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Trends in Work-related Injury Rates and the Associated Incurred Costs in Long-term Care Centers

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TRENDS IN WORK-RELATED INJURY RATES AND THE ASSOCIATED INCURRED COSTS IN LONG-TERM CARE CENTERS

by

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ABSTRACT
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Background. Nursing assistants, working in long–term care facilities, have consistently been among the top occupational groups experiencing work-related musculoskeletal injuries. These injuries have been attributed the physical demands of lifting and moving the individuals in their care. Great strides in research have identified successful risk reduction strategies such as the implementation safe patient handling and mobility programs. The benefits of these programs have been advocated over the last two decades, but the rate of injuries among nursing assistants continues to be more than double the national average for all other industries. The purpose of this study was to investigate the influence of safe patient handling and mobility policies and procedures, facility resources, and work practices on the trends in injury rates and the associated costs in long-term care facilities.

Methods. Thirty-eight facilities contributed information to the study. Data were gathered on safe patient handling policies, facility resources, work practices, work-related injuries and workers' compensation costs for 2002 – 2011.

Results. Eighty-four percent of the facilities had patient handling policies or were preparing to implement in the upcoming year. All of the facilities had mechanical lifting devices, employee training and procedures for embedding safe patient handling into daily

work practices. Nineteen facilities contributed one to ten years of data, showing injury rates decreased 63% from 2002 – 2011. Eleven facilities provided worker's compensation information showing medical and indemnity costs decreased 54% from 2006 – 2011. The presence of a policy, was not found to independently influence these factors. The number of days away from work due to work-related injuries was significantly lower in facilities with patient handling policies. *Conclusion.* The presence of the policy was not found to independently influence injury rates or costs, but the prevalence of safe patient handling policies, mechanical lifting devices and safe work practices suggested that a safety culture may finally be present in long-term care. Despite the impressive reductions in injuries and costs, the continued higher than average rate of injuries among this occupational group may indicate that other factors now play a greater role in work-related injuries.

DEDICATION

To my family and friends, who listened more than should be expected, provided countless encouragements, gently inquired about the process, waited *fairly* patiently, and all the while, remained fully present for me - just as I needed them to be.

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LIST OF ABBREVIATIONS

ADL	Activities of daily living
ANA	American Nurses Association
BLS	Bureau of Labor and Statistics
CI	Confidence interval
CMI	Case mix index
CMS	Centers for Medicare and Medicaid Services
DART	Rate of cases with days away from work, on job restriction or transfer
DON	Director of Nursing
EMG:	Electromyogram
FTE:	Full-time equivalent.
HCA	Health Care Administration
HRPD	Hours per resident per day
HSE	Health Safety Executive
IRB	Institutional Review Board
L5/S1	Between the 5^{th} lumbar and 1^{st} sacral vertebral disks
LLC	Limited liability company
Lost days	Days away from work
LPN:	Licensed practical nurse
LTC:	Long-term care facility. Nursing home
MDS	Minimum data set
Modified duty	Work restrictions or job transfer
N	Newtons

NA:	Nursing assistant, nurse's aide
NAICS:	North American Industry Classification System
NIOSH:	National Institute of Occupational Safety and Health.
OSHA:	Occupational Safety and Health Administration.
RD	Regression discontinuity
RN:	Registered nurse
RR	Relative risk. Rate ratio
RUG	Resource Utilization Group
SPHM:	Safe Patient Handling and Mobility
USB	Universal Serial Bus
UK	United Kingdom
UW-EC	University of Wisconsin-Eau Claire
UWM	University of Wisconsin-Milwaukee
WC	Workers' Compensation
WRMSI:	Work-related musculoskeletal injury

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Trends in Work-Related Injury Rates and the Associated Incurred Costs in Long-Term Care Centers

Significance

Over the last decade, most private industries have recorded a gradual decline in workplace illnesses and injuries. The nursing profession has also realized fewer injuries, although the number of reported cases continues to be far greater than most other occupations. In fact, for years and years, nursing personnel, particularly nursing assistants (NAs), and specifically those working in long-term care facilities (LTC), have consistently been among the top occupational groups for injury rates and for number of injuries (BLS, 2012).

Incidence and Prevalence of Injuries. From 2003 until 2011, the Bureau of Labor and Statistics (BLS) injury rates for all private industries in the U.S. declined from 5.0 to 3.5 cases per 100 full-time equivalent workers (FTE). Long-term care facilities, called nursing care facilities by the BLS, also reported declining injury rates from 9.3 in 2006, to 8.2 in 2011. For cases where the worker had to be away from work, on job restriction or transfer (DART), the 2011 rate for LTC facilities was 5.3 per 100 FTE compared with 1.9 for all industries (BLS, 2012).

Work-related musculoskeletal injuries (WRMSI) experienced by nursing aides, orderlies and attendants, accounted for more than half of the injuries that required days away from work in 2011. Back injuries alone accounted for 55% of the WRMSI, with a median number of five days away from work (BLS, 2012).

Over 1,600,000 individuals are employed in the U.S. in LTC facilities (BLS, 2012), the majority of whom are nursing personnel. With injury rates above 8%, and

DART rates above 5%, nursing personnel, particularly those working in LTC environments, continue to be among the top occupational groups experiencing work-related injuries.

In the last two decades, the high risk of WRMSI among nursing personnel has been strongly associated with the transfer and repositioning of dependent patients (Cameron, Armstrong-Stassen, Kane, & Moro, 2008; Daraiseh et al., 2003; Engkvist, Hjelm, Hagbert, Menckel, & Ekenvall, 2000; Owen & Garg, 1990) The American Nurses Association (ANA) succinctly summarized these risks in their "Handle with Care" campaign by stating "There is no safe way to manually lift a physically dependent adult patient" (de Castro, 2004, p. 2). The ANA continues to cite patient handling tasks as the primary risk factors for WRMSI and recommends the use of mechanical lifting devices to reduce or eliminate lifting for nursing personnel (ANA, 2010).

Patient Handling and Mobility. The risks for WRMSI have been significantly correlated with the physical demands of work in LTC, primarily due to patient transfer and repositioning activities (Andersen, Haahr, & Frost, 2007; Cameron et al., 2008; Daraiseh et al., 2003; Engkvist et al., 2000; Garg & Owen, 1992). Biomechanical analysis of these tasks has been extensively studied over the past two decades, revealing the risks to healthcare workers and advocating the benefits of using mechanical lifting and repositioning devices (Daynard, Cooper, Tate, Norman, & Wells, 2001; Garg et al. 1991 a, 1991b ; McGill & Kavcic, 2005; Santaguida, Pierrynowski, Goldsmith, & Fernie, 2005; Winkelmolen, Landeweerd, & Drost, 1994).

Biomechanical risks. Biomechanical analyses and direct measurements have quantified the effects and estimated the musculoskeletal injury risks of patient handling

tasks on healthcare workers (Daynard et al., 2001; Garg, Owen, Beller, & Banaag, 1991a, 1991b; McGill & Kavcic, 2005; Santaguida et al., 2005; Winkelmolen et al. 1994). The risks of a low back injury have been determined by using biomechanical models to estimate the net forces and net moments on the L5/S1 intervertebral disc (Chaffin, 1969). The L5/S1 location was selected because of a review of injury histories and cadaver studies. A maximum compressive load tolerance value of 3400 newtons (N) was determined by imparting compressive forces on cadaver spines and measuring the maximal loads before damage. After a review of laboratory and cohort studies, the National Institute of Occupational Safety and Health (NIOSH) recommended that compressive forces on the low back during work tasks should remain below 3400 N (NIOSH, 1981). The NIOSH value, called the action limit, has become the standard for ergonomic job design. A 500 N action limit for shear forces, at either the L4/L5 or L5/S1 disc level, has also been suggested by some authors (Daynard et al., 2001; McGill & Kavcic, 2005).

More recently, researchers have utilized instrumentation such as electromyogram (EMG), force plates, and motion analysis to further refine the estimates of the reaction moments, the roles of individual tissues and the estimated loads on the low back during patient handling activities (Arjmand & Shirazi-Adl, 2005; Caboor et al., 2000; Kier & MacDonnell, 2004; Winkelmolen et al., 1994). Not surprisingly, the conclusions from over 20 years of research have been similar-manual transfers and manual repositioning of patients resulted in estimated compressive and shear loads that exceeded the recommended limits and were associated with a high risk of injury.

Safe patient handling and mobility policies. The high rate of injuries among healthcare personnel has prompted the development of injury prevention strategies, including policies that suggest or regulate how workers transfer and reposition patients. These guidelines, commonly referred to as Safe patient handling and mobility (SPHM) policies, recommend that healthcare workers use mechanical devices to move patients who cannot assist or who may become combative during transfer maneuvers. The policies advocate for individualized lifting plans for each patient to encourage independence where possible, yet minimize or eliminate lifting by the healthcare worker (OSHA, 2009). Policies and programs regarding SPHM have been implemented in many healthcare settings during the last decade, and were intended to eliminate the primary risk factor for injury for the healthcare worker. Despite the presence of mechanical lifting devices and no-lift policies, the injury rate for nursing personnel in healthcare, particularly in LTC settings remains high.

Purpose

The purpose of this study was to examine the impact of SPHM policies in LTC on injury rates and the associated costs, and to explore the trends in these variables in the years following policy implementation. The relationships between employee training, policy enforcement and the availability of resources were also examined.

The questions guiding this research were:

Question one. In LTC facilities, were the injury rates and the associated medical and indemnity costs from patient handling tasks reduced following implementation of a SPHM policy?

Hypothesis one. In the three years after policy implementation the average injury rates and associated costs, related to patient handling tasks, were less than during the three years prior to the policy implementation.

Hypothesis two. In 2011, workers' injuries related to patient care were lower in facilities with a SPHM policy in effect for more than three years, than in facilities without a policy.

Question two. Were LTC facilities able to maintain the initial benefits of their SPHM policies?

Hypothesis one. During the years following policy implementation, the trends in injury rates and associated costs were maintained or improved.

Question three. In facilities with the lowest injury rates, lost work days and related WC costs, what were the common factors related to employee training programs, policy enforcement, availability of SPHM resources and other work practices that may have contributed to worker safety?

Background

Biomechanical studies.

Manual transfers. Biomechanical studies of nursing work in the late 1980's and early 1990's were already highlighting patient handling tasks as high risk activities (Carlson, 1989; Garg & Owen, 1992; Garg et al. 1991a, 1991b; Garg, Owen & Carlson, 1992). An early field study in a large Midwestern LTC found that seated transfers of patients (i.e bed to wheelchair) were rated as difficult, and transfers from toilet to wheelchair were rated as the most stressful patient handling task (Garg et al., 1992). The researchers also observed and videotaped NAs during work. As was common at the time,

the NAs performed manual transfers 98% of the time, most often with another worker. The biomechanical analyses of these manual transfers estimated that the greatest forces and flexion moments occurred between toilet to wheelchair and wheelchair to bed, confirming what the NA's perceived as most difficult. Subsequent biomechanical analysis in a laboratory supported the field study results. The estimated compressive forces on the L5/S1 disc for the typical two person manual patient transfers exceeded the 3400 N NIOSH action limit (Garg et al., 1992; Garg et al., 1991a, 1991b).

Marras, Davis, Kirking, and Bertsche (1999) analyzed manual patient transfers from bed to wheelchair and wheelchair to toilet with a 50 kg non-weight bearing, but cooperative "patient". A lumbar motion monitor, worn by the subjects on their back, collected three-dimensional position, velocity and acceleration data during the transfer tasks. Electromyographic data from the subjects' trunk muscles assisted the biomechanical analysis to estimate the compressive and shear forces on the spine. All manual transfers exceeded the 3400 N criterion level, and the estimated compressive forces during single person transfers exceeded 6000 N.

Manual bed boosts and other repositioning tasks have also been investigated for possible risks to caregivers. Winkelmolen et al. (1994) evaluated five two-person manual bed repositioning techniques. Video recordings by three cameras and manual measurements of joint angles from the images allowed the analysis of shifting a volunteer upwards in a hospital bed. The compressive forces at the L5/S1 disc were estimated with a static biomechanical computer program. The mean compressive forces varied from 3315 N to 4487N and were greater in all lifts for the heavier "patient". Only the "Australian lift" with a patient of less than 55 kg was estimated to produce compressive

loads less than the 3400N action limit. The lift involved placing the patient's arms over the back of the nurses' shoulders while the two nurses simultaneously created a sling under the thighs of the patient. All other lifts and conditions exceeded the limit. Similar results were found by Marras et al. (1999) and Skottte and Fallentin (2008). Both the single person and two person hook and drag techniques resulted in excessive forces. A common draw sheet technique resulted in compressive loads of 3800 N.

Mechanical devices. Various mechanical devices have been developed to assist with patient movement and handling and to reduce the known stressors on the caregiver. These devices can be as simple as a gait belt but are more commonly recognized as floor lifts, ceiling lifts and friction reducing devices for bed repositioning. A number of studies have compared the effects of the devices against the traditional manual methods and/or against each other. The studies all agree that mechanical devices reduce compressive forces on the spine, but the devices have not completely solved the problem. A review of some of the literature on the mechanical devices follows.

Horizontal transfers. Friction-free transfer devices are used to perform lateral motions such as transferring from a bed to a gurney, or for bed boosts upwards in bed. These maneuvers have traditionally been performed by grasping a bed sheet under the patient or by grasping or hooking the patient's limbs as described above. Assessments of lateral transfer devices have addressed the forces on the caregiver and the friction coefficients of the devices. Lloyd and Baptiste (2006) compared 11 different lateral transfer devices or techniques by measuring the pull force with a force gauge and analyzing still photographs at the moment of load inception. The University of Michigan 3D Static Strength Prediction Program estimated the spinal compression and the shear

forces on the worker. During lateral transfers, the friction reducing devices resulted in a range of reasonable compressive forces (966 N - 2941 N) and shear forces (27 N – 797 N) on the caregiver.

Friction-free lateral transfer devices have been perceived by the workers as significantly less difficult than the manual draw sheet technique and required fewer workers to reposition heavier patients (Pellino, Owen, Knapp & Noack, 2006). McGill and Kavcic (2005) analyzed the coefficient of friction of three sliding devices, and the muscular activity and kinematic effects on the caregiver during use. Although the devices lowered the friction by 50%, as compared to a standard draw sheet technique; the forces on the low back varied depending upon the subject's posture and technique. Variability was also found by Lloyd and Baptiste (2006) where spinal loading was influenced by the caregiver's stance and posture, the friction coefficient of the device, the height of the transfer surfaces, handles, angle of pull and the weight of the patient. Despite the variations, the devices were all found to be superior to the traditional manual methods.

Recently, procedures have been suggested for lateral transfers and repositioning maneuvers using the floor or ceiling mounted mechanical devices. Although studies were not found on the effectiveness of this use, the devices have been recommended when the patient cannot participate or when the lifting or rolling needed for a sliding device would require the caregiver to lift more than 35 lbs or 15 kg (Nelson, Motacki, & Menzel, 2009; Waters, 2007). An accessory device fits on the ceiling or floor lift and clamps onto the bed sheet. By allowing the device to elevate one or both sides of the sheet, the patient can be easily rolled with the device to place a transfer sling or sliding sheet, and then horizontally moved without lifting by the worker (Vancare, 2010)

Lifting devices. Ceiling mounted lifts and floor-based mechanical devices have consistently and effectively reduced the estimated peak compressive forces on the low back to less than 3400 N during patient transfer tasks (Daynard et al. 2001; Kier & MacDonnell, 2004; Santaguida et al., 2005; Zhuang, Stobbe, Hsiao, Collins, & Hobbs, 1999). In studies of transfers between bed and wheelchair with moderately or fully dependent patients, both floor and ceiling lifts were found to be superior to manual transfers (Kier & MacDonnell, 2004; Zhuang et al., 1999). Ceiling lifts have resulted in lower forces on the back than floor-based mechanical devices (Kier & MacDonnell, 2004; Santaguida et al., 2005). Rice, Wooley, and Waters (2009) measured the forces needed to push, pull and rotate both floor and ceiling lifts carrying "patients" of various weights up to 145 kg. Ceiling lifts required 50-75% less force than floor-based devices and all types of mechanical lifts were considered acceptable for 90% of the female population based generally on push/pull data by Snook and Ciriello (1991). The authors cautioned that the results were achieved on optimal floor conditions and greater forces would be required to push, pull and rotate floor lifts on carpeted or uneven floors (Rice et al., 2009).

The mechanical devices have shown great results, although there are drawbacks. The rolling of the patient to position the sling has, at times, resulted in compressive forces that exceeded the criterion level especially with heavier patients (Zhuang et al., 1999). Rolling a patient toward the caregiver was found to be more stressful than rolling away (Santaguida et al. 2005; Zhuang et al. 1999). Zhuang et al. (1999) found that 10% of the subjects exceeded the action limit for compressive forces while using mechanical devices. The authors suggested that the overweight worker may be a contributing factor.

Santaguida et al. (2005) found that rolling and shifting the patient to position the sling with either floor or overhead devices comprised 59% of the transfer duration. This was supported by NAs who reported that the sub tasks involved in using the ceiling lifts added time and effort to the transfer process and decreased satisfaction with their use (Zhuang, Stobbe, Collins, Hsiao & Hobbs, 2000).

Cumulative spinal loads. Daynard et al. (2001) stated that cumulative spinal loads could be defined as either "the accumulated demands on the spine during a single patient handling activity or the accumulation of loading throughout a worker's lifetime" (p.200). Workers who repeat or prolong adverse trunk postures may be at risk for injury from the cumulative effect of spinal loading. To assess the cumulative spinal loads, a quasi-dynamic biomechanical analysis included motion analysis with video and joint digitalization. Thirty-three female unit assistants (NAs) performed patient transfer tasks manually with gait belts, with floor-based transfer devices and with friction reducing bed repositioning devices. The transfers were conducted with a lighter volunteer (55 kg), who participated partially in the transfer and a heavy volunteer (100 kg) who did not participate, (i.e. represented a fully dependent patient). As expected, the manual transfers, for both bed-to-wheelchair transfers and chair boosts resulted in peak spinal compression values that exceeded the NIOSH action limit. The assistive devices improved the peak compression forces to less than 3400 N, however, the cumulative loads with the assistive devices were often greater than with the manual task due to the increased time and increased number of actions needed to complete the task. The authors proposed that the cumulative effects of spinal loading may be influencing the dramatic number of low back injuries among healthcare workers and should warrant further attention.

Patient handling devices. The patient handling literature has overwhelmingly concluded that single person transfers and most two-person manual transfers of a seated patient resulted in excessive forces and an increased risk of injury. The use of mechanical devices reduced the peak compressive forces to below the threshold value, but the increased duration of the task resulted in cumulative compressive forces that were greater than found in the manual transfers. Other patient handling tasks such as lateral transfers and upward boosting were found to be improved with low friction devices. The additional time and trunk flexion needed to place a friction reducing device under a passive patient may diminish the value of the device when compared to the immediate procedure of using the bed sheet that is already in place. These may be strong factors in the low compliance with use of devices (Daynard et al., 2001).

Although mechanical devices have demonstrated reduced risk of injury to healthcare workers, the widespread benefits of these devices have not yet been fully realized. Internationally, countries such as the United Kingdom (UK) and Australia have mandated the use of manual lifting devices through national policies and regulations. The impact of these policies has not been overwhelmingly positive.

Safe patient handling and mobility policies. In 1992, the UK responded to the high rate of injuries by enacting a national lifting regulation called the Manual Handling Operations Regulations: Guidance on Regulations (HSE, 2000). The intent of the regulation was to eliminate all manual lifting and the associated injuries in all occupations including healthcare. In Australia, the Victorian Department of Human Services provided millions of dollars in funding between 1998 and 2004 to support no lift programs (Martin, Harvey, Culvenor, Payne, & Else, 2004). In the US, neither standards

nor regulations exist nationally, but the Occupational Safety and Health Administration (OSHA) and other agencies have provided encouragement and guidelines for the development of SPHM programs (Nelson et al., 2005; OSHA, 2009). As of January 2013, eleven individual states in the US enacted legislation, adopted resolutions, rules or regulations regarding minimal lift policies in healthcare facilities and other states have introduced legislation (ANA, 2013). In addition, many individual healthcare facilities and health systems have enacted programs that included the addition or improvement of mechanical devices and training in their use. The results of some of these programs are discussed below.

Success of policies. There have been many reported benefits of SPHM programs including decreased numbers of injuries, fewer missed work days and decreased costs from injury claims (Alamgir et al., 2008; Chhokar et al., 2005; Collins, Wolf, Bell & Evanoff, 2004; Donaldson, 2000; Engkvist, 2006; Li, Wolf & Evanoff, 2004; Garg & Owen, 1992; Martin, Harvey, Culvenor & Payne, 2009; Miller, Engst, Tate, & Yassi, 2006; Park, Bushnell, Bailer, Collins & Stayner, 2009; Zadvinskis & Salsbury, 2010). Decreased costs and fewer lost work days per claim have been associated with a reduction in the severity of injuries. Other reported benefits have been the workers' perceptions of a lowered risk of injury (Engst, Chhokar, Miller, Tate & Yassi, 2005; Miller et al., 2006), less discomfort with transfer tasks (Li et al., 2004), less tiredness at the end of shift and increased job satisfaction (Engkvist, 2006).

During 2000-2001, the Ohio Bureau of Workers' Compensation provided grants for equipment purchases, training and consultation specifically targeted to reduce back injuries among direct-care staff in LTCs (Park et al., 2009). The purchase of mechanical

devices was associated with a 21% decrease in the rate of low back injuries and a reduction in the claim costs per worker. Training and consultation alone had a small impact on the injury rates.

Collins et al. (2004) implemented a SPHM program that included the use of mechanical lifting equipment and repositioning aids, worker training, a medical management program, and a written zero-lift policy. The study spanned three years pre-intervention and three years post-intervention. The intervention was implemented in six LTCs and included all nursing staff (n= 1728). The authors reported significantly decreased injury rates (RR = .39, 95% CI .29 - .55), decreased WC costs, fewer lost work days, fewer restricted work days, and a 30% reduction in the incidence of resident assaults on caregivers.

Miller et al. (2006) evaluated the work practices of healthcare workers in two LTCs assessing the effectiveness of portable ceiling lifts for patient handling. The outcomes revealed that the workers in the intervention group reported less discomfort ($F(1, 16) = 28.51$, $p = .0001$) when they used ceiling lifts as compared to manual lifting and 82% reported that the ceiling lifts made their job easier. Also, the workers in the intervention facility perceived that their job was less mentally demanding than was reported by the workers in the control facility ($F(1, 28) = 4.387$, $p = .045$). The injuries and associated costs were improved in the intervention facility as compared to the control.

Policy concerns. The majority of the early literature on the impact of SPHM policies came out of the UK after the Health Safety Executive's (HSE) manual handling regulations went into effect in 1993. Unfortunately, in the first several years following

the implementation of the UK regulations, the rate of injuries among patient handlers did not decrease (HSE, 2007). While 33% of reporting agencies documented a decrease in manual handling injuries between 2000 and 2003, 28% of the agencies reported an increase in manual handling injuries. This resulted in an overall slight increase in the proportion of manual handling injuries among healthcare workers. In 2007, the HSE continued to report that 25% of nurses in the UK missed work due to work-related back pain (HSE, 2007).

Martin et al. (2009) evaluated the effect of a no-lift policy across a large health system in Australia affecting 15,000 to 17,000 FTEs over a 10 year period. While a statistically significant reduction in the rate of back injury claims (23.9%) occurred after the intervention, shoulder injury claims steadily increased. This finding caused concerns about new physical stresses due to mechanical lifts. Also, a non-significant upward trend in back injury claims, two to three years post-intervention, caused some concerns about the sustainability of a multifaceted ergonomics policy.

Texas was the first state in the U.S. to pass SPHM legislation for hospitals and LTCs (Safe Patient Handling & Movement Practices, Texas S. B. 1525, 2005). The legislation took effect in 2006 yet the rate of illness and injury cases increased in the first year from 6.8 per 100 workers in 2005 to 7.1 cases in 2006. The rate then declined for the next four years ending at 5.7 cases in 2010 (BLS, 2012). At first glance, this looks positive but prior to the legislation, the injury rates in LTCs had already been declining steadily (from 10.2 cases in 2000). The rate of injury in all private industries, both in Texas and nationally followed the same path. In Texas, the injury rate for private industries declined from 4.0 cases in 2003 to 2.7 cases in 2010. Despite SPHM

legislation, LTCs in Texas continued to report injuries at more than twice the rate for all industries in the state (BLS, 2012) (Figure 1).

The results of SPHM programs have been positive in individual studies, yet similar benefits for healthcare workers have not been apparent in state, national or international injury rates.

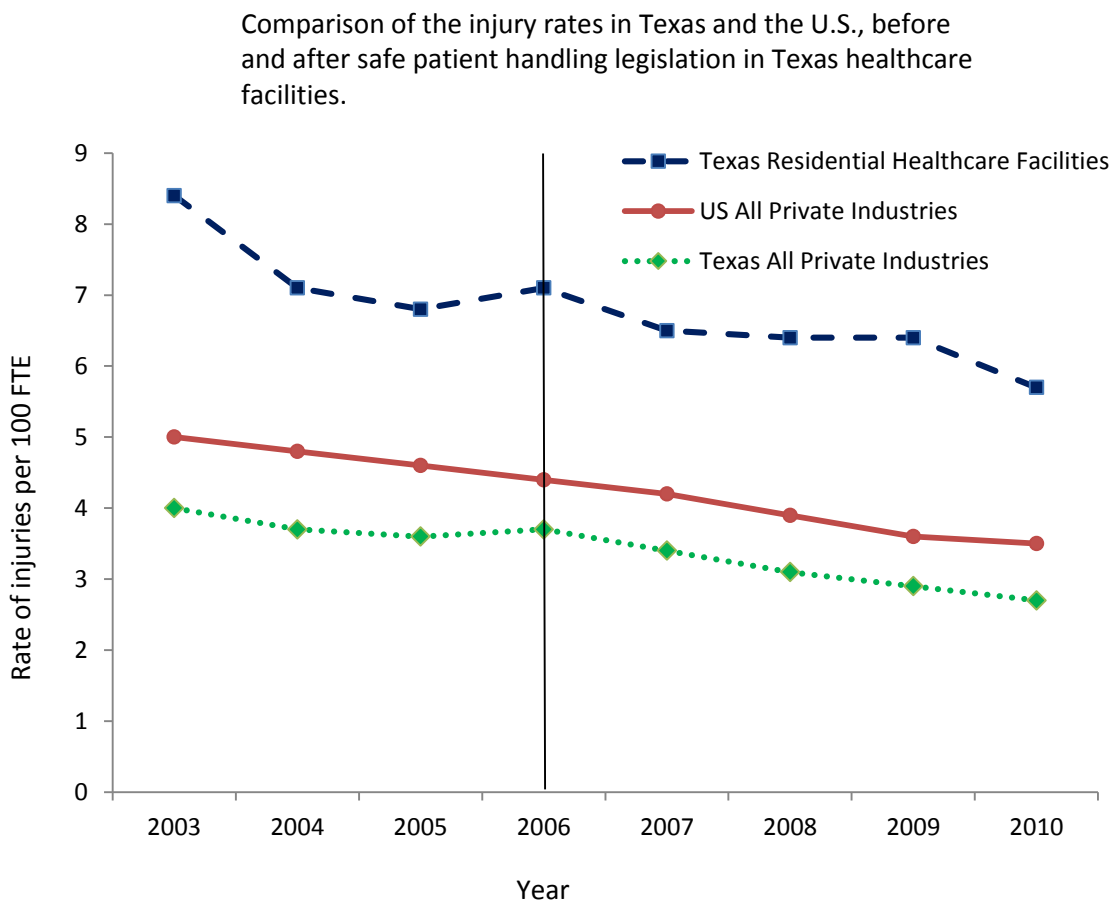

Figure 1. A comparison of the injury rates for Texas residential healthcare facilities, Texas private industries and US private industries. Safe patient handling policies were required in all Texas healthcare agencies by 2006.

Literature Review

Risk Factors for Injury

An aging workforce and worker shortages are serious problems facing nursing personnel (ANA, 2010, Squillace et al. 2009). The increasing prevalence of obesity (CDC, 2008) challenges a nursing workforce that is older, likely overweight, understaffed, performing more duties and lifting heavier patients (ANA, 2010). Excessive workload demands are also considered primary areas of stress and dissatisfaction, leading to attrition and contributing to the workforce shortage (CDC, 2008; Geiger-Brown et al., 2004; Zontek, Isernhagen, & Ogle, 2009). These multidimensional factors increase the demands on the existing workforce contributing to workplace fatigue and injury (Zontek et al., 2009).

Workforce issues.

Worker shortage. A 2007 Nursing Staff Vacancy and Turnover Report, by the American Health Care Association (AHCA, 2008) stated that America's LTCs were facing a critical shortage of nearly 110,000 nursing personnel. The projected shortage was attributed to the increasing health service needs for the aging baby boomers. The current aging workforce is also rapidly approaching retirement causing inadequate staffing levels and prompting concerns about increased workloads. All this is reportedly leading to poor job satisfaction and job turnover (AACN, 2010). The 2004-2005 Nursing Assistant Survey (CDC/NCHS, 2008) reported that 44.7 % of NAs working in LTCs indicated that they may leave their position within one year. Among the top reasons cited for leaving were "found a better or new job" and "working conditions".

Age. The aging of the baby boomer population (born between 1946 and 1964) has increased the demand for medical and related services from a similarly aging workforce (AACN, 2010; BLS, 2009; and ICHRN, 2008). In 2008, the average age of a registered nurse (RN) in the U.S. was 46.8 years (ICHRN, 2008). The 2004 Nursing Assistant Survey (CDC/NCHS, 2008) found that more than a third of certified NAs working in LTCs were older than 45 years.

Age has been identified as a risk factor for musculoskeletal injuries among nurses. Engkvist et al. (2000) found that being over age 40 slightly increased risk of an overexertion back injury, but being over age 50 greatly increased risks as compared with being under age 40. Cameron et al. (2008) found that 57% of older (over 45 years) Canadian RNs experienced job-related back pain "more than rarely over the last 12 months" (p. 108) and 51% reported neck pain. Nationally, workers aged 45-54 years had the highest DART rate for overexertion injuries and closely followed the 34-44 age group for DART rate due to back injuries (BLS, 2012). The older workers missed more days per injury, with the 65 years and older group representing the greatest number of days missed (BLS, 2012).

Obesity. One of the factors contributing to the increasing workload and risk of injury is the increasing prevalence of obesity (Andersen et al., 2007; Engkvist et al., 2000; WHO, 2006). Obese individuals are not only heavier loads for workers to lift; they are more frequent consumers of medical services (Hahler, 2002). Besides caring for heavier patients, there is also the concern that the healthcare workers themselves, are likely to be overweight or obese.

Work environment. Long and rotating shifts, common in acute and LTC settings, have been associated with risk of injury (Åkerstedt, Fredlund, Gillberg & Jansson, 2002; Cameron et al., 2008; Spurgeon, Harrington & Cooper, 1997). Significant associations with back pain have also been found with sleep inadequacy, typical of shift workers (Cameron et al., 2008). Injury risk among nursing personnel has also been associated with psychosocial factors such as lack of job control (Andersen et al. 2007; Cameron et al., 2008; Schmidt & Diestel, 2010) job satisfaction (Andersen et al., 2007; Daraiseh et al., 2003; Zontek et al. 2009), perceived risk of injury and the organizational and social environment (Daraiseh et al., 2003). Hasson and Arnetz (2007) found that in LTCs and home care settings, the greatest predictor of work dissatisfaction among nursing personnel was work-related exhaustion. Exhaustion was referred to as "feelings of fatigue related to one's work" (p. 472). In both settings the NAs rated their work-related exhaustion as high.

Policy compliance. Several studies have attempted to uncover the reasons why the lifting policies have not been more effective in reducing workplace injuries. Studies have suggested that the lack of significant outcomes may be due to noncompliance with patient handling policies. The reasons for noncompliance have been attributed to inadequate training, limited availability of lifting devices and too little time to set up and use a device (Evanoff, Wolf, Anton, Canos & Collins, 2003; Li et al., 2004; Moody, McGuire, Hanson, & Tigar, 1996; White & Gray, 2004). It has also been suggested that nurses and other workers resist complying with policy changes for various reasons including a conflict with their perceived role as a caregiver (Kneafsey, 2000), disbelief in management's stated or implied motives (Stanley, Meyer, & Topolnysky, 2005) and

frustration and powerlessness regarding change (Malin, 1994; Spence-Laschinger, Sabiston, Finegan & Shamian, 2001).

A paradigm shift in care-giving. Kneafsey (2000) provided a comprehensive literature review of the problems of implementing a patient handling program in healthcare agencies. Beyond the resource/training/time deficit issues as described by others, Kneafsey (2000) discussed how the occupational socialization of nurses has impacted the implementation of patient handling programs. She discovered characteristics that have impeded nurses' ability to change their practices. In brief, nurses, predominantly female, have been socialized by their profession and the community to maintain the practices of their professional culture. These practices included performing ritualistic tasks, working hard and protecting others before self. The process of socialization was perpetuated by nurses through students, subordinates and peers. She supported her discussion by citing studies of students who modeled the incorrect practices of the nurse rather than challenge the custom by suggesting or performing the patient handling task, utilizing mechanical devices as outlined by hospital policy. Kneafsey suggested that, for effective change, proper resources were necessary and senior nursing staff must be targeted to become the creators of the new practice norms. In this way they become the role models of change.

Pellatt (2005) further emphasized the challenging role of nurses in changing practice. She explored dignity issues in implementing a patient handling policy into nursing practice. She presented legal cases where patients refused to be transferred via mechanical lifting devices because they felt it violated their dignity. Nurses were placed in the awkward position of placing themselves at risk by performing the manual transfer

in violation of the policy or disregard the rights and needs of the patient by following regulations. Through a discussion of the relative value of rights, Pellatt (2005) suggested that nurses, with proper training, confidence and skill could effectively ensure both dignity and safety during use of mechanical lifts.

Policy implementation studies. Several studies have investigated the impact of SPHM policies, the training and the use of mechanical lifting devices in a variety of healthcare settings. Because LTC facilities continue to lead the industry for injury rates and the incurred costs for those injuries, only studies of these settings will be included here.

Safe patient handling and mobility interventions reported in the literature included the introduction of or upgrade of mechanical devices, training procedures and the implementation of SPHM policies. The study outcomes were generally compared before and after the intervention and included injury rates, DART rates, days of missed work (days lost) and/or days of restricted work due to injuries, and data for the specific sources of injury (all injuries, patient lifting and transferring, repositioning, other patient cares, assaults, other). A few studies also included the trends in the outcome data illustrating the impact of the interventions over time.

Garg and Owen (1992) introduced patient handling devices and two-hour hands-on training sessions in two units of a LTC setting (140 residents). Four years of combined data for the two units, showed a post-intervention incidence rate for back injuries 43% lower than during the pre-intervention phase. In the post-intervention phase, lost days due to work injuries reduced to zero.

Evanoff et al. (2003) studied changes in musculoskeletal injuries after provision of mechanical lifting devices and a two-hour hands-on training course on lift operation. The settings included four hospitals and five LTC facilities. Injury, costs and compliance data were collected for 1- 2 years pre-intervention and 1-2 years post-intervention. While injury rates and lost days decreased, the reductions were greater on units where personnel reported using the lifts and in LTC settings where policies mandated use. The reported aggregate post-intervention relative risk (RR) for injuries was 0.82, 95% CI (0.68, 1.00). For LTC settings, the RR was 0.71 with a 95% CI (0.49, 1.03). The authors also surveyed workers regarding lift use. They found that use was greater in LTC settings than in hospitals and by NAs more than RNs. Fifty percent of the non-RN patient caregivers in LTC settings reported using lifts during their previous shift as compared to 10% of RNs. The primary reasons for not using lifts were reported as too time consuming, lack of training, the availability of staff to lift manually and/or lifts were not needed.

Collins et al. (2004) examined six LTCs (552 beds) for three years pre- and three years post-SPHM policy implementation. After adjusting for covariates of facility, age, job tenure, gender and work status they reported decreased patient handling injuries following the intervention, RR .39, 95% CI (0.29, 0.55). The greatest reductions in injury rates were reported in patient transfers (61%, 3.80 to 1.49 injuries per 100 FTE) and turning or rolling patients (61%, 2.17 to 0.85 injuries per 100 FTE). Injury rates for repositioning patients decreased 36% (1.85 to 1.17 injuries per 100 FTE).

Alamgir et al. (2008) examined the impact of the installation of ceiling lifts in three LTC (a total of 454 beds). They collected data five years pre- and post-installation. They reported decreased WRMSI post-intervention, RR, .56, 95% CI (0.47, 0.67). The

authors examined the trends in injury rates, days lost and costs per WRMSI due to patient handling. They found that injury rates, costs and days lost declined after lift installation, but within 3-4 years both costs and days lost began to increase again.

Chhokar et al. (2005) monitored the trends of the injury rates and costs for three years pre- and post-installation of ceiling lifts in one LTC setting. Following installation of ceiling lifts and staff training, injury rates and days lost for "all" injuries and for "patient lifting" injuries were significantly different than during the pre-intervention period. Rates for repositioning injuries were not significantly different in the post-intervention phase. The authors reported that the program benefits were not fully realized for two years, possibly due to carryover from the cumulative nature of WRMSI.

Examination of the trends in the annual data for three years pre- and three years post-intervention revealed that both injuries and costs rose sharply during the three years pre-intervention. During the three years following the intervention, all measures declined steadily, returning to levels that were near or better than three years pre-intervention. At three years post-intervention the injury rates for both transfers and repositioning were lower than the pre-program levels. Although lost days declined during the post-intervention phase, the rates remained greater than the level three years prior. Costs dramatically decreased in the first two years then rose slightly during the third year post, remaining somewhat below the levels from six years prior. The greatest realized benefit of the intervention was to reverse the upward trends in injuries and costs.

Mechanical lifts. Miller et al. (2006) examined the impact of moving residents into a new 63 bed LTC facility that ultimately included 10 ceiling lifts in addition to the four mechanical floor lifts available pre-intervention. Staff received one hour of training

on the ceiling lifts. The pre-intervention ratio of lifts to bed was 4:63 or 1:16. The post-intervention ratio was 1 lift to 7 beds, exceeding the ratio recommended by NIOSH of one lift per every 8-10 residents in need of transfer assistance (Collins, Nelson & Sublet, 2006). A control facility had 100 beds and four mechanical floor lifts (ratio 1:25) with no changes during the intervention timeframe. Musculoskeletal injuries decreased from three to two during each of the two-12 month pre-intervention periods, decreasing to one in the post-intervention year. This compared to the control facility where there were eight injuries in both pre-intervention periods and 14 in the post-intervention phase. Neither staffing levels, nor rates of injury were provided.

Ronald et al. (2002) and Spiegel et al. (2002) assessed the transition of a 124 bed LTC unit of a hospital from the use of floor lifts to ceiling lifts. They found that post-intervention injury rates declined for lifting tasks but increased for repositioning and other patient care tasks. Time loss due to WRMSI increased for lifting, repositioning and other patient related tasks. Costs for 12 months after, compared to 12 months before, with a 5 month intervention period, decreased for both lifting and repositioning tasks. The authors reported that both injuries and costs had been trending upwards prior to the installation of ceiling lifts. In the pre-intervention period, the unit had five floor lifts, a manual transfer aid and two ceiling lifts that serviced four beds. This was a ratio of 10 lifts per 124 residents or 1:13. Additionally, the ratio of lifts to residents with specific need of mechanical devices was 1:7. While the data illustrated injury rate and cost benefits of switching from floor-based lifting devices to ceiling lifts, it is noted that during the pre-intervention phase, the number of floor lifts was already considered adequate for the population, yet the injury rates were increasing.

Engst et al. (2005) also looked at the transition from using floor-based mechanical devices to ceiling lifts. The study included two hospital based LTC units with 75 beds each. Both units had three floor lifts and one sit-stander (ratio 1:25). The intervention unit staff received one hour training in use of the lift. Injury data were based on 21 month pre- and post-intervention phases separated by a six month intervention period. The number of injuries remained constant for both the intervention and control units, however, the repositioning injuries decreased from seven to five in the intervention group and increased from four to five in the control group. The intervention unit reported a 68% decrease in compensation costs for lifting and transferring, and a 53% increase in costs for repositioning injuries.

Tullar et al. (2010) conducted a systematic review of the literature related to interventions targeted to reduce WRMSI symptoms among healthcare workers. They included SPHM policies, introduction of mechanical devices and training programs. The review found moderate evidence that patient handling training alone had no effect on WRMSI; however there was moderate evidence to support multi-component interventions. Multi-component patient handling interventions included a SPHM policy, mechanical devices and training in their use. Only three studies were considered to be of medium-high quality (Collins et al., 2004, Smedley et al. 2003; Yassi et al. 2001) and two found decreased injury rates due to the ergonomic programs (Collins et al., 2004, Yassi et al., 2001).

The literature review has shown that manual handling of dependent patients places workers at risk for injury. Mechanical patient handling devices reduce compressive loading on the low back of healthcare workers (Kier & MacDonell, 2004;

Skotte & Fallentin, 2008). Workplace policies are in place to encourage and/or mandate the use of mechanical devices when performing lifting tasks, yet statistics on rates of injury among nursing personnel remain high even in regions with no-lift regulations. Most of the studies of multi-component interventions have been conducted on six or fewer facilities. Positive results have been reported when comparing pre- to post-policy, but when the trends of injuries and costs over time are presented, the effects are not as positive. The continued high rate of injuries among healthcare workers, particularly in LTC settings provide the impetus for this study.

Impetus for the Study

The impetus for this study was the continued high rate of injuries among nursing personnel despite the increased presence of ergonomic efforts in LTC settings. Nationally, the implementation of policies to promote SPHM, and the presence of mechanical devices to reduce the risks of patient care, have been only partially effective in reducing the number of reported injuries and in maintaining those benefits over time. Several studies have reported impressive reductions in workers' injuries and reductions in the associated costs in the first years after the policy was implemented. Only a few studies examined trends in injury rates in the years after policy implementation, and some indicated that the initial positive benefits diminished over time. Even in states where SPHM policies were mandated, injury rates among LTC personnel remained twice the rate for most industries.

The extensive body of literature on SPHM suggested several possible reasons for the lack of benefit of lifting devices, most notably non-compliance with use of the devices. The reported reasons for noncompliance with using lifts included lack of

training, resources and time. Also, non-compliance may be related to the perceived role of being a caregiver who puts others before self. Additional risk factors for work injuries included the interrelated issues of increasing workload, worker shortages, aging workers, and the increased obesity of both workers and patients.

Little attention has been given to the training programs associated with SPHM policies, the enforcement of these policies or the impact of the availability of resources such as the devices themselves or the necessary slings or other equipment. These factors may influence compliance and the continued benefits of a SPHM program.

The purpose of this study was to examine the impact of SPHM policies on several LTC facilities in the Midwest and to examine trends in injury rates after policy implementation. The relationships between these trends and employee training, policy enforcement and the availability of resources were explored. Through a survey of RNs, other ergonomic practices that may be impacting injury rates were explored.

Theoretical Considerations

The existing literature on patient handling contains minimal reference to theoretical structure as a means to understanding WRMSI among healthcare workers. The studies providing the background for this research were primarily based on biomechanical models.

