10-24-2012 12:00 AM

Examining work-related injuries of healthcare workers using lost-time claims, risk perceptions, photovoice, safety climate, and participatory ergonomics as data sources

Paula van Wyk
The University of Western Ontario

Supervisor
Dr. Alan Salmoni
The University of Western Ontario

Graduate Program in Kinesiology
A thesis submitted in partial fulfillment of the requirements for the degree in Doctor of Philosophy

EXAMINING WORK-RELATED INJURIES OF HEALTHCARE WORKERS USING LOST-TIME CLAIMS, RISK PERCEPTIONS, PHOTOVOICE, SAFETY CLIMATE, AND PARTICIPATORY ERGONOMICS AS DATA SOURCES

(Spine title: Work-related injuries of healthcare workers)

(Thesis format: Integrated Article)

by

Paula Marguerite van Wyk

Graduate Program in Kinesiology

A thesis submitted in partial fulfillment
of the requirements for the degree of
Doctor of Philosophy

The School of Graduate and Postdoctoral Studies
The University of Western Ontario
London, Ontario, Canada

THE UNIVERSITY OF WESTERN ONTARIO
School of Graduate and Postdoctoral Studies

CERTIFICATE OF EXAMINATION

Supervisor

Dr. Alan Salmoni

Supervisory Committee

Dr. Jim Dickey

Dr. Mickey Kerr

Examiners

Dr. Jim Dickey

Dr. Tony Vandervoort

Dr. Julie Schermer

Dr. Richard Wells

The thesis by

Paula Marguerite van Wyk

entitled:

Examining work-related injuries of healthcare workers using lost-time claims, risk perceptions, photovoice, safety climate, and participatory ergonomics as data sources

is accepted in partial fulfillment of the
requirements for the degree of
Doctor of Philosophy

Date

Chair of the Thesis Examination Board

Abstract

The purpose of this dissertation was to examine work-related injuries of healthcare workers. Chapter 2 analyzed Workers Safety and Insurance Board (WSIB) claims data from 2004-2009 for three occupational roles (registered nurses, registered nursing assistants, and nurse aides and orderlies) working in Ontario hospitals and long-term care homes. Chapter 2 also explored changes in the body part affected, nature of injury, and accident type. Chapter 3 data described the risk perceptions of healthcare workers in long-term care. Chapter 4 utilized the Photovoice method for identifying patient lift and transfer risk factors. Chapter 5 assessed the safety climate and implemented participatory ergonomics programs in two long-term care homes.

Chapter 2 found that the number of claims remained consistent from 2004-2009 for the occupational roles in Ontario hospitals and long-term care homes. The most common body part associated with reported injuries was the trunk/back. The most common nature of injury reported was strains, sprains and tears. The most common accident type was overexertion injuries, when further analyzed the most common tasks attributed to injuries were lifting and pushing or pulling.

Chapter 3 found that healthcare workers did not appear to have the ability to identify risk, as there was little to no differentiation in the perceptions for the common causes and tasks. The lack of differentiation was in contrast to the WSIB data in Chapter 2 that clearly illustrated that overexertion injuries were the majority of accident types reported in claims. If healthcare workers do not accurately assess their risk of injury, they may not behave in a manner that avoids hazardous situations. As a result, they are placing themselves at an increased risk of injury.

Chapter 4 illustrated that Photovoice was a valuable method for identifying risk factors as the approach stimulated discussion, provided visual evidence, and did not create additional paperwork for healthcare workers.

Chapter 5 indicated that prior to implementing a participatory ergonomics program the ergonomist should assess the safety climate of the organization as this can help dictate the necessary steps and structure of the participatory ergonomics process.

Keywords

Work-related injuries, healthcare, risk perception, Photovoice, risk factors, safety climate, participatory ergonomics, participatory ergonomics framework, process evaluation

Acknowledgments

I once read that defending a thesis is like fighting a snake
There are different sizes and styles that a thesis or snake can take
The four years of training is to learn when to jump and when to strike
Some would argue it is harder than learning to ride a bike
During this journey, I've been afforded many teachers and people of support
Despite if I was happy or stressed, no one's advice ever fell short

Al Salmoni has been my mentor, my teacher, my chiefdom
Always providing me with knowledge, advice, and wisdom
He also knew when to let me wander and when to get me in gear
Which of course sometimes was done via a swift kick in the rear!
I will always be grateful for all that Al has done for me
And I know my career will be amazing if I'm half as successful as he

Jim Dickey has been an enduring confident, support, and fan
He picked me up off the floor and helped when I said "I don't think I can"
He taught me it is important to remember the purpose of the fight
Isn't about saving the world but can be as simple as turning on a light

Providing me advice and resources along the way were Mickey Kerr, Alison Doherty, and Craig Hall
So I would like to take a moment to let them know I appreciate them all
This whole process wouldn't be possible without Jenn, Miranda, and Jacqui from the grad office
There is no amount of words or thanks I can offer them that will ever suffice

The Pals of Al Sal or Al Sals Gals are people I will never forget
It has been a pleasure to know you and I'm so glad we met
Lynn Zhu and Lyndsay Foisey, our business ideas, papers, rants and raves
The world better be ready for you because you'll make huge splashes and waves
Denise Bedard, there is a special thanks to you girlfriend
I'm always inspired by your energy that appears to have no end
To Cheryl Gilmour and Michelle Halligan my Swiss Cheese Girls
You ladies are some of my favourite diamonds and pearls
The rest of the AlSal gang, from the Ergonomics and Aging Lab, especially Eric and Tripat
I'll miss all of our conversations and journal clubs with beverages that we sipped

To all the people at Western who helped me not fall off the wagon
Like Carly McKay, Carissa Kanters, Jackie Simatovic, Justine Wilson, Ryan Frayne and Andrew the Dragon
For the continued support from those who moved out west
Craig & Margie Steinback, Alex Williams, and Louis Mattar, you guys are the best
With thanking individuals I met at Western, I have barely begun
Additional thanks to Leslie Witton, Janet McMordie, Scott Holmes, Danielle Tobin, Stefanie DeJesus, and Chantelle Nielson
As well as to my ladies Giulia Pepe, Kat Plewa and Michelle Gu
To each I express my gratitude and thanks for all that you have done and will do

To my friends outside of Western, who's strength and support I often did borrow
Jos Anderson, Danielle Bissonnette, Zahra Jivrag, Scott/Shoe, Natasha Collia, Becky Hood, Irene Velentzas, and Michael Sauro
Jen Rycroft, Daniela Lanc, Aine Pattison, Lesley Higgins, Sharon Sabourin, John Schram, Janice Davie and Maggie Hewitt
Without any of you guys I would never have survived or managed to get through it

A very special number of thanks are needed for my family near and far
I'm in debt to each one of you and sincerely thank you for all that you are
Dad, Mom, Laura, Leo, Elise, Juliet, Nana, Patty, Jessica, Danny, Aunt Pat, Aunt Rose, and Aunt Mary Lou
Thank you for all of your support, I love each one of you!
To my favourite mom of all my moms, a very special thank you for helping me follow my rainbow
For all the extras you did for me the deepest gratitude upon you I bestow
I'm thankful to a special someone who's love and support has been unwavering
From the neighbourhood to apple orchards, I'm excited for the blessings our future will bring

I have made many memories, so many I hope to always recall
From large to small, even waving hello to David Edwards when passing in the hall
Throughout this process I have learned that your "I CAN" is more important than your "IQ"
And that without the support from others, my success would not happen, so to all, I offer a very sincere **THANK YOU**.

Funding Acknowledgments:

Graduate Student Thesis Research Awards
Institute for Work & Health S. Leonard Syme Training Fellowship
Ontario Graduate Scholarships
University of Western Ontario Dean’s Entrance Scholarship
Western Graduate Research Scholarships

Table of Contents

List of Tables

List of Figures

List of Appendices

Chapter 1

1 Introduction

1.1 Work-related injuries in healthcare

Traditionally, most work-related injury and illness claims have been reported by industry workers in sectors such as manufacturing and construction; however, claims from healthcare workers, more specifically nursing personnel, have become more abundant (Marras et al., 1999; Retsas and Pinikahana, 2000; Evanoff et al., 2003; de Castro 2006). Although work-related injuries are confounded by factors from outside the work environment (Burton et al., 1997), nurses, as well as other healthcare workers, are at risk for injuries due to awkward postures and heavy loads (Smedley et al., 1995; de Castro, 2006). Although industrial workers may also be exposed to awkward postures and heavy loads, the objects they manipulate can often be held close to the body, come with handles, and remain in a static state. These are characteristics that the National Institute of Safety and Health (NIOSH) state promote a safer lifting situation (de Castro, 2006; Waters, 2006). Most of the time, the object of manipulation for healthcare workers is a person who does not come with handles, is often unpredictable and/or dynamic in movement, does not weigh less than 50 pounds, and may not be able to be held close to the body of the worker. Patients and residents are often suffering from an illness or injury and they may be attached to a variety of equipment (i.e., intravenous or oxygen) adding increased difficulty to lifting and transferring tasks (Galinsky et al., 2001). Furthermore, in long-term care, most residents are older than hospital patients and this can be associated with an increased number of concerns. For example, older individuals in long-term care may be living with multiple disorders, including cognitive impairments and their skin may tear more easily than the skin of a younger individual. These factors may create a unique lifting situation for healthcare workers and places them at an increased risk of injury. The lifting or transferring of patients and residents is only one task that healthcare

workers are required to perform that increases their risk of injury.

Over the years, there has been a decline in the number of injury claims reported among industrial workers in high-risk occupations but the same has not been clearly shown for healthcare workers (Fragala & Bailey, 2003; Nelson et al., 2006). It is encouraging that there have been noticeable decreases in claims; however, the limitations when using claim data must be appreciated. Since Workplace Safety and Insurance Board (WSIB) lost-time claims are absolute values, caution must be exercised when comparing across sectors or within a sector over time using the WSIB lost-time claim data. It is possible that the decrease in the absolute number of lost-time claims in some industries changed because of changes in the number of employees in that sector (e.g., loss of jobs), and not in the incidence of injuries. In addition, these lost-time claims do not represent all injuries that occurred. Therefore, the lost-time claim data are suggestive but not definitive. On the other hand, the absolute number of lost-time claims is important, because it is this absolute number that drives WSIB costs. With these limitations in mind, it is still informative to use WSIB lost time claim data to improve our understanding of worker injuries.

Sprains and strains have been the predominant nature of injury associated with nurse injury claims in the United States since the 1980s (Klein et al., 1984; Personick, 1990). Canadian workers' compensation claim data from 1990 have also shown that sprains and strains have been the leading category under the nature of injury for all industries (Choi et al., 1996). When analyzed by occupation, it was found that nursing occupations were at the highest risk, determined by odds ratios, of sprains and strains. Among the nursing occupations, nurse aides and orderlies (NAOs) followed by registered nursing assistants (RNAs) had the highest risk of sprains and strains (Choi et al., 1996). Therefore, if this trend has continued it would be assumed that NAOs would have a higher number of claims for the period from 2004 to 2009 than other groups (registered nurses (RNs) and RNAs).

Workers' compensation claims have also primarily been associated with overexertion under the accident type category, typically as a result of lifting and pulling tasks (Klein et al., 1984; Jensen, 1985). Canadian data have shown that overexertion injuries increased the risk, as determined by odds ratios, of sprains and strains occurring among those working in nursing and trucking occupations (Choi et al., 1996). Furthermore, the majority of these injury claims were attributed to the back (Choi et al., 1996). Hospital nursing staff who responded to a survey confirmed that they perceived lifting patients to be associated with back pain (Harber et al., 1985) and the body part most often affected, as reported in injury claims, has been the back (Cust et al., 1972; Klein et al., 1984; Jensen, 1985).

With the aging population, the need for long-term care homes will continue to rise. Thus, it is important to determine if work-related injuries within hospitals and long-term care homes are different so that proper injury prevention strategies can be developed. Furthermore, it is important to also analyze injury data to determine if the same number and types of injuries are occurring to all healthcare workers, or if there are differences between registered nursing staff (for example, registered nurses and registered practical nurses) and nurse aides (for example, personal support workers).

The goal of study one (Chapter 2) was to determine whether the number of lost-time claims reported in the Province of Ontario's WSIB data changed from 2004 to 2009, as well as to identify the most common nature of injury, accident type, and body part associated with the lost-time claims. The main research questions were:

i. Has the number of WSIB lost-time claims per year changed from 2004 to 2009 for RNs, RNAs, and NAOs working in Ontario hospitals and long-term care homes?

ii. Has the nature of injury, accident type, and affected body part changed over the period from 2004 to 2009 for the three employee groups within Ontario hospitals and long-term care homes?

1.2 Work-related injuries: the risk perceptions of healthcare workers in long-term care

WSIB lost-time claims are often used as a standard by which to identify problem areas in a particular industry. It is of interest to also examine the perceptions of workers with respect to workplace risks. In contrast to WSIB lost-time claim data, workers' perceptions may identify other workplace risks that go unnoticed, as they do not result in injuries, or injuries severe enough to be reported. Risk perception data may provide a different perspective on the same problem as WSIB claim data.

Very few studies were found that looked at the perceptions of healthcare workers with respect to performing their tasks and the associated risks. Furthermore, there is a paucity of research that has looked at the perceptions of healthcare workers in long-term care homes. In 1995, a study claimed to be unique in collecting hospital nurses' perceptions of the underlying causes of injuries after they sustained a back injury (Yassi et al., 1995). These nurses, who were from an acute care hospital, felt the underlying issue with respect to work-related injuries was the lack of training associated with patient transfers and lifts. The study however, only ascertained what nurses perceived were the mechanisms of back injury. It would have been informative if they had asked about perceptions of injury with respect to all tasks that the nurses performed and all body parts. Accurate risk perception is an important component of injury prevention and risk management programs.

Risk perceptions are studied to examine risk behaviour and the probability of accidents and injuries occurring (Rundmo, 2000). If an individual perceives a risk, they may behave in a way to avoid an accident or injury (Rundmo, 2000). However, if they lack control over the risk, they may also lack the ability to alter their behaviour. Individuals who believe they have the ability to alter a situation and prevent an injury from occurring think differently about risk and act differently in risky situations than those who believe they have no control and that the likelihood of injury is left to external factors such as

luck or chance (Elkind, 2007).

Several factors appear to affect risk perception. For example, risk perception has been shown to be affected by familiarity with tasks (control and training), perceived ability to control outcomes (control), levels of knowledge (training), degree of potential hazard (severity/lethalness), and the likelihood of experiencing an accident (prevalence) (Elkind, 2007; Nielson et al., 2011). Understanding the risk perceptions of workers is crucial for the development of effective safety strategies (Real, 2008). An individual's risk perception can be influenced by the severity of a potential injury, the prevalence or likelihood of an injury occurring and the control they perceive to have over the hazard or source of risk. The Workplace Safety Questionnaire (WSQ) has been used to assess perceptions of safety issues among workers in the Italian printing industry and aircraft maintenance technicians in the Canadian Forces (Leiter & Robichaud, 1997; Leiter et al., 2009). The WSQ was based on work by Cox & Tait (1991) and Leiter & Cox (1992), which describes risk perception with respect to an individual's judgment of a hazard's potential lethalness, prevalence and their ability to control the hazard. Study two (Chapter 3) utilized the WSQ (modified for healthcare workers) to assess perceptions of safety issues among workers in long-term care homes. Determining the risk perceptions of healthcare workers with respect to specific tasks they preform affords the information that highlights which tasks should be targeted for interventions, especially if the tasks that they perceive to have the most associated risk are the same tasks that are being reported in injury claims.

The primary purpose of study two (Chapter 3) was to describe the risk perceptions of healthcare workers in long-term care. The secondary purpose was to examine differences in the perceptions of registered staff in comparison to non-registered staff. The research questions for study two were:

R1: As measured by the (modified) Workplace Safety Questionnaire, how do workers in long-term care perceive the risks of their work?

R2: Are the perceptions of healthcare workers in long-term care homes different between registered staff and non-registered staff?

1.3 Using photographs to identify patient transfer risk factors in a participatory ergonomics approach to reducing healthcare workers risk of injury in long-term care

The variety of tasks performed in a variety of organizations complicates having a gold standard tool for identifying workplace injury risk factors. There are three main approaches for identifying risk factors; self-reports (e.g. surveys, focus groups, interviews), direct observation (e.g. checklists), and direct measurement (e.g. electromyography) (David, 2005; Dempsey et al., 2005). Each method has benefits and limitations. For example, surveys are inexpensive, can evaluate both physical and psychosocial factors and can be circulated to a variety of workers (Silverstein et al., 1997; David, 2005). Surveys, however, may require a large sample size, are often not occupation specific, and are primarily returned by workers who have a problem or issue (Silverstein et al., 1997; David, 2005). Direct observations, such as checklists, are also inexpensive and can be used widely. Checklists, however, often only focus on specific body parts (e.g. the back) and the most severe problem (e.g. peak spinal compression), and may involve a scoring system that lacks evidence and thus outcomes are largely hypothetical (David, 2005). Direct measurement techniques, such as electromyography, can provide more detailed information such as local muscle fatigue and muscle tension, however, the results may be difficult to interpret, require highly trained and skilled staff, and can be expensive (David, 2005).

In an already busy healthcare setting, additional paper work for the staff to complete and software for the staff to learn, may seem too daunting and therefore reduce participant involvement. One way to simplify the task of risk identification may be to use photography. A comprehensive approach using photographs in participatory ergonomics

that has yet to be explored in the identifying of issues and risk factors is Photovoice. The Photovoice method began in China to provide rural village women an opportunity to identify and represent their concerns and need for change via photography (Wang & Burris, 1997). The method is intended to be a participatory process with a needs assessment focus (Carlson et al., 2006) and therefore may be a natural fit for a participatory ergonomics approach.

Photovoice was derived from Freirian, a documentary photography, and feminist theory based approaches. Photovoice photography invites people to think critically about the images presented and the community from which the images were taken (Wang & Redwood-Jones, 2001). This underpinning comes from Paulo Freire's approach to critical education. More importantly, the opportunity for less powerful people to present images of their tasks, environments and/or community aids in restoring the disconnect between them and more privileged and powerful people (Wang et al., 1998). Photovoice affords people on both ends of the continuum, for example frontline staff and management, to work together to shift the power dynamics and be co-creators of knowledge and change (Carlson et al., 2006). Via a Freirian-based approach, Photovoice utilizes the philosophy of empowerment and participation to promote health, safety and community development (Minkler & Wallerstein, 2003; Carlson et al., 2006). The underlying understanding of community photography supports this theoretical underpinning as it explores how ordinary, underprivileged individuals can use photography to advocate change (Wang & Redwood-Jones, 2001). Photovoice is also based upon the inherent tenants of documentary photography; however, instead of the photographer behind the lens as with documentary photography, Photovoice affords an insider perspective to draw attention to issues they deem important and need an action plan for change (Wang & Burris, 1994; Wang & Burris, 1997; Strack et al., 2004). After all, the insider is better positioned to understand the true issues they are facing; illustrating a feminist theory approach (Strack et al., 2004).

The purpose of the Chapter 4 was to determine whether photovoice strategies could be useful for workers in helping them identify risk factors inherent in lifting and transferring residents during their workday. Chapter 4 is a portion of a larger study examining the

implementation of participatory ergonomic (PE) programs in two long-term care homes (Chapter 5).

1.4 Safety Climate and Participatory Ergonomics

Social structures, or a good safety culture, are dependent upon an organization or workplace working together to achieve common goals in a safe manner (Mearns et al., 2003). In order to attain and sustain a positive safety culture, communication is a crucial aspect. The Health and Safety Commission (1993) ascertained that workplace communication must be founded on trust and incorporate everyone sharing their perceptions regarding the importance of safety. The development of a positive safety culture is crucial as it is the foundation for the promotion of safety behaviours and from which employers and employees will develop their individual safety attitudes (Mearns et al., 2003). A concept that has often been used interchangeably with safety culture is safety climate. Safety climate measures employer and employee attitudes about their workplace environment. It is a moment-in-time 'snapshot' of an organization's current state of safety (Mearns & Flin, 1999).

Participatory ergonomics (PE) is a process that aims to bring key individuals representing both management and frontline staff together to identify issues, develop solutions and implement changes (Institute of Work and Health (IWH), 2009; Theberge et al., 2006; van der Molen et al., 2005). PE refers to active worker involvement in implementing ergonomic knowledge and changes into a workplace with the support of supervisors, managers, and employers (Nagamachi, 1995; Loisel et al., 2001). Participation or involvement appears to be the central component of PE programs, as it works towards creating more human centered work and improving organizational culture (Burgess-Limerick et al., 2007).

Participatory ergonomics is a multimodal approach that includes individuals affected by any changes made in an attempt to optimize workplace health, safety and performance for

all (healthcare workers, management, patients/residents) involved. PE change teams can be beneficial in the attempt to proactively find hazards and develop strategies to implement that can hopefully avoid injuries from occurring. By utilizing worker involvement in the intervention process, PE has been found to be a successful process in several industries, such as, agriculture, mining, and construction (Rainbird & O'Neill, 1995; Moir & Buchholz, 1996; Koda et al., 1997; Kawakami et al., 1999; Jafry & O'Neill, 2000; Zalk, 2001). Workplace participation provides workers the opportunity to have more control in their working environment and with their tasks (Zalk, 2001). After all, the workers are the individuals with the expert knowledge as to how best to perform tasks, and it seems only natural to tap into this resource when attempting to create a more safety conscious environment. This is the fundamental benefit of PE programs (Zalk, 2001). A potential weakness, however, is that the workers need to feel a sense of comfort and security to begin with so that they are willing to participate (Zalk, 2001). Thus, it may be informative for the ergonomist to first assess the safety climate of an organization prior to implement PE.

There is no predefined best way to conduct a PE program (Theberge et al., 2006). To provide practical advice and guidance to an ergonomist or an organization for how to implement a participatory ergonomics program in the workplace Haines et al. (2002) developed the Participatory Ergonomic Framework (PEF). The PEF has been tested and refined to include nine dimensions, each with its own subcategories: i) permanence of initiative, ii) involvement, iii) level of influence, iv) decision-making power, v) mix of participants, vi) requirement, vii) focus, viii) remit/brief, and ix) role of the ergonomics specialist. Although each of these dimensions comes with sub-categories, it is not known what effect these subcategories have on the outcome of the PE process. Another aim of this study was to determine if certain 'levels' of the PEF dimensions affect the PE process.

There have been several studies that have utilized PE and have claimed its success. However, most of these successes have been based on injury data related outcomes. There has yet to be a study that truly identifies how and why the PE process is successful. In other words, there has been a lack of understanding about the process used during a PE initiative (Driessen et al., 2010; van der Molen et al., 2005). Driessen et al. (2010) attempted to perform a process evaluation on PE. The components to their process evaluation consisted of recruitment, reach, fidelity, satisfaction, and implementation components. One of the study's main foci was on implementation rates and the success of implementation, however, these outcomes did not necessarily indicate why the PE process was successful. As PE can address both ergonomic and psychosocial (i.e. climate) facets, another aim of this study was to assess the PE process with respect to the dimensions of safety climate and the PEF. A Process Evaluation was created based on the four dimensions altered for the two groups that participated in a PE program to identify risk factors and develop solutions for patient lifts and transfers.

The implementation of change, such as solutions generated from a PE program, should fit the safety climate and coincide with the organization's values and goals. If the safety climate of an organization is not understood it may become difficult to implement change. The lack of understanding of an organization's safety climate may be a leading reason as to why ergonomic interventions, implementations and changes are not always successful. Some of the dimensions associated with safety climate surveys include, but are not limited to, 'supervisory support for safety', 'safety learning behaviours', 'safety training', 'ergonomic practices', teamwork climate', and 'perceptions of management' (Amick et al., 2000; Sexton et al., 2006; Ginsburg et al., 2009). These dimensions assess workers' perceptions of management involvement, and if it is shown to be supportive, workers may feel more empowered to participate in a PE program (Zalk, 2001). If the teamwork climate is shown to be positive, this may indicate that management and non-management change team members could work together successfully and constructively in a PE program. Therefore, it is likely that there is a connection between dimensions of the safety climate and the PE process as related to the PEF dimensions for a PE program. Furthermore, there is a lack of research that has evaluated the process of a PE program.

Understanding what facilitates or complicates the PE process may be advantageous for further refinement of PE program guidelines.

An original purpose of this study was to examine whether safety climate affected the participatory ergonomics process, and vice versa. Employees at three long-term care homes were invited to complete a safety climate survey prior to and after the implementation of a PE program. Due to the lack of completed surveys during the post-PE period a pre-post analysis was not possible. As a result, only the safety climate surveys completed prior to the PE program implementation were analyzed. A second purpose of this study was to examine the implementation of a PE program using different 'levels' of the Participatory Ergonomics Framework (PEF, Haines et al., 2002).

Figure 1.0 below gives a snapshot of the studies completed in this thesis. Since the studies were not entirely linear in nature, it is hoped this figure provides a holistic view of the work completed.

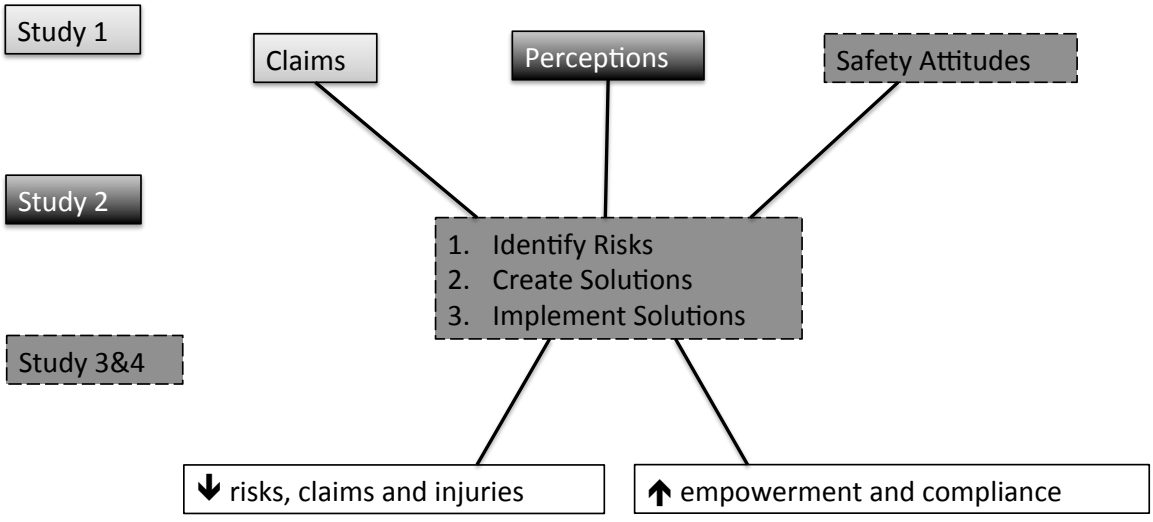

Figure 1.0: Overview of the studies involved in the presented Ph.D. Thesis

1.5 References

Amick, B.C., Habeck, R.V., Hunt, A., Fossel, A.H., Chapin, A. Keller, R.B., & Katz, J.N. (2000). Measuring the impact of organizational behaviors on work disability prevention and management. *Journal of Occupational Rehabilitation*, 10(1), 21-38

Burgess-Limerick, R., Straker, L., Pollock, C., Dennis, G., Leveritt, S., & Johnson, S. (2007). Implementation of the participative ergonomics for manual tasks (PErforM) programme at four Austrlian underground coal mines. *International Journal of Industrial Ergonomics*, 37, 145-155

Burton, A.K., Symonds, T.L., Zinzen, E., Tillotson, K.M., Caboor, D., Van Roy, P., and Clarys, J.P. (1997). Is ergonomic intervention alone sufficient to limit musculoskeletal problems in nurses? *Occupational Medicine*, 47(1), 25-32.

Carlson, E. D., Engebretson, J., & Chamberlain, R. M. (2006). Photovoice as a social process of critical consciousness. *Qualitative Health Research*, 16(6), 836-852

Choi, B., Levitsky, M., Lloyd, R., and Stones, I. (1996). Patterns and risk factors for sprains and strains in Ontario, Canada 1990: an analysis of the Workplace Health and Safety Agency Data Base. *Journal of Occupational and Environmental Medicine*, 38(4), 379-389.

Cox, S., & Tait, R. (1991). *Reliability, safety and the human factor*. London: Butterworth Heineman

Cust, G., Pearson, J.C.G., and Mair, A. (1972). The prevalence of low back pain in nurses. *International Nursing Review*, 19, 169-179.

David, G.C. (2005). Ergonomic methods for assessing exposure to risk factors for work-related musculoskeletal disorders. *Occupational Medicine*, 55, 190-199

de Castro, A.B. (2006). Handle with care: the American nurses association's campaign to address work-related musculoskeletal disorders. *Orthopaedic Nursing*, 25;356-365

Dempsey, P.G., McGorry, R.W., & Maynard, W.S. (2005). A survey of tools and methods used by certified professional ergonomists. *Applied Ergonomics*, 36, 489-503

Driessen, M.T., Proper, K.I., Anema, J.R., Bongers, P.M., & van der Beek, A.J. (2010). Process evaluation of a participatory ergonomics programme to prevent low back pain and neck pain among workers. *Implementation Science*, 6, 65

Elkind, P.D. (2007). Perceptions of risk, stressors, and locus of control influence intentions to practice safety behaviours in Agriculture. *Journal of Agromedicine*, 12(4), 7-25

Engkvist, I., Hjelm, E.W., Hagberg, M., Menckel, E., & Ekenvall, L. (2000). Risk indicators for reported over-exertion back injuries among female nursing personnel. *Epidemiology*, 11(5), 519-522

Evanoff, B., Wolf, L., Aton, E., CAnos, J., & Collins, J. (2003). Reduction in injury rates in nursing personnel through introduction of mechanical lifts in the workplace. *American Journal of Industrial Medicine*, 44, 451-457

Fragala, G., & Bailey, L.P. (2003). Addressing occupational strains and sprains: musculoskeletal injuries in hospitals. *AAOHN*, 51(6), 252-259

Galinsky, T., Waters, T., & Malit, B. (2001). Overexertion injuries in home health care workers and the needs to ergonomics. *Home Health Care Services Quarterly*, 20(3), 57-73

Ginsburg, L., Gilin, D., Tregunno, D., Norton, P.G., Flemons, W., & Fleming, M. (2009). Advancing measurement of patient safety culture. *Health Services Research*, 44(1), 205-224

Haines, H., Wilson, J.R., Vink. P., & Koningsveld, E. (2002). Validating a framework for participatory ergonomics (PEF). *Ergonomics*, 45(4), 309-327

Harber, P., Billet, E., Gutowski M., Soohoo, K., Lew, M., and Roman, A. (1985). Occupational low-back pain in hospital nurses. *Journal of Occupational Medicine*, 27(7), 518-524.

Institute for Work & Health (IWH). (2009). A guide to successful participatory ergonomics programs. *Reducing MSD hazards in the workplace*, 1-11

Jafry, T., & O'Neill, D.H. (2000). The application of ergonomics in rural development: a review. *Applied Ergonomics*, 31(3), 263-268

Jensen, R.C. (1985). Events that trigger disabling back pain among nurses. *Proceedings of the Human Factors Society – 29th Annual Meeting*, 799-801.

Kawakami, T., Batino, J.M., & Khai, T.T. (1999). Ergonomic strategies for improving working conditions in some developing countries in Asia. *Industrial Health*, 37(2), 187-198

Klein, B.P., Jensen, R.C., and Sanderson, L.M. (1984). Assessment of workers' compensation claims for back strains/sprains. *Journal of Occupational Medicine*, 26(6), 443-448.

Koda, S., Nakagiri, S., Yasuda, N., Toyota, M., & Ohara, H. (1997). A follow-up study of preventive effects on low back pain at worksite by providing a participatory occupational safety and health program. *Industrial Health*, 35(2), 243-248

Leiter, M.P., & Cox, T. (1992). The impact of stress on safe working behavior in health care: implications for training and task design. Paper presented at the APA/NIOSH conference, *A changing workforce in a changing workplace*. Washington, DC.

Leiter, M.P., & Robichaud, L. (1997). Relationships of occupational hazards with burnout: an assessment of measures and models. *Journal of Occupational Health Psychology*, 2(1), 35-44

Leiter, M.P., Zanaletti, W., & Argentero, P. (2009). Occupational risk perception, safety training, and injury prevention: testing a model in the Italian printing industry. *Journal of Occupational Health Psychology*, 14(1), 1-10

Loisel, P., Gosselin, L., Durand, P., Lemaire, J., Poitras, S., & Abenhaim, L. (2001). Implementation of a participatory ergonomics program in the rehabilitation of workers suffering from subacute back pain. *Applied Ergonomics*, 32, 53-60

Marras, W. S., Davis K. G., Kirking, B. C., & Bertsche, P. K. (1999). A comprehensive analysis of low-back disorder risk and spinal loading during the transferring and repositioning of patients using different techniques. *Ergonomics*, 42(7), 904-926

Mearns, K.J., & Flin, R. (1999). Assessing the state the organizational safety – culture or climate? *Current Psychology*, 18(1), 5-17

Mearns, K., Whitaker, S.M., & Flin, R. (2003). Safety climate, safety management practice and safety performance in offshore environments. *Safety Science*, 41, 641-680

Minkler, M., & Wallerstein, N. (eds.). (2003). *Community-Based Participatory Research for Health*. San Francisco: Jossey-Bass

Moir, S., & Buchholz, B. (1996). Emerging participatory approaches to ergonomic interventions in the construction industry. *American Journal of Industrial Medicine*, 29(4), 425-430

Nagamachi, M. (1995). Requisites and practices of participatory ergonomics. *International Journal of Industrial Ergonomics*, 15, 371-377

Nelson, A., Matz, M., Chen, F., Siddharthan, K., Lloyd, J., & Fragala, G. (2006). Development and evaluation of a multifaceted ergonomics program to prevent injuries associated with patient handling tasks. *International Journal of Nursing Studies*, 43, 717-733

Nielsen, M.B., Mearns, K., Matthiesen, S.B., & Eid, J. (2011). Using the job demands-resources model to investigate risk perception, safety climate and job satisfaction in safety critical organizations. *Scandinavian Journal of Psychology*, 52, 465-475

Personick, M.E. (1990). Nursing home aides experience increase in serious injuries. *Monthly Labor Review*, 113 (2), 30-37.

Rainbird, G., & O'Neill, D.H. (1995). Occupational disorders affecting agricultural workers in tropical developing countries. *Applied Ergonomics*, 26, 185-187

Real, K. (2008). Safety: a field application of the risk perception attitude framework. *Journal of Applied Communication Research*, 36(3), 339-359

Retsas, A., & Pinikahana, J. (2000). Manual handling activities and injuries among nurses: an Australian hospital study. *Journal of Advanced Nursing*, 31, 875-883

Rundmo, T. (2000). Safety climate, attitudes and risk perceptions in Norsk Hydro. *Safety Science*, 34, 47-59

Sexton J.B., Helmreich R.L., Neilands T.B., Rowan K., Vella K., Boyden J., Roberts P.R., & Thomas E.J. (2006). The safety attitudes questionnaire: psychometric properties, benchmarking data, and emerging research. *BMC Health Services Research* 6,44

Shamian, J., O'Brien-Pallas, L., Thomson, D., Alksnis, C., & Kerr, M.S. (2003). Nurse absenteeism, stress and workplace injury: what are the contributing factors and what can/should be done about it? *International Journal of Sociology and Social Policy*, 23, 81-103

Silverstein, B.A., Stetson, D.S., Keyerling, W.M., & Fine, L.J. (1997). Work-related musculoskeletal disorders: comparison of data source for surveillance. *American Journal of Industrial Medicine*, 31, 600-608

Smedley, J., Egger, P., Cooper, C., & Coggon, D. (1995). Manual handling activities and risk of low back pain in nurses. *Occupational and Environmental Medicine*, 52, 160-163

Strack, R. W., Magill, C., & McDonagh, K. (2004). Engaging youth through photovoice. *Health Promotion Research*, 5(1), 49-58

Theberge, N., Granzow, K., Cole, D., & Laing, A. (2006). Negotiating participation: understanding the "how" in an ergonomic change team. *Applied Ergonomics*, 73, 239-248

van der Molen, H. F., Sluiter, J. K., Hulshof, C. T. J., Vink, P., van Duivenbooden, C., Holman, R., & Frings-Dresen, M. H. W. (2005). Implementation of participatory ergonomics intervention in construction companies. *Scandinavian Journal of Work, Environment & Health*, 31(3), 191-204

van Wyk, P.M. (Chapter 2). A six-year comparison of WSIB injury claims made from 2004-2009 by healthcare workers in Ontario hospitals and long-term care homes.

Wang, C., & Burris, M. (1994). Empowerment through photo novella: portraits of participation. *Health Education Quarterly*, 21(2), 171-186

Wang, C., & Burris, M. (1997), Photovoice: concept, methodology, and use for participatory needs assessment. *Health Education & Behavior*, 24(3), 369-387

Wang, C.C., & Redwood-Jones, Y.A. (2001). Photovoice ethics: perspectives from flint photovoice. *Health Education & Behaviour*, 28(5), 560-572

Wang, C.C., Yi, W. K., Tao, Z. W., & Carovano, K. (1998). Photovoice as a participatory health promotion strategy. *Health Promotion International*, 13(1), 75-86

Waters, T., Collins, J., Galinsky, T., & Caruso, C. (2006). NIOSH research efforts to prevent musculoskeletal disorders in the healthcare industry. *Orthopaedic Nursing,* 25, 380-389

Yassi, A., Khokhar, J., Tate, R., Cooper, J., Snow, C., & Vallentyne, S. (1995). The epidemiology of back injuries in nurses at a large Canadian tertiary care hospital: implications for prevention. *Occupational Medicine*, 45(4), 215-220

Zalk, D.M. (2001). Grassroots ergonomics: initiating an ergonomics program utilizing participatory techniques. *The Annals of Occupational Hygiene*, 45(4), 283-289

Chapter 2

2 A six-year comparison of Workplace Safety and Insurance Board (WSIB) lost-time claims made from 2004-2009 by healthcare workers in Ontario hospitals and long-term care homes

2.1 Introduction

Over the past two to three decades, injuries resulting in lost-time claims to healthcare workers have been problematic. For example, in 2004, the industry sectors with the most lost-time claims of injury and illness in Canada were service, manufacturing, automotive, construction and healthcare (Table 1.0) (WSIB, 2010). Over the next six years, the total number and the overall percentage of reported claims for the top four industries declined. In comparison, the total number of reported claims from the healthcare sector remained fairly consistent and the percentage of claims attributable to the healthcare sector therefore increased. It is encouraging that there have been noticeable decreases in claims; however, the limitations when using claim data must be appreciated. Since Workplace Safety and Insurance Board (WSIB) lost-time claims are absolute values, caution must be exercised when comparing across sectors or within a sector over time using the WSIB lost-time claim data. It is possible that the decrease in the absolute number of lost-time claims in some industries changed because of changes in the number of employees in that sector (e.g., loss of jobs), and not in the incidence of injuries. In addition, these lost-time claims do not represent all injuries that occurred. Therefore, the lost-time claim data are suggestive but not definitive. On the other hand, the absolute number of lost-time claims is important, because it is this absolute number that drives WSIB costs. With these limitations in mind, it is still informative to use WSIB lost time claim data, particularly if a valid denominator is not available.

Table 1.0: WSIB lost-time claims registered from 2004-2009 of injury or illness by industry

	2004		2005		2006		2007		2008		2009	
INDUSTRY	TOTAL	(%)	TOTAL	(%)	TOTAL	(%)	TOTAL	(%)	TOTAL	(%)	TOTAL	(%)
SERVICE	80659	23.2	81343	23.2	77833	23.3	77299	23.7	72580	23.8	58385	23.8
MANUFACTURING	63178	18.1	62791	17.9	58504	17.6	53636	16.5	48461	15.9	34999	14.3
AUTOMOTIVE	32554	9.3	30949	8.8	27591	8.3	23252	7.1	17962	5.9	10918	4.5
CONSTRUCTION	28170	8.1	29473	8.4	29300	8.8	29990	9.2	30253	9.9	23568	9.6
HEALTHCARE	27751	8	28842	8.2	28640	8.6	29369	9	29716	9.7	27756	11.3

Note: The (%) refers to the number of claims from an industry as the numerator and the total number of claims for all industries as the denominator, multiplied by 100. Data are from the WSIB Statistical Supplement to the 2009 Annual Report.

Data from Statistics Canada during this same six-year period indicate that the number of employees have continuously increased in the 'health care and social assistance' industry (Table 2.0). If the number of reported claims per year have remained fairly consistent but the number of employees have increased, this would suggest that the number of claims per employee have been decreasing. Canadian injuries in acute care hospitals and long-term care homes have used the total hours worked by all employees, or payroll as a denominator to determine the rate of injuries per full-time equivalent (FTE) employee (Alamgir et al., 2007). Knowing the rate of injuries per FTE can identify if a specific intervention is successful in reducing the incidence of injuries in a healthcare organization, but it is only useful if a valid denominator can be determined. The use of earned hours in the denominator has been considered a more favourable estimate of FTEs than the more widely used total payroll divided by average salary, as the wages between healthcare workers can have a large variation (O'Brien-Pallas et al., 2004). The Statistics Canada data does not provide values that can be used as a denominator for specific employee groups like registered nurses (RNs), registered nurse assistants (RNAs) or registered practicing nurses, and nurse aides and orderlies (NAOs) or personal support workers for Ontario hospitals and long-term care homes. Although there are organizations who track the number of registered healthcare workers (e.g. RNs and RNAs) this does not seem to be true for long-term care homes in Ontario. Research based in one hospital or nursing home is advantageous as a denominator can be

determined through data from human resources. Unfortunately, knowing the rate of injuries in one healthcare location does not necessarily illustrate province wide trends. Although a denominator may not be available, the WSIB lost-time claim data can still provide valuable information for prevention efforts. For example it is informative to determine which body part, nature of injury, and accident type are most commonly reported in lost-time claims as this information can inform allocation of injury prevention resources.

Table 2.0: Statistics Canada CANSIM Table 281-0024 - The number of employees in the Ontario health care and social assistance industry from 2004-2009

North American Industry Classification System (NAICS)	2004	2005	2006	2007	2008	2009
Health care and social assistance*	490,103	501,021	518,437	531,731	551.806	578,971
Ambulatory health care services	135,959	137,440	143,501	144,505	153,542	159,808
Hospitals	177,353	185,321	186,828	193,642	196,534	200,325
Nursing and residential care facilities	97,432	95,753	100,437	103,849	107,503	120,161
Social assistance	79,358	82,507	87,671	89,735	94,227	98,676

Note: This is a replication of the CANSIM Table 281-0024: Employment (SEPH), unadjusted for seasonal variation, by type of employee for selected industries classified using the North American Industry Classification System (NAICS). The data presented is annual (persons) from Ontario for all employees in the Health care and social assistance industry. * Indicates the row for the industry of which consists of the subsequent rows

According to the Bureau of Labor Statistics, workers' compensation data from New York State in 1980 showed that more claims of back (body part) and sprains and strains (nature of injury) were reported by nurse aides and orderlies (NAOs) than registered nursing assistants (RNAs), which were both ranked above registered nurses (RNs) (Jensen, 1986). The data were further analyzed by occupational role and setting within the healthcare industry. Based on incidence ratios, NAOs in nursing and personnel care (assumed to be working in long-term care homes) were ranked the highest with the most back sprain claims (Jensen, 1986). They were followed by RNAs in hospitals, NAOs in hospitals, and then RNAs in nursing and personnel care. Although these data suggest that there are more NAOs being injured in healthcare, especially in nursing and personnel care, than RNAs and RNs, the total number of cases by occupational role and setting were not reported. The data consisted of other settings in the healthcare industry, for example doctors' offices, and therefore this may be why RNs were not ranked in their top five with the most back sprain claims per number of employees. Alternatively, the tasks RNs are responsible for may be less physically demanding than NAOs and RNAs. The data presented were also not for all claims, but just the most frequently reported injured body part (back) and nature of injury (sprains and strains). Furthermore, the data analyzed were only for one year, thus not providing information as to whether there was a decrease, increase or consistent trend in the number of reported claims. The majority of studies reported in the literature focus on nurses in hospital settings (e.g. Yassi et al., 1995; Retsas & Pinikahana, 2000; Trinkoff et al., 2003; Lipscomb et al., 2004; de Castro et al., 2006; Barnes, 2009). With the aging population, the need for long-term care (LTC) homes will continue to rise. Thus, it is important to determine if work-related injuries within these two settings are different so that proper injury prevention strategies can be developed. Furthermore, it is important to analyze lost-time claim data to determine if the same number and types of claims are being reported by all healthcare workers, or if there are differences between registered nursing staff (for example, registered nurses and registered practical nurses) and nurse aides and orderlies (for example, personal support workers). Therefore, one of the purposes of the present study was to determine what, if any, trends existed among Ontario Workers Safety and Insurance Board (WSIB) claims

by occupational role (RN, RNA, NAO) by setting (hospital, long-term care home) by year (2004-2009).

Although it is beneficial to know whether the number of injuries and claims are different between hospitals and long-term care homes, it would be useful to determine whether the lost-time claims have similar attributes in each setting and among each occupational role. Sprains and strains have been the predominant nature of injury associated with nurse injury claims in the United States since the 1980s (Klein et al., 1984; Personick, 1990). Canadian workers' compensation claim data from 1990 have also shown that sprains and strains have been the leading category under the nature of injury for all industries (Choi et al., 1996). When analyzed by occupation, it was found that nursing occupations were at the highest risk, determined by odds ratios, of sprains and strains. Among the nursing occupations, NAOs followed by RNAs had the highest risk of sprains and strains (Choi et al., 1996). Therefore, if this trend continued it would be assumed that NAOs would have a higher number of claims for the period from 2004 to 2009 that other groups.

Workers' compensation claims have also primarily been associated with overexertion under the accident type category, typically as a result of lifting and pulling tasks (Klein et al., 1984; Jensen, 1985). Canadian data have shown that overexertion injuries increased the risk, as determined by odds ratios, of sprains and strains occurring among those working in nursing and trucking occupations (Choi et al., 1996). Furthermore, the majority of these injury claims were attributed to the back (Choi et al., 1996). Hospital nursing staff who responded to a survey confirmed that they perceived lifting patients to be associated with back pain (Harber et al., 1985). Thus it is not surprising that the body part most often affected, as reported in injury claims, has been the back (Cust et al., 1972; Klein et al., 1984; Jensen, 1985).

