:

1. Almost never 2. Very infrequently 3. Infrequently 4. Frequently 5. Very frequently 6. Almost always



When I handle patients ...

Almost never → Almost always

2.1	I check if the task creates high risk or increased risk to myself or to the patient	1	2	3	4	5	6
2.2	I determine if the patient is able to help with the task: that is, the patient can do as I say, and is physically able to help	1	2	3	4	5	6
2.3	I choose only the lowest risk 'no-lift' practices for handling the patient safely	1	2	3	4	5	6
2.4	I only lift, pull, push or lower loads (people or objects) that weigh less than 16 kilograms (35 pounds)	1	2	3	4	5	6
2.5	I write the patient handling method, equipment, and help that is needed from other caregivers onto the patient's care plan	1	2	3	4	5	6
2.6	I get help when I need it to be sure I and my patient stay safe	1	2	3	4	5	6
2.7	I carry out the chosen "no-lift" practices without causing harm to the patient or injuring myself	1	2	3	4	5	6
2.8	When the patient's condition changes, I reassess the patient handling risk and write the handling changes onto the care plan	1	2	3	4	5	6
2.9	I report all patient handling incidents, issues or concerns	1	2	3	4	5	6
2.10	I report it when patient care is affected because of lack of staff, patient handling equipment or training	1	2	3	4	5	6
2.11	I report changes in my own ability to carry out patient handling tasks safely	1	2	3	4	5	6
2.12	I contribute to improving patient handling in my workplace	1	2	3	4	5	6



Safe Patient Handling Survey

EMPLOYEE SURVEY FOR PERIOD: June 1 to September 1, 2007

When answering questions, use your own experience for the period shown above:

Circle the number that indicates how much you **Agree** or **Disagree** with each statement. Use the following scale:

1. Strongly disagree 2. Disagree 3. Somewhat disagree 4. Somewhat agree 5. Agree 6. Strongly agree



In my work or workplace ...

Strongly disagree Strongly agree



3.1	I am aware of and understand my organization's policies and plans regarding the safe handling of patients	1	2	3	4	5	6
3.2	I am clear on what are effective 'no-lift' ways to carry out patient handling safely	1	2	3	4	5	6
3.3	I am clear about how my organization expects me to carry out 'no lift' patient handling	1	2	3	4	5	6
3.4	I know what the consequences of unsafe practices would be to myself, my family, my colleagues and my patients	1	2	3	4	5	6
3.5	I am clear on how my patient handling practices will be measured	1	2	3	4	5	6
4.1	I am able to do risk assessments and patient handling care plans	1	2	3	4	5	6
4.2	I have the skills to perform 'no-lift' safe patient handling practices	1	2	3	4	5	6
4.3	I am able to use patient handling equipment safely	1	2	3	4	5	6
4.4	I can physically perform 'no lift ' patient handling practices	1	2	3	4	5	6
4.5	My workplace gives me good support to deal with stressors so I can continue to handle patients safely	1	2	3	4	5	6
4.6	When I am unsure what to do, I can quickly get help	1	2	3	4	5	6

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June 1-September 1, 2007

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Safe Patient Handling Survey

EMPLOYEE SURVEY FOR PERIOD: June 1 to September 1, 2007

When answering questions, use your own experience for the period shown above:

Circle the number that indicates how much you **Agree** or **Disagree** with each statement. Use the following scale:

1. Strongly disagree 2. Disagree 3. Somewhat disagree 4. Somewhat agree 5. Agree 6. Strongly agree



In my work or workplace ...

Strongly disagree Strongly agree



5.1	My organization has a safe patient handling policy and plans	1	2	3	4	5	6
5.2	The way we do our work keeps caregivers and patients safe	1	2	3	4	5	6
5.3	Patient handling practices are designed to make them safe and easy to carry out	1	2	3	4	5	6
5.4	I can easily get help from co-workers to help with patient handling when I need it	1	2	3	4	5	6
5.5	The workload and pace allows me to carry out patient handling practices safely	1	2	3	4	5	6
5.6	There is an effective system in place for recording and reporting patient handling incidents and injuries	1	2	3	4	5	6
5.7	I am expected to change unsafe conditions or stop unsafe work	1	2	3	4	5	6
5.8	There is enough training in place for me to learn risk assessment and safe patient handling practices	1	2	3	4	5	6
5.9	Completed patient handling care plans are readily available for me to use	1	2	3	4	5	6
5.10	Properly designed and maintained patient handling equipment is available and accessible for me to use	1	2	3	4	5	6
5.11	Areas where I carry out patient handling have adequate space and are free of hazards (clutter, slippery floor etc.)	1	2	3	4	5	6
5.12	I have proper footwear and clothing for safe patient handling	1	2	3	4	5	6
5.13	I get annual refresher training on safe patient handling practices	1	2	3	4	5	6
5.14	I get information about the effectiveness of safe patient handling in my workplace	1	2	3	4	5	6

EMPLOYEE SURVEY FOR PERIOD: June 1 to September 1, 2007

When answering questions, use your own experience for the period shown above:

Circle the number that indicates how much you Agree or Disagree with each statement. Use the following scale:

1. Strongly disagree 2. Disagree 3. Somewhat disagree 4. Somewhat agree 5. Agree 6. Strongly agree

In my work or workplace ...