The overarching assumption has been that injuries to the workers would be decreased with the implementation of a SPHM program. As illustrated, the benefits have not yet been fully realized.

Methods

The goal of this study was to determine whether SPHM policies in LTC settings have maintained reductions in employee injuries and related costs over time.

Design

The research study was conducted by the dissertator with the assistance of the 2011-2012 University of Wisconsin-Eau Claire (UW-EC) Health Care Administration (HCA) student interns and their faculty. The interns were completing a one year internship in LTC settings in Wisconsin, Minnesota, Iowa and Illinois.

A retrospective cohort design was used to address the research questions that follow.

Question one. In LTC facilities, were the injury rates and the associated medical and indemnity costs from patient handling tasks reduced following implementation of a SPHM policy?

Hypothesis one. In the three years after policy implementation the average injury rates and associated costs, related to patient handling tasks, were less than during the three years prior to the policy implementation.

Hypothesis two. In 2011, workers' injuries related to patient care were lower in facilities with a SPHM policy in effect for more than three years, than in facilities without a policy.

Question two. Were LTC facilities able to maintain the initial benefits of their SPHM policies?

Hypothesis one. During the years following policy implementation, the trends in injury rates and associated costs were maintained or improved.

Question three. In facilities with the lowest injury rates, lost work days and related WC costs, what were the common factors related to employee training programs, policy enforcement, availability of SPHM resources and other work practices that may have contributed to worker safety?

Study Settings

Long-term care settings in Wisconsin, Minnesota, Iowa and Illinois were contacted for inclusion in this study by the UW-EC interns. The facilities were the sites of the 12 month internship in HCA.

Subjects

Recruitment. The "facilities" were the primary subjects for this study. Both the University of Wisconsin-Milwaukee (UWM) and the UW-EC approved the study through their Institutional Review Boards (IRB).

Once IRB approval was granted from both Universities, the administrators of the facilities were approached by the UW-EC HCA interns. The interns reviewed the study procedures with their supervising administrators and provided a letter outlining the study description (Appendix A). The administrator had the opportunity to decline participation of their site without any consequences from UW-EC or UWM. Agreement was implied by allowing the data collection. Access to these records at the site was within the scope of the intern's role as a student "administrator"; however information was not collected if the facility administrator declined. Inclusion criteria for facilities was determined by the fieldwork sites for this year's HCA interns and by the North American Industry Classification System (NAICS) codes 623110 and 623210, Nursing Care Facilities and Residential Mental Retardation Facilities respectively. In continuous care settings,

represented by the NAICS code 633110, only the skilled nursing care and rehabilitation units were included.

Additional facility information was collected through a survey (Appendix B), given to the Director of Nursing (DON) and/or her proxy from each facility. In many facilities, other individuals besides the DON had more involvement in the SPHM program. The nurses were recruited for the survey by the on-site interns. The confidential survey was provided electronically via email, with the results collected by the primary researcher. If access to the electronic survey was not possible, a paper copy with a stamped envelope, addressed to the primary researcher, was provided. The survey instructions assured each individual that participation was voluntary and lack of participation would not have any consequences.

Subject inclusion criterion for the survey was being the DON or an equivalent employee in a supervisory and management role at each facility. There were no exclusion criteria for completing the survey.

Sample size. Due to reliance on the UW-EC interns for access to LTC facilities, the samples or facilities included in this study were limited to a maximum of 40. This contrasted with most previous work where the number of facilities were six or fewer (Alamgir et al., 2008; Collins et al., 2004).

The desired sample size for a research study is generally dependent on four factors: the desired power of the study, the alpha level, the number of independent variables and the expected effect sizes (Cohen, Cohen, West & Aiken, 2003; Tabachnick & Fidell, 2007). An adequate number of "subjects" or in this case, facilities, were needed for confidence that the results of the study were meaningful. The power of this study, or

the ability to detect true differences in injury rates and costs, was limited by the number of participating facilities. The sample size was expected to be a maximum of 40 facilities from the fieldwork sites of the UW-EC HCA interns and the DONs from those sites. Some facility administrators and DONs chose not to participate. Additionally, several students chose to participate partially or not at all, further limiting the sample. As expected, the study was under-powered due to the limited sample size; however, the number of participants exceeded most of the previous work in this area.

For this study, the level of significance was set at $\alpha = 0.05$.

Measurements

Direct measurements. Injury and related cost data were requested from 40 LTC settings. On-site HCA interns gathered information from the facilities about injury rates, associated costs, and resources such as mechanical lifts, policy information, training procedures, workforce information, resident census and acuity.

Questionnaires. The DON of each facility and/or other individual with pertinent responsibility and knowledge were surveyed with a brief questionnaire on the patient handling policies and procedures, enforcement, training and barriers to use of safe patient handling procedures. The survey also included questions on the morning meal schedule and ergonomic bathing processes as related to reducing physical strain on the direct care providers.

Data Collection

After University IRB approvals and agreement from facility administrators, the data were collected by the interns (Appendices C & D) between March and June, 2012. Participating interns gathered information from their sites and submitted data

electronically via a secure web platform or through the mail directly to the primary researcher. The requested facility data included the following:

The SPHM policy. If a SPHM policy existed, the on-site student intern obtained a copy of the policy, the date of implementation and the training procedures associated with the policy.

Injury data. According to OSHA, facilities with 10 or more full time employees are required to complete the OSHA 300 logs and 300a summary reports annually, and to retain them for at least five years (OSHA, 2004). The 300 logs track work-related injuries and illnesses, including the name of the employee, the job title of the injured worker, the nature or cause of the event, the body part(s) injured and whether the event required days away from work, work restriction or job transfer. Injuries that are listed on the log must be deemed work-related, and include any of the following: death, loss of consciousness, medical treatments such as diagnostic tests, medications, and therapy. Recordable injuries also include those resulting in days of restricted work or away from work or job transfer. Injuries not included are those involving only first aid or minor treatments. Diagnostic procedures alone are not considered recordable unless the procedures confirm a recordable condition (OSHA, 2004).

The 300a summary is a form that must be completed and posted by all employers annually. It provides a summary of the total number of cases of injuries, cases with days away from work, on restriction or transfer, and the number of days involved in those cases. The summary also includes the total number of hours worked by all employees during the year and the average number of employees (OSHA, 2004).

Interns collected the OSHA 300 forms, as available, for at least three years prior to the date of a SPHM Policy and all years until 2011. If the policy was implemented after 2005, or no policy existed, the interns attempted to collect the data for a ten year span from 2002-2011. This data provided a comparison to the data from facilities with policies. The interns also collected the OSHA 300a summary reports from the same years. The names of individual workers were deleted from the 300 logs before photocopying or prior to downloading electronic records.

Incurred medical cost data from workers' compensation. Interns collected the Workers' Compensation Loss Runs Reports (WC) from the facilities for the same years described above. The names of individuals were deleted or blacked out.

Equipment inventory. An inventory of the mechanical patient handling devices was conducted including the year of purchase, locations served and estimated costs.

Experience modification rates. When available, the experience modification rates for the years 2001-2012 were collected. This rate was assigned by an independent agency to either reward or penalize the facility for their safety record. The rate influenced the cost of the WC premiums, increasing or decreasing premiums based on the facility's safety trends. The assigned number was determined from a three year trend in safety performance for a period prior to the previous year. For example, a 2011 experience modification rate was based on the incurred costs of workplace injuries during 2007 through 2009. Claims, resulting in days away from work incurred more penalties in the experience modification rate than medical-only claims, encouraging ergonomic practices and early return to work programs. The trends in experience modification rates were expected to provide additional evidence of the cost savings of SPHM programs in LTC.

Workforce information. Information about the current workforce in each facility was collected, including the number of employees, average hours worked and average number of FTEs for RNs, licensed practical nurses (LPNs), and NAs.

Resident census and acuity. The interns collected current information on the census of the facility and a description of the average acuity level of the residents. The acuity levels of the residents were reported as Resource Utilization Group (RUG) levels. The Minimum Data Set (MDS) 3.0 RUG-IV 48-cell CMI calculation worksheet was an online tool provided by the Centers for Medicare and Medicaid Services (CMS). It was commonly used in LTC facilities to report individual residents' RUG levels and to determine a facility wide value called a case mix index (CMI) (Centers for Medicare & Medicaid, 2011). The cumulative average scores for all residents in each facility increased or decreased the facility's CMI from a baseline of 1.0. Medically or behaviorally complex residents raised the CMI, and residents with few personal care, nursing or therapy needs lowered the CMI. The resulting CMI score for each facility was intended to be an indicator of the human resources needed to care for the residents (CMS, 2011).

Each resident in a facility was assigned a RUG level score. The individual residents' RUG levels were determined by a combination of factors including the activities of daily living (ADL) score from the MDS assessment (CMS, 2010) and other medical and behavioral considerations. The MDS assessments were required at frequent intervals for reimbursement from insurers such as Medicare Part A. The ADL score included the resident's assistance requirements for bed mobility, transfers, toilet use and eating. An ADL score of five or less indicated active participation of the resident with

limited assistance provided by staff. Scores between 6 and 10 indicated the assistance of 1-2 caregivers for ADLs. Scores greater than 10, indicated the need for weight bearing support, requiring two caregivers for transfers, bed mobility and toileting. The highest ADL score of 16 indicated a resident who was completely dependent, requiring two staff for assistance with all mobility and personal cares (MDS). Each of the 48 weighted RUG levels were defined by a range of ADL scores (CMS, 2012). A RUG level of 1.0 indicated that the human resources needed to care for a resident were standard for the industry. Numbers greater than 1.0 indicated greater human resources needed and were associated with ADL scores of six or more. Lower numbers indicated fewer skilled caregivers needed, generally associated with ADL scores of five or less. The range of RUG levels was 0.45 to 3.0. A general impression of the acuity of the residents within a facility was reported by the percentage of the census that was assigned RUG levels associated with ADL scores of 6 or greater.

A recent copy of the MDS 3.0 RUG-IV 48-cell CMI calculation worksheet, generated by the facility, was submitted by the students.

All records were submitted to the dissertator, via a secure web platform or by postal mail, and entered into an aggregate database. All paper files were destroyed after useful data were entered into the database.

All data were stored in a primary computer file in a password protected laptop in the possession of the primary researcher. A back up file of all data were stored in password-protected Universal Serial Bus (USB) flash drive.

Survey of the DON. A survey was presented by the interns to the DON or his or her proxy in June 2012. The survey was sent directly to the individual's email and

electronically returned via a secured web platform accessible only to the primary researcher and the faculty from the UW-EC HCA program. A paper copy and mailing envelope were provided when necessary.

The survey contained 16 multiple choice questions about patient handling procedures, training, policy/procedure enforcement, barriers to compliance and other ergonomic practices (Appendix B). A space was provided after each question for comments or clarification. The surveys were coded to the on-site intern. Identifying information about the individual completing the survey was not retained with the data. The intern's name was used to connect each survey to the pertinent information about the respective facility.

Data Management

Data were submitted electronically to a secure web server accessible only to the primary researcher, and the faculty of UW-EC HCA program. Additional data were received by the primary researcher via postal mail. All data were de-identified prior to submission. All information was coded to the interns' names and entered into an aggregate database by the primary researcher. Facility names were removed from the database and follow-up information was provided back to the students through their UW-EC email addresses. The database was saved on a password protected laptop and a password protected USB drive. All paper copies from individual facilities were shredded.

Limitations

There were several limitations of this study, most notably, the data collection by 40 interns from the UW-EC. The HCA interns were fourth year college students with limited exposure to research and to the data pertaining to workplace injuries. They

experienced difficulties identifying and collecting all of the necessary records from their facilities. In few cases, the facility administration expressed hesitation or unwillingness to allow the intern to participate. While the students initially agreed to partner in this research project, at the time of data collection some may not have the motivation to be diligent in the thorough and timely collection of data. In addition, several of the students cited excessive work and other commitments that impeded their ability to participate. In several cases, changes in facility ownership, WC carriers and key personnel prevented access to information. Some students reported that no one on site knew where the records were located or the records themselves were disorganized and incomplete. Facilities that were owned by corporations combined the records of multiple campuses requiring tedious separation of pertinent data by the students.

Differences in policy information, training procedures and other variables added a challenge in comparing facilities. The simple designation of having a SPHM policy varied greatly. Some facilities provided a comprehensive procedural manual covering every patient handling situation and specifying the lifting devices needed. Others offered a brief policy suggesting that lifts should be used "as needed" to prevent injuries to the staff. The written policy may not have adequately reflected the actual procedures that occurred on site.

The policy language was only examined in the current form, despite records of recent revisions after earlier initial implementation dates. The student may have not correctly interpreted the presence or absence of a policy, and may have misjudged procedures for policies.

The submitted data included information gathered by the students from various sources. Some reports were submitted in their original form after blocking out identifying information. The reports that had been generated by facility staff or WC carriers contained varying degrees of detail and accuracy. The reports required careful examination and comparison to verify dates, math errors and other possible sources of error.

The BLS generated the national data that revealed trends in workplace injuries and is frequently used as a baseline for research studies. The definitions used by the BLS were modified in 2006 to provide injury data on the specific category of nursing care facilities. Prior to 2006, the industry category of nursing and residential facilities included nursing care facilities and other residential treatment centers such as drug and alcohol facilities and homes for the developmentally disabled. This limited the comparison of study data with the national data to the years 2006-2011.

A retrospective study is limited by events that have occurred in the past that may or may not be evident to the researcher(s). Some of these missed events may have impacted the results of this study. These include fluctuations in the SPHM policy regulations, resident census, resident acuity levels, workforce levels, ownership status or other factors that could have influenced the outcomes of interest, namely the trends in work-related injuries and costs over the last ten years.

Data Cleaning

As previously stated, data collection by interns who were unfamiliar with research added challenges. Beyond the issue of timely submission of data, other problems included incomplete, illegible and/or inaccurate information.

The interns were also limited by the on-site staff that provided the information, or provided access to the old records and reports. Some of the submitted reports and records contained several inaccuracies as well. Specific data cleaning issues for each of the records will be discussed in turn.

SPHM policy. Some of the policies submitted by the interns were procedures for equipment use or for specific patient care tasks, i.e. transferring a resident from bed to wheelchair. Requests for additional information were made to the students via email until the correct form was submitted. The only documents that were accepted as SPHM policies were those titled "patient handling policies" (or equivalent) with an effective date and specific information about reducing employee injuries through the use of safe patient handling procedures. If the policies referred to other documents, such as patient handling algorithms, the additional documents were requested from the student via email. Only submitted documents meeting the above criteria were included in the analysis.

Because policy language varied greatly, specific criteria were used to categorize the policies as minimal, basic or comprehensive (Appendix E). The criteria for categorizing the written policies included: the frequency of training procedures, the inclusion of specific procedures for patient care tasks with specifications for using particular devices, the management of bariatric patients, and enforcement procedures for complying with the policy.

***Policy implementation date*.** The implementation date submitted by the intern was verified from the submitted policy. If inconsistent, the dates were verified through email correspondence between the primary researcher and the intern. If the date could not be confirmed, the policy was not included in the analysis.

***Training programs for patient handling*.** The interns submitted the facilities' requirements for patient handling training. The information was compared with the written SPHM policies and inconsistencies were verified via email and through the survey of the DON. For comparisons on the comprehensiveness of SPHM policies, the training language from the policy was used. When considering the training procedures that were occurring in the facilities, the DON surveys were considered the most reliable information.

Patient handling mechanical devices. The inventory of SPHM devices submitted by the interns was considered accurate as submitted.

OSHA 300 and 300a reports. The reporting methods varied a great deal between facilities and between recorders. In some entries, very careful, detailed, legible information was recorded. At other times, illegible or minimal entries provided little more than the date. In some cases the boxes indicating that an injury occurred were not checked by the writer. Also, page totals were sometimes neglected or incorrectly summed.

Every effort was made to decipher the mechanism of injury and correctly summarize data totals. In some cases, the WC loss runs reports verified the mechanism of injury since, in most cases; both reports logged the same events. If entries were indecipherable, and could not be verified by the WC report, the data for the year were excluded. Because the mechanism of injury was frequently not clear or not indicated, separate totals representing causes of injury could not be derived from the 300 logs. Annual totals for number of injuries, number of cases with days lost, and/or number on restriction were verified with the 300a summaries. If neither were clear, the year's data

were excluded. For any facility, partial year reports were excluded. This occurred with facility openings or changes in ownership. In some cases, intermittent years, but complete reports, were submitted by the intern. These were included in the aggregate database.

The OSHA 300a summaries included the number of injury cases and lost day counts from the OSHA 300 logs. The 300a reports also included the number of hours worked in the facility for all employees during the calendar year. This value was required in order to calculate the injury rates and other annual rates. For three facilities that were missing hours for a single year, the hours were estimated as the average of the two adjacent years. For one facility, the hours for two sequential years were missing. The adjacent years were used to estimate the hours for the missing years. If more than two subsequent years were missing or adjacent years were not available, the rates were not calculated or included.

In two cases, the OSHA 300 logs and the 300a summary reports referred to an entire campus, including the skilled nursing units, an assisted living, and independent living apartments. Since the workforce hours and/or the injuries to combined staff (kitchen, maintenance, etc.) could not be separated for the LTC facility alone, the data were not included.

WC loss runs reports. The interns were limited by the availability and completeness of the WC loss runs reports. These reports were generated by the WC carrier and were formatted for a "policy year" that might not have coincided with the calendar year. The reports for some facilities were for multiple campuses and had to be screened by the interns to highlight only pertinent claims. Careful review of the report dates was necessary to clarify the date the injury occurred and whether a case was re-

opened with additional costs. Several reports were quarterly or multi-year summaries. These were not included unless the entire year was provided. All costs for injuries were assigned to the year that the injury occurred.

The WC data were generally very detailed and included the specific cause(s) of injury and the body part(s) injured. This allowed a subset of facilities to be examined for the rates and costs of injuries due to patient lifting or lowering, repositioning or during the assistance or provision of personal cares, such as dressing or bathing, and assaults on staff by residents. Because some reports used less specific codes to describe data, such as patient handling and patient assisting, all of these categories were grouped together as patient handling injuries (Appendix F). All other causes of injury were coded as 'non-patient handling injuries' and included slips and falls, lifting objects other than residents, needle sticks and other non-care related activities. Injuries that occurred only as a result of a resident becoming combative or resistive were coded as 'resident resisted'. If the resident resisted during a transfer, the injury was coded as patient handling but identified as involving resistance or aggression by the resident.

The WC reports were not entirely consistent with the OSHA 300 logs although both reported the work-related injuries and illnesses for the facility. The OSHA 300 logs did not require minor cases to be reported, however many times the case was included in the WC report. OSHA logs also allowed the deletion of cases that were ultimately denied as work-related. If any costs were incurred prior to the denial, these same cases also remained on the WC reports. As a result, the WC reports included many additional cases that were not on the OSHA reports, several of which incurred no costs. All cases in the WC reports that incurred no costs were deleted from analysis, as they were minor

complaints that did not represent changes in work status or medical care and were not included on the OSHA logs. Cases that included costs, regardless of exclusion on the OSHA logs, were included in the analysis of the WC data. Because of the differences in the number of cases reported on the OSHA logs and the WC reports, separate rates of injury were calculated using each tool. The detail in the WC reports allowed a comparison of the causes of injury and body parts affected by the event. These details were not consistently evident in the OSHA logs preventing these calculations from these data.

Resident acuity levels. The facility RUG levels were based on the MDS 3.0 RUG-IV 48-cell CMI calculation worksheet (Appendix D). The assessment was required in LTC settings for reimbursement purposes for residents using Medicare A and medical assistance. Residents using other methods of payment might not have been included in the facilities RUG worksheet. The requested worksheet was generated at one point in time by each facility. The report dates varied greatly by facility, generally current to the date of submission. This date did not coincide specifically with the dates any other data, such as injury rates. The census and/or the RUG levels may have been different at other times and could only be used as general approximations of the acuity level of the residents.

DON surveys. The surveys were sent to multiple individuals in each facility that have responsibilities regarding direct patient care, the training and performance reviews of NAs. These individuals included DONs, assistant DONs, and health education personnel. The multiple choice surveys included comments sections for the participants to clarify their answers. In cases where the participant narrated an answer that closely

matched one of the unselected options, their answer was modified accordingly. In the cases where two individuals from one facility submitted surveys, the answers were included if they were the same or if only one individual answered the question. For questions where the two responses differed, the responses were not included in the aggregate summary.

Data Analysis

The aggregate data collected from the participating facilities were analyzed quantitatively through comparison of injury rates and associated costs in relation to various timeframes, facility characteristics and trends over time. Descriptive analysis provided a qualitative review of the relationships between injury rates and costs, and safe patient handling resources, training programs, enforcement procedures and other variables that were not conducive to quantitative analysis. No individuals were identified. Facilities were described aggregately, by size category, ownership structure and the presence and comprehensiveness of safe patient handling policies. Microsoft Office Excel 2007 was used for the majority of the calculations. International Business Machines Corporation® SPSS® version 20.0, (IBM, 2011) was used to determine the risk ratios.

Risk ratio. Risk ratio, also known as relative risk (RR), is the ratio of the risk of an event when exposed to an intervention, to the risk of the event occurring without the intervention (Dawson & Trapp, 2004). For this study, RR compared the changes in work-related injuries and costs in facilities pre- and post-policy implementation. Significance in the risk ratios was reported with the use of confidence intervals (CI). Use of a 95% confidence interval to test significance of the RR statistic is common in medical literature

(Dawson & Trapp, 2004). Evidence of a significant change in risk, for this study, a decrease in risk, was indicated by RR that was less than 1 and a confidence interval that did not contain 1.0.

Regression discontinuity. Regression discontinuity (RD) was the intended statistic to examine the impact of SPHM policies over time. Regression discontinuity has been used in a variety of non-experimental contexts to estimate program effects following an intervention (Lee & Lemieux, 2010). An RD design would be appropriate when other factors, beyond the intervention, were continuously related to the variables of interest. In this study, the variables of interest were the injury rates, lost work days and associated costs. These outcome variables were "continuously related" to the facility size, ownership status, resident census and acuity factors. While these variables may have changed somewhat over the years, they were assumed to be stable. Changes in workforce hours were reflected in the collected data. The intended benefit of the RD design was the isolation of the impact of the intervention within these continuously related factors. The design included a threshold, where the intervention influenced the cohort group. The threshold was the year that the SPHM policy was implemented. Unfortunately, the limited amount of usable data both pre- and post-intervention prevented use of the RD design. Instead, descriptive analysis described the results of the study.

Research questions.

***Question one*.** In LTC facilities, were the injury rates and the associated medical and indemnity costs from patient handling tasks reduced following implementation of a SPHM policy?

Hypothesis one. In the three years after policy implementation the average injury rates and associated costs, related to patient handling tasks, were less than during the three years prior to the policy implementation.

A risk ratio examined the employee injury rates, lost work days, total incurred costs days lost and restricted or transferred before and after the SPHM policy was implemented. The comparison of patient care related injuries compared to other injuries examined the impact of the SPHM policies. Patient care related injuries were those reported by the employee to be caused by direct interaction with patients. Non-patient care related injuries were those that occurred during other aspects of employment such as slip and falls, lifting equipment, or performing housekeeping tasks. Further, patient care related injuries that were specific to patient lifting, repositioning and performing personal cares associated with ADLs, were separated from those involving assaults by patients. The determination of the cause of the employee injury was based on the description from the OSHA log and the WC reports. Significant improvements were evidenced by a RR <1 and a CI that didn't include 1.0.

Hypothesis two. In 2011, workers' injuries related to patient care were lower in facilities with a SPHM policy in effect for more than three years, than in facilities without a policy.

The same RR analysis was completed for injury rates, DART rates, lost work days and total incurred costs. Significance was assessed by a RR <1 and a CI that didn't include 1.0.

***Question two*.** Were LTC facilities able to maintain the initial benefits of their SPHM policies?

Hypothesis one. During the years following policy implementation, the trends in injury rates and associated costs were maintained or improved.

For question two and the related hypothesis, the RD design intended to examine the trends in patient handling related injury rates, days lost, incurred medical costs, incurred indemnity costs, and experience modification rates for as many years as was supported by the collected data. In order to have adequate data to establish a trend, at least 3 years of data pre- and post-policy were needed for the analysis. Only three facilities provided the required number of years of data. This small sample was inadequate for the RD analysis. Instead, the hypothesis was addressed through descriptive methods. To describe the trends, the data were formatted in annual averages. Regardless of the month that the policy was implemented, the date was generalized to the year. The year that the policy was implemented was regarded as the "policy" year or the threshold value. The years before the policy were coded as -1, -2, -3, etc. The years after the policy were coded as 1, 2, 3, etc. with the threshold year coded as 0.

Historically injury rates in LTC settings have been far greater than most industries but during the last decade they have been declining steadily. The declining trends challenge the examination of the impact of a SPHM policy. Without the benefit of the regression statistics for addressing the hypothesis, data for the participating facilities were discussed relative to trends in the state and national data.

Question three. In facilities with the lowest injury rates, lost work days and related WC costs, what were the common factors related to employee training programs, policy enforcement, availability of SPHM resources and other work practices that may have contributed to worker safety?

The results from all data sources addressed question three.

Protection of Human Subjects

All data regarding injuries to workers and the WC costs for those injuries were de-identified by the UW-EC interns prior to submission to the primary researcher. The privacy act of 1974 protects individual worker's confidentiality with regard to reported work-related injuries. The interns, in their role as "administrators" were authorized to access these records. Once individual names were removed from the records, there was almost no risk that an individual could be identified from the OSHA 300 logs or the WC reports. Although WC reports were not protected documents, individual names were deleted. It would be highly unlikely for an individual to be identified by the summarized data. Because all data were sorted, combined and summarized, there was almost no remaining risk of identifying any individual. Aggregate data will be maintained in a secure server, for up to 10 years, accessible only to Darcie Olson, OTR, MHS, and Jennifer Johs-Artisensi, Ph.D., the collaborating researcher from UW-EC.

None of the facilities declined participation in the study after data had been collected. If they had, the data would have been withdrawn from the study without any consequences to their relationship to the student intern, researchers or Universities.

Time Frame

The research proposal was accepted in March 2012. Following IRB approvals, the facilities were recruited and data collection began immediately continuing until June 2012. The final surveys were collected during July, 2012. A summary was provided to participating facilities in August 2012.

Results

Description of the Sample.

Forty LTC facilities in Wisconsin, Minnesota, Iowa and Illinois were invited to participate in this study through the on-site UW-EC HCA interns. Thirty-eight facilities (95%) agreed to participate by submitting some or all of the requested information. The majority of the participating facilities were corporate-owned (*n* = 26, 68%), or limited liability companies (LLC) (*n* = 9, 24%). Two facilities (5%) were owned by religious organizations and one was government-owned (3%). The facilities were evenly split between for-profit, including the LLCs (*n* = 18, 47%), and not-for-profit organizations (*n* = 19, 50%). The LTC facilities varied in size from 27 to 302 beds. Fourteen (37%) were small facilities with up to 99 beds, 20 (53%) were medium sized with 100-199 beds and four (10%) had more than 200 beds.

Descriptive statistics. Appendix G summarizes information about the participating facilities (*N* = 38), including the type and quantity of information each facility provided. Along with other information, the facilities provided information about the 2011 resident census and scope of services available, (*n* = 22, Table G1), SPHM policies and procedures (*n* = 38, Table G2), resident acuity information (*n* = 17, Table G1; *n* = 7, Table G3), and an inventory of mechanical devices (*n* = 14, Table G4).

Appendix G lists the participating facilities individually and in groups. The order was defined by recent injury rates. Facilities in Group A (*n* = 6), Group B (*n* = 5), and Group C (*n* = 6) had the lowest through highest injury rates respectively. Group D facilities (*n* = 5) did not provide current injury rates, but submitted other facility and/or

policy information. Group E facilities (*n* = 16) provided only policy information and/or responses to the nursing survey.

SPHM policies. Thirty-four interns (90%) submitted information about SPHM practices in their facilities (Table G2). Two policies had unclear implementation dates and were removed from the analysis.

Twenty-four facilities (75%) had SPHM policies and procedures that were implemented prior to 2012 and eight facilities (25%) reportedly had no formal SPHM policies. Three of the "no policy" facilities reported a SPHM policy implementation during 2012.

The facilities that provided information about SPHM policies were located in Wisconsin (*n* = 12, 50%) Minnesota (*n* = 11, 46%) and Iowa (*n* = 1, 4%).

The submitted policies were compared and classified as minimal, basic or comprehensive by the detail they included. The key elements of classification were the identification of criteria for selecting appropriate mechanical devices, the training frequency and procedures, and the language specifying enforcement for failure to adhere to the policy. An algorithm describing the process of classifying the SPHM policies is located in Appendix E.

Of the submitted policies, six (25%) were comprehensive, providing detailed information about SPHM procedures, training and enforcement. Seven facilities (29%) had basic policies that provided some information in the areas of patient care, worker training and enforcement. Eleven facilities (46%) had minimal policies that provided little information beyond suggesting safe patient handling procedures "as needed".

Scope of service. Twenty-two facilities provided information on the number of beds and current number of residents designated as traditional skilled nursing care, memory care and short term rehabilitation (Table G1). Eight of the facilities (36%) offered all three services. Traditional units represented the majority, accounting for an average of 65% of the facilities' beds. Five facilities (23%) provided only traditional skilled nursing care. One facility (5%) reported no traditional skilled nursing care beds. They offered short-term rehabilitation as their only service. Short-term rehabilitation units accounted for 21% of the beds and were available in 59% of the facilities. Memory care units are typically for residents with cognitive issues such as Alzheimer's disease or dementia. Between 0% and 54% of the beds in the facilities were designated as memory care. Fifty-five percent of the facilities offered memory care units, with some offering multiple units for varying levels of dementia care.

Staffing. The 2011 annual work hours for all employees were submitted by 19 (50%) facilities. These values, combined with the number of injuries, were essential for calculating injury rates. Sixteen (42%) facilities separated out the 2011 work hours for RNs/LPNs and NAs (Table G1).

A standard measure of comparison of LTC facilities' staffing levels was the hours of care per resident per day (HRPD). This value represented the direct care hours provided by licensed nurses and by NAs per resident per day. The values were reported to the state during the facility's annual inspection and published online for the public to examine (Medicare.gov, 2011). The standards for Iowa, Minnesota and Wisconsin required at least 2.03 HRPD for all direct care staff in LTC facilities (Harrington, 2010).

The 2011 HRPD for the participating facilities from the online database Nursing Home Compare (Medicare.gov, 2011) are reported in Table G1. The reported mean for the study facilities was 4.2 HRPD (*SD* = 0.7, *n* = 37, range 3.2 – 6.8) for LPN, RN and NA combined care. The HRPD were also calculated for facilities that submitted 2011 work hours for NAs and RN/LPNs. The mean calculated HRPD for all care staff was slightly less than the online value at 3.8 (*SD* = 0.7, *n* = 17, range 2.1 – 5.0). The individual facilities' calculated HRPD for NAs and licensed nursing staff are listed in Table G1. The mean calculated HRPD for NAs was 2.4 (*SD* = 0.4, *n* = 16, range 2.1 – 3.8) and 1.3 for licensed staff (*SD* = 0.4, *n* = 16, range 0.6 – 2.2).

Resident acuity. Seventeen facilities, representing 45% of the sample, submitted MDS 3.0 RUG-IV 48-cell CMI worksheets (Appendix D) for comparison of resident acuity. The submitted RUG worksheets included weighted entries for a total of 1166 (51%) residents out of the 2270 indicated by the aggregate census of the seventeen facilities (Table G1). Some residents were not assessed due to facility procedures that limited ratings to those covered by Medicare Part A or Medical Assistance. Only nine (53%) of the facilities included information on more than 94% of their reported census. The remaining eight facilities included data on fewer than 74% of the residents. The average CMI for the nine facilities providing at least 94% census data, was 1.10, ranging from 0.92 – 1.32 (*SD* 0.12).

Seven of the nine facilities with complete RUG data also provided injury rates allowing a limited comparison of the injury rates and approximate level of assistance required by the residents (Table G3). Approximately 40% of the facilities' residents required two caregivers for bed mobility, weight bearing support for transfers and

toileting, and additional assistance for eating (Range 28.9 – 67.3%, Table G3). An additional 28% of the residents required 1-2 caregivers for the same tasks (Range 18.3 – 35.2%). Based upon the premise of no-lift environments, the need for 1-2 caregivers for transfers indicated that between 55% and 89% of the residents of the LTC facilities were appropriate for the use of mechanical lifting devices for repositioning and transfers.

Mechanical devices. Twenty-one facilities (55%) provided an inventory of the mechanical devices available for patient handling during some or all of the years from 2002 – 2011 (Table G4).

All of the facilities reported owning floor-based mechanical lifting devices, either total lifts, sit-to-stand lifts or both. Only one facility reported having a ceiling lift. This was purchased and installed by an individual resident. Collins et al (2006) recommended a minimum ratio of 8-10 residents who were non-weight bearing per one total-lifting device. The same ratio was recommended for sit-to-stand devices for residents who were able to participate partially in transfers and are cooperative. Although the annual resident census was not collected for years other than 2011, an estimated ratio of the number of residents served by each lifting device is presented in Table G4. The ratios were estimated from the 2011 resident census for each facility.

In 2011, the mean ratio of all residents to all lifting devices for all facilities was 8.6 residents per lift (*SD*, 3.6, *N* = 21, range 4.5 to 21.3, Table G4). Since the residents' weight bearing status was unknown, the ratio of the correct style of device to residents with specific needs could not be determined. As an example, residents who could assist partially with transfers would need sit-to-stand devices and those who could not bear weight required total lifts. Even with the inclusion of the ambulatory residents who may

not have needed the devices, the majority of facilities exceeded the recommended ratios of one lift for every 8 – 10 residents. In 2011, 16 facilities reported at least one lift for every 10 residents (76%), and 11 facilities had one or more lifts for every eight residents (52%).

Equipment costs. Although the purchase price for some of the lifting devices were submitted, the majority of the information was provided in general terms, i.e. "four total lifts cost $1200 - $2400". The limited detail regarding the specific cost per unit or equipment costs per year prevented further examination.

DON Survey

An online survey was sent via email to 50 individuals at 39 facilities. Twenty-nine DONs or their representatives (58%) from 26 facilities (67%) completed the survey. The titles of those completing surveys included DON (*n* = 21, 72%), assistant DON (*n* = 4, 14%) and others including education director, manager, employee health nurse or staff development nurse (*n* = 4, 14%). Two surveys were received from three of the facilities. The detailed results of the responses to the survey are provided in Appendix H.

Mechanical devices. Nearly all of the facilities had procedures requiring the use of mechanical patient handling devices with dependent residents (89%). Dependent residents were defined as those who required weight bearing support. Ninety-six percent of the facilities required the inclusion of device use for dependent residents in the care plan.

Training. The facilities reported training NAs in use of the mechanical devices upon hire (96%), annually (65%) and/or on the job as needed (42%).

Procedures. Ninety-six percent of the facilities reported that transfers of either a 90 lb. or 150 lb. dependent resident required a mechanical device and two caregivers. One facility (4%) reported that two caregivers could perform a manual transfer for a 90 lbs. resident.

Performance reviews. A discussion on the use of mechanical lifts was included in NAs' performance reviews in 32% of the facilities. Mechanical lifts were discussed only if there was a problem in 46% of the facilities. They were not discussed during performance reviews in 23% of the facilities.

Ease of use. The use of mechanical devices in tub rooms and shower rooms was rated as 'very easy' by 55% or with 'some difficulty' by 45% of the facilities. Residents' bathrooms were more challenging with 57% reporting some difficulty and 17% reporting lift use in bathrooms as very difficult. Only one facility (4%) reported that lifts could not be used in these spaces.

Fear of falling. Eighty-seven percent of the facilities reported that residents were concerned about falling 'at times' during transfers with mechanical devices, and 13 % reported residents were not concerned about falling.

Issues with lifts. All of the facilities reported that maintenance, charged batteries, availability of slings and access to lifts were either no problem or a problem sometimes. None of the facilities rated these issues as big problems.

Non-compliance. All of the facilities reported consequences for non-compliance with use of lifting devices. The consequences included warnings (77%), suspension (42%), retraining (21%) and termination (13%). Seven facilities (27%) reported using all four of the consequences.

Other care procedures. The nurses were asked about other work practices that may impact employee safety. Regarding flexible meal plans, only 10 (39%) facilities encouraged residents to be at breakfast at a set time. Responses from 14 facilities indicated a flexible morning meal schedule (54%).

Forty-eight percent of the facilities never used packaged bathing wipes in place of baths or showers. Only one facility (4%) reported using these wipes often.

The DON survey was completed by representatives from 26 facilities. Fifteen of these facilities submitted information on work injuries and eight also submitted WC data.

OSHA documents

Twenty-two facilities (55%) provided OSHA 300 logs and/or OSHA 300a summaries for various years between 2002 and 2011. Information from three facilities lacked adequate detail and was eliminated from the analysis. The remaining sample included 19 facilities (48%) each providing from one to ten years of injury data from OSHA documentation. Fourteen of the facilities that provided useful OSHA documents were located in Wisconsin (74%), four in Minnesota (21%) and one in Iowa (4%) (Appendices G & I). Twelve (63%) of the nineteen facilities providing OSHA documents had a SPHM policy in place prior to 2012, with implementation dates ranging from 1995 to 2011. The most frequently cited year for implementation was 2008 (n = 3), followed by 2010 (n = 2) and 2011 (n = 2).

OSHA logs from fifteen (79%) of the facilities included the job title of the individuals reporting injuries. This allowed a separate calculation of the percentage of injuries reported by NAs annually (Table I1). Twelve of the facilities included the

number of hours worked in 2011 by the NAs and RNs/LPNs allowing separate calculations of the injury rates for the nursing personnel (Tables I1, I2 & I3).

WC Loss Runs Reports

Fifteen facilities provided WC reports for various years from 2002 to 2011 (Table I1, Appendix J). These reports contained details from the WC carrier about work-related injuries and the payment of medical and disability expenses related to the injuries. Of these, eleven facilities provided one to seven years of useful data. Two of the facilities were located in Minnesota (18%) and the remaining nine were in Wisconsin (82%).

Injury Rates

Injury rates are presented here as per 100 FTEs. The rates were calculated using the Bureau of Labor Statistics' equation where rate per 100 FTEs = (number of injuries * 200,000)/ total hours worked per year (OSHA, 2004). Facility injury rates from OSHA and WC data differed somewhat due to differences in reporting requirements for the two agencies. Generally the OSHA logs included fewer cases than the WC reports resulting in slightly lower OSHA injury rates for the same facility. If a case was ultimately denied by WC as not being related to work, it was deleted from the OSHA log. The WC reports retained all cases that generated costs (L. Zangl, personal communication, April, 2012).

On few occasions, the OSHA logs from the facilities contained extra cases not included in the WC reports. These may have been attributed to injuries incurred by contracted employees, such as traveling nurses, or independent contractors who were covered by a different workers' compensation insurer (P. Vetter, personal communication, November 2, 2012). Beyond first aid, these cases were required for the OSHA logs but not by the facility's WC carrier. Injuries listed on the OSHA logs, that

were not also on the WC reports were few, around 3% of the total reported injuries (13 out of 388).

The injury data from the OSHA and WC reports are presented in Appendix I. Rates of injury are compared for facilities with and without formal SPHM policies and pre- and post-policy implementation. Facilities were considered to be without policies during the years prior to SPHM policy implementation. The year that the policy was implemented was excluded from the data.

Trends.

Injury rates. In 2011, the mean injury rate for all injuries, all employees from the OSHA reports was 7.6 injuries per 100 FTE (*SD* = 4.2, *n* = 15, Table I4). For the Minnesota facilities, the rate was 10.2 per 100 FTE (*SD* = 5.1, *n* = 3, Table I5) and for Wisconsin facilities the rate was 7.1 per 100 FTE *SD* = 4.1, *n* = 11, Table I5). The WC reports produced an average injury rate of 9.0 injuries per 100 FTE (*SD* = 3.0, *n* = 6, Table I6). The WC rates were derived from five Wisconsin facilities and one Minnesota facility.

As an attempt to examine the impact of a SPHM policy on injury rates–beyond the initial attention during the implementation phase–facilities with established policies for three or more years were separated out. The mean OSHA injury rate in 2011 for facilities with SPHM policies for three or more years was 9.6 per 100 FTE (*SD* = 4.4, *n* = 5, Table I1). For facilities without policies, the mean rate was 4.7 per 100 FTE (*SD* = 2.6, *n* = 6, Table I4).

The mean rates of injuries for all facilities for NAs and RNs/LPNs, were 14.1 and 11.0 per 100 FTE, respectively (*n* = 13, Table I1). For facilities with an established policy

for three or more years, the 2011 injury rates for NAs and RNs were 16.1 and 9.7 per 100 FTE respectively (n = 6). For facilities without policies the rates for NAs and RNs were 9.7 and 9.2 respectively (n = 3, Table I1).

The trends in injury rates for all employees for the years 2004 to 2011 are displayed in Figure 2. Trends could not be determined for NAs and RNs/LPNs.

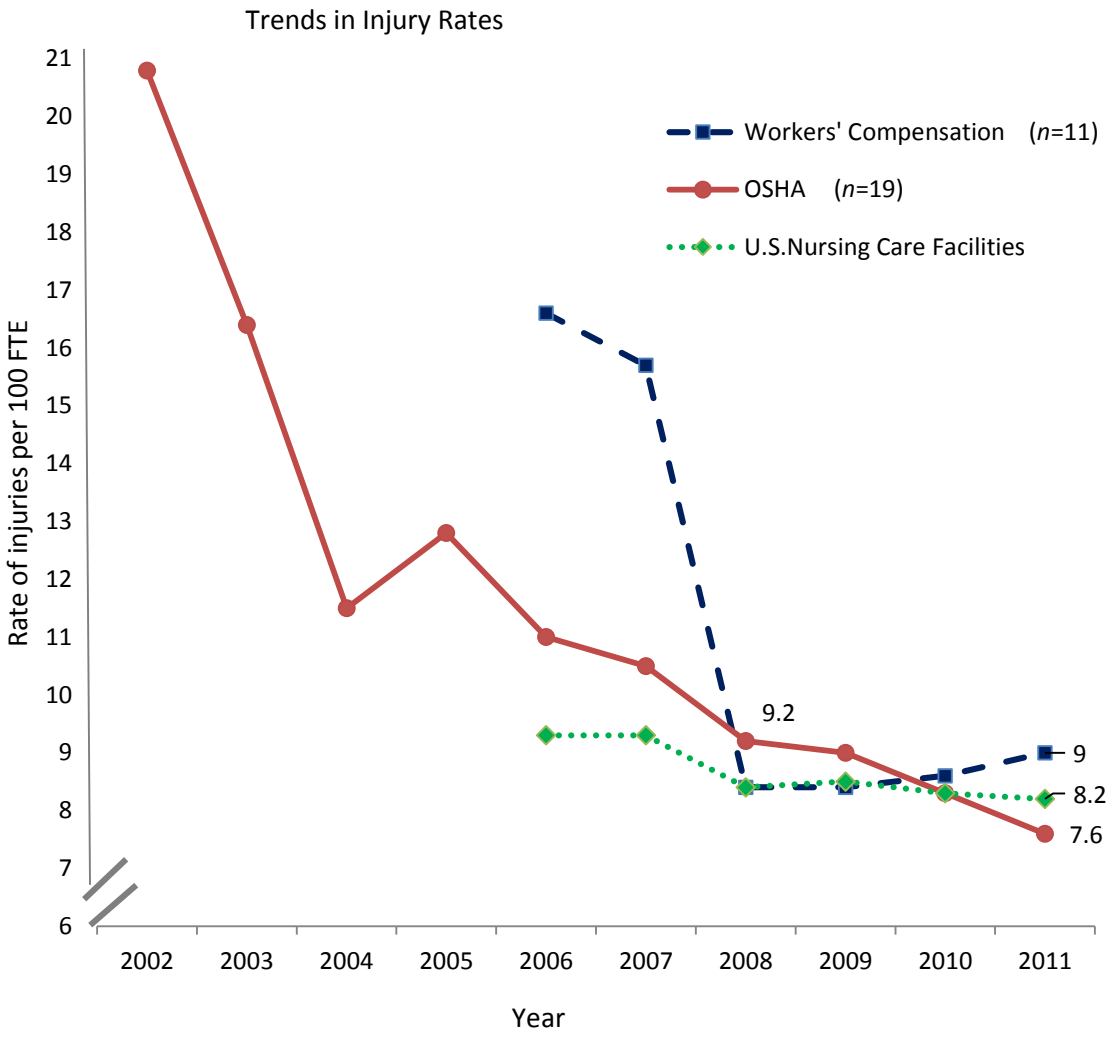

Figure 2. Trends in mean injury rates per 100 full time equivalent employees from 2002 to 2011 from the Occupational Safety and Health Administration 300 logs, Workers' Compensation loss runs reports, and national data adapted from www.bls.gov. The national rates for nursing care facilities are included for the years 2006-2011. The injury rates are inclusive of all types of injuries for all employees and are from a pool of 19 long-term care facilities in Iowa, Minnesota and Wisconsin.