The majority of studies looking at healthcare injuries tend to focus on the back. As back injuries and claims are typically associated with the highest costs, it is natural to want to assess the problem and work towards reducing the occurrences (Burton et al., 1997). A survey of nurses from four long-term care (LTC) homes in the Netherlands found that 36% had back complaints (Engels et al., 1996). Also in the Netherlands, employees from

eight university hospitals completed a survey that resulted in a prevalence of 76% for low back complaints (Bos et al., 2007). Geriatric nurses, primarily from German LTC homes, had survey results of 47.9% low back disorder point prevalence (Dulon et al., 2008). Another questionnaire study showed results regarding low back pain of German nurses to have a 61.2% point prevalence and a 87.0% lifetime prevalence (Hofmann et al., 2000). Staff from six hospitals in Turkey were surveyed, and it was found that 65.8% of respondents had experienced low back pain (Karahan et al., 2009). An eight-year longitudinal survey study conducted at a hospital in Switzerland found an annual low back pain prevalence range of 73% to 76% (Maul et al., 2003). Nurses from health clinics and hospitals in Malaysia responded to a survey indicating a 79.4% prevalence of back pain (Rahmah et al., 2008). Nursing staff from an acute care hospital in Hong Kong completed a survey in which 80.9% of the 50 respondents reported having suffered from back pain at some point during their career (French et al., 1997). A questionnaire was also used in an Australian study and revealed that nurses (student and working in hospitals) had an annual low back prevalence of 71% (Mitchell et al., 2008). Respondents from a Tunisian survey of hospital staff revealed an annual low back pain prevalence of 51.1% (Bejia et al., 2008). A Norwegian survey looked at nursing aides and found a two-week musculoskeletal pain prevalence of 88.8% among respondents (Eriksen, 2003). A much earlier study shared questionnaire results that revealed over 65% of nurses were experiencing low back problems within the past year and that over 80% of these problems were occurring to nurses who worked in a hospital setting (Owen, 1989). It appears to be common to assess back injuries among healthcare workers via a questionnaire. It is difficult to compare the questionnaire responses from each of these studies as the questions may have differed, the definition of a back injury or even what constituted the back may have differed, and the time period used for calculating prevalence differed. With that being said, it can still be observed that back injuries are a universal concern among healthcare workers.

In 1998, ceiling mounted lifts were installed in the extended care unit of a British Columbia hospital. Data from one year and three years post-implementation of the ceiling lifts showed significant decreases in the number of reported claims and compensation costs associated with patient transfers and lifts (Ronald et al., 2002;

Spiegel et al., 2002; Chhokar et al., 2005). The success of this "Resident Lifting System Project" in British Columbia spawned the motivation to implement a similar program in Ontario (McRobbie, 2007). Ontario's "Patient Lift Initiative" made $60 million available from the Ontario's Ministry of Health and Long-Term Care to install patient lifting equipment between 2004 and 2006, with focus on the reduction and prevention of nurse musculoskeletal injuries in long-term care homes and hospitals (The Nursing Secretariat News, 2005). If the "Patient Lift Initiative" was similarly successful to the "Resident Lifting System Project" then over the six-year span from 2004 to 2009 there should have been a decrease in the number of claims associated with overexertion and lifting among RNs, RNAs, and NAOs in both hospital and long-term care settings (assuming that lifts were installed).

The present study was a unique opportunity to analyze Ontario lost-time claim data from WSIB during and following the "Patient Lift Initiative." In addition to developing normative values to be compared to in the future, it is also important to note that there has been a lack of Canadian lost-time claims data in the literature. Additionally, the data in this study were analyzed by 1) two different settings – acute care hospitals and long-term care homes; 2) three occupational roles – Registered Nurses (RNs), Registered Nursing Assistants/Registered Practical Nurses (RNAs), and Nurse Aides and Orderlies/Personal Support Workers (NAOs); and 3) six years – 2004 to 2009. Furthermore, the lost-time claims were further examined by 1) Nature of Injury, 2) Accident Type, and 3) Body Part.

The goal of this study was to determine whether the number of lost-time claims changed from 2004 to 2009, as well as to identify the most common nature of injury, accident type, and body part associated with the lost-time claims. The main research questions were:

i) Has the number of WSIB lost-time claims per year changed from 2004 to 2009 for RNs, RNAs, and NAOs working in Ontario hospitals and long-term care homes?

ii) Has the nature of injury, accident type, and affected body part changed over the period from 2004 to 2009 for the three occupational roles within Ontario hospitals and long-term care homes?

2.2 Methods

The WSIB database was accessed to obtain information regarding claims made in acute care hospitals and long-term care homes in Ontario from 2004 to 2009. The data reported in the database was not represented at the individual level and thus consent was not applicable to the review of records in this study. When an injury occurs during the course of employment that results in an employee being disabled or requiring medical attention, the incident must be reported to WSIB. There are three forms that should be sent to WSIB that represent the worker's claim which is assigned a claim number and processed via the adjudication procedures. This study only assessed lost-time claims and the associated injury details (e.g. nature of injury, accident type, body part) from healthcare organizations from 2004 to 2009.

The WSIB data used were lost-time injury claims by workers who had lost wages as a result of temporary or permanent impairment. These data do not include fatalities. The data from the WSIB database were represented at the aggregate level of healthcare settings (acute care hospital, long-term care home) representing approximately 210 hospitals and 600 long-term care homes in Ontario. However, it was possible that the database did not represent all of these healthcare settings or all injuries that occurred to a healthcare worker while at work, as it was dependent upon which organizations reported a work-related injury. Furthermore, the data provided by WSIB were the number of claims. As the total number of RNs, RNAs, and NAOs was not known for each setting for each year, only absolute numbers could be analyzed. Analyzing WSIB claims also present other limitations. It is not known whether the number of claims in the data represent a new injury from each worker since it is possible that one worker submitted multiple claims or multiple claims represent the same injury.

WSIB amalgamates all the information from the forms submitted for each claim into a database based on a variety of codes. Each healthcare organization is first separated according to their classification of "schedule 1" or "schedule 2", which is related to how they pay their premiums. The majority of acute care hospitals and long-term care homes are classified as "schedule 1" organizations, and only schedule 1 claims were included in this study.

The WSIB data obtained were Schedule 1 organizations, including Class H Government and Related Services; Classification Units 8611000 (general hospitals) and 8621001 (nursing home operations, also known as long-term care homes); National Occupation Classifications 3152 (registered nurses (RNs)), 3233 (registered nursing assistants, also known as registered practical nurses (RPNs)), and 3413 (nurse aides and orderlies, also known as healthcare aides and personal support workers); Body Part (e.g., 1000 Cranial region, 1100 Brain, 1200 Hair, 1300 Skull, etc.); Nature of Injury (e.g., 1000 Traumatic Injuries to bones, nerves, spinal cord, unspecified, 1100 Broken cartilage, 1200 broken tooth, etc.); Accident Type (e.g., 1000 Struck against, 1100 stepped on object, 1200 struck against stationary object, etc.); Accident Source/Type (e.g., 1000 Acids, 1100 Acid gases, 1200 Inorganic acids, etc.); Age; and Municipal Location.

Claim data were stratified by setting and then by occupational role. The data were then examined separately for Body Part, Nature of Injury, and Accident Type. As wages, payroll, or worked hours were not available at the aggregate level of data, full-time equivalents (FTEs) were not calculated. As previously mentioned, the data were analyzed using the absolute data available.

Coding

All of the original data were kept in one Excel spreadsheet. Additional spreadsheets were created for each of the three areas of analyses (body part, nature of injury, and accident type). The data were first sorted to separate the hospital claims from the long-term care claims. Then the data for each setting were sorted by occupational role (registered nurse (RN), registered nursing assistant (RNA), and nurse aides or orderlies (NAO)). Then the data were coded based on the descriptions of the injuries. The Body Part, Nature of

Injury, and Accident Type codes and descriptions were based on the Canadian Standards Association (CSA) Z795-96 coding of Work Injury or Disease Information. To reduce the number of codes and categories, similar classifications were grouped together. It should be noted that original coding of the lost-time claims for each of the three attributes produced more code categories than appears in this study. Upon further examination, it was decided to reduce the number of code categories as some codes were rarely reported, (for example, exposure to caustic or noxious substances). These categories were recoded into the "Other" category. The addition of these categories did not increase the "Other" category to more than 20% of all the injuries reported, and thus was deemed acceptable. The codes for each section are shown in Table 3.0 below.

To determine the most common lost-time claim body part once all the data were coded, the total number of claims for each category was summed. Then the frequencies for each category were calculated to reveal which body part claims categories were more commonly reported. The same process was performed to determine the most common nature of injury and accident type related to the lost-time claim.

Table 3.0: Codes for the categories associated with body part, nature of injury, and accident type

Claim Attribute	Code	Category Description
Body Part	1000	Head
	10000	Trunk/Back
	20000	Neck/Shoulder
	24000	Abdomen
	25000	Hip/Groin/Pelvic
	30000	Upper Extremities
	40000	Lower Extremities
	80000	Multiple Body Parts
	90000	Other
Nature of Injury	1000	Traumatic Injury
	2000	Dislocations, Fractures, Avulsions
	3000	Sprains, Strains, Tears
	4000	"Itis", Inflammation
	5000	Bruises, Lacerations, Scratches
	6000	Burns, Poisonings, Toxic Effects
	8000	Dorsopathies
	11000	Cranial or Head Injuries
	12000	Other
Accident Type	1000	Falls
	2000	Bodily Reaction
	3000	Overexertion
	4000	Repetitive Motions
	5000	Aggressive Person
	6000	Struck By/Against
	12000	Other

2.3 Results

An important caveat to these data is the fact that there is no denominator and that the data are simply absolute values. As such, differences between hospitals and long-term care (LTC) homes likely reflect differences in the number of employees at each location and among different occupational roles (particularly Figure 1 and 2 and Table 4 below). Healthcare workers in hospitals and long-term care (LTC) homes in Ontario reported 18288 lost-time claims from 2004 to 2009. The mean age of the injured workers was 42.67 (+/- 10.55) years. There was no discernible trend in the lost-time claim data when presented by year (Figure 2.0).

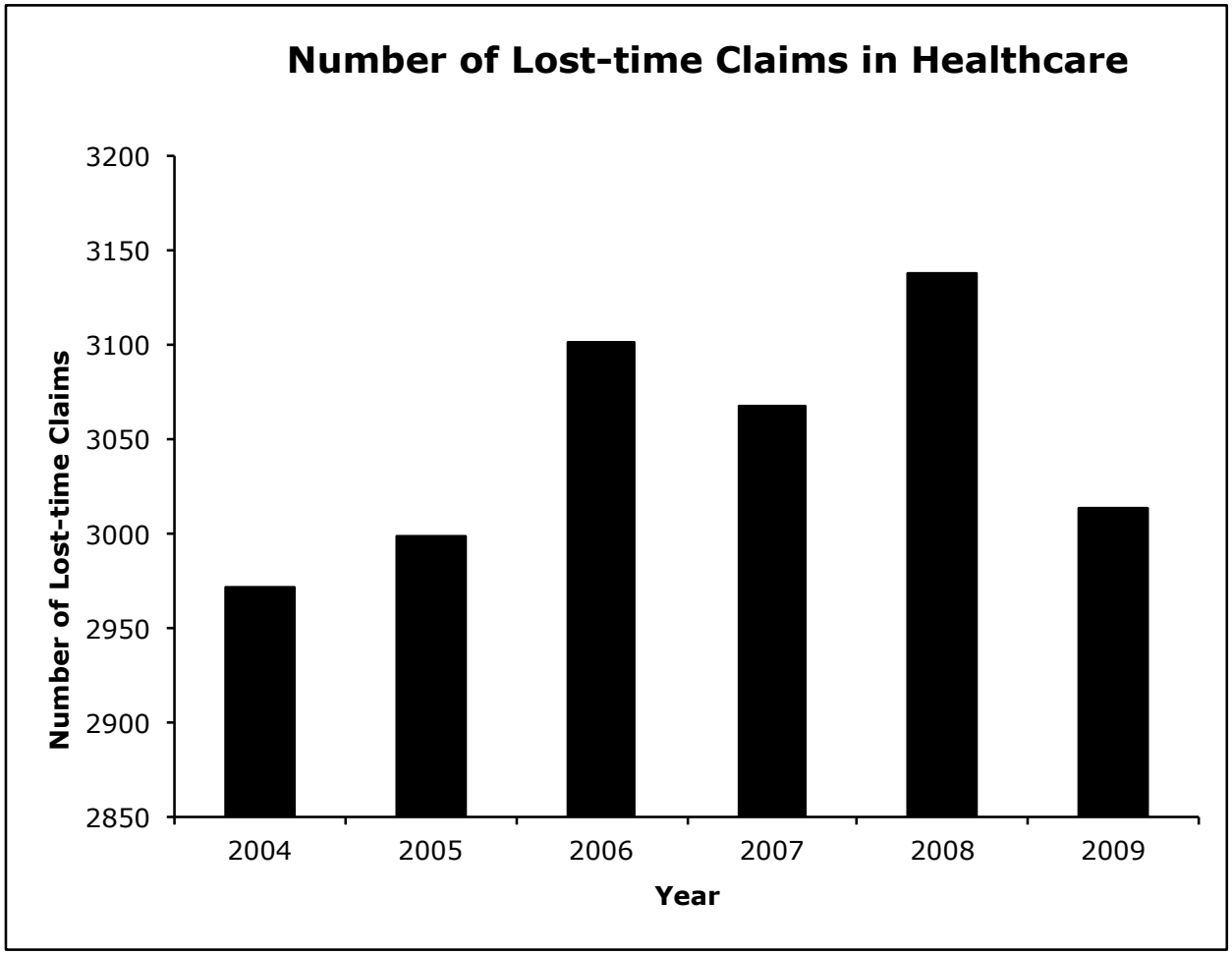

Figure 2.0: Number of lost-time claims in healthcare from 2004 to 2009. Note, only reported claims from hospitals and long-term care homes in Ontario are included in this data

Of the lost-time claims within the Ontario healthcare sector, each year the total number of claims in hospitals (10255) was greater than the number of lost-time claims in long-term care homes (8033) (Fig 3.0). Although there were yearly fluctuations in the number of lost-time claims, overall they appeared relatively consistent within the settings, approximately 1700 claims per year in hospitals and approximately 1350 claims per year in LTC homes.

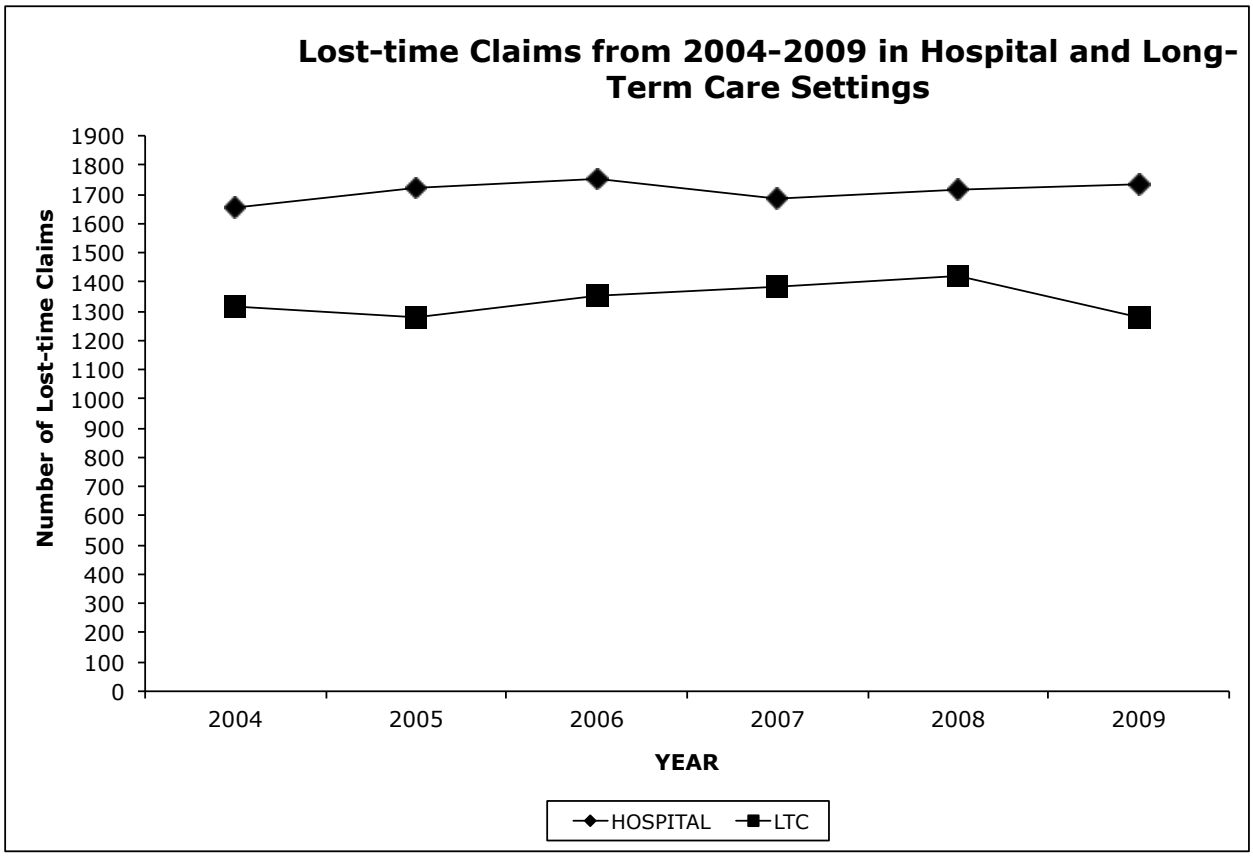

Figure 3.0: Number of lost-time claims in Ontario hospitals and LTC homes from 2004-2009

Table 4.0 shows the lost-time claims per year for each setting broken down by occupational role. From 2004 to 2009 the number of claims remained relatively constant for RNs, RNAs, and NAOs in both hospital and long-term care settings. It can be noted that the majority of claims in hospitals were reported by RNs, whereas the majority of claims in long-term care homes were reported by NAOs, across all six years.

Table 4.0: Number and percentage of lost-time claims in hospitals and LTC homes from 2004 to 2009 by occupational role (RN - registered nurse, RNA - registered nursing assistant, NAO - nurse aides and orderlies)

	HOSPITAL			LTC		
YEAR	Occupational Role	Number of Claims	Percent (%)	Occupational Role	Number of Claims	Percent (%)
2004	RN	1190	**71.95**	RN	147	11.16
	RNA	226	13.66	RNA	131	9.95
	NAO	238	14.39	NAO	1039	**78.89**
2005	RN	1276	**74.19**	RN	125	9.78
	RNA	207	12.03	RNA	111	8.69
	NAO	237	13.78	NAO	1042	**81.53**
2006	RN	1282	**73.26**	RN	117	8.66
	RNA	233	12.03	RNA	123	9.10
	NAO	235	13.78	NAO	1111	**82.24**
2007	RN	1206	**71.66**	RN	113	8.16
	RNA	251	14.91	RNA	135	9.75
	NAO	226	12.43	NAO	1136	**82.08**
2008	RN	1248	**72.77**	RN	140	9.84
	RNA	215	12.54	RNA	119	8.36
	NAO	252	14.69	NAO	1164	**81.80**
2009	RN	1192	**68.78**	RN	143	11.17
	RNA	287	16.56	RNA	121	9.45
	NAO	254	14.66	NAO	1016	**79.38**

What was the most common Body Part?

The body part data were categorized into categories; i) Head, ii) Trunk/Back, iii) Neck/Shoulder, iv) Abdomen, v) Hip/Groin/Pelvic, vi) Upper Extremities, vii) Lower Extremities, viii) Multiple Body Parts, ix) Other (such as chest, heart, lungs, body systems) (see Table 5.0). From 2004 to 2009, for all occupational roles in both settings, the majority of lost-time claims involved the trunk/back. Additionally, 10-20% of the claims involved the neck/shoulder and 5-16% of the claims pertained to multiple body parts. This latter statistic would suggest that the number of claims involving the back, neck, and shoulder might actually have been higher than seen here. There was also an increase in abdomen claims in 2009 for all occupational roles in both settings. As the claims attributed to the abdomen increased, those attributed to the trunk/back decreased, whereas the number for the neck/shoulder remained fairly consistent.

RNs tended to report a higher percentage of trunk/back lost-time claims in hospitals than in LTC settings except in 2007 and 2009. In 2007 there was a rise in RN trunk/back lost-time claims in LTC homes, whereas in 2009 there was a decline in RN trunk/back lost-time claims in hospitals. Although there was an increase in the percentage of trunk/back lost-time claims in 2007 for RNs in LTC, the opposite was observed for RNAs. On average over the six-year span, RNAs had a slightly higher percentage of trunk/back lost-time claims in both hospital and LTC settings than RNs. NAOs had a lower percentage of trunk/back lost-time claims in hospitals on average than RNs and RNAs, but typically reported a greater percentage in LTC settings. In general, there appeared to be a decline in the percentage of lost-time claims to the trunk/back in 2009 compared to in 2004 for RNs, RNAs, and NAOs in hospitals and LTC homes. Overall, trunk/back lost-time claims still remain problematic for all occupational roles in both healthcare settings in Ontario.

Table 5.0: Body part lost-time claims (%) reported by RNs, RNAs, and NAOs in hospital and LTC home settings from 2004 to 2009

BODY PART (%)						
HOSPITAL - RN						
	2004	2005	2006	2007	2008	2009
HEAD	3.53	3.29	3.82	3.48	2.96	4.36
TRUNK/BACK	**48.40**	**46.47**	**45.87**	**43.62**	**41.75**	**33.64**
NECK/SHOULDER	13.19	14.50	15.21	13.85	13.06	15.18
ABDOMEN	3.03	2.19	2.57	3.98	4.01	12.50
HIP/GROIN/PELVIC	1.51	2.04	1.72	1.49	1.68	1.34
UPPER EXTREMITIES	10.25	9.72	8.19	9.87	10.66	10.99
LOWER EXTREMITIES	8.82	10.34	10.06	10.45	10.74	9.23
MULTIPLE BODY PARTS	6.64	6.66	7.49	8.87	9.29	7.89
OTHER	4.62	4.78	5.07	4.39	5.85	4.87
HOSPITAL - RNA						
	2004	2005	2006	2007	2008	2009
HEAD	0.88	2.42	4.72	1.59	1.86	2.10
TRUNK/BACK	**47.35**	**47.83**	**40.77**	**45.82**	**44.65**	**36.36**
NECK/SHOULDER	15.04	14.01	19.31	15.94	14.88	10.14
ABDOMEN	3.54	2.90	0.86	6.37	3.26	23.08
HIP/GROIN/PELVIC	2.65	3.38	1.72	1.20	1.86	1.75
UPPER EXTREMITIES	8.85	10.14	11.59	8.76	10.23	9.44
LOWER EXTREMITIES	12.39	7.73	9.87	9.16	8.84	7.34
MULTIPLE BODY PARTS	5.31	5.80	6.87	7.17	9.30	6.29
OTHER	3.98	5.80	4.29	3.98	5.12	3.50
HOSPITAL - NAO						
	2004	2005	2006	2007	2008	2009
HEAD	2.52	5.06	4.26	4.87	5.16	3.15
TRUNK/BACK	**44.54**	**35.86**	**34.04**	**38.94**	**44.05**	**34.65**
NECK/SHOULDER	10.92	12.24	15.32	14.16	13.89	11.42
ABDOMEN	1.26	0.42	0.85	3.10	2.78	12.60
HIP/GROIN/PELVIC	2.94	2.11	2.13	1.77	1.19	0.79
UPPER EXTREMITIES	18.07	18.57	15.32	12.83	12.70	17.72
LOWER EXTREMITIES	11.34	16.46	11.91	11.95	9.92	8.66
MULTIPLE BODY PARTS	5.88	6.75	10.21	8.41	7.94	6.30
OTHER	2.52	2.53	5.96	3.98	2.38	4.72

BODY PART (%)

LTC - RN

	2004	2005	2006	2007	2008	2009
HEAD	9.52	4.00	2.56	4.42	5.71	2.80
TRUNK/BACK	**37.41**	**32.80**	**34.19**	**43.36**	**32.86**	**33.57**
NECK/SHOULDER	15.65	15.20	14.53	10.62	11.43	7.69
ABDOMEN	0.68	1.60	10.26	7.96	5.71	17.48
HIP/GROIN/PELVIC	2.72	3.20	1.71	0.88	1.43	2.80
UPPER EXTREMITIES	10.88	13.60	11.97	7.96	10.00	7.69
LOWER EXTREMITIES	9.52	18.40	12.82	6.19	11.43	9.09
MULTIPLE BODY PARTS	8.84	7.20	5.13	11.50	16.43	13.29
OTHER	4.76	4.00	6.84	7.08	5.00	5.59

LTC - RNA

	2004	2005	2006	2007	2008	2009
HEAD	3.05	4.50	4.88	6.67	4.20	3.31
TRUNK/BACK	**40.46**	**45.05**	**38.21**	**31.11**	**47.06**	**32.23**
NECK/SHOULDER	16.79	18.02	8.94	15.56	12.61	17.36
ABDOMEN	0.76	0.00	7.32	11.11	2.52	14.88
HIP/GROIN/PELVIC	5.34	0.90	2.44	2.22	1.68	0.83
UPPER EXTREMITIES	9.92	11.71	10.57	14.07	11.76	7.44
LOWER EXTREMITIES	12.21	9.91	14.63	8.15	8.40	9.92
MULTIPLE BODY PARTS	9.92	6.31	8.13	8.15	8.40	7.44
OTHER	1.53	3.60	4.88	2.96	3.36	6.61

LTC - NAO

	2004	2005	2006	2007	2008	2009
HEAD	3.37	2.40	4.23	3.26	3.52	2.95
TRUNK/BACK	**46.78**	**45.39**	**43.92**	**41.37**	**43.30**	**42.52**
NECK/SHOULDER	15.01	13.05	13.50	13.03	14.60	12.70
ABDOMEN	1.35	2.30	5.67	7.04	2.92	4.63
HIP/GROIN/PELVIC	2.02	2.11	2.25	2.46	1.29	1.87
UPPER EXTREMITIES	10.11	11.42	12.15	11.62	11.43	10.43
LOWER EXTREMITIES	8.76	10.84	7.83	9.86	9.62	9.94
MULTIPLE BODY PARTS	9.43	7.49	6.93	8.10	9.62	11.12
OTHER	3.18	4.99	3.51	3.26	3.69	3.84

What was the most common Nature of Injury

The nature of injury was coded into categories; i) Traumatic injuries ii) Dislocations, fractures, avulsions iii) Sprains, strains, tears iv) “Itis", Inflammation (such as tendonitis, epicondylitis, and bursitis), v) Cuts, bruises, lacerations, scratches vi) Burns, poisonings, toxic effects vii) Dorsopathies viii) Cranial or head injuries (such as concussions) ix)

Other (such as pneumonia, influenza, post traumatic stress). The most common nature of injury was sprains, strains and tears from 2004 to 2009 for all occupational roles and settings (Table 6.0). Overall, the percentage of sprains, strains, and tears reported for each occupational role in the hospital setting decreased from 2004 to 2009. In LTC homes, this trend was only observed for the RNAs. The percentage of sprains, strains, and tears claims reported by NAOs was lower than RNs and RNAs in hospitals, but greater in LTC homes. Furthermore, the percentage of lost-time claims attributed to sprains, strains and tears by NAOs in hospitals was lower than the percentage of lost-time claims attributed to the same nature of injury in LTC homes. Another common nature of injury reported in the lost-time claims was cuts, bruises, lacerations, and scratches (which included any reported needle stick injuries). It can also be noted that in 2009 there were notable increases in the percentage of lost-time claims accounted for in the "Other" category for all occupational roles and settings, except for NAOs in LTC homes. Upon further inspection of the raw data, it was observed that an increase in the number of lost-time claims with the nature of injury associated with abdominal problems, more specifically, "infectious diseases peculiar to the intestines" were reported. This appears to coincide with the increase of abdominal lost-time claims in 2009 for the body part data. Overall, sprains, strains and tears lost-time claims remained problematic for all occupational roles in both healthcare settings in Ontario.

Table 6.0: Nature of injury lost-time claims (%) reported by RNs, RNAs and NAOs in hospital and LTC home settings from 2004 to 2009

NATURE OF INJURY (%)

HOSPITAL - RN

	2004	2005	2006	2007	2008	2009
TRAUMATIC INJURIES	0.59	0.24	0.78	0.58	0.48	1.51
DISLOCATIONS, FRACTURES, AVULSIONS	3.36	2.98	3.28	3.23	4.17	3.36
SPRAINS, STRAINS, TEARS	**64.62**	**68.65**	**68.56**	**68.82**	**66.59**	**58.22**
"IT IS", INFLAMMATION	4.71	5.17	3.67	3.98	3.85	4.95
CUTS, BRUISES, LACERATIONS, SCRATCHES	10.34	10.74	11.00	9.78	10.02	8.05
BURNS, POISONINGS, TOXIC EFFECTS	1.01	0.71	1.33	1.66	1.52	1.43
DORSOPATHIES	5.13	3.21	2.81	3.48	2.96	2.52
CRANIAL OR HEAD INJURIES	0.76	0.94	1.01	0.83	1.20	1.51
OTHER	9.50	7.37	7.57	7.63	9.21	18.46

HOSPITAL - RNA

	2004	2005	2006	2007	2008	2009
TRAUMATIC INJURIES	0.88	0.00	0.00	1.20	0.93	1.05
DISLOCATIONS, FRACTURES, AVULSIONS	1.77	3.86	5.15	3.19	2.33	3.48
SPRAINS, STRAINS, TEARS	**70.80**	**68.12**	**72.96**	**72.51**	**73.95**	**53.31**
"IT IS", INFLAMMATION	3.10	6.76	4.72	6.37	7.91	5.23
CUTS, BRUISES, LACERATIONS, SCRATCHES	7.52	9.18	9.01	6.37	4.19	8.71
BURNS, POISONINGS, TOXIC EFFECTS	1.77	0.97	1.72	0.80	0.93	0.35
DORSOPATHIES	5.31	4.35	0.43	0.80	2.79	1.74
CRANIAL OR HEAD INJURIES	0.00	0.97	0.86	0.00	1.40	0.00
OTHER	8.85	5.80	5.15	8.76	5.58	26.13

HOSPITAL - NAO

	2004	2005	2006	2007	2008	2009
TRAUMATIC INJURIES	0.42	0.00	0.43	0.00	1.19	1.18
DISLOCATIONS, FRACTURES, AVULSIONS	3.78	5.49	3.83	3.54	2.38	5.12
SPRAINS, STRAINS, TEARS	**61.34**	**60.34**	**62.55**	**65.93**	**65.87**	**57.48**
"IT IS", INFLAMMATION	6.30	5.06	4.68	6.19	4.76	6.30
CUTS, BRUISES, LACERATIONS, SCRATCHES	12.18	22.78	17.87	13.27	13.89	7.09
BURNS, POISONINGS, TOXIC EFFECTS	1.68	2.11	2.55	0.44	1.98	0.79
DORSOPATHIES	3.78	1.27	1.70	0.88	2.38	1.97
CRANIAL OR HEAD INJURIES	0.00	0.84	1.70	1.77	1.98	0.39
OTHER	10.50	2.11	4.68	7.96	5.56	19.69

NATURE OF INJURY (%)

LTC - RN

	2004	2005	2006	2007	2008	2009
TRAUMATIC INJURIES	0.68	0.00	0.85	0.00	0.71	0.70
DISLOCATIONS, FRACTURES, AVULSIONS	3.40	6.40	3.42	3.54	5.00	2.80
SPRAINS, STRAINS, TEARS	**56.46**	**63.20**	**60.68**	**61.95**	**64.29**	**57.34**
"IT IS", INFLAMMATION	4.76	4.80	6.84	2.65	3.57	0.70
CUTS, BRUISES, LACERATIONS, SCRATCHES	18.37	14.40	9.40	12.39	7.86	8.39
BURNS, POISONINGS, TOXIC EFFECTS	2.04	0.80	0.00	1.77	2.86	1.40
DORSOPATHIES	4.08	1.60	1.71	5.31	2.14	4.20
CRANIAL OR HEAD INJURIES	1.36	0.00	0.00	1.77	2.86	0.70
OTHER	8.84	8.80	17.09	10.62	10.71	23.78

LTC - RNA

	2004	2005	2006	2007	2008	2009
TRAUMATIC INJURIES	0.76	0.00	0.81	0.00	0.00	2.48
DISLOCATIONS, FRACTURES, AVULSIONS	1.53	5.41	4.88	2.96	4.20	1.65
SPRAINS, STRAINS, TEARS	**67.94**	**72.07**	**65.85**	**59.26**	**68.91**	**61.98**
"IT IS", INFLAMMATION	6.87	4.50	4.07	2.96	2.52	1.65
CUTS, BRUISES, LACERATIONS, SCRATCHES	11.45	12.61	10.57	14.07	15.13	11.57
BURNS, POISONINGS, TOXIC EFFECTS	0.00	0.90	0.81	0.74	1.68	2.48
DORSOPATHIES	3.82	0.90	0.81	2.96	0.84	0.00
CRANIAL OR HEAD INJURIES	0.00	0.90	0.81	2.22	2.52	1.65
OTHER	7.63	2.70	11.38	14.81	4.20	16.53

LTC - NAO

	2004	2005	2006	2007	2008	2009
TRAUMATIC INJURIES	0.77	0.10	0.54	0.44	0.69	1.28
DISLOCATIONS, FRACTURES, AVULSIONS	2.60	2.78	2.70	2.90	3.01	2.56
SPRAINS, STRAINS, TEARS	**70.74**	**72.84**	**68.14**	**69.01**	**71.65**	**72.93**
"IT IS", INFLAMMATION	3.85	3.36	3.60	4.05	4.12	3.74
CUTS, BRUISES, LACERATIONS, SCRATCHES	10.20	12.48	12.06	10.92	11.25	9.06
BURNS, POISONINGS, TOXIC EFFECTS	0.58	0.86	0.81	0.79	0.43	1.57
DORSOPATHIES	4.23	1.92	1.53	2.02	2.32	1.77
CRANIAL OR HEAD INJURIES	0.96	0.48	1.98	1.06	1.12	0.69
OTHER	6.06	5.18	8.64	8.80	5.41	6.40

What was the most common Accident Type?

Accident type was grouped into the following categories; i) Fall, ii) Bodily Reaction, iii) Overexertion, iv) Repetitive Motion, v) Aggressive Person (e.g. patient/resident), vi) Struck by/against, vii) Other (exposure to caustic, noxious, or allergenic substance, rubbed or abraded by friction or pressure) (see Table 7.0). Overexertion was the category most cited as the type of accident leading to a lost-time claim for RNs, RNAs, and NAOS in hospital and LTC home settings. Overall, overexertion lost-time claims decreased from 2004 to 2009 for all occupational roles and settings. RNs in hospitals attributed a greater percentage of lost-time claims to overexertion than in long-term care homes. The same trend was observed for RNAs. In contrast, for the majority of years the NAOs attributed a greater percentage of lost-time claims to overexertion in LTC homes than in hospitals. The percentage of lost-time claims attributed to falls and bodily reactions were the next most frequently reported accident types. Falls and bodily reactions represented 10-20% of the reported accident type. For most occupational roles in each setting the percentage remained consistent throughout the six-year span. Again it can be noted that in 2009 the "Other" category spiked in percentage, with the exception of NAOs in LTC homes. Further analysis revealed that there was an increase in the number of claims attributed to "exposure to caustic, noxious substances" as the accident type. Overall, overexertion lost-time claims remained problematic for all occupational roles in both healthcare settings in Ontario.

Table 7.0: Accident type lost-time claims (%) reported by RNs RNAs, and NAOs in hospital and LTC home settings from 2004 to 2009

ACCIDENT TYPE (%)

HOSPITAL - RN

	2004	2005	2006	2007	2008	2009
FALL	11.26	10.97	10.53	12.02	13.78	11.33
BODILY REACTION	14.96	15.99	16.85	19.07	14.26	15.18
OVEREXERTION	**49.58**	**49.29**	**47.11**	**44.53**	**46.15**	**37.84**
REPETITIVE MOTION	1.60	2.27	2.89	3.23	3.13	2.10
AGGRESSIVE PERSON	7.48	7.21	7.18	4.98	5.29	7.13
STRUCK BY/AGAINST	7.31	7.52	7.72	8.37	7.29	7.13
OTHER	7.82	6.74	7.72	7.79	10.10	19.30

HOSPITAL - RNA

	2004	2005	2006	2007	2008	2009
FALL	7.52	13.04	13.73	11.95	13.49	8.36
BODILY REACTION	17.26	9.66	15.88	13.55	17.67	11.50
OVEREXERTION	**57.08**	**53.62**	**48.07**	**46.61**	**48.84**	**35.19**
REPETITIVE MOTION	1.77	2.90	0.43	5.18	1.86	2.09
AGGRESSIVE PERSON	5.31	11.11	12.02	8.37	6.05	8.01
STRUCK BY/AGAINST	5.31	3.38	5.15	3.59	5.12	8.71
OTHER	5.75	6.28	4.72	10.76	6.98	26.13

HOSPITAL - NAO

	2004	2005	2006	2007	2008	2009
FALL	7.14	12.24	8.94	11.95	13.10	9.45
BODILY REACTION	15.97	15.61	16.60	15.04	16.67	18.50
OVEREXERTION	**48.74**	**38.82**	**40.00**	**44.25**	**40.48**	**36.22**
REPETITIVE MOTION	5.04	3.38	5.11	4.42	5.56	6.30
AGGRESSIVE PERSON	4.20	4.64	5.96	5.31	3.97	2.36
STRUCK BY/AGAINST	14.29	22.36	17.87	12.39	13.10	8.27
OTHER	4.62	2.95	5.53	6.64	7.14	18.90

ACCIDENT TYPE (%)

LTC - RN

	2004	2005	2006	2007	2008	2009
FALL	18.37	19.20	11.11	13.27	17.14	16.08
BODILY REACTION	19.73	21.60	20.51	21.24	20.71	17.48
OVEREXERTION	**29.93**	**28.80**	**29.91**	**34.51**	**29.29**	**25.87**
REPETITIVE MOTION	2.04	2.40	3.42	0.88	3.57	2.10
AGGRESSIVE PERSON	15.65	14.40	8.55	9.73	10.00	9.79
STRUCK BY/AGAINST	8.84	6.40	8.55	7.96	5.00	4.90
OTHER	5.44	7.20	17.95	12.39	14.29	23.78

LTC - RNA

	2004	2005	2006	2007	2008	2009
FALL	11.45	16.22	9.76	13.33	18.49	20.66
BODILY REACTION	17.56	10.81	18.70	17.78	21.01	12.40
OVEREXERTION	**41.98**	**48.65**	**36.59**	**29.63**	**31.93**	**30.58**
REPETITIVE MOTION	0.76	3.60	1.63	2.96	1.68	3.31
AGGRESSIVE PERSON	16.79	8.11	13.82	14.07	14.29	6.61
STRUCK BY/AGAINST	7.63	9.01	8.94	8.15	6.72	9.09
OTHER	3.82	3.60	10.57	14.07	5.88	17.36

LTC - NAO

	2004	2005	2006	2007	2008	2009
FALL	10.59	11.13	9.63	12.85	13.40	9.15
BODILY REACTION	15.98	15.83	14.40	19.63	19.07	21.26
OVEREXERTION	**51.01**	**50.96**	**47.25**	**39.00**	**42.61**	**43.21**
REPETITIVE MOTION	1.64	1.44	2.16	1.67	2.66	2.95
AGGRESSIVE PERSON	9.62	8.64	9.90	11.53	8.51	8.46
STRUCK BY/AGAINST	7.60	6.72	8.01	6.95	8.25	7.09
OTHER	3.56	5.28	8.64	8.36	5.50	7.87

Overexertion lost-time claims were examined more closely to determine the tasks that lead to these claims. There were originally six subcategories created: lifting, pulling or pushing, carrying or turning, throwing, static postures with application of a force, and overexertion injuries in general. There were very few reports of carrying or turning, throwing, and static postures with application of a force, and thus they were amalgamated together in the category labeled "Other". There were also claims reported as overexertion in general. These were excluded from further analyses, as they did not highlight which tasks were specifically resulting in overexertion. The two main tasks that resulted in overexertion lost-time claims from 2004 to 2009 for RNs, RNAs, and NAOS, in both hospital and LTC home settings, were lifting and pulling or pushing (see Table 8.0). Lifting tasks were primarily related to the lifting and transferring of patients/residents. The pulling or pushing tasks were with respect to equipment, which included the pulling and pushing of lift devices and wheelchairs, with or without the presence of a patient/resident. Lifting accounted for at least 50% of the overexertion lost-time claims in hospitals, except for NAOs in 2008, where pulling and pushing tasks were the majority. Lifting lost-time claims were the majority of overexertion claims in LTC homes for all occupations. In 2006, lifting represented 100% of the overexertion claims for RNs in LTC homes. The number of lost-time claims attributed to lifting in hospitals remained fairly consistent from 2004 to 2009. The number of lost-time claims attributed to lifting in LTC homes decreased from 2004 to 2009 for RNs and NAOs, whereas they increased for RNAs. Overall, lost-time claims due to lifting lost-time still remain problematic for all occupational roles in both healthcare settings in Ontario.

Table 8.0: Overexertion lost-time claims (%) reported by RNs, RNAs, and NAOS in hospital and LTC home settings from 2004 to 2009

OVEREXERTION (%)

HOSPITAL - RN

	2004	2005	2006	2007	2008	2009
LIFTING	63.16	51.14	63.46	62.61	59.77	64.08
PULLING OR PUSHING	26.32	37.50	27.88	33.04	34.48	31.07
OTHER	10.53	11.36	8.65	4.35	5.75	4.85

HOSPITAL - RNA

	2004	2005	2006	2007	2008	2009
LIFTING	68.18	66.67	64.71	68.18	73.68	66.67
PULLING OR PUSHING	27.27	26.67	23.53	27.27	15.79	33.33
OTHER	4.55	6.67	11.76	4.55	10.53	0.00

HOSPITAL - NAO

	2004	2005	2006	2007	2008	2009
LIFTING	52.78	50.00	52.78	54.05	44.44	52.94
PULLING OR PUSHING	44.44	36.67	38.89	43.24	55.56	47.06
OTHER	2.78	13.33	8.33	2.70	0.00	0.00

OVEREXERTION (%)

LTC - RN

	2004	2005	2006	2007	2008	2009
LIFTING	62.50	37.50	100.00	66.67	66.67	44.44
PULLING OR PUSHING	37.50	50.00	0.00	33.33	25.00	55.56
OTHER	0.00	12.50	0.00	0.00	8.33	0.00

LTC - RNA

	2004	2005	2006	2007	2008	2009
LIFTING	50.00	18.18	37.50	53.33	63.64	66.67
PULLING OR PUSHING	50.00	81.82	62.50	46.67	36.36	33.33
OTHER	0.00	0.00	0.00	0.00	0.00	0.00

LTC - NAO

	2004	2005	2006	2007	2008	2009
LIFTING	64.71	57.14	52.81	60.71	48.28	59.79
PULLING OR PUSHING	30.59	38.96	39.33	28.57	44.83	35.05
OTHER	4.71	3.90	7.87	10.71	6.90	5.15

2.4 Discussion

The majority of lost-time claims in the hospital setting were reported by RNs, whereas the majority of claims in LTC homes were reported by NAOs. It is important to note that the percentages of RNs, RNAs, and NAOs differ within hospitals and LTC homes. More RNs working in hospitals than NAOs relates to a greater number of RNs being exposed to injury risks. Similarly, a greater number of NAOs in LTC homes increases the number of NAOs exposed to injury risks than RNs. Therefore, caution needs to be taken when interpreting these results. Nonetheless, it seems that to make the greatest impact, future research aiming to decrease the number of injuries, WSIB claims, compensation costs, and risks of injuries in healthcare should focus on RNs in hospitals and NAOs in LTC homes.

Body Part

The present study looked at the proportion of lost-time claims that were associated with the back. Over the years, there have been attempts to reduce injuries involving the back by altering patient lifts and transfers (Nelson et al., 2006). The primary reason for injuries among healthcare workers, particularly back injuries, have been attributed to patient lift and transfer tasks (Nelson et al., 2006). In both the hospital and long-term care settings, as well as for all three occupational roles (RNs, RNAs, and NAOs), injuries were most often associated with the back compared to other body parts. In hospitals, the range of claims related to the back was 36% to 52%. Similarly, in LTC homes the range of claims related to the back was 36% to 50%. The percentage of claims related to the back decreased from 2004 to 2009, which may suggest that the number of injuries to the back were also decreasing. When looking at the absolute numbers in the data, it was noticed that the total number of back injuries reported in 2004 were greater than in 2009. A greater decrease for claims for back injuries was seen for all occupational roles in hospitals compared to the total number of back injuries in LTC homes. Nonetheless, claims resulting from back injuries remain problematic.

Nature of Injury

Sprains, strains, and tears have been a commonly reported nature of injury. Injury data from healthcare workers in hospitals and long-term care homes in the United States highlighted that injuries were predominantly sprains and strains (Evanoff et al., 2003). A previous study that assessed Ontario workers' compensation claims from 1990 found that over 50% of the injuries recorded were sprains and strains (Choi et al., 1996). The present study supported these findings as sprains, strains, and tears was the most common nature of injury category. Although a slight decrease was seen over the six-year period in the present study, all occupational roles in the hospital setting and for RNAs in LTC, sprains, strains, and tears made up the most frequently reported nature of injury for the WSIB lost-time claims. Future research needs to focus on this particular nature of injury, as it has been a consistently prevalent issue in healthcare.

Accident Type

For all occupational roles and settings, overexertion injuries were the most common accident type. As one of the duties assigned to healthcare workers is manual handling tasks, these results were not surprising. It was interesting to observe that RNs in LTC homes attributed a fewer percentage of lost-time claims to overexertion than the other two occupational roles in both settings and RNs in hospitals. This finding suggests that the tasks of RNs in LTC homes may involve fewer manual handling tasks. It has previously been found that lifting frequency is a causative factor in the production of back injuries among nurses. This relationship revealed that nursing personnel who performed patient lifts infrequently were less likely to experience back injuries (Stobbe et al., 1988). Unfortunately, a lack of literature about the roles of nurses and the tasks they perform in LTC homes does not allow for a conclusive statement regarding RNs performing fewer manual handling tasks. Further research needs to examine the roles and tasks of RNs, RNAs, and NAOs in hospitals and LTC homes.

Overexertion as a category in and of itself does not provide enough information as to what was happening when the injury took place. In the present study the most common tasks associated with overexertion injuries were lifting and pulling or pushing. Lifting

and transferring patients or residents have been attributed in the literature as a primary reason for work-related injuries in healthcare (Owen et al., 1992; Owen and Garg, 1993; Yassi et al., 1995; Yassi et al., 2001; Nelson et al., 2003; Nelson et al., 2006). Lifting patients has traditionally been an issue with respect to causing injuries, and the current study suggests that little change has taken place (Cust et al., 1972; Klein et al., 1984; Harber et al., 1985; Jensen, 1985). In the past, when LTC nurses were asked about the physical strains associated with work-related tasks, 65% of respondents claimed lifting was the most troublesome task (Engels et al., 1996). Although in the present study there was a decrease in overexertion lost-time claims in 2009 from 2004, lifting remained a common task associated with overexertion claims.