Strongly disagree → Strongly agree

6.1	I have a supportive workplace that motivates me to safely carry out patient handling practices	1	2	3	4	5	6
6.2	Management responds quickly and decisively to improve unsafe conditions and/or practices	1	2	3	4	5	6
6.3	I am held responsible for how safely I handle patients	1	2	3	4	5	6
6.4	I get specific, positive feedback about my safe handling of patients	1	2	3	4	5	6
6.5	I get helpful, corrective feedback when I don't handle patients safely	1	2	3	4	5	6
6.6	I am recognized for the part I play in handling patients safely	1	2	3	4	5	6
6.7	I am motivated by the feedback and recognition I receive for my safe handling of patients	1	2	3	4	5	6

In my work or workplace people usually ...

Strongly disagree → Strongly agree

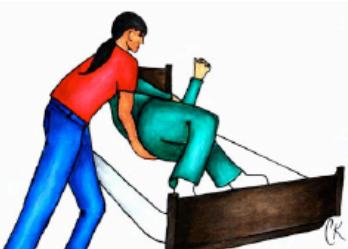
7.1	Treat each other with respect and fairness	1	2	3	4	5	6
7.2	Are honest and trustworthy	1	2	3	4	5	6
7.3	Are receptive to change	1	2	3	4	5	6
7.4	Deal with conflicts directly and fairly to resolve problems	1	2	3	4	5	6
7.5	Hear and understand what others have to say	1	2	3	4	5	6
7.6	Appreciate others who work and communicate in a different way	1	2	3	4	5	6
7.7	Treat me as a valuable member of the team	1	2	3	4	5	6
7.8	Consider others' feelings	1	2	3	4	5	6
7.9	Work well together with their co-workers, management and other departments	1	2	3	4	5	6
7.10	Talk openly about their ideas and points of view	1	2	3	4	5	6
7.11	Are open to others' ideas, comments and suggestions	1	2	3	4	5	6
7.12	Take pride in their work	1	2	3	4	5	6
7.13	Take responsibility for what they do and say	1	2	3	4	5	6
7.14	Willingly and sincerely apologize when they offend someone	1	2	3	4	5	6


EMPLOYEE SURVEY FOR PERIOD: June 1 to September 1, 2007

Circle the number that best describes how **frequently** you perform these practices. Use the following scale:

1. Almost never 2. Very infrequently 3. Infrequently 4. Frequently 5. Very frequently 6. Almost always



<p>8.1</p>	<p>How often do you, alone or with another handler, turn patients by pulling them over onto their side using your hands and arms or a draw sheet (flip turn)?</p>  <p>This picture shows the handler putting their hands and arms under the patient to lift and turn them onto their side.</p>	<p>Almost never Almost always →</p> <p>1 2 3 4 5 6</p>
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<p>8.2</p>	<p>How often do you, alone or with another handler, hook your arm under the patient's shoulder to move them (hook bed)?</p>  <p>This picture shows the handlers lifting, dragging or pulling the patient by hooking at the shoulder. This is commonly used for repositioning the patient in the bed.</p>	<p>Almost never Almost always →</p> <p>1 2 3 4 5 6</p>
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EMPLOYEE SURVEY FOR PERIOD: June 1 to September 1, 2007

Circle the number that best describes how **frequently** you perform these practices. Use the following scale:

1. Almost never 2. Very infrequently 3. Infrequently 4. Frequently 5. Very frequently 6. Almost always



8.3

How often do you, alone or with another handler, hook your arm at the patient's shoulder to help them stand up (hook chair)?



This picture shows a common way of assisting patients to stand up. The handler lifts, drags or pulls the patient by hooking their hand or arm at the patient's shoulder

Almost never Almost always
→

1 2 3 4 5 6

8.4

How often do you, alone or with another handler, help the patient to stand up in this way (pivot)?



This picture shows the handler helping a patient to stand by counterbalancing their weight with the patient to pull them to standing. This is also commonly done using a transfer belt.