DART rates. The DART rate is considered a measure of the severity of injuries because the worker is unable to perform normal work duties (BLS, 2011). The DART rates for the study facilities declined from 12.2 cases per 100 FTE in 2002 to 5.7 cases in 2011 (Table I7). The DART rate for NAs in 2011 was 10.8 cases per 100 FTE (*SD* = 7.8, *n* = 12, Table I2). For RNs/LPNs the rate was 4.1 per 100 FTE (*SD* = 6.1, *n* = 12).

The rates of cases with days away from work (lost days) for all employees have remained near 2.0 per 100 FTE since 2006 (Table I7). Nursing assistants were nearly double the RNs/LPNs' rate in 2011 with 4.3 injuries per 100 FTE (*SD* = 4.1, *n* = 12) as compared to 1.7 per 100 FTE (*SD* = 4.1, *n* = 12, Table I2).

Days affected by injuries. Over the last decade, the average number of days of work affected by injuries declined overall from an average of 325 to 169 days per 100 FTE (Table I8). This included lost days and modified days when the worker was on restricted duty or transferred to a different job. For all employees, days on restriction or transfer increased from 90 to 137 days per 100 FTE. Whereas, days lost declined steadily from 233 to 31 days per 100 FTE (Figure 3, Table I8). The overall effect was fewer days of work affected by WRMSI.

In 2011, NAs averaged 283 days on restriction or transfer (*SD* = 271.4, *n* = 12) and 58 days away (*SD* = 76.4, *n* = 12) per 100 FTE (Table I3). The licensed nurses averaged 89 modified duty days (*SD* = 199.2, *n* = 12) and 8 days away (*SD* = 25.8, *n* = 12) per 100 FTE (Table I3).

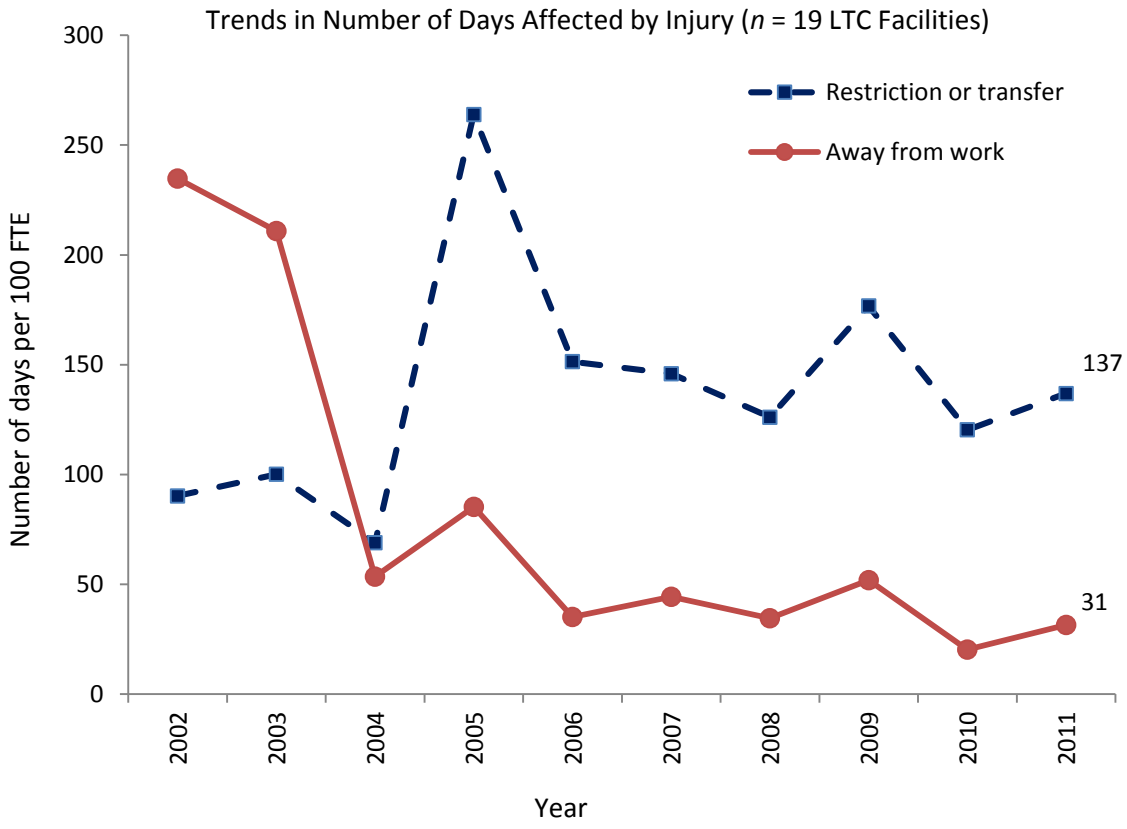

Figure 3. Trends in the mean number of days of restricted or transferred work and the mean number of days away from work per 100 full-time equivalent employees, due to work related injuries, all employees, all facilities, 2002-2011.

The sample facilities saw an overall reduction in the number of days of work affected by injuries. These values were moderately influenced by the reduction in rates of injury. The mean number of days per injury have been far less variable (Table I9). The mean number of modified duty days per injury fluctuated between 17 and 71 days, ending at 36 in 2011. The mean number of lost days per injury fluctuated, between 7 and 71, ending at 13 days per injury in 2011.

Injury details. Between three and five facilities provided adequate detail for each of the years 2006 – 2011, to calculate injury rates by cause of injury and area of the body injured (Tables I10 & I11).

Patient handling injuries decreased by 45% between 2006 and 2011, reaching the lowest level of 3.3 per 100 FTE in 2010. Non-patient handling injuries fluctuated between 4.6 and 7.0 per 100 FTE, showing only a slight downward trend during the same time frame. Figure 4 illustrates the trends in injury rates from patient care activities and non-patient care activities, and from patient transfers and repositioning from 2006 to 2011. Injury rates pertain to all employees.

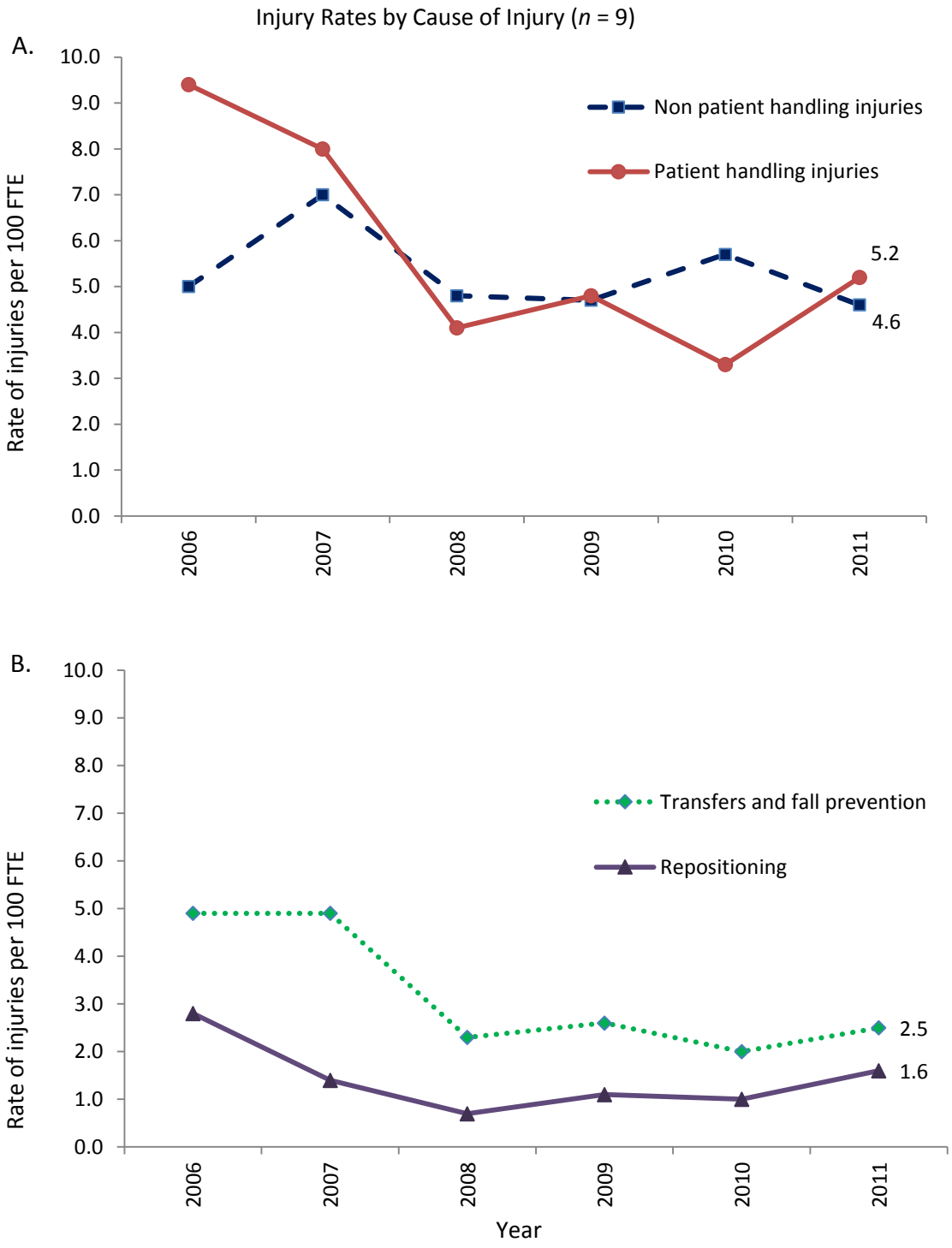

Figure 4. Trends in mean injury rates by cause of injury, 2006 to 2011. Data derived from a pool of nine long-term care facilities. Injury rates are presented for non-patient handling and patient handling causes (A). Patient handling injuries are separated into transfers and repositioning events (B). FTE = full-time equivalent worker.

Distribution of injuries by cause. Three facilities provided detailed data from 2006 to 2011 on the distribution of injuries by cause. In 2006 patient handling injuries represented 63% of all injuries, dropping to 50% in 2011. The greatest change in patient handling injuries was for patient transfers, decreasing from 34% of all injuries in 2006 to 22% in 2011. Figure 5 compares 2006 and 2011 for the three facilities.

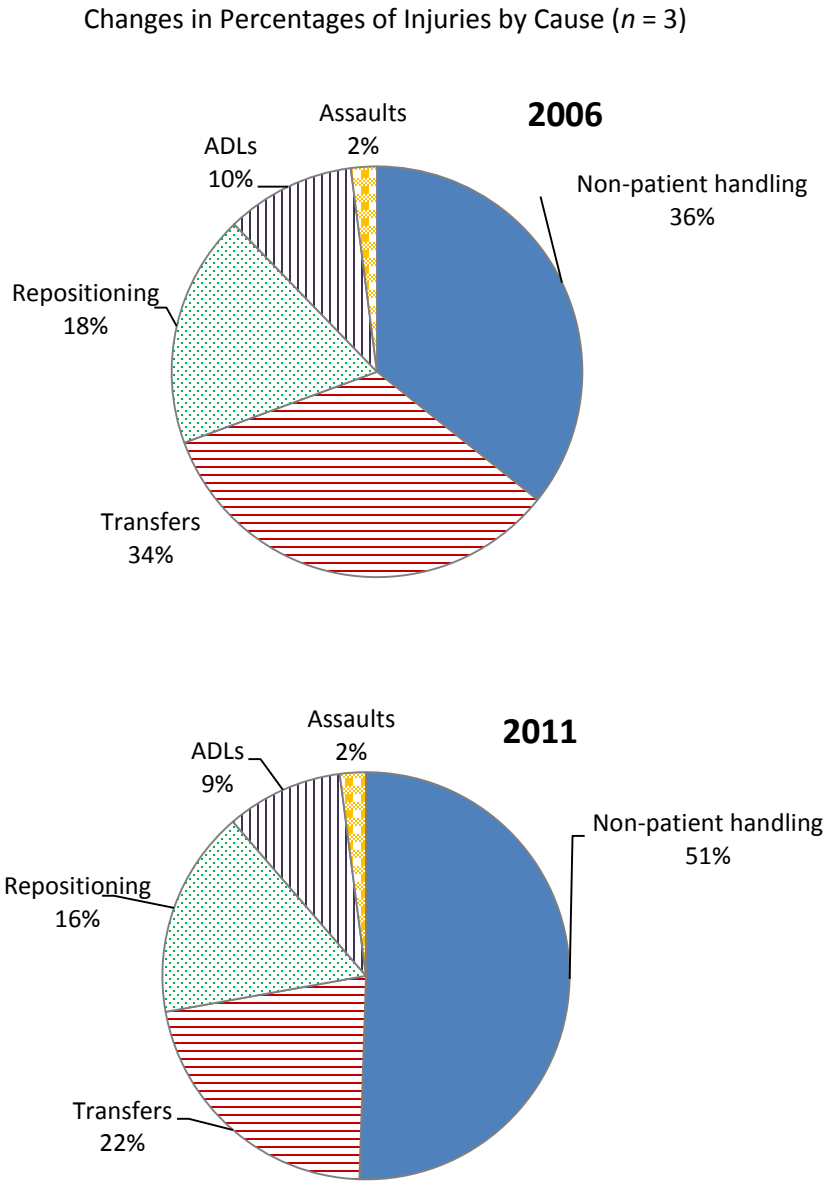

Figure 5. The mean percentages of injuries by cause, for all employees in three long-term care facilities, for the years 2006 and 2011. Activities of daily living (ADLs) included providing personal cares such as dressing or bathing. Assaults included intentional or unintentional acts by a resident resulting in injury.

Injuries to the back. In 2011 the facilities recorded a mean of 4.0 (*SD* = 2.0, *n* = 5, Table I11) back injuries from all causes per 100 FTE for all employees. The majority of the cases were a result of patient handling events. From 2006 until 2011 back injuries from patient handling declined steadily from 4.0 to 2.9 per 100 FTE. The lowest value of 1.6 was seen in a one year drop in the rate in 2008. This was due to fewer injuries from transfers. Back injuries from non-patient handling events, while lower than patient handling rates, did not decline over time with rates in 2011 slightly higher than the previous five years. Figure 6 illustrates the trends in back injuries from 2006 – 2011 for non-patient handling and patient handling injuries, including transfers and repositioning.

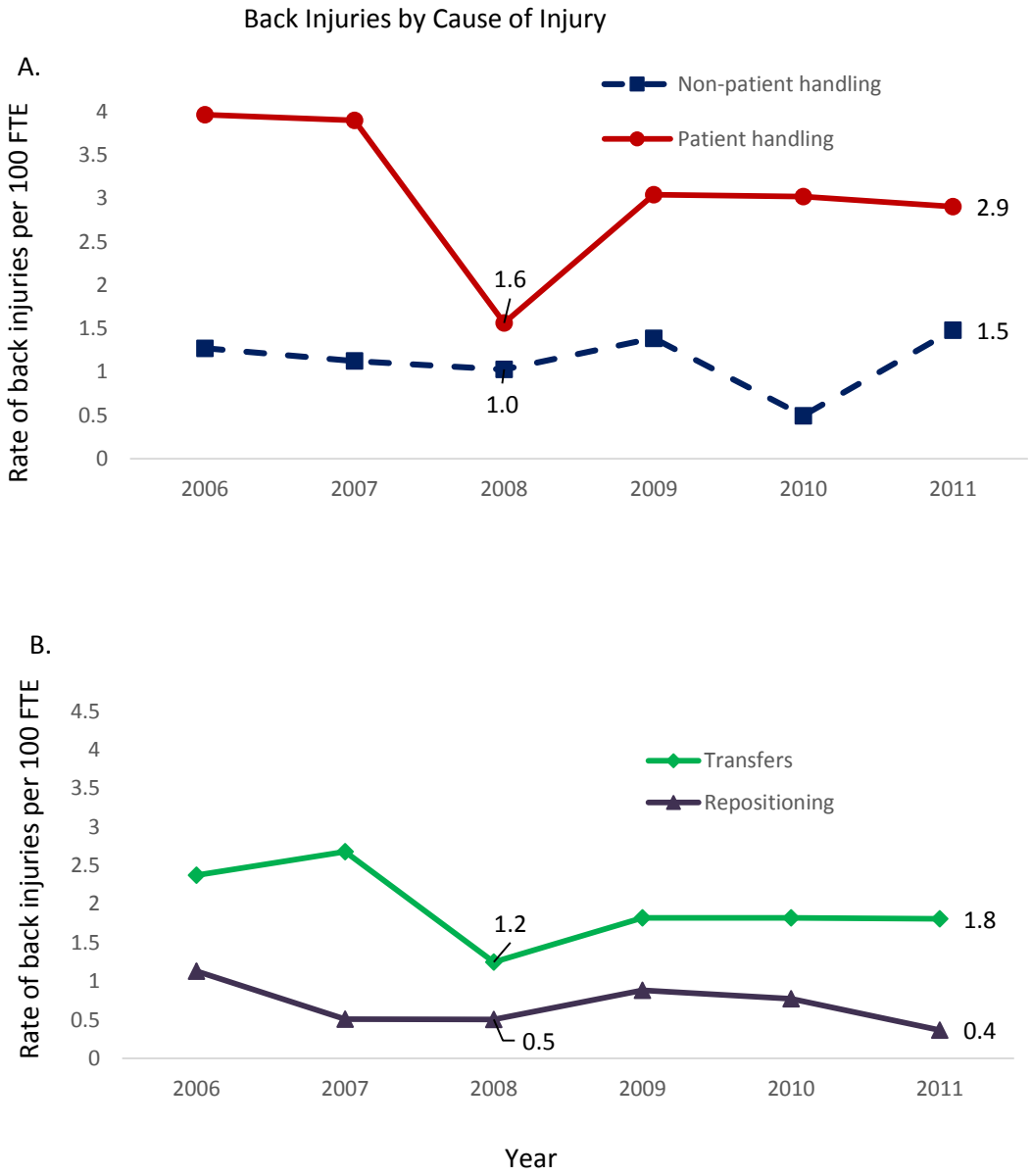

Figure 6. Trends in mean back injuries for all employees by cause of injury, 2006 – 2011. Data derived from a pool of nine long-term care facilities. Back injury rates are presented for non-patient handling and patient handling causes (A). Patient handling back injuries are separated into transfers and repositioning events (B). FTE = full-time equivalent worker.

Historically, more than 50% of work-related injuries to direct care providers in LTC have involved the back (BLS, 2011). In 2011, back injuries accounted for 41% of all injuries for all employees of the participating facilities. This compared with 2006 when 35% of all injuries were to the back. Figure 7 illustrates the distribution in percentages of all injuries by areas of the body, for 2006 and 2011 (*n* = 3 LTC facilities).

All injuries by Area of the Body Affected

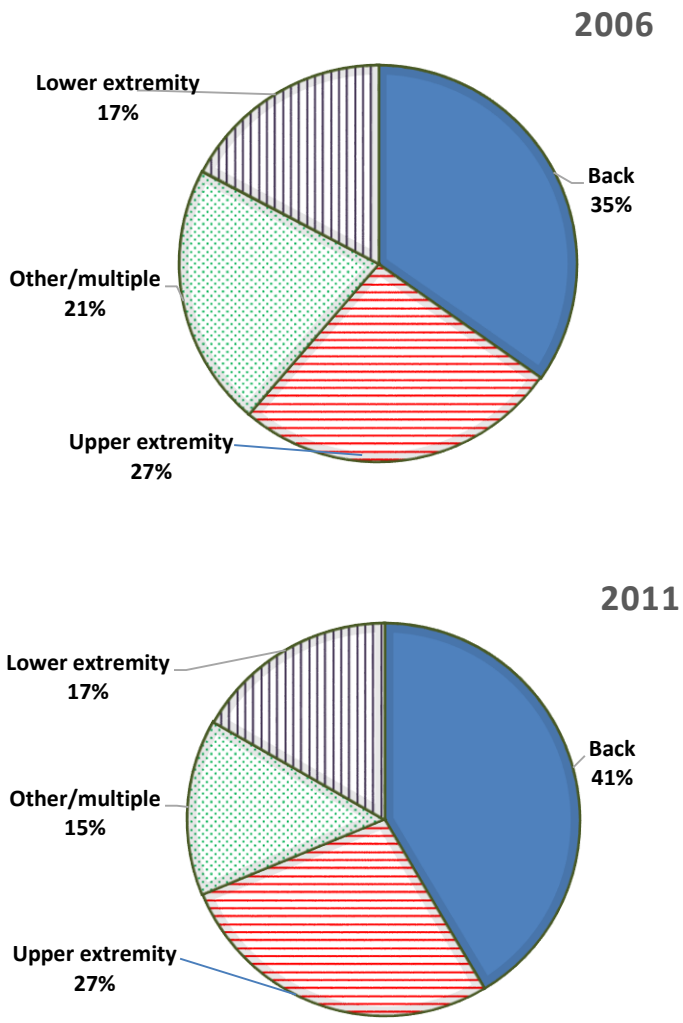

Figure 7. The mean percentage of injuries affecting areas of the body, for all employees in three long-term care facilities, for the years 2006 and 2011. Other/multiple refers to injuries to more than one area of the body or an injury to an area not otherwise described, such as the head.

As expected, back injuries constituted a greater percentage of the injuries for patient handling events. They comprised 38% of the injuries in 2006, increasing to 60% in 2011 (n = 3). Figure 8 illustrates the differences in the distribution of patient handling injuries for 2006 and 2011 by the area of the body.

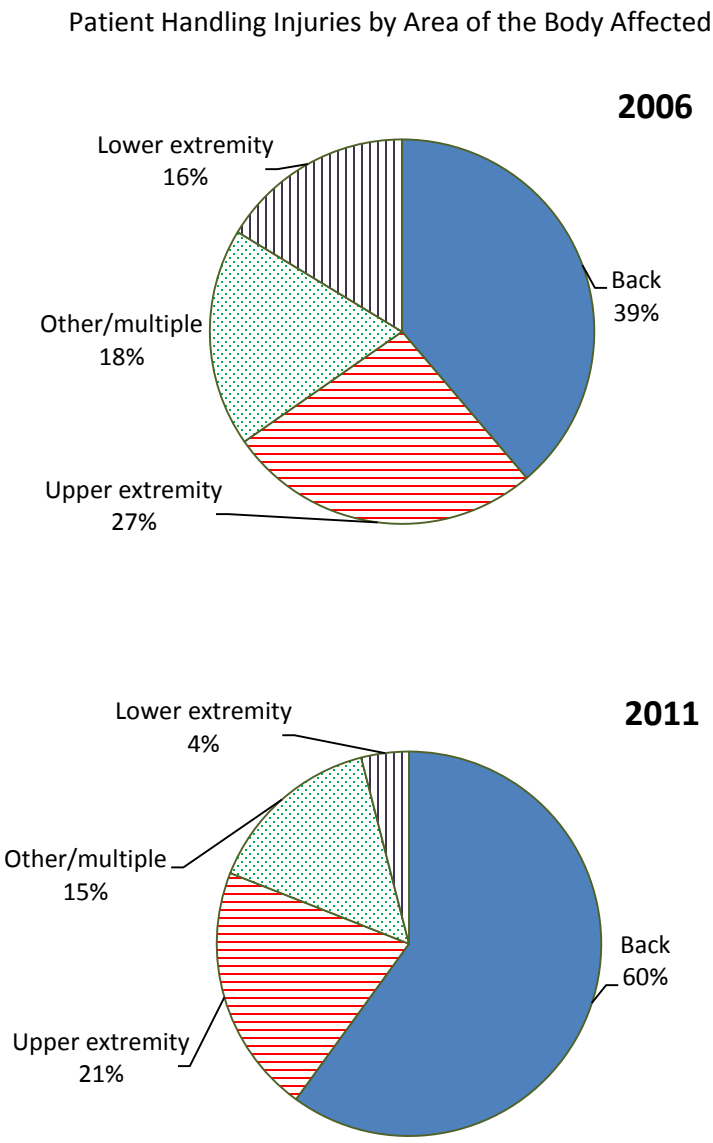

Figure 8. The mean percentage of patient handling injuries by areas of the body, for all employees in three long-term care facilities, for the years 2006 and 2011. Injuries from patient handling included patient transfers, repositioning, performing personal cares and fall prevention. Other/multiple refers to injuries to more than one area of the body or an injury to an area not otherwise described, such as the head.

Despite the declining rate of injuries overall, back injuries remain a major concern in LTC settings. Policies for SPHM were specifically intended to reduce back injuries by eliminating lifting during patient transfers and other patient handling events. The following results present the injury rates before and after implementation of SPHM policies.

Policy implementation. Ten facilities with SPHM policies prior to 2011 provided OSHA data for one or more years before and/or after policies were implemented. Data for additional years pre- and post-policy, derived from fewer than three facilities are included in Table I12. The rates of all injuries to all employees dipped two years prior to policy implementation and showed little improvement in the post-policy years. Injury and DART rates pre- and post-policy are displayed in Figure 9.

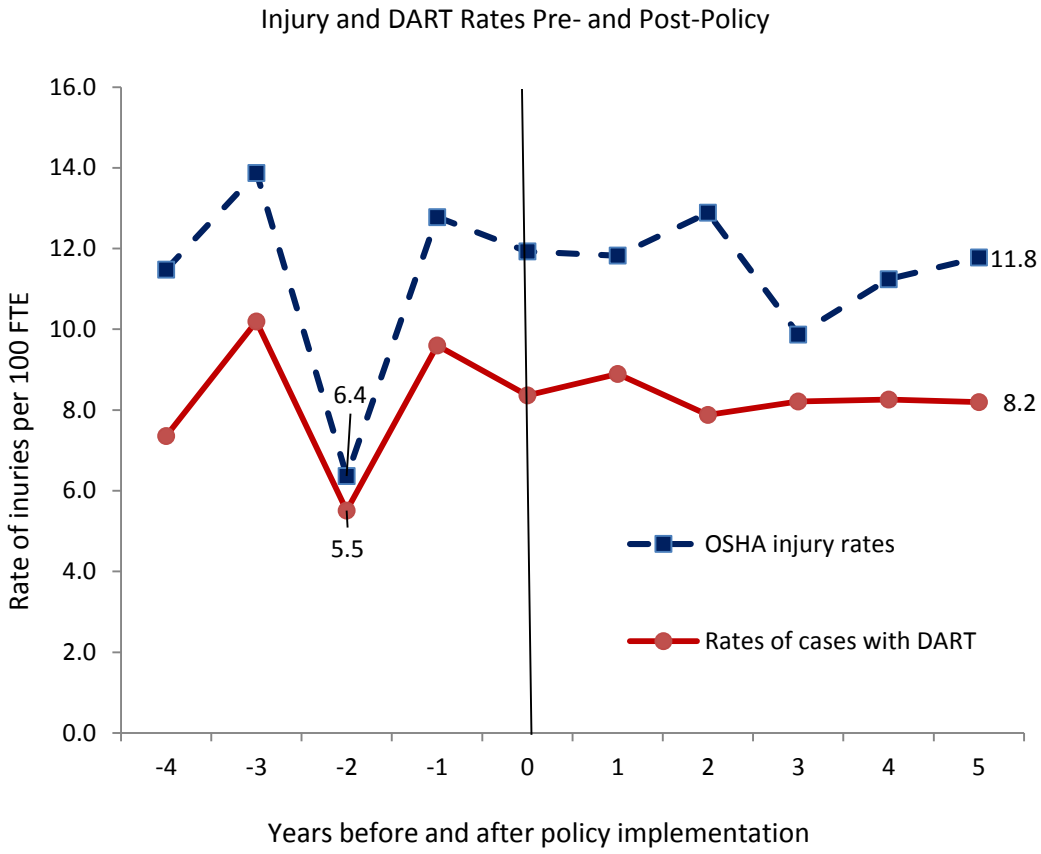

Figure 9. Trends in mean OSHA injury and DART rates pre- and post-SPHM policy implementation. The results are derived from a pool of 19 long-term care facilities, 3 - 8 facilities providing data for each year. OSHA = Occupational safety and health administration; DART = rates of injuries with days away, on restriction or transfer; SPHM = safe patient handling and mobility; FTE = full-time equivalent employee.

A limited sample of 2 - 3 facilities provided WC data for the three years after SPHM policy implementation. A single facility provided data for additional years post-policy (Tables I13 & I14). The data provided adequate detail to examine trends in injury rates by cause and by body part injured. The post-policy trends in the rates of injuries from non-patient handling tasks and from patient handling tasks are displayed in Figure 10 and Table I13. Although the sample size was small, the facilities showed declining rates of injuries from patient handling, whereas the non-patient handling injury rates increased. Although the patient handling injury rates declined overall, rates due to transfers rose in the third and fourth post-policy years.

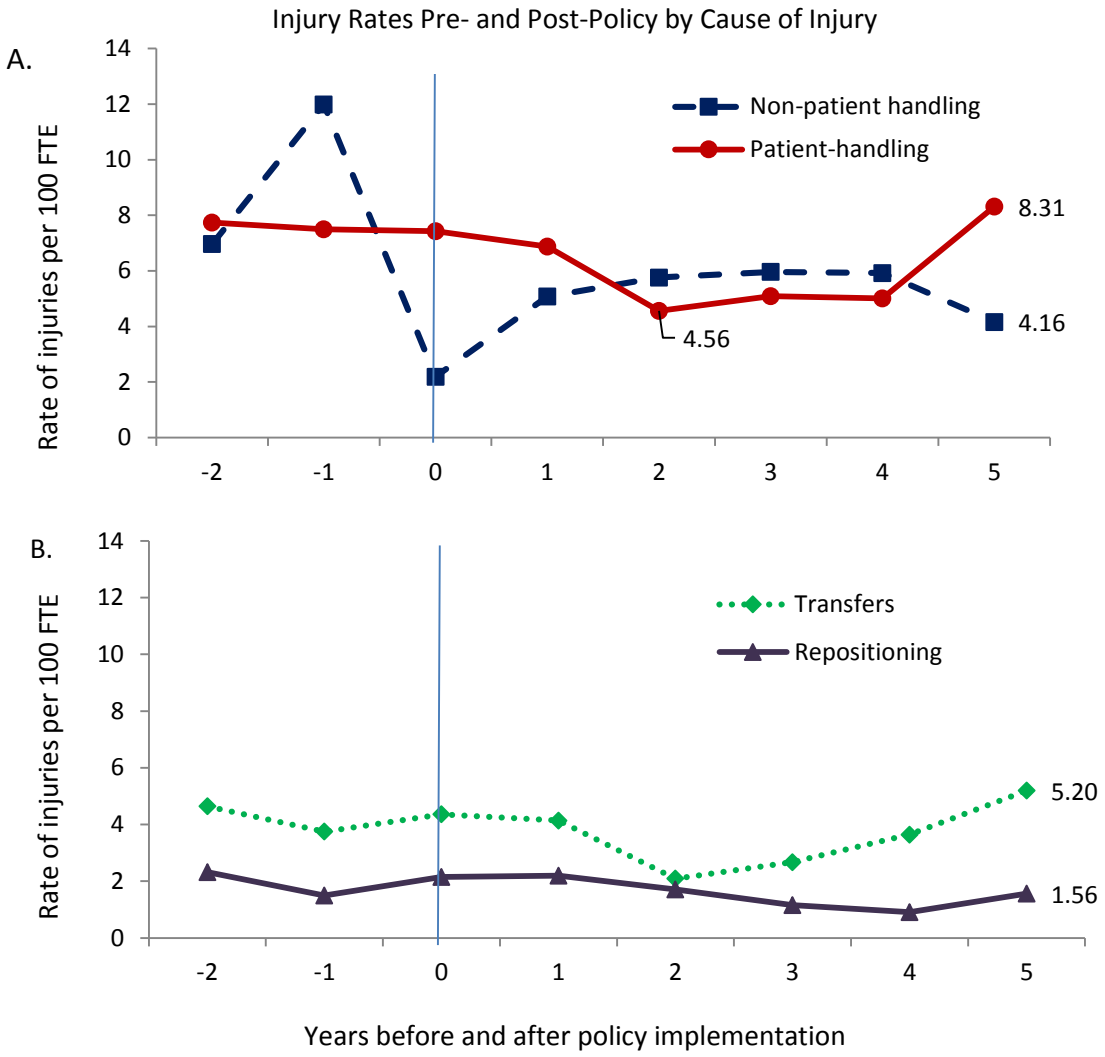

Figure 10. Trends in mean injury rates by cause of injury, pre- and post-SPHM policy implementation. Data derived from a pool of 1 – 4 long-term care facilities per year. Injury rates are presented for non-patient handling and patient handling causes (A). Patient handling injuries are separated into transfers and repositioning events (B). FTE = full-time equivalent worker. SPHM = safe patient handling and mobility.

Back injuries due to patient handling and other causes fluctuated in the post-policy years (Table I14). Patient handling injuries, especially due to patient transfers, decreased for the first few years post-intervention. A rise in injuries from transfers reached pre-intervention levels by the fourth post-policy year Repositioning injuries rose in the first post-policy year then dropped in years two and three. (Figure 11).

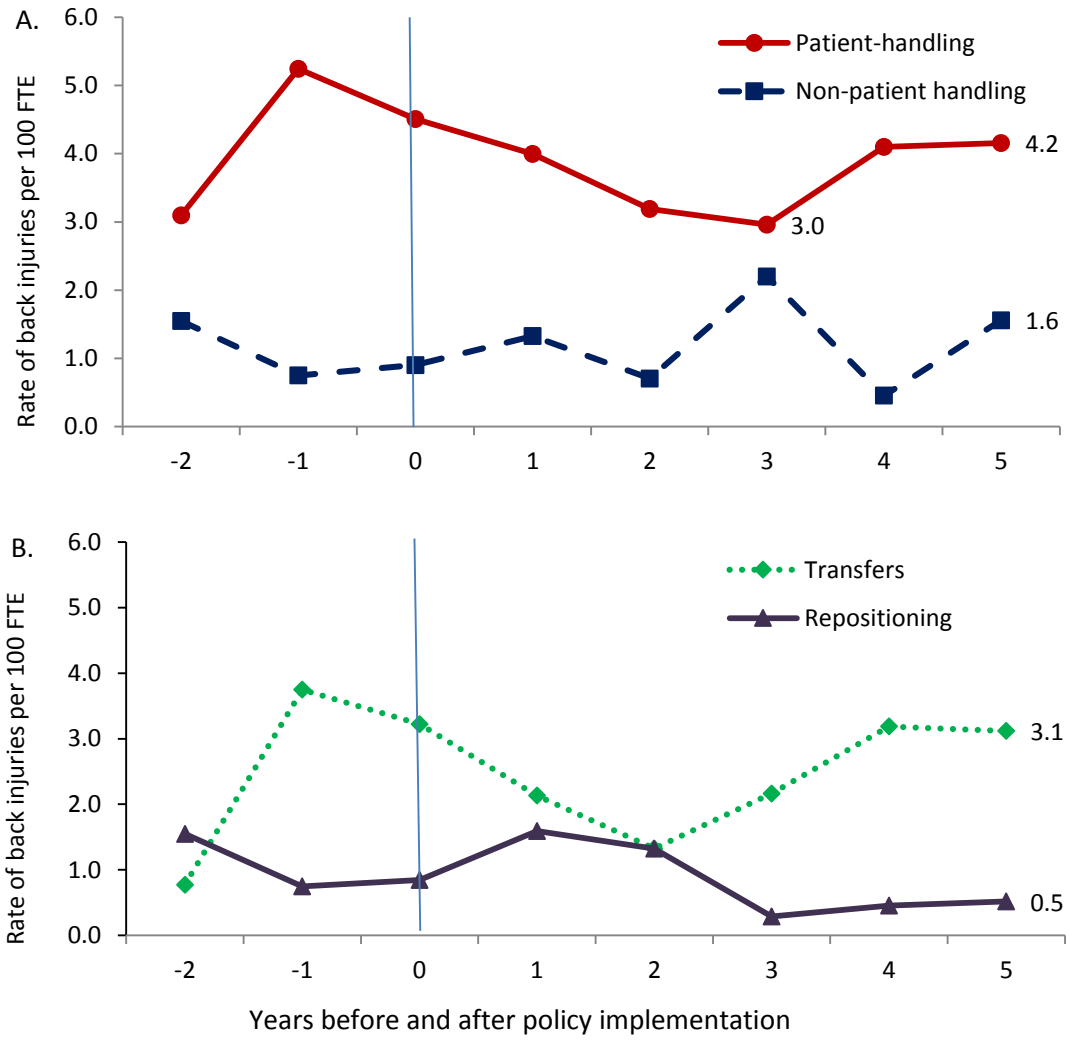

Figure 11. Trends in back injury rates by cause of injury, pre-and post-SPHM policy implementation. The results are derived from a pool of 1 - 3 long-term care facilities per year. Back injury rates are presented for non-patient handling and patient handling causes (A). Patient handling back injuries are separated into transfers and repositioning events (B). FTE = full-time equivalent worker. SPHM = safe patient handling and mobility.

Rate ratios pre-and post-policy. Rate ratios were used to compare injury rates before and after implementation of SPHM policies (Table 1). Three facilities provided three or more years of data both pre- and post-policy implementation. Rate ratios indicated that no significant differences occurred after policy implementation in the rates of all injuries, cases with DART, or cases with lost days. Following SPHM policy implementation, more work days were affected by injuries, but the average number of lost days per 100 FTE was reduced by more than 50%.

Table 1

Comparison of Injury Rates Pre- and Post-SPHM policies (n=3)

	Pre		Post				
	M	*SD*	*M*	*SD*	*RR*	95% CI	*p*
Cases							
All injuries	14.0	2.2	12.6	5.1	0.93	[0.46, 1.87]	.836
DART cases	11.2	1.6	9.7	2.6	0.91	[0.40, 2.04]	.818
Modified duty	7.3	0.7	4.8	2.8	0.71	[0.24, 2.18]	.554
Lost days	3.9	1.9	3.7	2.8	1.0	[0.26, 3.9]	1.0
Days							
DART	303	10.4	332	31	1.1	[0.95, 1.27]	0.218
Modified duty	213	113.1	287	34	1.4	[1.14, 1.60]	0.0005
Lost days	154	68	17	69	0.45	[0.34, 0.59]	<0.0001

Note. Rates per 100 FTE = (Annual number of injuries or days *200,000 hours)/ total hours worked by all employees; All data obtained from OSHA Reports from a pool of 10 long-term care facilities, SPHM = Safe patient handling and movement, OSHA = Occupational Safety and Health Administration; FTE= full-time equivalent worker, DART = Cases with days away, job restriction or job transfer.

Rate ratios with and without policies. Injury rates and the rates of the number of days affected by injuries in 2011, were compared for facilities with and without SPHM policies. Only facilities with at least three years of data following the implementation of a SPHM policy were included as "with policy" (Table 2). For detailed facility data see Appendix I.

There were no differences in the rates of injury between facilities with SPHM policies and the facilities without policies (Table 2). Facilities with policies recorded more days on modified duty and away from work per 100 FTE (Table 2).

Table 2

Comparison of 2011 Injury Rates for Facilities With and Without SPHM Policies

	Policy *(n=6)*		No policy *(n=6)*				
Cases	*M*	*SD*	*M*	*SD*	RR	95% CI	*p*
All injuries	9.6	4.8	4.7	2.6	2.0	[0.71, 5.64]	.19
DART cases	7.8	4.2	3.2	1.8	2.7	[0.73, 9.76]	.14
Modified duty	5.3	2.2	2.2	1.3	2.5	[0.50, 12.59]	.27
Lost days	3.3	2.5	1.1	1.1	3.0	[0.32, 28.36]	.34
Days							
Modified duty	226	138	43	12	5.3	[3.81, 7.25]	<.0001
Lost days	51	52	15	11	3.4	[1.92 6.03]	<.0001

Note. Rates per 100 FTE = (Annual number of injuries or days *200,000 hours)/ total hours worked by all employees; All data obtained from OSHA Reports, Facilities with SPHM policies for at least three years. Facilities without policies with at least three years of data. SPHM = Safe patient handling and movement, OSHA = Occupational Safety and Health Administration; FTE= full-time equivalent worker, DART = Cases with days away, job restriction or job transfer, Risk is lowered if the RR is below 1, significance is achieved with a CI that does not include 1.

Costs.

The loss runs reports generated by the workers' compensation carriers provided the total incurred costs for each injury. These costs included medical expenses, wages for lost days and permanent disability payments. For cases that remained open at the time of the report, the total incurred costs included estimates of future payments. All costs were attributed to the year of injury.

The costs associated with work injuries have been reported in the literature in various ways. Some studies reported the total costs incurred by facilities (Collins, et al., 2004; Engst, et al., 2005; Nelson, et al., 2005; Zadvinskis & Salsbury, 2010). Alamgir et al. (2008) reported costs per licensed bed. More commonly, the costs were reported per FTE, per 100 FTE (Li, et al., 2004; Martin, et al., 2009; Spiegel, et al., 2002) or per claim (Charney, Simmons, Lary, & Metz, 2006; Chhokar, et al., 2005; Engkvist, 2006; Park, et al., 2009; Spiegel, et al., 2002;).

The cost data are presented in Appendix J in various formats. The costs per 100 FTE provide a reference that is easier to compare between facilities. The mean costs per claim provide a sense of the severity of the injuries. Medians are presented because of the skewing effects of outliers in small samples. All amounts are presented as United States dollars (USD) and adjusted by the consumer price index for medical services to reflect 2011 values (BLS, 2012).

Costs per 100 FTE. Among the participating facilities, the 2011 mean cost of work-related injuries per 100 FTE was $29,100 ($n$ = 6, Table J1). This value represented all workers employed by the facilities including direct patient care, kitchen, custodial and

administrative staff. The costs varied a great deal among the facilities ranging from $4,700 to $73,700 per 100 FTE.