Ontario "Patient Lift Initiative"

The present study illustrated that back lost-time claims were prominent in the WSIB data. A decrease in the absolute number of back lost-time claims decreased from 2004 to 2009. The decrease in back lost-time claims provides support that the Ontario "Patient Lift Initiative" may have been beneficial. Furthermore, a more significant decrease in the total number of back injuries was seen for all occupational roles in hospitals compared to the total number of back injuries in LTC homes. It may be that the Ontario "Patient Lift Initiative" was more successful in hospitals, or that more devices were installed in the hospital setting, than in the LTC setting. Furthermore, the reduction in overexertion lost-time claims also implies that the Ontario "Patient Lift Initiative" may have been successful in reducing injuries that were a result of patient transfers and lifts. Nevertheless, despite the implementation of lifting equipment in Ontario from 2004 to 2006, and the potential success of the initiative, lifting patients and residents seems to remain a predominant problem for lost-time claims in healthcare.

Caution is needed when relating the WSIB lost-time claim data to the Ontario "Patient Lift Initiative" as this relationship was not specifically examined in the present study. The potential relationship between the Ontario "Patient Lift Initiative" and the reduction in lost-time claims associated with the back and lifting tasks does highlight the value in looking at the subcategories of WSIB lost-time claim data, however. Although the

Ontario "Patient Lift Initiative" may have been at least partially effective, back and lifting claims were still the majority of lost-time claims in their respective categories. Thus, further action is required to reduce lost-time claims associated with the back and patient lift and transfer tasks.

Limitations

Only absolute data were available for analyses in this study. The lack of a denominator prevented any FTE, risk ratios, or other statistical analyses to be calculated; however, the WSIB (absolute) data provided some valuable insight into injuries experienced by health care workers in Ontario. Although it was not possible to directly compare the results of this study with the literature primarily due to different definitions, it could be seen that the majority of injuries were sprains, strains, and tears, due to overexertion, and affecting the trunk/back. The absolute data afforded the opportunity to see that the number of lost-time claims from 2004 to 2009 did not change. Furthermore, the WSIB database was not originally designed for epidemiologic research but for the purpose of administrative tracking on claims processing (Choi et al., 1996). Absolute data can help workers' compensation organizations such as WSIB and researchers to allocate resources that focus on the body part, nature of injury, and accident type that are associated with the most lost-time claims. This is beneficial for preventing injuries, as well as reducing the associated healthcare costs.

Recommendations

It became evident that there is a lack of information regarding NAOs, or Personal Support Workers (PSWs), in Ontario. After contacting several healthcare organizations, different Ministries (Labour, Health), and local Members of Provincial Parliament (MPPs), ascertaining information as to the number of NAOs or PSWs in Ontario hospitals and long-term care homes was not possible. There needs to be a report or organization that tracks the number of all healthcare workers in Ontario. A valid denominator, which could be determined if the number of healthcare workers by occupational role and setting were known, would be beneficial for calculating rates of injuries. It is helpful to know the rates of injuries among occupational roles in different

healthcare settings, as it would be a more precise indicator when evaluating injury prevention initiatives. Absolute data, such as the lost-time claim data, not only drive WSIB costs but they also help identify common trends with respect to the body part affected, the nature of injury and the accident type associated with the claims. In reality, it would be advantageous to calculate both absolute and relative statistics evaluating prevention programs and the reduction of claim costs.

When focusing on the reduction of lost-time claims within healthcare, it is important to make nurses a primary focus in hospitals, and NAOs (or PSWs) a primary focus in long-term care homes. The patient or resident population, duties, tasks, and time restraints are only a few examples of the differences between the potential risks of injury to healthcare workers in hospitals versus LTC homes. Nurses predominantly were the healthcare worker with the greatest number of lost-time claims in hospitals, and NAOs predominantly were the healthcare worker with the greatest number of lost-time claims in long-term care homes. Furthermore, as RNs in LTC homes attributed a lower percentage of lost-time claims to overexertion injuries, it is recommended that future research determines the current roles and tasks of RNs, RNAs, and NAOs in hospitals and LTC homes as this may be critical information to implementing appropriate interventions that aim to reduce injuries, lost-time claims, and compensation costs.

2.5 Conclusions

The present study found that the majority of lost-time claims still involve the back, lifting tasks, and sprain, strains and tears. Although there have been attempts to reduce back injuries attributed to patient lift and transfer tasks, research in these areas still needs to remain a priority. It was not possible in the present study to assess the relative number of lost-time claims associated with each occupational role and setting. There is a need for a resource that tracks the number of healthcare workers in different healthcare settings by occupational roles in order to calculate rates of injury. Future injury prevention research should look at utilizing both relative and absolute data to determine intervention success as well assessing the reduction of worker's compensation claim costs.

2.6 References

Alamgir, H., Cvitkovish, Y., Yu, S., and Yassi, A. (2007). Work-related injury among direct care occupations in British Columbia, Canada. *Occupational and Environmental Medicine*, 64, 769-775.

Ando, S., Ono, Y., Simaoka, M., Hiruta, S., Hattori, Y., Hori, F., and Takeuchi, Y. (2000). Associations of self estimated workloads with musculoskeletal symptoms among hospital nurses. *Journal of Occupational and Environmental Medicine*, 57, 211-216.

Barnes, A.F. (2009). Reducing the incidence of back pain: student nurses' recommendations. *British Journal of Nursing*, 18(21), 1334-1338.

Bejia, I., Younes, M., Jamila, H.B., Khalfallah, T., Salem, K.B., Touzi, M., Akrout, M., and Bergaoui, N. (2005). Prevalence and factors associated to low back pain among hospital staff. *Joint Bone Spine*, 72, 254-259.

Bos, E., Krol, B., van der Star, L., and Groothoff, J. (2007). Risk factors and musculoskeletal complaints in non-specialized nurses, IC nurses, operation room nurses, and X-ray technologists. *International Archives of Occupational and Environmental Health*, 80, 198-206.

Burton, A.K., Symonds, T.L., Zinzen, E., Tillotson, K.M., Caboor, D., Van Roy, P., and Clarys, J.P. (1997). Is ergonomic intervention alone sufficient to limit musculoskeletal problems in nurses? *Occupational Medicine*, 47(1), 25-32.

Chholar, R., Engst, C., Miller, A., Robinson, D., Tate, R.B., and Yassi, A. (2005). The three-year economic benefits of a ceiling lift intervention aimed to reduce healthcare worker injuries. *Applied Ergonomics*, 36, 223-229.

Choi, B., Levitsky, M., Lloyd, R., and Stones, I. (1996). Patterns and risk factors for sprains and strains in Ontario, Canada 1990: an analysis of the Workplace Health and Safety Agency Data Base. *Journal of Occupational and Environmental Medicine*, 38(4), 379-389.

Cust, G., Pearson, J.C.G., and Mair, A. (1972). The prevalence of low back pain in nurses. *International Nursing Review*, 19, 169-179.

deCastro, A.B., Hagan, P., and Nelson, A. (2006). Prioritizing safe patient handling: the American Nurses Association's handle with care campaign. *Journal of Nursing Administration*, 36(7-8), 363-369.

Dulon, M., Kromark, K., Skudlik, C., and Nienhaus, A. (2008). Prevalence of skin and back diseases in geriatric care nurses. *International Archives of Occupational and Environmental Health*, 81, 983-992.

Engels, J.A., van der Gulden, J.W.J., Senden, T.F., and van't Hof, B. (1996). Work related risk factors for musculoskeletal complaints in the nursing profession: results of a questionnaire survey. *Occupational and Environmental Medicine*, 53, 636-641.

Eriksen, W. (2003). The prevalence of musculoskeletal pain in Norwegian nurses' aides. *International Archives of Occupational and Environmental Health*, 76, 625-630.

Evanoff, B., Wolf, L,. Aton, E., Canos, J., and Collins, J. (2003). Reduction in injury rates in nursing personnel through introduction of mechanical lifts in the workplace. *American Journal of Industrial Medicine*, 44, 451-457.

French, P., Flora, L.F.W., Ping, L.S., Bo, L.K., and Rita, W.H.Y. (1997). The prevalence and cause of occupational back pain in Hong Kong registered nurses. *Journal of Advanced Nursing*, 26, 380-388.

Haggar-Guenette, C., and Proulx, J. (1992). Back injuries at work, 1982-1990. *Perspectives*, 4(3).

Harber, P., Billet, E., Gutowski M., Soohoo, K., Lew, M., and Roman, A. (1985). Occupational low-back pain in hospital nurses. *Journal of Occupational Medicine*, 27(7), 518-524.

Hignett, S. (1996). Postural analysis of nursing work. *Applied Ergonomics*, 27(3), 171-176.

Hofmann, F., Stossel, U., Michaelis, M., Nubling, M., and Siegel, A. (2002). Low back pain and lumbago-sciatica in nurses and a reference group of clerks: results of a comparative prevalence study in Germany. *International Archives of Occupational and Environmental Health*, 75, 484-490.

Jensen, R.C. (1985). Events that trigger disabling back pain among nurses. *Proceedings of the Human Factors Society – 29th Annual Meeting*, 799-801.

Jensen, R.C. (1986). Work-related back injuries among nursing personnel in New York. *Proceedings of the Human Factors Society – 30th Annual Meeting*, 244-248.

Karahan, A., Kav, S., Abbasoglu, A., and Dogan, N. (2009). Low back pain: prevalence and associated risk factors among hospital staff. *Journal of Advanced Nursing*, 65(3), 516-524.

Klein, B.P., Jensen, R.C., and Sanderson, L.M. (1984). Assessment of workers' compensation claims for back strains/sprains. *Journal of Occupational Medicine*, 26(6), 443-448.

Lipscomb, J., Trinkoff, A., Brady, B., and Geiger-Brown, J. (2004). Health care system changes and reported musculoskeletal disorders among registered nurses. *American Journal of Public Health*, 94(8), 1431-1435.

Maul, I., Laubli, T., Klipstein, A., and Krueger, H. (2003). Course of low back pain among nurses: a longitudinal study across eight years. *Journal of Occupational and Environmental Medicine*, 60, 497-503.

McRobbie, H. (2007). Improving ergonomics through patient lifting hoists: the Canadian experience. *Magazine of European Campaign on Musculoskeletal Disorders*, 20-23.

Mitchell, T., O'Sullivan, P.B., Burnett, A.F., Straker, L., and Rudd, C. (2008). Low back pain characteristics from undergraduate student to working nurse in Australia: a cross-sectional survey. *International Journal of Nursing Studies*, 45, 1636-1644.

Nelson, A., Fragala, G., and Menzel, N. (2003). Myths and facts about back injuries in nursing. *American Journal of Nursing*, 103, 32-40.

Nelson, A., Matz, M., Chen, F., Siddharthan, K., Lloyd, J., and Fragala, G. (2006). Development and evaluation of a multifaceted ergonomics program to prevent injuries associated with patient handling tasks. *International Journal of Nursing Studies*, 43, 717-733.

O'Brien-Pallas, L., Shamian , J., Thomson, D., Alksnis, C., Koehoorn, M., Kerr, M., and Bruce, S. (2004). Work-related disability in Canadian Nurses. *Journal of Nursing Scholarship*, 36(4), 352-357.

Owen, B.D. (1989). The magnitude of low-back problem in nursing. *Western Journal of Nursing Research*, 11(2), 234-242.

Owen, B.D., Garg, A., and Jensen, R.C. (1992). Four methods for identification of most back-stressing tasks performed by nursing assistants in nursing homes. *International Journal of Industrial Ergonomics*, 9, 213-220.

Owen, B.D., and Garg, A. (1993). Back stress isn't part of the job. *American Journal of Nursing*, 93, 48-51.

Personick, M.E. (1990). Nursing home aides experience increase in serious injuries. *Monthly Labor Review*, 113 (2), 30-37.

Rahmah, M.A., Rozy, J., Halim, I., Jamsiah, M., and Shamsul, A.S. (2008). Prevalence of back pain among nurses working in government health clinics and hospital in Port Dickson, Malaysia. *Journal of Community Health*, 14(2), 11-18.

Retsas, A., and Pinikahana, J. (2000). Manual handling activities and injuries among nurses: an Australian hospital study. *Journal of Advanced Nursing*, 31(4), 875-883.

Ronald, L., Yassi, A., Spiegel, J., Tate, R., Tait, D., and Mozel, M. (2002). Effectiveness of installing overhead ceiling lifts – reducing musculoskeletal injuries in an extended care hospital unit. *American Association of Occupational Health Nurses Journal*, 50(3), 120-127.

Spiegel, J., Yassi, A., Ronald, L., Tate, R., Hacking, P., and Colby, T. (2002). Implementing a resident lifting system in an extended care hospital – demonstrating cost-benefit. *American Association of Occupational Health Nurses Journal*, 50(3), 128-134.

The Nursing Secretariat News. (2005). *New Initiatives Help Ontario Attract and Keep Nurses*, Issue 2, page 3.

Tinubu, B.M.S., Mbada, C.E., Oyeyemi, A.L., and Fabunmi, A.A. (2010). Work-related musculoskeletal disorders among nurses in Ibadan, South-west Nigeria: a cross-sectional survey. *BMC Musculoskeletal Disorders*, 11(12), 1-8.

Trinkoff, A., Brady, B., and Nielsen, K. (2003). Workplace prevention and musculoskeletal injuries in nurses. *Journal of Nursing Administration*, 33(3), 153-158.

Workplace Safety and Insurance Board (WSIB). (2010). *Statistical Supplement to the 2009 Annual Report*, 1-32.

Yassi, A., Khokkhar, J., Tate, R., Cooper, J., Snow, C., and Vallentyne, S. (1995). The epidemiology of back injuries in nurses at a large Canadian tertiary care hospital: implications for prevention. *Occupational Medicine*, 45, 215-220.

Yassi, A., Cooper, J.E., Tate, R.B., Gerlach, S., Muir, M., Trottier, J., and Masset, K. (2001). A randomized controlled trial to prevent patient lift and transfer injuries of health care workers. *Spine*, 26, 1739-1746.

Chapter 3

3 Work-related injuries: the risk perceptions of healthcare workers in long-term care

3.1 Introduction

It has long been accepted that work-related injuries are a predominant problem within healthcare. In the United States, healthcare workers, more specifically nurses, have consistently been among the top 10 occupations with the most work-related musculoskeletal injuries according to the Bureau of Labor Statistics (BLS, 2006). Canadian statistics appear to follow a similar trend with the healthcare sector reporting higher injury rates than the average for all other industries when combined (Miller et al., 2006). Although there appears to have been an overall decline in work-related musculoskeletal injury rates since the early 1990s for most occupations, this does not seem to have been the case for healthcare workers (Nelson & Baptiste, 2006). From 2004 to 2009 the number of Workplace Safety Insurance Board (WSIB) lost-time claims made by healthcare workers in Ontario hospitals and long-term care homes remained relatively unchanged (van Wyk, Chapter 2). It was further determined that of the healthcare workers, more Registered Nurses reported lost-time claims in hospitals, whereas more Nursing Aides and Orderlies (non-registered staff) reported lost-time claims in long-term care homes (van Wyk, Chapter 2). Other studies have found that among healthcare workers, the number of lost work days were greater among long-term care workers than full-time hospital workers (de Castro, 2006; Nelson & Baptiste, 2006). Although there is an apparent need for research to focus on healthcare workers in long-term care, the majority of research predominately focuses on nurses in acute care hospitals.

The most reported body part, accident type and nature of injury among Ontario WSIB lost-time claim data were the back, overexertion due to lifting, and sprains, strains and tears, respectively (van Wyk, Chapter 2). Although WSIB data is the only known work-related lost-time claim database in Ontario, it is acknowledged that the reported claims do not fully represent all the injuries that may occur in workplaces. Nonetheless, WSIB lost-

time claims are often used as a standard by which to identify problem areas in a particular industry. It is of interest to also research the perceptions of workers with respect to workplace risks. In contrast to WSIB lost-time claim data, workers' perceptions may identify other workplace risks that go unnoticed, as they do not result in injuries, or injuries severe enough to be reported. Risk perception data may provide a different perspective on the same problem as WSIB claim data.

Perceptions of Healthcare Workers

Very few studies were found that looked at the perceptions of healthcare workers with respect to performing their tasks and the associated risks. Furthermore, there is a paucity of research that has looked at the perceptions of healthcare workers in long-term care homes. In 1995, a study claimed to be unique in collecting hospital nurses' perceptions of the underlying causes of injuries after they sustained a back injury (Yassi et al., 1995). These nurses, who were from an acute care hospital, felt the underlying issue with respect to work-related injuries was the lack of training associated with patient transfers and lifts. They also expressed that inadequate staffing, faulty equipment, poor housekeeping, and an inefficient workplace layout were causative factors in work-related injuries (Yassi et al., 1995). The study however, only ascertained what nurses perceived were the mechanisms of back injury. It would have been informative if they had asked about perceptions of injury with respect to all tasks that the nurses performed and all body parts. Accurate risk perception is an important component of injury prevention and risk management programs.

Risk Perceptions

Healthcare workers have not been asked about their perceptions of risk with respect to the variety of tasks that may be hazardous. Risk perceptions have been identified as a crucial factor in discussing risks and are an inherent part of making decisions (Sjoberg, 2000; Williams and Noyes, 2007). It is important to study risk perceptions because it is believed that risk perceptions are linked with behaviour and thus exposure to risk. Furthermore, risk perceptions have been viewed as logical and empirical precursors to actions or behaviours that could avoid hazards or hazardous situations (Cordeiro, 2002).

In other words, behaviour and exposure to risk may be altered through the influence of risk perceptions (Rundmo, 1999; Cordeiro, 2002). If an individual can be taught to recognize risk, then that individual can be educated as to how to avoid injurious situations.

There are several different definitions of risk, and therefore of risk perception (Hoegberg, 1998). For example, risk perception has been described as being comprised of an individual's subjective assessment of the probability of experiencing an adverse effect (Rundmo, 2000; Lund & Rundmo, 2009), how safe an individual feels with safety measures (Clarke, 2006), and as a multidimensional construct that incorporates a combination of an individual's assessment of the likelihood of experiencing an adverse effect and the cognitions related to the source of risk (Nielson et al., 2001). As it is believed that an individual's belief in their own abilities to control a hazard can greatly influence their risk perceptions, the cognitive aspect has important relevance (Elkind, 2007). The operational definition of risk perception for this study will be one described by Cox & Tait (1991), which stated that risk perception is an individual's recognition of a hazard's capacity to harm and the estimation of the probability of incurring harm. This definition relates to an individual's perception of lethalness/severity, prevalence and control (Leiter & Robichaud, 1997).

It has been shown that perceptions regarding risk and safety have greater predictive validity with respect to workplace accidents and injuries than safety attitudes (Clarke, 2006). Risk perceptions are studied to examine risk behaviour and the probability of accidents and injuries occurring (Rundmo, 2000). If an individual perceives a risk, they typically will behave in a way to avoid an accident or injury (Rundmo, 2000). Furthermore, if an individual perceives a risk and perceives that that risk would result in a severe injury they will most likely alter their behaviour to avoid potential injury. However, if they lack control over the risk, they may also lack the ability to alter their behaviour. Individuals who believe they have the ability to alter a situation and prevent an injury from occurring think differently about risk and act differently in risky situations than those who believe they have no control and that injury, or the lack thereof, is left to external factors such as luck or chance (Elkind, 2007). One way to increase the control

an individual has over a task or situation is through training. When hospital nurses and student nurses perceived they had received training on patient lifts or transfers they also had an increased confidence when performing these patient lifts or transfers (van Wyk et al., 2010). Training could also include teaching about risky situations and tasks. Thus, it is important to determine which tasks healthcare workers perceive to be placing them at an increased risk.

Injuries that occur with a low perceived severity, low perceived control and a high perceived prevalence are often viewed as "part of the job" (Breslin et al., 2007). With respect to youth workers, it has been suggested that in addition to these perceptions, their subordinate status in the workplace may also play a role (Breslin et al., 2007). Healthcare workers have also adopted the mindset that some level of risk and injury are a part of their duties (de Castro et al., 2006). In healthcare, non-registered staff may feel that they are subordinate to registered staff and management. Personal Support Workers and Healthcare Aides have less education and training than Registered Nurses and Registered Practical nurses. As a result, they may perceive less control over their tasks and job, and thus perceive a higher risk of injury. Therefore, it is important to ascertain the risk perceptions of registered staff (Registered Nurses, Registered Practical Nurses) and those of non-registered staff (Personal Support Workers, Healthcare Aides) as they may differ from one another and this may indicate that different approaches to reduce injury risk will need to be employed.

Several factors appear to affect risk perception. For example, risk perception has been shown to be affected by familiarity with tasks (control and training), perceived ability to control outcomes (control), levels of knowledge (training), degree of potential hazard (severity/lethalness), and the likelihood of experiencing an accident (prevalence) (Elkind, 2007; Nielson et al., 2011). There has been debate in the literature that the likelihood of an injury occurring (prevalence) will determine risk perceptions; others refute this idea and state that it is the severity of injury (lethalness) that will determine risk perceptions (Young et al., 1992; Wogalter et al., 1999; Weinstein, 2000). Most of the research that relates to this debate focuses on consumer products, and has not focused on workplace injuries associated with tasks such as patient lifts and transfers. However, a key finding

is that if the likelihood or severity is perceived to be low, then there is no urge or motivation to enact change (Weinstein, 2000). Understanding the risk perceptions of workers is crucial for the development of effective safety strategies (Real, 2008). An individual's risk perception can be influenced by the severity of a potential injury, the prevalence or likelihood of an injury occurring and the control they have over the hazard or source of risk. A model (Figure 4.0) showing the relationship of lethalness, prevalence, control, training and risk was previously developed and validated (Leiter & Robichaud, 1997; Leiter et al., 2009). Thus, determining the risk perceptions of healthcare workers with respect to specific tasks they preform affords the information that highlights which tasks should be targeted for interventions, especially if the tasks they perceive to have the most associated risk are the same tasks that are being reported in injury claims.

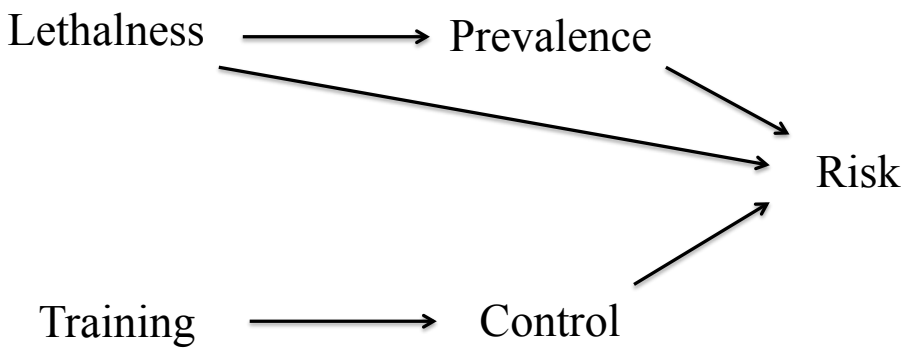

Figure 4.0: Model of the relationship of lethalness, prevalence, control, training, and risk. Adapted from Leiter & Robichaud (1997)

Workplace Safety Questionnaire

The Workplace Safety Questionnaire (WSQ) has been used to assess perceptions of safety issues among workers in the Italian printing industry and aircraft maintenance technicians in the Canadian Forces (Leiter & Robichaud, 1997; Leiter et al., 2009). The WSQ was based on the work by Cox & Tait (1991) and Leiter & Cox (1992), which describes risk perception with respect to an individual's judgment of a hazard's potential

lethalness, prevalence and their ability to control the hazard. Lethalness and prevalence are viewed as independent factors that assess a workplace's capacity to inflict harm while control assesses a worker's ability to cope with the demands (Leiter & Robichaud, 1997). In other words, risk can be viewed from the lens of the worker as the recognition that harm may come from a hazard and the probability of that harm occurring (Cox & Tait, 1991). More specifically, lethalness looks at the severity of an injury that may occur as a result of a hazard. Prevalence is the estimated frequency of an injury occurring from a hazard. Control is the amount of mastery and management a worker has over their interactions with hazards in the workplace. The more perceived control and the less perceived lethalness and prevalence with respect to hazards in the workplace the less risk a worker perceives (Leiter & Robichaud, 1997). Therefore, all three components have a direct relationship with risk perception itself. Another factor that has been considered is training. It is thought that training can influence control and thus influence risk perception (Leiter & Robichaud, 1997).

The WSQ is comprised of five subscales: lethalness (the severity of a potential injury), prevalence (how often an injury may occur), risk (level of exposure), control (ability to perform tasks with command over whether or not the worker is placing themselves at risk for injury), and training (education and instruction on how to perform tasks and duties) (Leiter et al., 2009). The WSQ is a structured questionnaire that asks workers about their perceptions on the above five factors with respect to specific risk factors (e.g. common tasks and duties) within their workplace (Leiter et al., 2009). Differences in risk perception have been found among workers in different departments as a result of the type of work performed (Leiter et al., 2009). In long-term care homes the type of work may be variable among occupational roles and therefore, differences in perceptions of risk and injury may exist between registered staff (registered nurses, RNs and registered practical nurses, RPNs) and non-registered staff (healthcare aides, HCAs and personal support workers, PSWs).

The primary purpose of this study was to describe the risk perceptions of healthcare workers in long-term care. Thus, the primary research question for this study was:

> R1: As measured by the Workplace Safety Questionnaire, how do workers in long-term care perceive the risks of their work?

As non-registered staff may view themselves as subordinates, it may be that registered staff perceive a lower lethalness, prevalence and risk, and higher control and training with respect to the common causes, tasks and duties associated with work-related injuries in long-term care homes than non-registered staff. Thus, an additional research question was:

> R2: Are the perceptions of healthcare workers in long-term care homes different between registered staff and non-registered staff?

3.2 Methods

Participants

Healthcare workers from six long-term care homes in South-western Ontario were invited to participate in this study. The administrators from each home were first contacted and a meeting was set up between them and the investigator. At the meeting, the investigator discussed the purpose of the study and reviewed the questionnaire with the administrator. All of the long-term care homes contacted agreed to participate in the study. Attached to each copy of the questionnaire was a letter of information and a form that stated completion of the questionnaire was acknowledgement of the participants consent. Ethics for the study was obtained from the University Research Ethics Board.

Instrument

The 'Safety Questionnaire' in this study was adapted from the Workplace Safety Questionnaire (WSQ) (Leiter & Robichaud, 1997; Leiter et al., 2009). To determine the common causes and tasks an open-ended pilot questionnaire was given to healthcare workers in one long-term care home within South-western Ontario. Questions included, but were not limited to: "When injuries occur, what do you think the common causes are (why do injuries to staff happen in long-term care)?", "What tasks/duties of your job do you find the most physically stressful?", "What parts of your job, that are not physical tasks, do you find the most stressful?", and "What are your biggest concerns regarding work-related injuries?". The responses to these questions were then analyzed for the common causes and tasks associated with injuries to healthcare workers in long-term care and were used for the Safety Questionnaire in this study.

A total of 14 common causes and tasks were established for this study (Table 9.0). Causes are factors that may increase the risk in a situation, for example an aggressive resident or a fatigued worker. A task is a duty that a worker performs, for example lifting or transferring a resident. These common causes and tasks can be viewed as the sources of risk the healthcare workers are exposed to.

Table 9.0: The 14 common causes and tasks used in the survey as previously determined by the pilot study. A "C" denotes a common cause, and a "T" denotes a common task

		Common cause or task
1	C	Resident Behaviours (e.g. unpredictable, aggressive)
2	C	Staff Stressors (e.g. tired, overstressed, not paying attention)
3	T	Lifting Heavy Objects (e.g. weight of residents)
4	C	Resident Conditions (e.g. decreasing mental and physical abilities)
5	C	Time Pressures (e.g. fast paced work)
6	C	Improper Body Mechanics and Lifting Techniques
7	T	Repositioning or Turning a Resident
8	T	Lifting or Transferring a Resident Manually (e.g. bed to chair)
9	T	Lifting or Transferring a Resident with a Lift Assist (e.g. bed to chair with Hoyer or Sara Lift)
10	T	Resident Care (e.g. bathing, washing, dressing, changing)
11	C	Slips, trips and/or falls
12	C	Working with malfunctioning equipment (e.g. wheelchair, lift assist)
13	T	Pushing/Pulling (e.g. med cart, wheelchair, equipment)
14	T	Bending down (e.g. lowest drawers in med cart, changing beds)

As with the WSQ, there were five factors, each with an associated 7-point scale for the first four factors, and 4-point scale for the fifth factor in the Safety Questionnaire (Appendix A). The first factor, lethalness, asked 'how severe an injury would a problem with each of the 14 common causes or tasks' usually produce on a 7-point scale from 1 (minor) to 7 (potentially fatal). Thus, the respondent would answer on a 7-point scale the severity they associated for each of the 14 common causes and tasks. The second factor, prevalence, asked 'how often do you think injuries at work occur involving the following 14 common causes and tasks' on a 7-point scale from 1 (never) to 7 (daily). The third factor looked at perceived risk. This section asked 'to what extent do you feel at risk of injury due to each of the 14 common causes and tasks' on a 7-point scale from 1 (not at risk at all) to 7 (could not be more at risk). The next section was control. This factor asked 'to what extent do you feel your skills and experience give you control over experiencing a work-related injury with the following 14 commons causes and tasks' on a 7-point scale from 1 (no control) to 7 (total control). The last factor, training, stated 'indicate how much safety training you have received concerning the 14 common causes and tasks' on a 4-point scale from 1 (none) to 4 (extensive training).

There was also a section in the questionnaire that asked for demographic data, such as age, gender, occupational role and history of injuries. Furthermore, the participants were asked when in the shift they perceived injuries were more likely to occur, where in the long-term care home injuries were perceived to most likely occur (e.g. resident's room), and which occupation they perceived was at most risk of injuries (e.g. healthcare workers, construction workers, automotive workers, butchers, miners, and airport baggage handlers).

Procedures

After contacting the long-term care homes, in most cases a meeting occurred between the researcher and the Director of Care from the home, in one case the meeting occurred with the person appointed to the Occupational Health and Safety position. Each individual was informed as to the nature of the study and their approval was obtained to invite employees to participate in the study. The distribution of the surveys was based on the

discretion of each long-term care home. For example, in most homes questionnaires and a locked box for the return of completed questionnaires were left in the break room. At other locations a locked box was kept at the main reception desk and the employees were provided a survey in their mailboxes. An instruction page was given with each survey. The surveys took approximately 15 to 20 minutes to complete. Each long-term care home had the surveys for approximately one month. A limitation of this time frame was that only employees who had a shift during this time were able to participate in this study. Thus, currently injured staff, individuals on vacation or on a leave of any kind did not have the opportunity to participate in this study.

Data Analyses

To determine the internal consistency of the Safety Questionnaire a Cronbach's alpha was calculated using SPSS (v.20) for the lethalness, prevalence, risk, control, and training factors.

R1: As measured by the Workplace Safety Questionnaire, how do workers in long-term care perceive the risks of their work?

All of the responses for the five factors (lethalness, prevalence, risk, control, training) were entered into an excel spreadsheet. The data were then grouped by occupational role; registered staff (Registered Nurses, Registered Practical Nurses) and non-registered staff (Personal Support Workers, Health Care Aides). To determine the perceptions of the participants the mean and standard deviations were calculated for the responses to each of the 14 common causes and tasks for each of the five factors. The responses were also plotted in histograms.

R2: Are the perceptions of healthcare workers in long-term care homes different between registered staff and non-registered staff?

The second stage of data analyses was to explore the comparisons of responses by registered staff (registered nurses and registered practical nurses) with non-registered staff (healthcare aides and personal support workers). A mean score was calculated for each worker for each factor (lethalness, prevalence, risk, control, and training). An

independent sample t-test was then computed for each factor comparing registered staff to non-registered staff. The data in the other category of employees were not used in these calculations.

3.3 Results

Healthcare workers (N=74) from six long-term care homes in South-western Ontario volunteered to participate in this study. The mean age of the participants was 42.42 years +/- 11.0 years. Of the workers who participated 25 were registered staff (registered nurses or registered practical nurses), 40 were non-registered staff (healthcare aides and personal support workers), and nine were 'other' (e.g., management, clergy, kinesiologist). Most participants were female (n=67). Of the 74 participants, 24 responded that they had experienced at least one work-related injury in the past year. They perceived work-related injuries in long-term care occurring to healthcare workers to primarily take place in the resident's room, followed by the resident's bathroom, the tub room, the hallway, the dining room and then the common room or activity room. It was most commonly perceived that work-related injuries in long-term care homes occur most often within the last two hours of a worker's shift, followed by the middle of a shift, and then the first two hours of a shift. They also most commonly perceived healthcare workers in long-term care to experience the highest frequencies of work-related injuries, followed by construction workers, miners, airport baggage handlers, automotive assembly line workers, and butchers.

Cronbach's Alpha

The alpha coefficients with respect to the 14 common causes and tasks for lethalness was 0.928, for prevalence was 0.841, for risk was 0.952, for control was 0.899, and for training was 0.896 (Table 10). These results indicate a high level of internal consistency for the five factors of the Safety Questionnaire.

Table 10: Cronbach's Alpha scores for lethalness, prevalence, risk, control, and training for the 14 common causes and tasks that lead to workplace injuries in healthcare

Safety Questionnaire Factor	Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
Lethalness (A)	0.928	0.928	14
Prevalence (B)	0.841	0.939	14
Risk (C)	0.952	0.953	14
Control (DA)	0.899	0.901	14
Training (DB)	0.896	0.898	14

R1: What are the perceptions of healthcare workers in long-term care homes with respect to the common causes and tasks (sources of risk)?

To determine the perceptions of the participants (n=74) the mean and standard deviations were calculated for the responses for each of the 14 common causes and tasks for each of the five factors. These data are presented in Table 11.0 and Figures 5.0 – 9.0. The data are described further below.

Perceived Lethalness

The perceived lethalness scale ranged from 1 (minor) to 4 (take time off of work or required medical attention) to 7 (potentially fatal). The common causes and tasks perceived to lead to injuries with the most severity were lifting heavy objects, improper body mechanics and lifting techniques, slips, trips and/or falls, and working with malfunctioning equipment (Table 11.0). The healthcare workers perceived injuries due to all of the common causes and tasks to at least require time off of work or medical

attention except for lifting or transferring a resident with a lift assist, resident care, pushing/pulling, and bending down, which had lower perceived lethalness. Overall, the lifting and transferring tasks, except for those involving a lift assist, were among the top five highest levels of perceived lethalness (Figure 5.0). This would imply that the perceptions of healthcare workers, in addition to the WSIB claim data, indicate that patient lifts and transfers cause the most severe injuries in healthcare.

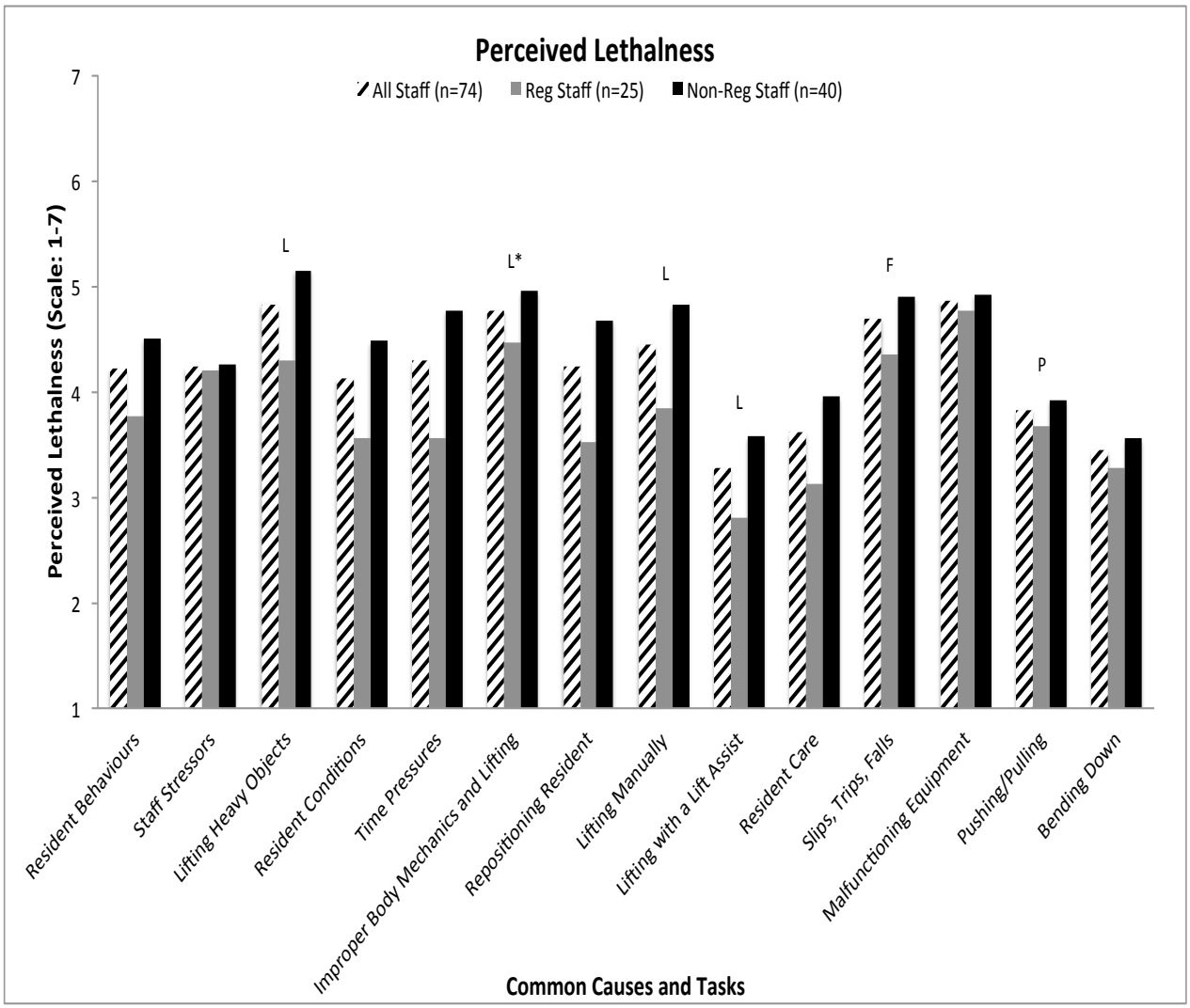

Figure 5.0: Perceived lethalness of long-term care staff (n=74), registered staff (n=25) and non-registered staff (n=40). Perceived lethalness scale: 1(minor) - 4(take time off work or require medical attention) - 7 potentially fatal)

L = lifting task

L* = cause associated with lifting

F = slips, trips, falls

P = pushing or pulling task

Perceived Prevalence

The seven options on the perceived prevalence scale were: 1 (never), 2 (every few years), 3 (yearly), 4 (a few times a year), 5 (monthly), 6 (weekly) and 7 (daily). All common causes and tasks were perceived to occur at least a few times a year, with the exception of lifting or transferring a resident with a lift assist which was just below this marker on the scale provided (Table 11.0). Of the common causes and tasks, six were perceived to cause injuries monthly. These were resident behaviours, staff stressors, lifting heavy objects, resident conditions, improper body mechanics and lifting techniques, and repositioning or turning a resident. Overall, the registered staff and non-registered staff perceived that injuries due to resident behaviours occur more frequently than the other common causes and tasks (Figure 6.0).

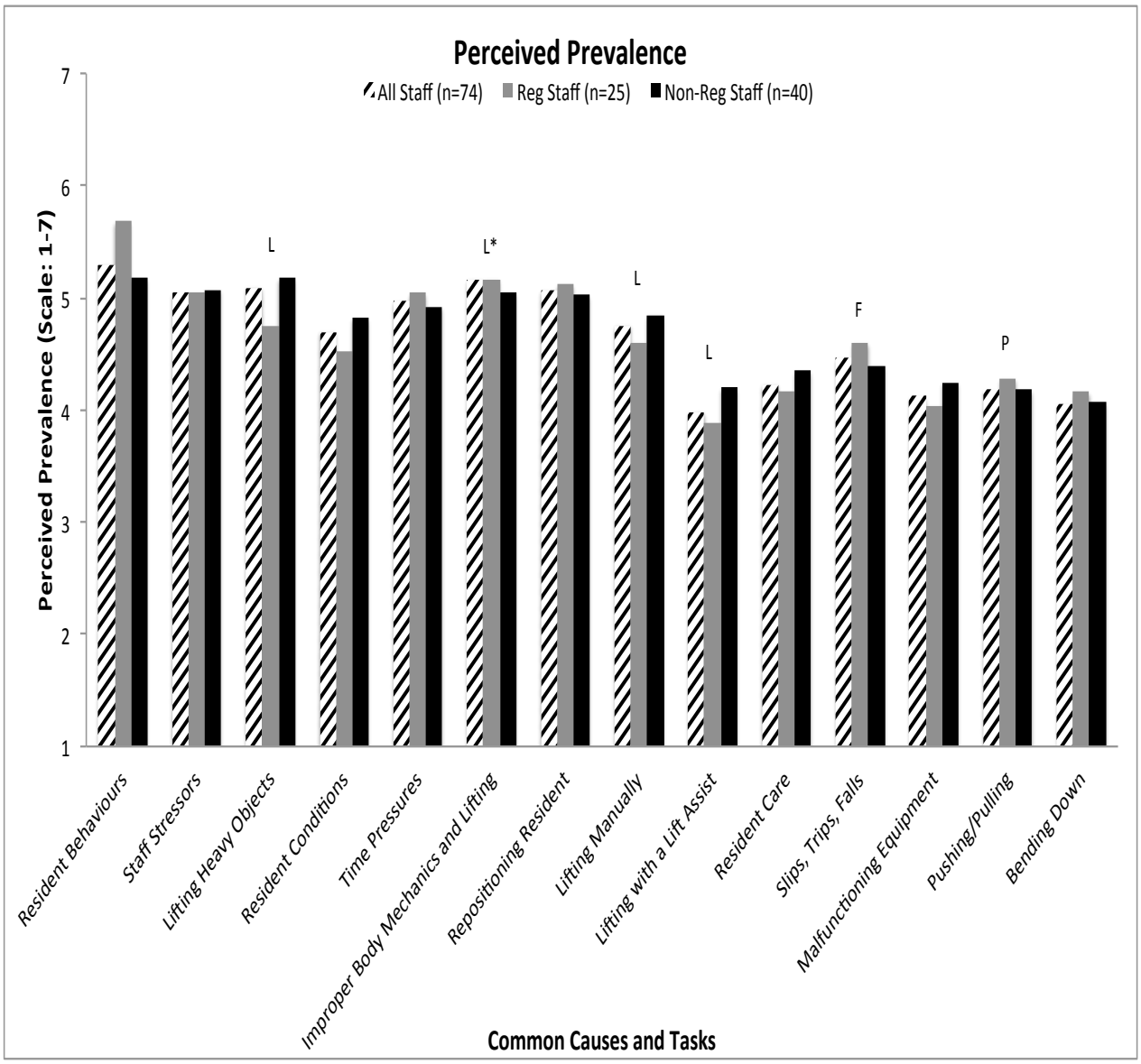

Figure 6.0: Perceived prevalence of long-term care staff (n=74), registered staff (n=25) and non-registered staff (n=40). Preceived prevalence scale: 1(never) - 4(a few times a year) - 7(daily)

L = lifting task

L* = cause associated with lifting

F = slips, trips, falls

P = pushing or pulling task

Perceived Risk

The perceived risk scale ranged from 1 (not at risk at all) to 4 (at risk) to 7 (could not be more at risk). Overall, resident behaviours was perceived to be the common cause or task that exposes the healthcare workers to the most risk of injury (Table 11.0). All common causes and tasks were perceived to expose the healthcare workers to some risk of injury. The common cause or task associated with the most overall perceived risk was resident behaviours (Figure 7.0).

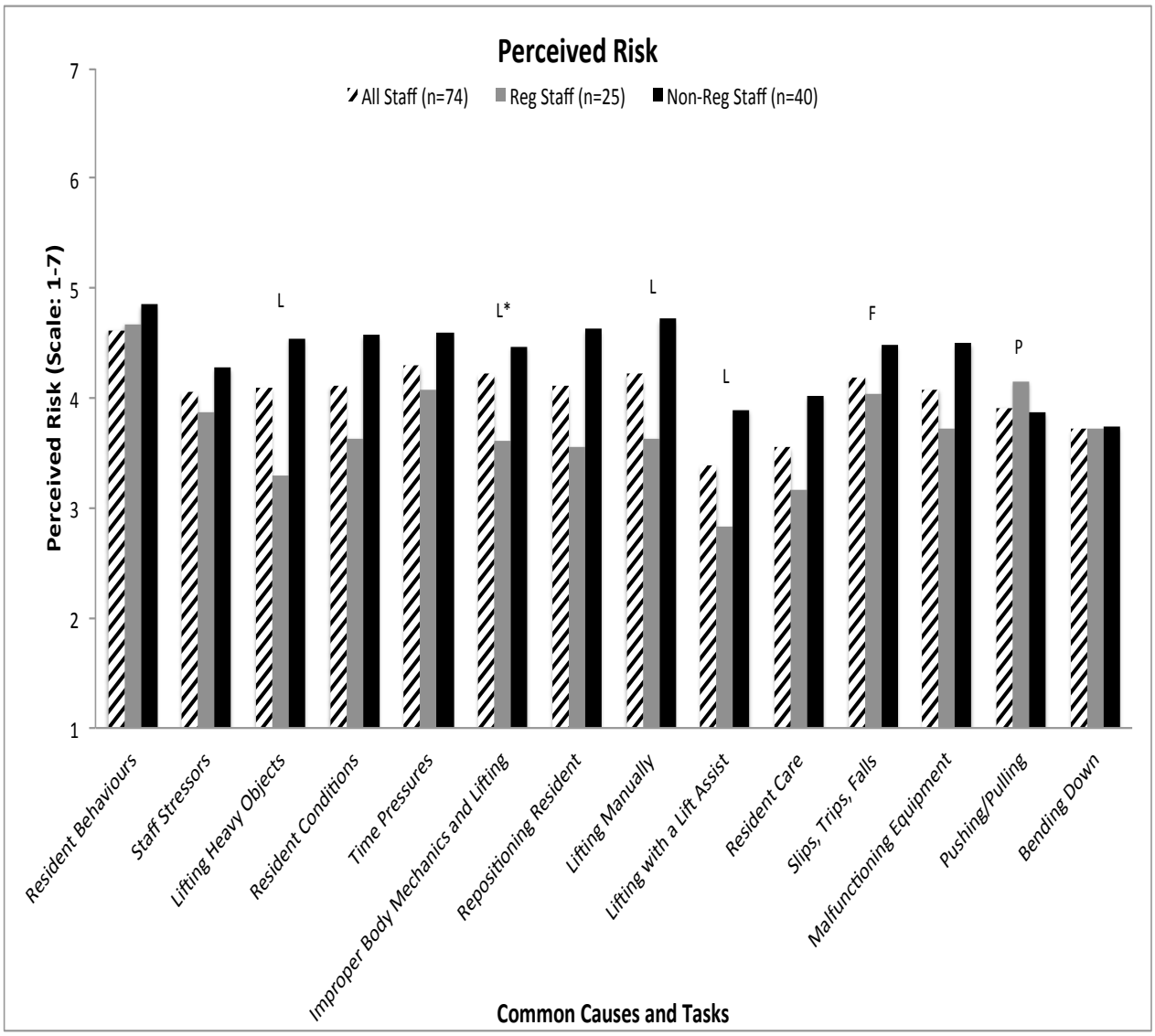

Figure 7.0: Perceived risk of long-term care staff (n=74), registered staff (n=25) and non-registered staff (n=40). Perceived risk scale: 1(not at risk at all) - 4(at risk) - 7(could not be more at risk)

L = lifting task

L* = cause associated with lifting

F = slips, trips, falls

P = pushing or pulling task

Perceived Control

The perceived control scale ranged from 1 (no control) to 2 (minimal control) to 4 (some control) to 6 (great control) to 7 (total control). The common cause or task that the healthcare workers perceived to have the most control over was improper body mechanics and lifting techniques (Table 11.0). All other common causes and tasks healthcare workers perceived to have some control over except for staff stressors, resident conditions, time pressure, slips, trips and/or falls, and working with malfunctioning equipment which had lower perceived control. Overall, the healthcare workers had the highest perceived control for the common causes and tasks associated with patient lifts and transfers (Figure 8.0).