Almost never Almost always
→

1 2 3 4 5 6

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June 1-September 1, 2007


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EMPLOYEE SURVEY FOR PERIOD: June 1 to September 1, 2007

Circle the number that best describes how frequently you perform these practices. Use the following scale:

1. Almost never 2. Very infrequently 3. Infrequently 4. Frequently 5. Very frequently 6. Almost always

8.5	How often do you, alone or with another handler, lift the trunk and/or legs of a patient (top and tail chair)?		<p>Almost never Almost always</p> <p>→</p> <p>1 2 3 4 5 6</p>
	<p>This picture shows a handler lifting the trunk and/or legs of a patient. Handlers use this to reposition the patient in a chair, or to lift them onto a bed.</p>		

8.6	How often do you, alone or with another handler, reposition the patient in bed in this way (top and tail)?		<p>Almost never Almost always</p> <p>→</p> <p>1 2 3 4 5 6</p>
	<p>Sometimes one handler uses one arm supporting the patient's back and the other arm lifting the patient's knees to help the patient sit up at the side of the bed, or get back into bed.</p>		

8.7	How often do you alone lift, lower, restrain, push or pull using more than 16kg (35 lbs) of force?	<p>Almost never Almost always</p> <p>→</p> <p>1 2 3 4 5 6</p>



EMPLOYEE SURVEY FOR PERIOD: June 1 to September 1, 2007

Workplace Injuries/Incidents

To help us understand how the experiences you reported in this survey are impacting your safety (and the safety of patients), we need to have information about all personal injuries or safety incidents you had in the time period shown above. Please be as honest and accurate as you can be, and include any that you may not have formally reported.

9.1	In the time period shown above, have you had any patient handling injuries that you looked after yourself and then went back to work right away? This might be a scratch, bruise, or musculoskeletal pain	Circle one Yes No
	If you answered 'YES' and went back to work right away, how many times did this occur in the time period shown above? Please write the NUMBER of times in the box beside.	Number of times <input type="text"/>

9.2	In the time period shown above, have you had any injuries from handling patients where you needed treatment by a health professional AND you were able to return to work for your next scheduled shift after the injury?	Circle one Yes No
	If you answered 'YES' and were able to go back to work for your next scheduled shift, how many times did this occur in the time period shown above? Please write the NUMBER of times in the box beside.	Number of times <input type="text"/>

9.3	In the time period shown above, have you had any injuries from handling patients where you needed treatment by a health professional AND needed to take time off work to recover from the injury?	Circle one Yes No
	If you answered 'YES' and needed to take time off work to recover, how many shifts have you missed in the time period shown above? Please write the NUMBER of shifts in the box beside.	Number of shifts <input type="text"/>

EMPLOYEE SURVEY FOR PERIOD: June 1 to September 1, 2007

9.4	In the time period shown above, have any of your patients been injured during patient handling? (This information is required to assist in improving the system of patient handling)	<p>Circle one</p> <p>Yes No</p>
	If you answered 'YES', please write in the NUMBER of each type of patient injury in the boxes beside:	<p>Number of patient injuries:</p> <p>Skin Tears, bruises:</p> <div data-bbox="1149 625 1304 688" style="border: 1px solid black; width: 95px; height: 30px; margin: 0 auto;"></div> <p>Muscle Strain, Joint strain:</p> <div data-bbox="1149 762 1304 825" style="border: 1px solid black; width: 95px; height: 30px; margin: 0 auto;"></div> <p>Fractures:</p> <div data-bbox="1149 856 1304 919" style="border: 1px solid black; width: 95px; height: 30px; margin: 0 auto;"></div> <p>Slip, trip:</p> <div data-bbox="1149 951 1304 1014" style="border: 1px solid black; width: 95px; height: 30px; margin: 0 auto;"></div> <p>Fall:</p> <div data-bbox="1149 1056 1304 1119" style="border: 1px solid black; width: 95px; height: 30px; margin: 0 auto;"></div> <p>Fatalities:</p> <div data-bbox="1149 1161 1304 1224" style="border: 1px solid black; width: 95px; height: 30px; margin: 0 auto;"></div>
9.5	In the time period shown above, have you experienced acts of verbal aggression by patients? (This includes swearing, threats, yelling, sexual harassment etc.)	<p>Circle one</p> <p>Yes No</p>
9.6	If yes, how many times?	<p>Number of times</p> <div data-bbox="1149 1392 1304 1455" style="border: 1px solid black; width: 95px; height: 30px; margin: 0 auto;"></div>
9.7	In the time period shown above, have you experienced acts of physical aggression by patients? (This includes pinching, hitting, spitting, biting, grabbing, kicking etc.)	<p>Circle one</p> <p>Yes No</p>
9.8	If yes, how many times?	<p>Number of times</p> <div data-bbox="1149 1581 1304 1644" style="border: 1px solid black; width: 95px; height: 30px; margin: 0 auto;"></div>

**EMPLOYEE SURVEY FOR PERIOD: June 1 to September 1, 2007**

This demographic information will be used for statistical purposes only. It will not be used to identify any individual. Do not write your name.

10.1 What type of unit or department you work in most of the time? (Tick one)

Medical	Rehabilitation	Orderly/Warden
Surgical	Emergency	Security
Intensive care	Long-term care	Housekeeping
Operating room	Mental health	Maintenance
Pediatrics	Obstetrics	Mortuary
Orthopedics	Volunteer	Administration
Diagnostic services (x-ray, MRI,	Please state other department here:	

10.2 What is your job title? (Tick one)

Caregiver/carer
Nursing assistant/Aide
Registered Nurse
Please state any other job title here:

Write answer here:

10.3	How long have you been working at your current job ?	
10.4	How long have you been working for your current organization ?	
10.5	If you are a FULL-TIME employee, what are the total hours per week you work on a regular basis?	
10.6	If you are a PART-TIME employee, what full-time equivalent hours do you work on a regular basis?	
10.7	If you are a CASUAL/RELIEF employee, how many hours per week do you work on a regular basis?	