Trends in costs per 100 FTE. The mean costs for all injuries per 100 FTE declined from 2006 to 2011. In 2008 there was a one year drop in costs to $14,600. During the same year, the costs per 100 FTE for all injuries that resulted from patient handling dropped to $8,100. This was 78% less than the previous year and lower than the three years that followed. As with the rates of injury (Figure 4), the costs for non-patient handling injuries per 100 FTE did not decline over time. Figure 12 illustrates the trends in the costs for all injuries per 100 FTE for non-patient handling and patient handling injuries from 2006 to 2011.

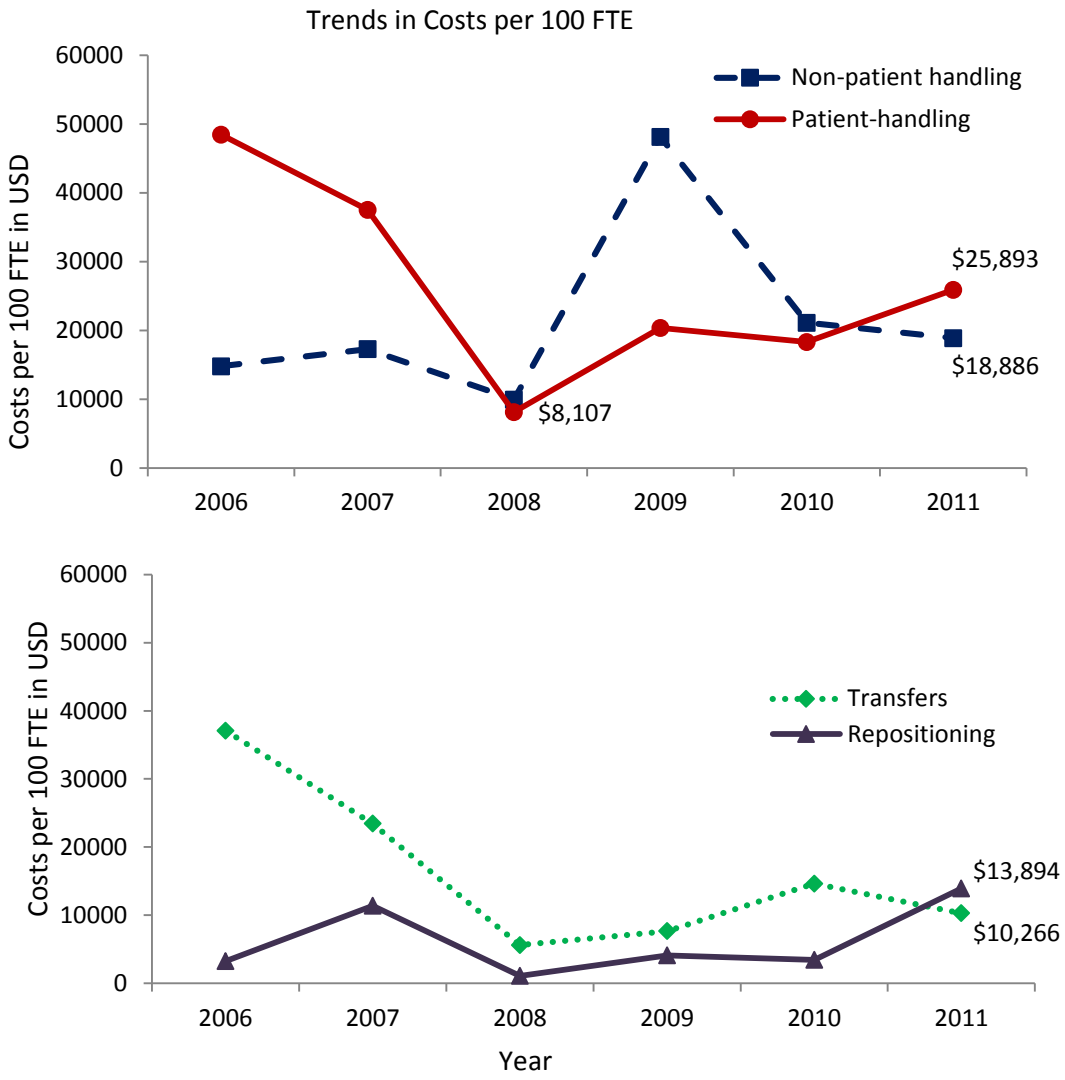

Figure 12. Trends in the mean costs of all injuries, all employees, per 100 full-time equivalent workers, by cause. Data derived from a pool of nine long-term care facilities. All costs are adjusted to 2011 rates by the consumer price index for medical services, adapted from www.BLS.gov/cpi/tables.htm. Costs are presented for non-patient handling and patient handling injuries (A). Patient handling injuries are separated into transfers and repositioning events (B). USD = United States dollars FTE = full-time equivalent worker.

Back injuries per 100 FTE. The costs per 100 FTE for back injuries among all employees, from all causes were also lowest in 2008 at $6,000 after peaking in 2007 at $24,400. The costs for all back injuries included injuries that occurred during assaults and cases where the cause of injury was not cited. During the same time period, the costs per 100 FTE for back injuries from both non-patient handling and patient handling fluctuated greatly. Costs for back injuries from non-patient handling events ranged between $912 and $7,700 per 100 FTE. Patient handling costs for back injuries ranged from $4,700 to $22,400 per 100 FTE. Back injuries attributed to patient transfers alone ranged from $5,500 to $12,500 per 100 FTE (Figure 13).

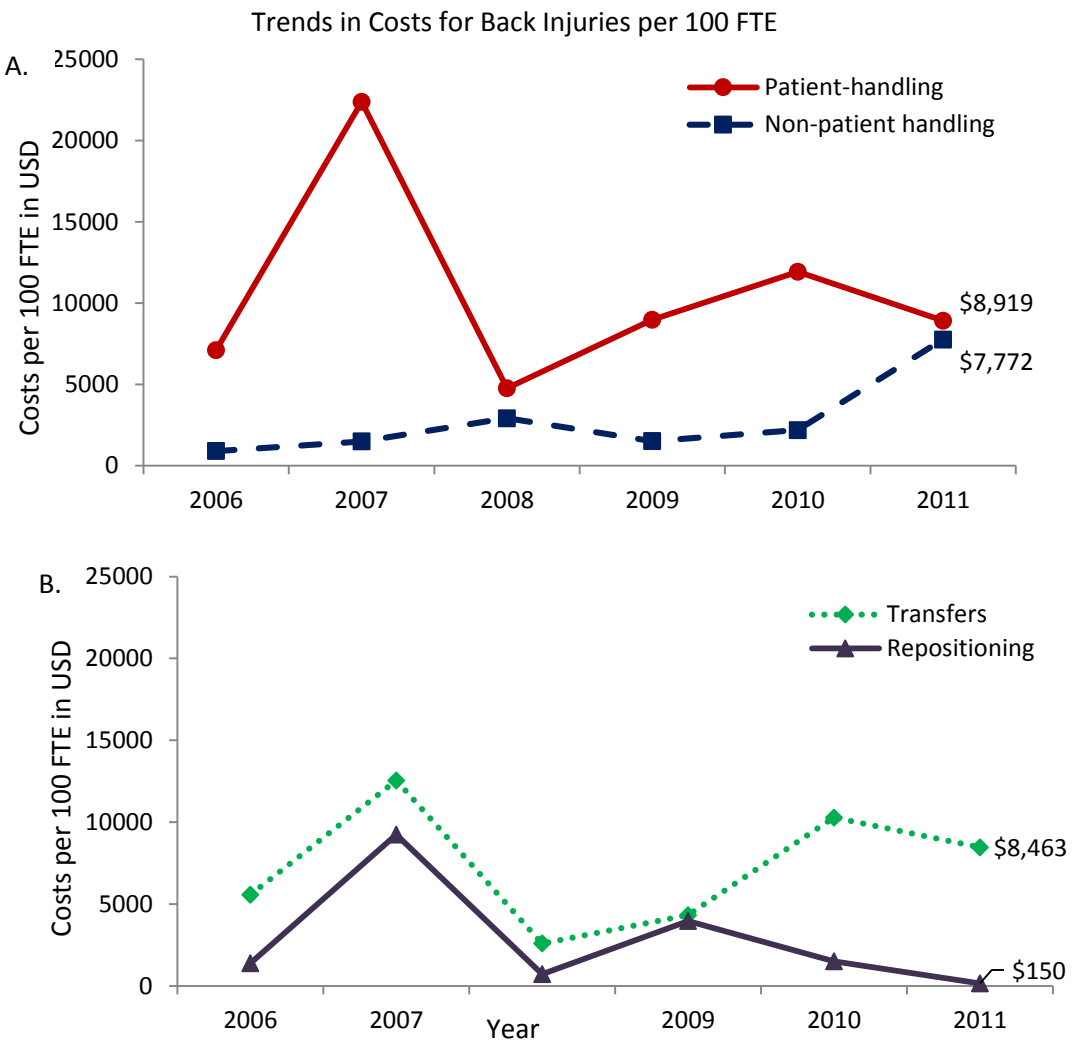

Figure 13. Trends in mean costs per 100 FTE for back injuries, by cause. Data derived from a pool of nine long-term care facilities. All costs are adjusted to 2011 rates by the consumer price index for medical services, adapted from www.BLS.gov/cpi/tables.htm. Costs are presented for non-patient handling and patient handling injuries (A). Patient handling injuries are separated into transfers and repositioning events (B). USD = United States dollars FTE = full-time equivalent worker.

Costs per 100 FTE post-policy. A few facilities provided enough information to determine the costs of injuries per 100 FTE for the years pre- and post-policy implementation (Table J3). The mean costs per 100 FTE for all injuries were lowest during the policy implementation year and highest in the third year post-policy. The same trend was noted with non-patient handling injuries. The costs per 100 FTE for patient handling injuries were higher during the two years pre-policy than in any of the years after policy implementation (Figure 14).

The costs per 100 FTE for all back injuries and back injuries from non-patient handling, were greater in the third post-policy year than before or during implementation (Table J4). Back injuries resulting from patient handling and specifically from patient transfers recorded lower costs in the third post-policy year than during the policy year. These results were based on data from only two or three facilities (Figure 14). Details are presented in Table J4.

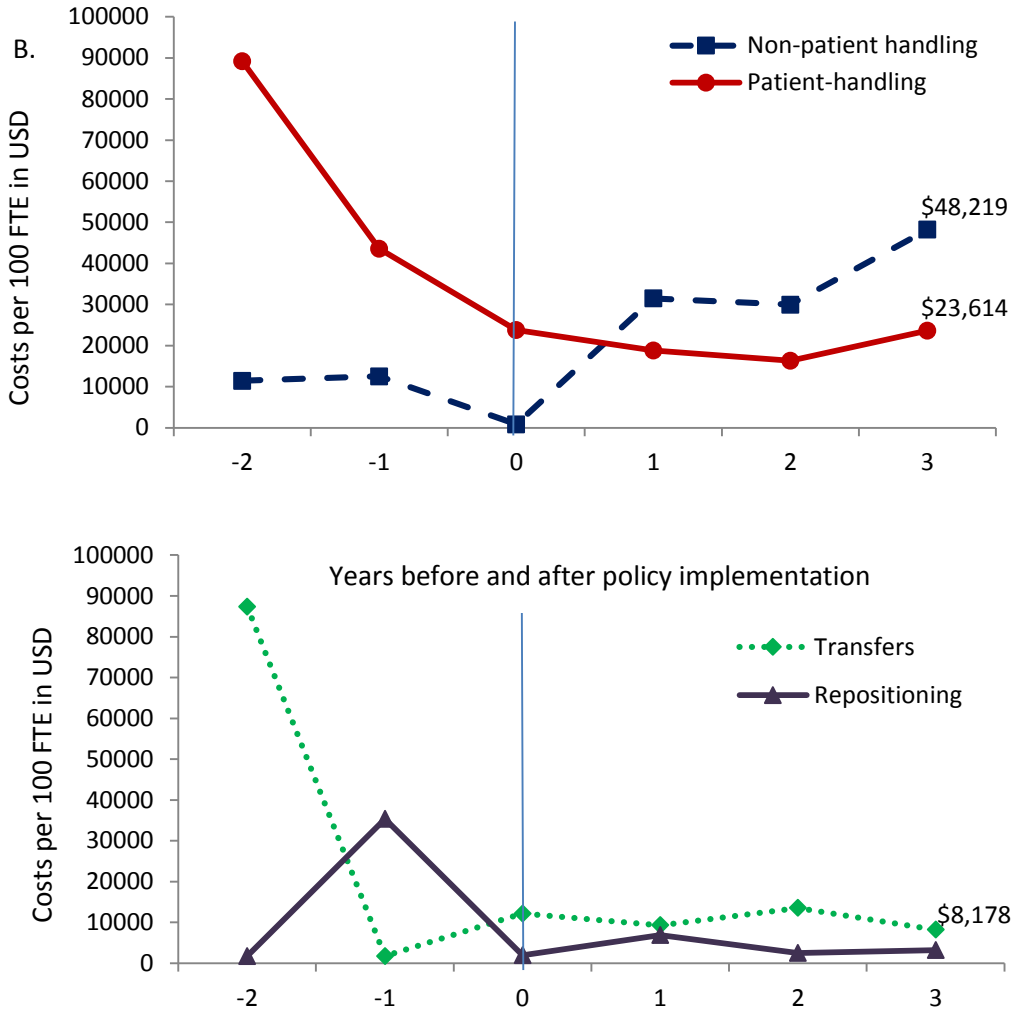

Figure 14. Costs of injuries per 100 FTE, pre- and post-SPHM policy implementation. Data derived from a pool of nine long-term care facilities. All costs are adjusted to 2011 rates by the consumer price index for medical services, adapted from www.BLS.gov/cpi/tables.htm. Costs are presented for non-patient handling and patient handling injuries (A). Patient handling injuries are separated into transfers and repositioning events (B). USD = United States dollars FTE = full-time equivalent worker.

Costs per claim. Examining the costs per claim provided a sense of the severity of the injuries (Table J5). In 2011, the mean cost per claim for the LTC facilities was approximately $2500 (*n* = 8). This value was similar for both patient handling and non-patient handling injuries, $2700 and $3000 respectively. The mean costs per claim among the eight facilities ranged from $750 to $6000, with half of the facilities reporting means below $1500/claim. The 2011 median cost per claim for the sample facilities for all injuries, all causes, was $1800 (*n* = 8).

Trends in costs per claim. Between 2006 and 2011, the mean costs per claim, per year for the facilities for all injuries, fluctuated between $2500 and $5000 (Table J5). Non-patient handling injuries also fluctuated. The costs for patient handling injuries during the same timeframe, declined fairly steadily from $5600 to $2700 representing a 52% reduction. An unsteady decline is noted in costs per claim for injuries due to transfers, while costs for repositioning injuries fluctuated greatly (Figure 15).

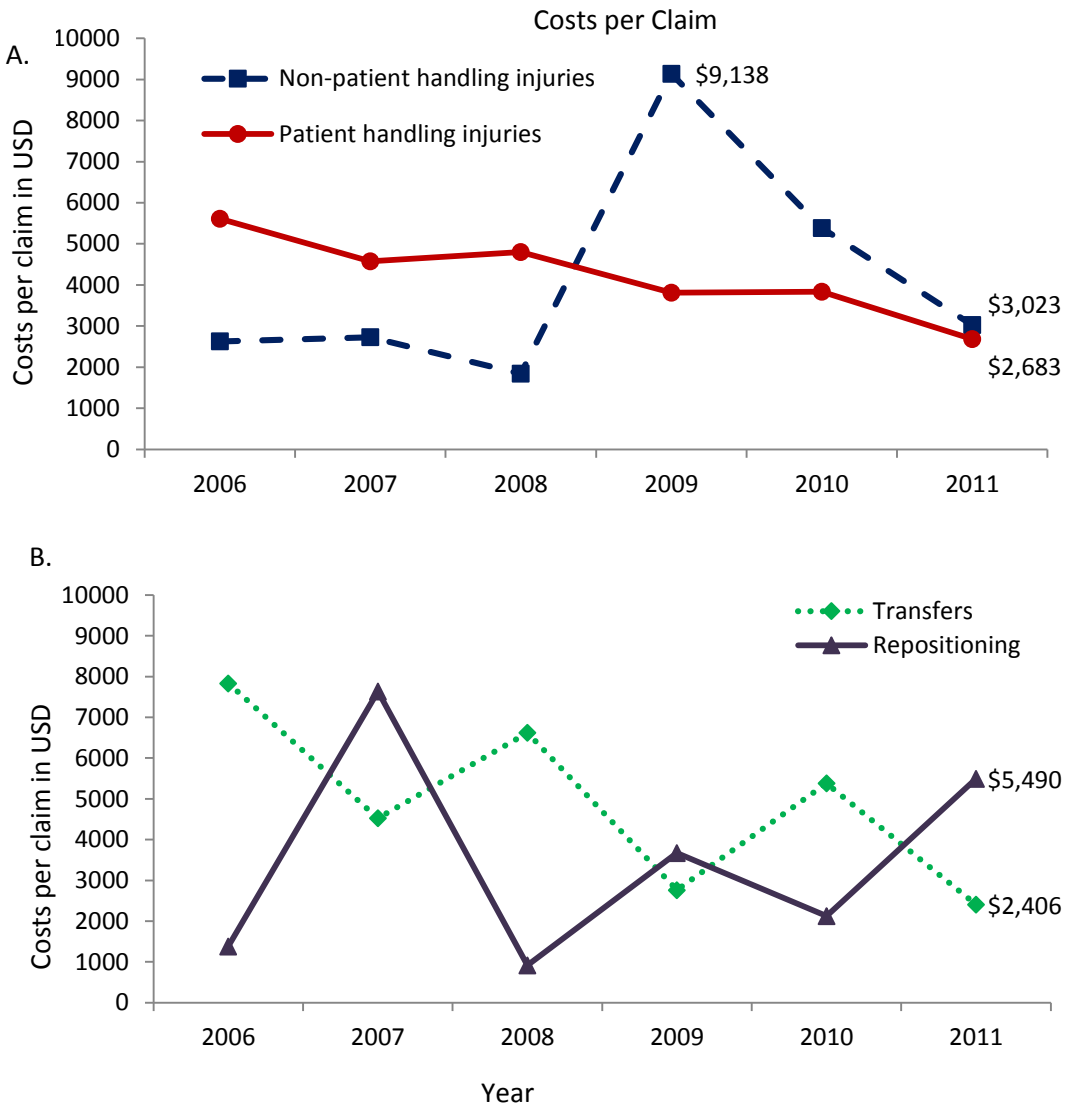

Figure 15. Mean costs per claim for all injuries in USD, by cause. Data derived from a pool of ten long-term care facilities. All costs are adjusted to 2011 rates by the consumer price index for medical services, adapted from www.BLS.gov/cpi/tables.htm. Costs are presented for non-patient handling and patient handling injuries (A). Patient handling injuries are separated into transfers and repositioning events (B). USD = United States dollars FTE = full-time equivalent worker.

Back injury costs per claim. In 2011, injuries to the back from all causes, incurred by all workers, including patient care staff, kitchen workers, administrators and others, averaged $2121 per claim (*n* = 6 facilities, Table J6). This was similar to the mean per cost of a back injury from all patient handling claims at $2075 (*n* = 5), and lower than patient transfer claims at nearly $2800 (*n* = 4). Non-patient handling claims for back injuries averaged over $3500 for the facilities (*n* = 3).

Trends in back injury costs per claim. Back injuries from all causes fluctuated between $1400 and $4700 per claim during the years 2006 – 2011 (Table J3). The costs per claim for back injuries from patient handling showed a slight downward trend since 2006 while non-patient handling events resulted in a slight upward trend. The costs of injuries from patient transfers ranged between $1662 and $6896 per claim (Figure 16).

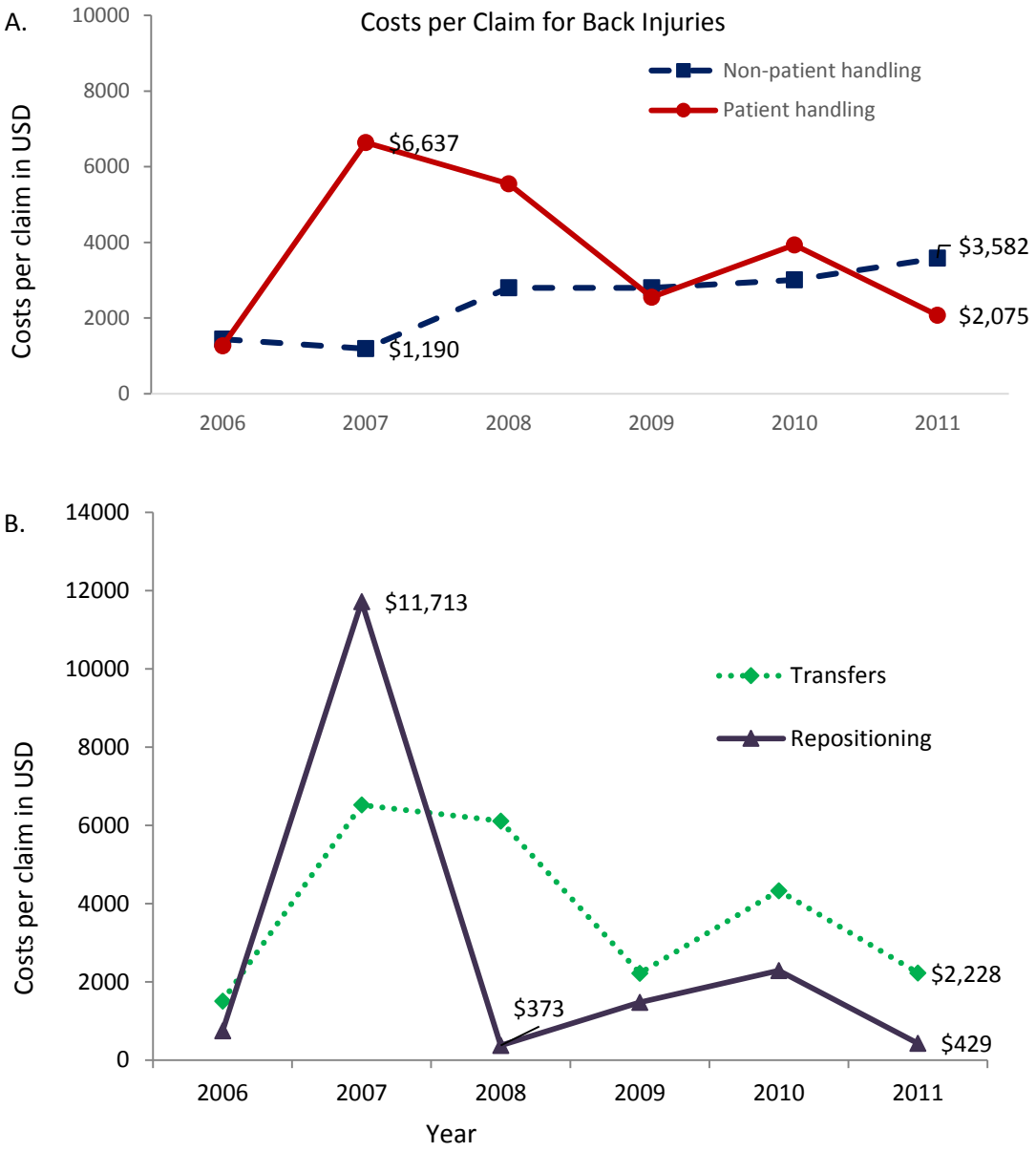

Figure 16. Mean costs per claim for back injuries in USD, by cause. Data derived from a pool of ten long-term care facilities. All costs are adjusted to 2011 rates by the consumer price index for medical services, adapted from www.BLS.gov/cpi/tables.htm. Costs are presented for non-patient handling and patient handling injuries (A). Patient handling injuries are separated into transfers and repositioning events (B). USD = United States dollars; FTE = full-time equivalent worker.

Costs per claim post-policy. In the years following SPHM policy implementation, the costs per claim for all injuries remained fairly steady around $4000 - $5000 (Table J7). The costs per claim for non-patient handling injuries escalated in the first post-policy year and stayed above $6000 per claim through the third post-policy year. Patient handling costs remained below $4000 per claim through the third post-policy year (Figure 17). Figure 18 continues the display of patient handling costs per claim for transfers and repositioning.

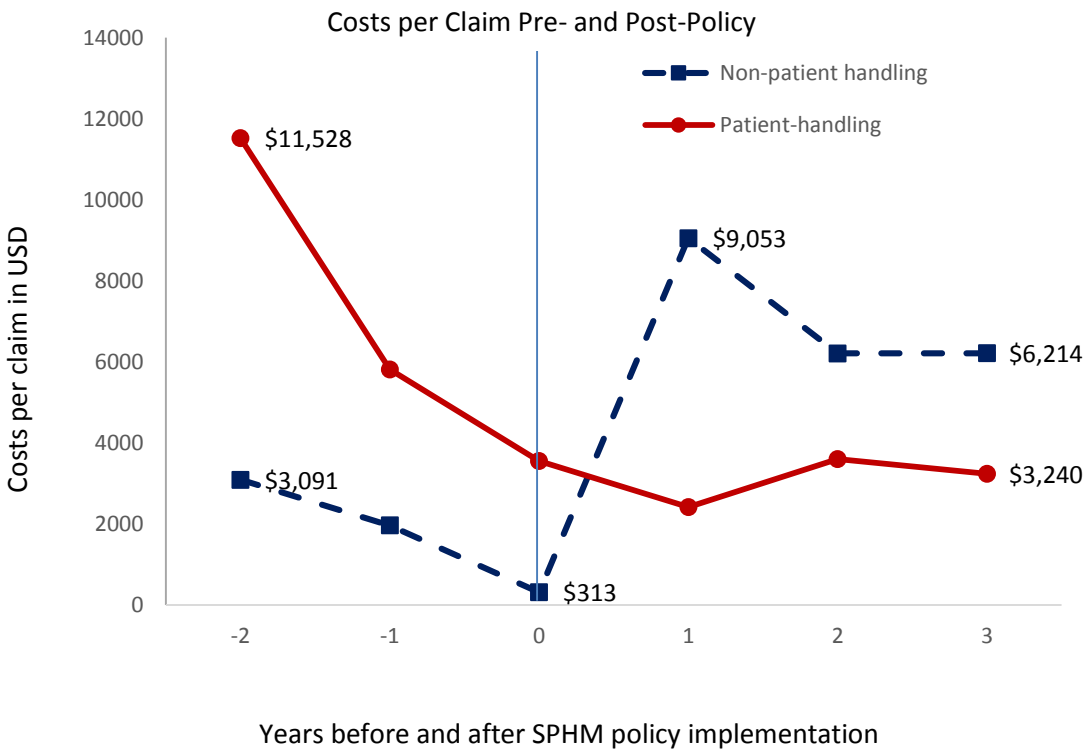

Figure 17. Mean costs per claim in USD for all injuries, post-SPHM policy, by cause. Data derived from a pool of three long-term care facilities. Only one facility contributed data for the pre-policy years. All costs are adjusted to 2011 rates by the consumer price index for medical services, adapted from www.BLS.gov/cpi/tables.htm. USD = United States dollars; FTE = full-time equivalent worker.

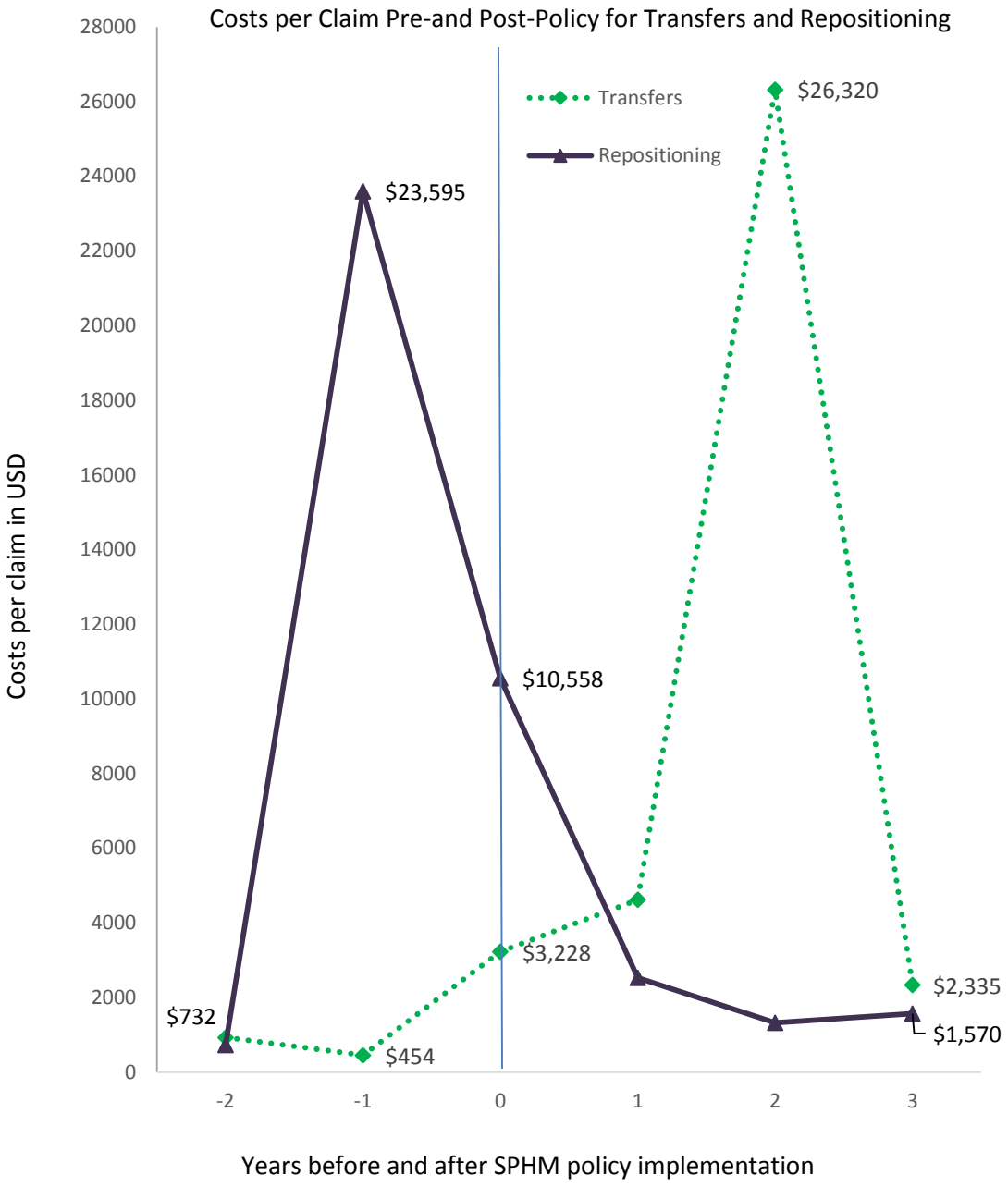

Figure 18. Mean costs per claim in USD for patient handling injuries, post-SPHM policy, by cause. Data derived from a pool of three long-term care facilities. Only one facility contributed data for the pre-policy years. All costs are adjusted to 2011 rates by the consumer price index for medical services, adapted from www.BLS.gov/cpi/tables.htm. USD = United States dollars; FTE = full-time equivalent worker.

Costs per claim for back injuries post-policy. Although three facilities provided data for the three years post-policy, they did not each have back injury claims each year for some of the identified causes. This restricted the pool to fewer than three facilities for most of the variables. The limited data for back injury claims pre- and post-policy are presented in Table J8 and Figures 19 and 20.

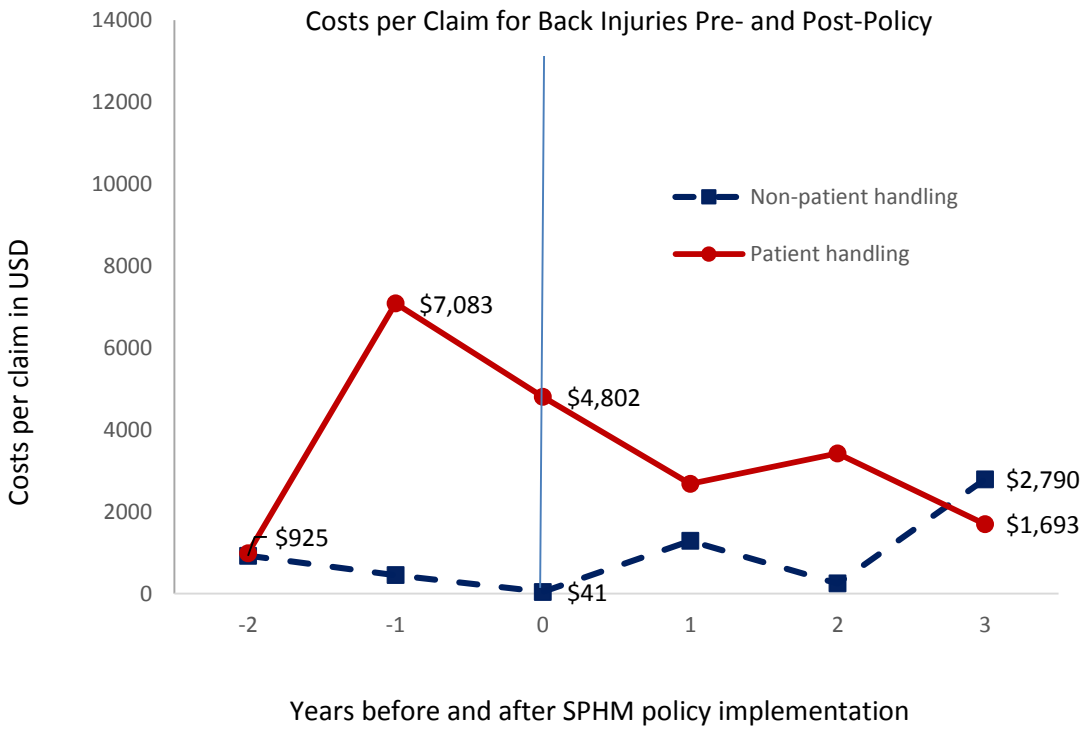

Figure 19. Mean costs per claim in USD for back injuries, post-SPHM policy, by cause. Data derived from a pool of three long-term care facilities. Only one facility contributed data for the pre-policy years. All costs are adjusted to 2011 rates by the consumer price index for medical services, adapted from www.BLS.gov/cpi/tables.htm. USD = United States dollars; FTE = full-time equivalent worker.

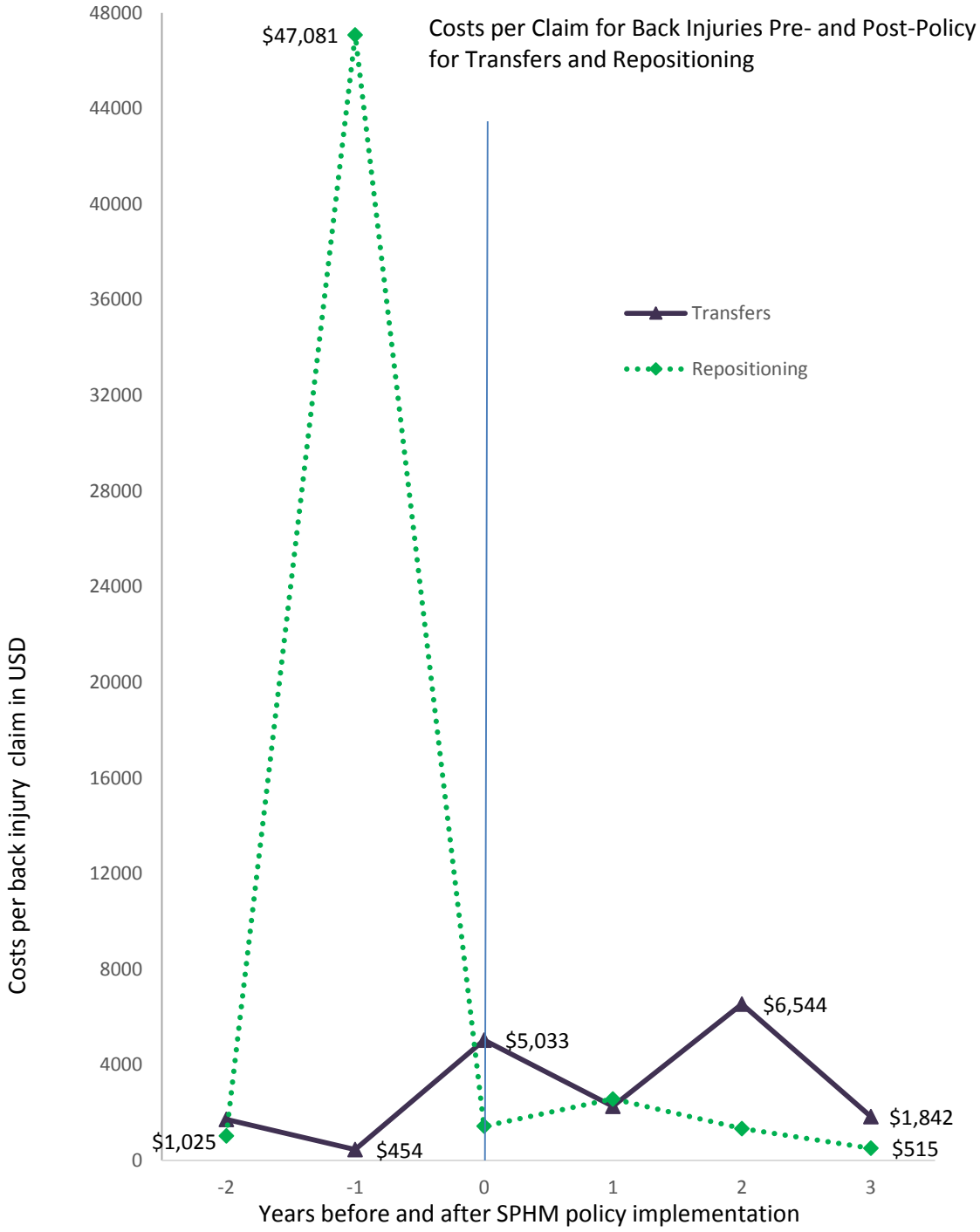

Figure 20. Mean costs per claim in USD for back injuries from patient handling, pre- and post-SPHM policy, by cause. Data derived from a pool of three long-term care facilities. Only one facility contributed data for the pre-policy years. All costs are adjusted to 2011 rates by the consumer price index for medical services, adapted from www.BLS.gov/cpi/tables.htm. USD = United States dollars; FTE = full-time equivalent worker.

Experience modification rates. Fourteen facilities (35%) provided experience modification rates for some or all of the years between 2001 and 2012. The rates, reflecting the ergonomic practices and safety records from earlier years, provided a modifier that increased or decreased the WC premiums paid by the facilities. For example if the total premium was $100,000 per year, a modification rate of 0.75 saved the facility $25,000. A rate of 1.25 increased the premium by $25,000.

The rates for 2011, based on the years 2007 - 2009, ranged from 0.68 to 1.13 (M = 0.93, SD = 0.14, n = 13, Table K1). For 2012, the experience modification rates ranged between 0.62 and 1.25 (M = 0.94, SD = 0.21, n = 8). The trend for the years 2003 through 2012 was an unsteady rise until 2006 (representing 2002 – 2004) followed by a steady five-year decline, rising slightly again in 2012. Facilities with SPHM policies recorded rates that were lower than their policy-free counterparts for all years (Table K1). The trend in experience modification rates following policy implementation is presented in Table K2.

Discussion

The purposes of this study were to examine the impact of SPHM policies in LTC facilities on injury rates and the associated costs, and to explore the trends in these variables in the years following policy implementation. The impact of other factors such as training, policy enforcement and resources were also examined. These purposes were achieved by analyzing information gathered from LTC facilities including OSHA and WC records from 2002 to 2011. Individual facility resources and work practices were explored for possible contributions to injury rates and the associated costs of WRMSI. The research questions and hypotheses that guided this study are presented here followed

by a discussion of findings. At the end of this section, limitations of this study and suggestions for future research are discussed.

Research Questions.

The first question guiding this study explored the trends in injury rates due to patient handling and the associated medical and indemnity costs following implementation of a SPHM policy. The first hypothesis posited fewer injuries and costs from patient handling, evidenced by comparing the three years post-policy to the three years pre-policy.

Only one facility provided enough information about causes of injuries to compare two years pre-policy to three years post-policy. Although the data from a single facility were inadequate to support the hypothesis, the values reflected substantial reductions in injury rates and costs. The mean patient handling injury rates pre- and post-policy were 7.6 and 5.4 injuries per 100 FTE respectively. The mean costs of patient handling injuries pre- and post-policy were $66,383 and $25,677 per 100 FTE respectively. This reflected reductions of nearly 60% from both transfer and repositioning injuries. Costs per claim for patient handling injuries decreased 42%. Costs per claim for transfers and repositioning decreased 15% and 77% respectively. For additional details regarding the data from this facility, see Table 3.

Table 3.

Injury Rates and Associated Costs Pre- and Post-SPHM Policy for One LTC Facility

Patient handling injuries, WC data	Pre-policy	Post-policy	Percent change
Injury rate per 100 FTE	7.6	5.4	↓ 29%
Costs per 100 FTE	$66,383	$25,677	↓ 61%
Costs per claim	$ 8,672	$ 5,070	↓ 42%
Transfers			
Injury rate per 100 FTE	4.2	2.7	↓ 36%
Costs per 100 FTE	$44,532	$18,090	↓ 59%
Costs per claim	$ 9,636	$ 8,234	↓ 15%
Repositioning			
Injury rate per 100 FTE	1.9	2.5	↑ 32%
Costs per 100 FTE	$18,528	$ 7,448	↓ 60%
Costs per claim	$12,164	$ 2,822	↓ 77%
Non-patient handling injuries, WC			
Injury rate per 100 FTE	9.5	5.3	↓ 44%
Costs per 100 FTE	$22,547	$51,364	↑128%
Costs per claim	$ 2,529	$10,306	↑308%
All injuries, OSHA data			
Injury rate per 100 FTE	11.4	8.1	↓ 29%
DART rate per 100 FTE	11.1	8.1	↓ 27%

Note. Injury rates and costs are the mean values from one long-term care facility providing data for two years pre-SPHM policy and three years post-SPHM policy. All costs are in USD and adjusted to 2011 values by the consumer price index (CPI-U) for medical services (BLS, 2012). Costs per 100 FTE = (Annual costs for injuries* 200,000 hours)/total hrs worked by all employees. LTC = long term care; USD = United States dollars; SPHM = safe patient handling and mobility; FTE = full-time equivalent employee; WC = workers' compensation; OSHA = occupational safety and health administration; DART = cases with days away, on job restriction or transfer.

The second hypothesis stated that facilities with policies for at least three years would have lower rates of injury from patient handling than facilities without policies. None of the facilities without policies submitted records with adequate detail for calculation of patient handling injury rates. Without the information on cause of injury, only rates for injuries by all causes could be determined.

In 2011, the mean rate for all injuries in facilities with policies for more than three years was 9.6 injuries per 100 FTE (SD = 4.8, n = 6). The mean rate in facilities without policies was 4.7 injuries per 100 FTE (SD = 2.6, n = 6). This finding was contrary to the expected results.

The second question posed by this study was whether LTC facilities were able to maintain the initial benefits of the SPHM policies. This question assumed that the initial response of the SPHM policy was positive, as found by most of the previous research.