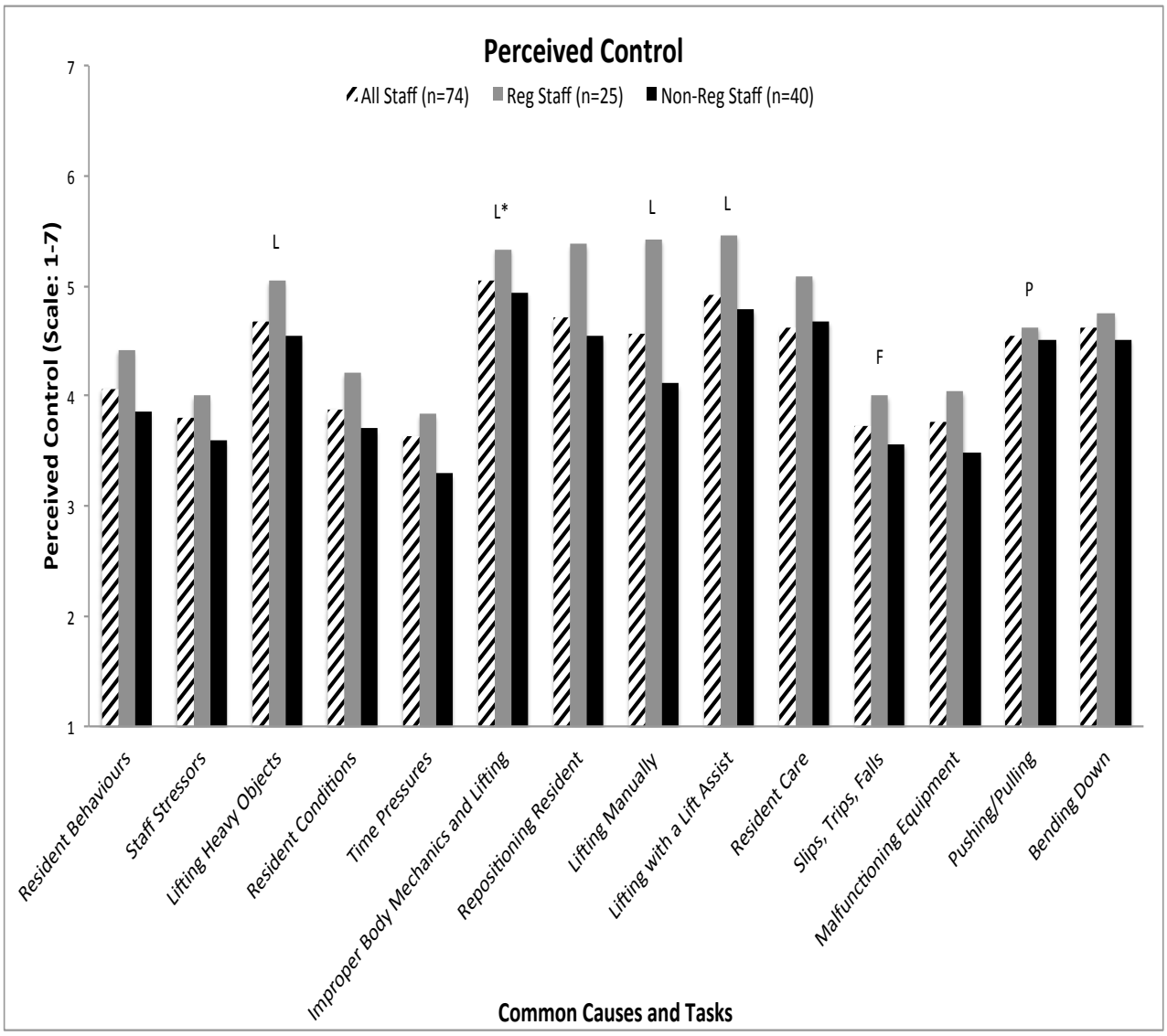

Figure 8.0: Perceived control of long-term care staff (n=74), registered staff (n=25) and non-registered staff (n=40). Perceived control scale: 1(not control) - 4(some control) - 7(total control)

L = lifting task

L* = cause associated with lifting

F = slips, trips, falls

P = pushing or pulling task

Perceived Training

The four options on the perceived training scale were: 1 (none), 2 (minimal training), 3 (training), and 4 (extensive training). The common causes and tasks that the healthcare workers perceived having received training for were lifting heavy objects, improper body mechanics and lifting technique, repositioning or turning a resident, lifting or transferring a resident manually and lifting or transferring a resident with a lift assist (Table 11.0; Figure 9.0). Healthcare workers perceived at least minimal training for the other common causes and tasks.

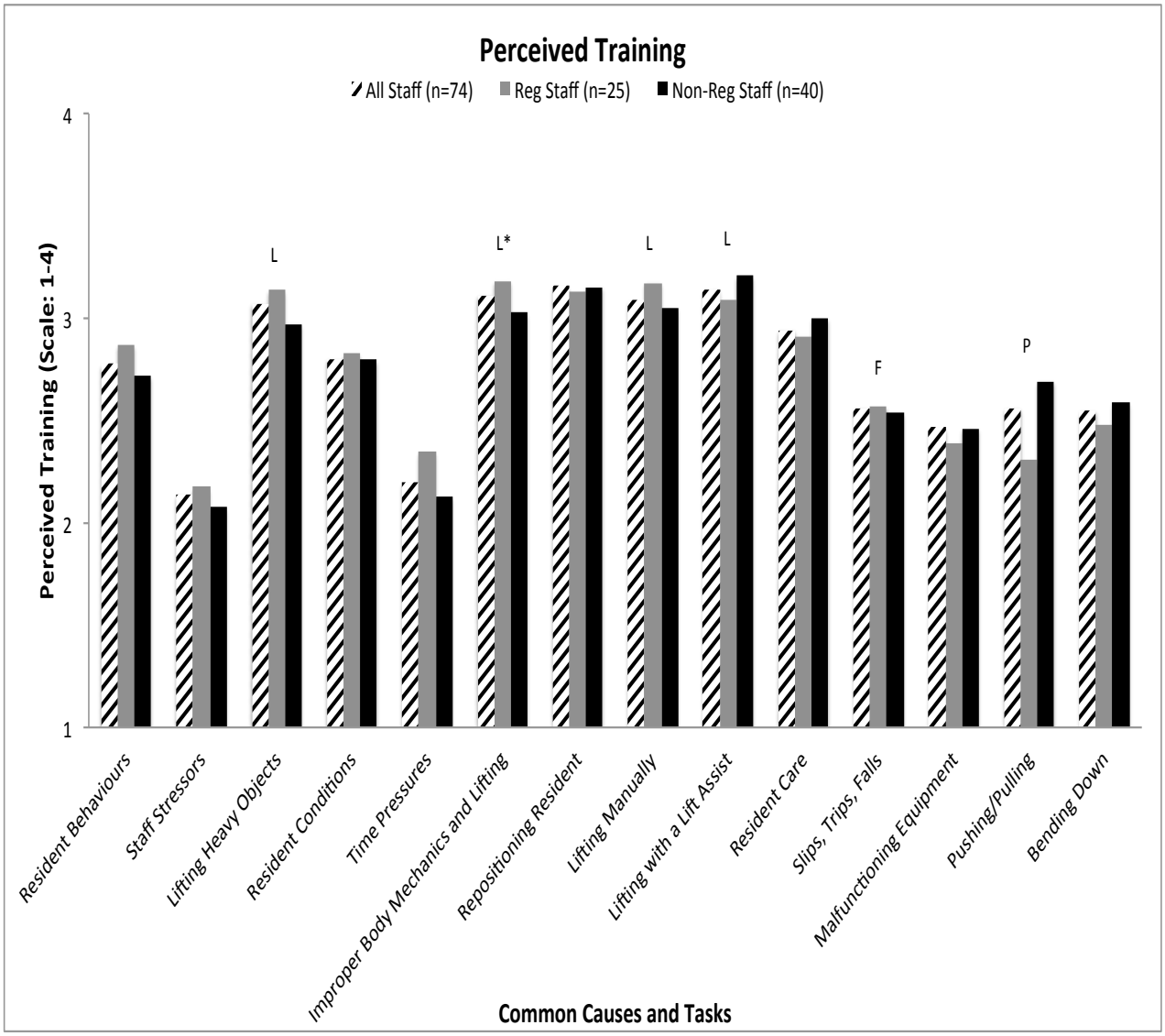

Figure 9.0: Perceived training of long-term staff (n=74), registered staff (n=25) and non-registered staff (n=40). Perceived training scale: 1(none) - 2(minimal training) - 3(training) - 4(extensive training)

L = lifting task

L* = cause associated with lifting

F = slips, trips, falls

P = pushing or pulling task

Table 11.0: The means and standard deviations for the 14 common causes and tasks for perceived lethalness, perceived prevalence, perceived control, and perceived training for healthcare workers (n=74) in long-term care. For perceived lethalness, prevalence, risk and control a 7-point scale was used, and for perceive training a 4-point scale was used.

Factors	Common Causes and Tasks													
	Resident Behaviours	Staff Stressors	Lifting Heavy Objects	Resident Conditions	Time Pressures	Improper Body Mechanics and Lifting	Repositioning Resident	Lifting Manually	Lifting with a Lift Assist	Resident Care	Slips, Trips, Falls	Malfunctioning Equipment	Pushing/ Pulling	Bending Down
Lethalness														
mean	4.08	4.19	4.77	4.05	4.15	4.77	4.09	4.31	3.12	3.42	4.61	4.72	3.68	3.32
standard deviation	1.53	1.49	1.26	1.62	1.64	1.27	1.49	1.50	1.47	1.55	1.51	1.52	1.47	1.35
Prevalence														
mean	5.25	5.04	5.09	5.38	4.97	5.16	5.07	4.76	3.96	4.20	4.43	4.13	4.16	4.04
standard deviation	1.61	1.33	1.47	6.07	1.65	1.29	1.38	1.69	1.70	1.76	1.51	1.55	1.72	1.70
Risk														
mean	4.60	4.05	4.09	4.11	4.29	4.22	4.11	4.22	3.39	3.55	4.18	4.08	3.91	3.71
standard deviation	1.64	1.50	1.59	1.63	1.64	1.58	1.61	1.75	1.45	1.55	1.52	1.67	1.65	1.57
Control														
mean	4.04	3.80	4.68	3.89	3.64	5.04	4.71	4.57	4.91	4.61	3.73	3.76	4.54	4.63
standard deviation	1.28	1.44	1.36	1.54	1.69	1.27	1.44	1.39	1.42	1.29	1.61	1.84	1.50	1.51
Training														
mean	2.78	2.14	3.07	2.80	2.20	3.11	3.15	3.09	3.14	2.94	2.56	2.46	2.56	2.55
standard deviation	0.65	0.82	0.64	0.80	0.90	0.63	0.65	0.70	0.66	0.73	0.82	0.94	0.84	0.84

R2: Are the perceptions of healthcare workers in long-term care homes different between registered staff and non-registered staff?

The data were also analyzed to determine if the perceptions of the registered nursing staff differed from the perceptions of the non-registered staff. Responses from 65 participants (25 registered staff and 40 non-registered staff) were analyzed. The mean scores for each registered staff and non-registered staff participant for each of the five factors of the Safety Questionnaire (lethalness, prevalence, risk, control, training) were calculated. An independent t-test was run occupational role (registered staff, non-registered staff) as the group variable (Table 12.0). The significance of the Levene's test for equality of variance was greater than 0.05 for all factors. Thus, for all the factor scores, equal variances were assumed. The t-tests revealed statistically significant differences for three of the five factor scores. These were perceived lethalness, perceived risk and perceived control. Non-registered staff perceived higher levels of lethalness and risk than registered staff. Registered staff had higher levels of perceived control than non-registered staff, however. There were no statistically significant differences between the registered staff and the non-registered staff for perceived prevalence and perceived training.

Table 12.0: Independent samples t-tests for five Safety Questionnaire factors with occupational role (registered staff, non-registered staff) as a grouping variable

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Difference Lower	Difference Upper
Lethalness	EVA	0.24	0.62	-2.55	63	0.01*	-0.65	0.26	-1.16	-0.14
	EVNA			-2.56	52	0.01	-0.65	0.25	-1.16	-0.14
Prevalence	EVA	3.44	0.07	-0.11	63	0.91	-0.04	0.33	-0.70	0.63
	EVNA			-0.12	59	0.91	-0.04	0.31	-0.66	0.59
Risk	EVA	0.05	0.82	-2.10	63	0.04*	-0.65	0.31	-1.28	-0.32
	EVNA			-2.08	50	0.04	-0.65	0.31	-1.28	-0.02
Control	EVA	0.46	0.50	2.18	63	0.03*	0.49	0.23	0.04	0.95
	EVNA			2.25	56	0.02	0.49	0.22	0.05	0.94
Training	EVA	0.04	0.85	0.11	63	0.91	0.01	0.12	-0.23	0.26
	EVNA			0.12	56	0.91	0.01	0.12	-0.22	0.25

* Indicates a statistical significance at a value of 0.05 or below. EVA = equal variances assumed. EVNA = equal variances not assumed.

3.4 Discussion

Workers' compensation data has shown that the number of claims for healthcare workers in Ontario long-term care homes remained relatively unchanged from 2004 to 2009 (van Wyk, Chapter 2). The accident types most often associated with these claims were overexertion, further broken down into lifting and pushing or pulling tasks, and falls. Overexertion injuries were the majority of accident type claims for all healthcare workers

in long-term care from 2004 to 2009. A greater percentage of Nursing Aides and Orderlies (non-registered staff) reported overexertion claims than Registered Nursing Assistants and Registered Nurses (registered staff) (van Wyk, Chapter 2). Using the Workplace Safety Questionnaire (WSQ), this study attempted to determine the perceptions registered staff and non-registered staff from South-western Ontario long-term care homes had towards the most common cause and tasks leading to injury in their workplace and if these perceptions coincided with WSIB claim data.

R1: As measured by the Workplace Safety Questionnaire, how do workers in long-term care perceive the risks of their work?

The healthcare workers in long-term care homes perceived that all of the common causes and tasks in the present study, that were previously identified in the pilot as potentially injurious and physically stressful, place them at risk of injury severe enough to require time off work or medical attention, and would occur a few times a year to monthly. On a positive note, they perceived having control over and having received at least minimal training for each common cause and task.

Although the data from the current study is not directly comparable with the data from the WSIB study (van Wyk, Chapter 2), there are two interesting points worth noting. Firstly, the perceived lethalness data did ask the respondents about injuries that would be severe enough to at least take time off work. The WSIB claim data looks specifically at lost-time claims (van Wyk, Chapter). Overexertion injuries due to patient lifts and transfers were the most common accident types from the WSIB lost-time claim data from 2004 to 2009 (van Wyk, Chapter 2). The current study agrees with the WSIB claim data as lifting heavy objects, improper body mechanics and lifting techniques, and lifting or transferring patients manually were associated with the highest levels of perceived lethalness. These common causes and tasks were perceived to result in injuries severe enough to require time off work and imply that patient lifts and transfers are problematic due to the associated severity of injury.

The second point of interest is the lack of differentiation in the responses in the current study. As previously noted, healthcare workers perceived the majority of the common causes and tasks to lead to injuries that are severe enough to require time off work or medical treatment, to occur at least a few times a year, and place them at risk of injury. This may be partially due to the fact that causes and tasks used in the present study were identified in the pilot study to be the most common causes and tasks related to workplace injuries. The common causes and tasks among aircraft maintenance technicians for Leiter & Robichaud's (1997) Workplace Safety Questionnaire were developed in consultation with the safety officer for the base and other workplace personnel. Although the study was able to provide support for the proposed risk model in their study, they did not provide details about the findings from the questionnaire. As a result, it is uncertain if the lack of differentiation in responses is unique to the present study. The WSIB claim data, however, incorporates most of these causes and tasks and showed a clear differentiation between the accident types or sources of risk.

It was expected that the common causes and tasks associated with the highest perceived lethalness, prevalence and risk would have the lowest perceived control (Leiter & Robichaud, 1997). For example, it would be expected that lifting heavy objects, improper body mechanics and lifting techniques, and resident behaviours would be associated with the least amount of control. These results were not shown in the current study's data, however. Improper body mechanics and lifting techniques were associated with the highest levels of perceived control despite being among the highest perceived levels of lethalness, prevalence, and risk. Furthermore, as the model by Leiter & Robichaud (1997) illustrated a direct path between control and training, it was assumed that the common causes and tasks with the highest perceived control would also have the highest perceived training. Although there was a lack of differentiation in the data from this study, it did appear that the common causes and tasks associated with lifting and transferring had both the highest levels of perceived control as well as perceived training.

Healthcare workers appeared to perceive higher levels of lethalness, prevalence and risk for more causes (e.g. resident behaviours) than tasks (e.g. lifting or transferring a resident manually). The registered staff and non-registered staff also perceived less control over

the causes than the tasks. With respect to resident behaviours, which are often unpredictable, resident conditions and time pressures, it is not surprising that there were lower levels of perceived control. The behaviours and conditions of a resident are often preconditions and cannot be changed. Time pressures may change from shift to shift, but are more likely due to organizational policies and demands. Registered staff often have more administrator power. As a result, they may perceive to have higher levels of control over causes than the non-registered staff. This would provide support for some causes being out of reach for the front-line worker to alter as they have less administrative power. These findings suggest that there is a need for an alternative approach to education and injury prevention programs. It may be advantageous for training and education to focus on how to perform a task properly, as well as identify the associated risks, and then to incorporate the different types of causes that are sources of risk in long-term care homes. For example, first teach the staff how to properly lift a resident, and then consider lifting a resident who has aggressive behaviours, and then one who has a cognitive impairment, or is attached to different medical devices (e.g. catheter, oxygen). The pre-determined proper lifting techniques and body mechanics may not always be the best option if a healthcare worker is not presented with an ideal situation. Furthermore, 'proper' lifting techniques and body mechanics were originally developed for inanimate objects, and not for lifting of people. There does not appear to be any biomechanical studies that examine safe lifting techniques of a lurching person. Although the term 'proper lifting techniques and body mechanics' was used in the present study, this was a result of healthcare workers who completed the pilot survey using this terminology. Thus, proper lifting techniques and body mechanics need to also be addressed and evaluated for different lift and transfer scenarios. Further examination of coping strategies to increase control (Leiter & Robichaud, 1997) may also need to be considered in future studies. It is vital to provide healthcare workers with the key information to always put them in control of a situation and when performing a task to help prevent injuries to themselves and the resident. Therefore, if they are aware of the dangers regarding tasks as well as causes, they will be better suited to combat sources of risk and alter their behaviour accordingly to remain injury free.

R2: Are the perceptions of healthcare workers in long-term care homes different between registered staff and non-registered staff?

Differences were shown between the registered and the non-registered staff for the perceived lethalness, risk and control factors from the Safety Questionnaire in the present study. It was expected that the non-registered staff would perceive less control and more risk of injury as a result of their subordinate role (Breslin et al., 2007). Supporting this hypothesis, the non-registered staff had higher levels of perceived lethalness and perceived risk and lower levels of perceived control than the registered staff in the present study. The model developed by Leiter & Robichaud (1997) (Figure 1.0) identified direct relationships between perceived lethalness and perceived risk, and perceived control and perceived risk. The differences between the registered staff (lower perceived lethalness and risk, higher perceived control) and the non-registered staff (higher perceived lethalness and risk, lower perceived control) provide support for this model. Risk perceptions may be altered by the familiarity with tasks (control and training), perceived ability to control outcomes (control), levels of knowledge (training), degree of potential hazard (lethalness/severity), and likelihood of experiencing an accident or injury (prevalence) (Elkind, 2007; Nielson et al., 2011). Thus, it may be advantageous to focus prevention efforts on the reduction of the degree of potential risk, familiarity with tasks, and perceived ability to control outcomes.

Limitations

There were several obstacles in attaining more participants for this study. Anecdotal evidence from healthcare workers and managers from several long-term care homes suggested that they were "all surveyed out". Upon the collection of the questionnaires from one long-term care home, the researcher observed that healthcare workers were invited to complete five other questionnaires. It was further suggested by several managers and healthcare workers that if a researcher wants to have their questionnaire completed, that a prize needs to be offered; for example an I-pad. It was observed that at each of the long-term care homes, there was a questionnaire being distributed with the

advertisement that completion and return would provide them with a ballot to win such a prize. The lack of adequate funding to provide such a prize and the potential ethical conflict associated with coercion of offering a prize, prohibited using such a strategy in the present study.

It is also suggested that if this study is to be replicated that the number of common causes and tasks is reduced to half, from 14 to 7. This would decrease the length of the questionnaire and potentially appear less time consuming to participants. Although the questionnaire in this study only took approximately 10-15 minutes to complete, the length of the questionnaire at first glance may have dissuaded some healthcare workers from participating, fearing that it would take too long to complete. Although a reduction in the number of common causes and tasks may decrease the length of the questionnaire, it would also decrease the comprehensive coverage that the current instrument afforded.

A potential limitation to the findings of the present study is the validity of the Safety Questionnaire. It has become commonly accepted that males voluntarily engaged in more risky behaviours than females (Harris et al., 2006). It has previously been shown that risk of injury among females was increased by a high workload (Salminen et al., 2004). This same relationship was not seen for males (Salminen et al., 2004). Thus, if female healthcare workers perceive a high workload and negative consequences, such as an injury, from performing a task, they may perceive higher levels of risk than male healthcare workers. It has also been found that the risk of injury was higher among older nurses than younger nurses (Engkvist et al., 2000). This would suggest that younger healthcare workers would have decreased perceptions of injury severity, prevalence, and risk than older healthcare workers. Although there were few males and a limited age range in the present study, sex and age differences were not found for the five factors of the Safety Questionnaire (perceived lethalness, perceived prevalence, perceived risk, perceived control, and perceived training). However, a high level of internal consistency for the five factors was established.

3.5 Conclusions

There is an abundance of research that has used questionnaires to ask healthcare workers about work-related injuries, especially those relating to the back or low back (Bejia et al., 2008; Bos et al., 2007; Dulon et al., 2008; Eriksen, 2003). However, there has been a lack of research that looks at perceived risk, control, and training in association with the prevalence of work-related injuries. Furthermore, the previous research did not elicit information with respect to the tasks healthcare workers perform, although it has been stated that physically demanding tasks such as patient lifts and transfers are the primary cause for work-related musculoskeletal injuries. It was not surprising that non-registered staff perceived less control but a greater risk and severity (lethalness) of injuries occurring due to the tasks that they perform. Interventions that increase the perceived control that non-registered staff have over their duties may go a long way to alter their risk perceptions and behaviour. Interventions that increase ability to control outcomes and familiarity with tasks may also decrease risk of injury.

Healthcare workers did not appear to have the ability to identify risk, as there was little to no differentiation in the perceptions of the five factors for the common causes and tasks. Unfortunately, it was not possible to compare the results of the current study with other studies that utilized the Workplace Safety Questionnaire. These other studies focused on the development of a risk perception model and not the risks identified by each workplace (Leiter & Robichaud, 1997; Leiter et al., 2009). Furthermore, the lack of differentiation in the present study was in contrast to the WSIB data that clearly illustrated that overexertion injuries were the majority of accident types reported in claims. If healthcare workers do not accurately assess their risk of injury, they may not behave in a manner that avoids hazardous situations. As a result, they are not only place themselves at an increased risk of injury, but they are also increasing the risk of injury for the resident, the individual for whom they are to provide care.

3.6 References

Arcury, T.A., Quandt, S.A., & Russell, G.B. (2002). Pesticide safety among farmworkers: perceived risk and perceived control as factors reflecting environmental justice. *Environmental Health Perspectives*, 110(s2), 233-240

Bejia, I., Younes, M., Jamila, H.B., Khalfallah, T., Salem, K.B., Touzi, M., Akrout, M., & Bergaoui, N. (2005). Prevalence and factors associated to low back pain among hospital staff. *Joint Bone Spine*, 72, 254-259

Bos, E., Krol, B., van der Star, L., & Groothoff, J. (2007). Risk factors and musculoskeletal complaints in non-specialized nurses, IC nurses, operation room nurses, and X-ray technologists. *International Archives of Occupational and Environmental Health*, 80, 198-206

Breslin, F. C., Polzer, J., MacEachen, E., Morrongiello, B., & Shannon, H. (2007). Workplace injury or "part of the job": towards a gendered understanding of injuries and complaints among young workers. *Social Science & Medicine*, 64, 782-793

Bureau of Labor Statistics (BLS). (2006). *Workplace Injuries and Illnesses in 2005.* Washington, District of Columbia, United States: U.S. Department of Labor

Clarke, S. (2006). Contrasting perceptual, attitudinal and dispositional approaches to accident involvement in the workplace. *Safety Science*, 44, 537-550

Cohn, L.D., Macfarlane, S., Yanez, C., and Imai, W.K. (1995). Risk-perception: differences between adolescents and adults. *Health Psychology*, 14(3), 217-222

Cordeiro, R. (2002). Suggestion of an inverse relationship between perception of occupational risks and work-related injuries. *Cad. Saude Publica*, 18(1), 45-54

Cox, S., & Tait, R. (1991). *Reliability, safety and the human factor*. London: Butterworth Heineman

de Castro, A.B. (2006). Handle with care: the American nurses association's campaign to address work-related musculoskeletal disorders. *Orthopaedic Nursing*, 25;356-365

de Castro, A.B., Hagan, P., & Nelson, A. (2006). Prioritizing safe patient handling. *The Journal of Nursing Administration*, 36, 363-369

Dulon, M., Kromark, K., Skudlik, C., & Nienhaus, A. (2008). Prevalence of skin and back diseases in geriatric care nurses. *International Archives of Occupational and Environmental Health*, 81, 983-992

Elkind, P.D. (2007). Perceptions of risk, stressors, and locus of control influence intentions to practice safety behaviours in Agriculture. *Journal of Agromedicine*, 12(4), 7-25

Engkvist, I., Hjelm, E.W., Hagberg, M., Menckel, E., & Ekenvall, L. (2000). Risk indicators for reported over-exertion back injuries among female nursing personnel. *Epidemiology*, 11(5), 519-522

Eriksen, W. (2003). The prevalence of musculoskeletal pain in Norwegian nurses' aides. *International Archives of Occupational and Environmental Health*, 76, 625-630

Evanoff, B., Wolf, L., Aton, E., CAnos, J., & Collins, J. (2003). Reduction in injury rates in nursing personnel through introduction of mechanical lifts in the workplace. *American Journal of Industrial Medicine*, 44, 451-457

Garg, A., & Owen, B. (1992). Reducing back stress to nursing personnel: an ergonomic intervention in a nursing home. *Ergonomics*, 34, 407-419

Harris, C.R., Jenkins, M., and Glaser, D. (1006). Gender differences in risk assessment: why do women take fewer risks than men? *Judgment and Decision Making*, 1(1), 48-63

Hignett, S. (1996). Postural analysis of nursing work. *Applied Ergonomics*, 27(3), 171-176

Hoegberg, L. (1998). Risk perception, safety goals and regulatory decision-making. *Reliability Engineering and System Safety*, 59, 135-139

Leiter, M.P., & Cox, T. (1992). The impact of stress on safe working behavior in health care: implications for training and task design. Paper presented at the APA/NIOSH conference, *A changing workforce in a changing workplace*. Washington, DC.

Leiter, M.P., & Robichaud, L. (1997). Relationships of occupational hazards with burnout: an assessment of measures and models. *Journal of Occupational Health Psychology*, 2(1), 35-44

Leiter, M.P., Zanaletti, W., & Argentero, P. (2009). Occupational risk perception, safety training, and injury prevention: testing a model in the Italian printing industry. *Journal of Occupational Health Psychology*, 14(1), 1-10

Li, J., Wolf, L., & Evanodd, B. (2004). Use of mechanical patient lifts decreased musculoskeletal symptoms and injuries among health care workers. *Injury Prevention*, 10, 212-216

Lund, I. O., & Rundmo, T. (2009). Cross-cultural comparisons of traffic safety, risk perception, attitudes and behaviou. *Safety Science*, 47, 547-553

Miller, A., Engst, C., Tate, R.B., & Yassi, A. (2006). Evaluation of the effectiveness of portable ceiling lifts in a new long-term care facility. *Applied Ergonomics*, 37; 377-385

Nielsen, M.B., Mearns, K., Matthiesen, S.B., & Eid, J. (2011). Using the job demands – resources model to investigate risk perception, safety climate and job satisfaction in safety critical organizations. *Scandinavian Journal of Psychology*, 52, 465-475

Nelson, A., & Baptiste, A. (2006). Evidence-based practices for safe patient handling and movement. *Clinical Reviews in Bone and Mineral Metabolism,* 4(1); 55-69

Real, K. (2008). Safety: a field application of the risk perception attitude framework. *Journal of Applied Communication Research*, 36(3), 339-359

Rundmo, T (1999). Perceived risk, health and consumer behaviour. *Journal of Risk Research*, 2, 187-200

Rundmo, T. (2000). Safety climate, attitudes and risk perceptions in Norsk Hydro. *Safety Science*, 34, 47-59

Salminen, S. (2004). Have young workers more injuries than older ones? An international literature review. *Journal of Safety Research*, 35(5), 513-521

Shamian, J., O'Brien-Pallas, L., Thomson, D., Alksnis, C., & Kerr, M.S. (2003). Nurse absenteeism, stress and workplace injury: what are the contributing factors and what can/should be done about it? *International Journal of Sociology and Social Policy*, 23, 81-103

Sjoberg, L. (2000). Factors in risk perception. *Risk Analysis*, 20, 1-11

Slovic, P., Fischhoff, B. & Lichtenstein, S. (2000). Facts and Fears: Understanding Perceived Risk. In P. S.ovic, (Ed.) *The Perception of Risk* (pp. 137-153). Sterling, VA: Earthscan.

Stone, P.W., & Gershon, R.R.M. (2006). Nurse work environments and occupational safety in intensive care units. *Policy, Politics, & Nursing Practice*, 7(4), 240-247

Tate, R.B., Yassi, A., & Cooper, J. (1999). Predictors of time loss after back injury in nurses. *SPINE*, 24(18), 1930-1936

van Wyk, P.M. (Chapter 2). A six-year comparison of Workplace Safety and Insurance Board lost-time claims made from 2004-2009 by healthcare workers in Ontario hospitals and long-term care homes

van Wyk, P.M., Andrews, D.M., & Weir, P.L. (2010). Nurse perceptions of manual patient transfer training: implications for injury. *Work*, 37(4), 361-373

Weinstein, N.D. (2000). Perceived probability, perceived severity, and health-protective behavior. *Health Psychology*, 19(1), 65-74

Williams, D.J., & Noyes, J.M. (2007). How does our perception of risk influence decision-making? Implications for the design of risk information. *Theoretical Issues in Ergonomics Science*, 8(1), 1-35

Wilson, P., & Eklund, R.C. (1998). The relationship between competitive anxiety and self-presentational concerns. *Journal of Sport & Exercise Psychology*, 20, 81-97

Wogalter, M.S., Young, S.L., Brelsford, J.W., & Barlow, T. (1999). The relative contributions of injury severity and likelihood information on hazard-risk judgments and warning compliance. *Journal of Safety Research*, 30(3), 151-162

Yassi, A., Khokhar, J., Tate, R., Cooper, J., Snow, C., & Vallentyne, S. (1995). The epidemiology of back injured in nurses at a large Canadian tertiary care hospital: implications for prevention. *Occup Med*, 45(4); 215-220

Young, S.L., Wogalter, M.S., & Brelsford ., J.W. (1992). Relative contribution of likelihood and severity of injury to risk perceptions. *Proceedings of the Human Factors Society 36th Annual Meeting,* 1014-1018

Chapter 4

4 Using photovoice to identify patient transfer risk factors in a participatory ergonomics approach to reducing healthcare workers risk of injury in long-term care

4.1 Introduction

Quality circles were developed in Japan to help ensure quality control in workplaces (Nagamachi, 1995). Small groups of employees would discuss their experiences to help create solutions to problems and then several of the small groups would come together to discuss findings and create potential implementation plans (Nagamachi, 1995). Similarly, participatory ergonomics (PE) is a process that aims to bring key individuals, representing both management and frontline staff, together to identify issues, develop solutions and implement changes (van der Molen et al., 2005; Theberge et al., 2006; Institute of Work and Health (IWH), 2009). PE involves participation, organization, education and job design (Nagamachi 1995). It could be argued that PE is a refinement of quality circles. The common element for both PE and quality circles is the utilization of the expert knowledge of the workers through their involvement in the attempts to improve the working environment (Burgess-Limerick et al., 2007). Participation or involvement appears to be the central component of PE programs, as it works towards creating more human centered work and improving organizational climate (Burgess-Limerick et al., 2007).

Participatory ergonomics is a multimodal approach that includes individuals affected by any changes made in the attempt to optimize workplace health, safety and performance for all (healthcare workers, management, patients/residents) involved. PE teams can be beneficial in an attempt to proactively find hazards and develop strategies that when implemented aim to reduce injuries. Workers more actively involved in their workplace are provided more opportunity to have control over their working environment and their tasks (Zalk, 2001). Worker involvement, as well as management participation, provides

added resources to the PE stages of identifying issues and risk factors, developing solutions and implementing changes (Table 13.0). After all, the workers are the individuals with the expert knowledge as to how best to perform tasks, and it seems only natural to tap into this resource when attempting to create a more safety conscious environment.

Table 13.0: The three main stages in a participatory ergonomics program

Participatory Ergonomics Stages
Identify Issues and Risk Factors
Develop Solutions
Implement Changes

The variety of tasks performed in a variety of organizations complicates having a gold standard tool for identifying workplace injury risk factors. There are three main approaches for identifying risk factors; self-reports (e.g. surveys, focus groups, interviews), direct observation (e.g. checklists), and direct measurement (e.g. electromyography) (David, 2005; Dempsey et al., 2005). Each method has benefits and limitations. For example, surveys are inexpensive, can evaluate both physical and psychosocial factors and can be circulated to a variety of workers (Silverstein et al., 1997; David, 2005). Surveys, however, may require a large sample size, are often not occupation specific, and are primarily returned by workers who have a problem or issue (Silverstein et al., 1997; David, 2005). Direct observations, such as checklists, are also inexpensive and can be used widely. Checklists, however, often only focus on specific body parts (e.g. the back) and the most severe problem (e.g. peak spinal compressions), and may involve a scoring system that lacks evidence and thus outcomes are largely

hyopthetical (David, 2005). Direct measurement techniques, such as electromyography, can provide more detailed information such as local muscle fatigue and muscle tension, however, the results may be difficult to interpret, require highly trained and skilled staff, and can be expensive (David, 2005).

During the stage of identifying issues or risk factors in a PE program it is common for individuals who are a part of the change team (the management, staff and ergonomist partaking in the PE process) to observe the tasks being performed and conduct assessments via ergonomic checklists and tools (e.g. direct observation). The risk factors are identified and prioritized by a change team to provide them guidance for what issues solutions need to address. Ergonomists in a study that implemented PE in a railway transportation company, an airline company, a university and a steel company identified risk factors using a checklist when visiting workplaces and observing workers perform tasks (Driessen et al., 2008). The checklist included information about the type of work performed, lifting heavy loads, frequent bending and rotating, co-worker support, job organization, job planning, management styles, materials and equipment (Driessen et al., 2008). In the attempt to decrease the number of manual handling injury claims among a group of hospital cleaners, a PE program was implemented and risk factors were identified using a simple manual handling checklist tool (Carrivick et al., 2005). Although this study did not state if the checklist was previously designed or created just for this study, the authors did describe its components. The manual handling checklist tool from this study included gathering information about the body actions and postures of the workers when performing tasks, the duration and frequency of manual handling tasks, the load (e.g. weight, size, distance moved), workplace factors (e.g. layout, environment), and worker demographics (Carrivick et al., 2005). The Manual Tasks Risks Assessment Tool (ManTRA) was used to identify risk factors as part of a PE program implemented in food, construction and health workplaces (Straker et al., 2004). The ManTRA includes identifying the duration of a task, the cycle time, forces required, speed of movements, awkwardness, and vibration exposure for different body regions. Other PE programs have also used biomechanical modeling in addition to ergonomic checklists. For example, a PE program implemented in a manufacturing company in the automotive industry (Laing et al., 2005) incorporated National Institute for Occupational

Safety and Health load lifting equations (Waters et al., 1993), Snook and Ciriello manual materials handling tables (Snook and Ciriello, 1991), the Job Content Questionnaire (Karasek, 1985), and 4D Watbak biomechanical modeling software (University of Waterloo, Waterloo, ON, Canada).

In an already busy healthcare setting, additional paper work for the staff to complete and software for the staff to learn, may seem too daunting and therefore reduce participant involvement. One way to simplify the task of risk identification may be to use photography. Although photographs have been used in PE programs, they were used as a means to inform the ergonomist about the tasks performed and used to illustrate risk factors (Udo et al., 2006; Driessen et al., 2008). As an ergonomist may not be familiar with the workplace or tasks performed, the photographs afforded them a visual aid prior to the PE process to increase their comprehension of the issues identified. A more comprehensive approach using photographs in PE that has yet to be explored in the identifying of issues and risk factors is Photovoice. The Photovoice method began in China to provide rural village women an opportunity to identify and represent their concerns and need for change via photography (Wang & Burris, 1997). The method is intended to be a participatory process with a needs assessment focus (Carlson et al., 2006).

Photovoice was derived from Freirian, a documentary photography, and feminist theory based approaches. Photovoice photography invites people to think critically about the images presented and the community from which the images were taken (Wang & Redwood-Jones, 2001). This underpinning comes from Paulo Freire's approach to critical education. More importantly, the opportunity for less powerful people to present images of their tasks, environments and/or community aids in restoring the disconnect between them and more privileged and powerful people (Wang et al., 1998). Photovoice affords people on both ends of the continuum, for example frontline staff and management, to work together to shift the power dynamics and be co-creators of knowledge and change (Carlson et al., 2006). Via a Freirian-based approach, Photovoice utilizes the philosophy of empowerment and participation to promote health, safety and community development (Minkler & Wallerstein, 2003; Carlson et al., 2006). The

underlying understanding of community photography supports this theoretical underpinning as it explores how underprivileged individuals can use photography to advocate change (Wang & Redwood-Jones, 2001). Photovoice is also based upon the inherent tenants of documentary photography; however, instead of the photographer behind the lens as with documentary photography, Photovoice affords an insider perspective to draw attention to issues they deem important and need an action plan for change (Wang & Burris, 1994; Wang & Burris, 1997; Strack et al., 2004). After all, the insider is better positioned to understand the true issues they are facing; thus, illustrating a feminist theory approach (Strack et al., 2004).

The benefits of photovoice are participation, empowerment and strength of those often not heard from to identify issues and promote change. Each of these qualitities nicely mirror the goals of a PE program, as PE aims to increase the participation of workers and empower workers by having them involved in the process of identifying problems and creating solutions (van der Molen et al., 2005; Theberge et al., 2006; Burges-Limerick et al., 2007). One difference between PE and Photovoice may be the length of time of the project. PE has been described as a long-term commitment to identify issues, create solutions and implement changes, whereas Photovoice was designed to be a short-term project to help identify issues (Flum et al., 2010). However, the essence of the identification of an issue via Photovoice to include the empowerment of individuals who do not always get a voice seems to imply it may be an advantageous tool to be used in the identification of risk factors stage in the PE process.

This article will focus on how Photovoice was used by the change teams in two long-term care homes to identify risk factors associated with performing patient lifts and transfers. Lifting and transferring patients and residents have long been related to work-related injuries to healthcare workers, and it has recently been confirmed that these tasks remain problematic (Videman et al., 1984; Harber et al., 1985; Estryn-Behar et al., 1990; Smedley et al., 1995; Yassi et al., 1995; Engkvist et al., 2000; Nelson et al., 2006; van Wyk, Chapter 2). There are many risk factors for these types of injuries.

Even without the psychosocial or work organizational considerations, physical risk factors alone are considered enough to produce work-related injuries among healthcare workers (Menzel et al., 2004). Healthcare workers are at an increased risk of injury primarily due to the uniqueness of their job (French et al., 1997). The tasks healthcare workers are required to perform, such as patient lifts and transfers, often produce injury-related concerns, particularly to the back (Harber et al., 1985; Owen, 1989). Looking at the loads on the spine, several studies have found that one person and two person lifts expose workers to injury risk as the tasks exceed acceptable spinal tolerance levels (Garg & Owen, 1992; Owen et al., 1992; Marras et al., 1999). In addition to physical loadings, awkward postures, body flexion, twisting and the weight of the load being lifted increase the risk of being injured (Smedley et al., 1995; Engkvist et al., 1998).

Additionally, an increase in risk of injury when performing patient lifts and transfers has been found to be associated with lifting and transferring patients multiple times per shift, working on an orthopedic ward, previous injury, and the healthcare worker being an immigrant (Engkvist et al., 2000). These risk factors were based on questionnaire responses from hospital nurses. The lack of ergonomic knowledge and availability of lifting devices have also been found to be predisposing risk factors for work-related injuries for nurses in hospitals (Sikiru & Hanifa, 2010). Another survey of hospital nurses found that risks of work-related injuries increased when working in the same position for prolonged periods (Tinubu et al., 2010). Previously discussed work-related risk factors associated with patient lifts and transfers lack evaluation of the task itself. Furthermore, it is rare that input is sought from both the frontline staff who have practical knowledge of the tasks being performed and the associated risk factors, and management who help create organizational policies and make funding decisions. Participatory ergonomics brings frontline staff and management together to discuss workplace issues, such as patient lift and transfer tasks, and focus on the risk factors associated with the goal to create solutions to reduce the risk of injury.

The purpose of the present study was to determine whether photovoice strategies could be useful for workers in helping them identify risk factors inherent in lifting and transferring residents during their workday. The current study is a portion of a larger

study examining the implementation of participatory ergonomic (PE) programs in two long-term care homes.

4.2 Methods

For the purposes of the current study the two long-term care homes will be referred to as HIPE (high participatory ergonomics) and LOPE (low participatory ergonomics) homes. Photovoice was involved in the identification of risk factors in the PE process. Thus, the Photovoice method was addressed in the first and second change team meetings in the PE process. Chapter 5 provides more detailed information about the PE programs, as well as the long-term care homes involved.

Procedures:

During the first change team meeting, the team was introduced to the ergonomist, told the purpose of the project, provided basic ergonomic training, taught how to identify risk factors, and taught the purpose and process of Photovoice. Each change team was provided with 2 disposable cameras that took approximately 30 photographs each. The change team members were asked to take photos of risk factors involved with patient transfers. They were more specifically directed to take photos that involved risks of injury to the worker, but they were not prohibited from including photos that depicted risks of injury to the resident. Furthermore, they were also encouraged to take photos that illustrated what they were doing well when performing patient transfers. The reason for this latter directive was twofold. First, it is possible that change team members may have an incorrect perception of what a risk factor is, despite the training they received. For example, they may identify a risk factor that is safe procedure, and vice versa. Secondly, identifying only risk factors may create a negative atmosphere, whereas identifying what workers are doing well may create positive reinforcement. The ethical concerns of taking photos of fellow co-workers and residents were also discussed. The change team members were instructed to inform the workers and residents about the purpose of the photographs, that they could refuse being photographed, and emphasize

that they were not being evaluated or assessed. The change team members were also asked to inform anyone in a photograph that their faces would be erased or covered, and that the photographs would not be published. Ethics approval for this project was obtained from the University Research Ethics Board.

The change teams were also provided with Photovoice logs to record picture number, camera number, photographer, title of photo, risk factor shown/description of photo, possible solutions, and added notes. The Photovoice logs were to be used to understand the reasons why the photographer took the photograph and the risk factor(s) that they were trying to depict. Only the ergonomist had access to the Photovoice logs after they were submitted. Therefore, in the meeting where the change teams discussed the photographs and risk factors, the photographer could remain anonymous. Furthermore, the change team members other than the ergonomist, were not aware whether the photograph was taken by a management or a non-management member.

Data Analysis

The change teams were given approximately two weeks to take photos. The ergonomist then collected the cameras and had the photos developed for the next change team meeting. At the second change team meeting the photos were viewed as a group (the faces of individuals in the photos were removed or masked) and together risk factors were identified and discussed.

The photographs were shown on a computer screen one at a time for everyone to see. Each change team member was also provided with a page print out of the photograph. The ergonomist would then ask the change team members what risk factors they felt were identified in the photographs. Each potential risk factor identified was discussed by the change team. The ergonomist took notes during the discussion of each photograph, and before a new photograph was presented, she reviewed the risk factors identified to gain consensus from the change team members.

