Reducing Injuries in Intermediate Care

Risk factors for musculoskeletal and violence-related injuries among care aides and licensed practical nurses in Intermediate Care facilities

A joint project of

- **Workers' Compensation Board of British Columbia**
- **Hospital Employees' Union**
- **Occupational Health and Safety Agency for Healthcare in B.C.**
- **Institute of Health Promotion Research**
- **Canadian Institutes of Health Research**
- **University of British Columbia**

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Contact information

The full report, *Reducing Injuries in Intermediate Care,* is posted on the Workers' Compensation Board of B.C. website (www.worksafebc.com) and the Occupational Health and Safety Agency for Healthcare website (www.ohsah.bc.ca). A limited number of hard copies of the report are available from the WCB and OHSAH:

- WCB Industry Services – Health Care Prevention Division, PO Box 5350 Stn Terminal, Vancouver BC, V6B 5L5. Telephone: 604-276-3100. Toll free within B.C.: 1-888-621-7233.
- OHSAH: Telephone: 604-775-4032. Toll free within B.C.: 1-800-359-6612. Contact: Henrie de Boer, Manager of Communications, 604-775-4045.

A summary of the report is available at the Hospital Employees' Union website (ww.heu.org) and the OHSAH website (www.ohsah.bc.ca).

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How to read this report

Overview: A quick overview of the entire project, including important findings and recommendations, is in Section 1 (Executive Summary).

Background: The background to the project, the questions we asked, and the methods we used to explore the questions are in Sections 2 to 5.

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Major results: The major results of the research (without interpretation) are in Section 6 (Findings).

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Notes on terminology

- To protect confidentiality, the Intermediate Care facilities in this project were given pseudonyms (e.g., Willow Home, Elm Home).
- "Study facility" refers to the eight facilities in the project.
- "LIRFs and HIRFs" are acronyms referring to the study facilities, which were divided into two injury-rate groups: four low injury-rate facilities called LIRFs and four high injury-rate facilities called HIRFs.
- "Significant" and "not significant" are used to describe the *statistical* significance of a finding. In quantitative analyses, a result needs to pass a statistical threshold to be considered significant (i.e., not based on chance alone).
- "Administrator" is the generic title referring to the management position also known as Executive Director, Chief Executive Officer, Manager of Residential Care, etc.
- "Care aide/LPN" means "care aide and LPN." It does *not* mean "care aide or LPN."
- "Director of care" is the generic title referring to the management position also known as Clinical Care Coordinator; Director of Resident Care, Manager of Nursing and Programs, Site Manager of Clinical Services, Coordinator of Care, etc.

Acknowledgments

Many thanks to the management and staff at the participating Intermediate Care facilities for their valuable contributions to this research.

Section 1. Executive summary

1.1 Purpose and scope of the research

Injury rates are very high among staff in Intermediate Care (IC) facilities in British Columbia. Between 1994 and 1998, overall injury rates in IC were approximately 50% higher than in B.C.'s acute care sector and slightly higher than in long term care as a whole (Workers' Compensation Board of B.C., 2000). The injury rate for care aides and licensed practical nurses in IC was higher still. Despite this troubling trend, very little attention has been focused on the hazards specific to IC nursing homes.

The Hospital Employees' Union (HEU) initiated this research project in 2000. The purpose of the study was to gain an understanding of the risk factors for musculoskeletal (MSI) and aggression-related injuries faced by care aides and LPNs in IC facilities. Funding was provided by the Workers' Compensation Board of B.C. and through the Community Alliance for Health Research (CAHR), a program of the Canadian Institutes of Health Research (CIHR). The project was affiliated with the Occupational Health & Safety Agency for Healthcare (OHSAH), the CAHR, and the Institute of Health Promotion Research and the School of Nursing at the University of British Columbia. There was a multi-stakeholder steering committee that included representatives from employers, unions, and the B.C. Ministry of Health, among others.

The context: Residents in Intermediate Care nursing homes have varying degrees of mobility, and the majority have some level of dementia. As a result, injuries among direct-care staff have less to do with resident handling (i.e., lifts and transfers) and more to do with assisting in "activities of daily living" with individuals whose capabilities and moods are in constant flux. A sensitive and flexible approach is considered essential when working with IC residents. The overall context of Intermediate Care in B.C. is also significant. In the last decade, a shortage of public facilities and the trend towards home-based care have led to a resident population with more complex and advanced needs than previously. Finally, most time-loss injuries in IC are musculoskeletal (MSI), a type of injury associated with job design and organizational culture.

Research objectives: The main objectives of the study were to:
1. Identify a broad range of organizational, psycho-social, and biomechanical risk factors associated with injuries in Intermediate Care.
2. Pinpoint key intervention strategies for reducing staff injury and improving staff well-being.

Researchers also set out to pioneer ergonomic methods for measuring physical workload in care providers and to develop a new survey instrument for assessing organizational culture in residential care and other healthcare settings.

Research design: Two key premises informed the project's conceptual framework:
• Direct-care staff in all Intermediate Care facilities would have a heavy physical workload.
• Low injury-rate facilities would have more successful ways of organizing work than high injury-rate facilities, thus mitigating the risks associated with heavy demands.

The project was designed as a comparative study of eight IC facilities, four with relatively low injury rates and four with relatively high injury rates. Quantitative and qualitative research

methods were integrated, including 1) on-site data collection of injury rates, WCB claims, staffing, workers' demographics, facility funding, etc.; 2) an ergonomic study of physical loads; 3) a telephone survey of care aides and LPNs; and 3) interviews and focus groups with managers, RNs, care aides, LPNs, and HEU health and safety committee representatives.