The hypothesis asserted that following policy implementation, the trends in injury rates and associated costs were maintained or improved. The intended statistical analysis was a RD design that would separately examine the impact of SPHM policies from the concurrent decline in injuries. The limited number of facilities providing post-policy information prevented the regression analysis. Instead, the post-policy trends of injury rates and costs were examined and discussed.

Injury rates from all causes neither decreased nor increased in the years following SPHM policy implementation (Figure 9). When examined in more detail, the data suggested a downward trend in the rates of patient handling injuries for two years post-policy. There was a slight rise in the third post-policy year due to increasing injuries from transfers (Figure 10). Costs for all injuries increased during the post-policy years, both

per 100 FTE and per claim (Figures 14 & 17 respectively). Three facilities provided continuous detailed information for several years post-policy indicating that costs for patient handling injuries fluctuated greatly by facility (Appendix L).

The last question examined factors that contributed to worker safety, lower injury rates and lower costs. In brief, the facilities with lower injury rates tended to be smaller, report more staff per resident, and consisted of a greater percentage of traditional skilled nursing and memory care beds. They had fewer or no short term rehabilitation beds. The DON survey respondents from the facilities with lower injury rates indicated more training in SPHM procedures was typically provided and they responded more positively regarding the accessibility and availability of mechanical lifts when needed. Interestingly, the DONs from the facilities with lower injury rates reported less flexibility in the morning routine of getting residents to the dining room for breakfast. Some of the variables are compared in Table 4. Additional details can be found in Appendices G and H.

An in-depth discussion of the findings follows Table 4.

Table 4.

Comparison of Facilities With Low and High Injury Rates

Variables	Facilities	
	Group A (n=6)	Group C (n=6)
Mean 2011 injury rate, per 100 FTE	4.7	12.3
Mean DART rate	3.2	10.1
Beds	78	133
% Skilled nursing	75%	65%
% Short-term rehab	10%	27%
% Memory care	15%	8%
Census	70	113
Case Mix Index (RUG-IV)	1.08	1.13
% census requiring minimal assist	30%	20%
% census requiring maximum assist	42%	47%
HRPD all care staff (www.medicarecompare.gov)	3.6	4.3
Nursing assistant HRPD calculated	2.7	2.3
Resident to device ratio	11.1	9.3
% with SPHM policy by 2011	50%	100%
Initial training	100%	100%
Annual training	100%	50%
Training as needed	67%	25%

Note. Additional details for these and other variables, for all participating facilities, can be found in Appendices G and H. The facilities are grouped according to mean DART rates from 2010 and 2011, from lowest to highest. FTE = full-time equivalent employee; DART = rates of cases with days away, on job restriction or transfer; RUG = resource utilization group; ADL = activities of daily living; HRPD = hours per resident per day; NA = nursing assistant; SPHM = safe patient handling and mobility.

Findings

Injury rates. Over the last decade, the national trends for injury rates and injuries with DART have been declining for most industries, including LTC facilities. Consistent with the national data, the facilities in this study had declining injury rates, cases with DART and to a lesser degree, cases with days away from work (Figure 21).

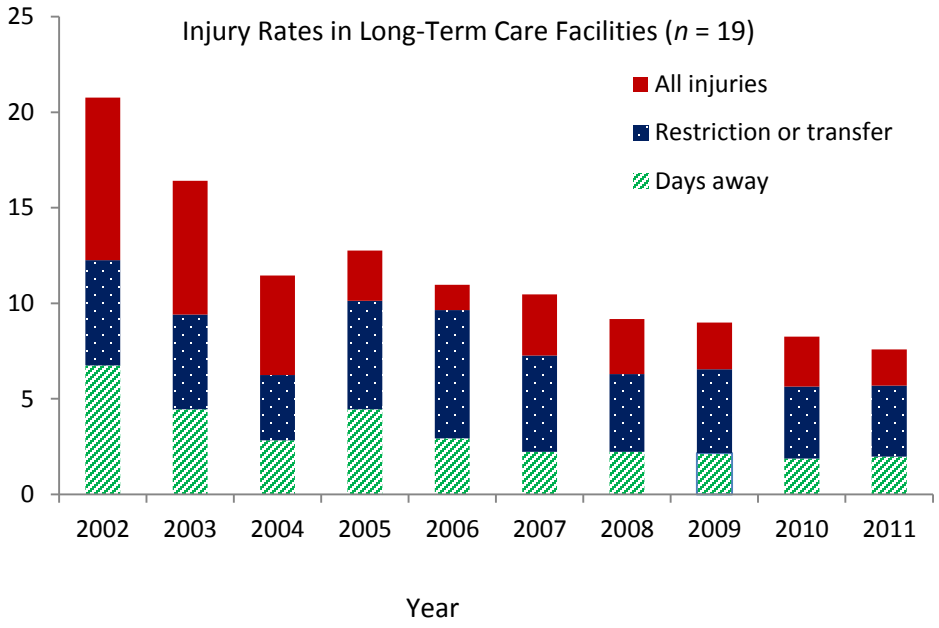

Figure 21. Rates of injuries, rates of injuries with days away on restriction or job transfer (DART) and rates of injuries with days away from work from 2002 - 2011. Rates presented per 100 full-time equivalent (FTE) workers. Mean values derived from a pool of 19 long-term care facilities in Iowa, Minnesota, and Wisconsin. Rates represent injuries from all causes, for all employees.

Recently, the BLS reported that NAs were among the top five occupations for high rates of injuries severe enough to result in days away from work, and the top six for reporting musculoskeletal disorders (BLS, 2012). Consistent with national data, the WC reports indicated that the majority of injuries were caused by patient handling. In this sample, during the years 2006 to 2011, an average of 53% (range 20% - 75%, *N* = 7) of the WC injury claims were due to patient handling. Thirty-seven percent (*N* = 10) of all injuries involved the back and 46% of all back injury claims were due to patient transfers. In 2011, seven facilities providing detailed WC data reported 5.2 patient handling-injuries per 100 FTEs for all employees. Back injuries alone were reported as 2.9 per 100 FTEs. This study could not tease out the specific incidence of back injuries or injuries due to patient handling among NAs, however, twelve facilities provided enough detail in the 2011 OSHA logs to tally the number of NAs reporting injuries. Fifty-two percent of all injuries reported on the OSHA 300 logs were from NAs (range 0% - 86%, *N* = 12). In LTC, NAs typically perform the patient handling tasks so the actual rates of patient handling injuries were likely higher for this group.

SPHM policies. Despite the trend of fewer injuries in LTC, the rates in 2011 remained high as compared to other private industries (BLS, 2012). To promote safety among healthcare professionals, eleven states including Minnesota, passed legislation regarding SPHM (ANA, 2012). In Minnesota, the law required all healthcare facilities to implement a written SPHM policy by July 1, 2008 including plans to implement a full program by January 1, 2011 (Safe Patient Handling Program, 2007). Grants were made available to purchase equipment and support the implementation of these programs. No similar governmental regulations or rules existed in either Wisconsin or Iowa.

Only one of the Minnesota facilities reported a SPHM policy prior to 2008. Eight facilities implemented their policies in 2008 (67%) and two in 2010 (18%). Six of the eleven (55%) policies that were submitted by Minnesota facilities met the regulations minimally, containing language that suggested using lifting devices when needed. Three (27%) of the Minnesota policies were basic, requiring lifting devices with all dependent residents and two (18%) were comprehensive with detailed instructions about when and how to move dependent residents. One facility reportedly did not have a policy as of 2011. Based on the Minnesota regulations, this was most likely due to incorrect information provided at the facility level or because the student elected not to locate and submit the information.

Twelve (63%) of the Wisconsin facilities had policies implemented between 1999 and 2011. Forty-two percent of the policies were comprehensive and only 17% were minimal.

Trends. Considering the SPHM legislation in Minnesota, the injury rates might be expected to be lower than in Wisconsin, especially after 2008. This was not the case. The trends in both states showed an overall decline during the last decade, with Wisconsin rates below those in Minnesota during the last three years. A pronounced decrease in injury rates was noted in Minnesota facilities in 2003 and in Wisconsin facilities in 2004 (Figure 22).

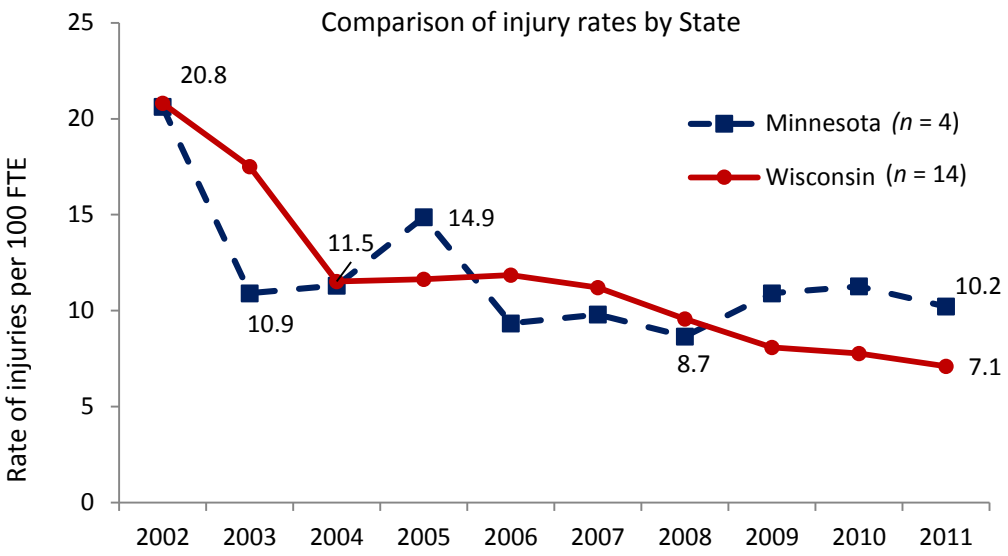

Figure 22. Trends in injury rates in long-term care facilities in Minnesota and Wisconsin from 2002 – 2011. The injury rates are reported per 100 full-time equivalent (FTE) employees and reflect all injuries for all employees. A pool of four Minnesota facilities and 14 Wisconsin facilities provided between one and ten years of data.

A change in the national reporting requirements for defining recordable injuries for OSHA may have impacted the rates in both Wisconsin and Minnesota in 2003 and 2004. Beginning in 2002, minor injuries, previously included in the logs, were no longer recordable (Wiatrowski, 2004). Prior to 2002, the logs included treatments such as the application of a bandage or use of hot or cold treatments. With fewer injuries recorded on the OSHA logs, this change would have reduced the number of recordable injuries after 2002. The facilities did not provide information for 2001 to examine changes during that interval, but the decreases in 2003 and 2004 may have been in response to the different procedure of recording injuries.

The decreased injury rates in 2004 could not be directly compared to national or state data because prior to 2006, the state and national databases combined all residential facilities including LTC, substance abuse and mental health settings. At the state level, in 2004, the Minnesota injury rates for all residential facilities decreased from 10.5 to 9.3 per 100 FTE. This followed a year of no change and was the largest single year decrease until 2011 when the rate dropped by 1.6. The change in 2004 may have also been a result of a state-wide ergonomic program aimed at reducing injuries in LTC facilities.

Starting in 2002 the Workplace Safety Consultation unit of the Minnesota Department of Labor and Industry began contacting Minnesota LTC facilities for participation in a study on the impact of ergonomic services on worker safety (Zaidman, 2010). Interventions occurred in 24 facilities during 2004 - 2005 and included on-site health and safety consultations, ergonomics seminars and information about how to obtain safety grants. An additional 49 facilities served as controls, submitting injury rate and cost information without receiving the interventions. The study reported decreased

injury rates among most of the participating and control facilities. Similar to the results of this study, the Minnesota study found a substantial drop in rates in 2004 for all injuries and injuries with DART for all employees in both the intervention and control facilities. The author suggested that heightened awareness of ergonomic interventions among the nursing workforce may have increased safety practices among all employees. Participation in or awareness of the statewide study may have influenced the facilities in the current study, affecting the injury rates in 2003 – 2004.

In contrast to the study data, the rate of injuries for all residential facilities in Wisconsin increased in 2004 from 10.2 to 12.2 injuries per 100 FTE (BLS, 2012). The injury rate in the sample Wisconsin LTC facilities decreased during that timeframe.

Both the Wisconsin and Minnesota facilities participating in this study had professional relationships with the UW-EC HCA program. The administrators and DONs of the Wisconsin facilities may have participated in the same regional conferences and meetings as those from Minnesota facilities. Perhaps the safety culture generated in Minnesota impacted Wisconsin facilities, positively influencing injury rates in 2004.

Since 2004, the Wisconsin facilities have shown a fairly steady downward trend in injury rates. The Minnesota facilities had lower rates in the years just prior to the SPHM legislation, followed by a two year rise in injury rates. This dip two years prior to policy was also seen in the pre-policy trends of injury rates for all facilities (Figure 9). This may have corresponded to the increased attention to safety during preparation for the SPHM program roll out.

Few published studies were found that provided annual injury rates for comparison of pre- and post-policy trends. The majority of these studies of LTC settings

included the addition of ceiling lifts, employee training and/or the addition or continuation of a SPHM policy.

Mechanical lifting devices.

Ceiling lifts. Alamgir et al. (2008) and Chhokar et al. (2005) studied the addition of ceiling lifts into LTC facilities. No mention was made about prior SPHM policies or the availability of floor-based lifting devices in either of these studies. Prior to the ceiling lift installation Alamgir et al. (2008) reported that rates for patient handling WRMSI were already declining. The decline leveled off during the last two pre-intervention years. Chhokar et al. (2005) also reported minimal change in lifting injuries in the two immediate pre-intervention years, but repositioning injuries dipped two years prior.

Miller et al. (2006) and Ronald et al. (2002) reported on patient handling injuries in single LTC facilities where ceiling lifts replaced floor-based lifting devices. Neither study discussed SPHM policies that may have existed prior to the ceiling lift installation. Both found that injuries increased during the pre-intervention phases.

Following the SPHM interventions most of the studies reported decreased injuries from lifting (Alamgir et al., 2008; Miller et al., 2006; Ronald et al., 2002) but repositioning injuries were not consistently improved. Chhokar et al. (2005) found that repositioning injury rates rose in the first post-intervention year followed by two years of decline. Ronald et al. (2002) found that the number of repositioning injuries remained higher after intervention than during the first pre-intervention phase.

These studies included the addition of ceiling lifts into LTC facilities. With the exception of one ceiling lift in one facility, only floor-based lifting devices were used by the healthcare staff in this study. Other studies compared trends before and after

interventions in healthcare settings with the addition of floor-based devices and a SPHM program.

Floor-based lifts. Martin et al. (2009) reported on the trends of back injuries among nurses before, during and after implementation of a mandatory SPHM program in the Australian state of Victoria. Up to fifty agencies provided data for some or all of the years of the study. During the five pre-implementation years, back injuries dropped for three years then continued to decline slowly over the next two years. The rates fluctuated while the policy was being implemented and then rose slowly in the two years post-implementation.

Several of these reports of annual trends indicated flattened curves, or minimal changes in injury rates in the years just prior to SPHM intervention (Alamgir et al., 2008; Chhokar et al., 2005; Martin, et al., 2009; Miller et al., 2006). One study reported a dip in repositioning injury rates two years pre-intervention (Chhokar et al., 2005). These authors did not speculate on reasons for the pre-implementation trends. The current study found that two years prior to SPHM policy implementation, rates for all injuries and cases with DART were more than 50% lower than either of the adjacent years. Injuries from transfers and repositioning also stabilized in the year immediately pre-policy. Other than increased attention to safety, prompted by preparation for the policy roll out, none of the data collected provided information as to why these pre-policy reductions in injuries occurred (Table I12, Figure 9).

The post-intervention injury trends reported in the literature were mostly positive (Alamgir et al., 2008; Chhokar et al., 2005; Miller et al., 2006; Ronald et al., 2002). However, some studies reported no change or increased injury rates for some or all of the

measures after the SPHM intervention (Martin, et al., 2009; Ronald et al., 2002). Martin et al. (2009) suggested that the post-implementation trends may have been affected by the approach to manual handling, equipment maintenance, accessibility, and floor surfaces. Alamgir et al. (2008) discussed a variety of factors that could have affected the trends in injury rates including workers' attitudes toward reporting injuries, and the increased awareness of WRMSI throughout the process by both workers and employers. Chhokar et al. (2005) suggested that a delay in positive results may have been the cumulative nature of WRMSI with continued reports of injuries into the intervention period. They also suggested that delays may have been due to the time needed to change the culture of work. In this study, a nurse (personal communication A. Olson, April 3, 2013) suggested that with new procedures, the unfamiliar methods take longer, requiring staff to rush through usual work tasks. Nearly 30% of the DONs completing the survey cited rushing as a key factor contributing to injuries (Appendix H).

The aggregate post-intervention trends in this study revealed that rates for all injuries were fairly constant in the five years post-policy and were not statistically different from the pre-policy period (Tables 1 & I12, Figure 9). During the three post-policy years patient handling injuries, including back injuries, decreased (Table I13, I14, Figures 10 & 11). Only two or three facilities provided data for each of these years to illustrate the trends, however, the majority of the cited studies also reported on fewer than three facilities (Alamgir et al., 2008; Chhokar et al., 2005; Miller et al., 2006; Ronald et al., 2002).

Comprehensive ergonomic programs. Tuller et al. (2010) conducted a systematic review and concluded that multi-component patient handling programs were

effective in improving musculoskeletal health. Several intervention studies included multidimensional programs with comprehensive organizational policies, selection and acquisition of appropriate mechanical devices and employee training. The impact of these ergonomic programs was examined by comparing outcomes pre- and post-intervention (Collins et al., 2004; Evanoff, et al., 2003; Garg & Kapellusch, 2012; Garg & Owens, 1992; Nelson et al., 2005).

Early comprehensive SPHM programs involved the introduction of new procedures and devices and attempted to change the culture in resident care to one where the use of mechanical devices replaced lifting of dependent residents. A single facility study by Garg and Owen (1992) found 25% fewer injuries among NAs after implementing a multifaceted SPHM program. There were 43% fewer back injuries and no lost days in the months after the intervention. Although the post-intervention injury rate was 47 cases per 100 FTE, the NAs did not require restrictions or miss work due to their injuries. This study was conducted when injury rates in healthcare facilities were much higher than during recent years. In 1994, the earliest year the BLS online archives provided injury rates for residential facilities, the rate for all employees was 16.5 per 100 FTE compared with the current rate of 8.2 (BLS, 2012). It is important also to recognize that rates for injuries reported prior to 2002 included minor incidents and first aid (Wiatrowski, 2004).

Several multi-setting studies also had significant findings after implementing new or enhanced SPHM programs. Evanoff et al. (2003) reported reduced injury rates for nursing personnel in five LTCs from 6.9 to 4.9 per 100 FTE (29%). Collins et al. (2004)

reported a 46% decrease in patient handling injuries among nursing staff in six LTC facilities from 13.4 to 7.3 injuries per 100 FTE.

Garg and Kapellush (2012) introduced new programs and devices into four facilities and improved the SPHM interventions in three facilities. They reported a 60% reduction in patient handling injuries among nursing staff overall, from 24.4 to 9.8 per 100 FTE. The facilities where procedures and equipment were newly introduced had better results than those with existing programs.

A study by Nelson et al. (2005) conducted in 2001 – 2002, examined the results of improving the existing SPHM interventions in 19 LTC settings. The nursing personnel self-reported patient handling WRMSI, revealing a 28% reduction after intervention, from 24 to 16.9 injuries per 100 FTE. The injury rates pre- and post-policy from the cited studies are compared with the current sample in figure 23.

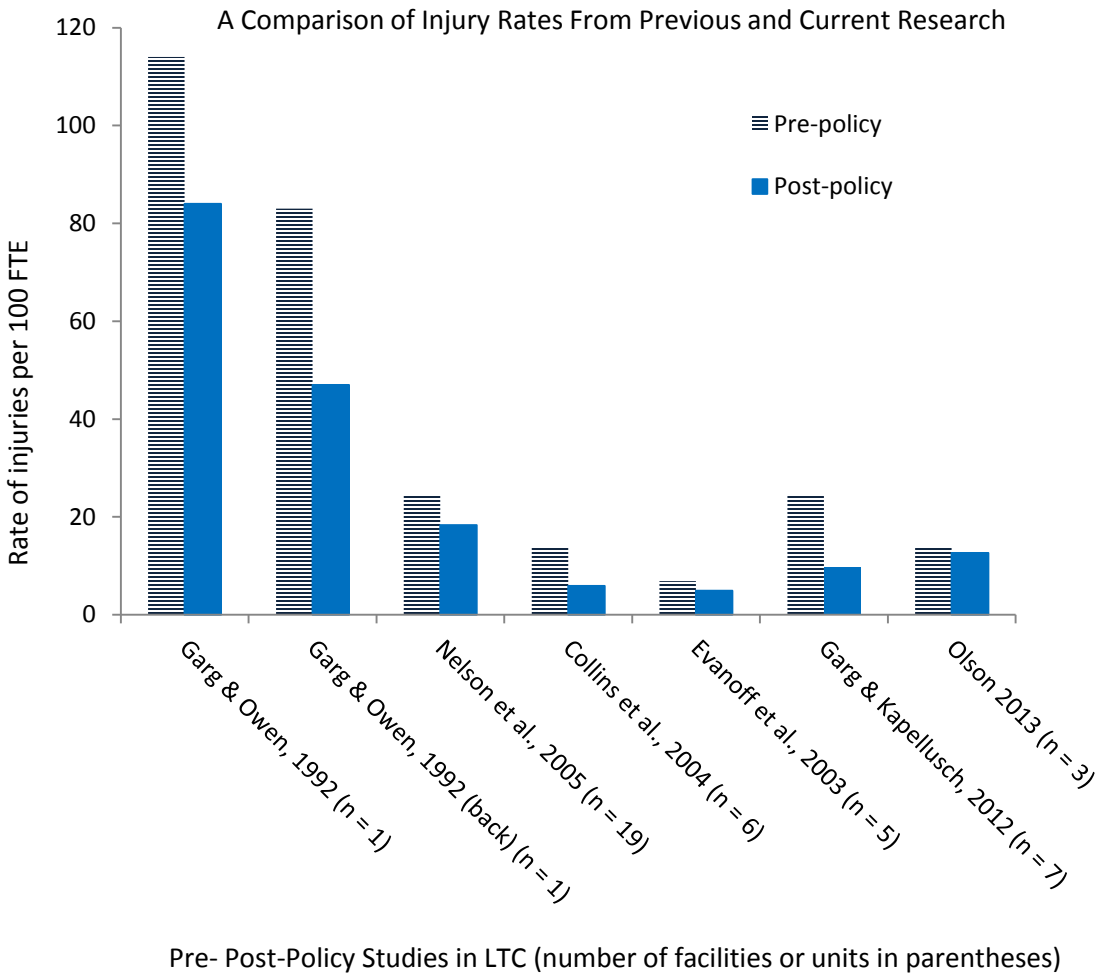

Figure 23. A comparison of injury rates pre- and post-SPHM intervention for previous research and the current study. The sample numbers indicate the number of facilities or units reported in the study. All work pertained to long-term care facilities or units. Injury rates for all previous work pertained to patient handling injuries only. The current work pertains to all injuries.

In many instances, the cited studies included an onsite presence by the research team, guiding equipment purchases, interviewing staff and monitoring compliance (Garg & Kapellusch, 2012; Garg & Owen, 1992; Nelson et al., 2005). Garg and Kapellusch (2012) described a participatory ergonomics approach, where representatives from multiple departments collaborated in decision making and program design to improve the effectiveness of the SPHM intervention. The researchers assisted the teams before and after the intervention, providing support, guidance and empowerment.

The retrospective design of the current study was limited in assessing the comprehensiveness of the facilities' SPHM intervention procedures or programs. The information collected from each facility, including the DON survey, attempted to glean insights by examining the policy language, training schedules, device inventory and DON perspectives on work practice.

Policy influence. The statistical analysis comparing facilities with policies to those without, and comparing pre- to post-policy intervention, did not reveal any significant differences in injury rates or rates of injury with DART (Tables 1 & 2). The days affected by work injuries were significantly different. Facilities with policies, either compared to those without or to themselves pre-policy, were more likely to have more days of modified work. The only result that met expectations was the reduction in days away from work post-policy. This may have indicated less severe injuries following policy implementation requiring fewer days away from work. It was also possible that restricted work was more prevalent in the facilities with policies, allowing workers to remain at work during recovery from injury. No information was collected on the availability of restricted work in the facilities.

Most of the intervention studies reported significant improvements in the number of days affected by injuries after SPHM interventions (Evanoff et al., 2003; Chhokar et al., 2005; Collins et al., 2004; Garg and Kapellusch, 2012; Garg and Owen, 1992; Miller et al., 2006). Only Garg and Kapellusch (2012) reported an increase in the number of restricted work days in one facility where the intervention aimed to improve the existing programs. The restricted work days increased from 155.3 to 182.0 days per 100 FTE. Similar to the current study, the rate of days away decreased significantly post-intervention, from 145.6 to 7.3 per 100 FTE. The remaining four facilities in the study received new SPHM programs. They reported significant reductions in both restricted work days and days away.

Restrepo et al. (2013) initiated a study intending to compare injuries and costs in facilities with policies to those without. They found that in 2007 most facilities already had policies in place, requiring a change in focus to factors that impacted patient handling injuries. They concluded that a comprehensive policy was one of the most important components in improving worker safety. They defined a comprehensive policy as one with clear procedures on how and when to use mechanical lifting devices. Training new staff in the use of these devices was also considered very important.

Training. The majority of the facilities participating in this study already had a policy in place (75%) or planned implementation in 2012 (9%). Twenty (63%) of the submitted policies required initial training and seventeen (53%) included the requirement of annual training. Although not necessarily included in the written policy, the DON survey confirmed that training occurred in nearly all of the facilities. The survey results

indicated that 92% of the facilities provided initial and 71% provided annual training in SPHM and the use of lifting devices.

Devices. D'Arcy, Sasai & Stearns (2012) analyzed the 2004 National Nursing Assistant Survey data to examine relationships between patient handling injuries and organizational factors. They reported that the most significant factor in lowering the odds of work related injuries was the availability of lifts. This was supported by a large scale study of Ohio LTC facilities where the funds spent on equipment such as electric beds and lifts, correlated with decreased back injuries (Park et al., 2009).

The DON survey specifically addressed the accessibility and availability of lifts for the caregivers (Appendix H, Figure 24). The majority of respondents reported no problems in their facilities with these issues. Having charged batteries was reported as a problem sometimes for 50% of the respondents.

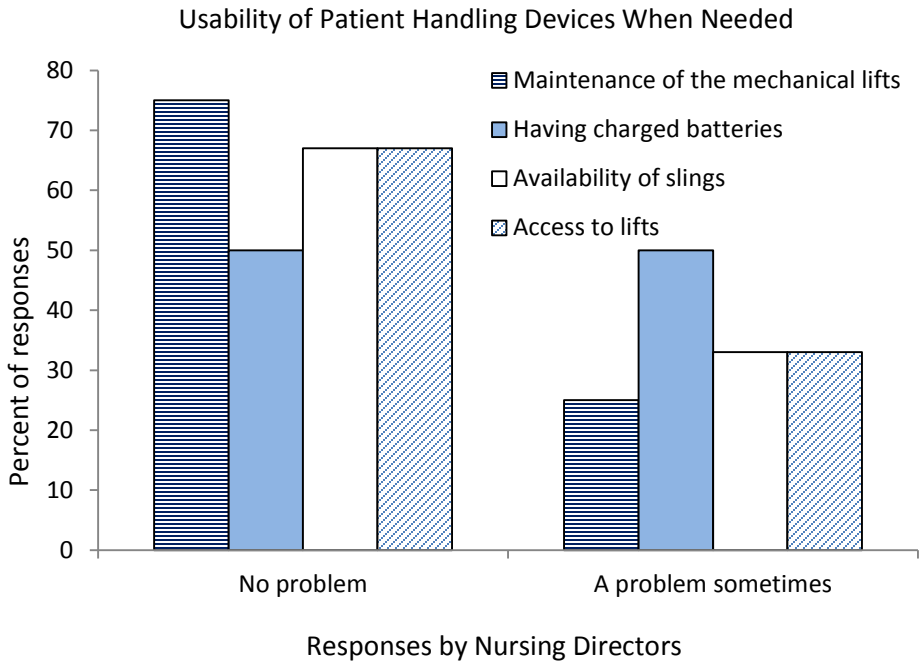

Figure 24. Responses regarding the usability of lifting devices in long-term care facilities. The director of nursing, or equivalent staff member, from 26 facilities answered survey questions regarding the usability of patient handling devices when needed.

The inventories of lifting devices provided a general idea of the annual ratios of residents to lifting devices in the facilities during the last decade (Table G4). The interns were tasked with collecting the year, make, model and cost of lifts. A limitation of the data collection instrument was that it did not reveal whether the inventory was complete for each year, nor whether non-powered lifting devices were included. Additionally, it was not clear whether the devices were ever removed from use. In the inventory, the purchased devices were assumed to accumulate throughout the years. This may have resulted in better ratios than were actually present. In 2011, the resident to device ratio was adequate in the majority of the facilities with an aggregate average of 8.8 residents per lift. In all of the years prior to 2011, the average exceeded 12 residents per lift, which was inadequate according to the recommended ratio of 8-10 residents per lift (Collins et al., 2006).

Compliance and enforcement. Having an adequate number of available lifting devices did not guarantee that the workers used them. Assessing compliance has been attempted in a few studies. Engkvist (2006) and Evanoff et al. (2003) used self-report to estimate the use of mechanical lifting devices. Li et al. (2004) used counters on lifting devices and estimated the expected use. Koppleaar et al. (2011) observed RNs and NAs while they worked and recorded whether the caregiver used the correct devices and/or used them correctly. All of the studies reported underutilization of mechanical lifting devices based on the abilities of the population. Kopplear et al. (2011) reported that lifting devices were correctly used for transfers 72% of the time in LTC facilities. They identified the inaccessibility of lifting devices as the biggest barrier for compliance. This study did not directly assess compliance with SPHM policies or device use, but the

survey of the DONs attempted to understand the availability and accessibility of devices and the supervisor oversight and enforcement of SPHM practices.

Restrepo et al. (2013) identified two measures of compliance as important in predicting worker safety in LTC settings. They suggested that performance reviews should include a discussion of lift use and that facilities need to have established consequences for non-compliance. According to the survey responses, these strategies were not consistently utilized in the sample facilities.

One-third of the facilities reported that performance reviews always included a discussion of the use of lifts. Twenty-three percent reported that lifts were not discussed during reviews. The remaining responses (46%) indicated that the discussion occurred as needed if a problem had been observed or reported. Progressive disciplinary action was mentioned in the comments by four (14%) of the DONs. This was described as a series of consequences for non-compliance. These included warnings, retraining, suspension and termination. Twenty-three percent of the DONs indicated that all four of these consequences were used in their facilities. None of the DONs indicated that there were no consequences for non-compliance, but four respondents (17%) left the question blank.

The survey of the DONs indicated that participating facilities were committed to SPHM procedures regardless of the presence or comprehensiveness of a written policy. The accessibility and training in the use of mechanical devices was overwhelmingly positive. All but one of the respondents indicated that SPHM procedures were always included in a resident's care plan. Restrepo et al. (2013) suggested that the perceptions of the DON provided a strong indicator of the SPHM culture of the facility and contributed to reduced injury rates and costs of WRMSI.

Costs. Several studies reported decreased costs for patient handling injuries following SPHM policy implementation. Reductions in costs from patient handling injuries in general, and from lifting injuries were most notable. Studies by Nelson, et al. (2005) and Miller et al. (2005) recorded post-intervention savings of more than 70% in medical costs and lost time for patient handling injuries among nursing personnel. Garg and Kapellusch, (2012) discussed a mean cost savings of over $70,000 per year for patient transfer injuries after implementing SPHM programs. Chhokar et al. (2005) reported that in the post-intervention period there were significant decreases in patient handling costs, with lower costs from transfers, but not from repositioning injuries. Collins et al. (2004) and Alamgir et al. (2008) both reported increased mean costs per claim for patient handling injuries, yet overall costs for the facilities were lower due to fewer injuries. Spiegel et al. (2002) reported 42% lower costs per 50 FTE for patient handling injuries in the year following ceiling lift installation, with 69% costs savings from transfer injuries alone. Additional information provided by the authors indicated that the 44% reduction in costs per 50 FTE from repositioning injuries did not clearly represent the fluctuations in the costs over time. A sharp rise in costs before and during the ceiling lift installation was followed by a pronounced drop during the first post-intervention phase. These shifts provided the values for the reported cost savings. During a second post-intervention phase, approximately one year later, the costs rose, approaching and surpassing levels from the earlier pre-intervention phases. Engst et al. (2005) reported that the costs for transfers decreased 68% following the installation of ceiling lifts, but costs for repositioning injuries increased 53%. Questionnaires revealed

that staff preferred not to use ceiling lifts for repositioning due to the time needed to use the devices.

Post-policy. The trends in costs per 100 FTE following the implementation of a SPHM policy were not entirely as expected, but had some similarities to previous work. The costs for patient handling injuries decreased prior to and during the policy implementation and for two years following. The costs for injuries from transfers were more positively impacted by the SPHM policy than repositioning injuries. Finally, the benefits of lower costs for patient handling injuries began to wane in the third year post-policy as costs began to rise.

As noted earlier, the injury rates did not decrease significantly post-intervention. Also noted previously, only one facility provided continuous cost data pre- and post-policy, revealing a trend toward lower costs from patient handling injuries after implementing a SPHM policy (Table 3).

A total of ten facilities provided cost information for one or more years, but only three provided multiple years of data following SPHM intervention with detailed injury information and annual work hours to calculate rates per 100 FTE.

Figure 25 illustrates the trends in the costs and rates of injury for patient handling in three LTC facilities during the years following a SPHM policy implementation. The impact of injury rates and costs per claim on the costs per 100 FTE were evident. Concurrent increases or decreases in the injury rate and costs per claim created large swings in the costs per 100 FTE. For some variables, these large magnitude shifts in the annual costs per 100 FTE were in tens of thousands of dollars.

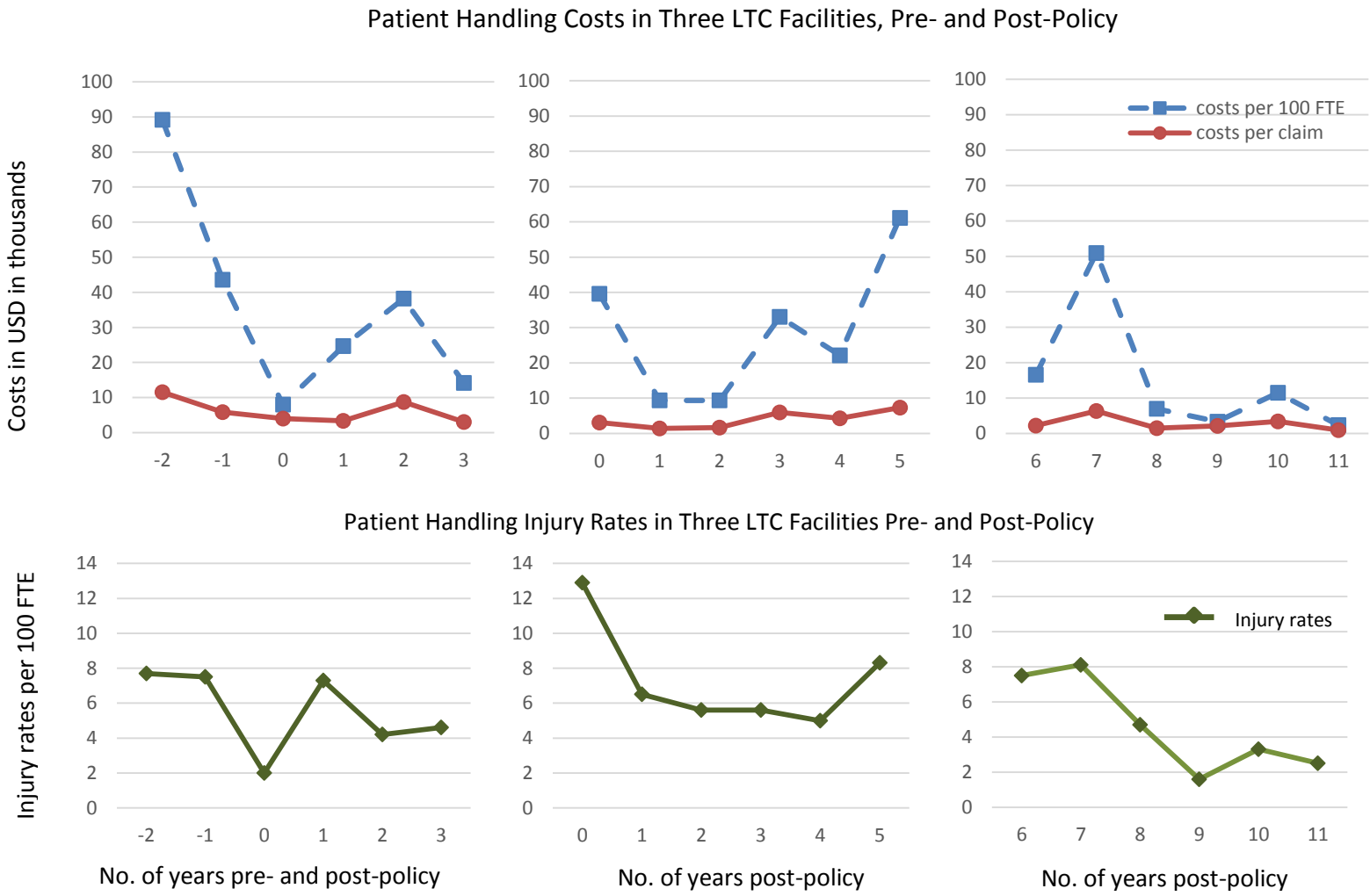

Figure 25. The impact of SPHM policies on costs per 100 FTE, costs per claim and injuries per 100 FTE for patient handling injuries in three LTC facilities. The horizontal axis represents the years prior to, during or following policy implementation. All data pertains to patient handling injuries and are adapted from the workers' compensation loss runs reports. SPHM = safe patient handling and mobility; FTE = full-time equivalent employee.

For the sample facilities, the mean costs per 100 FTE were lowest during the intervention year for non-patient handling injuries, then increased during the post-intervention years (Table J3).

Costs for patient handling injuries declined in the years prior to implementation and continued to decline for two post-policy years. Patient handling costs then increased in the third post-policy year, but remained substantially below the pre-policy levels. Examination of longer trends in two facilities showed large variations in the costs per 100 FTE for patient handling injuries during the years post-policy (Figure 25). One facility had a general upward trend in the costs per claim. Even with a declining rate of injuries for most years, the costs to the facility increased, indicated by the costs per 100 FTE. Another facility showed relatively constant costs per claim and a declining rate of injuries, resulting in decreased costs per 100 FTE.

For the sample, the costs per 100 FTE due to transfers were lowest in the year prior to implementation and in the third post-policy year (Table J3). Repositioning injury costs per 100 FTE for all injuries were lower during the policy year than any of the three years following. Back injury costs due to patient handling, particularly due to repositioning were lowest in the third post-policy year (Table J4). Costs due to repositioning dropped to only $181 per 100 FTE (Table J4, $n = 2$ facilities).

Beyond reducing injuries to caregivers, SPHM programs aimed to reduce the severity of the injuries that did occur. Frequently used indicators of severity were the number of days away from work following injury and the costs of injuries per claim (Engst et al., 2005; Garg & Owen, 1992). The significant reductions in lost days of work were previously discussed (Tables 1, 2, & I9). The direct costs of the lost days were the

wages for days missed. These values were included in the incurred costs. Indirect costs, including the costs to replace the workers during days away, were not included here.

The mean costs per claim for non-patient handling injuries decreased prior to and during policy implementation then rose during the post-policy years (Table J7). By contrast, patient handling claims were lower during and after implementation than in either pre-policy year (Table J7). This was somewhat surprising as costs per claim for transfers were higher in all of the post-policy years than during either pre-policy year (Tables J7 & J8). Mean patient handling costs were reduced by the costs per claim of repositioning injuries. These were lower during the post-policy period than the years before or during the implementation (Tables J7 & J8).

Costs per claim for back injuries from all patient handling causes were lower in the third post-policy year than just prior to or during the implementation (Table J8). This was due to the concurrent reductions in both transfers and repositioning. By contrast, costs per claim for back injuries from non-patient handling events were highest in the third post-policy year.

Fewer injuries and lower costs per claim during the implementation process for both non-patient handling and patient handling injuries, resulted in the lowest facility costs for all injuries during the years just prior to and during SPHM implementation (Tables J3 & J7). These savings may have resulted from greater safety awareness during the policy preparation and roll-out. As the focus on the SPHM intervention passed, compliance may have waned resulting in increased injuries, more severe injuries and increased costs per 100 FTE (Tables I13 & J3). This happened immediately for non-patient handling injuries with a $30,000 increase in costs per 100 FTE in the first post-

policy year. By comparison, patient handling injuries and the associated costs were more responsive to the focus on safety, declining in advance, during and after the implementation until rising in the third post-policy year. With one-third of the facilities implementing policies during the years 2006 – 2010, it became clear that the surprisingly low injury rates and costs noted in 2008 were the result of the heightened focus on safety (Tables I7, I8, J1, & J2).

Annual trends. Corresponding to the 38% reduction in injuries for all facilities, the annual incurred costs per 100 FTE were 54% less in 2011 than in 2006 (Tables I6 & J1). These values were adjusted for inflation and included medical and indemnity costs for all injuries for all employees. The majority of costs in 2011 (52%) were from non-patient handling events (M = \$18,886, n = 3, range \$12,520 to \$24,184). In 2011, 16% of the total costs were attributed to transfers, representing 22% of the total injuries. Twenty six percent of the costs per 100 FTE were attributed to repositioning events (16% of total injuries).

The trends revealed fewer injuries and lower overall costs in recent years, but the costs per 100 FTE for back injuries were greater in 2011 than in 2006. In 2011, back injuries accounted for more than one-third of the incurred costs and 41% of all injuries, whereas in 2006, back injuries accounted for only 18% of the facilities' total costs and 35% of the injuries (n = 3, range 4% - 44%).

The annual costs per claim for patient handling injuries declined during the study period (Table J5, Figure 15, 2011 M = \$2683, n = 5, range \$946 to \$7355). Injuries from transfers had lower mean costs per claim during 2011 than during the previous five years (Table J5, M = \$2406, n = 4 facilities, range \$804 - \$4418). Repositioning injuries

emerged as an area of concern with mean costs per claim in 2011 that were higher than four of the previous five years (Figure 15, 2011 *M* = $5490, *n* = 5, range $264 to $22537). As previously stated, repositioning injuries accounted for 26% of the total costs and 16% of the total injuries in 2011. The incidence rate of repositioning injuries rose slightly in 2011 to 1.6 per 100 FTE (Table I10, Figure 5).