Photovoice typically employs the "SHOWeD" approach when having a group discuss photographs. This entails asking: What do you *see*? What is really *happening*? How does

this relate to *our* lives? *Why* does this problem or this strength exist? What can we *do* about this? (Wang et al., 1998). In this study change team participants were asked to identify what they perceived to be risk factors via this approach and additionally asked to think about how they could be categorized according to the acronym *PEMEH* (Process, Equipment, Materials, Environment, Human). During the training provided in the first meeting, the change teams were provided information based on the MSD Prevention Toolbox (http://www.preventionbestpractices.org/msd_tool_3a.pdf). In addition to learning about ergonomics in general, the change teams were taught about what causes work-related injuries (force, awkward posture, repetition, and duration of task) and the five categories that are likely the cause of injury hazards. These causes are: Process (e.g. duration of task, procedures), Equipment (e.g. bed height, adjustability of lifting devices), Materials (e.g. storage location of lifting devices, weight of resident), Environment (e.g. temperature, clutter in resident's room), and Human (e.g. insufficient training for lifting devices, task pressures and demands), or PEMEH. According to the MSD Prevention Toolbox, PEMEH can help identify why a risk factor may exist which can then aid in developing solutions. For this study SHOWeD and PEMEH were used as tools to help aid in conversations about and identifying potential risk factors.

4.3 Results

Interestingly, no management members from either the HIPE or LOPE change teams took any photographs, however, the change teams were not made aware of this fact.

The HIPE and LOPE groups each took approximately 60 pictures. Examples of some of the photographs are depicted below. To maintain confidentiality, the depictions are traces of key people and objects from the photographs. In Figure 10.0, a healthcare worker is about to lift and transfer a resident via a lift device. When the change team discussed this photograph they identified risk factors to be the twisted and leaning posture of the healthcare worker, that the sling was not properly placed around the resident, and that this procedure should be completed by two workers, and not just one.

Figure 10.0: A healthcare worker attempts to move a resident using a lifting device herself

In the next photograph (Figure 11.0), two healthcare workers were attempting to manually move a resident from her chair to her bed. According to procedures, the two healthcare workers should have used a sit-to-stand lift device to perform the task. In fact, there was a sit-to-stand lift readily available in the room, but was not being used. Also, there was a sign on the wall indicating the type of lift that should be used, which was not the lift the healthcare workers were performing. Furthermore, the change team members discussed the poor body postures of both of the healthcare workers increasing their risks of injury. Photovoice enabled the change team to identify risk factors associated with resident behaviours as seen in this photograph, an aspect that is not evaluated when looking at just physical attributes such as awkward posture and spinal compressions. This particular photograph was also unique in that it provided evidence that a lift and

transfer were being performed manually despite the presence of a lifting device readily available in the room and the sign on the wall indicating proper procedures. The change team indicated that this was a resident who would frequently refuse to allow healthcare workers to move her with any type of assistive aid, although she had been assessed for a sit-to-stand lift. This particular photograph facilitated conversation between non-management and management change team members about not following proper procedure. The non-management change team members were able to voice concerns several healthcare workers would often face when lifting and transferring resistant residents. One of the issues brought forth was that there was a perceived lack of time to perform tasks, especially around meal time. Through discussion, management change team members came to realize that there was a lack of education about what staff members should do when dealing with resistant or aggressive residents. The discussion that was stimulated from this photograph also highlighted that there was a need to reassess residents more frequently for the type of lift that should be performed, and that the resident may also require being educated about the purpose of a specific lifting procedure. This particular photograph was advantageous because the improper procedures caught the attention of the management change team members but the concealed identities of the workers photographed protected them from being reprimanded. This afforded the opportunity for the change team to freely discuss issues that promote improper procedures and to constructively identify risk factors and generate solutions for these situations.

Figure 11.0: Two healthcare workers attempt to manually lift and transfer a resident from her chair to her bed

The next two depictions were from a series of photographs that illustrated two healthcare workers attempting to lift and transfer a male resident from a supine position to a wheelchair. In Figure 12.0, the healthcare workers were rolling the resident from side to side to place the sling underneath him. The change team indicated that the height of the bed was not properly adjusted, the resident was poorly positioned and the healthcare workers were repositioning him via his pants, the healthcare workers were bent at the back and not at the knees, they were reaching and twisting, and that they were working over and leaning on the bed side rails. Once the resident was in the sling and it was hooked to the lifting device, the healthcare workers began to lift and transfer him. In Figure 13.0, risk factors illustrated were that the healthcare workers failed to lower the bed side rails, and thus they lifted the resident up and over an unnecessary barrier, that the destination was too far away, and that once the resident was lifted, the transfer aspect required the healthcare workers to manually push and pull the lifting device.

These photographs led to discussions about the position of the resident during a lift and transfer, repositioning a resident by his or her clothes, and how proper procedures were violated when the bed rails were not lowered. These were risk factors that the change team discussing the photograph were able to identify that may have otherwise gone unnoticed if the Photovoice method was not used. Checklists often only focus on the worker performing the task and do not allow for assessments of more than one worker performing a task, the environment, any equipment being used, and behaviours of the object, in this case a person, being manipulated. Furthermore, as the photograph captures the moment the task is being performed and provides visual evidence, the change team was able to identify multiple risk factors and the relationship between the multiple risk factors that was increasing the risk of injury. A checklist may identify a particular risk factor but may limit any discussion about how the risk factor related to other potential risk factors and may have been challenging for individuals, in particular management change team members who do not perform tasks, to visualize the task being performed and thus impede further discussion.

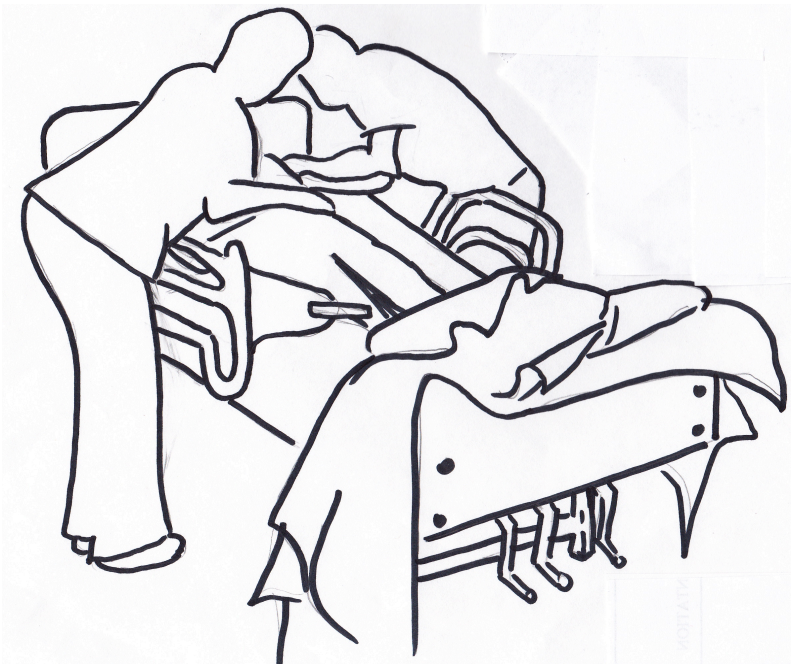

Figure 12.0: Two healthcare workers place a sling underneath a resident, preparing him for a lift and transfer

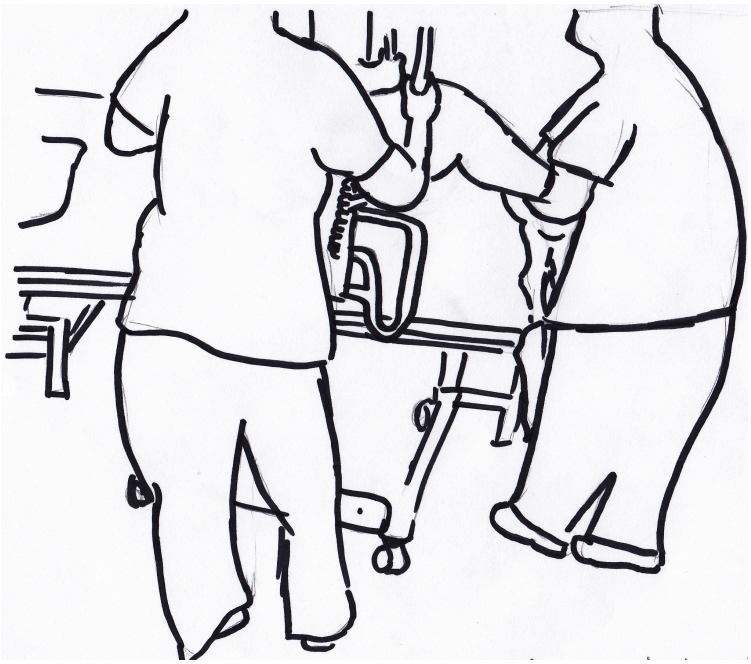

Figure 13.0: The resident is in the lifting device. One healthcare worker manipulates the lifting device, while the other healthcare worker guides and secures the resident via his legs

Each long-term care home categorized the identified risk factors into one of six categories: worker posture, equipment, resident, spacing, policy, and procedure (Table 1.0). These categories were created after all the risk factors were discussed and agreed upon by the change team members. The specific factors were similar for each long-term care home. After all the risk factors had been listed and organized into one of the six categories, members of each change team ranked them in an ascending priority sequence. The means of all the rankings was calculated by the ergonomist and are presented in Table 14.0. The priority rankings aided the change teams in developing solutions in the next stage of the PE program. Some of these risk factors may have been identified using checklists, for example those relating to worker posture. However, the photographs and stimulated discussion as a result of Photovoice, enabled the change teams to identify risk factors regarding equipment, resident, spacing, policy, and procedure that may have otherwise been unnoticed.

Table 14.0: Risk factors and associated priority rankings identified by each of the two participatory ergonomic change teams via the photovoice approach

RISK FACTOR	HIPE	PRIORITY RATING	LOPE	PRIORITY RATING
Worker Posture	Habit to bend over with back	1	Reaching (e.g. across resident, bed)	1
	Worker reaching across resident	2	Bending over with back (e.g. to remove foot pedals)	2
	Worker positions themselves in an odd location forcig them to move oddly during the transfer and increasing the time to perform the task… (due to having to hook on slings)	3	Position of worker (depending too much on the resident to be independent)	3
	Straining to pull sling with resident in the attempt to guide them to the destinatin (e.g. wheelchair)	4	Awkward trunk postures (e.g. back bent, twisted)	4
	Worker too far away from resident thus making them stretch and reach	5	Positioned too far away (e.g. from resident, bed, lift)	5
	Worker to the side of resident rather than in line	6	Leaning to one side (unequal weight distribution)	6
	Poor body mechanics (e.g. twisted)	7	Worker leaning on side rails while preparing resident for a transfer/lift	7
			Awkward hand postures	8

RISK FACTOR	HIPE	PRIORITY RATING	LOPE	PRIORITY RATING
Equipment	Slings are difficult to place on resident	1	Performing transfer/lift with the wheelchair tilted	1
	Some wheelchairs are too large for sit/stands causing workers to adopt new methods and bad postures	2	Lack of equipment being used (e.g. transfer belt, walker)	2
	Chair/bed height (too high or too low)	3	Bed height (too high/low)	3
	Lack of use of sliders and tilt chairs	4	Side rails of bed not lowered	4
	Belt not being used when one should be used	5	Lift (or resident) too high/low	5
	Inappropriate lift being used	6	Inappropriate footwear or worker	6
	Wrong sling used	7	Too much clutter (e.g. items on resident's walker)	7
	Slings improperly attached/crossed	8	Slats (stays) not being used to support resident's head and neck during mechanically aided transfer/lift	8
	Sling not being used properly	9	Wheelchair too close to/far from lift	9
	Hazard: name tag loosely hanging	10	Not putting on the breaks (e.g. of wheelchair, or lift/aid)	10
			Not putting up footrests on wheelchair	11
			Alignment/placement of lift/aid (e.g. should be straight on and not between resident's legs)	12

RISK FACTOR	HIPE	PRIORITY RATING	LOPE	PRIORITY RATING
Resident	Resistive residents	1	Resident not secured in lift or left unattended; thus can swing or fall	1
	Aggressive residents	2	Resident not able to hold on but the transfer/lift is performed any way	2
	Incorrect placement/positioning of resident's hands	3	Resident is unpredictable and being assisted manually	3
	Incorrect placement/positioning of resident's feet on lift	4	Resident prefers a method to be used, even if not appropriate (e.g. talks worker into performing a one person lift instead of a two person or aided lift)	4
	Worker holding on to resident (e.g. grabbing resident rather than sling)	5	Resident position (e.g. too far from lift, too close to edge of bed)	5

RISK FACTOR	HIPE	PRIORITY RATING	LOPE	PRIORITY RATING
Spacing	Resident grasping bars makes adjusting clothes (e.g. pants) challenging and thus worker adopting bad postures	1	Furniture placement forcin the lift to be performed a certain way that is placing the worker at risk	1
	Reident is (transfer occurring) too far from destination (e.g. wheelchair too far away)	2	Cluttered areas (e.g. resident room, general area)	2
	Lack of space available to conduct the resident transfer	3	Constricted space (e.g. performing lift up against wall)	3
	Corners cut due to bed positions (lack of space)	4	Destination or transfer/lift too far away	4
	Items on floor (e.g. urine bag)	5	Room desig/layout - residents have the right to move around their furniture but this is not always optimal for transfers	5
	Residents have the right to move around their furniture but this is not always optimal for transfers	6		
	Too much clutter in residents' room	7		
	Mat on floor making transfer difficult	8		

RISK FACTOR	HIPE	PRIORITY RATING	LOPE	PRIORITY RATING
Policy	Lack of education regarding lifts for family and residents	1	Ignoring the posted signs for lift/transfer that should be used	1
	Resident is not reassessed frequent enough (resulting in wrong method/lift used)	2	Lack of education to resident and residents' family about lifting procedures and policies	2
	Policy for lift is based only on lower limb weight bearing abilities	3	Policy for lift is based only on lower limb weight bearing abilities	3
	STOP REASSESS sign on wall ignored	4	Worker education - workers assuming they can perform a task better and faster manually	4
			No policy that states to aid in the transfer the head of the bed should be raised	5

RISK FACTOR	HIPE	PRIORITY RATING	LOPE	PRIORITY RATING
Procedures	Wheelchair (destination) needs to be brought closer (tasks take longer, frustrating for resident to move further, adding extra steps, less confidence/more anxiety in resident)	1	Wrong transfer method used (e.g. one person when it should be a two person lift/transfer)	1
	Uneven lifting weight between two workers	2	Transferring/lifting a resident up and over the bed side rails to a destination far away	2
	One person is performing lifting when it should be a two-person lift	3	Actually lifting resident themselves, all weight on worker	3
	Manual lifts performed when a sit/stand or belt should be used	4	Resident lowered sideways into wheelchair from lift	4
	Workers preventing wheelchair from moving with legs	5	Multitasking - in the middle of a transfer/lift stopping to adjust residents clothing	5
	Pulling resident up under his/her arms	6	Not positioning resident well to aid in the ease of the transfer/lift	6
	Worker on wrong side of resident during transfer	7	Worker guiding resident to sit from in front rather than from beside (resident is attempting to sit blidnly)	7
	Worker not looking at resident	No rating given		
	Resident can "swing" when in the lift, they are not stabilized	No rating given		
	Grasping residents by clothes (e.g. pants)	No rating given		
	Grasp resident under legs when sliders (maislides) are available	No rating given		
	Lift device available in room but not used	No rating given		
	Physically moving lift (rather than using the controls)	No rating given		

4.4 Discussion

The participatory ergonomics change teams were able to identify lifting and transferring task risk factors via the Photovoice process that are not as readily identified using other, more traditional methods (e.g. checklists). Performing lifts and transfers in the long-term care home do not always mirror how the tasks are performed in a laboratory or a classroom. Photographs depicted that workers were performing lifts and transfers in awkward positions (e.g. too far away from resident, leaning on bed side rails). These awkward positions were identified as risk factors as they forced the worker to perform the task in non-neutral body positions and they could lead to an increased amount of time to perform the task. The change teams also discussed that it is challenging to secure a resident in the slings used to hook them into a lifting device. Healthcare workers wished that there were alternative methods to slings, however no one was able to come up with a solution. Future research should evaluate different engineering solutions for reducing the difficulties of using these slings. The footwear of healthcare workers was also discussed among one of the change teams. The photographs depicted that healthcare workers were wearing a variety of different types of shoes. The change team decided that shoes with a tread, covered toes and a back, for example a running shoe, were necessary and would reduce risks. Unless a checklist was designed to specifically ask about worker footwear, this risk factor would have gone unidentified. The photographers in this study did not specifically take photographs of workers footwear, however, the visual evidence and the stimulated discussion as a result of the photographs provided opportunities to identify additional risk factors.

Photovoice was advantageous in identifying risk factors associated with the resident. Although performing a lift or transfer may be the main focus of injury prevention, it was found that there were several additional risks that the resident being lifted or transferred add to the task. For example, the unpredictable movements of a resistive or aggressive resident need to be taken into consideration when performing lifting and transferring tasks. The characteristics of the resident were not always explicitly depicted in photographs, however, discussions that arose from viewing the photographs as a group were vital in identifying these issues. The same can be said for the lack of policies or the

lack of compliance for lifting and transferring policies in the long-term care homes. In both the HIPE and LOPE long-term care homes, the decision trees for which lifting procedures should be used for a resident only assessed for the resident's ability to bear weight on their lower limbs. It was identified that the inability of a resident to use one upper limb, for example to grab the bar on the sit-to-stand lifting device, was a risk factor. Therefore, it was determined that the policies needed to be updated to include upper limb abilities. It was also identified in both long-term care homes that there was a lack of policy about informing residents and their family members about how lifting methods for each resident are chosen, why they are chosen, and how they increase the safety of the workers and the residents.

Some of the risk factors identified were similar to what has been reported elsewhere. These mainly involved those regarding the workers' posture, for example, reaching, bending over with the back, twisted, and positioned too far away from the resident, bed or lift device. This study also found that the wrong equipment was used, or not used at all. It has been reported that 98% of patient lifts and transfers are performed manually, even when devices are readily available (Garg & Owen, 1992). Common reasons provided for not complying with the use of lifting devices are the lack of perceived need, the lack of time, the lack of maneuvering space, and insufficient training (Evanoff et al., 2003; Li et al., 2004).

In addition to identifying different risk factors than previously reported in the literature, the change team members from each long-term care home expressed that they enjoyed and felt empowered by the Photovoice process. Although it may be a common practice to use ergonomic checklists, the use of photography provided an opportunity for the participants to gather information without feeling like they were assessing or judging their colleagues. Although there were some workers who did not feel comfortable being photographed, there were no reports of any residents objecting to this method. One solution was having the worker take the photograph and the change team member take the place of the worker performing the task for the purpose of the photograph. Alternatively, the photographer would take the photograph in a manner that would exclude that worker from being in the frame. Had a resident refused to be photographed,

the change team member could observe the task being performed and have the workers perform the task again as a mock performance.

A benefit of the photographs over the standard observation methods was that the photographs captured snapshots of the task being performed. It was discussed when looking at the photographs that it was easier to identify awkward postures in one picture than it was when observing a task happening in real time. When the task was performed in real time the body movements appeared to be normal, but when broken down risk factors appeared to be highlighted and more evident to the change team members. Presenting multiple photographs of lifting and transferring tasks also afforded a fuller discussion about the identified risk factors. This was advantageous because discussion often resulted in other risk factors being identified, whether they were depicted in the photograph being discussed or as a result of change team members sharing stories of similar situations and experiences. The opportunity to discuss the tasks, scenarios, photographs and risk factors is an unique and vital aspect of the Photovoice method.

There were several aspects of the Photovoice method that were advantageous for identifying risk factors over other methods typically used in participatory ergonomic programs (Table 15.0). The main features of self-reports (e.g. surveys), direct observation (e.g. checklists), direct measurement (e.g. electromyography) and Photovoice that were compared were: cost, training, visual evidence, and focus of analysis.

Cost

The cost of the direct observation and self-report methods are considered inexpensive (David, 2005). Checklists and surveys often only involve the costs of paper and photocopying. There are costs associated with Photovoice, but they are minimal. This study utilized disposable cameras, however, an organization may purchase digital cameras, which would eliminate the need for photograph development. Studies that utilize direct measurement systems can be expensive although they can provide large quantities of accurate data (David, 2005). Direct measurement techniques can also be invasive, for example, the attachment of sensors directly on the worker (David, 2005). Photovoice offers a less invasive and a less expensive method of risk factor analysis.

Furthermore, Photovoice requires less time for data collection and data analyses than other methods. The level of expertise required to take photographs is arguably less than the skill and knowledge needed for other methods.

Training

There was very little training required for Photovoice in comparison to other assessment methods. Every change team member was familiar and had experience with a camera. Nonetheless a few moments were taken to show everyone how the disposable cameras worked and to explain the Photovoice logs. The change team members in both homes expressed that they were thankful that they did not need to use any paper and pencil methods, such as a checklist. Although the Photovoice logs may seem like added paperwork, the change team members did not perceive them to be bothersome. Not all change team members who took photographs used the Photovoice logs, but those who did said it helped them keep track of what they had photographed, and they were able to write down what they had perceived to be a risk factor, or a job well done, when they initially took the picture. The Photovoice logs also aided the ergonomist in understanding what the photographer was seeing through the lens, which was advantageous for the stimulation of discussion. The Photovoice logs were perceived to be less burdensome and more engaging than the idea of using checklists. Concern was expressed from some non-management change team members about the constantly changing policies, procedures, forms and checklists in their long-term care home. They discussed with the ergonomist that they do not feel confident that they are completing paperwork accurately as the paperwork is constantly being changed and little training is provided. These non-management change team members expressed gratitude prior to even using the cameras as they were confident about their abilities to take pictures of risk factors. They also stated appreciation for not having to learn a new checklist and that they were enthusiastic about the project.

Checklists may require a marginal amount of training. The ability of individuals to use checklists to assess risk factors has greatly varied from excellent to inconsistent (Brodie & Wells, 1997). If change team members are analyzing a lifting task and are not

consistent with their predictions or scoring, this complicates the identification of risk factors. Some aspects of a task may be deemed hazardous when they are not, and other tasks may be missed all together. When analyzing individual's abilities to use ergonomic checklists it was found that the sensitivity of the tools was high, resulting in some jobs being erroneously classified as hazardous (Brodie & Wells, 1997). For the current study, the change team members were encouraged to take photographs of tasks being performed well, and tasks being performed with increased risk factors. The Photovoice logs submitted with the cameras indicated if the picture was depicting a risk factor or a proper procedure. There was a situation with the LOPE change team where a member perceived the picture they submitted to depict a proper procedure. However, through discussion with the change team, and with the aid of the ergonomist, it was decided that the photograph actually indicated several risk factors and indeed was not an example of proper technique. In addition, the reverse situation was also common. In both change teams in which a photograph was taken to depict a risk factor, the technique was deemed to be less hazardous than the photographer originally thought. Therefore, Photovoice was advantageous because it provided a worker the anonymous (excluding the ergonomist) opportunity to take photographs of what they perceived were or were not risk factors and then afforded the group the opportunity to discuss the photographs with the expertise of an ergonomist to truly identify if factors depicted were hazardous. Furthermore, checklist data is no longer useful after risk factors are identified. Photographs can be used in future training modules illustrating risk factors, as well as proper procedures.

Visual Evidence

There is the old adage that 'a picture is worth a thousand words' and this may be particularly true when analyzing risk factors related to bodily movements. A non-management worker shared that they were a visual learner and that they preferred using photographs as an aid to visualize a situation and identify risk factors. Even ergonomists have noted that they would prefer to have some form of video capture when assessing workplaces (Dempsey et al., 2005). If an ergonomist who has been trained to assess workplaces would prefer to have visual evidence of a task to aid in their assessment then

photographs would be advantageous for a less experienced and trained individual or group.

The photographs were also key in stimulating discussion among the change team members. Everyone was able to view the photograph and discuss it specifically with respect to risk factors they could see. The change team members also used the photographs to recall similar events they had experienced or witnessed. The photographs also stimulated discussion because every change team member, including the management members and the ergonomist who lack time and experience on the floor, could 'join' the photographer at the site of the risk being discussed. This became particularly important in a few situations when discussing the environmental issues (lack of space) or policy issues (not using a readily available lift, as seen in Figure 11.0). Therefore, not everyone involved needed to be present to take the photograph, because through the photograph everyone was able to visualize the location, the task, and the risk factors.

Focus of Analysis

The use of checklists limits risk factor analyses to the back, neck, shoulder, arms and wrists (David, 2005). In addition to limited body parts, the scope of checklists and surveys often only focus on the most severe problem in a task (Silverstein et al., 1997). Furthermore, there is not a checklist specifically designed for analyzing risk factors related to patient transfers and lifts in long-term care homes. The structure of a checklist is only designed for specific analyses afforded by the knowledge built in and the insight used to create the checklist. Checklists are limited by their inherent verbal characteristics (Easterby, 1967). Photographs, on the other hand, allow for risk factor analyses for what is depicted in a picture. This can include identifying more than one risk factor, and analyzing all body parts of a worker, the equipment (see Figure 10.0, the sling was not properly placed around the resident), and the environment (see Figure 13.0, unnecessary barrier and distant destination). Photographs are also advantageous because they allow for more than one worker to be assessed for awkward postures and other risk factors. There does not appear to be a checklist that focuses on lifting tasks being performed by

more than one worker. This is problematic when assessing risk factors in healthcare as patient transfers and lifts often require more than one worker to perform the task (see Figures 10.0 – 13.0). Photovoice, however, is useable for multi-worker as well as multi-factor assessments.

Table 15.0: Comparing risk factor analysis tool features across four method types: self-report (e.g. survey), direct observation (e.g. checklist), direct measurement (e.g. electromyography), and photovoice

Feature	Self-Report	Direct Observation	Direct Measurement	Photovoice
Cost	Minimal	Minimal	Expensive	Minimal
Training	Minimal	Minimal-Moderate	Extensive	Minimal
Familiarity with tool	No	No	No	Yes
Visual Evidence	No	Sometimes	With video-based analyses	Yes
Body Part	Primarily only back, neck, shoulder, arms, wrists	Depends on the focus of the tool (e.g. checklist)	Depends on method, but potentially any body part	Any body part
Multi-factor/worker	Depends on design, but typically only	Depends on design, but typically only	Depends on design, but typically only	Yes. Can assess multiple risk factors, and

	focuses on most severe problem and one worker	focuses on most severe problem and one worker	focuses on most severe problem and one worker	more than one worker at the same time.
Environment	Rarely	Rarely	No	Yes
Stimulate Discussion	Maybe	Depends on how presented	No	Yes

Although all members of the change teams were encouraged to take photographs, it was only frontline workers who actually utilized the cameras. This was a potential limitation of the study. The lack of management members taking photographs was not discussed in the meetings, and may require further investigation. However, it is unknown if other PE studies had full and equal involvement of all change team members. Although management change team members in this study did not take photographs, they were actively involved in discussions of the photographs and identifying risk factors. It was assumed that, since the frontline staff work more closely with the individuals in the photographs and also perform the tasks themselves, it was more appropriate for them to be taking the photographs. Furthermore, the management often had other tasks to perform that did not afford them the time to be on the floors. In retrospect it may have been beneficial that only staff took photos, as they may have been uneasy if they saw management taking photos.

4.5 Conclusions

This study attempted to involve PE change team members in the identification of risk factors using the Photovoice approach. The PE and Photovocie approaches both aim to create a sense of participation, empowerment and ownership among the individuals partaking in the project (Minkler & Wallerstein, 2003; van der Molen et al., 2005; Carlson et al., 2006; Theberge et al., 2006; Burges-Limerick et al., 2007). Frontline workers are not always afforded the opportunity or the decision power to voice their concerns about risks of injuries when performing tasks and duties. It was speculated that management was not always aware of the conditions on the floor, as their jobs require them to attend to other matters and issues. Thus, via PE and Photovoice, this study brought together management and frontline workers to identify problems by using photography to categorize risk factors associated with patient lifts and transfers in long-term care homes. The change teams indicated that they enjoyed the Photovoice approach to identifying risk factors and agreed that other methods would have been less favourable. The taking of photographs was successful in identifying several risk factors that were categorized as issues related to either worker posture, equipment, resident, spacing, policy, or procedure. Some risk factors confirmed what has previously been discussed in the literature, but this new approach also identified different risk factors for which their has been little discussion (e.g., resident behaviours or procedures not properly executed). Although not all of the risk factors identified were specifically depicted in a photograph, a unique aspect of Photovoice is that change teams were afforded the opportunity to discuss each photograph and share relevant stories of similar situations and experiences. Photovoice promoted communication and participation among all change team members, because everyone was able to relate to the photographs through their own experiences. The photographs also provided the change teams with a permanent record of the problems that need to be addressed. In the latter stages of the PE process, for example during the creation of solutions, the photographs were often referred to in order to refresh the memories of the change team members as to why and how certain risk factors were identified. Furthermore, the photographs could be used to aid in providing realistic pictures of scenarios during training modules. This study showed that Photovoice is a viable method for change teams to identify risk factors. This is not to suggest that going

forth that the PE process should only utilize Photovoice, but rather, the ergonomist and the change team need to choose the method that is most appropriate and advantageous for their program. Overall, the Photovoice method was enjoyed by the change team members, was advantageous in identifying risk factors, and promoted group participation, communication, and empowerment.

4.6 References

Blegen, M. A., & Vaughn, T. A. (1998). A multisite study of nurse staffing and patient occurrences. *Nursing Economics*, 16(4), 196-203

Brodie, D., & Wells, R. (1997). An evaluation of the utility of three ergonomics checklists for predicting health outcomes in a car manufacturing environment. *Proceeding of the 19th Annual Conference of the Human Factors Association of Canada*, 45-52

Burgess-Limerick, R., Straker, L., Pollock, C., Dennis, G., Leveritt, S., & Johnson, S. (2007). Implementation of the participative ergonomics for manual tasks (PEforM) programme at four Australian underground coal mines. *International Journal of Industrial Ergonomics*, 37, 145-155

Carlson, E. D., Engebretson, J., & Chamberlain, R. M. (2006). Photovoice as a social process of critical consciousness. *Qualitative Health Research*, 16(6), 836-852

David, G.C. (2005). Ergonomic methods for assessing exposure to risk factors for work-related musculoskeletal disorders. *Occupational Medicine*, 55, 190-199

Dempsey, P.G., McGorry, R.W., & Maynard, W.S. (2005). A survey of tools and methods used by certified professional ergonomists. *Applied Ergonomics*, 36, 489-503

Easterby, R.S. (1967). Ergonomics checklists: an appraisal. *Ergonomics*, 10(5), 549-556

Engkvist, I., Hagberg, M., Hjelm, E., Menckel, E., & Ekenvll, . (1998). The accident process preceding overexertion back injuries in nursing personnel. *Scandinavian Journal of Work, Environment and Health*, 24, 367-375

Engkvist, I., Hjelm, E. W., Hagberg, M., Menckel, E., & Ekenvall, L. (2000). Risk indicators for reported over-exertion back injuries among female nursing personnel. *Epidemiology*, 11(5), 519-522

Estryn-Behar, M. Kaminski, M., Peigne, E., Maillard, M. F., Pelletier, A., Berthier, C., Delaporte, M. F., Paoli, M. C., & Leroux, J.M. (1990). Strenuous working conditions and musculo-skeletal disorders among female hospital workers. *International Archives of Occupational and Environmental Health*, 62, 47-57

Evanoff, B., Wolf, L., Aton, E., Canos, J., & Collins, J. (2003). Reduction in injury rates in nursing personnel through introduction of mechanical lifts in the workplace. *American Journal of Industrial Medicine*, 44, 451-457

Flum, M. R., Siqueira, C. E., DeCaro, A., & Redway, S. (2010). Photovoice in the workplace: a participatory method to give voice to workers to identify health and safety hazards and promote workplace change – a study of university custodians. *American Journal of Industrial Medicine*, 53, 1150-1158

Fochsen, G., Josephson, M., Hagberg, M., Tommingas, A., & Lagerstrom, M. (2006). Predictors of leaving nursing care: a longitudinal study among Swedish nursing personnel. *Occupational and Environmental Medicine*, 63, 198-201

French, P., Lee, F. W. F., Liu, S. P., Luk, K. B., & Wong, H. Y. R. (1997). The prevalence and cause of occupational back pain in Hong Kong registered nurses. *Journal of Advanced Nursing*, 26, 380-388

Garg, A., & Owen, B. (1992). Reducing back stress to nursing personnel: an ergonomic intervention in a nursing home. *Ergonomics*, 35, 1353-1375

Haines, H., Wilson, J.R., Vink, P. & Koningsveld. (2002). Validating a framework for participatory ergonomics (the PEF). *Ergonomics,* 45(4), 309-327

Harber, P., Billet, E., Gutowski, M., SooHoo, K., Lew, M., & Roman, A. (1985). Occupational low-back pain in hospital nurses. *Journal of Occupational Medicine*, 27(7), 518-524

Institute for Work & Health (IWH). (2009). A guide to successful participatory ergonomics programs. *Reducing MSD hazards in the workplace*, 1-11

Kovner, C., & Gergen, P.J. (1998). Nurse staffing levels and adverse events following surgery in US hospitals. *Image. Journal of Nursing Scholarship*, 30(4), 315-321

Larese, D. E., & Fiorito, A. (1994). Musculoskeletal disorders in hospital nurses: a comparison between two hospitals. *Ergonomics*, 37, 1205-1211

Li, J., Wolf, L., & Evanoff, B. (2004). Use of mechanical patient lifts decreased musculoskeletal symptoms and injuries among health care workers. *Injury Prevention*, 10, 212-216

Lipscomb, J., Trinkoff, A., Brady, B., & Geiger-Brown, J. (2004). Health care system changes and reported musculoskeletal disorders among registered nurses. *American Journal of Public Health*, 94(8), 1431-1436

Marras, W. S., Davis K. G., Kirking, B. C., & Bertsche, P. K. (1999). A comprehensive analysis of low-back disorder risk and spinal loading during the transferring and repositioning of patients using different techniques. *Ergonomics*, 42(7), 904-926

Menzel, N. N., Brooks, S. M., Bernard, T. E., & Nelson, A. (2004). The physical workload of nursing personnel: association with musculoskeletal discomfort. *International Journal of Nursing Studies*, 41, 859-867

Minkler, M., & Wallerstein, N. (eds.). (2003). *Community-Based Participatory Research for Health*. San Francisco: Jossey-Bass

Nagamachi, M. (1995). Requisite and practices of participatory ergonomics. *International Journal of Industrial Ergonomics*, 15(5), 371-377

Needleman, J., Buerhaus, P., Mattke, S., Stewart, M., & Zelevinsky, K. (2002). Nurse-staffing levels and the quality of care in hospitals. *Journal of Health Politics, Policy and Law*, 346(22), 1715-1722

Nelson, A., Matz, M., Chen, F., Siddharthan, K., Lloyd, J., & Fragala, G. (2006). Development and evaluation of a multifaceted ergonomics program to prevent

injuries associated with patient handling tasks. *International Journal of Nursing Studies*, 43, 717-733

Owen, B. D. (1989). The magnitude of low-back problem in nursing. *Western Journal of Nursing Research*, 11(2), 234-242

Owen, B. D., Garg, A., & Jensen, R. C. (1992). Four methods for identification of most back-stressing tasks performed by nursing assistants in nursing homes. *International Journal of Industrial Ergonomics*, 9, 213-220

Sikiru, L., & Hanifa, S. (2010). Prevalence and risk factors of low back pain among nurses in a typical Nigerian hospital. *African Health Sciences*, 10(1), 26-30

Silverstein, B.A., Stetson, D.S., Keyerling, W.M., & Fine, L.J. (1997). Work-related musculoskeletal disorders: comparison of data source for surveillance. *American Journal of Industrial Medicine*, 31, 600-608

Smedley, J., Egger, P., Cooper, C., & Coggon, D. (1995). Manual handling activities and risk of low back pain in nurses. *Occupational and Environmental Medicine*, 52, 160-163

Strack, R. W., Magill, C., & McDonagh, K. (2004). Engaging youth through photovoice. *Health Promotion Research*, 5(1), 49-58

Theberge, N., Granzow, K., Cole, D., & Laing, A. (2006). Negotiating participation: understanding the "how" in an ergonomic change team. *Applied Ergonomics*, 73, 239-248

Tinubu, B., Mbada, C., Oyeyemi, A., & Fabunmi, A. (2010). Work-related musculoskeletal disorders among nurses in Ibadan, South-et Nigeria: a cross-sectional survey. *BMC Musculoskeletal Disorders*, 11(12), 1-8

Trinkoff, A. M., Johantgen, C., & Le, R. (2005). Staffing and worker injury in nursing homes. *American Journal of Public Health*, 95(7), 1220-1225

van der Molen, H. F., Sluiter, J. K., Hulshof, C. T. J., Vink, P., van Duivenbooden, C., Holman, R., & Frings-Dresen, M. H. W. (2005). Implementation of participatory ergonomics intervention in construction companies. *Scandinavian Journal of Work, Environment & Health*, 31(3), 191-204

van Wyk, P.M. (Chapter 2). A six-year comparison of Workplace Safety and Insurance Board lost-time claims made from 2004-2009 by healthcare workers in Ontario hospitals and long-term care homes

Videman, T., Nurminen, T., Tola, S., Kuorinka, I., Vanharanta, H., & Troup J. D. G. (1984). Low-back pain n nurses and some loading factors of work. *Spine*, 9(4), 400-404

Wang, C., & Burris, M. (1994). Empowerment through photo novella: portraits of participation. *Health Education Quarterly*, 21(2), 171-186

Wang, C., & Burris, M. (1997), Photovoice: concept, methodology, and use for participatory needs assessment. *Health Education & Behavior*, 24(3), 369-387

Wang, C.C., & Redwood-Jones, Y.A. (2001). Photovoice ethics: perspectives from flint photovoice. *Health Education & Behaviour*, 28(5), 560-572

Wang, C.C., Yi, W. K., Tao, Z. W., & Carovano, K. (1998). Photovoice as a participatory health promotion strategy. *Health Promotion International*, 13(1), 75-86

Yassi, A., Khokhar, J., Tate, R., Cooper, J., Snow, C., & Vallentyne, S. (1995). The epidemiology of back injuries in nurses at a large Canadian tertiary care hospital: implications for prevention. *Occupational Medicine*, 45(4), 215-220

Zalk, D.M. (2001). Grassroots ergonomics: initiating an ergonomics program utilizing participatory techniques. *The Annals of Occupational Hygiene*, 45(4), 283-289

Chapter 5

5 Participatory ergonomics and safety climate in long-term care

5.1 Introduction

This study was designed to examine the implementation of participatory ergonomics (PE) programs to improve patient lifts and transfers in two long-term care homes and to measure the pre- and post-PE intervention safety climates. There were several aims for this study.

i) To examine the relationship between safety climate and participatory ergonomics (PE);

ii) To see the effect of altering the PE process by utilizing different sub-categories of the Participatory Ergonomics Framework (PEF, Haines et al., 2002);

iii) To perform a process evaluation of the PE programs implemented at the two long-term care homes; and

Due to a lack of safety climate surveys returned in the post intervention period nullifying a pre-post analysis of the data, this study is presented as a descriptive practice-oriented research case study (Dul & Hak, 2008). Discovering and describing variables within a broader category is the aim of descriptive practice-oriented research (Dul & Hak, 2008). Accordingly, the overall objective was to contribute to the knowledge of the relationship between safety climate and participatory ergonomics and the participatory ergonomic process by identifying and describing the following: the pre-PE safety climate of the two intervention long-term care homes, the results of the process evaluation, and the solutions generated by the long-term care homes. The following introduction discusses safety culture and safety climate (terms that are often used interchangeably), participatory ergonomics, the participatory ergonomics framework, and process evaluation.

Safety Culture/Safety Climate

An organization, like any team, in order for it to work, be successful and strive forward, needs to work together and share common goals. This loosely defines the culture of an organization. In essence there needs to be *something* that links everything or everyone together. This something can also be referred to as the "social glue" that binds everyone together, that is, the culture of an organization (Detert et al., 2000). Social structures, or a good safety culture, are dependent upon an organization or workplace working together to achieve common goals in a safe manner (Mearns et al., 2003). In order to attain and sustain a positive safety culture, communication is a crucial aspect. The Health and Safety Commission (1993) ascertained that workplace communication must be founded on trust and incorporate everyone sharing their perceptions regarding the importance of safety. The development of a positive safety culture is crucial as it is the foundation for the promotion of safety behaviours and from which employers and employees will develop their individual safety attitudes (Mearns et al., 2003). A concept that has often been used interchangeably with safety culture is safety climate. Safety climate measures employer and employee attitudes about their workplace environment. It is a moment-in-time 'snapshot' of an organization's current state of safety (Mearns & Flin, 1999).

In order to help ensure safe operation, workplaces need to strive for a positive safety climate as the elements or dimensions of safety climate help to uncover unsafe attitudes and behaviours that can be altered proactively rather than after an incident occurs (Mearns et al., 2003). Safety climate is often defined as being made up of a number of dimensions. As with many articles pertaining to culture and climate, the number of dimensions of safety climate varies (Flin et al., 2000; Mearns et al., 2003). Ascertaining the safety climate of an organization in and of itself is not enough action to make changes within an organization. Safety climate acts as a challenge for an organization to change, to become more safety savvy (Zammuto & Krakower, 1991; Colla et al., 2005). When organizations utilize safety climate measurements to identify areas of needed improvement, changes can be made within the workplace that can alter a variety of outcomes. For example, it is been seen that organizations that have strong safety climates also report fewer workplace injuries than organizations that have weak safety climates

(Diaz & Cabrera, 1997; Gerhson et al., 2000). One of the questions in the original design of this study was to determine the relationship between safety climate and participatory ergonomics. First, does the strength of safety climate affect the acceptance and successfulness of the participatory ergonomics process? Secondly, does participatory ergonomics as an intervention improve the safety climate of a long-term care home? Unfortunately, due to the lack of safety survey responses after the participatory ergonomics was implemented only the first relationship could be addressed.

Participatory Ergonomics

Traditionally, ergonomic consultants parachute into an organization, assess the workplace and offer interventions and changes with an aim to decreasing risks of workplace injuries. In healthcare, work-related musculoskeletal injuries are a primary concern, especially those due to patient lifts and transfers. Patient lifts and transfers have been noted as a primary cause for work-related injuries in healthcare, both in the past (Owen et al., 1992; Owen & Garg, 1993; Yassi et al., 1995; Yassi et al., 2001; Nelson et al., 2003; Nelson et al., 2006) and recently (van Wyk, Chapter 2). Efforts to improve lifting techniques have traditionally involved education on proper body mechanics. These efforts however have often not always proven successful (Hignett, 1996). Additionally, several interventions have been implemented in an attempt to decrease these injuries. Mechanical lift devices, such as Hoyer and Sara lifts, are examples of interventions that have been designed to reduce compressions and strain placed upon the workers transferring people (Smedley et al., 1995; Daynard et al., 2001). There is no doubt that the design of the mechanical lift devices have been meticulously discussed, debated, tested, and scrutinized among engineers. Furthermore, when the decision makers in healthcare organizations choose to purchase and implement a mechanical lift device in their workplace, they most likely thoroughly considered and debated about the right choice for their employees. However, it is probably unlikely that the decision makers involved the frontline staff whom would be "*forced*" to use these devices and change their procedures to abide with compliance of the new implementation(s). This may be a crucial factor as frontline staff can provide valuable feedback as to whether the implementation being considered is one that is feasible in their minds (i.e. training, timing, environmental constrictions, etc...) in

addition to management's worry about finances and policies. If frontline staff are involved with such decisions, they may be more willing to adopt the implementation and promote continual adherence to the change. In other words, it would be advantageous at times for the management and the frontline staff to work together as a team to help solve problems and promote positive change and safety within an organization, or specifically for this study, a long-term care home.

Participatory ergonomics (PE) is a process that aims to bring key individuals representing both management and frontline staff together to identify issues, develop solutions and implement changes (Institute of Work and Health (IWH), 2009; Theberge et al., 2006; van der Molen et al., 2005). PE refers to active worker involvement in implementing ergonomic knowledge and changes into a workplace with the support of supervisors, managers, and employers (Nagamachi, 1995; Loisel et al., 2001). It could be argued that PE is a refinement of quality circles in Japan. However, Nagamachi (1995) claims that quality circles are not always ergonomic in nature. Furthermore, workers involved in quality circles are not necessarily trained in ergonomics, and thus any ergonomic changes identified and implemented may be purely incidental (Liker et al., 1989). According to Nagamachi (1995), PE involves participation, organization, education and job design. The common element for both PE and quality circles is the utilization of the expert knowledge of the workers through their involvement in the attempts to improve the working environment (Burgess-Limerick et al., 2007). Participation or involvement appears to be the central component of PE programs, as it works towards creating more human centered work and improving organizational climate (Burgess-Limerick et al., 2007).

Participatory ergonomics is a multimodal approach that includes individuals affected by any changes made in an attempt to optimize workplace health, safety and performance for all (healthcare workers, management, patients/residents) involved. PE change teams can be beneficial in the attempt to proactively find hazards and develop strategies to implement that can hopefully avoid injuries from occurring. Being a member of the PE change team is rewarding for a variety of reasons. First, it makes everyone more aware of the risks involved in tasks and to help them advocate for change (Lippin et al., 2000).

If healthcare workers participate as a change team member they will become more actively aware of the issues in their workplace and can hopefully help prevent injuries before they occur. By utilizing worker involvement in the intervention process, PE has been found to be a successful process in several industries, such as, agriculture, mining, and construction (Rainbird & O'Neill, 1995; Moir & Buchholz, 1996; Koda et al., 1997; Kawakami et al., 1999; Jafry & O'Neill, 2000; Zalk, 2001). Workplace participation provides workers the opportunity to have more control in their working environment and with their tasks (Zalk, 2001). After all, the workers are the individuals with the expert knowledge as to how best to perform tasks, and it seems only natural to tap into this resource when attempting to create a more safety conscious environment. This is the fundamental benefit of PE programs (Zalk, 2001). A potential weakness, however, is that the workers need to feel a sense of comfort and security to begin with so that they are willing to participate (Zalk, 2001). Thus, it may be informative for the ergonomist to first assess the safety climate of an organization prior to implement PE.

Another crucial and potentially beneficial aspect is management involvement in the PE process. Management involvement will provide management the opportunity to be more fully involved and informed about the organization and the frontline workers. This will promote the idea that management is showing a commitment to safety, cares about the employees, and is open to different ideas and solutions.

There is no predefined best way to conduct a PE program (Theberge et al., 2006). To provide practical advice and guidance to an ergonomist or an organization for how to implement a participatory ergonomics program in the workplace Haines et al. (2002) developed the Participatory Ergonomic Framework (PEF). The PEF has been tested and refined to include nine dimensions, each with its own subcategories: i) permanence of initiative, ii) involvement, iii) level of influence, iv) decision-making power, v) mix of participants, vi) requirement, vii) focus, viii) remit/brief, and ix) role of ergonomics specialist. Further information and details for each of these dimensions and associated sub-categories has previously been published (Haines et al., 2002). Although each of these dimensions comes with sub-categories, it is not known what effect these subcategories have on the outcome of the PE process. For example, the dimension

‘involvement’ has three sub-categories. Involvement could entail everyone an organization participating in the PE program (full direction participation), or workers may be elected to actively represent the wider workforce (direct representative participation), or individuals may be chosen by management to represent a typical subset of a larger group (delegated participation). Another aim of this study was to determine if certain ‘levels’ of the PEF dimensions affected the PE process. The ‘levels’ of the PEF dimensions used to develop the PE programs for this study were categorized as ‘high participatory ergonomics, HIPE’ which aimed to use the subcategories that afforded more involved, developed and broader advice, and ‘low participatory ergonomics, LOPE’ which aimed to use the subcategories that afforded less involved and narrow advice. Although it would have been favourable to develop multiple PE programs based on all of the PEF dimensions, this was not feasible. Thus, four dimensions were altered for the two groups (Table 16.0). The four dimensions chosen were; involvement, decision-making power, mix of participant and remit/brief. These four dimensions were chosen based on the feasibility of altering them for the two groups.