Safe Patient Handling Survey

EMPLOYEE SURVEY FOR PERIOD: June 1 to September 1, 2007

10.8 Which shifts do you work? (Tick one)

<input type="checkbox"/> Days only	<input type="checkbox"/> Days and nights	<input type="checkbox"/> All 3 - days, nights, and evenings
<input type="checkbox"/> Nights only	<input type="checkbox"/> Nights and evenings	
<input type="checkbox"/> Evenings only	<input type="checkbox"/> Days and evenings	

10.9 What is the length of your shift? (Tick one)

<input type="checkbox"/> 4 hours
<input type="checkbox"/> 8 hours
<input type="checkbox"/> 12 hours
<input type="checkbox"/> Other:

10.10	Do you work at more than one job? (Tick one)	<input type="checkbox"/> Yes	<input type="checkbox"/> No
10.11	If you work at more than one job, how many total hours per week do you work at ALL of your jobs combined?	Write total hours here:	

10.12 What is your gender?(Tick one)

<input type="checkbox"/> Male
<input type="checkbox"/> Female

10.13 Please tell us how old you are:

10.14 How frequently in a work shift do you handle patients? This includes lifting, lowering, pushing, pulling, repositioning, propping, stabilizing, or restraining patients or their limbs?
(circle one)

1.Almost never **2.**Very infrequently **3.**Infrequently **4.**Frequently **5.**Very frequently **6.**Almost always

You have now completed the survey! Thank you!

12 of 12

June 1-September 1, 2007

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Safe Patient Handling Survey™ - Employer Questions

Period June 1-September 1, 2007

1. What is the staff turnover on your unit? Specifically, what percentage of your staff left and needed to be replaced from June 1- September 1, 2007?
2. What is the main reason staff leave?
3. What was the percentage absenteeism for staff for June 1-September 1 2007?
4. How many incidents of verbal aggression by patients did your staff report for June 1-September 1 2007? (This includes swearing, threats, yelling, sexual harassment etc.)
5. How many incidents of physical aggression by patients did your staff report for June 1-September 1 2007? (This includes pinching, hitting, spitting, biting, grabbing, kicking etc.)
6. What was your organization's score on the most recent patient satisfaction survey (percent)?
7. How many full-time equivalent employees do you have on your ward?
8. How many inpatient/resident beds do you have on your ward?
9. What patient handling system was your unit using?
10. What percentage of the employees answering the SPH Survey™ are competently using the system?
11. What was the commencement date of the patient handling system? (Month/Year)?
12. Please indicate the total hours worked by all **EMPLOYEES** on your ward for June 1-September 1 2007:
13. Enter in the box provided the total hours worked by all **NON-EMPLOYEES** (students, contractors) for June 1-September 1 2007:
14. Please indicate the total number of patients admitted to your ward in June 1-September 1, 2007:
15. What were the **TOTAL NUMBER (FREQUENCY)** of musculoskeletal/patient handling incidents amongst your **EMPLOYEES** for June 1-September 1 2007 that resulted in:

- First Aid only (no lost time)
- Medical aid (no lost time beyond date of injury)
- Lost time (beyond date of injury)

16. Please indicate the number of serious **EMPLOYEE** musculoskeletal incidents reported to or investigated by government enforcement agency for June 1-September 1 2007:

17. Please indicate the number of shifts/days lost due to **EMPLOYEE** musculoskeletal incidents for June 1-September 1 2007:

18. Please indicate the number of shifts/days on alternative/modified work due to **EMPLOYEE** musculoskeletal incidents for June 1-September 1 2007:

19. What was the total number (frequency) of musculoskeletal incidents amongst your **NON-EMPLOYEES** (students, contractor, volunteer, visitor or other) for June 1-September 1 2007 that resulted in:

- First Aid only (no lost time)
- Medical aid (no lost time beyond the date of injury)
- Hospitalization

20. What was the number of serious **NON-EMPLOYEE** musculoskeletal incidents reported to or investigated by government enforcement agencies for June 1-September 1 2007?

21. What was the total number (frequency) of **PATIENT** or **CLIENT** incidents in the time period shown above that resulted in:

- Skin tears, bruises
- Muscle Strain, Joint Strain
- Fractures
- Slip, trip, fall
- Fatalities

21. Please indicate the number of serious **PATIENT** musculoskeletal incidents reported to or investigated by government enforcement agency in the time period shown above:

Appendix 2: Performance Maximizer™ and Great Safety Performance™ model.