The actual number of repositioning injuries reported in 2011 were few (*n* = 11 injuries, 5 facilities) but the costs for some of the individual claims were high. One facility reported that two of three repositioning injuries in 2011 had costs of $20,260 and $47,000 per injury. Both involved the upper extremity and both occurred while boosting a resident in bed. The remaining 81% of the aggregate repositioning injuries from the five facilities ranged from $168 to $6350 per claim. Compared with 2006, these values have risen substantially. In 2006, three facilities reported that 25% of the repositioning injuries had costs ranging from $1000 to $4000 per claim. The remaining 75% were below $800 per claim. The mean facility costs per claim for injuries to the upper extremity during repositioning have risen steadily since 2008 when no claims were recorded. In 2009, 2010 and 2011 the mean costs per claim were $393, $6538 and $18,529 respectively.

By contrast, back injuries resulting from repositioning and transfers incurred lower mean costs per claim in 2011 than during most previous years (Table J6). However, these low values may not fully illustrate the trends in the severity of back injuries. Almost every year since 2006 the mean costs per claim for back injuries due to transfers and repositioning have fluctuated dramatically, increasing and decreasing by thousands of dollars per claim. In 2011, 13 of 18 total claims for back injuries from four facilities were due to transfers (72%). Three (23%) were greater than $10,000 per claim

($11,550, $12,600, $14,472), and the ten remaining claims were below $1900. This compared with 2006 when fewer of the injuries from transfers involved the back (52%, *n* = 3 facilities, 21 total injuries). In 2006, the adjusted costs per claim for 10 of 11 back injuries ranged between $441 and $3,413 and the cost of one claim was $16,152.

The percentage of back injuries from patient transfers, where the costs exceeded $10,000, rose in the last few years from 0% in 2009, 15% in 2010, to the current 23%. The highest individual claim in 2011 was just under $15,000. A costly claim, but during three of the four years prior to 2011, there were costlier claims between $33,000 and $48,000 each. Even though a growing percentage of claims reported by the facilities in 2011 were over $10,000, individually they were substantially lower than claims recorded in previous years. From another perspective, the percentage of claims for back injuries due to patient transfers with total costs under $1000 (46%) were lower in 2011 than during four of the previous five years. This suggested that, despite fluctuations, the annual costs per claim for back injuries due to patient handling were decreasing.

The decreased costs per claim in 2011 for patient handling injuries, particularly for transfers, suggested declining severity of injuries. This may indicate decreased severity from transfers, but the fluctuations in the costs per claim of back injuries and the small number of participating facilities prevented any strong conclusions regarding injury trends.

Repositioning injuries varied greatly during the study period with the lowest costs per claim for back injuries noted in 2011. While positive, the trend of increasing costs per claim for upper extremity injuries bears attention.

The cost savings from the declining injury rates, along with other positive work practices, resulted in a mean 19% reduction in WC experience modification rates in 2011 as compared with 2006 (Table K1). It should be noted that 2006 represented the highest mean rate from the timeframe. Regardless, the 2011 mean modification rate of 0.93 indicated a 7% cost savings on insurance premiums for the facilities. The presence of a SPHM policy was not shown to independently contribute to a reduction in injuries or incurred costs but facilities with policies did show an additional 4% reduction in the 2011 modification rates.

There are many additional costs of implementing SPHM programs and from work injuries that were not revealed through this study. Siddharthan et al. (2005) summarized the costs of SPHM programs and WRMSI as including capital costs, training costs, direct costs for the medical care, and lost productivity. These costs included but were not limited to the purchase and maintenance of lifting devices, slings and other accessories, the management of claims, the hiring, training and wage replacement for the injured and the time and materials required for the initial and ongoing training of workers for the SPHM procedures. These costs were ongoing and complex to estimate. They have been tallied or estimated in several studies as the basis of a cost benefit analysis and were reported as reaching hundreds of thousands of dollars per facility at the start of a SPHM program (Engst, et al., 2005; Nelson et al., 2005; Siddharthan et al., 2005; Spiegel et al., 2002). Some suggested that the indirect costs could be roughly estimated by doubling the direct costs (Engst, et al., 2005; Spiegel et al., 2002). The complexities of a retrospective analysis of facilities, with a limited access to when or how program components were

added, prevented estimation of indirect costs. Only the total incurred costs provided by the WC carriers were included here.

Comparisons. The costs could not be compared between facilities with or without policies or pre- or post-policy due to insufficient information. This study did not find significant differences in injury rates between facilities with and without policies or before or after policy implementation. A further comparison of the facilities with low and high rates may provide more insight into factors that either reduced or increased injuries.

The mean DART injury rates for 2010 – 2011 were used to sequence the nineteen facilities from low to high to examine the impact of various factors. The rates of cases with DART were utilized instead of rates of all injuries because some facilities might have used more stringent criteria than others for logging cases. The DART cases were only recorded if the worker was on light duty or off of work. While variability may have existed in the assignment of restricted duty, it seemed to be the less variable rate and has commonly been used for injury rate comparisons (BLS, 2012). The average of 2010 – 2011 was selected to include facilities that did not provide 2011 data and to minimize the effects of injury rate fluctuations in 2011. For small facilities, a few injuries during one year could dramatically increase the rate. This effect was partially overcome by averaging two years. Except for one facility, averaging three years resulted in a similar order with the same top and bottom six facilities. This outlier facility provided only one year of data and was ranked number eight in the two year averages and number five in the three year averages (Table I2). Facilities without rates for either 2010 or 2011 were not included in the comparison.

Group A included the six facilities with the lowest mean DART rates for 2010 - 2011 (*M* = 3.4, *SD* = 1.4, range 0.9 – 4.3). Group C included the six facilities with the highest mean rates (*M* = 8.5, SD = 2.0, range 6.5 – 11.6). These groups and some individual features of the facilities were compared for organizational and work practices. More information for these facilities is provided in Table 3, and Appendices G and H.

Organization. Both groups included facilities that were for-profit and not-for-profit. All Group A facilities were corporately owned. They were smaller, averaging 78 beds (*SD* = 29.8) and a census of 70 residents (*SD* = 26.5). Five of the facilities were in located Wisconsin and one was located in Iowa. The mean population of the facilities' communities was 32,493 (*SD* = 41,897)

Two Group C facilities were religious organizations, and one was a partnership. The average facility size was 139 beds (*SD* = 19.1) with a census of 113 residents (*SD* = 29.7). The locations were evenly split between Wisconsin and Minnesota. The mean population of the facilities' communities was 50,617 (*SD* = 32,953). This contrasted with Park et al. (2009) where larger facilities were found to have lower injury rates.

Restrepo et al. (2013) found weak evidence of a relationship between for-profit organizations and lower injury rates and costs. They suggested that the relationship may be embedded in other factors, such as organizational commitment, comprehensive policies and the commitment of the DONs.

Scope of service. Only two Group A facilities had short-term rehabilitation beds compared with five in Group C. Both groups had three facilities with memory care units but in Group A there were a greater percentage of beds dedicated to residents with

cognitive issues. Group A facilities averaged 15% memory care beds where Group C facilities averaged 8 %.

***Acuity*.** Studies by Garg and Kapellusch (2012) and Nelson et al. (2008) included measures of resident acuity in evaluating the effectiveness of a SPHM program. Garg and Kappelusch (2012) reported on one facility with increasing annual CMI values following the SPHM intervention, suggesting that an increasing number of residents required greater personal care while the injury rates and associated costs decreased during the same timeframe.

Nelson et al. (2008) examined facilities' MDS scores pre- and post-intervention to assess changes in the number of residents assigned to each level. The intent was to observe the maintenance or decline in the residents' level of care status in a SPHM environment. This was in response to concerns that mechanical devices might not encourage continued participation in movement and transfers. They found that the program was beneficial to residents. Post-policy, fewer residents were assigned to the levels representing the need for greater assistance in bed mobility and transfers. The challenges Nelson et al. (2008) found with using these values included the inability to control for co-morbid conditions that affected MDS levels, and the tendency for frail residents of LTC facilities to decline or expire versus improve. In the current study, several MDS values contributed to an individual's ADL score. The ADL scores along with additional medical and psychosocial criteria provided the RUG level assignment. Using the RUG levels connected to the range of ADL scores, the percentages of residents who needed greater levels of personal care, including transfers, were compared between groups (Table G3). Only two facilities in Group A, and three in Group C provided data

for this comparison. In Group A there was a higher percentage of residents with ADL scores representing minimal care. Thirty percent of the residents were assigned ADL scores 1- 5, indicating they were somewhat independent in ADLs and required little personal care, this compared with 20% in Group C. For the highest ADL scores, representing weight bearing support needed during ADLs and transfers, Group A facilities assigned these levels to 43% of the residents, while Group C facilities assigned them to 48% of the residents. This indicated that a large percentage of residents in both groups required the use of lifting devices for transfers and repositioning. There was a slight positive trend noted between greater ADL scores and higher injury rates.

Staffing. The HRPD downloaded from the Medicare website (www.Medicare.gov, 2012) resulted in an average of 4.4 HRPD (*SD* = 1.0, *n* = 22) for all nursing care for the participating facilities. This value indicated the combined number of hours of care each day that were provided to a single resident by all nursing staff. The values represented the mean hours and resident census for a particular point in time. Group A averaged 3.7 HRPD (*SD* = 0.25, *n* = 6). Group C averaged more hours of care at 4.2 HPRD (*SD* = 0.32, *n* = 6) which may have represented the care needed for residents with higher ADL scores, or for residents receiving short-term rehabilitation.

The calculated HRPD were determined from the annual 2011 work hours for NAs, licensed staff and the mean resident census. These values may have been determined at different times and differed from those submitted to Medicare. The Group A facilities' calculated mean for all nursing personnel was the same as the online published value at 3.7 HRPD (*SD* = 0.13, *n* = 4). The Group C mean HRPD was lower than the published values at 3.5 (*SD* = 0.95, *n* = 4), and lower than the Group A mean.

The mean HRPD for NAs was also higher for Group A at 2.7 (*SD* = 0.22, *n* = 4). Group C's mean NA HRPD was 2.3 (*SD* = 0.40, *n* = 4). The differences could be due to the fluctuations in work hours or the resident census, or perhaps Group C facilities provided fewer staff hours per resident. Combined with the greater percentage of residents needing assistance with personal cares, Group C facilities would have been expected to provide more HRPD, especially by NAs.

Devices. Contrary to the expectations, the Group A facilities had poorer ratios of residents to lifting devices than Group C. The 2011 ratios for the Groups A and C were 11.2 and 9.3 residents to lifting device, respectively. This may be due to the higher percentage of residents in Group A facilities with less need for assisted transfers, as indicated by ADL scores of less than five.

The DON surveys were completed by three individuals from Group A and four from Group C. All, except one from Group C, indicated that devices were required for transferring dependent residents. The lone Group C respondent reported that mechanical devices were suggested. All indicated strong preferences for device use for either 90 lbs. or 150 lbs. residents. All indicated that initial training in device use was provided. All respondents from Group A confirmed annual training and two of three indicated that additional training was provided as needed. This was more training than indicated by Group C respondents. Two of four in Group C added that annual training was offered and only one indicated that training was provided as needed to improve performance.

Policies. Half of the facilities in Group A had SPHM policies versus all of the facilities in Group B. Only one in each group had a comprehensive policy. Two of three

Minnesota facilities in Group C had minimal policies, which may have indicated a minimal effort to meet the 2008 standard.

An interesting comparison. Two facilities, one from each group, stood out as having the highest percentage of high care residents. They reported ADL scores of eleven or greater for 56% and 67% of their residents (Group A and Group C). The 2011 DART rates for these facilities were 0 and 12.5 per 100 FTE respectively, representing the lowest and the highest rates for this sample. The information provided by these facilities on staffing, inventory of devices and SPHM policies did not reveal clear reasons for the differences in injury rates. Although the Group A facility was much smaller, the number of reported lifting devices was considered inadequate compared to the recommendations. The facility did not have a SPHM policy before the study or report that it was intended for 2012. The Group C facility, was larger and met the recommended ratio of residents to devices but had a higher percentage of residents needing assistance. The facility had implemented a formal SPHM policy in 2008 with mandatory training upon hire, annually and as needed.

Individuals from each of these facilities completed a survey with very similar responses. Both indicated frequent training, enforcement and ease of access to fully functional lifts. The Group A respondent reported bathroom accessibility was a problem sometimes and indicated that residents were concerned about falling from lifts sometimes. The Group C respondent reported that total lifts could not be used in bathrooms but sit-to-stand lifts could and the residents were never concerned about falling from lifts.

The Group A facility DON responded that meals were at a set time in the dining room and bathing wipes were never used in place of tub baths or showers. The Group C respondent indicated participation in more flexible routines with residents' determining their own breakfast time and the use of bathing wipes sometimes.

These results suggested that within individual facilities, the usual indicators of safety did not fully illustrate practices that contributed to a safe working environment. Other than a higher percentage of residents needing assistance in Group C, and less bathroom accessibility, many of the indicators were contrary to expected results.

Limitations.

Some of the limitations in data collection were discussed earlier, specifically, acquiring thorough and legible records from the facilities. Many of the records were either unavailable, difficult to read or simply not submitted despite repeated requests.

Of the records received, there were challenges in determining injury rates as some events resulted in multiple injuries. These were not assigned to particular parts of the body, instead were included as "other". This may have reduced the rates of back and upper extremity injuries. The lack of annual work hours for NAs and RNs for all facilities and for years other than 2011, prevented an illustration of injury trends among these caregivers. This would have been more informative and comparable to other work.

The retrospective nature of this study and the primary researchers lack familiarity with the facilities prevented any conclusions regarding individual work practices that may have impacted injuries. This was highlighted in the example above.

Based upon the work of others, the implementation process and continued focus by a research team may have contributed to initial or ongoing positive outcomes. No

information was collected on how the SPHM policies were implemented or whether strategies were in place to continue to highlight safety and maintain the focus on SPHM.

Finally, the perspectives of the DON were suggested by Restrepo et al. (2013) as a good indicator of the safety consciousness of the facility. The uniformity of the DONs responses suggested that the survey questions may have had obvious answers toward safe patient handling. More attention to the format of the survey might have generated more descriptive information, leading to the detection of differences between the facilities. While the survey did generate many comments, they too, followed similar patterns toward a culture of safety. The final limitation of this study was the lack of input from the primary caregivers on factors that either contributed to injuries or that were protective. The voice of the NA was not heard.

Conclusion

Several indicators of worker safety in LTC facilities have been discussed (D'Arcy et al., 2012; Koppelaar et al., 2011; Restrepo et al., 2013). These have included a comprehensive SPHM policy, adequate staffing, training, available and accessible resources, and an organizational commitment to employee safety. Many studies have reported impressive reductions in injury rates and costs by addressing these variables directly. The majority of the previous work cited throughout this paper involved the addition of new or improved mechanical devices, on-site presence and comprehensive data collection by the researchers. The effects on patient handling injury rates, particularly due to transfers supported the variables above as indicators of safety.

This study found that, although injuries and costs decreased over time, the specific impact of SPHM policies, mechanical devices and training programs could not

be clearly seen. Organizational commitment was not measured beyond the agreement to participate in a study of worker safety. The retrospective nature of this work and the data collection by a host of college students added challenges to the consistency and thoroughness of the data. Despite these challenges, some conclusions could be drawn.

Similar to Restrepo et al., (2013), the majority of the facilities had policies in place or policies planned in the upcoming year. This complicated the comparison of facilities with and without policies, and pre- and post-policy. The data from facilities with policies indicated that during the pre-implementation year, the rates of injury and costs tended to be low. This may have obscured differences in the 2011 injury rates between facilities with and without policies, as well as pre- and post-policy.

The comparison of facilities with low and high injury rates indicated that only minor differences were detected in community and facility size, staffing levels and scope of practice. The example of the facilities with the lowest and highest injury rates, illustrated that other factors likely play a major role in workplace safety.

It has been reported that the culture of safety in LTC has been slow to change due to long standing practices in the nursing profession (Kneafsey, 2000; Pellatt, 2005). The information presented here suggested, in many respects, that a culture of safety now exists. Regardless of the presence of a formal policy, the data indicated that the strategies learned from the SPHM campaign have become the rule instead of the exception. Nationally, the vast majority of NAs report access to and training in the use of SPHM devices (D'Arcy et al., 2012). In this study the DON survey respondents overwhelmingly indicated a commitment to SPHM strategies regardless of the presence or absence of a formal policy.

Injury rates have declined in LTC facilities but they remain higher than other industries, especially for the NAs. D'Arcy et al. (2012) suggested that since devices and training have become commonplace, the focus should be on providing adequate time for NAs to complete residents' ADLs. The concepts of inadequate time and injuries from rushing were also identified as areas of concern by several of the survey respondents.

Suggestions for future research.

Further work on assessing injury rates in LTC should examine the issues of adequate time and include the perspectives of the NAs. The strategies used to implement and maintain the focus on SPHM programs may provide more insight about successful outcomes. In addition, the increased rates of injury and associated costs for repositioning and for non-patient handling injuries suggest other areas to be explored.

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Index to the Appendices

Appendix A

Letter to Administrator

Trends in work-related injury rates and the associated incurred costs in long term care centers

Informed Consent
UWM IRB Protocol # 12.262, approval date 2/27/2012
UW-EC IRB Protocol # FWA00001217, approval date 2/20//2012

Dear Facility Administrator,

You are invited to participate in a research study, entitled Trends in Work-related Injury Rates and the Associated Incurred Costs in Long Term Care Centers. The study is being conducted by Darcie Olson, OTR, MHS and Phyllis M. King, Ph.D, of the University of Wisconsin – Milwaukee, and Jennifer Johs-Artisensi, Ph.D, University of Wisconsin-Eau Claire and practicum student interns from the UW-Eau Claire HCAD Program, and has been approved by the institutional Review Boards at both UW-Eau Claire (IRB Protocol approval #) and UW- Milwaukee (IRB Protocol approval #JOHSARJL3592012).

The purpose of this study is to examine trends in the injury rates and associated costs in long term care facilities over the last 10-15 years. Approximately 40 facilities will participate in this study. If you agree to participate, you will be asked to provide past data on injury rates, associated cost data, and descriptive information about your facility such as your current workforce, resident census and resident acuity levels, and the UW-Eau Claire practicum students will collect and submit the information from your facility sometime between March and June of 2012.

Risks that you may experience from participating are considered minimal. With your assistance, the interns will access and de-identify the injury and loss runs data. They may require minimal assistance from management staff in locating records. There are no costs for participating. Benefits of participating include a comparison of your facility's trends and ergonomic efforts with those of other long term care facilities in the region.

Your information collected for this study is completely confidential and neither individual, nor facility names will ever be identified with injury data or workers compensation information. In reporting of results, no information that could identify your facility will ever be reported, only aggregate results will be released. Individual facility data from this study will be saved on a password protected computer for one year. The de-identified aggregate data will be saved for up to 10 years. Only the UW-EC student intern from the site, Darcie Olson, OTR, MHS and Jennifer Johs-Artisensi, Ph.D. will have access to the information. However, the Institutional Review Board at UW-

Milwaukee, UW-Eau Claire or appropriate federal agencies like the Office for Human Research Protections may review this study's records.

Your participation in this study is voluntary. You may choose not to take part in this study, or if you decide to take part, you can change your mind later and withdraw from the study, and researchers will delete your organizations data if you withdraw. You are free to not answer any questions or withdraw at any time. Your decision will not change any present or future relationships with either the University of Wisconsin Eau Claire or the University of Wisconsin- Milwaukee. There are no known alternatives available to participating in this research study other than not taking part.

If you have questions about the study or study procedures, you are free to contact the investigator at the address and phone number below. If you have questions about your rights as a study participant or complaints about your treatment as a research site, contact the UW-Milwaukee's Institutional Review Board at (414)229-3173 or irbinfo@uwm.edu. You may also contact Dr. Don Bredle, Chair, Institutional Review Board for the Protection of Human Subjects, Office of University Research, McPhee 123B, University of Wisconsin – Eau Claire, Eau Claire, WI 54702-4004, telephone (715) 836-3953.

To voluntarily agree to include your facility in this study, you must be 18 years of age or older. By supplying your organization's de-identified data, you are giving your consent to voluntarily participate in this research project.

Thank you!

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Appendix B

Nursing Survey

Trends in work-related injury rates and the associated incurred costs in long term care centers

Informed Consent
UWM IRB Protocol # 12.262, approval date 5/15/2012
UW-EC IRB Protocol # JOHSARJL3592012, approval date 6/4/2012

Thank you for participating in this brief survey about patient handling procedures in your facility. This survey is part of a joint research project by the University of Wisconsin-Milwaukee and the University of Wisconsin Eau-Claire. The results will be combined with several facilities in the Midwest to examine policies and procedures and how they impact worker safety.

Your participation is appreciated, and it is complete voluntary. It will benefit the researchers in this project and the body of knowledge about safe patient handling. There is no direct benefit to you and no consequence to you or your facility for declining participation. Completion of this survey indicates your consent to participate.

If you, as the DON are unable or unwilling to complete the survey, please request that the survey be completed by another staff member who also has both supervisory and management roles, such as a nursing team leader. The survey is completely voluntary. Thank you for your assistance in this project.

1. Please indicate the last name of the student intern who has provided this survey.

2. In your facility, for residents not able to move around on their own (dependent), **do procedures require** powered mechanical lift use (hereafter called **mechanical lifts**)? Select one answer.
    a. Yes, there are clear procedures that **require** mechanical lifts for dependent residents
    b. There are procedures that suggest use of mechanical lifts when needed.
    c. No, there are no **written procedures** here that require the use of mechanical lifts.
    e. Other, please specify.

3. For dependent residents, **do the care plans** require the use of mechanical lifts?
   a. Yes, **the care plans must reflect** the device use for dependent residents.
   b. No, the use of mechanical lifting devices **is not required** as part of the care plan.
   c. Other, please specify.

4. Are newly hired CNAs trained in how to use powered mechanical lifts? Select all that apply:
   a. Training is provided for all new employees involved in patient care.
   b. Training is provided annually.
   c. Training occurs on the job as needed.
   d. No training in powered mechanical lifts is provided.
   e. Other, please specify.

5. When transferring a dependent resident who weigh 90lbs from bed to chair (or vice versa), which of the following procedures do you prefer? Select one answer.
   a. A mechanical lifting device and two caregivers.
   b. A powered mechanical lifting device and one caregiver.
   c. Two caregivers may perform a manual transfer.
   d. One caregiver may perform a manual transfer.
   e. Manual transfers of dependent residents are not allowed in this facility.
   f. Other, please explain.

6. When transferring a dependent resident who weighs 150 lbs from bed to chair (or vice versa), which of the following procedures do you prefer?
   a. A mechanical lifting device and two caregivers.
   b. A powered mechanical lifting device and one caregiver.
   c. Two caregivers may perform a manual transfer.
   d. One caregiver may perform a manual transfer.
   e. Manual transfers of dependent residents are not allowed in this facility.
   f. Other, please explain.

7. When a CNA or other direct care provider is being evaluated for job performance, how often is the use of mechanical lifts mentioned?
   a. The performance review **always includes a discussion** of the use of mechanical lifts.
   b. Mechanical lifts are included in a job performance review if a problem has been observed or reported.
   c. The use of mechanical lifts are **not included** in performance reviews.
   e. Other, please explain.

8. In your facility, how would you rate the ease of use of mechanical lift in the residents' bathrooms?
   a. Very easy.
   b. Some difficulty.
   c. Very difficult
   e. Lifts cannot be used in the bathrooms here.
   f. Other, please explain.

9. In your facility, how would you rate the ease of use of mechanical lift in the tub rooms or shower rooms?

a. Very easy.
b. Some difficulty.
c. Very difficult
e. Lifts cannot be used in the tub or shower facilities here.
f. Other, please explain.

10. Generally, do you think the residents are concerned about falling during use of a mechanical lifting device?

a. Yes, residents are very concerned about falling during transfers with lifting devices
b. At times, residents are concerned.
c. No, residents are not concerned about falls with use of lifting devices.

11. For each of the following items, please indicate your perception of issues in your facility.

Maintenance of the mechanical lifts.

a. This is not a problem here.
b. This is a problem sometimes.
c. This is a big problem here.
e. Does not apply.
f. Other, please explain.

Having charged batteries in the mechanical lifts.

a. This is not a problem here.
b. This is a problem sometimes.
c. This is a big problem here.
e. Does not apply.
f. Other, please explain.

Availability of slings when needed.

a. This is not a problem here.
b. This is a problem sometimes.
c. This is a big problem here.
e. Does not apply.
f. Other, please explain.

Access to lifts when needed.

a. This is not a problem here.
b. This is a problem sometimes.
c. This is a big problem here.
e. Does not apply.
f. Other, please explain.

12. In your facility, are there any consequences for an employee who doesn't follow the care plan or facility policy regarding use of mechanical lifting devices? Check all that apply.

a. This does not apply to this facility. No policy or procedure in place.
b. Employee is fired.
c. Employee is suspended.
d. Employee is warned.
e. Employee is retrained.
f. Other, please explain.

13. In your facility, what is the procedure for serving breakfast? Select all that apply.

a. As possible, all residents are in the dining room at a set time.
b. Residents can decline breakfast in the dining room.
c. Residents can select their breakfast time in the dining room during a set timeframe.
d. Staff can determine the breakfast time for residents in the dining room.
e. Other, please explain.

14. In your facility, are packaged bathing wipes used in place of showers, tub bathing or sponge bathing with soap and water?

a. No, these types of cleansing wipes are never used.
b. The wipes are used between baths or showers for partial cleansing.
c. The wipes are occasionally used in place of bath or shower.
d. The wipes are frequently used in place of bath or shower.
e. The wipes are used often in place of soap and water.

15. Please describe or list any factors that you think might contribute to injuries among workers in your facility.

16. Please describe or list any factors that might contribute to the reduction of injuries among workers in your facility.

Appendix C

Student Data Collection Worksheet

Practicum Student Name _____

UWM Researcher: **Darcie Olson** dlolson@madisoncollege.edu 608 774-4185 cell 608 258-2313 office

Research question to be addressed by this research: What are the trends in injury rates and the associated costs in Skilled Nursing Facilities over the past 10-15 years?

1. **Does the facility have a policy regarding lifting, movement and/or handling of residents?**
2. **If not already submitted, obtain a copy of the patient handling policy, employee training procedure and schedule. Indicate the date of policy implementation? _____**

The information requested on this form can be gathered **whether or not a safe patient handling and movement policy (SPHM) exists**. Other names for this policy include: no-lift, low-lift, minimal-lift. Hereafter it will be referred to as the SPHM policy. Collect as much of the information as possible from your facility.

A. **Training programs in patient handling or use of mechanical equipment.** This includes back schools or other protective education.

Costs can be estimated by duration, frequency and attendees. This information may be obtained from the Director of Nursing, Education Department or specified in the SPHM policy.

Year Initiated?	Initial training program for program onset or new employees	Ongoing training
Estimated duration (hrs): Who was required to attend?		
Who is/was required to attend.		

B. **Equipment (patient handling and lifting devices):** It will be helpful to compare the equipment that was present each year to see if the number of patient lifts influenced injury rates.

The Director of Nursing or members of a Safe Patient Handling team may be helpful in finding this information. Some facilities have "super users", individuals with more responsibility for the success of a patient handling program.

1. Inventory the number and types of patient handling devices (costs where available) and the year when the devices were purchased. If more than 10 years ago, specify > 10 yrs. **If specifying a brand, include model number, i.e. Sara 2000, Arjo 1200, etc.**

Year	Number and type of devices	Costs for devices and installation (ceiling lifts?)	Year(s) purchased?	Locations served, i.e. within room only, stored in hallway, storeroom, different wing, etc.
Ceiling lifts				
Total lifts -floor based				
Pivot stand lifting devices -Sit to stand devices				
Mechanical walkers -Sit to stand/walk				
Friction reducing lateral transfer devices				

C. 1. **The OSHA 300 logs for at least three years prior to a SPHM Policy until present, OR the years 2002-2011.** All facilities are required to keep the log illustrated below for at least five years. It is common that facilities will keep the logs for many years. If so, request permission to gather the information for the years specified above. The logs are usually in Human Resources, Safety or Workers' Compensation offices depending on your facility.

These logs will track the number and type of injuries experienced by the workers. Most facilities track this required data either in an Excel-type spreadsheet or on a paper copy. If your facility uses an Excel spreadsheet to track, please remove the column with employee's names and submit it in electronic form. If your facility uses the hard copy forms, please cover or fold back columns A& B with the names, and photocopy or scan the original logs for submission. **Remember, do not send forms with workers' names.**

Person		Case			Classify the case-check only one				Enter the number of days the injured or ill worker was:		Check the injury column or choose one type of illness					
					Away from work		Remained at work									
	C.	D.	E.	F.	G.	H.	I	J	K	L	1	2	3	4	5	6
	Job Title	Date of injury or onset of illness	Where the event occurred?	Describe injury or illness, parts of body affected, and object substance that directly injured or made person ill.	Death	Days away from work	Job transfer or restriction	Other recordable cases	Away from work (days)	On job transfer or restriction (days)	Injury	Skin disorders	Respiratory Condition	Poisoning	Hearing loss	All other illnesses

2. **OSHA 300A Summary of Work-Related Injuries and Illnesses. Copy this form for the years 2002-2011.** It doesn't contain any identifying information and doesn't need to be modified. It will be located in the same office as the 300 log above.

D. Costs from "Loss Runs" reports, associated with recordable injuries (from OSHA 300) for at least three years prior to a SPHM policy until present OR the years 2002-2011.

Loss Runs will be held in Human Recourses, Safety or with the Workers' Compensation representative. Ultimately, the study will separate costs by how the injury happened. This will allow patient care tasks to be separated from other workplace injuries, and for lifting injuries to be separated from repositioning events. Download or copy loss runs reports and **delete workers' names electronically or by blacking them out.**

E. Experience Modification Rates.

These numbers can be obtained from Human Resources or the Chief Financial Officer.

2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
(97-99)	(98-00)	(99-01)	(00-02)	(01-03)	(02-04)	(03-05)	(04-06)	(05-07)	(06-08)	(07-09)	(08-10)

F. Workforce hours

1. From Human Resources or the Director of Nursing, find out the **current number of FTEs** for the job classifications as listed below.

Current Year	Annual average number of employees	Total hours worked by all employees during year
All employees		
CNAs (FTE)		
RN/LPNs (FTE)		

G. Resident census (total number of beds/current census) and Resident acuity

For the current year, provide some descriptions of the types of services provided by the skilled nursing facility, i.e. Traditional Long Term, Short-Term Rehabilitation, Traditional + Dementia, etc. , and the total number of beds.

Unit description	Total number of beds	Average Annual Census for 2011
EXAMPLE: Traditional unit	20	15
Total		

In the facility, for the calculation for the average **degree of care required by the residents**, we will be using your RUG-48 Classification for your resident population for a designated day within the previous 30 days. Please fill in the attached spreadsheet and submit it with the rest of your information, which will probably require the assistance of the Director of Nursing, MDS Coordinator and/or the Business Office.

Checklist:

- SPHM Policy
- Training schedule
- Device Inventory
- OSHA 300 Logs 2002*-2011 (*include three prior to SPMH policy)
- OSHA 301 Summary 2002*-2011 (*include three prior to SPMH policy)
- Loss Runs Reports 2002*-2011 (*include three prior to SPMH policy)
- Experience Modification Rates 2001-2011
- Workforce Hours/Current staffing levels
- Census and Resident Acuity spreadsheet

Appendix D

MDS 3.0 RUG-IV 48 cell CMI Calculation Worksheet

MDS 3.0 RUG-IV 48-cell CMI Calculation

Facility Name

Date

RUG Class	Number of Residents	CMI	Weighted # of Residents
RUG-48 Classification			
BA1		0.53	-
BA2		0.58	-
BB1		0.75	-
BB2		0.81	-
CA1		0.65	-
CA2		0.73	-
CB1		0.85	-
CB2		0.95	-
CC1		0.96	-
CC2		1.08	-
CD1		1.15	-
CD2		1.29	-
CE1		1.25	-
CE2		1.39	-
ES1		2.22	-
ES2		2.23	-
ES3		3.00	-
HB1		1.22	-
HB2		1.55	-
HC1		1.23	-
HC2		1.57	-
HD1		1.33	-
HD2		1.69	-
HE1		1.47	-
HE2		1.88	-
LB1		0.95	-

LB2		1.21	-
LC1		1.02	-
LC2		1.30	-
LD1		1.21	-
LD2		1.54	-
LE1		1.26	-
LE2		1.61	-
PA1		0.45	-
PA2		0.49	-
PB1		0.65	-
PB2		0.70	-
PC1		0.85	-
PC2		0.91	-
PD1		1.06	-
PD2		1.15	-
PE1		1.17	-
PE2		1.25	-
RAA		0.82	-
RAB		1.10	-
RAC		1.36	-
RAD		1.58	-
RAE		1.65	-
Totals	-		-
Nursing Home CMI			-

Adapted from personal communication from University of Wisconsin-Eau Claire, Health Care Administration Program.

Appendix E

Audit for designating SPHM policies as minimal, basic or comprehensive

1. Does the SPHM policy recommend using specific mechanical devices for patient handling tasks? (0-1 points)

_____ Score 1 point if mechanical devices are recommended, including gait belt, to keep workers safe, vs. use safe methods as needed.

2. Does the SPHM policy identify specific procedures for different patient handling tasks and include specific patient handling devices? The patient handling tasks may include: (0-5 points)

- Ambulation
- Bed to cart transfers
- Bed to chair transfers
- Repositioning
- ADLs, etc.

_____ Score 1 point for each procedure outlined in the policy

3. Does the SPHM policy describe specific procedures for managing the care of bariatric patients? (0-1 points)

_____ Score 1 point if a bariatric plan is included

4. Does the SPHM policy require training? (0-3 points)

- Upon hire
- Annually
- As needed to correct or improve performance

_____ Score 1 point for each training procedure specified

5. Does the SPHM policy outline enforcement procedures and/or consequences? (0-2 points)

_____ Score 2 points if enforcement is discussed in the policy

_____ Total Score

SPHM Policy Designations

0-4 points	Minimal Policy
5-8 points	Basic Policy
9-11 points	Comprehensive Policy

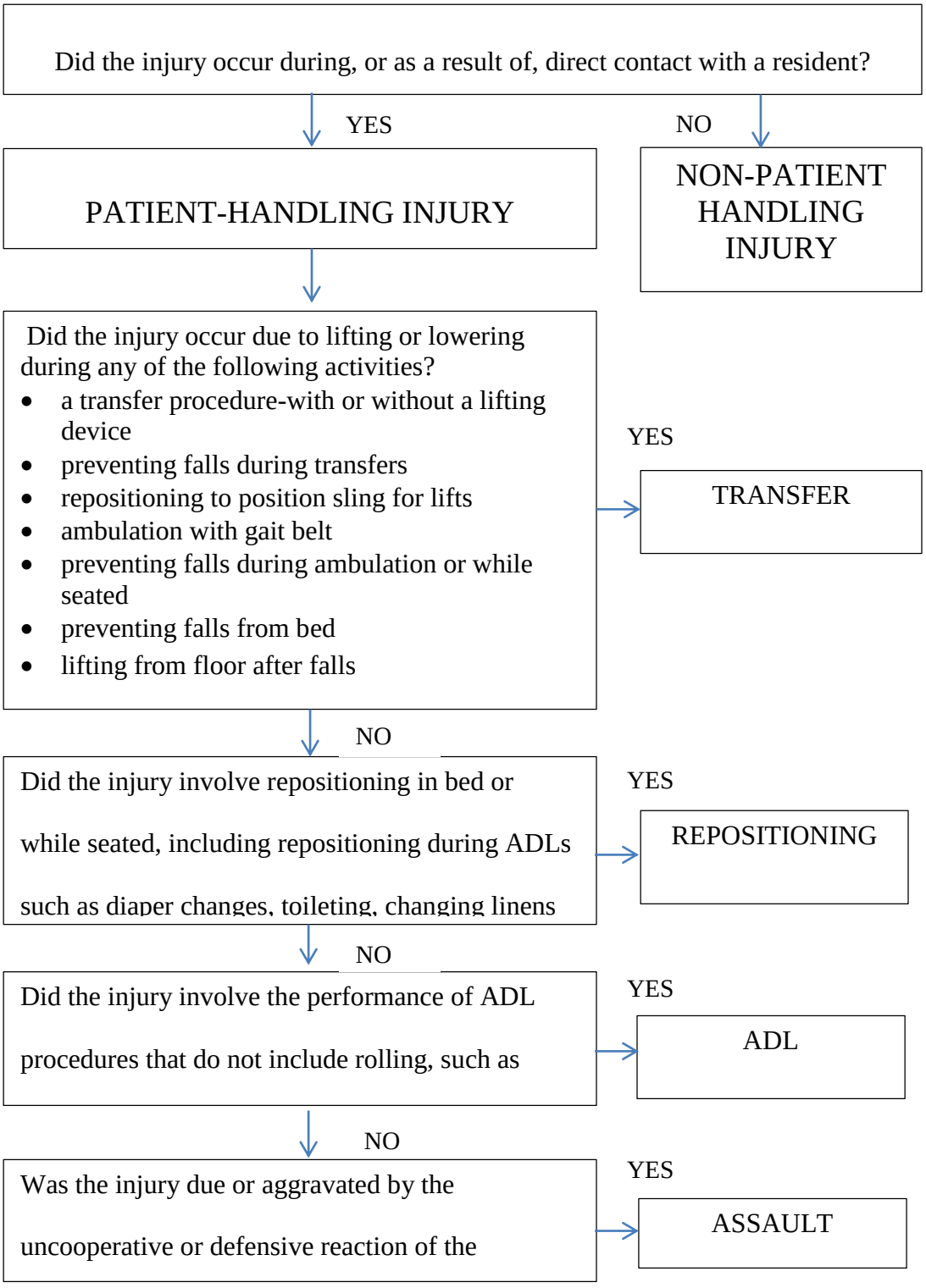
Adapted from:

Restrepo, T. Schmid, F. A., Gucer, P. W., Shuford, H. L., Shyong, C. J., & McDiarmid, M. A., (2013). Safe lifting programs at long-term care facilities and their impact on workers' compensation costs. *Journal of Occupational and Environmental Medicine, 55*(1), 27-35. doi: 10.1097/JOM.0b013e318270d535

Zangl, L. (2012). Resident Handling Program Assessment, 3M Insurance Solutions, Inc. personal communication.

Appendix F

Algorithm for classifying injuries



Index to Appendix G

Table G1

Characteristics of the Participating Facilities (N = 38)

Facility no.[a]	State	Profit status	Ownership	Beds	Census	Scope of Services Percentage of beds SNF	Mem.	Rehab	CMI	% Census[b]	Hrs per resident per day NA	RN[c]	All[d]
Group A													
1	WI	For profit	Corp.	55	48	100	0	0	1.33	100	—	—	3.8
2	IA	For profit	Corp.	40	37	100	0	0	0.92	100	2.6	1.0	3.7
3	WI	For profit	LLC	110	101	44	22	34	—		—	—	3.9
4	WI	Non-profit	Corp.	60	56	75	0	25	0.98	23	2.8	1.0	3.8
5	WI	Non-profit	Corp.	98	92	76	24	0	1.10	22	2.8	0.9	3.4
6	WI	For profit	LLC	105	87	57	43	0	—		2.4	1.6	3.2
M				78	70	75.3	14.8	9.8	1.08		2.7	1.0	3.6
SD				29.8	26.5	22.5	17.8	15.5	0.18		0.2	0.1	0.3
Mdn				79	71.5	75.5	11	0	1.04				
Group B													
7	WI	Non profit	Corp.	166	149	26	54	21	1.05	94	2.6	1.5	4.3
8	WI	For profit	LLC	68	45	100	0	0	1.09	100	2.4	1.0	4.1
9	WI	For profit	LLC	152	115	100	0	0	1.09	94	2.3	0.7	3.6
10	MN	Non profit	Corp.	214	204	46	19	35	1.01	71	2.8	2.2	4.5
11	WI	Non profit	Rel.	160	148	45	38	17	1.00	20	2.4	1.4	6.4
M				152	132.2	63.4	22.2	14.6	1.05		2.3	1.4	3.8
SD				52.8	58.3	34.4	23.8	14.9	0.05		0.5	0.6	2.3
Mdn				160	148	46	19	17	1.05				

Table G1 continues

Table G1 continued

Facility no.[a]	State	Profit status	Ownership	Beds	Census	Scope of services Percentage of beds SNF	Mem.	Rehab	CMI	% Census[b]	Hrs per resident per day NA	RN[c]	All[d]
Group C													
12	MN	Non profit	Corp.	101	93	61	20	18	1.15	95	2.8	1.6	4.4
13	MN	For profit	Corp.	137	128	60	12	28	1.08	95	2.4	1.4	4.3
14	WI	For profit	LLC	144	69	20	0	80	1.07	38	2.1	0.6	4.4
15	WI	For profit	LLC	160	142	76	0	24	—		2.3	1.7	3.9
16	WI	Non profit	Corp.	150	143	83	17	0	—		2.4	1.2	4.0
17	MN	Non profit	Rel.	104	102	89	0	11	1.20	100	2.5	1.7	4.5
M				132.7	112.8	64.8	8.2	26.8	1.13		2.3	1.1	4.3
SD				24.6	29.7	24.9	9.3	27.9	0.06		0.4	0.6	0.3
Mdn				140.5	115	68.5	6	21	1.12				
Group D													
18	WI	Non profit	Corp.	90	85	100	0	0	1.00	49	2.3	0.8	4.0
19	WI	For profit	LLC	100	88	47	26	27	1.21	47	—	—	3.9
20	WI	Non profit	LLC	42	38	0	0	100	—		—	—	6.8
21	MN	Non profit	Corp.	108	97	50	27	23	1.03	76	—	—	4.5
22	MN	Non profit	Corp.	208	203	71	29	0	1.00	100	—	—	4.6
M				107.6	102.2	53.6	29.4	35.4	1.06				4.8
SD				60.7	60.8	36.7	31.2	37.8	0.10				1.2
Mdn				100	88	50	26	27	1.02				

Table G1 continues

Table G1 continued

Facility no.[a]	State	Profit status	Ownership	Beds	Census	Scope of service Percentage of beds SNF	Mem.	Rehab	CMI	% Census[b]	Hrs per resident per day NA	RN[c]	All[d]
Group E													
23	WI	Non profit	LLC	161	132	—	—	—	—				3.9
24	MN	For profit	Corp.	70	65	—	—	—	—				3.4
25	WI	Non profit	Corp.	31	28	—	—	—	—				4.8
26	MN	Non profit	Corp.	62	58	—	—	—	—				4.6
27	MN	Non profit	Corp.	187	165	—	—	—	—				4.0
28	WI	Non profit	Corp.	102	96	—	—	—	—				4.1
29	MN	For profit	Corp.	84	61	—	—	—	—				5.0
30	MN	For profit	Corp.	302	285	—	—	—	—				3.8
31	WI	Gov.	Gov.	90	82	—	—	—	—				4.6
32	MN	For profit	Corp.	138	126	—	—	—	—				3.7
33	WI	Non profit	Corp.	27	—	—	—	—	—				—
34	MN	For profit	Corp.	175	172	—	—	—	—				3.9
35	WI	Non profit	Corp.	123	111	—	—	—	—				4.3
36	IL	For profit	Corp.	202	181	—	—	—	—				4.4
37	WI	Non profit	Corp.	177	157	—	—	—	—				3.6
38	WI	For profit	Corp.	55	58	—	—	—	—				4.0
Totals													
M				120	103.2	64.8	18.0	21.4	1.08		2.5	1.3	4.2
SD				59.6	47.6	28.5	21.3	25.7	0.10		0.2	0.4	0.7
Mdn				107	95	66.0	14.5	19.5	1.07		2.4	1.3	4.0
n				38	22	22	22	22	17		16	16	37

Table G1 continues

Table G1 continued

Note. Forty facilities from the internship sites for the 2011-2012 University of Wisconsin-Eau Claire, Health Care Administration students were invited to participate in the study. Cells with — indicate data were unavailable. Empty cells indicate that data were not applicable. SNF = skilled nursing facility, Mem. = Memory Care, refers to dementia care; Rehab = Rehabilitation; CMI = case mix index; NA = nursing assistant; RN = registered nurse; WI = Wisconsin; Corp. = corporation; IA = Iowa; LLC = limited liability company; MN = Minnesota; Rel. = religious organization; Gov. = government owned; IL = Illinois.