Table 16.0: The participatory ergonomics framework (PEF) dimensions by group

PEF Dimension	HIPE	LOPE
Involvement	Direct Representative Participation (Change team members elected, and actively represent co-workers)	Delegated Participation (Change team members are appointed by senior management and do not actively represent co-workers)
Decision Power	Group Delegation (Change team has increased discretion)	Group Consultation (Change team is encouraged to voice their opinions, but senior management retains the right to make final decisions)
Mix of Participants	Any staff member. Management, nurses, personal support workers, physiotherapists, student, etc…	Mainly management with some registered nursing staff
Remit/Brief	Everyone involved in risk factors identification, solution generation, solution implementation	Management involved in risk factors identification, solution generation, solution implementation. Other team members only involved in risk factor identification.

HIPE – high participatory ergonomics

LOPE – low participatory ergonomics

Based on Haines et al., 2002

Process Evaluation

There have been several studies that have utilized PE and have claimed its success. However, most of these successes have been based on injury data related outcomes. There has yet to be a study that truly identifies how and why the PE process is successful. In other words, there has been a lack of understanding towards effectiveness of PE (Driessen et al., 2010; van der Molen et al., 2005). Driessen et al. (2010) did attempt to perform a process evaluation on PE. The components to their process evaluation consisted of recruitment, reach, fidelity, satisfaction, and implementation components. One of the study's main foci was on implementation rates and the success of implementation, however, these outcomes did not necessarily indicate why the PE process was successful. As PE can address both ergonomic and psychosocial (i.e. climate) facets, another aim of this study was to assess the success of PE with respect to the dimensions of safety climate and the PEF. A Process Evaluation survey was created based on the four dimensions altered for the HIPE and LOPE groups.

Study Purpose

If the safety culture/climate of an organization is not understood it may become difficult to implement change. The implementation of change should fit the safety culture/climate and coincide with the organization's values and goals. The lack of understanding of an organization's safety culture/climate may be a leading reason as to why ergonomic interventions, implementations and changes are not always successful. Some of the dimensions associated with safety climate surveys include, but are not limited to, 'supervisory support for safety', 'safety learning behaviours', 'safety training', 'ergonomic practices', teamwork climate', and 'perceptions of management' (Amick et al., 2000; Sexton et al., 2006; Ginsburg et al., 2009). These dimensions assess workers' perceptions of management involvement, and if it is shown to be supportive, workers may feel more empowered to participate in a PE program (Zalk, 2001). If the teamwork climate is shown to be positive, this may indicate that management and non-management change team members could work together successfully and constructively in a PE program. One of the requirements for a successful PE intervention is ensuring that the right people are involved (van Eerd et al., 2010). Therefore, it is likely that there is a connection between dimensions of the safety climate and the PE process as related to the PEF dimensions for a PE program. Furthermore, there is a lack of research that has evaluated the process of a PE program. Understanding what facilitates or complicates the PE process may be advantageous for further refinement of PE program guidelines.

An original purpose of this study was to examine if safety climate affected the participatory ergonomics process, and vice versa. Employees at three long-term care homes were invited to complete a safety survey prior to, and after the implementation of a PE program to examine safety climate dimensions. Due to the lack of completed safety climate surveys during the post-PE period a pre-post analysis was not possible. As a result, only the safety climate surveys completed prior to the PE program implementation were analyzed. A second purpose of this study was to examine the implementation of a PE program using different 'levels' of the Participatory Ergonomics Framework (PEF, Haines et al., 2002).

5.2 Methods

Participants

Three long-term care homes in the South-western Ontario were invited to participate. The researcher met with administration from each long-term care home to discuss the study. Each home seemed excited and eager to participate. These long-term care homes were approached because they were similar in location and size based on the number of resident beds. Each of the three long-term care homes were randomly assigned to one of three groups: no participatory ergonomics (NOPE), high participatory ergonomics (HIPE) or low participatory ergonomics (LOPE). This was done by writing the three long-term care homes on individual pieces of paper, and the three groups on individual pieces of paper. The three long-term home pieces of paper were put into a container, and the three groups were put into another container. One long-term care home and one group were drawn and matched together. This process was repeated until all three long-term care homes were assigned to a group. This study was reviewed and approved by the University Research Ethics Boards, as well as by the management and unions associated with each long-term care home.

No Participatory Ergonomics (NOPE)

The NOPE home was a 160 bed long-term care facility that offered nursing and personal care around the clock. This home was originally intended to act as a control. The NOPE group was invited to complete the safety survey at time one (prior to the participatory ergonomics program being implemented at the intervention long-term care homes) and at time two (after the completion of the participatory ergonomics program at the intervention long-term care homes). Unfortunately, due to the lack of post-PE surveys received from all three long-term care homes the intended analysis was no longer feasible. As a result, the NOPE group will not be discussed further in this study.

High Participatory Ergonomics (HIPE)

The HIPE home was a 157 bed long-term care facility that offered nursing and personal care around the clock. The HIPE group was the long-term care home with a PE program designed using more involved, developed and broader PEF dimension subcategories (Table 1.0). The PEF dimension sub-categories used for the HIPE group are described below.

Involvement

The HIPE group was designed to be the most involved group. Since it is not feasible to involve every individual in a PE change team, a subgroup of participants was selected to participate as part of the change team and was instructed to consult with other employees to gain a broader perspective for additional input. As the aim for the change team members was to actively represent the viewpoints of their co-workers the HIPE group was assigned the '*Direct Representative Participation*' Involvement from the PEF. Furthermore, the employees chosen to be representatives on the change team were to be elected by co-workers.

Decision Power

For the HIPE group, the change team was to have increased discretion and responsibility to organize their jobs without reference back to higher management or within the organization. At the onset of the PE intervention, this PEF level of Decision Power, '*Group Delegation*' was advised that the solutions developed needed to be feasible. As the change team was comprised of both management and non-management, they did have an increased power to make decisions.

Mix of Participants

As the HIPE group was intended to have the greatest involvement, they were also afforded to have the largest Mix of Participants. The long-term care home was encouraged to invite and elect employees from any and all units/departments within the

workplace. The HIPE change team was comprised of: three management members (Director of Resident Care, Nurse Educator, other), two registered nursing staff members (both Registered Practical Nurses), two non-registered staff members (both Personal Support Workers) and one ergonomist (researcher). The Director of Resident Care and one of the Personal Support Workers attended every change team meeting. By the last change team meeting, they were the only two present (aside from the ergonomist/researcher). Thus the original change team had eight members, but this unfortunately dwindled to three members.

Remit/Brief

All members of the HIPE change team, management and non-management, were invited to be involved in all of the PE steps. Their responsibilities included risk factor identification, solution generation and solution implementation.

Low Participatory Ergonomics (LOPE)

The LOPE home was a 154 bed long-term care facility that offered nursing and personal care around the clock. The LOPE group was the long-term care home with a PE program designed using less involved and narrow PEF dimension subcategories (Table 1.0). The PEF dimension sub-categories used for the LOPE group are described below.

Involvement

The LOPE change team comprised of an individual who represented of a typical subset of a larger group (i.e. nurses) and members of management. Unlike the HIPE change team, the members of the LOPE change team were not instructed to actively represent the views of others, and thus were assigned the '*Delegated Participation'* level of Involvement from the PEF. The members of the change team were selected by management rather than elected by co-workers.

Decision Power

Although management encouraged the staff members on the PE change team to make their views known, they retained the right to take action or not. Thus the LOPE group had a '*Group Consultation*' level of Decision Power according to the PEF.

Mix of Participants

The LOPE change team was designed to have a limited Mix of Participants. Thus only management and registered nursing staff, primarily registered nurses, were targeted to be members of the change team. The Director of Care and Executive Manager decided to have the LOPE change team comprised of: five management members (RAI Coordinator, Executive Director, Quality Manager, Staff Educator, and Health and Safety), one registered staff member (Registered Nurse) and one ergonomist (researcher). Unfortunately half way through the process one of the management members (Health and Safety) took another job and thus was no longer available to participate. Therefore the change team originally had seven members and was reduced to six members.

Remit/Brief

The Registered Nurse was originally only to be involved with the identification of risk factors, whereas the management would be involved fully in all three components of the PE process. However, the LOPE change team opted to keep the one Registered Nurse involved throughout as they felt the opinions, perspectives and knowledge from an individual who has frontline experience was a vital component of the process.

Procedures

It was previously determined that patient lifts and transfers remain a task that leads to workplace injuries in healthcare (van Wyk, Chapter 2). Thus, the problem of focus for the PE process was previously determined as patient lifts and transfers.

The ergonomist/researcher then contacted long-term care homes in South-western Ontario based on the number of resident beds within each facility. The ergonomist met with upper management within each long-term care home contacted and they all agreed to participate in the study. Support and commitment from each long-term care home and their upper management was attained.

The next step was to create PE change teams. The HIPE change team was to be comprised of a mix of management, registered nursing staff (Registered Nurses, Registered Practical Nurses), non-registered staff (Personal Support Workers, Healthcare Aides), and anyone else whom they deemed to provide additional knowledge and support to the PE process. Each member of the HIPE change team was to be elected by their peers. The LOPE change team was to be comprised only of management and registered nursing staff. Each member of the LOPE change team was to be selected by upper management. Each long-term care home was advised that the change team should be comprised of six to ten people.

While each long-term care home assembled their change teams, a safety survey was distributed to all employees to determine the pre-PE safety climate. All employees (management and staff) were invited to complete a "Safety Survey in Long-Term Care Settings". This survey combined the Modified Stanford Patient Safety Culture Survey Instrument (MSI, Ginsburg et al., 2009), an adapted version of the Safety Attitude Questionnaire (SAQ, Sexton et al., 2006), and five sections (14 questions) of the Organizational Policies & Practices (OPP, Amick et al., 2000). The MSI was chosen as it is the instrument currently adopted by Accreditation Canada to assess safety climate in all Canadian long-term care homes (Ginsburg et al., 2009). The SAQ was also chosen as it was derived for healthcare, has been used in multiple settings (although not LTC as of yet), and has shown psychometric rigour (Sexton et al., 2006). For this study, the SAQ was altered to more accurately represent the terminology pertaining to long-term care. Furthermore, questions that related specifically to patient safety were also asked with worker safety as a focus. For example, safety attitudes and perceptions regarding the statement 'I am encouraged by my colleagues to report any concerns I may have regarding' was asked with respect to 'resident safety' and 'worker safety'. The people-

oriented culture, active safety leadership, safety diligence, safety training, and ergonomic practices of the OPP were additionally included as these dimensions were considered valuable in relation to ergonomics and worker safety, as well as to safety climate (Amick et al., 2000). Although the disability management and labor-management climate dimensions are of value, they were excluded for two reasons: firstly, the focus of the participatory ergonomics program was not on disability management or return-to-work and secondly, to reduce the number of questions being presented to the participants.

The first change team meeting for each long-term care home was an introductory meeting. The primary aim was to introduce the ergonomist to the other members of the change team, and vice versa, to provide information about the project, ergonomics, the ergonomics of lifting, what risk factors are, how to identify risk factors, and a description of the Photovoice process to be used to identify risk factors for transfers and lifts. Each change team member was provided with a binder containing all the learning materials as well as two logs: a communication log and a photovoice log. At the end of the meeting, the change team was given two disposable cameras on which they were to take photos of what they perceived to be patient lift and transfer risk factors.

The second change team meeting was focused on identifying risk factors. All the photographs from the disposable cameras were developed and presented to the change teams. The change teams went through the photographs one by one discussing any of the risk factors present. The risk factors were previously reported (van Wyk, Chapter 4).

Once a list of risk factors was created, they were compiled together under subheadings. The subheadings for both the HIPE and LOPE groups were: worker posture, equipment, resident, spacing, policy and procedures. These subheadings were discussed independently with each change team. Prior to the next meeting the change teams were asked to prioritize the risk factors. They were also asked to indicate if there were any additional risk factors that should be added to the list. The HIPE change team members were also instructed to ask their colleagues if they agreed with the list or could think of any other additional risk factors not already included on the list.

At the third and fourth change team meetings the risk factors were discussed by category and in priority order to determine potential solutions. Each change team was instructed to mention any solution, regardless of price and feasibility. This was to aid the creativity process and to ensure that no idea was left out of consideration. After the list of solutions was compiled, they were then reviewed for feasibility. After the meeting, the HIPE change team was instructed to ask their colleagues if they agreed with the list or could think of any other additional solutions not already included on the list.

At the final meeting an implementation plan for all the feasible solutions was discussed. This entailed how the solutions could be implemented, where they should be implemented and who was in charge of ensuring that they were implemented. All of the meetings occurred over a span of six months for each intervention long-term care home.

After meeting two, four and five, each member of the change team was invited to complete a process evaluation survey.

The safety survey was also distributed to all employees at each long-term care home after the last PE change team meeting. The number of completed surveys returned decreased in all three long-term care homes. Of the surveys that were returned, they were completed by different employees than those who had submitted surveys prior to the PE intervention. As a result, pre-post analyses were not feasible, and the post-PE safety surveys that were returned were not analyzed for this study.

Instruments

Safety Survey in Long-Term Care Settings

The Safety Survey comprised of the MSI, SAQ, and OPP (Appendix C).

The Modified Stanford Patient Safety Culture Survey Instrument (MSI)

The Modified Stanford Patient Safety Culture Survey Instrument (MSI) was developed in Canada for use in healthcare settings, including long-term care (Ginsburg et al., 2009). The MSI has also been tested for psychometric rigour (Ginsburg et al., 2009). This 46-item patient safety climate survey is broken into 7 dimensions: senior leadership support for safety (seven items), supervisory support for safety (seven items), threats to safety (nine items), fear of repercussions (four items), safety learning behaviours (five items), reporting culture (five items), and learning culture (six items) (Ginsburg et al., 2006; Nieva & Sorra, 2003). Since 2008, the MSI has been adopted by Accreditation Canada to assess safety climate (culture) in long-term care facilities (Ginsburg et al., 2006).

Each question of the MSI was answered using a five-point agree-disagree Likert scale with a "not applicable" option. Examples of questions include: "Good communication flow exists up the chain of command regarding resident safety issues" (senior leadership support for safety); "I am rewarded for taking quick action to identify a serious mistake" (supervisory support for safety); "Personal problems can adversely affect my performance" (threats to safety); "Asking for help is a sign of incompetence" (fear of repercussions); "Individuals involved in major events contribute to the understanding and analysis of the event and the generation of possible solutions" (safety learning behaviours); "I am sure that if I report an incident to our reporting system, it will not be used against me" (reporting culture); and "On this unit, when people make mistakes, they ask others about how they could have prevented it" (learning culture).

Safety Attitude Questionnaire (SAQ)

The most widely used safety climate survey in healthcare is the Safety Attitudes Questionnaire (SAQ) (Deilkas & Hofoss, 2008). The SAQ was derived from the Intensive Care Unit Management Attitudes Questionnaire and the Flight Management Attitudes Questionnaire (FMAQ) (Sexton et al., 2006). The FMAQ measures aviation employees' attitudes regarding teamwork, leadership, communication, and collaborative decision making (Sexton et al., 2006). These dimensions have also been deemed important in healthcare, and thus the SAQ was designed to ask healthcare employees about their attitudes on these aspects (Sexton et al., 2006). The motivation behind the SAQ in healthcare is on patient safety climate and has shown to be a psychometrically sound instrument (Sexton et al., 2006). Sexton et al. (2006) explains that the SAQ focuses on 6 dimensions of patient safety climate: teamwork climate (six items), safety climate (seven items), job satisfaction (five items), stress recognition (four items), perceptions of management (six items), and working conditions (four items). The SAQ has been adapted for use in a variety of healthcare settings, for example, ICUs, operating rooms, inpatient wards, ambulatory clinics, emergency departments, maternity wards, and pharmacies (Deilkas & Hofoss, 2008; Modak et al., 2007; Pronovost & Sexton, 2005; Sexton et al., 2006). All of these adapted versions are all formatted for hospital-based settings. In other words, currently there is not a SAQ version adapted for long-term care.

Each question of the SAQ was also answered using a five-point agree-disagree Likert scale with a "not applicable" option. Examples of questions include: "I have the support I need from other personnel to care for residents" (teamwork climate); "Medical errors are handled appropriately in this clinical area" (safety climate); "This is a good place to work" (job satisfaction); "I am less effective at work when fatigued" (stress recognition); "Management supports my daily efforts" (perceptions of management); and "Trainees in my discipline are adequately supervised" (working conditions).

Organizational Policies & Practices (OPP)

The 22-item Organizational Policies and Practices (OPP) survey was developed to measure safety attitudes primarily with a disability management and return-to-work focus (Amick et al., 2000). The OPP was designed to examine safety climate via the following dimensions: people-oriented culture (five items), active safety leadership (four items), safety diligence (three items), safety training (one item), ergonomic practices (two items), disability management (six items), and labor-management climate (two items) (Amick et al., 2000). For the purposes of this study the latter two dimensions were not included in the study.

The OPP questions were also answered using a five-point agree-disagree Likert scale with a "not applicable" option. Examples of questions include: "Working relationships are cooperative" (people-oriented culture); "Top management is actively involved in the safety program" (active safety leadership); "Action is taken when safety rules are broken" (safety diligence); "Employees are provided training in safe work practices for the job hazards they will encounter" (safety training); and "Jobs are designed to reduce heavy lifting" (ergonomic practices).

Communication Log

The communication log was to be used by a change team member when they spoke to another change team member, or another employee not on the change team, outside of the change team meetings (Appendix D). The communication log asked the individual to indicate the occupational role of the person with whom they spoke (e.g. management, Registered Nurse, Personal Support Worker, Physiotherapist), the method of communication (e.g. in person, on the phone, via an email), the topic discussed (e.g. risk factors, solution development, implementation), and any additional notes they wanted to share.

Photovoice Log

The photovoice log was for each change team member who took a photograph (Appendix E). The photovoice log was used to record the camera number, the picture number, the title of the photograph, the risk factor shown or a description of the photo, possible solutions, and additional notes. These photovoice logs were used in the second meeting to aid in the discussion of each photograph.

Process Evaluation

The process evaluation was developed for this project to assess the change team members' perceptions of involvement (two items), decision power (nine items), mix of participants (three items), and remit/brief (five items) (Table 17.0, Appendix F). These dimensions were the PEF dimensions altered for the HIPE and LOPE groups. The questions for the process evaluation were intended to be exploratory and were designed specifically for this study.

Table 17.0: The dimensions and items/questions of the process evaluation

Dimension	**Items/Questions**
	Scale: 0(never) 1(rarely) 2(sometimes) 3(often) 4(always)
Involvement	How often did you talk to other members of the change team outside of scheduled meeting times about issues relevant to the change process?
	How often did you talk to other work colleagues not on the change team outside about issues relevant to the change process?
Decision Power	Did you feel comfortable discussing issues relevant to the change process with management?

	Did you feel comfortable discussing issues relevant to the change process with your supervisor? Did you feel comfortable discussing issues relevant to the change process with non-management staff? Did you feel involved in the decisions made by the change team? Did you feel the decisions made reflect suggestions that you made? Did you agree with the decisions being made by the change team? Did you feel management members of the change team are making more decisions than non-management members? Did you feel non-management members of the change team are making more decisions than management members? Did you feel that management and non-management members of the change team are equally involved in making decisions?
Mix of Participants	Did you like the mix of individuals on the change team for this process?
Remit/Brief	Do you feel that your voice was heard in the change team meeting(s)? Do you feel that your suggestions were valued? Do you have confidence that your suggestions will be considered and followed through?
	Scale: 1(too little) 2(just right) 3(too much)
Mix of Participants	Did you feel management was adequately represented? Did you feel non-management staff was adequately represented?

Remit/Brief	Do you feel management adequately voiced their opinion? Do you feel non-management staff voiced their opinion the right amount?

Data Analysis

Safety Climate

Although a descriptive practice-oriented research case study style does not typically involve quantitative statistics, safety climate dictates the need for quantitative evaluations (Dul & Hak, 2008; Ginsburg, 2006). As the Safety Survey in Long-term Care settings used in the present study was comprised of questions that were answered using a five-point agree-disagree Likert scale, all three subcomponents were analyzed the same way. As the survey was developed to reflect safety perceptions, attitudes and knowledge of healthcare workers in long-term care homes, the analysis of percent positive responses (PPRs) was used. PPRs looks at the percentage of positive responses which are represented by "agree" and "strongly agree" answers for positively phrased items and "disagree" and "strongly disagree" answers for negatively phrased items (Ginsburg, 2006). When the frequency of positive responses is 80% or greater for a particular category, a more positive climate is indicated. When the frequency of positive responses is below 80%, this indicates areas for improvement, and when the frequency of positive responses is below 50%, these items or dimensions should be targeted first for improvement (Ginsburg, 2006; Singer et al., 2009). Only the pre-PE safety surveys for the HIPE (n=16) and LOPE (n=32) groups were analyzed. This decision was necessary due to the lack of returned surveys post-PE for all three groups (HIPE (n=5), LOPE (n=11), NOPE (n=0)), and there was no one who completed and returned a survey both pre- and post-PE.

In addition to determining the safety climate strength of the HIPE and LOPE long-term care homes prior to PE implementation, an average score across questions within each dimension of the survey was computed for each respondent. An independent samples t-test was performed for each dimension to determine whether there were differences between the two long-term care homes in safety climate prior to the implementation of the PE program. Since the surveys contained 18 dimensions it is acknowledged that an inflated alpha error rate was likely, however, given the exploratory nature of this work was felt to be justified.

Participatory Ergonomics Process & Process Evaluation

The developed solutions and implementations from the Participatory Ergonomics process were analyzed with a qualitative approach to uncover common patterns and trends from both the HIPE and LOPE groups. The Process Evaluation surveys were also analyzed for common patterns and trends rather than specific quantitative outcomes.

5.3 Results and Discussion

Safety Survey in Long-term Care Settings

HIPE

The HIPE long-term care home was assigned as the HIPE group prior to the safety survey being distributed. Furthermore, the safety climate analysis was not completed until after the PE process was complete. This was done to avoid influencing the opinions of the ergonomist.

The data from the safety survey indicated the safety climate for the majority of the dimensions to be weak (<80% positive response). All of the MSI dimensions except for 'fear of repercussions' were indicated as areas needing improvement (Figure 14.0). The MSI dimensions that should be the priority for improvements were 'threats to safety' and

'learning culture'. These dimensions were determined to be high priority because they had the lowest percent positive responses. All of the SAQ dimensions except for 'job satisfaction' were indicated as areas needing improvement (Figure 15.0). The SAQ dimension that was deemed to be an initial priority for improvement was 'perceptions of management.' The only OPP dimension that was not indicated as weak was 'safety training' (Figure 16.0). All of the other dimensions were indicated as priorities for improvement. The items within each of the dimensions that were indicated as requiring improvements (>80% positive response) are presented in Table 18.0.

The responses indicate that the HIPE long-term care home had a poor safety climate. This was not surprising for the ergonomist to discover as in the field notes that the ergonomist took before and after each PE change team meeting her perceptions became less and less positive. At the meetings the management sat on one side of the table and non-management on the other. For example, the management change team members often exerted their power and control over the non-management change team members. At the beginning of the process change team members arrived on time, but by the last meeting the participants that showed up were on average ten minutes late. Throughout the meetings, many change team members, particularly management, were constantly looking at the time and checking their phones. It was often challenging to engage in discussions with the change team members as they were slow to respond to questions, and any responses provided were brief and lacked detail. If there was a disagreement, more often than not, the opinions of management were then accepted as the opinions of the change team. There were several times when the ergonomist would show up for a scheduled change team meeting to find out that the date and time was no longer convenient for the long-term care home. Thus, communication with the gatekeeper of the HIPE long-term care home was not favourable.

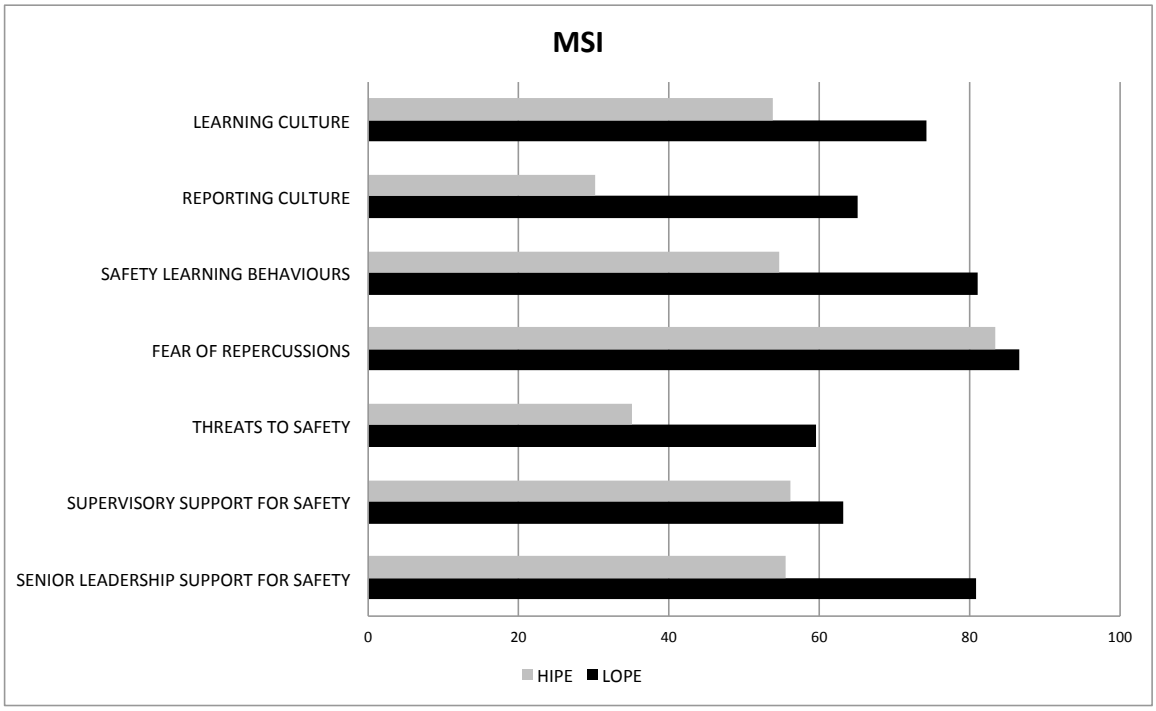

Figure 14.0: The modified Stanford atient safety culture survey instrument (MSI) percent positive responses (PPRs) by dimension of safety climate for the HIPE and LOPE long-term care homes

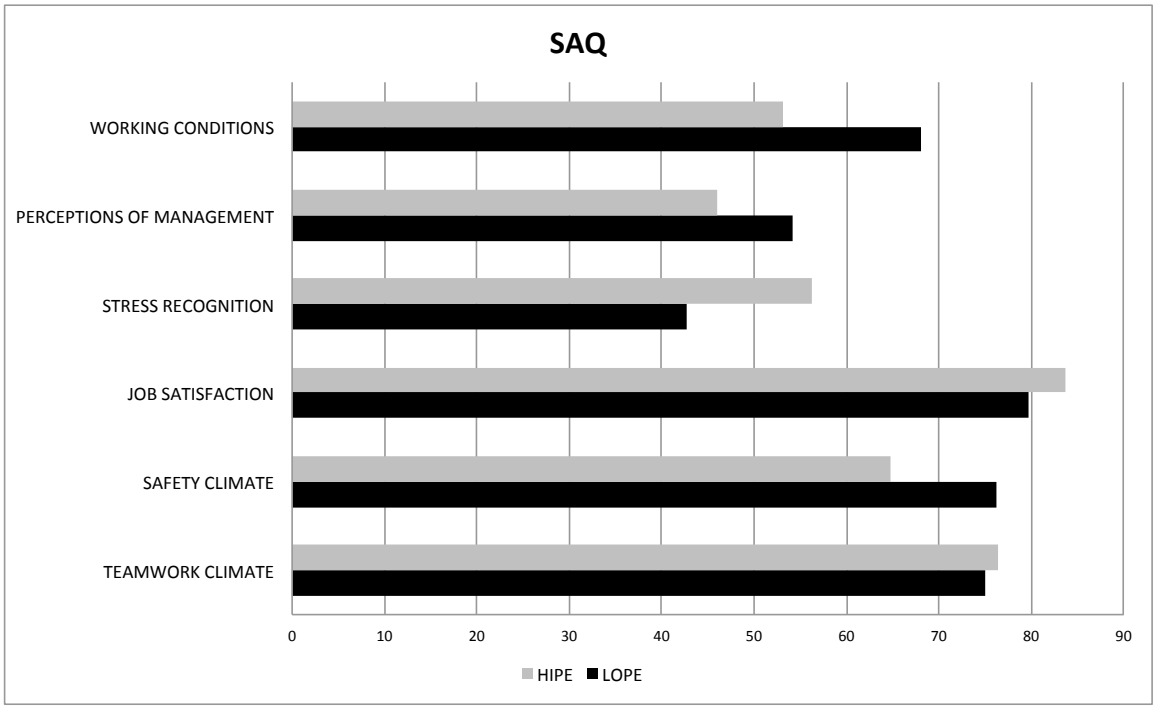

Figure 15.0: The safety attitude questionnaire (SAQ) percent positive responses (PPRs) by dimension of safety climate for the HIPE and LOPE long-term care homes

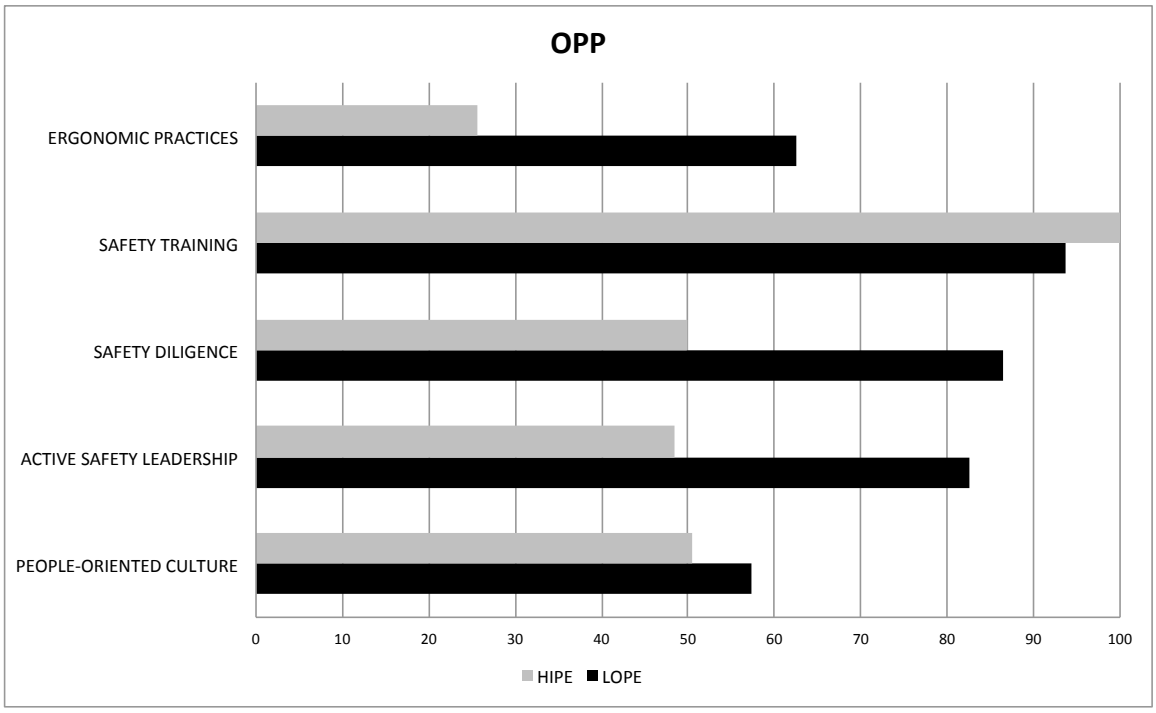

Figure 16.0: Organizational policies & practices (OPP) percent positive responses (PPRs) by dimension of safety climate for the HIPE and LOPE long-term care homes

Table 18.0: Descriptive statistics of survey items requiring improvement by dimension of safety climate from each survey component (MSI SAQ, OPP)

Survey Component	Dimensions and Items	PPR (%) - HIPE	PPR (%) - LOPE
MSI	**Senior Leadership Support For Safety**	**56**	**81**
	Resident safety decisions are made at the proper level by the most qualified people	50	
	Good communication flow exists up the chain of command regarding resident safety issues	56	78
	Senior management has a clear picture of the risk associated with resident care	29	78
	Senior management considers resident safety when program changes are discussed	47	
	My organization effectively balances the need for resident safety and the need for productivity	47	72
	I work in an environment where resident safety is a high priority	75	
	Supervisory Support for Safety	**56**	**63**
	I am rewarded for taking quick action to identify a serious mistake	20	19
	My supervisor/manager says a good word when she/he sees a job done according to established resident safety procedures	44	44
	My supervisor/manager seriously considers staff suggestions for improving resident safety	63	63
	Whenever pressure builds up, my supervisor/manager wants us to work faster, even if it means taking shortcuts (R)	56	74
	My supervisor/manager overlooks resident safety problems that happen over and over (R)	44	69
	Threats to Safety	**35**	**60**
	I am less effective at work when I am fatigued	44	69
	Personal problems can adversely affect my performance	7	35
	Loss of experienced personnel has negatively affected my ability to provide high quality resident care (R)	47	67
	I have not enough time to complete resident care tasks safely (R)	19	68
	In the last year, I have witnessed a co-worker do something that appeared to me to be unsafe for the resident in order to save time (R)	15	52
	I am provided with adequate resources (personnel, budget, and equipment) to provide safe resident care	13	65
	I have made significant errors in my work that I attribute to my own fatigue (R)	69	72
	I believe that health care error constitutes a real and significant risk to our residents	63	
	I believe health care errors often go unreported (R)	40	28
	Fear of Repercussions	**83**	**87**
	Reporting a resident safety problem will result in negative repercussions for the person reporting it (R)	73	
	I will suffer negative consequences if I report a resident safety problem		78
	Safety Learning Behaviours	**55**	**81**
	Individuals involved in major events contribute to the understanding and analysis of the event and the generation of possible solutions	60	71
	A formal process for disclosure of major events to residents/families is followed and this process includes support mechanisms for residents, family, and care/service providers	53	78
	The resident and family are invited to be *directly* involved in the entire process of understanding: what happened following a major event and generating solutions for reducing the re-occurrence of similar events	60	75
	Things that are learned from major events are communicated to staff on our unit using *more than one* method (e.g. communication book, in-services, unit rounds, emails) and/or at *several* times so all staff hear about it	27	
	Changes are made to reduce re-occurrence of major events	73	
	Reporting Culture	**30**	**65**
	I am sure that if I report an incident to our reporting system, it ill not be used against me	19	63
	I am not sure about the value of completing incident reports (R)	31	66
	If I report a resident safety incident, I know that management will act on it	56	55
	Staff are given feedback about changes put into place based on incident reports	20	65
	Individuals involved in resident safety incidents have a quick and easy way to report what happened	25	77
	Learning Culture	**54**	**74**
	On this unit, when an incident occurs, we think about it carefully		77
	On this unit, when people make mistakes, they ask others about how they could have prevented it	44	68
	On this unit, after an incident has occurred, we think about how it came about and how to prevent the same mistake in the future	73	
	On this unit, when an incident occurs, we analyze it thoroughly	44	77
	On this unit, it is difficult to discuss errors (R)	38	68
	On this unit, after an incident has occurred, we think long and hard about how to correct it	44	74

Survey Component	Dimensions and Items	PPR (%) - HIPE	PPR (%) - LOPE
SAQ	**Teamwork Climate**	**76**	**75**
	Nurse input is well received in this clinical area	73	78
	In this clinical area, it is difficult to speak up if I perceived a problem with resident care	63	72
	Disagreements in this clinical area are resolved appropriately (i.e., not *who* is right, but *what* is best for the patient)	67	68
	I have the support I need from other personnel to care for residents		67
	The physician(s), OTs/PTs, healthcare aides, personal support workers and nurses (RNs, RPNS) here work together as a well-coordinated team	69	
	Safety Climate	**65**	**76**
	I would feel safe living here as a resident	69	77
	Medical errors are handled appropriately in this clinical area	54	78
	I receive appropriate feedback about my performance	44	53
	In this clinical area, it is difficult to discuss errors (R)	40	63
	I am encouraged by my colleagues to report any concerns I may have regarding:Resident safety	63	78
	I am encouraged by my colleagues to report any concerns I may have regarding:Worker safety	73	
	The culture in this clinical area makes it easy to learn from the errors of others	67	72
	Job Satisfaction	**84**	**80**
	Working here is like being part of a large family		72
	This is a good place to work		75
	Morale in this clinical area is high	44	65
	Stress Recognition	**56**	**43**
	When my workload becomes excessive, my performance is impaired	69	42
	I am less effective at work when fatigued	50	56
	I am more likely to make errors in tense or hostile situations	63	44
	Fatigue impairs my performance during emergency situations (e.g. emergency resuscitation, seizure)	44	29
	Perceptions of Management	**46**	**54**
	Management supports my daily efforts: Unit Management	56	58
	Management supports my daily efforts: LTC Home Management	31	53
	Management doesn't knowingly compromise resident safety: Unit Management	53	48
	Management doesn't knowingly compromise resident safety: LTC Home Management	50	52
	Management doesn't knowingly compromise worker safety: Unit Management	50	52
	Management doesn't knowingly compromise worker safety: LTC Home Management	44	52
	Management is doing a good job: Unit Management	63	61
	Management is doing a good job: LTC Home Management	50	60
	Problem personnel are dealt with constructively by our: Unit Management	38	54
	Problem personnel are dealt with constructively by our: LTC Home Management	38	53
	I get adequate, timely info about events that might affect my work, from: Unit Management	40	53
	I get adequate, timely info about events that might affect my work, from: LTC Home Management	40	53
	Working Conditions	**53**	**68**
	The levels of staffing in this clinical area are sufficient to handle the number of residents	19	48
	This long-term care (LTC) home does a good job of training new personnel	75	77
	All the necessary information for diagnostic and therapeutic decisions is routinely available to me	57	
	Trainees in my discipline are adequately supervised	62	67

Survey Component	Dimensions and Items	PPR (%) - HIPE	PPR (%) - LOPE
OPP	**People-Oriented Culture**	**50**	**57**
	The company involves employees in plans and decisions made	19	41
	Workers have trust in the company	33	41
	Communication is open and employees feel free to voice concerns and make suggestions	63	56
	Working relationships are cooperative	50	70
	Workers tend to stay with the company for a long time		78
	Active Safety Leadership	**48**	**83**
	Top management is actively involved in the safety program	69	
	The company spends time and money on improving safety	44	78
	The company considers safety equally with production and quality in the way work is done	38	
	Unsafe working conditions are identified and improved promptly	44	
	Safety Diligence	**50**	**86**
	Unsafe working conditions are identified and improved promptly	44	
	Equipment is well maintained	31	
	Action is taken when safety rules are broken	75	
	Ergonomic Practices	**26**	**63**
	Jobs are designed to reduce heavy lifting	31	78
	Jobs are designed to reduce repetitive movement	20	47

PPR = Percent Positive Response

R = Item was reverse-coded. Disagree and Strongly Disagree responses were positive.

LOPE

As with HIPE, the LOPE long-term care home was assigned as the LOPE group prior to the safety survey being distributed, and the data was not analyzed until the PE process was completed.

The safety survey data indicated that the safety climate for the majority of the dimensions for the LOPE long-term care home were weak (<80% positive response). The safety climate for the LOPE long-term care home, however, was more positive than the HIPE long-term care home. 'Learning culture', 'reporting culture', 'threats to safety', and 'supervisory support for safety' were the MSI dimensions indicated as areas needing improvement (Figure 14.0). None the MSI dimensions were marked as priorities for improvement. All of the SAQ dimensions except for 'job satisfaction' (which was borderline) were indicated as areas needing improvement (Figure 15.0). Of the areas needing improvement, 'stress recognition' should be a priority. Only 'ergonomic

practices' and 'people-oriented culture' from the OPP were areas indicated as needing improvement, though neither were weak enough to be considered priorities (Figure 16.0). Table 18.0 also presents the items within each of the dimensions that were indicated as requiring improvements (>80% positive response) for the LOPE long-term care home.

It was not surprising to learn that the safety climate of the LOPE long-term care home was stronger than the HIPE long-term care home. The PE change team meetings were perceived by the ergonomist to be more positive (and as verified by the field notes). The atmosphere was welcoming and friendly. The change team was always on time and prepared for the meeting. Everyone spoke respectfully and ensured the conversation was inclusive of everyone in the room. Any disagreements were handled civilly and in a democratic manner. An individual would state her opinion, any disagreeing points were made, and a discussion would ensue until a satisfactory conclusion or point of resolution was reached. Furthermore, contact and communication with the gatekeeper of the LOPE group was always prompt, diligent, and efficient.

Independent t-test

The mean scores were calculated for each respondent for each of the 18 dimensions of the safety survey. An independent t-test was run using SPSS (v.20) with the 18 safety survey dimensions as the test variables and the long-term care home (HIPE, LOPE) as the grouping variable. The group statistics are presented in Table 19.0, and independent samples test are presented in Table 20.0.

The significance of the Levene's test for equality of variance was only 0.05 or below for four of the safety survey dimensions (Table 20.0). Thus for 'threats to safety', 'safety diligence', 'safety training', and 'perceptions of management', equal variances were not assumed. For the remaining 14 dimensions, equal variances were assumed.

The t-tests revealed a statistically reliable difference between the mean scores of 'senior leadership support for safety', 'threats to safety', 'safety leadership behaviours', 'reporting culture', 'learning culture', 'active safety leadership', 'safety diligence' and

‘ergonomic practices’ of the HIPE and LOPE long-term care homes (Table 20.0). For all of these eight dimensions, the means for the LOPE long-term care home were greater than the means for the HIPE long-term care home. Under the limitation of an inflated type I error rate, these results suggest that the safety climate based on these eight dimensions was more positive in the LOPE long-term care home than the safety climate in the HIPE long-term care home.

Table 19.0: Group statistics for the HIPE and LOPE long-term care homes

	GROUP	N	Mean	Std. Deviation	Std. Error Mean
SENIOR LEADERSHIP SUPPORT FOR SAFETY	HIPE	16	3.33	0.7	0.18
	LOPE	32	3.99	0.49	0.09
SUPERVISORY SUPPORT FOR SAFETY	HIPE	16	3.49	0.49	0.12
	LOPE	32	3.57	0.59	0.1
THREATS TO SAFETY	HIPE	16	2.73	0.63	0.16
	LOPE	32	3.47	0.41	0.07
FEAR OF REPERCUSSIONS	HIPE	16	4.13	0.76	0.19
	LOPE	32	4.2	0.7	0.12
SAFETY LEARNING BEHAVIOURS	HIPE	15	3.44	0.45	0.12
	LOPE	32	3.94	0.42	0.07
REPORTING CULURE	HIPE	16	2.72	0.83	0.21
	LOPE	32	3.62	0.61	0.11
LEARNING CULTURE	HIPE	16	3.41	0.75	0.19
	LOPE	31	3.81	0.53	0.09
PEOPLE ORIENTED CULTURE	HIPE	16	3.26	0.52	0.13
	LOPE	32	3.41	0.69	0.12
ACTIVE SAFETY LEADERSHIP	HIPE	16	3.36	0.75	0.19
	LOPE	32	3.86	0.61	0.11
SAFETY DILIGENCE	HIPE	16	3.31	0.79	0.2
	LOPE	32	3.95	0.41	0.07
SAFETY TRAINING	HIPE	16	4.31	0.48	0.12
	LOPE	32	4.06	0.44	0.08
ERGONOMIC PRACTICES	HIPE	16	2.41	1.05	0.26
	LOPE	32	3.38	0.83	0.15

Table 20.0: Independent samples t-tests for the HIPE and LOPE long-term care homes

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig.(2-tailed)	Mean Difference	Std. Error Difference	Difference Lower	Difference Upper
SENIOR LEADERSHIP SUPPORT FOR SAFETY	EVA	1.00	0.32	-3.78	46	0.00*	-0.66	0.17	-1.01	-0.31
	EVNA			-3.36	23	0.00	-0.66	0.20	-1.06	-0.25
SUPERVISORY SUPPORT FOR SAFETY	EVA	0.66	0.42	-0.50	46	0.62	-0.86	0.17	-0.43	0.26
	EVNA			-0.53	36	0.60	-0.09	0.16	-0.42	0.24
THREATS TO SAFETY	EVA	4.54	0.04*	-4.92	46	0.00	-0.74	0.15	-1.04	-0.43
	EVNA			-4.27	21	0.00*	-0.74	0.17	-1.09	-0.38
FEAR OF REPERCUSSIONS	EVA	0.09	0.77	-0.33	46	0.74	-0.73	0.22	-0.52	0.37
	EVNA			-0.32	28	0.75	-0.73	0.23	-0.54	0.39
LEARNING BEHAVIOURS	EVA	0.49	0.49	-3.75	45	0.00*	-0.50	0.13	-0.77	-0.23
	EVNA			-3.64	26	0.00	-0.50	0.14	-0.78	-0.22
REPORTING CULTURE	EVA	1.41	0.24	-4.26	46	0.00*	-0.90	0.21	-1.32	-0.47
	EVNA			-3.84	23	0.00	-0.90	0.23	-1.38	-0.41
LEARNING CULTURE	EVA	2.99	0.90	-2.17	45	0.04*	-0.41	0.19	-0.78	-0.03
	EVNA			-1.94	23	0.07	-0.41	0.21	-0.84	0.03
PEOPLE ORIENTED CULTURE	EVA	1.29	0.26	-0.78	46	0.44	-0.15	0.20	-0.55	0.24
	EVNA			-0.86	39	0.40	-0.15	0.18	-0.51	0.21
ACTIVE SAFETY LEADERSHIP	EVA	1.61	0.21	-2.49	46	0.02*	-0.50	0.20	-0.91	-0.10
	EVNA			-2.33	25	0.03	-0.50	0.22	-0.95	-0.06
SAFETY DILIGENCE	EVA	17.95	0.00*	-3.68	46	0.00	-0.64	0.17	-0.98	-0.29
	EVNA			-3.01	19	0.01*	-0.64	0.21	-1.08	-0.19
SAFETY TRAINING	EVA	4.07	0.05*	1.82	46	0.08	0.25	0.14	-0.03	0.53
	EVNA			1.76	28	0.09*	0.25	0.14	-0.04	0.54
ERGONOMIC PRACTICES	EVA	1.33	0.25	-3.48	46	0.00*	-0.97	0.28	-1.53	-0.41
	EVNA			-3.21	25	0.00	-0.97	0.30	-1.59	-0.35
TEAMWORK CLIMATE	EVA	0.59	0.45	0.29	46	0.78	0.04	0.13	-0.23	0.31
	EVNA			0.30	35	0.77	0.04	0.13	-0.22	0.29
SAFETY CLIMATE	EVA	0.82	0.37	-1.50	46	0.14	-0.18	0.12	-0.42	0.06
	EVNA			-1.38	24	0.18	-0.18	0.13	-0.45	0.09

JOB SATISFACTION	EVA	0.19	0.67	0.27	46	0.79	0.04	0.16	-0.28	0.37
	EVNA			0.26	27	0.80	0.04	0.17	-0.30	0.39
STRESS RECOGNITION	EVA	0.11	0.74	0.71	46	0.48	0.20	0.27	-0.36	0.75
	EVNA			0.69	28	0.50	0.20	0.28	-0.38	0.77
PERCEPTIONS OF MANAGEMENT	EVA	4.06	0.05*	0.32	46	0.75	0.06	0.20	-0.33	0.46
	EVNA			0.37	44	0.71	0.60	0.17	-0.28	0.40
WORKING CONDITIONS	EVA	0.08	0.78	-1.52	45	0.14	-0.30	0.20	-0.70	0.10
	EVNA			-1.59	34	0.12	-0.30	0.19	-0.68	0.08

* Indicates a statistical significance at a value of 0.05 or below (an inflated alpha noted). EVA = equal variances assumed. EVNA = equal variances not assumed.