Reprinted with permission from GSP Surveys Ltd., Wellington, New Zealand



The Performance Maximizer® and Great Safety Cultures

Great workplace cultures energize, support and satisfy. They are safe & healthy – physically, emotionally, and mentally. They enable performance at its best. And, they retain good employees.

In a great workplace culture people willingly hold themselves accountable for great results. A Great Safety Culture is a great workplace culture with a specific focus on overall safety everywhere throughout the organization.

Despite great intentions and sincere efforts, workplace safety often ends up as an add-on program which holds workers accountable for workplace safety as opposed to building a system in which working safely is a way of life. This typically results in continued sub-optimal safety performance that is of great concern to front-line workers and management alike. The Great Safety Performance™ model and methodology takes you beyond the traditional safety procedures and training and targets the development of a total safety culture – a Great Safety Culture. The model enables companies to maximize the system of leading indicators that leads to management and workers incorporating good safety practices into everything they do. The result is a great workplace culture that is energizing, supportive and satisfying, and, in which working safely is the norm.

The Performance Maximizer® is a foundation concept for understanding human performance that is essential to building a Great Workplace Culture. This is where we must begin.



The Great Safety Performance™ model is built upon *The Performance Maximizer®*, which is a foundation concept for understanding human performance in the workplace.

The Performance Maximizer® takes a workplace systems perspective to provide practical insights into the nature of workplace performance, its management and improvement.

The resulting Great Safety Performance™ model incorporates safe work behaviours, states safe outcomes and business results. And, it defines a comprehensive set of leading indicators for working safely that include psycho-social factors.

The Great Safety Performance™ model is used to provide a picture of what safe performance looks like and what is needed to achieve it. We use it to...

- ✓ define/clarify desired safety performance,
- ✓ identify what is needed in each of five conditions to enable great safety performance,
- ✓ assess what enables and what prevents working safely, and
- ✓ implement actions to better manage or improve safety performance.

The Great Safety Performance™ model brings into sharp focus all the factors that impact working safely. Simply. Clearly.

We have clustered these factors into what we call the "Conditions for Great Safety Performance". That is, *Know What to do*, *Able to do it*, *Equipped to do it*, *Want to do it*, and, *Interactions* that foster trust, respect,

Developing Great Safety Cultures

integrity, collaboration and accountability. Having these Conditions or not having them in your organization is not a matter of choice. Like gravity, they are a fact of life. It's not optional!

But, you can choose what you do about it. How well you manage the overall performance "system" illustrated by The Great Safety Performance™ model will ultimately determine your progress toward your goal of zero injuries.

A Guide to understanding *The Performance Maximizer*®

Great Safety Performance – the oval in the middle

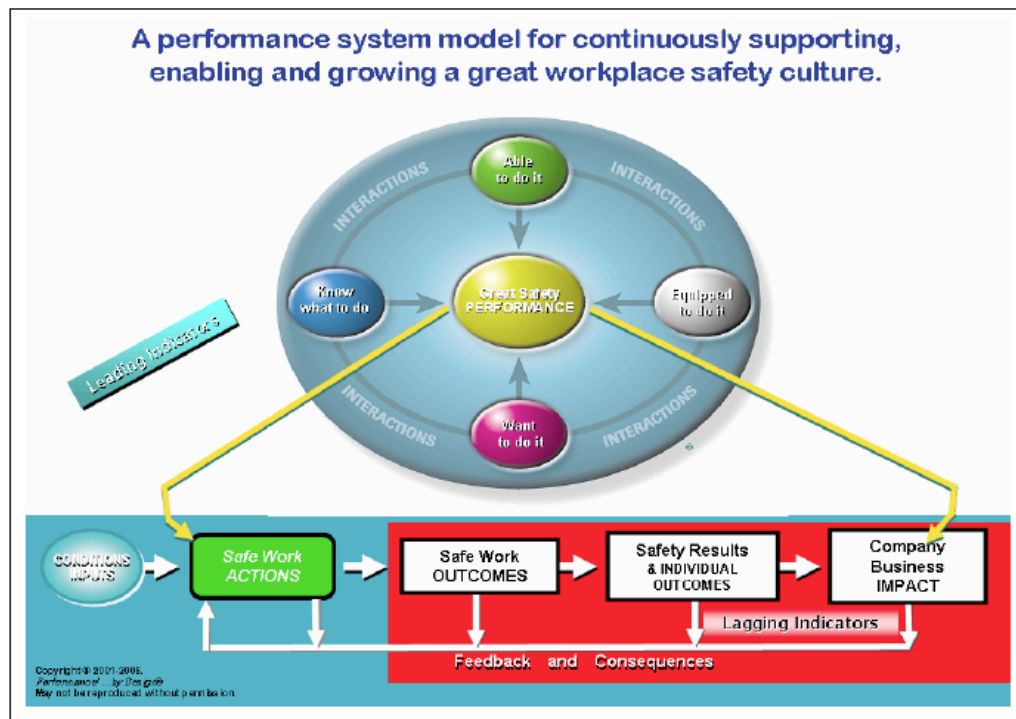
Performance is about what people Do, Achieve and Contribute to their organization. Great Safety Performance is superior results achieved in an exemplary manner.