[a]The facilities are numbered and grouped according to injury rates from 2010 and 2011, from lowest to highest. [b]The % census refers to the percentage of the facilities' census that are included in the CMI. [c]RN refers here to licensed nurses, including licensed practical nurses. [d]All hours per resident per day are adapted from the online database Medicare Compare. Retrieved on November 13, 2011 from www.medicare.gov.

Table G2

Safe Patient Handling and Mobility Policy Information by Facility (N = 38)

Facility no.[a]	State	Policy year[b]	Policy level	Required training				Enforcement for non-compliance		Device use in Care Plan
				POLICY			DON	POLICY	DON	
				Initial	Annual	As needed				
Group A										
1	WI	None[c]					Yes		Yes	Yes
2	IA	1995	Minimal	x			—	No	—	—
3	WI	2005	Comprehensive	x	x	x	—	Yes	—	—
4	WI	None[c]					Yes		—	—
5	WI	2011	Minimal	x	x	x	Yes	No	Yes	Yes
6	WI	None[c]							Yes	Yes
Group B								Yes		
7	WI	None[d]					Yes		Yes	Yes
8	WI	None[e]					Yes		Yes	Yes
9	WI	2000	Comprehensive	x	x	x	Yes	Yes	Yes	Yes
10	MN	2010	Minimal	x	x		Yes	No	Yes	Yes
11	WI	None [c]							Yes	Yes
Group C								—		
12	MN	2008	Minimal				Yes	Yes	—	—
13	MN	2008	Minimal	x	x		Yes	No	Yes	Yes
14	WI	2010	Basic				—	Yes	Yes	Yes
15	WI	2006	Comprehensive	x	x	x	Yes	Yes	—	—
16	WI	2003	Basic	x	x		Yes	No	Yes	Yes
17	MN	2008	Basic	x	x	x		Yes	Yes	Yes

Table G2 continues

Table G2 continued

Facility no.[a]	State	Policy year[b]	Policy desc.	Required training				Enforcement for non-compliance		Device use in Care Plan
				POLICY			DON	POLICY	DON	
				Initial	Annual	As needed				
Group D										
18	WI	2011	Comprehensive	x	x	x	Yes	Yes	Yes	Yes
19	WI	None					Yes		Yes	Yes
20	WI	2004	Comprehensive	x	x	x	Yes	Yes	Yes	Yes
21	MN	2008	Minimal	x		x	Yes	No	Yes	Yes
22	MN	2008	Basic	x		x	—	No	—	—
Group E										
23	WI	1999	Minimal				—	No	—	—
24	MN	2000	Minimal	x			Yes	No	Yes	Yes
25	WI	2004	Basic				—	No	—	
26	MN	2008	Basic	x	x	x	—	Yes	—	
27	MN	2008	Comprehensive	x	x	x	Yes	Yes	Yes	Yes
28	WI	2004	Minimal			x	Yes	No	Yes	Yes
29	MN	2010	Minimal	x		x	—	No	—	—
30	MN	2008	Comprehensive	x	x	x	—	Yes	—	—
31	WI	2011	Minimal				Yes	No	No	No
32	MN	None								
33	WI	—	—				Yes		Yes	—
34	MN	—	—				Yes		Yes	Yes
35	WI	—	—				Yes		Yes	Yes
36	IL	—	—				Yes		Yes	Yes
37	WI	—	—				Yes		Yes	Yes
38	WI	—	—				Yes		Yes	Yes

Table G2 continues

Table G2 continued

Note. Forty facilities from the internship sites for the 2011-2012 University of Wisconsin-Eau Claire, Health Care Administration students were invited to participate in the study. Cells with — indicate data were unavailable. Empty cells indicate that data were not applicable. DON = director of nursing survey respondent; WI = Wisconsin; IA = Iowa; MN = Minnesota; IL = Illinois.
[a]The facilities are numbered and grouped according to injury rates from 2010 and 2011, from lowest to highest. [b]The year referred to in the written SPHM policy as the date of implementation. [c] Implementing policy during 2012. [d] Has written procedures on use of lifts. [e]Written policy requires RN to screen residents and determine need for lifts.

Table G3

Distribution in Percentages of Resident Census by Amount of Assistance Needed for ADLs, by Facility (ADL Scores in Parentheses)

Facility no.[a]	None- minimal (0 - 5)	1 – 2 caregivers (6 – 10)	Two caregivers (11 – 16)	Extensive Services (≥ 2)	Total
Group A					
1	15.4	26.9	55.8	1.9	100%
2	44.7	26.3	28.9	0.0	100%
M	30.06	26.62	42.36	0.96	
Group B					
8	30.6	24.5	44.9	0.0	100%
9	34.3	29.6	33.3	2.8	100%
M	32.44	27.06	39.12	1.39	
Group C					
12	15.9	35.2	40.9	0.0	92%[b]
13	28.9	34.7	35.5	0.8	100%
17	13.5	18.3	67.3	1.0	100%
M	19.43	29.40	47.92	0.60	
Totals					
M	26.2	27.9	43.8	0.93	98.86%

Table G3 continues

Table G3 continued

Note. The ADL scores associated with the individual residents' RUGs Level assignments were derived from the Resident Assessment Instrument (RAI), Version 3.0, Section G: Functional Status. The RUG ADL score is the sum of the RAI ADL dependency scores for bed mobility, transfer, toilet use and eating. ADL scores 0-5 indicate that minimal assistance is required. Scores 6-10 indicate that 1-2 caregivers are needed, scores 11-16 indicate the need for weight bearing support and two caregivers. ADL scores of 0-5 are assigned to RUG Levels BA1, BA2, BB1, BB2, CA1, CA2, CB1, CB2, HB1, HB2, LB1, LB2, PA1, PA2, RAA, RAB; ADL scores 6-10 are assigned to RUG Levels CC1, CC2, PC1, PC2, LC1, LC2, HC1, HC2, RAC. ADL scores 11-16 are assigned to RUG levels CD1, CD2, CE1, CE2, PD1, PD2, PE1, PE2, LD1, LD2, LE1, LE2, HD1, HD2, HE1, HE2, RAD, RAE. Extensive services are assigned ADL scores equal or greater than 2, and apply to RUG levels ES1, ES2, ES3. Adapted from the Centers for Medicare and Medicaid, Long-Term Care Facility Resident Assessment Instrument User's Manual, MDS 3.0, Version 1.07, Ch. 6. Retrieved from http://www.cms.gov/Medicare/Quality-Initiatives-Patient-Assessment-Instruments/NursingHomeQualityInits/NHQIMDS30-ArchivedRAIManuals.html. ADL = activities of daily living; MDS = minimum data set; RUG = resource utilization group;
[a]The facilities are numbered and grouped according to injury rates from 2010 and 2011, from lowest to highest. [b]Facility 12 assigned 8% of the residents to DDF, an additional RUG-IV level used in Minnesota for short stay residents. Adapted from http://www.health.state.mn.us/divs/fpc/RUGIV120211.pdf

Table G4

Estimated Annual Ratios of Residents to Mechanical Lifting Devices, by Facility (n = 21)

Facility no.[a]	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Group A										
1[b]				48.0	24.0	16.0	12.0	12.0	12.0	12.0
2[c]								37.0	18.5	18.5
4[b]	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	11.2	11.2
5	18.4	18.4	15.3	15.3	13.1	11.5	10.2	9.2	9.2	9.2[d]
6[b]									21.8	4.8
M	22.3	18.5	18.5	26.8	17.8	14.4	12.5	18.6	14.7	11.1
SD	11.8	6.4	6.4	18.5	5.4	1.5	1.3	12.3	5.1	5.0
Mdn	22.3	18.5	18.5	18.4	15.3	14.0	12.0	13.0	12.0	11.2
n	2	2	2	3	3	3	3	4	5	5
Group B										
7[b]	10.6	10.6	10.6	10.6	10.6	10.6	10.6	10.6	10.6	10.6
8[b]	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
9			28.8	7.2	7.2	7.2	7.2	7.2	7.2	7.2
10	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	10.2[d]	7.3
11[b]				11.4	11.4	11.4	11.4	11.4	11.4	8.7
M	9.0	9.0	14.0	9.1	9.1	9.1	9.1	9.1	8.8	7.7
SD	4.0	4.0	10.4	3.2	3.2	3.2	3.2	3.2	2.9	2.3
Mdn	10.6	10.6	11.3	10.6	10.6	10.6	10.6	10.6	10.2	7.3
n	3	3	4	5	5	5	5	5	5	5

Table G4 continues

Table G4 continued

Facility no.[a]	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Group C										
12	93.0	46.5	46.5	46.5	46.5	46.5	46.5[d]	46.5	46.5	7.2
13							[d]		21.3	21.3
14								[d]	8.6	8.6
15	68.5	34.3	22.8	17.1	13.7[d]	11.4	9.8	8.6	8.6	8.1
16		[d]								6.8
17	17.0	17.0	17.0	17.0	17.0	17.0	17.0[d]	17.0	17.0	9.3
M	59.5	32.6	28.8	26.9	25.7	25.0	24.4	24.0	19.3	9.3
SD	38.8	14.8	15.6	17.0	18.1	18.9	19.5	19.9	15.7	3.4
Mdn	68.5	34.3	22.8	17.1	17.0	17.0	17.0	17.0	16.0	8.3
n	3	3	3	3	3	3	3	3	5	6
Group D										
18	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0[d]	5.0
19[b]							7.3	7.3	7.3	7.3
20			[d]				6.3	6.3	6.3	5.4
21							[d]			6.1
22							[d]			6.2
M	5.0	5.0	5.0	5.0	5.0	5.0	6.2	6.2	6.2	6.0
SD							1.2	1.2	1.2	0.9
Mdn							6.3	6.3	6.3	6.1
n	1	1	1	1	1	1	3	3	3	5

Table G4 continues

Table G4 continued

		2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Totals											
	M	28.4	18.5	18.4	17.6	15.1	14.1	12.5	14.1	12.9	8.6
	SD	31.3	14.0	12.6	14.6	11.3	10.9	10.4	11.9	9.6	3.6
	Mdn	14.0	14.0	15.5	13.0	12.9	11.7	11.0	11.4	10.4	7.3
	n	9	9	10	12	12	12	14	15	18	21

Note. The data are from a pool of 21 LTC facilities from Iowa, Minnesota, and Wisconsin. All ratios are estimated from 2011 resident census. Ratio = (all mechanical floor-based and ceiling lifting devices) /2011 resident census. Empty cells indicate that data were not provided.

[a]The facilities are numbered and grouped according to injury rates from 2010 and 2011, from lowest to highest. [b]Facilities without a SPHM policy prior to 2012. [c]Policy implemented prior to 2002. [d]Year of policy implementation.

Appendix H

Survey Results by Facilities, Groups and by Respondents

Questions	Facilities[a]		Respondents by Group[b]				
	n	%	A	B	C	D	E
			n = 3	*n* = 5[c]	*n* = 4	*n* = 5[c]	*n* = 11[c]
1. In your facility, for residents not able to move around on their own (dependent), do procedures require powered mechanical lift use (hereafter called mechanical lifts)? Select one answer.	26						
a. Yes, there are clear procedures that require mechanical lifts for dependent residents	23	89%	2	6	4	5	9
b. There are procedures that suggest use of mechanical lifts when needed.	1	4%	1				
c. No, there are no written procedures here that require the use of mechanical lifts.	1	4%					1
d. Other, please specify.[e] Group E ▪Therapy evaluates the resident and implements the procedures for transfer	1	4%					1

Table H1 continues

Table H1 continued

Questions	Facilities[a] *n*	Facilities[a] %	Respondents by Group[b] A	B	C	D	E
2. For dependent residents, do the care plans require the use of mechanical lifts?	25						
a. Yes, the care plans must reflect the device use for dependent residents.	24	96%	3	6	4	5	8
b. No, the use of mechanical lifting devices is not required as part of the care plan.	1	4%					1
c. Other, please specify.	0						
4. Are newly hired CNAs trained in how to use powered mechanical lifts? Select all that apply:	26						
a. Training is provided for all new employees involved in patient care.	25	96%	3	6	4	5	10
b. Training is provided annually.	16[d]	62%	3	4	2	3	6
c. Training occurs on the job as needed.	10[d]	42%	2	1	1	1	6
d. No training in powered mechanical lifts is provided.	0						

Table H1 continues

Table H1 continued

Questions	Facilities[a] *n*	Facilities[a] %	Respondents by Group[b] A	B	C	D	E
e. Other, please specify. Group B ▪Trained on the lifts as part of orientation with the mentor CNA. Group D ▪Training also occurs when there is an incident and a lift is involved.	2			1		1	
5. When transferring a dependent resident who weighs 90lbs from bed to chair (or vice versa), which of the following procedures do you prefer? Select one answer.	22						
a. A mechanical lifting device and two caregivers.	21[d]	96%	2	5	3	5	9
b. A powered mechanical lifting device and one caregiver.	2	9%					2
c. Two caregivers may perform a manual transfer.	1	4%					1
d. One caregiver may perform a manual transfer.	0						

Table H1 continues

Table H1 continued

Questions	Facilities[a] *n*	Facilities[a] %	Respondents by Group[b] A	B	C	D	E
e. Other, please explain.	6	3%	1		1		4
Group A ▪Depends on behaviors and any ability or not to bear weight but no manual transfers either pivot or mechanical used. Group C ▪It depends on the resident's ability to bear weight & assist with the transfer & what the resident's care plan indicates. It the resident can safely bear some weight with a Stand Up lift, then an assist of one is acceptable. Otherwise a full body lift. Group E ▪If they bear some weight: one person. ▪In this facility, if the resident is able to bear weight, a standing lift would be used. Only 1 person is nec. for this transfer. If a hoyer lift is used, 2 people are nec. ▪The device is determined by the residents ability to bear weight ▪If the resident cannot bear weight and hold onto an E-Z stand							
7. When transferring a dependent resident who weighs 150 lbs from bed to chair (or vice versa), which of the following procedures do you prefer?	24						
a. A mechanical lifting device and two caregivers.	23	96%	2	6	3		
b. A powered mechanical lifting device and one caregiver.	3	13%					
c. Two caregivers may perform a manual transfer.	0		1		1		

Table H1 continues

Table H1 continued

Questions	Facilities[a] *n*	Facilities[a] %	Respondents by Group[b] A	B	C	D	E
d. One caregiver may perform a manual transfer.	0						
e. Other, please explain	4	17%	1		1		2
Group A ▪No manual transfer but a pivot if can bear any weight or mechanical lift. Number for lift depends on behaviors Group C ▪see above. Group E ▪Same as above ▪type of device depends on abiity to bear wt							
8. When a CNA or other direct care provider is being evaluated for job performance, how often is the use of mechanical lifts mentioned? Select all that apply.	22						
a. The performance review always includes a discussion of the use of mechanical lifts.	7	32%	1	2	1	2	2
b. Mechanical lifts are included in a job performance review if a problem has been observed or reported.	10	46%	2	3	2		3
c. The use of mechanical lifts are not included in performance reviews.	5	23%		1	1	1	2

Table H1 continues

Table H1 continued

Questions	Facilities[a] *n*	Facilities[a] %	Respondents by Group[b] A	B	C	D	E
d. Other, please explain.	6	27%	1		1	1	2
Group A ▪there is a section for safety that would include any issues. Group C ▪this would only be brought up if there was an issue Group D ▪Not sure as I do not do performance evaluations ▪Unsure I do not do performance reviews. Group E ▪Not sure-new to facility ▪C.N.A. are checked off on a skills list annually							
9. In your facility, how would you rate the ease of use of mechanical lift in the residents' bathrooms?	23						
a. Very easy.	5	22%		2	2	2	
b. Some difficulty.	13	57%	3	1		3	6
c. Very difficult.	4	17%		1	1		2
d. Lifts cannot be used in the bathrooms here.	1	4%					1

Table H1 continues

Table H1 continued

Questions	Facilities[a] (*n* = 26) *n*	%	Respondents by Group[b] A	B	C	D	E
e. Other, please explain.	2	9%			1		1
Group C ▪sit to stand lifts can be used in the bathroom but not total body lifts. Group E ▪difficult in some rooms							
10. In your facility, how would you rate the ease of use of mechanical lift in the tub rooms or shower rooms?	22						
a. Very easy.	12	55%	1	3	2	5	2
b. Some difficulty.	10	45%	2		2		6
c. Very difficult	0						
d. Lifts cannot be used in the tub or shower facilities here.	0						
e. Other, please explain.	3	14%		2			1
Group B ▪We have different bathing/showering facilities throughout our buildings. We use tub chairs that the resident can be placed on in their room and transported to the bathing suite. Some difficult with mechanical lift transfers in shower rooms. ▪can be used in the shower room but not the tub room due to space issues. Group E ▪older building-accommodates lift							

Table H1 continues

Table H1 continued

Questions	Facilities[a] (n = 26) n	%	Respondents by Group[b] A	B	C	D	E
11. Generally, do you think the residents are concerned about falling during use of a mechanical lifting device?	23						
a. Yes, residents are very concerned about falling during transfers with lifting devices	0						
b. At times, residents are concerned.	20	87%	3	4	3	3	7
c. No, residents are not concerned about falls with use of lifting devices.	3	13%			1		2
For each of the following items, please indicate your perception of issues in your facility.							
15. Maintenance of the mechanical lifts.	23[d]						
a. This is not a problem here.	17	78%	3	4	4	3	6
b. This is a problem sometimes.	6	26%		2		1	4
c. This is a big problem here.	0						
d. Does not apply.	0						

Table H1 continues

Table H1 continued

Questions	Facilities[a] (*n* = 26) *n*	%	Respondents by Group[b] A	B	C	D	E
e. Other, please explain.	2	8%				1	1
Group D ▪Any time a lift is not functioning properly it is removed from service immediately to be looked at. Group E ▪do not have information yet.							
16. Having charged batteries in the mechanical lifts.	24						
a. This is not a problem here.	12	50%	3	4	3	3	2
b. This is a problem sometimes.	12	50%		2	1	2	8
c. This is a big problem here.	0						
d. Does not apply.	0						
e. Other, please explain.	1	4%					1
Group E ▪unsure							
17. Availability of slings when needed.	24						
a. This is not a problem here	16	67%	2	4	2	5	6
b. This is a problem sometimes.	8	33%	1	2	2		4

Table H1 continues

Table H1 continued

Questions	Facilities[a] (*n* = 26) *n*	%	Respondents by Group[b] A	B	C	D	E
c. This is a big problem here.	0						
d. Does not apply.	0						
e. Other, please explain.							
18. Access to lifts when needed.	24						
a. This is not a problem here.	16	67%	3	4	3	4	5
b. This is a problem sometimes.	8	33%		2	1	2	5
c. This is a big problem here.	0						
d. Does not apply.	0						
e. Other, please explain. Group E ▪not sure	1	4%					1
13. In your facility, are there any consequences for an employee who doesn't follow the care plan or facility policy regarding use of mechanical lifting devices? Check all that apply.	26						
a. This does not apply to this facility. No policy or procedure in place.	0						

Table H1 continues

Table H1 continued

Questions	Facilities[a] *n*	Facilities[a] %	Respondents by Group[b] A	B	C	D	E
b. Employee is fired.	11	42%	1	2	1	3	4
c. Employee is suspended.	10	39%	1	1	2	2	4
d. Employee is warned.	18	69%	2	4	4	2	7
e. Employee is retrained.	21	81%	3	4	4	2	8
f. Other, please explain.	12	46%	1	4	1	3	4

Group A
▪ depends on employee/situation

Group B
▪ Progressive disciplinary action
▪ the consequence depends on the severity of the situation as well as prior hx of CNA issues
▪Progressive discipline
▪Employee is retrained and given a Work Performance Evaluation documenting the issue and retraining. The consequence may depend on where the employee is in the disciplinary process or if there were negative outcomes from not following the care plan.

Group C
▪ It depends what other performance concerns have been addressed with the employee. Retraining is completed. We use a progressive discipline procedure, so it may involve a warning, suspension, or termination.

Group D
▪ progressive corrective action
▪All depends on the seriousness of the infraction and the progression of the discipline
▪Their is always discipline when not using, discipline depends on all the facts. First time not using a lift with no issues and no other issues is a written warning

Table H1 continues

Table H1 continued

Questions	Facilities[a] (*n* = 26) *n*	%	Respondents by Group[b] A	B	C	D	E
Group E ▪ Dependent on circumstances retrained, warned, terminated. ▪ either suspension/fired-depends on situation ▪ any staff not following the plan of care, when a resident's safety is effected is sent home pending an investigation, and developement of a plan of correction. ▪ It all depends on the circumstance							
14. In your facility, what is the procedure for serving breakfast? Select all that apply.	26						
a. As possible, all residents are in the dining room at a set time.	10	39%	2	2	2	2	2
b. Residents can decline breakfast in the dining room.	17	65%	3	2	3	3	7
c. Residents can select their breakfast time in the dining room during a set timeframe.	14	54%	1	2	3	1	7
d. Staff can determine the breakfast time for residents in the dining room.	0						

Table H1 continues

Table H1 continued

Questions	Facilities[a] (*n* = 26) *n*	%	Respondents by Group[b] A	B	C	D	E
e. Other, please explain.	4	15%					
Group B ▪ We have optional continental breakfast served between 6:30 – 9am, and we serve brunch at 10:30 am. Resident can choose to eat in their room if deemed safe, but generally we encourage socialization at mealtime. ▪ residents can choose the their own time to eat breakfast							
Group D ▪not involved in that particular area							
Group E ▪ food is offered when and where the resident would prefer ▪ They can have trays in their room, they can eat in dining room at set time or go to fine dining during a set time frame.							
15. In your facility, are packaged bathing wipes used in place of showers, tub bathing or sponge bathing with soap and water?	25						
a. No, these types of cleansing wipes are never used.	12	48%	2	2	1	1	6
b. The wipes are used between baths or showers for partial cleansing.	11	42%		1	3	4	4
c. The wipes are occasionally used in place of bath or shower.	1	4%		2			
d. The wipes are frequently used in place of bath or shower.	0						
e. The wipes are used often in place of soap and water.	1	4%	1	1			

Table H1 continues

Table H1 continued

Questions	Facilities[a] (*n* = 26) *n*	%	Respondents by Group[b] A	B	C	D	E
22. Please describe or list any factors that you think might contribute to injuries among workers in your facility.	22		3	6	3	4	7

Group A

▪ behavior of residents or failure to follow safety rules

▪ Physical condition of employee. Footwear employees wear. Employee being in a hurry to get work done. Kind of combative, resisitive residents that are in our Memory Care Unit.

Group B

▪ Inconsistency in resident performance, failure to read or follow the care card to utilize the appropriate transfer or number of persons required for the transfer, employess may trip over resident devices i.e. call cord or alarm cords, slipping on floor.

▪ Rushing and not thinking things thru before doing them.

▪ Poor body mechanics on occasion, previous injuries

▪ There are times that staff rush and dod not follow policy and procedure. When this happens the first time they are warned and re trained.

▪ Manuevering residents in small spaces in their w/c's , resident unpredicatable behavior

▪ The employee is in a hurry and does not assess a task before performing it

Group C

▪Not following residents care card, Not following policies and procedures

▪ Injureies may result from staff not being in good physical shape from lack or minimal exercise, being tired & being over weight.

▪ total body lifts are not always easy to move when a heavy resident is in the lift and there isa potential of injury to staff when turning the lift

Group D

▪ rushing, carelessness

▪ Not following the plan of care for transfer.

▪I believe it has to do with approach and sometimes it has to do with other factors like not thinking before doing.

▪injuries are rare and more unusual - i.e., a finger pinched in a drawer or door.

▪ Residents decline and aren't able to transfer as they were originally assessed and need to be a different lift

Table H1 continues

Table H1 continued

Questions	Facilities[a] (*n* = 26) *n*	%	Respondents by Group[b] A	B	C	D	E
Group E ▪ not using gait belt, not asking for help ▪ injuries are rare and more unusual - i.e., a finger pinched in a drawer or door. ▪ Slips and trips ▪ Aging work force, employee physical condition ▪ Doing lifts/transfers independently that require two people to save time. ▪ Working to fast, not using proper body mechanics, not thinking about the task, prior to completing the task. ▪ Improper body mechanics							
23. Please describe or list any factors that might contribute to the reduction of injuries among workers in your facility.	19		2	5	3	4	5
Group A ▪ training on behaviors during transfers ▪ Lifts available on every wing. Staffing ratios above average. Fitness/wellness programs available for employees. Back to work program for light duty workers with injuries.							
Group B ▪ Use of lifting devices, utilization of resident care cards which are posted in the resident rooms, analysis of incidents and corrective action, zip tying cords that may hang from beds, reinforcement of care card use. ▪ Thinking about what they are doing before they do it. ▪ Continuous training, re-education where necessary ▪ Continue to audit floors to check that policies and procedures are being followed. ▪ Education, safety article monthly in our newsletter							

Table H1 continues

Table H1 continued	Facilities[a] (n = 26)		Respondents by Group[b]				
Questions	*n*	%	A	B	C	D	E
Group C ▪ Making sure that they have the residents care information on them, and follow all policies and procedures. ▪ Staff not exercising, not getting enough sleep, not eating well. ▪we have enought lifts and slings, gait belt are always used for one person transfers,annual safety education, safety board,we encourage staff to keep in shape, staff are encouraged to offer safety suggestions, safe patient handling committee Group D ▪ slow down ▪ Continue training on proper transfers, Communication between all services to catch decline in residents ability and continued assessment of these residents to ensure proper plan is in place ▪ Low lift policy we have as well as recognizing hazards and addressing them immediately. Trying to be proactive rather than reactive. ▪ All beds are new fast electric beds, new increased number of lift equipment, policy of NO 2 person manual transfers Group E ▪ using gait belt, asking for help ▪ we don't have many injuries. ▪ Changing mindset ▪ Slowing down, thinking of body mechanics prior to completing task ▪ Training							
24. Please let us know if there are any other ideas, practices or suggestions that you feel we should be aware of.	3		0	1	0	1	1

Table H1 continues

Table H1 continued

Questions	Facilities[a] (n = 26)		Respondents by Group[b]				
	n	%	A	B	C	D	E
Group B							
▪ Easier mechanical lifts/slings for toileting. We find it very difficult to get resident on and off the toilet and manage their pants/incontinent product.							
Group D							
▪ Even with all the new good lift equipment, slip sheets to boost residents up in bed, still to much manual handling with this, ceiling lifts would greatly help this							
Group E							
▪ The word dependent is somewhat confusing when answering these questions. More information is required, as it's not a black and white question. Residents who are dependent can still be weight bearing, and that is the issue in determining lift use.							

Note. The electronic surveys were distributed via email to 50 individuals from 39 long term care facilities. The individuals were either the director of nursing or an equivalent role. The facilities were the internship sites for the health care administration students from the University of Wisconsin-Eau Claire.

[a]Responses were received from representatives from twenty-six long term care facilities in Iowa, Minnesota, Wisconsin and Illinios

[b]The individual responses were grouped according to injury rates from 2010 and 2011, from lowest to highest. [c]Two individuals from one facility provided responses and both were included. [d]Two respondents from a single facility provided contrasting answers and were eliminated from the facility response for this question.

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Table I1

Injury Rates and Distribution of Injuries in Percentages, by Facility and Occupation (n = 19)

	2002-2011 OSHA			2011 OSHA				2006-2011 WC		2011 WC
Facility no.[a]	No. yrs. of data	Mean rate all empl.	% of injuries, NAs	All empl.	% of injuries, NAs	Injury rate, NAs	Injury rate, RNs	No. yrs. of data	Mean rate, all empl.	Injury rate, all
Group A										
1[b]	6	5.4	—	0.0	—	—	—	—	—	
2	7	7.3	30	5.0[c]	0[c]	0.0[c]	14.3[c]	—	—	
3	5	7.1	82	—	—	—	—	—	—	
4[b]	6	12.2	60	4.0	67	6.9	0.0	1	7.1[d]	
5	10	5.9	67	7.2	86	12.6	7.0	4	5.2	7.3
6[b]	3	7.1	30	7.5	29	5.3	22.2	—	—	
M	6.2	7.5	53.8	4.7	45.5	6.5	7.1	2.5	6.2	7.3
SD	2.3	2.4	23.1		38.5	6.3	7.1			
Mdn	6.0	7.1	60.0		48.0	6.9	7.0			
n	6	6	5	5	4	4	4	2	2	1

Table I1 continues

Table I1 continued

Facility no.[a]	2002-2011 OSHA: No. yrs. of data	2002-2011 OSHA: Mean rate all empl.	2002-2011 OSHA: % of injuries, NAs	2011 OSHA: All empl.	2011 OSHA: % of injuries, NAs	2011 OSHA: Injury rate, NAs	2011 OSHA: Injury rate, RNs	2006-2011 WC: No. yrs. of data	2006-2011 WC: Mean rate, all empl.	2011 WC: Injury rate, all
Group B										
7[b]	9	9.7	—	5.7	—	—	—	—	—	—
8[b]	1	4.6[d]	0.8[d]	4.6	0.8	15.3	12.0	1	6.1[d]	6.1
9	6	7.8	63	5.0[c]	50[c]	9.9[c]	21.6[c]	6	10.0	5.8
10	10	8.9	50	6.5	62	15.6	3.7	—	—	—
11[b]	4	6.6	61[a]	6.5	61	16.8	5.4	—	—	—
M	6.0	7.5	43.7	5.7	43.5	14.4	10.7	3.5	8.1	6.0
SD	3.7	2.0			28.9	3.1	8.1			
Mdn	6.0	7.8			55.5	15.5	8.7			
n	5	5	4	5	4	4	4	2	2	2
Group C										
12	8	9.2	72	8.1[c]	41[c]	25.1[c]	0.0[c]	6	11.8	11.6
13	4	10.2	42	—	59	—	—	1	10.4[d]	—
14	2	12.6[d]	27[d]	13.8	53	30.1	38.5	2	10.5[d]	10.9
15	9	13.2	70	12.5[c]	71[c]	—	—	6	12.6	12.5
16	10	17.1	67	11.2[c]	61[c]	22.0[c]	5.9[c]	—	—	—
17	7	16.7	51	16.0[c]	44[c]	23.9[c]	12.7[c]	—	—	—
M	6.7	13.2	54.8	12.3	54.8	25.3	14.3	3.8	11.3	11.6
SD	3.1	3.3	18.0	3.0	11.2	3.5	17.0	2.6	1.1	0.8
Mdn	7.5	12.9	59.0	12.5	56.0	24.5	9.3	4.0	11.2	11.5
n	6	6	6	5	6	4	4	4	4	3

Table I1 continues

Table I1 continued

Facility no.[a]	2002-2011 OSHA: No. yrs. of data	2002-2011 OSHA: Mean rate all empl.	2002-2011 OSHA: % of injuries, NAs	2011 OSHA: All empl.	2011 OSHA: % of injuries, NAs	2011 OSHA: Injury rate, NAs	2011 OSHA: Injury rate, RNs	2006-2011 WC: No. yrs. of data	2006-2011 WC: Mean rate, all empl.	2011 WC: Injury rate, all
Group D										
18	4	18.5	38	—	—	—	—	—	—	—
19	3	13.2	—	—	—	—	—	1	16.1[d]	—
M	3.5	15.85	38					1	16.1	
SD										
Mdn										
n	2	2	1					1	1	
Totals										
M	6.0	10.2	50.7	7.6	48.9	14.1	11.0	3.1	10.0	9.0
SD	2.8	4.1	21.3	4.2	24.8	9.5	11.2	2.4	3.4	3.0
Mdn	6.0	9.2	55.5	6.5	56.0	15.3	7.0	2.0	10.4	9.1
n	19	19	16	15	14	13	13	9	9	6
Policy > 3 years										
M				9.6		16.1	9.7			
SD				4.4		9.7	7.9			
Mdn				9.7		18.8	9.3			
n				6		6	6			

Table I1 continues

Table I1 continued

Note. The data are from a pool of 19 LTC facilities from Iowa, Minnesota, and Wisconsin. Injury rates are per 100 FTE = (Annual number of injuries *200,000 hours)/ total hours worked by all employees. Cells with — indicate data were unavailable. Empty cells indicate that data were not applicable. LTC = long-term care facilities; FTE= full time equivalent worker; OSHA = Occupational Safety and Health Administration; WC = Workers' compensation; DART = cases with days away, on job restriction or transfer; SPHM = safe patient handling and movement.

[a]The facilities are numbered and grouped according to DART injury rates from 2010 and 2011, from lowest to highest. [b]Facilities without a SPHM policy prior to 2012. [c] Policy in place for at least 3 years. [d]Data derived from fewer than 3 facilities.

Table I2

Rates of Injury With Days of Work Affected, by Facility and Occupation

	2002-2011 DART		2011 DART			2011 Restriction or transfer	2011 Days away			2010-2011 DART
Facility no.[a]	No. yrs data	Mean, all employees	All empl.	NAs	RNs	All employees	All empl.	NAs	RNs	Mean, all employees[b]
Group A										
1[c]	6	3.1	0.0			0.0	0.0			0.9
2	7	4.9	3.4[d]	0.0	14.3	1.7	1.7	0.0	0.0	2.6
3	5	4.5	—			—	—			4.1
4[c]	6	10.4	4.1	6.9[c]	0.0[c]	1.4	2.7	6.9	0.0	4.2
5	10	3.4	5.2	12.6	0.0	4.1	1.0	2.1	0.0	4.2
6[c]	3	4.9	3.2	5.3	5.6	3.2	0.0	0.0	0.0	4.3
M	6.2	5.2	3.2	6.2	5.0	2.1	1.1	2.2	0.0	3.4
SD	2.3	2.7	1.9	5.2	6.7	1.6	1.2	3.3	0.0	1.4
Mdn	6.0	4.7	3.4	6.1	2.8	1.7	1.0	1.1	0.0	4.2
n	6	6	5	4	4	5	5	6	4	6

Table I2 continued

Table I2 continues

Facility no.[a]	2002-2011 DART: No. yrs data	2002-2011 DART: Mean, all employees	2011 DART: All empl.	2011 DART: NAs	2011 DART: RNs	2011 Restriction or transfer: All employees	2011 Days away: All empl.	2011 Days away: NAs	2011 Days away: RNs	2010-2011 DART: Mean, all employees[b]
Group B										
7[c]	9	6.1	3.2	—	—	1.8	1.4		—	4.3
8[c]	1	4.6	4.6	15.3	0.0	3.0	1.5	5.1	0.0	4.6
9	6	6.9	3.3[d]	3.3	14.4	0.8	2.5	0.0	7.2	5.0
10	10	6.6	5.2	12.7	2.5	4.2	1.0	3.9	0.0	5.6
11[c]	4	5.5	4.0	10.7	0.0	3.3	0.7	1.5	0.0	6.1
M	6.0	5.9	4.1	10.5	4.2	2.6	1.4	2.6	1.8	5.1
SD	3.7	0.9	0.9	5.1	6.9	1.3	0.7	2.3	3.6	0.7
Mdn	6.0	6.1	4.0	11.7	1.2	3.0	1.4	2.7	0.0	5.0
n	5	5	5	4	4	5	5	4	4	5
Group C										
12	8	9.0	8.1[d]	14.6	0.0	3.5	4.6	8.4	0.0	6.5
13	4	5.9					—			7.1
14	2	7.1	10.9	26.3	12.8	5.9	4.9	11.3	12.8	7.1
15	9	9.3	9.9[d]			7.3	2.6			8.6
16	10	12.2	9.4[d]	22.0	0.0	8.7	0.6	2.0	0.0	10.0
17	7	13.1	12.5[d]	19.5	0.0	6.3	6.3	10.8	0.0	11.6
M	6.7	9.4	10.1	20.6	3.2	6.3	3.8	8.1	3.2	8.5
SD	3.1	2.8	1.7	4.9	6.4	1.9	2.2	4.3	6.4	2.0
Mdn	7.5	9.2	9.9	20.8	0.0	6.3	4.6	9.6	0.0	7.9
n	6	6	5	4	4	5	5	4	4	6

Table I2 continues

Table I2 continued

Facility no.[a]	2002-2011 DART: No. yrs data	2002-2011 DART: Mean, all employees	2011 DART: All empl.	2011 DART: NAs	2011 DART: RNs	2011 Restriction or transfer: All employees	2011 Days away: All empl.	2011 Days away: NAs	2011 Days away: RNs	2010-2011 DART: Mean, all employees[b]
Group D										
18	4	6.1	—	—	—	—	—		—	—
19	3	10.9	—	—	—	—	—		—	—
M	3.5	8.5								
SD	0.7	3.4								
Mdn	3.5	8.5								
n	2	2								
Totals										
M	6.0	7.1	3.7	12.4	4.1	3.7	2.1	4.3	1.7	5.7
SD	2.8	2.9	2.5	7.8	6.1	2.5	1.9	4.1	4.1	2.6
Mdn	6.0	6.1	3.3	12.6	0.0	3.3	1.5	3.0	0.0	5.0
n	19	19	15	12	12	15	15	12	12	17

Note. The data are from the OSHA 300 logs from a pool of 19 LTC facilities from Iowa, Minnesota, and Wisconsin. Rates are per 100 FTE = (Annual number injuries with days of work affected *200,000 hours)/ total hours worked by all employees. Cells with — indicate data were unavailable. Empty cells indicate that data were not applicable. OSHA = Occupational Safety and Health Administration; LTC = long-term care facilities; FTE= full time equivalent worker; DART = cases with days away, on job restriction or transfer, NA = nursing assistant; RN = licensed nurse, including registered and licensed practical nurse.

[a]The facilities are numbered and grouped according to DART injury rates from 2010 and 2011, from lowest to highest. [b]Values used to number facilities. [c]Facilities without a SPHM policy prior to 2012. [d]Policy in place for at least 3 years.

Table I3.

Rates of Days of Work Affected by Injury, by Facility and Occupation

	2002 – 2011 Away, on restriction or transfer		2011 Away, on restriction or transfer			2011 Restriction or transfer			2011 Away		
Facility no.[a]	No. yrs data	Mean, all employees	All empl.	NAs	RNs	All empl.	NAs	RNs	All employees	NAs	RNs
Group A											
1[b]	6	33.3	0.0	—	—	0.0	—	—	0.0	—	—
2	7	205.0	151.0[c]	0.0	200.0	102.4	0.0	200.0	48.7	0.0	0.0
3	5	94.3	—	—	—	—	—	—	—	—	—
4[b]	6	164.9	39.1	75.9	0.0	25.6	10.3	0.0	13.5	65.5	0.0
5	10	90.0	117.0	237.4	0.0	114.9	235.3	0.0	2.1	2.1	0.0
6[b]	3	168.9	17.1	23.7	38.9	17.1	23.7	38.9	0.0	0.0	0.0
M	6.2	126.1	64.8	84.2	59.7	52.0	67.3	59.7	12.8	16.9	0.0
SD	2.3	64.0	65.8	106.9	95.3	52.7	112.4	95.3	20.8	32.4	
Mdn	6.0	129.6	39.1	49.8	19.4	25.6	17.0	19.4	2.1	1.1	
n	6	6	5	4	4	5	4	4	5	4	4

TableI3 continues

Table I3 continued

Facility no.[a]	2002 – 2011 Away, on restriction or transfer: No. yrs data	2002 – 2011 Away, on restriction or transfer: Mean, all employees	2011 Away, on restriction or transfer: All empl.	2011 Away, on restriction or transfer: NAs	2011 Away, on restriction or transfer: RNs	2011 Restriction or transfer: All empl.	2011 Restriction or transfer: NA	2011 Restriction or transfer: RN	2011 Away: All employees	2011 Away: NAs	2011 Away: RNs
Group B											
7[b]	9	175.6	54.7	—	—	29.8	—	—	24.9	—	—
8[b]	1	27.0	27.0	168.4	0.0	21.3	148.0	0.0	5.7	20.4	0.0
9	6	206.8	53.3[c]	96.0	50.4	39.2	96.0	43.2	4.2	0.0	7.2
10	10	181.2	126.5	386.0	92.5	119.9	361.6	92.5	6.5	24.4	0.0
11[b]	4	210.8	210.2	606.1	0.0	166.5	436.6	0.0	43.6	169.5	0.0
M	6	160.3	94.3	314.1	35.7	75.4	260.6	33.9	17.0	53.6	1.8
SD	3.7	76.1	74.6	230.4	44.7	64.4	164.3	44.0	17.1	78.0	3.6
Mdn	6	181.2	54.7	277.2	25.2	39.2	254.8	21.6	6.5	22.4	0.0
n	5	5	5	4	4	5	4		5	4	4
Group C											
12	8	266.3	334.6[c]	517.7	0.0	228.9	482.3	0.0	105.8	35.5	0.0
13	4	218.3									—
14	2	235.9	400.5	1139.1	782.1	327.3	936.1	692.3	73.2	203.0	89.7
15	9	301.7	513.9[c]			477.5			36.4		—
16	10	277.8	180.3[c]	466.0	0.0	177.8	458.0	0.0	2.5	8.0	0.0
17	7	357.0	310.4[c]	368.8	0.0	205.3	201.7	0.0	105.1	167.0	0.0
M	6.7	276.2	347.9	622.9	195.5	283.4	519.5	173.1	64.6	103.4	22.4
SD	3.1	49.5	122.5	349.6	391.0	122.3	305.3	346.2	44.9	96.1	44.9
Mdn	7.5	272.1	334.6	491.9	0.0	228.9	470.1	0.0	73.2	101.3	0.0
n	6	6	5	4	4	5	4	4	5	4	4

Table I3 continues

Table I3 continued

Facility no.[a]	2002 – 2011 Away, on restriction or transfer: No. yrs data	2002 – 2011 Away, on restriction or transfer: Mean, all employees	2011 Away, on restriction or transfer: All empl.	2011 Away, on restriction or transfer: NAs	2011 Away, on restriction or transfer: RNs	2011 Restriction or transfer: All empl.	2011 Restriction or transfer: NAs	2011 Restriction or transfer: RNs	2011 Away: All employees	2011 Away: NAs	2011 Away: RNs
Group D											
18	4	203.3	—	—	—	—	—	—	—	—	—
19	3	207.9	—	—	—	—	—	—	—	—	—
M	3.5	205.6									
SD		3.2									
Mdn		205.6									
n	2	2									
Total											
M	6.0	190.8	169.0	340.4	97.0	136.9	282.5	88.9	31.5	57.9	8.1
SD	2.8	84.9	156.2	322.6	223.9	133.6	271.4	199.2	37.1	76.4	25.8
Mdn	6.0	205.0	126.5	303.1	0.0	114.9	218.5	0.0	13.5	22.4	0.0
n	19	19	15	12	12	15	12	12	15	12	12

Note. The data are from the OSHA 300 logs from a pool of 19 LTC facilities from Iowa, Minnesota, and Wisconsin. Rates are per 100 FTE = (Annual number days of work affected *200,000 hours)/ total hours worked by all employees. Cells with — indicate data were unavailable. Empty cells indicate that data were not applicable. OSHA = Occupational Safety and Health Administration; LTC = long-term care facilities; FTE= full time equivalent worker; NA = nursing assistant; RN = licensed nurse, including registered and licensed practical nurse.