Process Evaluation

The process evaluation surveys were completed at three time periods: after the identification of risk factors, after solution generation, and after the implementation planning meeting. The number of process evaluation surveys returned was dependent on the number of change team member who were still participating at each stage of the project.

Involvement

The HIPE change team was designed to have direct representative participation, meaning they were to actively represent the viewpoints of their co-workers. One way of doing so is through verbal communication. Discussing the risk factors identified, the solutions generated and the implementation plan with fellow co-workers before and after the meetings, would help ensure that they were actively representing the viewpoints of their cohorts. The HIPE change team was encouraged at every change team meeting to be discussing the PE process with as many staff members as possible to ensure their input was being considered. From the first process evaluation to the last evaluation, the members of the HIPE change team increased their involvement from ‘sometimes’ to ‘often’.

The members of the LOPE change team 'often' would speak with other members of the change team outside of scheduled meetings about the PE process, but they would 'rarely' speak with staff who were not members of the change team. It is possible that this occurred because the majority of members were in management positions and thus did not normally have the opportunity to speak to non-management outside of change team meetings. However, as they were assigned delegated participation, they were not instructed to speak with others. The LOPE change team saw the lack of enlisting the opinions of non-management staff as problematic as they wanted to be diligent with the identification of risk factors and the generation of solutions. They felt input from frontline staff was warranted to ensure they were not leaving out any key risk factors or potential solutions. Furthermore, when the change team members who responsible for taking photographs of risk factors were on the floor taking photographs, they needed to discuss the project with the staff and as a result they would sometimes offer their opinions.

It appears that it is beneficial for the change team to actively represent the viewpoints of their co-workers. In doing so, an organization may increase the learning culture and safety diligence, dimensions of safety climate. Although this may not always be feasible due to the size of an organization, change teams that consist of senior management appointed members should be encouraged to talk to other staff members to ensure that they are being thorough in their identification of problems and generation of solutions. Thus, what may be an important distinction between the PEF sub-categories of involvement, is not whether the change team actively represents the viewpoints of their coworkers, but rather how they were selected to be a member of the change team: elected by peers or appointed by senior management. It may also depend on the organizations safety climate. If an organization has a poor safety climate they may need more encouragement from the ergonomist and this may alter how to best approach involving workers.

Decision Power

The HIPE change team became more comfortable discussing issues relevant to the PE process with management, supervisors, and non-management staff as they continued through the stages. The HIPE change team also perceived that management and non-management members of the change team were equally involved in making decisions. Furthermore individual members of the HIPE change team felt that they were 'often' to 'always' involved in the decisions made, that the decisions sometimes to always reflected the suggestions they had made, and that they 'often' to 'always' agreed with the decisions made by the change team as a whole. These responses indicated that the HIPE change team members were all involved in the decisions being made, which coincides with their group delegation of increased power to make decisions as a group. Although a pre-post analysis was not performed, the improved comfort in discussing relevant issues with other staff members, both management and non-management, may have been reflected in an improvement in such safety climate dimensions as 'senior leadership support for safety', 'safety leadership behaviours', 'learning culture' and 'active safety leadership'. All of these dimensions were found to be not as strong in the HIPE long-term care home as in the LOPE long-term care home. Thus, it is possible the PE intervention was having a positive affect on the safety climate of the long-term care home, or at least of the change team.

Considering that the LOPE change team was primarily composed of management members, it was not surprising to discover that they felt management was making more decisions than non-management members. They felt that the one non-management member was fully involved, but in absolute terms, management voices were more numerous. Similar to the HIPE change team, individual members of the LOPE change team felt that they were 'often' to 'always' involved in the decisions made, that the decisions often to always reflected the suggestions they had made, and that they 'often' to 'always' agreed with the decisions made by the change team as a whole. The positive teamwork dimension of safety climate supports the involvement of everyone on the change team in decisions. The LOPE change team was encouraged to voice their

opinions about what decisions were required, and the positive safety climate of the group helped to necessitate these actions.

In contrast to the HIPE change team, the LOPE change team members became slightly less comfortable discussing issues relevant to the PE process with management, supervisors, and non-management staff as they continued through the stages. It is unknown why the LOPE change team became less comfortable discussing issues with others. It is possible that as a result of their delegated participation and being discouraged to speak with staff outside of the change team meetings created a level of discomfort and not because they were unwilling to have any discussions. Furthermore, even though their levels of comfort decreased through the stages, the LOPE change team members still indicated that they often felt comfortable discussing issues with others.

Mix of Participants

For the stages of identifying risk factors and generating solutions, the HIPE change team felt that the mix of participant was 'just right' for management and non-management representation. For the implementation planning stage it was not surprising to find that they felt that there were not enough non-management members present. By the last change team meeting involvement had dwindled to only one non-management and one management member being in attendance. However, these two change team members felt that the one manager and one non-management present were enough to adequately represent the opinions of management and non-management on the change team. The Director of Resident Care stated that they would like to have more staff members present but that it is difficult to have them attend if the meetings do not coincide with when they are working. The change team agreed upon all of the dates and times for the scheduled meetings, however, if the non-management members were not scheduled to work that day then they did not come in during unpaid work hours to attend the meetings. There were times that the ergonomist showed up for a scheduled change team meeting and was informed upon arrival that the date and time was no longer suitable and the meeting had to be rescheduled. Although the HIPE change team started with the greatest mix of participants, they dwindled to a smaller number of participants by the last meeting. There

was no safety climate dimension that assessed an organizations commitment to safety. The HIPE long-term care home, however, did have poor percent positive responses for 'ergonomic practices' and 'active safety leadership'. It is possible that these dimensions need to be strengthened to ensure continual commitment from an organization. It may also be that the ergonomist needs to have the power to alter the mix of participants as the process and the needs of the organization dictate. For example, if certain workers become too busy or are not available to attend, other workers should replace them on the change team. Furthermore, the beginning stages require more non-management members to identify risk factors and solutions, whereas the latter stage of making final decisions and an implementation plan may require more management members.

There were originally five management members and one non-management member as part of the LOPE change team. At the end of every stage the change team members discussed that they would prefer to have more frontline staff be a part of the team, especially Personal Support Workers who frequently perform patient lifting and transferring tasks. The process evaluations supported their statements by indicating that the management representation was 'just right' to 'too much', and that the non-management members were not adequately represented. It became clear that although a change team composed of mainly management members can progress through the PE stages, it is advantageous to have an adequate number of frontline staff appointed to the team as well. The LOPE long-term care home pre-PE safety climate had strong 'senior leadership support for safety', 'safety training', 'safety diligence' and 'active safety leadership'. All of these dimensions may have supported the LOPE change team to remain committed to the PE process. Furthermore, the strong 'safety diligence' dimension supports the desire of the LOPE change team to include more non-management workers to ensure they are diligently addressing every possible issue and solution. It is unclear what the ideal number of and mix of participants is for a change team, however, there needs to be management and non-management members present to adequately provide knowledge, ideas, and decision making authority for the process to run smoothly and successfully. Furthermore, the organization and the stage of the PE process may dictate who needs to be involved as a member of the change team. Thus, the mix of participants needs to evolve with the PE stages and the needs of the organization.

Remit/Brief

All members of the HIPE change team were suppose to be involved in the three stages of the PE process. As the change team progressed through the stages the members felt their voices were heard more frequently. This may have been a result of fewer individuals attending meetings, but it may have also been a result of individuals becoming more comfortable speaking in the meetings. The change team members almost always felt that their suggestions were valued and contributed to decisions made. Across all of the stages the HIPE change team felt that both management and non-management members voiced their opinions the right amount. These findings were unexpected, as the ergonomist perceived that the management members would exert their power and control over the non-management members and explain why the suggestions of the non-management members were wrong. It would have been informative to interview each of the members individually to determine their perceptions of the interactions in the meetings. Furthermore, the HIPE long-term care home had poor 'reporting culture' and 'perceptions of management'. It was thought by the ergonomist that these safety climate dimensions would need to be improved for non-management to voice their opinions and be more fully involved in a PE program. Although attendance was reduced by the last change team meeting, the members, especially management, commented on how advantageous it was to have frontline staff present to offer their perspectives. The non-management members also commented that they appreciated being able to have input so that any changes in policies or equipment would be feasible, rather than being forced to comply with changes that they do not perceive to be realistic or practical. A pre-post comparison of the safety climates would be advantageous to determine if the PE program implemented in the HIPE long-term care home did alter the safety climate of the organization, or at least of the change team members. It is possible that the voices of change team members were heard more frequently because there were fewer individuals who attended meetings. Perhaps, it was the individuals who felt the PE process was positive and continually perceived that they were actively involved continued to attend meetings.

The members of the LOPE change team felt 'often' to 'always' that their voices were heard in the meetings, that their suggestions were valued, and that their suggestions were considered when making decisions. They also felt that management voiced their opinion 'too much' at first and then the right amount in the latter meetings. They felt that non-management voiced their opinions the right amount during the identification of the risk factors, but 'not enough' during the generation of solutions and implementation planning. Originally, the non-management members assigned to the change team were intended to only participate in the identification of risk factors. During the first solution generation meeting the one non-management person who was appointed to the change team was not in attendance. After this meeting, the management members felt it was necessary to have the RN present and invited her to the remaining change team meetings. Although they had one person present to represent the non-management staff, the change team, including the one RN, felt that more representation from this cohort was necessary. The LOPE change team recognized that management alone could generate solutions, but without the input from frontline staff they did not want to commit to making any decisions without knowing if staff liked the solutions and would comply.

Solutions from the Participatory Ergonomics Process

The solutions from the two PE programs were categorized into three sections; education, working as a team, and policy changes. These were not the only solutions generated by each of the long-term care home PE change teams. The solutions from the HIPE and LOPE PE change teams illustrate that the PE processes were successful in generating ideas for change. The ergonomist noted during the implementation planning meeting that the LOPE change team was more eager to carry out changes, and had already implemented some changes. On the other hand, the HIPE change team appeared disinterested in making further efforts to implement changes. Follow up with both long-term care homes would be required to determine how many changes were implemented.

HIPE Change Team

Education

Education was a popular solution to overcome risk factors in the HIPE change team. Two key audiences for education were the resident and their families, and the long-term care home staff.

Education for residents and their families

It was discussed that the resident and the family of the resident are often left out of the decision process when deciding the best procedures to lift and transfer a resident (e.g. two person lift, mechanical lift). Furthermore, often a resident or the family of a resident will complain about the approach the healthcare workers are using and make it difficult for the healthcare workers to complete their duties in a safe manner. Thus, it is also important to educate residents and their family members about why certain methods for lifts and transfers have been chosen and that they are in the best interest of safety for the healthcare workers and for the resident.

Education for staff

One approach to providing education for staff in long-term care homes has been through in-services. This entails having staff gather in a classroom-like setting and a specific topic, for example, safe lifting procedures, is taught by management, the physiotherapy department, or an outside consultant. In-services had been poorly attended in the HIPE long-term care home recently, and thus they needed to think of another method to provide education on a regular basis. The HIPE change team created the concept of education blitzes, which would entail on-the-spot in-services. The frontline staff were hesitant for the on-the-spot in-services to be treated as job assessments, but were more accepting of the education blitzes that provided friendly reminders. Topics of education blitzes discussed by the change team were: raising the back of the bed during a lift/transfer, the hazards of bad working postures, what to do with an aggressive/resistive resident, when it is acceptable to leave a sling under a resident, and is the resident ready to be lifted/transferred?

It has been previously found that healthcare workers often perceive resident behaviours to put them at more risk than the task they are performing (van Wyk, Chapter 3). The HIPE change team discussed that healthcare workers often put themselves in harms way when they attempt to complete a lift or transfer despite an aggressive or resistive resident. It is important to educate healthcare workers to acknowledge that there will be times that a resident should be left alone and return at a later time. The pressure to complete tasks in a certain amount of time seemed to be the primary reason why healthcare workers were determined to lift or transfer an aggressive or resistive resident. This mindset illustrates that the top-down pressures become a predominant concern and not the care of the resident. This is an aspect of the climate and culture in the long-term care home that needs to be rectified. One way is through education, to remind the healthcare workers that the safety and care of the resident is a priority and also that their own safety and well-being needs to be a priority. Another option may be developing a policy regarding what should be done when a resident is being aggressive or resistant during an attempt to lift or transfer them. The policy would outline what precautions and procedures should take place to ensure the safety of the resident and any healthcare workers involved with the task.

Other educational opportunities discussed were to help simplify the lifts and transfers healthcare workers are performing. For example, senior healthcare workers have found that it is advantageous to raise the head of the bed when trying to prepare a resident for a lift (e.g. attaching slings) and is less strenuous on the resident when the lift is performed. Future research needs to determine if this alteration also decreases biomechanical loads on the resident and the healthcare workers. Another alteration to the procedures discussed was when it is good to leave the sling under a resident. For example, when a resident is suffering from skin care issues, contractures, or is known to be resistive, the preparation for a lift is simplified when the sling is already under the resident. Furthermore, the sling can be used to grasp onto and reposition the resident when they are in bed, rather than manipulating the resident themselves.

Decreasing the distance the resident needs to be transferred was also a suggested lift and transfer task simplification. Several photographs illustrated that the resident was being lifted from his or her bed and that the destination (e.g. wheelchair) was on the other side

of the room. Although space and environmental restrictions can prove to be problematic, the riskiness of the task may decrease the closer the destination becomes.

Working as a Team

Another topic that was discussed a lot was working as a team. The Personal Support Worker (PSW) shared that there are times when a healthcare worker will try to find a second person to help with a lift and they are encountering fellow employees asking: "why can't you do the lift yourself?" This PSW explained that this often makes a healthcare worker, especially if they are a PSW, feel that they should be able to perform the task themselves and if they do not perform the task themselves that they are burdening fellow employees who are already taxed with duties and stressed to their limits. The PSW explained a second scenario in which two healthcare workers will be preparing to perform a lift or transfer, one individual may want to follow the previously approved method, whereas the other individual will want to perform the task another way. All too often, according to the PSW, the lift and transfer would be preformed the alternate, not pre-approved, method. The managers of the HIPE change team in attendance stated that the individual pressuring others to go against procedures should be written up for their inappropriate behaviour. The PSW explained that it would be rare to "tell on your colleague" as this could create more tension in the unit. It became clear that a change in attitude and culture is needed. The PSW stated: "we need to encourage a change in culture and put the safety of the resident and the staff first!" They discussed the need for better communication. For example, at meetings, everyone needs to be willing to discuss the care of residents, and if one resident should be lifted or transferred via a specific method it needs to be highlighted why this method is in the best interest of the resident and of the staff. The HIPE change team believed that communicating would help to ensure that everyone is aware and has agreed to the procedures. It was thought this would not only improve communication and worker attitudes, but also increase compliance, which should relate to staff not trying to force others to perform a lift or transfer in a way that is against procedures.

The HIPE change team also discussed how communication, by sharing stories, could help staff learn from one another. A story refers to a situation in which a resident was lifted or

transferred and it was either successful, or not successful. In other words, the staff would share their 'success stories' and 'scare stories'. Both types of stories are to share what worked really well, and what was not advantageous. This was considered particularly important when lifting a resident who is resistive or aggressive. Often times the lift may be performed according to proper procedures, however, the supplementary behaviours of the resident may alter how the procedure needs to be performed.

Working as a team to the HIPE change team also meant utilizing all staff members. For example, utilizing the recreational therapy team to help create routines with a resident to reduce the clutter in his or her room so more space is available for lifting equipment. A task becomes even more time consuming when it is being duplicated multiple times by staff or when a task needs to be redone because it was initially performed incorrectly. In order for the long-term care home to work together and provide consistent quality of care to the residents, it is important that everyone is following the same procedures. Performing direct patient care tasks, such as lifting or transferring, using different procedures can also be very confusing to the resident, especially if they are easily agitated, confused, or have a cognitive impairment. Thus, consistency is also a way to improve quality of care for residents by enhancing confidence that a task is being performed correctly.

Policy Changes

The use of lifting devices was discussed frequently in the HIPE change team meetings. Through the meeting it was discovered that certain lifting devices were preferred in specific units. Management was not aware of this, and had been ordering lifting devices based on what they felt was needed. As a result of these meetings, management was able to purchase the lifting devices that the staff actually wanted, and agreed that they would use, rather than purchasing the lifting devices without much evidence as to why they were choosing that particular device but because they were awarded the funding to make new equipment purchases.

There was also a lot of discussion about the consequences if a healthcare worker does not follow the proper procedures set by the long-term care home and the Ministry of Health and Long-Term Care. There had not been a lot of visible evidence that any consequences

are actually implemented. Therefore, it was discussed by both management and non-management change team members, that if there are rules and there are consequences for breaking the rules, that both need to be made more visible to ensure that staff are complying. In other words, if there are policies in place, there needs to be accountability and transparency in the long-term care home to ensure compliance.

The HIPE change team members perceived that there are constant changes to procedures coming from outside the long-term care home, for example, the Ministry of Health and Long-Term Care. As a result, they find it very difficult to ensure that everything in the long-term care home has been updated. One management change team member discussed that as soon we have finished updating all of the policies to abide by what the 'powers that be want' more changes come out and we are no longer up to date; to which a non-management change team member stated that it was difficult to know when and what is the correct procedure at any given moment because they are constantly changing. There seems to be a clear disconnect between frontline staff, management, and the policy makers.

LOPE Change Team

Education

Education was as big a factor in creating solutions for the different risk factors identified in the LOPE group as it was for the HIPE group. The LOPE change team also felt that the resident and their families of a resident, as well as staff would benefit from education.

Education for residents and their families

The LOPE change team felt that it was important to educate the residents and their families. One particular example was providing education about the dangers of clutter in a resident's room, including the furniture. Currently, in long-term care homes residents are permitted to set up their furniture however they prefer. The set-up is not always advantageous if the resident is to be lifted and transferred with a lifting device, as the lifting device does not always fit in the room with all the furniture. There was also concern that lifts and transfers cannot be performed safely due to the amount of knick-knacks in a resident's room. For example, one resident had a large number of books and

magazines on the tables and on the floor, had piles of clothing on a chair, bags of knitting on the floor, as well as a walker and a wheelchair near the bed. Navigating through this resident's room was challenging for two healthcare workers to enter with a mechanical lift assist and preform a lift and transfer. One of the key times the LOPE change team felt was a great opportunity to provide education to a resident and his or her family was during the tour of the long-term care home prior to being admitted. They felt it was advantageous to discuss the importance of minimizing clutter and obstacles prior to the resident moving in so that he or she minimized the items they bring with them.

The LOPE long-term care home sends a newsletter with different information about the residents and the long-term care home, as well as any upcoming events. The LOPE change team felt that it would be beneficial to provide educational information to residents and family members about different lifting and transferring procedures and policies in the safety section of the newsletter once or twice a year. The benefits of this information in the newsletter were believed to be two-fold; it would act as a refresher for the residents and family members, and if the lifting or transferring procedure decision changed for a resident, for example they are switched from a two-person lift to a mechanically aided lift, they have information that shows the decisions for the different procedures.

Education for Staff

The LOPE change team felt that it may be necessary to re-educate staff about different aspects of proper procedures when completing a lifting or transferring task, for example, getting as close as they can to the resident when performing a lift or transfer. In some of the photographs depicting risk factors, the healthcare workers were not close to the resident. This was increasing the awkward postures they were placing themselves in to perform the task, thus not only increasing their risk of injury but also decreasing the support and secure manual handling of the resident. The LOPE change team also felt it was important to re-educate the staff about the dangers of bending over with their backs when performing any tasks, not just lifting. Although the change team felt that staff

would be aware of the importance of proper body mechanics, they felt that it was important to institute friendly reminders.

The LOPE change team discussed that one of the challenges they have been dealing with in the long-term care home was that a lot of workers seem to think that it is faster and easier to use their preferred method to lift and transfer a resident than the assigned procedure. Thus, they felt educating staff is an important aspect in changing their mindset. The LOPE change team discussed that education is needed to not only remind healthcare workers how to properly lift and transfer a resident, but why certain methods have been chosen to increase the safety of the resident and the healthcare workers performing the tasks. Another way the LOPE change team discussed to improve worker compliance with using the proper lift and transfer procedures was to visibly support and promote staff who refuse to perform lifts and transfers against proper procedure, especially when another healthcare worker may be influencing them to perform the task improperly.

As in-services in the classroom have been poorly attended in the LOPE long-term care home as well, it was discussed that education should be disseminated to staff with in-services on the floor or in the unit. On-the-floor in-services would occur on all shifts to optimize the number of healthcare workers exposed to the education being presented. Furthermore, it was felt that on-the-floor in-services would afford staff the opportunity to ask specific details pertaining to their floor with the education being presented, and if any task procedures were being reviewed they could be practiced in the environment where they actually take place.

The LOPE change team discussed that in-services could include new topics such as the experience of being lifted or transferred, and dealing with resident behaviours during a lift or transfer. The change team felt that a lot of healthcare workers had no idea what it felt like to be lifted and transferred via any of the accepted methods. The LOPE change team thought it would be advantageous to include an educational component that has the workers experience the lifting and transferring procedure from the perspective of the resident. Being able to perceive what it is like to be lifted and transferred may provide

the healthcare workers a better understanding of the procedure and make them more aware of different aspects when performing the tasks for a resident.

The task (i.e. lifting) itself was discussed as a risk factor for injury, but additional factors, such as unpredictable resident behaviours, add another element of risk to lifting a resident. The LOPE change team decided that one solution was to have practice scenarios as part of the education and training they provide to the staff. This would involve how to perform a lift according to procedure, as well as how to perform the lift when a resident suddenly becomes aggressive or resistive. Although not every unpredictable scenario may be made into a training scenario, the basic knowledge of what to be aware of and how to handle the situation can be taught. The more knowledge that is provided to staff the better prepared they can be for unpredictable scenarios. Therefore, education of the staff should include reminders of what they should already know, for example, proper lifting procedures, as well as additional topics such as resident behaviours, that have not received attention in training or in-service programs.

Working as a Team

Aside from knowing how to properly perform a lift, the LOPE change team discussed that communication was a key aspect to ensure that a lift was being performed safely. Communication during a lift or transfer task is important between co-workers and important between the healthcare workers and the resident to ensure that everyone is aware of the process taking place and that everyone is working together. Lifting and transferring a resident can be a lot like a choreographed dance. In order for the lift or transfer to go smoothly, the healthcare workers (often two individuals) need to communicate to ensure that they are following the right steps and moving in sync. It is also important to always communicate with the resident what is happening. This can help the resident prepare themselves for any movement about to take place. It may also help the resident stay calm and thus not become suddenly aggressive or resistive.

Furthermore, it was also found that the different shifts did not always communicate with each other. If equipment malfunctioned on the day shift, the evening shift was not always made aware. If the method to lift a resident was changed on the evening shift, the morning shift was not always made aware. Thus, part of working as a team was ensuring that information was adequately and appropriately being disseminated between staff on all shifts.

When discussing the issue of clutter in a resident's room, the LOPE change team discussed how it is the responsibility of all staff to help create a safe and obstacle-free environment. Whenever a staff member is in a resident's room, it is his or her responsibility to keep the room clutter free. For example, when a healthcare worker enters a resident's room to administer medications, they should also clear any clutter that may have accumulated. This way the onus is not always placed upon the healthcare worker(s) performing the lift or transfer. When discussing clutter and the arrangement of furniture with residents, staff need to be reminded that this is the resident's home and that needs to always be respected.

Residents are assessed upon admission to determine which lifting and transferring methods are required. The assessments are performed within 48 hours of the resident moving into the long-term care home and are performed by the nursing staff. The LOPE change team felt that it would be beneficial to include a physiotherapist in the assessments, as they may provide additional resources. The physiotherapist is also responsible for providing therapeutic and rehabilitative care for the resident, and it may be important that they are aware of the resident's care plan for lifting and transferring to add different exercises into their regime that would aid in a smooth lifting and transferring scenario.

Policy Change

Often equipment has been purchased because management received funding to make purchases, but there has been a lack of asking frontline staff what equipment they would

like or what they needed. For example, management purchased transfer belts without first assessing if there was a need for them or if the staff would use them. Turned out, transfer belts were seldom being used. This gave the impression to management that more transfer belts needed to be purchased. Upon further inspection, it was found that there were plenty of transfer belts. They were being stored in a storage closet, an area that was not readily accessible to healthcare workers when performing lifts and transfers. As a result, the LOPE change team took the transfer belts from storage and made them more available by placing them in areas where they would be frequently required, for example the dining room. It was also suggested to have healthcare workers wear transfer belts, especially during meal times, as this is the time period that the transfer belts are most needed. The LOPE change team also decided to determine which equipment was used most often and where the equipment was used most often. This would allow them to make sure that the right equipment was being purchased and that the equipment was readily available for use.

Similar to the discussion among the HIPE change team, the LOPE change team felt that consequences need to be stricter and more visible when staff do not comply with proper lifting and transferring procedures. Consequences for the lack of compliance are always threatened, but rarely implemented. This is problematic because healthcare workers come to think that they can perform lifting and transferring tasks with a method of their preference, which may not be the safest method for them or the resident.

5.4 Conclusion

Throughout the process of this study there were a few lessons that became clear. First, there is an intimate relationship between safety climate (SC) and participatory ergonomics (PE). By its very nature PE needs an atmosphere that is enthusiastic, willing to address issues and implement changes, and motivates individuals from management and non-management to work together respectfully to allow growth and change to happen. Although comparisons pre- and post-implementation of PE could not be made with SC to specifically evaluate the relationship in this study, further research is

warranted. Future research should address how SC affects the implementation of a PE program as well as how a PE program affects an organization's SC. The second lesson was that guidelines as to how to create a change team would be advantageous and could be altered based on the safety climate of an organization. Each organization and identified issue for improvement is different and thus may require input from different individuals at different stages. For example, more non-management input may be needed to identify risk factors and generate solutions, whereas more management input may be required to implement changes. Thirdly, there is constant top-down pressure from the Ministry to the organization/management and from the organization/management to the non-management workers. However, the constant top-down pressure and changes to policies and procedures seems to occur without any bottom-up feedback.

Safety Climate and PE

The data on safety climate and PE in this study supports the idea that an ergonomist should administer a climate survey before implementing a PE program. Knowledge about an organization's safety climate would provide the ergonomist with more awareness about the organization, but more importantly, it might be that the dimensions of the PE structure need to be tailored to the climate. For example, a potential limitation to the success of a PE program may be the workers not wanting to participate because they lack a sense of comfort and security from management (Zalk, 2001). Thus, knowing scores for such safety climate dimensions as 'senior leadership support for safety' and 'supervisory leadership support for safety' from the Modified Stanford Patient Safety Culture Survey Instrument (MSI, Ginsburg et al., 2009) would inform the ergonomist whether the staff feel supported by management prior to implementing a PE program. If workers perceive a lack of support from management, this may alter the implementation of the PEF dimensions. For example, if a change team is provided with more decision power than the PEF dimension 'group consultation' in which management retains the right to accept or not accept any proposed changes, this may improve their perceptions of management support. In this study, the HIPE long-term care home elected individuals to

be change team members. In retrospect, the democratic process of direct representative participation, a subcategory of the involvement dimension of the PEF (Haines et al., 2002), may not have been the best option for an organization with a poor climate. This may have been why the ergonomist perceived that management was speaking down to the non-management members. In other words, it may be advantageous to first identify the safety climate of the organization and than choose the involvement subcategory to match the safety climate. As the safety climate of an organization is gradually improved, this may allow an ergonomist to also increase the participation and empowerment of the change team. A developmental evaluation, instead of a process or outcome evaluation, could then be used to encourage an organization to learn from mistakes or failures and to make the necessary changes to the process (Patton, 2011). The ultimate goal would be to have a good safety climate and a fully participatory PE change team and process. Future research needs to develop and test a model using the dimensions of the participatory ergonomics framework and of safety climate.

The Participatory Ergonomics Change Team and Process

As every organization is unique, it may not be possible to have one ideal participatory ergonomics framework. Hence, why there is no one agreed upon PE program format (Theberge et al., 2006). The PEF provides guidelines for creating a change team and developing a PE program (Haines et al., 2002). The PEF identifies nine dimensions each with sub-categories. The sub-categories offer levels for each dimension but the PEF does not offer an opinion on which option is the best. This study looked at four PEF dimensions: involvement, decision power, mix of participants, and remit/brief.

Involvement

Although the members of the HIPE change team were elected and volunteered to represent staff in the long-term care home, the lack of presence of some individual's questions the commitment they truly had to the PE program. If a HIPE change team member was not scheduled to work during the time the meeting was being held, they

would not attend. It was originally thought that the stronger the safety climate of a long-term care home would relate to increased support the healthcare workers would have for the PE program. This idea is supported by the stronger pre-PE safety climate of the LOPE long-term care home and the LOPE change teams continued enthusiasm and support for the process. However, the majority of the LOPE change team was managers, and they were accustomed to attending meetings throughout the day. The non-management member, however, was also committed to the process and attended meetings regardless of her work schedule. The only complaint that the LOPE change team had was that there were not enough non-management members involved.

Decision Power

One of the PEF sub-categories for decision power is group delegation which affords the change team the responsibility and authority to make decisions without reference back to senior management (Haines et al., 2002). However, without management involvement it would be difficult to know what funds and resources were available for the implementation of generated suggestions. Furthermore, management would have a better understanding of the organizational structure of the long-term care home than non-management (Bohr et al., 1997). The management members of the change teams in this study stated that they appreciated the input from non-management members as it helped to identify why certain decisions needed to be made. The change teams felt that as a group they were able to decide what they felt were the optimal solutions to generate and when authority from senior management was required they felt they presented a good case. Being able to make final implementation decisions required the input from all change team members in all of the PE stages. The LOPE change team was originally only going to have non-management input during the identification of risk factors, but they felt it was essential to involve non-management throughout the entire process. Furthermore, the LOPE change team members felt that it was necessary to communicate with staff who were not change team members to ensure that they were optimizing the amount of information and knowledge they had about risk factors and potential solutions. Therefore, although it is not be possible to have every employee in an organization as part of a change team, the reach can be extended out to all staff if the change team members take the time to talk to individuals outside of the meetings.

Mix of Participants

It became clear that the mix of participants was an important aspect for identifying risk factors and generating solutions. If there is not adequate frontline staff involved it becomes challenging to know if all the areas of concern are being addressed and if the solutions are feasible from a performance perspective. As PE is about bringing key individuals from an organization together to help solve problems and implement changes (Theberge et al., 2006; van der Molen et al., 2005), it seems that equal representation of management and non-management is appropriate. This study did not look at a PE change team with just non-management members and no management members. However, it is assumed that the lack of management presence would complicate the decision making process.

The optimal mix of participants may be different for different stages of the PE process and different organizations. Measuring the safety climate and interviewing key stakeholders prior to the implementation of a PE program will help the ergonomist suggest what the mix of participants should be. Furthermore, the mix of participants does not have to be static. The mix of participants should be permitted to evolve over time to be more optimal or efficient. In a poor safety climate it may necessitate that either the climate is improved before a PE program is implemented or that a smaller change team is formed to help repair the climate knowing that progress in terms of injury prevention may be slow at first. When a climate becomes more positive, a smaller change team may also be more efficient as it may relate to knowing there is a great amount of trust in the change team members. Therefore, the ergonomist should not hesitate to change the mix of participants in a developmental mind set to meet the safety climate and the needs of the organization.

Remit/Brief and the role of the Ergonomist

The HIPE and LOPE change teams were both successful in identifying risk factors and generating solutions. The risk factors and solutions each team developed were very similar to each other (see van Wyk, Chapter 4). However, it was evident to the ergonomist that the energy, atmosphere, and the social interactions between the two change teams differed greatly. The LOPE change team always arrived on time, with

notes and an eager attitude. The HIPE change team often would reschedule meetings after the ergonomist was already onsite, and even after rescheduling attendance continually dwindled in size. Furthermore, the HIPE team members were rarely punctual, nor prepared for the meetings. The safety climate data supports these observations. In general, the LOPE long-term care home had a more positive safety climate than the HIPE long-term care home. A previous study that implemented a PE program in a healthcare setting also found that everyone was initially supportive and enthusiastic about the program but their involvement diminished as the process moved into the later stages (Bohr et al., 1997). The reason for the diminished enthusiasm and involvement in the previous study was a result of workers perceiving that management was not supportive of the PE program and the coinciding generated solutions for change (Bohr et al., 1997). In the current study, management for both teams restated their support of the program at each change team meeting to the ergonomist and to the team. One management member from the HIPE change team stated that she was thankful that the ergonomist was so well organized and was able to keep the team on track and motivated to complete the project. In the current study, the HIPE long-term care home had a lower percent positive response for senior leadership support for safety than the LOPE long-term care home. This illustrates that the ergonomist may need to take on a more prominent leadership role in the PE process in organizations with poor safety climates. This can be challenging for the ergonomist as they need to keep themselves motivated and on track as well as keeping the change team motivated, on track and cordial.

More research is needed to examine the relationship between safety climate and participatory ergonomics. It may be beneficial to identify and potentially strengthen an organizations safety climate prior to the implementation of a PE program. Currently, it is not known if there is an optimal safety climate strength needed to ensure continual buy-in for, support for, enthusiasm for and involvement in a PE program by management and non-management workers.

Chain of Command

A critical learning moment for both change teams, but more evident in the HIPE change

team was what is being referred to in this discussion as ‘the pressure from above chain of command syndrome’. When pressure is constantly being passed down to subordinates a lack of support may be perceived. When the lower levels on the chain of command perceive that their opinion does not matter they may not be willing to comply with orders. This can have a huge impact on the safety climate of an organization, as the attitudes will not be positive. Non-management members were unaware of the stressors that management was constantly dealing with to ensure that the long-term care home was up to date with policies and procedures. Management was not fully aware that the lack of compliance among non-management or frontline staff was not due to an act of rebellion, but rather a lack of practicality. For example, the Ministry of Long-term Care may inform long-term care homes that they need to purchase a certain number of mechanical lifting devices and that a no-lift policy needs to be implemented. Often management is also provided with a list of mechanical lifting devices that should be considered for purchase, if not already predetermined. They may be predetermined by an umbrella organization that the long-term care home belongs to. For example, the company ‘Homes-4-You” may have five long-term care homes in the province. The head office company receives the information from the Ministry that a certain number of mechanical lift devices need to be implemented into each long-term care home. Head office then decides which devices will be purchased and informs management at each of the long-term care homes to expect a delivery. Unfortunately, frontline staff are not always asked for input when mechanical lift devices are being purchased, nor after they have been implemented. The management change team members from both the HIPE and LOPE groups mentioned that one of the most frustrating parts about keeping the long-term care home up to date on policies and procedures was that as soon as the home is brought up to code and standards, new policies and procedures are introduced. They are constantly behind, and they feel discouraged that they will never be able to be up to date. Frontline staff are often feeling the brunt of the stress as they are constantly having to alter their care plans for residents and learn new policies and procedures. The frontline staff complained about all the paperwork that is constantly changing and being added to. Resident care does not seem to be a priority on the list of tasks to do because a worker will get into more trouble for paperwork not being filled out than neglecting a resident.

In other words, before there are any more top-down changes, there needs to be a process for bottom-up feedback. It would be beneficial for the policy makers to understand what, if any, changes need to be implemented, and what would coincide with compliance, before spending money and resources that could be used elsewhere. This is not the first study to identify that government's efforts to ensure a high quality of care through policy-driven structural mechanisms creates increased stress among long-term care staff (DeForge et al., 2011). It has been previously found that top-down pressures create a non-feasible culture of compliance that coincides with frontline staff feeling that they are afraid and unable to care for their residents (DeForge et al., 2011). Perhaps a "participatory ergonomics" approach is required to bring together government and Ministry policy makers with management and non-management healthcare staff to determine together how the highest quality of care can be provided to patients and residents.

The present study was unable to truly address the relationship between safety climate and participatory ergonomics. The present study was able to illustrate that the participatory ergonomics process was successful in identifying risk factors and developing solutions for patient lifts and transfers in long-term care homes that may have gone unnoticed through other methods. Participatory ergonomics is an approach that can assist management to consult with frontline healthcare workers prior to purchasing new equipment or changing policies and procedures to strengthen the practicability and compliance of the changes.

5.5 References

Amick, B.C., Habeck, R.V., Hunt, A., Fossel, A.H., Chapin, A. Keller, R.B., & Katz, J.N. (2000). Measuring the impact of organizational behaviors on work disability prevention and management. *Journal of Occupational Rehabilitation*, 10(1), 21-38

Bohr, P.C., Evanoff, B.A., & Wolf, L.D. (1997). Implementing participatory ergonomics teams among health care workers. *American Journal of Industrial Medicine*, 32, 190-196

Burgess-Limerick, R., Straker, L., Pollock, C., Dennis, G., Leveritt, S., & Johnson, S. (2007). Implementation of the participative ergonomics for manual tasks (PErforM) programme at four Austrlian underground coal mines. *International Journal of Industrial Ergonomics*, 37, 145-155

Colla, J.B., Bracken, A.C., Kinney, L.M., & Weeks, W.B. (2005). Measuring patient safety climate: a review of surveys. *Quality and Safety In Health Care*, 14, 364-366

Daynard, D., Yassi, A., Cooper, J.E., Tate, R., Norman, R., & Wells, R. (2001). Biomechanical analysis of peak and cumulative spinal loads during simulated patient-handling activities: a substudy of randomized controlled trial to prevent lift and transfer injury of health care workers. *Applied Ergonomics*, 32, 199-214

DeForge, R., van Wyk, P., Hall, J., & Salmoni, A. (2011). Afraid to care; unable to care: a critical ethnography within a long-term care home. *Journal of Aging Studies*, 25, 415-426

Deilkas, E.T., & Hofoss, D. (2008). Psychometric properties of the Norwegian version of the safety attitudes questionnaire (SAQ), generic version (shortform 2006). *BMC Health Service Research*, 8, 191

Detert, J.R., Schroeder, R.G., & Mauriel, J.J. (2000). A framework for linking culture and improvement initiatives in organizations. *The Academy of Management Review*, 25(4), 850-863

Diaz, R.S., & Cabrera, D.D. (1997). Safety climate and attitude as evaluation measures of organizational safety. *Accident Analysis and Prevention*, 29, 643-650

Driessen, M.T., Proper, K.I., Anema, J.R., Bongers, P.M., & van der Beek, A.J. (2010). Process evaluation of a participatory ergonomics programme to prevent low back pain and neck pain among workers. *Implementation Science*, 6, 65

Dul, J., & Hak, T. (2008). *Case study methodology in business research*. Oxford, UK: Elsevier

Gershon, R.R.M., Karkashian, C.D., Grosch, J.W., Murphy, L.R., Escamilla-Cejudo, A., Flanagan, P.A., Bernacki, E., Kasting, C., & Martin, L. (2000). Hospital safety climate and its relationship with safe work practices and workplace exposure incidents. *American Journal of Infection Control*, 28(3), 211-221

Ginsburg, L. (2006). *Perceptions of patient safety culture in four health regions.* York University. Retrieved April 13, 2010 from http://www.atkinson.yorku.ca/~safetyculture/questionnaire/Generic_Safety_Culture_Benchmarking_Report.pdf

Ginsburg, L., Gilin, D., Tregunno, D., Norton, P.G., Flemons, W., & Fleming, M. (2009). Advancing measurement of patient safety culture. *Health Services Research*, 44(1), 205-224

Flin, R., Mearns, L., O'Connor, P., & Bryden, R. (2000). Measuring safety climate: identifying the common features. *Safety Science*, 177-192

Haines, H., Wilson, J.R., Vink. P., & Koningsveld, E. (2002). Validating a framework for participatory ergonomics (PEF). *Ergonomics*, 45(4), 309-327

Hignett, S. (1996). Work-related back pain in nurses. *Journal of Advanced Nursing*, 23, 1238-1246

Institute for Work & Health (IWH) (2005). Effectiveness of Participatory Ergonomic Interventions: A Systematic Review. Retrieve April 5, 2010 from: hhtp://www.iwh.on.ca/sys-reviews/effectiveness-of-pe-interventions

Jafry, T., & O'Neill, D.H. (2000). The application of ergonomics in rural development: a review. *Applied Ergonomics*, 31(3), 263-268

Kawakami, T., Batino, J.M., & Khai, T.T. (1999). Ergonomic strategies for improving working conditions in some developing countries in Asia. *Industrial Health*, 37(2), 187-198

Koda, S., Nakagiri, S., Yasuda, N., Toyota, M., & Ohara, H. (1997). A follow-up study of preventive effects on low back pain at worksite by providing a participatory occupational safety and health program. *Industrial Health*, 35(2), 243-248

Lippin, T.E.A., Calkin, K.R., & McQuiston, T.H. (2000). Empowerment-based health and safety training: evidence of workplace change from four industrial sectors. *American Journal of Industrial Medicine*, 38, 697-706

Loisel, P., Gosselin, L., Durand, P., Lemaire, J., Poitras, S., & Abenhaim, L. (2001). Implementation of a participatory ergonomics program in the rehabilitation of workers suffering from subacute back pain. *Applied Ergonomics*, 32, 53-60

Mearns, K.J., & Flin, R. (1999). Assessing the state the organizational safety – culture or climate? *Current Psychology*, 18(1), 5-17

Mearns, K., Whitaker, S.M., & Flin, R. (2003). Safety climate, safety management practice and safety performance in offshore environments. *Safety Science*, 41, 641-680

Modak, I., Sexton, J. B., Lux, T.R., Helmreich, R.L., & Thomas, E.J. (2007). Measuring safety culture in the ambulatory setting: the safety attitude questionnaire – ambulatory version. *Journal of General Internal Medicine*, 22(1) 1-5

Moir, S., & Buchholz, B. (1996). Emerging participatory approaches to ergonomic interventions in the construction industry. *American Journal of Industrial Medicine*, 29(4), 425-430

Nagamachi, M. (1995). Requisites and practices of participatory ergonomics. *International Journal of Industrial Ergonomics*, 15, 371-377

Nelson, A., Fragala, G., & Menzel, N. (2003). Myths and facts about back injuries in nursing. *American Journal of Nursing*, 103, 32-40

Nelson, A., Matz, M., Chen, F., Siddharthan, K., Lloyd, J., & Fragala, G. (2006). Development and evaluation of a multifaceted ergonomics program to prevent injuries associated with patient handling tasks. *International Journal of Nursing Studies*, 43, 717-733

Owen, B.D., Garg, A., & Jensen, R.C. (1992). Four methods for identification of most back-stressing tasks performed by nursing assistants in nursing homes. *International Journal of Industrial Ergonomics*, 9, 213-220

Owen, B.D., & Garg A. (1993). Back stress isn't part of the job. *American Journal of Nursing*, 93, 48-51

Patton, M.Q. (2011). *Development evaluation: applying complexity concepts to enhance innovation and use.* NY: Guilford Press

Pronovost, P., & Sexton, B. (2005). Assessing safety culture: guidelines and recommendations. *Quality and Safety In Health Care*, 14, 231-233

Rainbird, G., & O'Neill, D.H. (1995). Occupational disorders affecting agricultural workers in tropical developing countries. *Applied Ergonomics*, 26, 185-187

Singer, S.J., Gabba, D.M., Falwell, A., Lin, S., Hayes, J., & Baker, L. (2009). Patient safety climate in 92 US hospitals differences by work area and discipline. *Medical Care*, 47(1). 23-31

Sexton J.B., Helmreich R.L., Neilands T.B., Rowan K., Vella K., Boyden J., Roberts P.R., & Thomas E.J. (2006). The safety attitudes questionnaire: psychometric properties, benchmarking data, and emerging research. *BMC Health Services Research* 6,44

Smedley, J., Egger, P., Cooper, C., & Coggon, D. (1995). Manual handling activities and risk of low back pain in nurses. *Occupational and Environmental Medicine*, 52, 160-163

Theberge, N., Granzow, K., Cole, D., & Laing, A. (2006). Negotiating participation: understanding the 'how' in an ergonomic change team. *Applied Ergonomics*, 37, 239-248

van der Molen, H.F., Sluiter, J.K., Hulshof, C.T.J., Vink, P., van Duivenbooden, C., Holman, R., & Frings-Dresen, M.H.W. (2005). Implementation of participatory ergonomics intervention in construction companies. *Scandinavian Journal of Work, Environment & Health*, 31(3), 191-204

van Eerd, D., Cole, D., Irvin, E., Mahood, Q., Keown, K., Theberge, N., Village, J., St. Vincent, M., & Cullen, K. (2010). Process and implementation of participatory ergonomics interventions: a systematic review. *Ergonomics*, 53(10), 1153-1166

van Wyk, P.M. (Chapter 2). A six-year comparison of WSIB injury claims made from 2004-2009 by healthcare workers in Ontario hospitals and long-term care homes.

van Wyk, P.M. (Chapter 3). Work-related injuries: the risk perceptions of healthcare workers in long-term care

van Wyk., P.M. (Chapter 4). Using photovoice to identify patient transfer risk factors in a participatory ergonomics approach to reducing healthcare workers risk of injury in long-term care

Yassi, A., Khokhar, J., Tate, R., Cooper, J., Snow, C., & Vallentine, S. (1995). The epidemiology of back injuries in nurses at a large Canadian tertiary care hospital: implications for prevention. *Occupational Medicine*, 45, 215-220

Yassi, A., Cooper, J.E., Tate, R.B., Gerlach, S., Muir, M., Trottier, J., & Masset, K. (2001). A randomized controlled trial to prevent patient lift and transfer injuries of health care workers. *Spine*, 26, 1739-1746

Zalk, D.M. (2001). Grassroots ergonomics: initiating an ergonomics program utilizing participatory techniques. *The Annals of Occupational Hygiene*, 45(4), 283-289

Zammuto, R., & Krakower, J. (1991). Quantitative and qualitative studies of organizational culture. *Research in Organizational Change and Development*, 5, 83-114

Chapter 6

6 Discussion

6.1 Lessons Learned

This thesis provided me an opportunity to embark on a journey as an ergonomist as much as a researcher. After having lived through this process, especially the participatory ergonomics study, there are some main lessons that I have learned. Some of the lessons are with respect to being an ergonomist and researcher, other lessons were insights I learned from being immersed in several long-term care homes.