Always begin here by answering these questions for yourself, your team or organization:

- To what organization goals is our safety performance expected to Contribute? How are they measured?
- What safety outcomes are we accountable for Accomplishing to make that contribution, and how will we measure them?
- What do we need to Do well to produce those results (safe work actions and interaction behaviors)?

Defining Great Safety Performance specifies the Safe Work Actions (both task and interactions), the Safe Outcomes, and Business Results to which we contribute. See Figure 1.

Figure 1: Defining Great Performance



Developing Great Safety Cultures

Once "Great Safety Performance" has been defined and aligned with organization goals, identify the specific factors in the five Conditions for Great Safety Performance that need to be in place to enable success.

Leading Indicators - The Conditions for Great Safety Performance:

Know What to do

- *Vision, strategy and goals*
- *Values, beliefs, behavioral expectations*
- *Performance expectations: accountabilities, objectives, best practices*

Know What to do is about clarity and alignment on what needs to be accomplished. This means everyone is crystal clear about the "Great Safety Performance" that is expected of them. No assumptions. No guessing. Performance expectations for workplace safety and their measures have been discussed, clarified, agreed upon, communicated and understood. These expectations are aligned to organization vision, strategy and goals for creating a safe workplace. Also clear and valued are the most effective activities and practices that will accomplish desired work results in a safe manner. *Know What to do* also includes behavioral expectations (conduct/interactions) – that is, not only what work gets done but also how it gets done.

Able to do it

- *Personal attributes*
- *Knowledge, skills and experience*
- *Coaching support*
- *Personal well-being*

Able to do it is about capability to perform safely from a variety of perspectives. It means personal attributes, traits and characteristics should "fit" the requirements of the work - including a person's mental, physical and emotional capacities.

Able to do it is about competence - the knowledge, skills and experience necessary to achieve the required work results in a safe manner. On the job coaching, by peers, a supervisor or a mentor is also an essential factor in enabling safe performance. The physical and emotional health necessary to be safely productive and personally fulfilled is part of *Able to do it* as well.

Equipped to do it

- *Resources: staff, money, time, equipment, tools, job aids, workspace...*
- *Procedures, roles, processes and systems*
- *Information, data on performance*
- *Authority*

Equipped to do it is about resources, business/work processes and procedures, organizational and IT systems, and the physical environment in which work is done. It is also about having the information required to do the job as well as measurement data that lets people know how they are doing. People need to be clear about the scope and authority of their roles so that there is no confusion about "who does what around here" and how they are expected to work together to achieve the organization's goals. All of these – resources, tools, processes, environment, information, role clarity, etc. – all need to be geared to enable working safely.

Want to do it

- *Personal motivation, morale*
- *Feedback, recognition*
- *Reward, balance of consequences*
- *Relationships and Leader support*

Want to do it is about people's *willingness* to hold themselves accountable for quality work and achieving agreed upon results in a safe manner. It's about knowing that the contribution they make is valued and rewarded, that they are recognized for "doing the right things right" and held accountable for performance shortfalls, unsafe practices and inappropriate behavior. Leader support is crucial. A large part of feeling challenged, valued and recognized is up to them. The quality of interactions among employees, as well as obstacles within other conditions for great safety performance can often erode motivation, or "*Want to do it*".

Interactions

- *Trust*
- *Respect*
- *Integrity*
- *Collaboration*
- *Accountability*

Interactions are about the way we work. They are the behaviors and personal conduct that create the emotional climate of the workplace. Positive, healthy *Interactions* support personal well-being, develop a respectful workplace, foster productive relationships and have a profound impact on performance outcomes including safety in the workplace. *Interactions* that enable great performance are characterized by trust, respect, integrity, responsiveness, fairness, collaboration and accountability. *Interactions* constitute the behavioral performance expectations of the organization.

The Connecting Oval Line:

The five conditions for great performance are connected to each other – they are not independent variables. They are part of a system and impact each other. A change in one will impact the status of one or more of the others. Safety performance can only be maximized when all five enabling conditions are considered, planned for and systematically managed together, as a system.

The Arrows:

Like gravity, the five conditions for great safety performance are always present and inescapable! The arrows indicate that the conditions are active at all times and impact performance simultaneously and continuously. This reflects the "organic" nature of organizations.

The Oval Background:

The large oval background represents the total performance environment in which an organization's people operate. This total environment fosters great safety performance when all the interdependent conditions for performance are in a strong, positive, enabling state.