[a]The facilities are numbered and grouped according to DART injury rates from 2010 and 2011, from lowest to highest. [b]Facilities without a SPHM policy prior to 2012. [c] Policy in place for at least 3 years.

Table I4

OSHA Injury Rates

Facilities	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
U. S. LTC[a]	—	—	—	—	9.3	9.3	8.4	8.5	8.3	8.2
All[b]										
M	20.8	16.4	11.5	12.8	11.0	10.5	9.2	9.0	8.3	7.6
SD	9.2	5.9	4.9	5.7	4.9	5.0	4.2	4.4	4.6	4.2
Mdn	22.2	16.3	9.4	12.0	9.5	10.8	8.6	8.2	7.7	6.5
n	4	6	7	9	13	15	14	15	16	15
With policy[c]										
M	—	—	16.7[d]	16.0[d]	9.4	9.5	9.6	11.0	10.0	9.8
SD					1.4	3.6	4.3	4.5	5.5	4.2
Mdn					9.3	9.7	9.4	10.5	9.8	9.7
n			1	2	4	5	5	8	8	8
Without policy[e]										
M	20.8	15.0	10.6	11.8	11.2	11.0	8.2	6.7	5.7	4.7
SD	9.2	5.2	4.7	5.8	6.0	5.6	3.5	3.2	2.4	2.6
Mdn	22.2	14.1	9.2	9.9	9.8	11.4	7.4	7.2	6.1	5.1
n	4	5	6	7	8	10	7	8	7	6

Note. Rates per 100 FTE = (Annual number of injuries *200,000 hours)/ total hours worked by all employees. Cells with — indicate data were unavailable. Empty cells indicate that data were not applicable. FTE= full time equivalent worker; OSHA = Occupational Safety and Health Administration; U.S. = United States; LTC = Long term care.

[a]Data adapted from www.BLS.gov, Industry Illness and Injury Data, 2006-2011. [b]All facilities represents data from a pool of 19 LTC facilities from Iowa, Minnesota, and Wisconsin. [c]With policy represents data from the facilities for years when a safe patient handling and movement policy was in place, excluding the year of policy implementation. [d]Data derived from fewer than 3 facilities. [e]Without policy represents data from the facilities during years without a policy, regardless of future implementation.

Table I5

OSHA Injury Rates by State

Facilities	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Minnesota										
MN LTC.[a]	—	—	—	—	—	—	7.6	11.4	10.6	9.3
All[b]										
M	20.6[c]	10.9[c]	11.3[c]	14.9	9.3	9.8	8.7	10.9	11.3	10.2
SD				6.9	1.2	2.9	6.3	6.0	6.6	5.1
Mdn				12.0	8.8	10.2	7.5	9.0	10.5	8.1
n	1	1	2	3	3	4	4	4	4	3
With policy[bd]										
M								12.4	12.8	10.2
SD								6.3	7.3	5.1
Mdn								11.3	14.3	8.1
n								3	3	3
Without policy[be]										
M	20.6[c]	10.9[c]	11.3[c]	14.9	9.3	9.8	3.6[c]	6.4[c]		
SD				6.9	1.2	2.9				
Mdn				12.0	8.8	10.2				
n	1	1	2	3	3	4	1	1		

Table I5 continues

Table I5 Continued

Facilities		2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Wisconsin											
WI LTC.[a]		—	—	—	—	—	—	6.7	9.0	9.4	8.7
All[f]											
	M	20.8	17.5	11.5	11.6	11.9	11.2	9.6	8.1	7.8	7.1
	SD	11.3	5.8	5.9	6.0	5.7	5.7	3.7	3.9	3.2	4.1
	Mdn	23.9	18.4	9.0	8.7	11.1	10.8	9.4	7.9	8.0	6.5
	n	3	5	5	5	9	10	9	10	11	11
With policy[df]											
	M			16.7	20.0	9.9	10.4	10.1	10.0	9.9	10.6
	SD				9.1	1.1	3.4	4.9	4.1	2.5	3.9
	Mdn			16.7	20.0	9.5	10.2	11.0	9.1	9.8	11.8
	n				3	4	4	4	4	4	4
Without policy[ef]											
	M	20.8	16.0	10.2	9.5	12.3	11.7	9.2	6.8	5.7	4.7
	SD	11.3	5.4	5.9	4.4	7.6	7.1	3.0	3.5	2.4	2.6
	Mdn	23.9	16.3	8.5	8.6	15.0	12.0	7.7	7.7	6.1	5.1
	n	3	4	4	4	5	6	5	6	6	6

Note. Rates per 100 FTE = (Annual number of injuries *200,000 hours)/ total hours worked by all employees. Cells — indicate data were unavailable. Empty cells indicate that data were not applicable. FTE= full time equivalent worker; OSHA = Occupational Safety and Health Administration; MN = Minnesota; LTC = Long term care; WI = Wisconsin.

[a]Adapted from www.BLS.gov, Industry Illness and Injury Data, 2008-2011. [b]Represents data from pool of four LTC facilities in Minnesota. [c]Data derived from fewer than 3 facilities. [d]With policy represents data from facilities for years when an SPHM policy was in place, excluding the year of policy implementation. [e]Without policy represents data from facilities during years without an SPHM policy, regardless of future implementation. [f]Represents data from pool of fourteen facilities in Wisconsin.

Table I6

Workers' Compensation Injury Rates

Facilities		2006	2007	2008	2009	2010	2011
All							
	M	14.6	15.7	8.4	8.4	8.6	9.0
	SD	1.3	3.1	4.3	4.8	2.4	3.0
	Mdn	14.7	15.7	9.0	8.6	8.5	9.1
	n	3	4	4	4	7	6
With policy[a]							
	M	13.3[b]	13.6[b]	11.9[b]	10.1	9.3	10.2
	SD				4.1	1.8	3.0
	Mdn				11.6	8.5	11.2
	n	1	2	2	3	3	4

Note. Rates per 100 FTE = (Annual number of injuries *200,000 hours)/ total hours worked by all employees. Represents data from the Workers Compensation Loss Runs Reports from a pool of nine LTC facilities in Minnesota and Wisconsin. Empty cells indicate that data were not applicable. FTE= full time equivalent worker.

[a]With policy represents data from facilities for years when an SPHM policy was in place, excluding the year of policy implementation. [b] Data derived from fewer than 3 facilities.

Table I7

OSHA Rates of Injury Affecting Days of Work

Facilities	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
	Cases with days away, job restriction or transfer									
All										
M	12.3	9.4	6.3	10.1	9.6	7.3	6.3	6.5	5.6	5.8
SD	8.3	3.3	3.8	4.7	4.7	4.7	3.9	4.0	2.6	3.5
Mdn	9.1	9.3	5.9	10.0	8.4	6.5	5.7	5.6	5.4	4.6
n	4	6	7	9	13	15	14	15	16	15
With policy[a]										
M	—	—	10.0[b]	11.1[b]	6.8	7.4	6.4	8.9	6.4	7.8
SD					2.0	3.1	4.0	3.6	3.1	3.7
Mdn					7.4	6.5	8.6	8.6	6.0	8.7
n			1	2	4	5	5	8	8	8
Without policy[c]										
M	12.3	8.6	5.6	9.9	10.8	7.2	4.9	3.9	5.0	3.2
SD	8.3	2.9	3.7	5.4	5.3	5.4	2.7	2.7	2.2	1.6
Mdn	9.1	8.9	5.0	8.5	10.0	7.7	5.0	4.6	5.4	3.6
n	4	5	6	7	8	10	6	7	6	6

Table I7 continues

Table I7 continued

Facilities	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
	Cases with job restriction or transfer									
All										
M	4.8	4.9	3.0	5.7	6.7	5.1	4.1	4.4	3.8	3.7
SD	1.8	3.4	2.4	3.6	4.4	4.0	3.1	3.0	2.2	2.5
Mdn	4.5	4.2	3.3	6.4	4.6	3.8	2.6	4.2	3.9	3.3
n	4	6	7	9	13	15	14	15	16	15
With policy[a]										
M	—	—	3.3[b]	6.0[b]	4.3	5.3	4.2	6.3	4.8	5.0
SD					1.0	2.2	3.5	2.5	2.0	2.4
Mdn					4.0	5.6	3.1	6.3	4.2	5.1
n			1	2	4	5	5	8	8	8
Without policy[c]										
M	4.8	4.8	3.0	5.6	7.5	4.9	3.4	2.2	3.3	1.9
SD	1.8	3.8	2.7	4.0	5.2	4.8	3.1	2.0	1.9	1.4
Mdn	4.5	3.7	2.6	6.4	6.2	3.4	2.0	1.9	3.1	1.8
n	4	5	6	7	8	10	6	7	6	5

Table I7 continues

Table I7 continued

Facilities	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
	Cases with days away									
All										
M	7.5	4.5	3.2	4.5	2.9	2.2	2.2	2.2	1.9	2.1
SD	6.9	2.3	2.4	2.4	2.2	1.6	2.3	1.9	1.7	1.9
Mdn	5.2	4.3	3.1	3.2	2.5	2.2	1.7	1.5	1.8	1.5
n	4	6	7	9	13	15	14	15	16	15
With policy[a]										
M	—	—	6.7[b]	5.2[b]	2.4	2.1	2.3	2.6	1.6	3.0
SD					1.3	2.2	2.1	2.1	2.0	1.9
Mdn					2.6	2.0	2.4	2.0	1.0	2.5
n			1	2	4	5	5	8	8	8
Without policy[c]										
M	7.4	3.8	2.7	4.2	3.2	2.3	1.5	1.6	1.7	1.1
SD	6.9	1.7	2.0	2.0	2.6	1.8	1.6	1.8	1.0	1.0
Mdn	4.2	2.5	3.2	3.2	2.6	1.2	1.0	2.0	0.7	2.2
n	4	5	6	7	8	10	6	7	6	6

Note. Rates per 100 FTE = (Annual number of injuries where work days were affected *200,000 hours)/ total hours worked by all employees. Represents data from pool of 19 LTC facilities from Iowa, Minnesota, and Wisconsin. Cells with — indicate data were unavailable. Empty cells indicate that data were not applicable. OSHA = Occupational Safety and Health Administration; FTE= full time equivalent worker; LTC = Long term care.
[a]With policy represents data from the facilities for years when an SPHM policy was in place, excluding the year of policy implementation. [b]Data derived from fewer than 3 facilities. [c]Without policy represents data from the facilities during years without a SPHM policy, regardless of future implementation.

Table I8

OSHA Rates of Number of Days of Work Affected by Injuries

Facilities	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
	Days away, on job restriction or transfer									
All										
M	325	311	123	349	187	190	161	229	141	169
SD	301	122	78	189	122	153	120	161	115	156
Mdn	235	349	140	418	143	131	138	199	88	126
n	4	6	7	9	13	15	14	15	16	15
With policy[a]										
M	—	—	140[b]	500[b]	164	207	102	311	159	258
SD					125	174	64	141	110	158
Mdn					106	131	107	294	157	245
n			1	2	4	5	5	8	8	8
Without policy[c]										
M	325	283	120	306	184	182	124	134	97	58
SD	301	112	85	191	130	151	64	133	112	77
Mdn	235	331	117	331	155	124	121	171	70	33
n	4	5	6	7	8	10	6	7	6	6

Table I8 continues

Table I8 continued

Facilities	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
	Days on restriction or transfer									
All										
M	90	100	69	264	151	146	126	177	120	137
SD	109	95	61	178	114	145	116	164	113	134
Mdn	52	77	55	292	119	84	99	140	81	115
n	4	6	7	9	13	15	14	15	16	15
With policy[a]										
M	—	—	46[b]	372[b]	154	186	93	233	141	210
SD					131	160	61	184	102	139
Mdn					103	118	88	223	145	192
n			1	2	4	5	5	8	8	8
Without policy[c]										
M	90	95	73	233	134	126	74	112	81	43
SD	109	106	66	187	111	142	78	119	113	61
Mdn	52	28	57	247	128	74	42	116	35	23
n	4	5	6	7	8	10	6	7	6	6

Table I8 continues

Table I8 continued

Facilities	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
	Number of days away from work									
All										
M	233	325	47	85	35	44	35	52	20	31
SD	188	317	51	55	48	67	45	80	19	37
Mdn	226	189	30	87	8	14	9	28	18	13
n	5	7	8	9	13	15	14	15	16	15
With policy[a]										
M	—	—	47[b]	128[b]	10	21	9	78	18	48
SD			66	25	13	15	11	102	19	43
Mdn			47	128	4	14	7	38	14	43
n			2	2	4	5	5	8	8	8
Without policy[c]										
M	233	188	47	73	50	56	51	22	16	15
SD	188	101	53	56	56	80	61	31	17	17
Mdn	226	167	30	84	29	25	31	4	13	10
n	5	5	6	7	8	10	6	7	6	6

Note. Rates per 100 FTE = (Number of days of work affected*200,000 hours)/ total hours worked by all employees. Represents data from pool of 19 LTC facilities from Iowa, Minnesota, and Wisconsin. Cells with — indicate data were unavailable. Empty cells indicate that data were not applicable. OSHA = Occupational Safety and Health Administration; FTE= full time equivalent worker; LTC = Long term care. SPHM = safe patient handling and mobility. [a]With policy represents data from the facilities for years when an SPHM policy was in place, excluding the year of policy implementation. [b]Data derived from fewer than 3 facilities. [c]Without policy represents data from the facilities during years without an SPHM policy, regardless of future implementation.

Table I9

OSHA Rates of Days of Work Affected Per Injury

	Number of days away, transferred or on restriction per injury									
Facilities	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
All										
M	25	34	18	37	19	25	28	30	22	25
Sd	14	12	8	27	12	15	18	18	15	17
Mdn	25	32	18	33	14	28	22	35	20	23
n	4	6	7	9	13	15	14	15	16	15
With Policy[a]										
M	—	—	14[b]	46[b]	24	30	18	36	24	32
Sd				14	14	19	16	12	12	13
Mdn				46	22	29	14	40	20	31
n			1	2	4	5	5	8	8	8
Without policy[c]										
M	25	34	18	35	16	23	26	24	15	15
Sd	14	14	9	30	11	13	6	22	13	19
Mdn	25	30	19	26	13	24	26	29	13	8
n	4	5	6	7	8	10	6	7	6	6

Table I9 continues

Table I9 continued

Facilities	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
	Number of days restricted or transferred per injury									
All										
M	17	33	25	71	27	30	34	37	30	36
Sd	16	43	16	92	21	24	30	28	33	21
Mdn	16	18	19	43	23	25	25	36	23	31
n	4	6	6	9	13	15	14	15	15	14
With policy[a]										
M	—	—	14[b]	66[b]	32	39	22	36	28	47
Sd				13	19	28	16	24	22	18
Mdn				66	26	37	20	31	23	51
n			1	2	4	5	5	8	8	8
Without policy[c]										
M	17	35	27	73	24	25	28	38	17	20
Sd	16	48	17	106	24	21	27	34	17	18
Mdn	16	12	22	38	16	22	22	40	11	17
n	4	5	5	7	8	10	6	7	6	5

Table I9 continues

Table I9 continued

Facilities	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
	Number of days away per injury									
All										
M	43	71	16	26	15	11	33	37	7	13
Sd	37	89	10	26	35	12	87	72	7	16
Mdn	42	37	16	18	2	9	4	9	6	6
n	4	6	7	9	13	15	14	15	16	15
With policy[a]										
M	—	—	14[b]	36[b]	2	13	5	61	6	14
Sd				26	3	7	5	94	6	9
Mdn				36	2	14	4	16	4	14
n			1	2	4	5	5	8	8	8
Without policy[c]										
M	43	77	16	24	22	10	64	9	8	14
Sd	37	98	11	28	45	13	132	11	7	23
Mdn	42	34	20	12	7	4	9	9	8	4
n	4	5	6	7	8	10	6	7	6	6

Note. Number of days per injury = total days affected/number of injuries with days affected. Represents data from pool of 19 LTC facilities from Iowa, Minnesota, and Wisconsin. Cells with — indicate data were unavailable. Empty cells indicate that data were not applicable. OSHA = Occupational Safety and Health Administration; FTE= full time equivalent worker; LTC = Long term care.
[a]With policy represents data from the facilities for years when an SPHM policy was in place, excluding the year of policy implementation. [b]Data derived from fewer than 3 facilities. [c]Without policy represents data from the facilities during years without a SPHM policy, regardless of future implementation.

Table I10

Workers' Compensation Injury Rates by Cause of Injury

Causes	2006	2007	2008	2009	2010	2011
Non-patient handling[a]						
M	5.0	7.0	4.7	4.7	5.7	4.6
SD	1.9	3.4	2.9	1.3	1.2	1.6
Mdn	5.0	5.6	6.3	5.3	5.9	4.2
n	3	4	3	3	5	3
Patient handling[b]						
M	9.4	8.0	4.1	4.8	3.3	5.1
SD	3.0	1.4	1.9	2.9	1.9	2.9
Mdn	7.7	7.8	4.7	5.6	3.9	4.6
n	3	4	3	3	5	3
Transfers[c]						
M	4.9	4.9	2.3	2.6	2.0	2.5
SD	1.7	1.8	0.3	1.6	1.3	2.6
Mdn	4.6	4.2	2.4	3.0	1.9	2.3
n	3	4	3	3	5	3
Repositioning						
M	2.8	1.4	0.7	1.1	1.0	1.6
SD	1.4	0.2	1.2	1.9	0.7	0.7
Mdn	2.3	1.4	0.0	0.0	0.9	1.6
n	3	4	3	3	5	3

Table I10 continues

Table I10 continued

Note. Rates per 100 FTE = (Annual number of injuries *200,000 hours)/ total hours worked by all employees. Represents data from the Workers' Compensation Loss Runs Reports from a pool of nine LTC facilities in Minnesota and Wisconsin. FTE= full time equivalent worker.
[a]Non-patient handling injuries include activities not related to direct patient care such as slips and falls, needle sticks and manual lifting of objects. [b]Injuries from patient handling include patient transfers, repositioning, performing personal cares and fall prevention. [c]Transfers include fall prevention.

Table I11

Workers' Compensation Back Injury Rates by Cause of Injury

Causes	2006	2007	2008	2009	2010	2011
All						
M	5.2	5.1	3.2	3.4	2.8	4.0
SD	3.1	1.8	2.7	3.7	1.5	2.0
Mdn	4.6	5.4	3.3	2.9	2.3	4.6
n	3	4	4	4	6	5
Non-patient handling[a]						
M	1.3	1.1	1.0	1.4	0.5	1.5
SD	0.6	0.9	0.9	1.3	0.6	1.4
Mdn	1.5	1.2	1.5	1.5	0.5	1.6
n	3	4	3	3	4	3
Patient handling[b]						
M	4.0	3.9	1.6	3.0	3.0	2.9
SD	3.7	1.6	2.2	2.3	1.4	1.3
Mdn	3.1	3.8	0.7	3.0	3.3	2.9
n	3	4	3	3	4	3
Transfers[c]						
M	2.4	2.7	1.2	1.8	1.8	1.8
SD	2.7	1.2	0.5	0.9	1.0	1.6
Mdn	0.8	2.6	1.5	2.0	1.7	2.3
n	3	4	3	3	4	3

Table I11 continues

Table I11 continued

Causes	2006	2007	2008	2009	2010	2011
Repositioning						
M	1.1	0.5	0.5	0.9	0.8	0.4
SD	1.0	0.4	0.9	1.5	0.8	0.3
Mdn	1.5	0.6	0.0	0.0	0.6	0.5
n	3	4	3	3	4	3

Note. Rates per 100 FTE = (Annual number of back injuries *200,000 hours)/ total hours worked by all employees. All values represent data from the Workers' Compensation Loss Runs Reports from a pool of nine LTC facilities in Minnesota and Wisconsin. FTE= full time equivalent worker.
[a]Non-patient handling injuries include activities not related to direct patient care such as slips and falls, needle sticks and manual lifting of objects. [b]Injuries from patient handling include patient transfers, repositioning, performing personal cares and fall prevention. [c]Transfers include fall prevention.

Table I12

OSHA Injury Rates Pre- and Post-SPHM Policy

	Years pre-policy								Policy	Years post-policy							
Injuries	-8	-7	-6	-5	-4	-3	-2	-1	0	1	2	3	4	5	6	7	8
All																	
M	10.1	11.6	7.3[a]	5.5[a]	11.5	13.9	6.4	12.8	10.6	11.8	12.9	9.9	11.2	11.1	12.6[a]	11.0[a]	8.8[a]
SD	13.0	6.8	2.9	6.2	2.1	8.1	3.9	8.6	7.2	4.5	6.3	4.6	3.6	3.0	4.1	2.3	3.5
Mdn	18.4	10.9	7.3	5.5	12.0	12.0	7.9	12.0	11.3	11.0	13.4	10.6	11.4	10.8	12.6	11.0	8.8
n	3	3	2	2	4	5	5	7	8	8	6	5	3	4	2	2	2
DART																	
M	3.0	4.6	5.8[a]	5.1[a]	7.4	10.2	5.5	9.6	7.4	8.9	7.9	8.2	8.3	8.2	10.1[a]	9.6[a]	7.5[a]
SD	7.5	4.2	2.2	4.3	3.9	7.1	4.4	7.4	5.2	3.4	3.2	3.8	3.4	2.9	1.8	1.3	2.7
Mdn	6.5	4.2	5.8	5.1	7.8	12.7	4.2	8.2	7.1	8.4	7.8	8.1	7.3	9.1	10.1	9.6	7.5
n	3	3	2	2	4	5	5	7	8	8	6	5	3	4	2	2	2
Modified days[b]																	
M	0.3	1.9	1.4[a]	2.3[a]	3.8[a]	6.6	3.5	4.5	4.2	5.4	4.6	4.4	6.2	6.2	7.7[a]	5.8[a]	6.0[a]
SD	5.7	2.5	0.5	1.8	3.0	4.9	3.0	2.9	3.4	1.6	1.9	3.2	2.7	1.6	2.9	3.7	3.9
Mdn	2.2	1.0	1.4	2.3	3.8	7.2	3.5	3.7	4.7	5.4	4.1	3.6	6.8	6.5	7.7	5.8	6.0
n	3	3	2	2	4	5	5	7	8	8	6	5	3	4	2	2	2
Days away																	
M	0.8	2.6	4.4[a]	2.8[a]	3.6	3.6	2.1	5.1	3.3	3.5	3.3	3.8	2.1	2.0	2.4[a]	3.8[a]	1.5[a]
SD	5.9	1.9	1.8	2.6	1.0	3.2	2.1	5.6	2.9	2.7	3.2	1.9	1.6	1.4	1.2	2.4	1.2
Mdn	3.7	3.1	4.4	2.8	4.0	2.6	1.9	4.2	2.9	3.3	1.6	4.4	2.2	2.5	2.4	3.8	1.5
n	3	3	2	2	4	5	5	7	8	8	6	5	3	4	2	2	2

Table I12 continues

Table I12 continued

Note. Rates per 100 FTE = (Annual number of injuries *200,000 hours)/ total hours worked by all employees. Represents OSHA data from a pool of 10 LTC facilities with SPHM policies from Iowa, Minnesota, and Wisconsin. FTE= full time equivalent worker; OSHA = Occupational Safety and Health Administration; LTC = Long term care; SPHM = Safe Patient Handling and Movement; DART = Cases with days away, job restriction or transfer. [a]Data was derived from fewer than 3 facilities. [b]Modified days refers to cases with job restriction or transfer.

Table I13

Workers' Compensation Injury Rates Pre- and Post-SPHM Policy

	Years pre		Policy	Years post				
Causes	-2	-1	0	1	2	3	4	5
All								
M	8.9	11.9	9.6	12.6	10.3	11.6	11.4	12.5
n	2	2	4	2	3	2	1	1
Non-patient handling[a]								
M	7.0	12.0	2.2	5.1	5.8	6.0	5.9	4.2
n	1	1	2	2	3	2	1	1
Patient handling[b]								
M	7.7	7.5	7.4	6.9	4.6	5.1	5.0	8.3
n	1	1	2	2	3	2	1	1
Transfers[c]								
M	4.6	3.8	4.4	4.1	2.1	2.7	3.6	5.2
n	1	1	2	2	3	2	1	1
Repositioning								
M	2.3	1.5	2.1	2.2	1.7	1.2	0.9	1.6
n	1	1	2	2	3	2	1	1

Note. Rates per 100 FTE = (Annual number of injuries *200,000 hours)/ total hours worked by all employees. Represents data from poo1 of four LTC facilities in Minnesota and Wisconsin. The majority of the values represent fewer than three facilities. SPHM = Safe Patient Handling and Movement; FTE= full time equivalent worker.

[a]Non-patient handling injuries include activities not related to direct patient care such as slips and falls, needle sticks and manual lifting of objects. [b]Injuries from patient handling include patient transfers, repositioning, performing personal cares and fall prevention. [c]Transfers include fall prevention.

Table I14

Workers' Compensation Back Injury Rates Pre- and Post-SPHM Policy

	Years pre		Policy	Years post				
Causes	-2	-1	0	1	2	3	4	5
All								
M	2.3	4.1	3.8	5.3	3.9	5.4	4.6	5.7
n	2	2	3	2	3	2	1	1
Non-patient handling								
M	1.5	0.7	0.9	1.3	0.7	2.2	0.5	1.6
n	1	1	3	2	3	2	1	1
Patient handling[b]								
M	3.1	5.2	4.3	4.0	3.2	3.0	4.1	4.2
n	1	1	2	2	3	2	1	1
Transfers[c]								
M	0.8	3.7	3.1	2.1	1.3	2.2	3.2	3.1
n	1	1	2	2	3	2	1	1
Repositioning								
M	1.5	0.7	0.9	1.6	1.3	0.3	0.5	0.5
n	1	1	2	2	3	2	1	1

Note. Rates per 100 FTE = (Annual number of back injuries *200,000 hours)/ total hours worked by all employees. Represents data from pool of four LTC facilities in Minnesota and Wisconsin. The majority of the values represent fewer than three facilities. SPHM = Safe Patient Handling and Movement; FTE= full time equivalent worker.

[a]Non-patient handling injuries include activities not related to direct patient care such as slips and falls, needle sticks and manual lifting of objects. [b]Injuries from patient handling include patient transfers, repositioning, performing personal cares and fall prevention. [c]Transfers include fall prevention.

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Table J1

Annual Costs per 100 FTE for All Injuries by Cause of Injury

Cause	2006	2007	2008	2009	2010	2011
All[a]						
M	63,342	55,474	14,547	54,171	35,701	29,055
SD	41,062	12,997	10,709	51,795	35,266	26,158
Mdn	41,182	58,753	13,914	54,687	28,069	23,953
n	3	4	4	4	7	6
Non-patient handling[b]						
M	14,797	17,281	9,940	48,134	21,114	18,886
SD	11,451	9.718	8,901	36,358	28,671	5.905
Mdn	21,292	16,628	12,129	65,832	7,625	19,953
n	3	4	3	*3*	4	3
Patient handling[c]						
M	48,470	37,507	8,107	20,360	18,303	25,893
SD	37,098	19,006	1,212	15,317	15,749	31,097
Mdn	39,607	44,851	7,985	24,667	16,828	14,167
n	3	4	3	3	4	3
Transfers[d]						
M	37,072	23,424	5,587	7,621	14,618	10,266
SD	43,774	22,635	2,606	5,372	13,961	11,671
Mdn	16,330	24,500	5,962	8,519	11,945	7,838
n	3	4	3	3	4	3

Table J1 continues

Table J1 continued

Cause	2006	2007	2008	2009	2010	2011
Repositioning						
M	3,244	11,367	1,041	4,060	3,411	13,894
SD	1,347	16,122	1,803	7,031	4,012	18,645
Mdn	3,865	4,310	0	0	2,171	6,329
n	3	4	3	3	4	3

Note. Costs are derived from Workers' Compensation Loss Runs reports from a pool of nine LTC facilities in Minnesota and Wisconsin. All costs are in USD and adjusted to 2011 values by the consumer price index (CPI-U) for medical services (BLS, 2012). Costs per 100 FTE = (Annual costs for all injuries * 200,000 hours)/total hours worked by all employees. LTC = long term care; USD = United States dollars; FTE = Full-time equivalent worker.
[a]All injuries include assaults and unknown causes. [b]Non-patient handling injuries include activities not related to direct patient care such as slips and falls, needle sticks and manual lifting of objects. [c]Injuries from patient handling include patient transfers, repositioning, performing personal cares and fall prevention. [d]Transfers include fall prevention.

Table J2

Annual Costs per 100 FTE for Back Injuries by Cause of Injury

Cause	2006	2007	2008	2009	2010	2011
All[a]						
M	8,474	24,397	5,978	8,037	11,854	11,044
SD	8,268	18,725	6,050	11,142	15,827	12,716
Mdn	4,311	25,512	4,205	3,911	7,596	2,145
n	3	4	4	4	6	5
Non-patient handling[b]						
M	912	1,500	2,928	1,523	2,204	7,772
SD	768	1,544	4,676	1,733	4,448	9,541
Mdn	1,337	1,543	464	1,159	117	4.896
n	3	4	3	3	5	3
Patient handling[c]						
M	7,116	22,400	4,773	8,976	11,944	8,919
SD	9,486	17,686	1,639	10,406	15,984	9,046
Mdn	2,937	23,970	4,849	4,154	5,051	8,200
n	3	4	3	3	5	3
Transfers[d]						
M	5,570	12,549	2,589	4,318	10,278	8,463
SD	8,174	17,198	2,103	4,071	14,150	8,793
Mdn	1,278	5,314	2,226	2,081	4,677	7,838
n	3	4	3	3	5	3

Table J2 continues

Table J2 continued

Cause	2006	2007	2008	2009	2010	2011
Repositioning						
M	1,388	9,228	705	3,967	1,491	150
SD	1,325	17,380	1,221	6,871	1,759	189
Mdn	1,524	813	0	0	374	87
n	3	4	3	3	5	3

Note. Costs are derived from Workers' Compensation Loss Runs reports from a pool of nine LTC facilities in Minnesota and Wisconsin. All costs are in USD and adjusted to 2011 values by the consumer price index (CPI-U) for medical services (BLS, 2012). Costs per 100 FTE = (Annual costs for back injuries* 200,000 hours)/total hrs worked by all employees. LTC = long term care; USD = United States dollars; FTE = Full-time equivalent worker. [a]All back injuries include assaults and unknown causes. [b]Non-patient handling injuries include activities not related to direct patient care such as slips and falls and manual lifting of objects. [c]Injuries from patient handling include patient transfers, repositioning, performing personal cares and fall prevention. [d]Transfers include fall prevention.

Table J3

Annual Costs per 100 FTE for All Injuries Pre- and Post-SPHM Policy Implementation by Cause of Injury

Injuries	-2	-1	Policy year	1	2	3
All[a]						
M	56,032[b]	34,317[b]	20,509	42,654	46,287	74,548[b]
n	2	2	4	3	3	2
Non-patient handling[c]						
M	11,434[b]	12,532[b]	862[b]	31,467[b]	29,977	48,219[b]
n	2	2	2	2	3	2
Patient handling[d]						
M	89,196[b]	43,570[b]	23,796[b]	18,799[b]	16,310	23,614[b]
n	2	2	2	2	3	2
Transfers[e]						
M	87,362[b]	1,702[b]	12,157[b]	9,275[b]	13,515	8,178[b]
n	1	1	2	2	3	2
Repositioning						
M	1,699[b]	35,356[b]	1,933[b]	6,835[b]	2,488	3,165[b]
n	1	1	2	2	3	2

Note. Costs are derived from Workers' Compensation Loss Runs reports from a pool of nine LTC facilities in Minnesota and Wisconsin. All costs are in USD and adjusted to 2011 values by the consumer price index (CPI-U) for medical services (BLS, 2012). Costs per 100 FTE = (Annual costs for all injuries * 200,000 hours)/total hours worked by all employees. LTC = long term care; USD = United States dollars; FTE = Full-time equivalent worker.

[a]All injuries include assaults and unknown causes. [b]Means calculated from fewer than three facilities [c]Non-patient handling injuries include activities not related to direct patient care such as slips and falls, needle sticks and manual lifting of objects. [d]Injuries from patient handling include patient transfers, repositioning, performing personal cares and fall prevention. [e]Transfers include fall prevention.

Table J4

Annual Costs per 100 FTE for Back Injuries Pre- and Post-SPHM Policy Implementation by Cause of Injury

Cause	-2	-1	Policy year	1	2	3
All[a]						
M	2,155[b]	18,940[b]	8,153	12,267[b]	14,175	16,293[b]
n	2	2	3	2	3	2
Non-patient handling[c]						
M	1,373	339	924	1,704	194	9,789
n	1	1	3	2	3	2
Patient handling[d]						
M	2,937	37,161	11,200	12,356	13,981	6,177
n	1	1	3	2	3	2
Transfers[e]						
M	1,278	1,702	9,542	5,433	11,654	4,959
n	1	1	3	2	3	2
Repositioning						
M	1,524	35,286	1,303	6,129	11,654	181
n	1	1	3	2	3	2

Note. Costs are derived from Workers' Compensation Loss Runs reports from a pool of nine LTC facilities in Minnesota and Wisconsin. All costs are in USD and adjusted to 2011 values by the consumer price index (CPI-U) for medical services (BLS, 2012). Costs per 100 FTE = (Annual costs for back injuries * 200,000 hours)/total hours worked by all employees. LTC = long term care; USD = United States dollars; FTE = Full-time equivalent worker.

[a]All back injuries include assaults and unknown causes. [b]Means calculated from fewer than three facilities [c]Non-patient handling injuries include activities not related to direct patient care such as slips and falls and manual lifting of objects. [d]Injuries from patient handling include patient transfers, repositioning, performing personal cares and fall prevention. [e]Transfers include fall prevention.

Table J5

Annual Costs per Claim for All Injuries by Cause of Injury

Cause		2006	2007	2008	2009	2010	2011
All[a]							
	M	4,328	3,524	2,664	4,945	3,998	2,499
	SD	2,778	367	2,204	3,820	4,153	1,841
	Mdn	2,868	3,461	2,226	5,110	2,542	1,916
	n	3	4	5	4	8	8
Non-patient handling[b]							
	M	2,626	2,729	1,840	9,138	5,386	3,023
	SD	1,922	1,982	1,202	6,197	6,180	2,078
	Mdn	3,091	1,842	2,284	12,415	1,248	3,012
	n	3	4	4	3	5	5
Patient handling[c]							
	M	5,609	4,576	4,800	3,816	3,837	2,683
	SD	5,144	2,188	4,937	1,957	3,125	2,770
	Mdn	3,077	5,266	2,863	3,383	3,422	1,344
	n	3	4	4	3	6	5
Transfers[d]							
	M	7,835	4,527	6,624	2,765	5,380	2,406
	SD	9,512	4,653	8,268	402	7,366	1,782
	Mdn	2,422	3,502	3,200	2,812	3,412	2,202
	n	3	4	4	3	5	4

Table J5 continues

Table J5 continued

Cause	2006	2007	2008	2009	2010	2011
Repositioning						
M	1,380	7,639	917[e]	3,675 [e]	2,123	5,490
SD	981	10,693			2,104	9,581
Mdn	901	2,788			2,058	1,510
n	3	4	2	1	5	5

Note. Costs are derived from Workers' Compensation Loss Runs reports from a pool of ten LTC facilities. All costs are in USD and adjusted to 2011 values by the consumer price index (CPI-U) for medical services (BLS, 2012). Costs per claim are calculated from facilities or categories with incurred costs and pertain to all employees. Empty cells indicate that data were not applicable. LTC = long term care; USD = United States dollars.
[a]All injuries include assaults and unknown causes. [b]Non-patient handling injuries include activities not related to direct patient care such as slips and falls, needle sticks and manual lifting of objects. [c]Injuries from patient handling include patient transfers, repositioning, performing personal cares and fall prevention. [d]Transfers include fall prevention. [e]Means calculated from fewer than three facilities.

Table J6

Annual Costs per Claim for Back Injuries by Cause of Injury

Cause		2006	2007	2008	2009	2010	2011
All[a]							
	M	1426	4611	4782	2194	3005	2121
	SD	604	3559	5067	947	2788	1730
	Mdn	1252	4096	2668	2341	2775	1151
	n	3	4	5	3	6	6
Non-patient handling[b]							
	M	1443	1190	2798[c]	1025[c]	3008	3582
	SD	1721	685			3668	2600
	Mdn	925	1310			1676	3141
	n	3	3	2	2	3	3
Patient handling[c]							
	M	1264	6637	5545	2552	3934	2075
	SD	887	6635	5449	1300	3205	1523
	Mdn	988	4643	4484	2341	3862	1287
	n	3	4	4	3	5	5
Transfers[d]							
	M	1662	6896	6438	2258	6485	2784
	SD	1087	11085	7388	1188	8248	2193
	Mdn	1719	1829	4381	2341	3383	2247
	n	3	4	4	3	4	4

Table J6 continues

Table J6 continued

Cause	2006	2007	2008	2009	2010	2011
Repositioning						
M	1230[c]	16520	787[c]	4489[c]	2744	536
SD		26473			2567	331
Mdn		1818			2110	515
n	2	3	2	1	5	4

Note. Costs are derived from Workers' Compensation Loss Runs reports from a pool of ten LTC facilities. All costs are in USD and adjusted to 2011 values by the consumer price index (CPI-U) for medical services (BLS, 2012). Costs per claim are calculated from facilities with incurred costs for back injuries and pertain to all employees. Empty cells indicate that data were not applicable. LTC = long term care; USD = United States dollars;
[a]All injuries include assaults and unknown causes. [b]Non-patient handling injuries include activities not related to direct patient care such as slips and falls and manual lifting of objects. [c]Means calculated from fewer than three facilities. [d]Injuries from patient handling include patient transfers, repositioning, performing personal cares and fall prevention. [e]Transfers include fall prevention.

Table J7

Annual Costs per Claim for All Injuries Pre- and Post-SPHM Policy Implementation by Cause of Injury

Cause	-2	-1	Policy year	1	2	3
All[a]						
M	3,984[b]	1,897[b]	2,151	4,010	5,071	4,779[b]
SD			945	2,390	6,082	
Mdn			2,525	3,147	2,226	
n	2	2	4	3	3	2
Non-patient handling[c]						
M	3,091[b]	1,966[b]	313[b]	9,053[b]	6,209	6,214
n	1	1	2	2	3	3
Patient handling[d]						
M	11,528[b]	5,815[b]	3,555[b]	2,417[b]	3,598	3,240
n	1	1	2	2	3	3
Transfers[e]						
M	929[b]	454[b]	3,228[b]	4,619[b]	26,320	2,335
n	1	1	2	2	3	3
Repositioning						
M	732[b]	23,595[b]	10,558[b]	2,530[b]	1,328	1,570[b]
n	1	1	1	2	3	2

Note. Costs are derived from Workers' Compensation Loss Runs reports from a pool of ten LTC facilities in Minnesota and Wisconsin. All costs are in USD and adjusted to 2011 values by the consumer price index (CPI-U) for medical services (BLS, 2012). Costs per claim are calculated from facilities with incurred costs for all injuries and pertain to all employees. LTC = long term care; USD = United States dollars.

[a]All injuries include assaults and unknown causes. [b]Means calculated from fewer than three facilities [c]Non-patient handling injuries include activities not related to direct patient care such as slips and falls, needle sticks and manual lifting of objects. [d]Injuries from patient handling include patient transfers, repositioning, performing personal cares and fall prevention. [e]Transfers include fall prevention.

Table J8

Annual Costs per Claim for Back Injuries Pre- and Post-SPHM Policy Implementation by Cause of Injury

Cause	-2	-1	Policy yr	1	2	3
All[a]						
M	929[b]	3,214[b]	3,408	2,234[b]	2,940	2,268
n	1	2	3	2	3	3
Non-patient handling[c]						
M	925[b]	452[b]	41[b]	1,286[b]	250[b]	2,790
n	1	1	1	1	2	3
Patient handling[d]						
M	988[b]	7,083[b]	4,802[b]	2,677[b]	3,424	1,693
n	1	1	2	2	3	3
Transfers[e]						
M	1,719[b]	454[b]	5,033[b]	2,273[b]	6,544	1,842
n	1	1	2	2	3	3
Repositioning						
M	1,025[b]	47,081[b]	1,436[b]	2,575[b]	1,337	515[b]
n	1	1	1	2	3	2

Note. Costs are derived from Workers' Compensation Loss Runs reports from a pool of ten LTC facilities in Minnesota and Wisconsin. All costs are in (USD) and adjusted to 2011 values by the consumer price index (CPI-U) for medical services (BLS, 2012). Costs per claim are calculated from facilities with incurred costs for back injuries and pertain to all employees. USD = United States dollars; [a]All back injuries include assaults and unknown causes. [b]Means calculated from fewer than three facilities [c]Non-patient handling injuries include activities not related to direct patient care such as slips and falls, needle sticks and manual lifting of objects. [d]Injuries from patient handling include patient transfers, repositioning, performing personal cares and fall prevention. [e]Transfers include fall prevention.

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Table K1

Annual Experience Modification Rates

Facilities		2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
All											
	M	1.04	0.88	1.11	1.15	1.07	1.00	0.98	0.93	0.92	0.94
	SD	0.11	0.04	0.28	0.20	0.16	0.22	0.13	0.13	0.15	0.21
	n	3	3	7	6	10	12	12	13	13	8
With policy											
	M	—	—	—	—	1.00	0.91	0.95	0.94	0.93	0.94
	SD					0.20	0.21	0.16	0.16	0.15	0.21
	n					4	5	7	7	9	8
Without policy											
	M	1.04	0.88	1.11	1.22	1.11	1.17	1.03	0.94	0.95	—
	SD	0.11	0.04	0.30	0.22	0.13	0.15	0.07	0.10	0.15	—
	n	3	3	6	4	6	4	5	5	3	—

Note. Annual Experience Modification Rates are derived from safety indicators from previous years and serve to increase or decrease workers' compensation insurance premiums for the facility. The annual means were calculated from a pool of fourteen LTC facilities in Iowa, Minnesota, and Wisconsin. Cells with — indicate data were unavailable. Empty cells indicate that data were not applicable. LTC = long term care.

Table K2.

Experience Modification Rates Pre- and Post-SPHM Policy Implementation

	Number of years pre- or post-policy													
	-5	-4	-3	-2	-1	Policy year	1	2	3	4	5	6	7	8
Rate														
M	1.37	1.04	1.03	1.06	0.95	0.88	0.96	1.00	1.04	0.98	0.96	0.95	0.79	0.75
SD	0.08	0.20	0.15	0.02	0.10	0.16	0.16	0.12	0.09	0.18	0.22	0.27	0.14	0.14
n	3	5	5	4	5	6	5	4	4	6	4	4	3	3

Note. Experience Modification Rates are derived from safety indicators from previous years and serve to increase or decrease workers' compensation insurance premiums for the facility. The annual means were calculated from a pool of eleven LTC facilities in Iowa, Minnesota, and Wisconsin. Cells with ― indicate data were unavailable. Empty cells indicate that data were not applicable. LTC = long term care.

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