Injuries in healthcare are still a problem

It was expected that injuries were still a problem within healthcare. It was also expected that lifting injuries were still problematic. It was interesting to be able to observe how patient lifts and transfers were performed in different long-term care homes. A lot of healthcare workers have formed relationships with the residents that they are lifting and transferring. Through this connection they have been able to create dance-like movements to perform the task in a way that is familiar and offers a sense of security to the resident. More research is needed to observe and assess how healthcare workers perform patient lifts and transfers in the healthcare environment to determine if they have adapted methods that are most advantageous for them and the resident.

It was also observed that when mechanical lift devices are used to lift and transfer a resident that the entire process is not mechanical. Once the resident is securely in the lift, the healthcare worker then has to manually push and pull the lift device and the resident to the destination. Ceiling lifts erase this aspect, however, ceiling lifts are not always feasible. Therefore, mechanical lift devices are still needed as an alternative method.

Future research needs to explore the ability to eliminate the pushing and pulling efforts healthcare workers exert when trying to move the mechanical lift device.

Know the climate

There is an innate relationship between safety climate and ergonomics. The safety climate of an organization is rarely, if ever, assessed by an ergonomist prior to implementing any changes. The safety climate of an organization can highlight which dimensions require improvement. This is particularly important when wanting to implement change in a long-term care home. Even though in the two long-term care homes in this study that received a participatory ergonomics intervention produced similar risk factors and solutions, from my perspective as an ergonomist, one long-term care home was easier to work with. The change team that was always on time and prepared for meetings, spoke to each other respectfully, and did not need many queues from the ergonomist to stimulate discussion provided a more enjoyable experience. Although the safety climate data was not analyzed until after all the data collection was complete, the ergonomist perceived that the long-term care home for this change team had a more positive climate. The field notes that I took as an ergonomist before and after each change team meeting were key in understanding my point of view throughout the process. Furthermore, it aided me in being able to not let my opinions, whether positive or negative, about a long-term care home interfere with the participatory ergonomics process. It was a challenge as an ergonomist and a researcher to not allow my perceptions to affect the participatory ergonomics process.

Worker buy-in is just as important as management buy-in

Prior to implementing a participatory ergonomics program it is important to attain management buy-in. However, the research does not discuss the importance of attaining worker buy-in. It has been discussed that workers are more willing to participate once they perceive management support for the project (Zalk, 2001). However, management

buy-in only shows that they are willing to support the workers throughout this process. In other words, management support may empower workers to participate. The workers still need to believe in the project and want change themselves. One non-management worker said "If you make us change, we will change but we won't like it, it makes the work situation worse, the atmosphere becomes awful, the RNs get all the complaints from the PSWs and RPNs, so management is hidden from it, and when RNs try to talk to management they say 'like it or lump it', the government says change so we change or you have no job, the government says jump, management says how high, and they don't think about if the staff can jump any higher." One way to gain worker buy-in is to interview or have focus groups with the workers prior to implementing a participatory ergonomics program. The interviews or focus groups should take place without management being present. This will allow an ergonomist to determine if the workers would be willing to participate and be susceptible to change.

No more surveys

Every long-term care home that I visited had multiple surveys or research projects on the go. Healthcare workers are tired of participating in projects, especially surveys. One non-management worker said "There is always a survey, the bulletin board is cluttered, you should attend this, you should fill this out. Too overwhelming, especially if you work part time because you don't know which end to start with, so you end up having to ignore it." Management at each of the long-term care homes asked what prize I was offering the staff for completing the survey. I did not have ethical approval to provide such an incentive. Management at several long-term care homes said, "the surveys that do the best are the ones that are giving away an I-pad." Although surveys can be an inexpensive data collection method that has the potential to reach a lot of participants, if they are not being completed this is problematic. A more exciting method to data collection is required to spark interest and involvement. In this thesis, Photovoice provided a different approach to collecting data. One change team member said, "it was fun taking pictures, I almost forgot that it was for a research project." Therefore, healthcare workers may still

be willing to participate in research, they just do not have the time to complete surveys, or have become too overwhelmed by the number of surveys inviting them to participate.

On the backburner

Each long-term care home was excited to be contacted and to participate in the proposed research initiative. However, my project was delayed if there was a government initiative commencing. It was sometimes difficult to communicate with management at the long-term care homes. I would be diligent in making phone calls and sending emails reminding managers about the on-going projects and scheduled meetings. More often than not, if I wanted to communicate with a manager then I would have to go to the long-term care home to speak with them in person. Even then, I often would have to return to the long-term care home more than once, as the manager I wanted to speak with would be out of the office or in another meeting. Persistence was a characteristic I needed to possess in order to see these projects through. It was advantageous to gain acceptance into a long-term care home through a gatekeeper. For example, in one long-term care home a Registered Nurse offered to distribute and collect all of the surveys. This healthcare worker championed the project at the one site. Anytime I needed information, this healthcare worker became the individual I would contact. Being rooted in the organization may help to avoid any complications or delays in progress. Thus, in order to conduct research or implement an intervention in a healthcare setting, it may be beneficial for the researcher to be embedded in the organization or ensure that there is an employee who acts as a project champion.

We are the best long-term care home

Every single long-term care home that I visited, regardless of the project, stated that they were the long-term care home that was leading the way in the area. They all promoted themselves as the best at reducing injuries, working together with the staff, and providing the best services and quality of care to their residents. Clearly, not every single home can

be the best. It was perceived that management was very fearful of painting a negative picture of their long-term care home to anyone. I was also asked by each long-term care home why I was contacting them, and what perception I had of their long-term care home. It was evident that each long-term care home was very concerned about their reputation.

Top down pressures with no bottom up feedback

It became very clear through the participatory ergonomics process, as well as during visits to multiple long-term care homes, that management and non-management alike are suffocating under the thumb of higher powers, for example, the Ministry of Health and Long-Term Care. Individuals who work within healthcare made it clear that they are feeling over burdened and spread too thin. Management often discussed that as soon as they were able to update their long-term care home with standards, policies, and procedures, all of the standards, policies and procedures would be altered. This is causing a lot of undue stress on management. As a result, they place more stress on non-management staff to comply with all the changes. It was noted that new standards, policies, and procedures are not always clearly communicated to non-management staff. The non-management staff discussed that they often felt confused as to what the current standards, policies, and procedures were. As a result, there were times in which they would not bother trying to recall the current standards, policies and procedures and act according to what they felt was in the best interest of the resident and staff. Therefore, throughout this thesis, as an ergonomist, I did not only have to mediate between management and non-management staff, but I also had to be understanding of their criticisms of the government. A participatory ergonomics process was a step in the right direction for allowing frontline staff to voice an opinion and be heard by management. Future efforts need to also allow the voices of management and non-management to reach the government and policy makers. It appears that it would be a more efficient system if feedback from the bottom up was provided and not just a flow of information from the top down.

Too many Chiefs, not enough Indians

The non-management staff felt that there were too many administrators and not enough individuals working on the floor. It was perceived that more administrators were replacing bedside workers, which increases the workload on the non-management staff. Administration being "top heavy" was only increasing the perception that the staffing ratio was becoming more burdensome. One non-management worker said that "the ratio is like 1 to 150, we cannot have contact with every resident on one shift, it is frustrating. We cannot do our jobs, which is to care for the residents. I feel like we neglect some residents because you do not have time to get to them because you are only one person trying to provide care for so many." There are several administrative roles in long-term care homes, however, from the perspectives of people working in administration, their workloads are also too heavy. One manager felt that she could use more help but that her Director was never available. This manager felt that her Director was always "appearing busy but never doing anything." She felt that her job was very stressful because she had too many administrative roles and that the Director was not doing "their fair share". In a separate conversation, the Director noted that "my management team is great, but they cannot seem to make decisions on their own. I do not understand why we give them a management role but I still have to hold their hands through everything. I have other tasks that I need to tackle, but I cannot get to them when I have to babysit my management team." The disarray among the management and administrators does not go unnoticed by the non-management workers. It is perceived by non-management workers that the management was fighting their own administrative battles and that the non-management workers and the residents were being ignored. One non-management worker said "it is like when mom and dad fight and then the parents take it out on the children." The climate within the management team first needs to be strengthened before the climate of the entire home can have a positive change as well.

Too much paperwork

The non-management workers often complained that there is too much paper or computer work to complete. Several healthcare workers said that they studied nursing at school because they wanted to provide care to residents or patients, and interact with people who needed help. With all the reports that need to be completed, healthcare workers perceived that they spend more time doing paperwork than providing care for residents. Furthermore, it is perceived that the paperwork has nothing to do with the resident, but is about making more money for the long-term care home. One non-management worker said: "there is too much computer work, you can't do the bedside nursing, it is all about money and geared towards earning more money and not about the resident." The fear is that the paperwork will continue to become more burdensome and that the contact with residents will continue to decline. A Registered Nurse in one long-term care home said: "I just put in my two weeks notice, I am frustrated that I am being forced to learn how to do reports on the computer. It takes me long enough to complete reports on paper, it only takes longer on the computer, which means more time away from the residents. Healthcare has changed so much since I began over 40 years ago. Although some aspects have been an improvement, many others have not made healthcare better, and that is unfortunate."

Gap between needs and skills

The resident populations in long-term care homes appear to have increasing needs. There appears to be more co-morbidities and cognitive impairments associated with the aging process. Chapter 3 indicated that resident behaviours were perceived to place a worker at more of an increased risk of injury than patient lifts and transfers. Unfortunately, as the needs of the residents increase it appears that there is no associated increase in skills among healthcare workers. The lack of skills may be two-fold. The first possibility is

that healthcare workers are not being provided with adequate education to provide high quality care for residents in long-term care homes. Perhaps, a certificate program needs to be implemented so that healthcare workers can upgrade their education to work with special populations. This would provide an opportunity to educate healthcare workers on such aspects as resident behaviours, cognitive impairments, and co-morbidities. A second reason as to why the skill set is not increasing with the needs of the residents is that there appears to be a decrease in the number of Registered Nurses and an increase in the number of Personal Support Workers working in long-term care. Registered Nurses attend four years of university, whereas Personal Support Workers may only attend eight months to a year of college. Registered Nurses have an increased skill set based on the amount of education they receive. Although the argument is that Personal Support Workers do not cost as much money to employ, the decrease in Registered Nurses in long-term care homes may be compromising the quality of care provided to residents.

6.2 Conclusion

Overall, the present thesis identified that lost-time claims, especially those to the back and a result of patient lifts and transfers, remain problematic among healthcare workers in Ontario hospitals and long-term care homes. Healthcare workers also appear not to be able to accurately assess their risk of injury. Thus, they may not behave in a manner that avoids hazardous situations. A different approach was taken to bring management and frontline healthcare workers together to identify patient lift and transfer risk factors, generate solutions and implementation of intervention plans in long-term care homes via a Participatory Ergonomics (PE) program. Photovoice was found to be an advantageous method for identifying risk factors. Furthermore, the healthcare workers who were involved in the taking of photographs enjoyed this approach. The PE programs introduced to two long-term care homes were successful in identifying risk factors and generating solutions for patient lifts and transfers. As a result, several changes were implemented in the long-term care homes with the aim of increasing compliance with policies and procedures and reducing the risk of injuries to residents and healthcare

workers. Exploring work-related injuries of healthcare workers through Workplace Safety Insurance Board (WSIB) lost-time claims, risk perceptions of healthcare workers in long-term care homes, and Participatory Ergonomic programs that involved Safety Climate evaluations, a process evaluation and Photovoice strides were made to make healthcare settings a safer work environment.

Appendices

Appendix 1 (A): Safety Questionnaire

Safety Questionnaire

The purpose of this questionnaire is to find out your feelings towards safety issues in the workplace. Please read every question carefully and answer honestly.

A. How severe an injury would a problem with the following common causes, tasks or duties usually produce?

Answer the following questions with:

1	2	3	4	5	6	7
Minor		Take time off of work or Require medical attention				Potentially fatal

1.	Resident Behaviours (e.g. unpredictable, aggressive)	1	2	3	4	5	6	7
2.	Staff Stressors (e.g. tired, overstressed, not paying attention)	1	2	3	4	5	6	7
3.	Lifting Heavy Objects (e.g. weight of residents)	1	2	3	4	5	6	7
4.	Resident Condition (e.g. decreasing mental and physical abilities)	1	2	3	4	5	6	7
5.	Time Pressures (e.g. fast paced work)	1	2	3	4	5	6	7
6.	Improper Body Mechanics and Lifting Techniques	1	2	3	4	5	6	7
7.	Repositioning or Turning a Resident	1	2	3	4	5	6	7
8.	Lifting or Transferring a Resident Manually (e.g. bed to chair)	1	2	3	4	5	6	7
9.	Lifting or Transferring a Resident with a Lift Assist (e.g. bed to chair with a Hoyer or Sara Lift)	1	2	3	4	5	6	7
10.	Resident Care (e.g. bathing, washing, dressing, changing)	1	2	3	4	5	6	7
11.	Slips, trips and/or falls	1	2	3	4	5	6	7
12.	Working with malfunctioning equipment (e.g. wheelchair, lift assist)	1	2	3	4	5	6	7
13.	Pushing/Pulling (e.g. med cart, wheelchair, equipment)	1	2	3	4	5	6	7
14.	Bending down (e.g. lowest drawers in med cart, changing beds)	1	2	3	4	5	6	7

B. How often do you think injuries at work occur involving the following common causes, tasks or duties?

Answer the following questions with:

1	2	3	4	5	6	7
Never	Every few years	Yearly	A few times a year	Monthly	Weekly	Daily

1.	Resident Behaviours (e.g. unpredictable, aggressive)	1	2	3	4	5	6	7
2.	Staff Stressors (e.g. tired, overstressed, not paying attention)	1	2	3	4	5	6	7
3.	Lifting Heavy Objects (e.g. weight of residents)	1	2	3	4	5	6	7
4.	Resident Condition (e.g. decreasing mental and physical abilities)	1	2	3	4	5	6	7
5.	Time Pressures (e.g. fast paced work)	1	2	3	4	5	6	7
6.	Improper Body Mechanics and Lifting Techniques	1	2	3	4	5	6	7
7.	Repositioning or Turning a Resident	1	2	3	4	5	6	7
8.	Lifting or Transferring a Resident Manually (e.g. bed to chair)	1	2	3	4	5	6	7
9.	Lifting or Transferring a Resident with a Lift Assist (e.g. bed to chair with a Hoyer or Sara Lift)	1	2	3	4	5	6	7
10.	Resident Care (e.g. bathing, washing, dressing, changing)	1	2	3	4	5	6	7
11.	Slips, trips and/or falls	1	2	3	4	5	6	7
12.	Working with malfunctioning equipment (e.g. wheelchair, lift assist)	1	2	3	4	5	6	7
13.	Pushing/Pulling (e.g. med cart, wheelchair equipment)	1	2	3	4	5	6	7
14.	Bending down (e.g. lowest drawers in med cart, changing beds)	1	2	3	4	5	6	7

C. To what extent do you feel at risk of injury due to these common causes, tasks or duties?

Answer the following questions with:

1	2	3	4	5	6	7
Not at risk at all			At risk			Could not be more at risk

1.	Resident Behaviours (e.g. unpredictable, aggressive)	1	2	3	4	5	6	7
2.	Staff Stressors (e.g. tired, overstressed, not paying attention)	1	2	3	4	5	6	7
3.	Lifting Heavy Objects (e.g. weight of residents)	1	2	3	4	5	6	7
4.	Resident Condition (e.g. decreasing mental and physical abilities)	1	2	3	4	5	6	7
5.	Time Pressures (e.g. fast paced work)	1	2	3	4	5	6	7
6.	Improper Body Mechanics and Lifting Techniques	1	2	3	4	5	6	7
7.	Repositioning or Turning a Resident	1	2	3	4	5	6	7
8.	Lifting or Transferring a Resident Manually (e.g. bed to chair)	1	2	3	4	5	6	7
9.	Lifting or Transferring a Resident with a Lift Assist (e.g. bed to chair with a Hoyer or Sara Lift)	1	2	3	4	5	6	7
10.	Resident Care (e.g. bathing, washing, dressing, changing)	1	2	3	4	5	6	7
11.	Slips, trips, and/or falls	1	2	3	4	5	6	7
12.	Working with malfunctioning equipment (e.g. wheelchair, lift assist)	1	2	3	4	5	6	7
13.	Pushing/Pulling (e.g. med cart, wheelchair equipment)	1	2	3	4	5	6	7
14.	Bending down (e.g. lowest drawers in med cart, changing beds)	1	2	3	4	5	6	7

D. The following question is in two parts; For i) choose from 1-7, and for ii) choose from A-D

i) To what extent do you feel your skills and experience give you control over experiencing a work related injury with the following common causes, tasks or duties?

Answer the following questions with:

1	2	3	4	5	6	7
No Control	Minimal Control		Some Control		Great Control	Total Control

ii) Indicate how much safety training you have received concerning the following common causes, tasks or duties.

Please answer with:

A	B	C	D
None	Minimal Training	Training	Extensive Training

1.	Resident Behaviours (e.g. unpredictable, aggressive)	1	2	3	4	5	6	7	A	B	C D
2.	Staff Stressors (e.g. tired, overstressed)	1	2	3	4	5	6	7	A	B	C D
3.	Lifting Heavy Objects (e.g. weight of residents)	1	2	3	4	5	6	7	A	B	C D
4.	Resident Condition (e.g. decreasing mental & physical abilities)	1	2	3	4	5	6	7	A	B	C D
5.	Time Pressures (e.g. fast paced work)	1	2	3	4	5	6	7	A	B	C D
6.	Improper Body Mechanics & Lifting Techniques	1	2	3	4	5	6	7	A	B	C D
7.	Repositioning or Turning a Resident	1	2	3	4	5	6	7	A	B	C D
8.	Lifting or Transferring a Resident Manually (e.g. bed to chair)	1	2	3	4	5	6	7	A	B	C D
9.	Lifting or Transferring a Resident with a Lift Assist (e.g. Hoyer or Sara Lift)	1	2	3	4	5	6	7	A	B	C D
10.	Resident Care (e.g. bathing, washing, dressing, changing)	1	2	3	4	5	6	7	A	B	C D
11.	Slips, trips and/or falls	1	2	3	4	5	6	7	A	B	C D
12.	Working with malfunctioning equipment (e.g. wheelchair, lift assist)	1	2	3	4	5	6	7	A	B	C D
13.	Pushing/Pulling (e.g. med cart, wheelchair, equipment)	1	2	3	4	5	6	7	A	B	C D
14.	Bending down (e.g. lowest drawers in med cart, changing beds)	1	2	3	4	5	6	7	A	B	C D

E. Where do you think injuries at work occur most often?

(Please rank from 1 to 6; where 1 = most common place and 6 = least common place):

____ Residents Room

____ Bathroom

____ Tubroom

____ Hallway

____ Dining Room

____ Common Room/Activity Room

F. When do you think injuries at work occur?
(Please rank 1 to 3; where 1 = most often and 3 = least often):

____ First two hours of shift

____ Middle of shift

____ Last two hours of a shift

G. In which occupation do you think workers experience the highest frequencies of work-related injuries?
(Please rank from 1 to 6; where 1 = most injuries and 6 = least injuries)

____ Airport baggage handlers

____ Automotive assembly line workers

____ Butchers

____ Construction workers

____ Healthcare workers in long-term care

____ Miners

H. Participant Information

Age: _____ Gender: _____ Body Height: _____ Body Weight: _____

→ Highest Level of Education (Please choose one):

□ High school □ Some College □ College Diploma

□ Some University □ University Degree □ Graduate Work

→ Additional Characteristics (Please check all that apply):

□ Smoker □ Experience frequent headaches □ Post-menopause

□ Left-handed □ Play organized sports □ Have children

→ Job Role (Please choose one):

□ Registered Nurse (RN) □ Registered Practical Nurse (RPN) □ Physical Therapist (PT)

□ Healthcare Aid (HCA) □ Personal Support Worker (PSW) □ Rec & Leisure

□ Other: _____

→ Form of Employment (Please choose one):

□ Full Time □ Part Time

→ Normal Shift (Please choose one):

□ Days Only (7am – 3pm) □ Evenings Only (3pm – 11pm) □ Nights Only (11pm – 7am)

□ Days & Evenings □ Evenings & Nights □ Days & Nights

□ Days, Evenings & Nights

→ Years of experience in your present job (Please choose one):

□ 1 year or less □ 1 to 5 years □ 5 to 10 years

□ 10 to 15 years □ 15 to 20 years □ More than 20 years

→ Years worked at current job location (Please choose one):

□ 1 year or less □ 1 to 5 years □ 5 to 10 years

□ 10 to 15 years □ 15 to 20 years □ More than 20 years

→ Do you have another job (please circle)? Yes No

→ Have you been injured at your current job in the last twelve months concerning? (please circle):
Yes No

If Yes, please provide information for each injury sustained below

✤ **INJURY #1** Estimated Date: _____
Primary Body Location (please circle): Back Shoulder Neck Other:_____
Location where injury took place (e.g. resident's room): _____
How much time did you take off work: _____
Did you file a WSIB claim (please circle): Yes No

What was the primary cause or task of the injury (please select **one** from the list below): _____

Where there any secondary causes or tasks, if so what where they (please select from the list below):
_____

Common Causes or Tasks (choose the appropriate response and place the letter in the space provided):

A Resident Behaviours (e.g. unpredictable, aggressive)
B Staff Stressors (e.g. tired, overstressed, not paying attention)
C Lifting Heavy Objects (e.g. weight of residents)
D Resident Condition (e.g. decreasing mental and physical abilities)
E Time Pressures (e.g. fast paced work)
F Improper Body Mechanics and Lifting Techniques
G Repositioning or Turning a Resident
H Lifting or Transferring a Resident Manually (e.g. bed to chair)
I Lifting or Transferring a Resident with a Lift Assist (e.g. bed to chair with a Hoyer or Sara Lift)
J Resident Care (e.g. bathing, washing, dressing, changing)
K Slips, trips, and/or falls
L Working with malfunctioning equipment (e.g. wheelchair, lift assist)
M Pushing/Pulling (e.g. med cart, wheelchair equipment)
N Bending down (e.g. to lowest drawers in med cart, changing bed)
O Other: _____

✤ **INJURY #2** Estimated Date: _____
Primary Body Location (please circle): Back Shoulder Neck Other:_____
Location where injury took place (e.g. resident's room): _____
How much time did you take off work: _____
Did you file a WSIB claim (please circle): Yes No

What was the primary cause or task of the injury (please select **one** from the list above): _____

Where there any secondary causes or tasks, if so what where they (please select from the list above):
_____

☺ THANK YOU FOR YOUR TIME AND FOR COMPLETING THIS SURVEY ☺!

Appendix 2 (B): Safety Questionnaire - Pilot Survey

Understanding Injuries among Long-term Care Workers

1. When do you think injuries at work are most likely to happen? (please circle one)

First two hours of shift Half way through shift Last two hours of shift

2. When injuries occur, what do you think the common causes are?

_____

_____

3. What parts of your job do you find the most physically stressful?

_____

_____

4. What parts of your job do you find the most non-physically stressful?

_____

_____

5. If there was something you could change about your job to improve it, what would that include?

_____

_____

6. What parts of your job do you enjoy the most?

_____

_____

7. Do you typically transfer/move a resident manually or with the assistance of a lifting/transfer aid (e.g. transfer belt, sara lift, hoyer lift, asking a fellow employee to help, etc?

_____

_____

8. Do you find it easier to transfer/move a resident manually or with a lifting/transfer aid (e.g. transfer belt, sara lift, hoyer lift, asking a fellow employee to help, etc…)? Why?

_____

_____

9. If any, what are obstacles that would prevent you from using a lifting/transfer aid (e.g. transfer belt, sara lift, hoyer lift, asking a fellow employee to help, etc…)?

_____

_____

10. Do you think injuries are more likely to occur in long-term care or acute hospital settings? Why?

_____

_____

11. Have you experienced an injury at work in the past:

1 month? Yes No

6 months? Yes No

12 months? Yes No

If Yes, where (e.g.: back, neck, shoulder, etc…) did you get injured?

_____

What were you doing at the time of the injury/How did the injury occur?

_____

How much time did you take off for your injury?

_____

Did you file a WSIB claim?

_____

Participant Information:

Age: _____ Gender: _____ Nationality: _____

Body Height: _____ Body Weight: _____

Highest Level of Education: ☐ High school ☐ Some College ☐ College Diploma

☐ Some University ☐ University Degree ☐ Graduate Work

Job Role: _____ Full time/Part time:_____

Shift: _____ Unit/floor: _____

Number of Working Days per Week (on average) _____

Number of Working Hours Per Week (on average) _____

Years of experience with job: _____

Years worked at current job location: _____

Do you have another job (please circle)? Yes No

If yes, what other job roles do you have?

_____

Prior to LTC did you work in a different healthcare setting (please circle)? Yes No

If Yes, where did you previously work?

_____

Why did you switch to LTC?

If you have any additional comments you wish to make please use the space provided below:

THANK YOU FOR YOUR TIME AND FOR COMPLETING THIS SURVEY!

Appendix 3 (C): Safety Survey

Safety Survey in Long-Term Care (LTC) Settings

(a combination of MSI, SAQ, & OPP)

Instructions:

1. Think of the unit as the area where you do most of your work
2. The survey is seeking your perceptions and opinions of these safety issues. Indicate the extent to which you agree or disagree with each of the following statements by checking one of the boxes. If you are unsure whether you agree or disagree, mark "neutral". If the question does not apply to your role or work setting, mark "not applicable".

UNIT/FLOOR I CURRENTLY WORK IN IS: _____

RESIDENT SAFETY: Activities to avoid, prevent, or correct adverse outcomes which may result from the delivery of health care

		Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Not Applicable
1	Resident safety decisions are made at the proper level by the most qualified people	☐	☐	☐	☐	☐	☐
2	Good communication flow exists up the chain of command regarding resident safety issues	☐	☐	☐	☐	☐	☐
3	Reporting a resident safety problem will result in negative repercussions for the person reporting it	☐	☐	☐	☐	☐	☐
4	Senior management has a clear picture of the risk associated with resident care	☐	☐	☐	☐	☐	☐
5	My unit takes the time to identify and assess risks to residents	☐	☐	☐	☐	☐	☐
6	My unit does a good job managing tasks to ensure resident safety	☐	☐	☐	☐	☐	☐
7	Senior management provides a climate that promotes resident safety	☐	☐	☐	☐	☐	☐
8	Asking for help is a sign of incompetence	☐	☐	☐	☐	☐	☐
9	If I make a mistake that has significant consequences and nobody notices, I do not tell anyone about it	☐	☐	☐	☐	☐	☐
10	I am sure that if I report an incident to our reporting system, it ill not be used against me	☐	☐	☐	☐	☐	☐
11	I am less effective at work when I am fatigued	☐	☐	☐	☐	☐	☐
12	Senior management considers resident safety when program changes are discussed	☐	☐	☐	☐	☐	☐
13	Personal problems can adversely affect my performance	☐	☐	☐	☐	☐	☐
14	I will suffer negative consequences if I report a resident safety problem	☐	☐	☐	☐	☐	☐
15	If I report a resident safety incident, I know that management will act on it	☐	☐	☐	☐	☐	☐
16	I am rewarded for taking quick action to identify a serious mistake	☐	☐	☐	☐	☐	☐
17	Loss of experienced personnel has negatively affected my ability to provide high quality resident care	☐	☐	☐	☐	☐	☐
18	I have not enough time to complete resident care tasks safely	☐	☐	☐	☐	☐	☐
19	I am not sure about the value of completing incident reports	☐	☐	☐	☐	☐	☐
20	In the last year, I have witnessed a co-worker do something that appeared to me to be unsafe for the resident in order to save time	☐	☐	☐	☐	☐	☐
21	I am provided with adequate resources (personnel, budget, and equipment) to provide safe resident care	☐	☐	☐	☐	☐	☐
22	I have made significant errors in my work that I attribute to my own fatigue	☐	☐	☐	☐	☐	☐
23	I believe that health care error constitutes a real and significant risk to our residents	☐	☐	☐	☐	☐	☐
24	I believe health care errors often go unreported	☐	☐	☐	☐	☐	☐
25	My organization effectively balances the need for resident safety and the need for productivity	☐	☐	☐	☐	☐	☐
26	I work in an environment where resident safety is a high priority	☐	☐	☐	☐	☐	☐
27	Staff are given feedback about changes put into place based on incident reports	☐	☐	☐	☐	☐	☐
28	Individuals involved in resident safety incidents have a quick and easy way to report what happened	☐	☐	☐	☐	☐	☐
29	My supervisor/manager says a good word when she/he sees a job done according to established resident safety procedures	☐	☐	☐	☐	☐	☐
30	My supervisor/manager seriously considers staff suggestions for improving resident safety	☐	☐	☐	☐	☐	☐
31	Whenever pressure builds up, my supervisor/manager wants us to work faster, even if it means taking shortcuts	☐	☐	☐	☐	☐	☐

32	My supervisor/manager overlooks resident safety problems that happen over and over	☐	☐	☐	☐	☐	☐
33	On this unit, when an incident occurs, we think about it carefully	☐	☐	☐	☐	☐	☐
34	On this unit, when people make mistakes, they ask others about how they could have prevented it	☐	☐	☐	☐	☐	☐
35	On this unit, after an incident has occurred, we think about how it came about and how to prevent the same mistake in the future	☐	☐	☐	☐	☐	☐
36	On this unit, when an incident occurs, we analyze it thoroughly	☐	☐	☐	☐	☐	☐
37	On this unit, it is difficult to discuss errors	☐	☐	☐	☐	☐	☐
38	On this unit, after an incident has occurred, we think long and hard about how to correct it	☐	☐	☐	☐	☐	☐

These questions are about your perceptions of overall resident safety

		A - Excellent	**B – Very Good**	**C - Acceptable**	**D - Poor**	**F - Failing**
39	Please give your unit an overall grade on resident safety	☐	☐	☐	☐	☐
40	Good communication flow exists up the chain of command regarding resident safety issues	☐	☐	☐	☐	☐

These questions are about what happens after a "major event".
MAJOR EVENTS: incidents causing fairly serious harm to residents that result from the deliver of health care

		Strongly Disagree	**Disagree**	**Neutral**	**Agree**	**Strongly Agree**	**Not Applicable**
41	Individuals involved in major events contribute to the understanding and analysis of the event and the generation of possible solutions	☐	☐	☐	☐	☐	☐
42	A formal process for disclosure of major events to residents/families is followed and this process includes support mechanisms for residents, family, and care/service providers	☐	☐	☐	☐	☐	☐
43	Discussion around major events focuses mainly on system-related issues, rather than focusing on the individual(s) most responsible for the resident	☐	☐	☐	☐	☐	☐
44	The resident and family are invited to be *directly* involved in the entire process of understanding: what happened following a major event and generating solutions for reducing the re-occurrence of similar events	☐	☐	☐	☐	☐	☐
45	Things that are learned from major events are communicated to staff on our unit using *more than one* method (e.g. communication book, in-services, unit rounds, emails) and/or at *several* times so all staff hear about it	☐	☐	☐	☐	☐	☐
46	Changes are made to reduce re-occurrence of major events	☐	☐	☐	☐	☐	☐

These questions are about organizational policies and practices

		Disagree -	Disagree	Neutral	Agree	Agree Strongly	Not Applicable
47	The company involves employees in plans and decisions made	☐	☐	☐	☐	☐	☐
48	Workers have trust in the company	☐	☐	☐	☐	☐	☐
49	Communication is open and employees feel free to voice concerns and make suggestions	☐	☐	☐	☐	☐	☐
50	Working relationships are cooperative	☐	☐	☐	☐	☐	☐
51	Workers tend to stay with the company for a long time	☐	☐	☐	☐	☐	☐
52	Top management is actively involved in the safety program	☐	☐	☐	☐	☐	☐
53	The company spends time and money on improving safety	☐	☐	☐	☐	☐	☐
54	The company considers safety equally with production and quality in the way work is done	☐	☐	☐	☐	☐	☐
55	Unsafe working conditions are identified and improved promptly	☐	☐	☐	☐	☐	☐
56	Equipment is well maintained	☐	☐	☐	☐	☐	☐
57	Action is taken when safety rules are broken	☐	☐	☐	☐	☐	☐
58	Employees are provided training in safe work practices for the job hazards they will encounter	☐	☐	☐	☐	☐	☐
59	Jobs are designed to reduce heavy lifting	☐	☐	☐	☐	☐	☐
60	Jobs are designed to reduce repetitive movement	☐	☐	☐	☐	☐	☐

These questions are about safety attitudes and perceptions for resident and worker safety

		Strongly -	Disagree	Neutral	Agree	Strongly Agree	Not Applicable
61	Nurse input is well received in this clinical area	☐	☐	☐	☐	☐	☐
62	In this clinical area, it is difficult to speak up if I perceived a problem with resident care	☐	☐	☐	☐	☐	☐
63	Disagreements in this clinical area are resolved appropriately (i.e., not *who* is right, but *what* is best for the patient)	☐	☐	☐	☐	☐	☐
64	I have the support I need from other personnel to care for residents	☐	☐	☐	☐	☐	☐
65	It is easy for personnel here to ask questions when there is something that they do not understand	☐	☐	☐	☐	☐	☐
66	The physician(s), OTs/PTs, healthcare aides, personal support workers and nurses (RNs, RPNS) here work together as a well-coordinated team	☐	☐	☐	☐	☐	☐
67	I would feel safe living here as a resident	☐	☐	☐	☐	☐	☐
68	Medical errors are handled appropriately in this clinical area	☐	☐	☐	☐	☐	☐
69	I know the proper channels to direct questions in this clinical are regarding: Resident safety	☐	☐	☐	☐	☐	☐
	Worker safety	☐	☐	☐	☐	☐	☐
70	I receive appropriate feedback about my performance	☐	☐	☐	☐	☐	☐
71	In this clinical area, it is difficult to discuss errors	☐	☐	☐	☐	☐	☐
72	I am encouraged by my colleagues to report any concerns I may have regarding: Resident safety	☐	☐	☐	☐	☐	☐
	Worker safety	☐	☐	☐	☐	☐	☐
73	The culture in this clinical area makes it easy to learn from the errors of others	☐	☐	☐	☐	☐	☐
74	My suggestions about safety would be acted upon if I expressed them to management	☐	☐	☐	☐	☐	☐
75	I like my job	☐	☐	☐	☐	☐	☐
76	Working here is like being part of a large family	☐	☐	☐	☐	☐	☐
77	This is a good place to work	☐	☐	☐	☐	☐	☐

78	I am proud to work in this clinical area		☐	☐	☐	☐	☐	☐
79	Morale in this clinical area is high		☐	☐	☐	☐	☐	☐
80	When my workload becomes excessive, my performance is impaired		☐	☐	☐	☐	☐	☐
81	I am less effective at work when fatigued		☐	☐	☐	☐	☐	☐
82	I am more likely to make errors in tense or hostile situations		☐	☐	☐	☐	☐	☐
83	Fatigue impairs my performance during emergency situations (e.g. emergency resuscitation, seizure)		☐	☐	☐	☐	☐	☐
84	Management supports my daily efforts:	Unit Management	☐	☐	☐	☐	☐	☐
		LTC Home Management	☐	☐	☐	☐	☐	☐
85	Management doesn't knowingly compromise resident safety:	Unit Management	☐	☐	☐	☐	☐	☐
		LTC Home Management	☐	☐	☐	☐	☐	☐
86	Management doesn't knowingly compromise worker safety:	Unit Management	☐	☐	☐	☐	☐	☐
		LTC Home Management	☐	☐	☐	☐	☐	☐
87	Management is doing a good job:	Unit Management	☐	☐	☐	☐	☐	☐
		LTC Home Management	☐	☐	☐	☐	☐	☐
88	Problem personnel are dealt with constructively by our:	Unit Management	☐	☐	☐	☐	☐	☐
		LTC Home Management	☐	☐	☐	☐	☐	☐
89	I get adequate, timely info about events that might affect my work, from:	Unit Management	☐	☐	☐	☐	☐	☐
		LTC Home Management	☐	☐	☐	☐	☐	☐
90	The levels of staffing in this clinical area are sufficient to handle the number of residents		☐	☐	☐	☐	☐	☐
91	This long-term care (LTC) home does a good job of training new personnel		☐	☐	☐	☐	☐	☐
92	All the necessary information for diagnostic and therapeutic decisions is routinely available to me		☐	☐	☐	☐	☐	☐
93	Trainees in my discipline are adequately supervised		☐	☐	☐	☐	☐	☐
94	I experience good collaboration with nurses (RNs, RPNS) in this clinical area		☐	☐	☐	☐	☐	☐
95	I experience good collaboration with physicians in this clinical area		☐	☐	☐	☐	☐	☐
96	I experience good collaboration with healthcare staff (OTs. PTs. HCAs, PSWs) in this clinical area		☐	☐	☐	☐	☐	☐
97	Communication breakdowns that lead to delays in delivery of care are common		☐	☐	☐	☐	☐	☐

BACKGROUND INFORMATION

Finally, please help us by providing the following information:

I. Age:
- ☐ <=30
- ☐ 31-40
- ☐ 41-50
- ☐ 51-60
- ☐ >60

II. Time in organization:
- ☐ < 1yr
- ☐ 1-2yrs
- ☐ 3-5 yrs
- ☐ 6-10 yrs
- ☐ > 10yrs

III. Gender:
- ☐ Female
- ☐ Male

IV. Shift worked most often:
- ☐ Day (e.g. 7am – 3pm)
- ☐ Evening (e.g. 3pm – 11pm)
- ☐ Night (e.g. 11pm-7am)

V. Your role:
- ☐ RN/RPN
- ☐ Allied Health
- ☐ Healthcare Aide
- ☐ Clinical Educator
- ☐ Clinical Care Manager
- ☐ MD
- ☐ Unit clerk/reception
- ☐ Support services (food services, housekeeping, maintenance, etc.)
- ☐ Administration (CEO, senior management, director, etc.)
- ☐ Other (Please specify: _____)

VI. Years working in this specialty:
- ☐ Less than 6 months
- ☐ 6 to 11 months
- ☐ 1 to 2 years
- ☐ 3 to 4 years
- ☐ 5 to 10 years
- ☐ 11 to 2 years
- ☐ 21 or more years

If you have any additional comments, questions, or concerns, please provide them in the space below.

Appendix 4 (D): Communication Log

COMMUNICATION (REACH) LOG

CHANGE TEAM MEMBER:

DATE OF COMMUNICATION:

PERSON/PEOPLE TALKED TO:
MANAGEMENT RN RPN PSW HCA OT/PT
OTHER: _____

METHOD OF COMMUNICATION:
IN PERSON (ONE ON ONE) VIA PHONE VIA EMAIL
IN PERSON (IN MEETING) OTHER: _____

TOPIC DISCUSSED:

RISK FACTORS SOLUTION DEVELOPMENT IMPLEMENTATION

NOTES:

Appendix 5 (E): Photovoice Log

PHOTOVOICE LOG

PICTURE NUMBER _____ CAMERA NUMBER _____

PHOTOGRAPHER:

TITLE OF PHOTO:

RISK FACTOR SHOWN/DESCRIPTION OF PHOTO:

POSSIBLE CAUSE CATEGORY (PEMEH):

PROCESS –

EQUIPMENT –

MATERIALS –

ENVIRONMENT –

HUMAN –

POSSIBLE SOLUTION:

ADDED NOTES:

Appendix 6 (F): Process Evaluation

Process Evaluation

Please answer the following questions with respect to this stage the Change Team just completed, thank you.

Please use the scale below for the following questions:

0	1	2	3	4
(never)	**(rarely)**	**(sometimes)**	**(often)**	**(always)**

- How often did you talk to other members of the change team outside of scheduled meeting times about issues relevant to the change process? 0 1 2 3 4
- How often did you talk to other work colleagues not on the change team outside about issues relevant to the change process? 0 1 2 3 4
- Did you feel comfortable discussing issues relevant to the change process with management? 0 1 2 3 4
- Did you feel comfortable discussing issues relevant to the change process with your supervisor? 0 1 2 3 4
- Did you feel comfortable discussing issues relevant to the change process with non-management staff? 0 1 2 3 4
- Did you feel involved in the decisions made by the change team? 0 1 2 3 4
- Did you feel the decisions made reflect suggestions that you made? 0 1 2 3 4
- Did you agree with the decisions being made by the change team? 0 1 2 3 4
- Did you feel management members of the change team are making more decisions than non-management members? 0 1 2 3 4
- Did you feel non-management members of the change team are making more decisions than management members? 0 1 2 3 4
- Did you feel that management and non-management members of the change team are equally involved in making decisions? 0 1 2 3 4
- Did you like the mix of individuals on the change team for this process? 0 1 2 3 4
- Do you feel that your voice was heard in the change team meeting(s)? 0 1 2 3 4
- Do you feel that your suggestions were valued? 0 1 2 3 4
- Do you have confidence that your suggestions will be considered and followed through? 0 1 2 3 4

Please use the scale below for the following questions:

1	2	3
(Too Little)	**(Just Right)**	**(Too much)**

- Do you feel management adequately voiced their opinion (please circle)? 1 2 3
- Do you feel non-management staff voiced their opinion the right amount? 1 2 3
- Did you feel management was adequately represented? 1 2 3
- Did you feel non-management staff was adequately represented? 1 2 3

Name: _____ Job Role: _____

Curriculum Vitae

Name: Paula Marguerite van Wyk

Post-secondary Education and Degrees:

The University of Western Ontario
London, Ontario, Canada
2008-2012 Ph.D.

University of Windsor
Windsor, Ontario, Canada
2005-2008 MHK

The University of Western Ontario
London, Ontario, Canada
2004-2005 Major in the Sociology of Health and Aging

The University of Western Ontario
London, Ontario, Canada
2000-2004 Honours BHSc

Honours and Awards:

Ontario Graduate Scholarship
2011-2012, 2010-2011, 2008-2009

Western Graduate Research Forum Alumni Association Poster Competition – Third Place
2010

Institute of Work & Health S. Leonard Syme Training Fellowship
2009-2010

Julien M. Christensen Graduate Student Award
2009

Canadian Federation of University Women Windsor Graduate Studies Award
2007

Western Graduate Research Scholarship
2008

Student Award of Merit
2004

Bachelor of Health Sciences Award of Achievement
2004

Honour W Award
2004

125 Award
2003

The Western Scholar Award
2000

Related Work Experience

Teaching Assistant
The University of Western Ontario
2008-2012

Guest Lecturer
Cognitive Ergonomics – The University of Western Ontario
2008-2011

Research Assistant/Consultant
Dearness Home
2008-2011

Research Assistant
The University of Western Ontario
2008-2010

Guest Lecturer
Occupational Health and Safety – Ryerson University
2010

Invited Speaker
Institute of Work & Health Plenary
2010

Guest Lecturer
Ergonomics and Aging – The University of Western Ontario
2009

Guest Lecturer
Human Sexuality Psychology Course – Fanshawe College
2009

Guest Lecturer
Research Design – University of Windsor
2008

Graduate Teaching Assistant
University of Windsor
2006-2008

Guest Lecturer
Functional Anatomy – University of Windsor
2006

Invited Speaker
Exceptional Children – University of Windsor
2006

Invited Speaker
Health and the Human Spirit – The University of Western Ontario
2005

Service:

Kinesiology Graduate Board President
The University of Western Ontario
2011-2012

Faculty of Health Sciences Faculty Council Graduate Student Representative
The University of Western Ontario
2011-2012

Kinesiology Executive Management Committee (KEMC) Graduate Student Representative
The University of Western Ontario
2011-2012

Kinesiology Graduate Affairs Committee (KGAC) Graduate Student Representative
The University of Western Ontario
2011-2012

Kinesiology School Affairs Committee (KSAC) Graduate Student Representative
The University of Western Ontario
2011-2012

Faculty of Health Sciences Graduate Chair Committee Kinesiology Graduate Student Representative
The University of Western Ontario
2011-2012

Kinesiology Graduate Board Chair
The University of Western Ontario
2010-2011

Kinesiology Graduate Board Vice President Finance, Chief Financial Officer (CFO)
The University of Western Ontario
2009-2010

Publications:

Articles published, in press, or submitted:

Fiedler, K.M., Weir, P.L., **van Wyk, P.M.,** & Andrews, D.M. (2012). Analyzing what nurses do during work in a hospital setting: A feasibility study using video. Work, 43, 515-523

DeForge, R., **van Wyk, P.**, Hall, J., & Salmoni, A. (2011). Afraid to care; unable to care: A critical ethnography within a long-term care home. *Journal of Aging Studies*, 25, 415-426

Weir, P.L., Andrews, D.M., **van Wyk, P.M.**, & Callaghan, J.P. (2011). The influence of training on decision times and errors associated with classifying trunk postures using video-based posture assessment methods. *Ergonomics*, 54(2), 197-205

van Wyk, P.M., Weir, P.L., & Andrews, D.M. (2010). Nurse perceptions of manual patient transfer training: Implications for injury. *Work* 37(4), 361-373

van Wyk, P.M., Weir, P.L., Andrews, D.M., Fiedler, K., & Callaghan, J.P. (2009). Determining the optimal size for posture bins used in posture assessment methods. *Ergonomics* 52(8), 921-930

Andrews, D.M., Arnold, T.A., Weir, P.L., **van Wyk, P.M.**, & Callaghan, J.P. (2008). Errors associated with bin boundaries in observation-based posture assessment methods. *Occupational Ergonomics* 8(1), 11-25

Position Papers:

van Wyk, P.M. & Salmoni, A. (2009). Factors affecting operator exposure to whole-body vibration. *A paper providing safety and health advice to stakeholders prepared for the Centre of Research Expertise for the Prevention of Musculoskeletal Disorders (CRE-MSD).*