A Performance System for building a Great Safety Culture

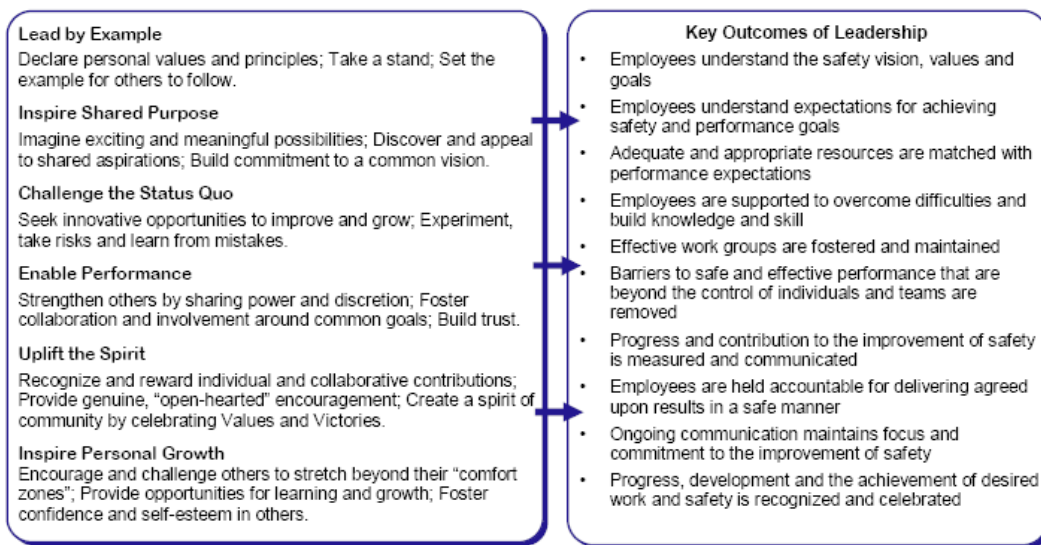
Research has confirmed that the *Conditions for Great Performance* enable effective performance on the job. Furthermore, when applied to safety, statistical analysis has identified a predictive relationship between the five *Conditions for Great Performance* and working safely on the job. In other words, the *Conditions* are leading indicators which are directly correlated to the safe work practices of workers and the safety-related outcomes of their actions on the job. Research has also confirmed that the *Conditions for Great Performance* are highly interdependent. This is a crucial message for leaders. Great Workplace Cultures don't just happen. Leaders create and sustain them. Leaders must recognize that in managing the safety of their people, they are dealing with an interconnected system. This means that safe performance on the job can only be maximized when all the enabling conditions are considered, planned for, measured and managed as interdependent elements. Continuously maximizing the conditions for great safety performance is therefore the crucial leadership task that will surround employees with a strong, enabling performance environment for safety.

Figure 2 illustrates how leaders can support, enable and grow a great safety culture. *The Performance Maximizer®* implicitly points to a required set of leadership practices which when skillfully practiced produce outcomes that strengthen and sustain the *Conditions for Great Safety Performance*. In this way leaders make safety a central theme in their management and improvement of workplace performance. They model the change they would like to see through their example, they inspire shared purpose and personal growth, challenge the status quo, enable high performance, and, create a focus on *Interactions* that foster trust, respect, integrity, collaboration and accountability.

The presence of the *Conditions for Great Safety Performance* will grow as a result of leaders' intentional and persistent performance of these leadership practices. The strengthened Conditions will reach a critical mass and "ripple" through the organization. This brings us back to where we started on page 1 - the outcome is a great workplace culture in which employees are energized, supported and enabled to safely perform at their best.

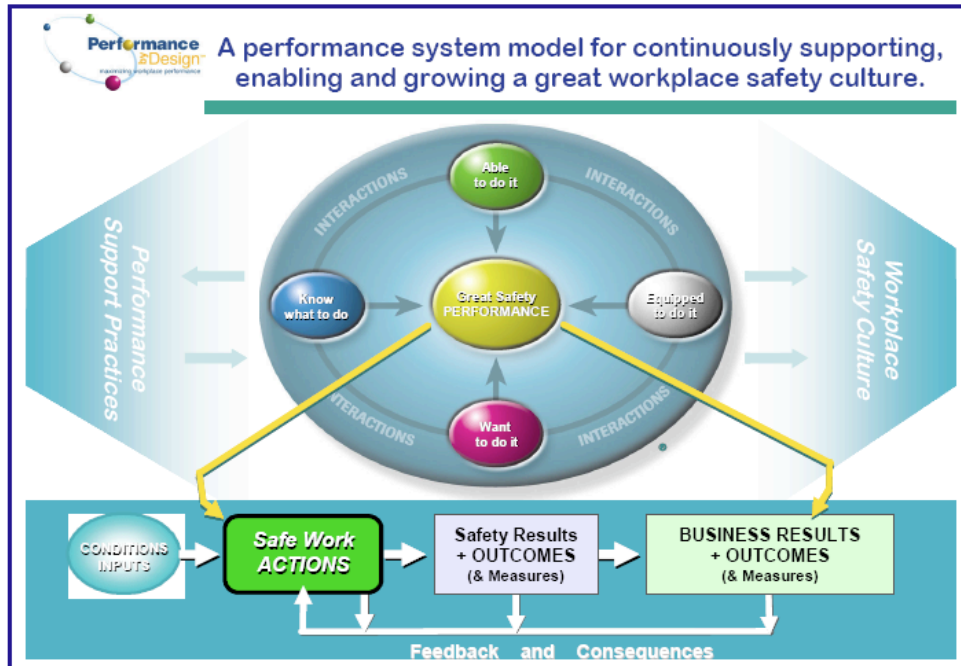
Described briefly below are performance-enabling leadership practices and outcomes which that will foster a Great Workplace, a Great Safety Culture:

Leadership Practices and their Outcomes



Developing Great Safety Cultures

Figure 2 – Performance System for building a Great Safety Culture



Appendix 3: Invitation and information for participants



Safe Patient Handling Study

Who: I would like to invite everyone on your unit who handles patients to participate in a Safe Patient Handling study for my Master of Nursing. I am exploring the relationship between the scores on the Safe Patient Handling Survey and patient handling injury rates for both staff and patients.

The more people participating in the survey, the better the results will reflect what you think and how the system of patient handling is working for you. The study is open to ALL who handle patients – nurses, care attendants, students, volunteers, full time, part time, casual, and on all shifts ~~days~~, nights and evenings.

When: The SPH Survey will be available over three weeks to allow everyone on every shift to complete it. It captures your experience from June 1 to September 1, ~~2007~~. It takes about 20 minutes to complete.

Why: The aim of the research is to determine if this survey is a helpful tool for collecting your feedback and opinions on how patient handling systems are working for you in your workplace. The information can then be used to improve the safety of patient handling for both patients and employees.

How: Simply complete the SPH Survey, put it into the envelope provided, ~~seal~~ it, and drop it into the collection box.

Professional Development Recognition Programme: Earn 40 minutes of professional development time. When you complete the survey, write your name on the list so a certificate can be provided to you.

ALL your responses are anonymous and confidential: Your answers will be grouped with the answers of numerous other respondents. Small groups (less than 5 respondents) will be combined with another group to preserve anonymity. There is no way for anyone to know how any one person has answered the questions. Do not write your name on the survey.

The grouped information will be preserved in a confidential database by the researchers, and results will be reported back to your organizational leaders and your ward. The survey will be processed by *Great Safety Performance Ltd* including monitoring for reliability and validity as approved by our Research Advisor at the School of Business and Economics, Wilfred Laurier University, Canada.

Note: Participation in this study is voluntary.

Further Info: Thank you for your assistance - your feedback is very important, and appreciated. For further information about the study, please contact me at (04)479-7207.

Heidi ~~Bärner~~ RN, BN, COHN(C)
Occupational Health Nurse

Appendix 4: Permissions



Columbia University
MAILMAN SCHOOL
OF PUBLIC HEALTH

December 1st, 2008

To Whom It May Concern,

This letter is to grant permission to Ms. Heidi Börner, a Nursing Masters candidate at Victoria University of Wellington in New Zealand working on her thesis to reproduce Figure 1 “Influence of safety climate” from:

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 work practices and workplace exposure incidents. *American Journal of Infection Control*, 28(3), 211-221.

Please feel free to contact me if you require more information or if you have any questions.

Sincerely yours,

A handwritten signature in blue ink, appearing to read 'Robyn Gershon'.

Robyn R. M. Gershon, MHS, DrPH
Professor
Rg405@columbia.edu



To Whom it May Concern,

I hereby grant Heidi Borner permission to reproduce the following in her Masters of Nursing thesis publication completed at Victoria University of Wellington, New Zealand:

1. Safe Patient Handling Survey™ - Employee and Employer Surveys
2. Performance Maximizer™ and Great Safety Performance™ model and information brochure.

Regards,

A handwritten signature in blue ink that reads "Anthony Roithmayr".

Anthony Roithmayr

Director, GSP Surveys Ltd and trademark holder of the Performance Maximizer™.
tony@greatsafetyperformance.com

3 December 2008

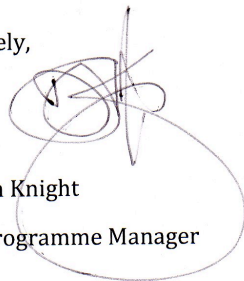
To Whom it May Concern,

Auckland Office
18 Sale Street, Auckland 1010
PO Box 5343, Wellesley Street
Auckland 1141
New Zealand
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Facsimile 09-915 9401
www.acc.co.nz

The Accident Compensation Corporation (ACC) hereby authorizes Heidi Borner, Master of Nursing student at Victoria University of Wellington to reproduce Figure 1 entitled "The United Kingdom Numerical Guidelines" which appears on page 10 of the *New Zealand Patient Handling Guidelines 2003*. The figure was reproduced by ACC with permission of the Health and Safety Executive in the United Kingdom.

The ACC understands that figure will appear in Ms. Borner's thesis and the source attributed to the ACC and the UK Health and Safety Executive.

Sincerely,



Darren Knight
ACC Programme Manager

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