The research examined factors in the study facilities such as organizational culture (communication, support, decision-making, etc.); safety environment (training, equipment, attitudes, policies, etc.); and resources (resident programming, regional health services, etc.). A key element in the conceptual framework was "the fairness factor," a concept that embraces principles of group identity, trust, respect, procedural justice, organizational effectiveness, and social solidarity, as well as established principles of control-support-demand and job satisfaction.

Workload was the other major focus of the research (e.g., staffing levels, perceptions of work demand, resident dependency, and ergonomic measures of physical load). Finally, extensive data and information were collected on the characteristics of workers and facilities.

1.2 Summary of key findings

In general, the study found significant differences between workloads and work environments in low injury-rate (LIRFs) and high injury-rate facilities (HIRFs). These differences were apparent in all dimensions of the research. At the same time, the study found no significant differences between LIRFs and HIRFs regarding characteristics of workers (except seniority), characteristics of residents, and per diem funding levels. The project's premises – that workload and work organization would figure prominently in risk factors for injuries in Intermediate Care – were substantiated.

The significant relationships between workload, injury rates, and workers' reports of well-being included:

• **Staffing levels:** Resident-to-care aide/LPN ratios differed substantially between high and low injury-rate facilities. HIRFs averaged 16:1 residents to staff compared with 12:1 residents to staff at LIRFs (average day shift across all units).

• **Physical workload:** On average, workers in HIRFs had significantly higher cumulative compression on their lower back than workers in LIRFs. This higher spinal compression was also strongly correlated with days lost per FTE and MSI injury rates. Other studies have shown that this degree of cumulative compression creates a substantial risk of low back pain. Further, HIRF workers showed a trend towards higher peak compression in their lower backs and higher peak activity in their neck/shoulders.

• **Perceptions:** Workers in HIRFs had more negative perceptions of their job demands and workload pressures than workers in LIRFs. They were more likely to report that they did not have enough time to get their work done, to work safely, to find a partner, or to use a mechanical lift. Workers in HIRFs also reported more pain, more burnout, poorer personal health, and less job satisfaction.

Our findings also showed strong relationships between the overall work environment and

workers' injury rates and well-being. These relationships were evident in:

• **Organizational culture:** Facilities with lower injury rates had more visible and consistent practices around information sharing, problem solving, policy dissemination and monitoring, and follow-up to concerns. In contrast to HIRFs, workers in LIRFs reported more supportive and trusting relationships between managers and front-line staff. Managers in LIRFs had high expectations of their staff as care providers and backed up those expectations with tangible supports, open communication, and respectful interactions.

• **Safety environment:** Facilities with lower injury rates had more consistent and clear policies/practices regarding resident aggression. The same was true regarding "no manual lift" policies/practices, which were reinforced with more accessible mechanical lifts. In contrast to HIRFs, workers in LIRFs reported being less worried about getting injured on the job and believed that their managers had a stronger active commitment to safety.

• **Organizational effectiveness:** Facilities with lower injury rates showed more capacity to deliver on the promises of their philosophy of care. In general, their programming for residents was better than that of HIRFs (e.g., recreation, rehabilitation, volunteer contacts). Front-line staff in LIRFs were more involved in care planning and reported more positive views of the philosophy of care, the overall quality and fairness of service to residents, and their own effectiveness and flexibility as care providers.

High and low injury-rate facilities also had features in common. The ergonomic study found that:
• Care aides from all facilities exhibited peak compression in the lower back that, on average, exceeded the U.S. National Institute for Occupational Safety and Health (NIOSH) Action Limit, indicating an increased risk of disc injury.
• Physical workload was intense for workers in all facilities before lunch and breakfast, especially during the pre-breakfast period when residents are wakened, transferred, dressed, and toiletted.
• Facility layout and equipment availability had significant impacts on workload. Restricted spaces such as small bedrooms and bathrooms increased the physical workload, a fact echoed in workers' perceptions.

Managers and workers in all facilities expressed the belief that continuous and inclusive training on safe lifting and transferring techniques, in particular, would be beneficial. Managers spoke about the importance of physiotherapy and rehabilitation services in maintaining residents' capacity for self-care, which benefits residents and staff alike. However, many managers described difficulties accessing and providing such services.

1.3 Conclusions

From these findings, a conceptual interpretation was developed, as follows: The emphasis in residential care today is on home-like, personalized environments in which the dignity and uniqueness of each elderly person is respected. In particular, residents with dementia must be approached with sensitivity and flexibility. Managers who view their front-line staff as key members of the team that delivers this model of care – i.e., who see their workers as responsible and capable – are likely to have practices and policies that promote a safer work environment,

cooperative relations, and a positive outlook on caregiving. In short, connections can be made between lower staff injuries and organizational effectiveness.

The project's design made possible a detailed examination of the salient dimensions of organizational culture in B.C.'s Intermediate Care facilities. Moreover, the study incorporated issues of fairness and congruency (social justice), which are not usually investigated in work organizational studies but are increasingly recognized as necessary to a meaningful analysis. Thus, the following recommendations, some of which deal with organizational culture, are consistent with current trends in occupational health, health promotion, and management literature.

1.4 Summary of recommendations

We recommend that the appropriate stakeholder(s)**:**

Rec. A1 Mandate the reporting of staffing levels in residential care facilities.
We recommend that staffing levels (resident-to-worker ratios) be reported and made available in facilities, on an annual basis. Reporting should include a numerical breakdown of direct care, clinical, and support staff levels. To ensure meaningful comparisons across facilities, we further recommend the adoption of a province-wide standardized method of measuring and reporting staffing levels.

Rec. A2 Examine staffing levels across B.C. and recommend province-wide standards.
We recommend that a province-wide committee be struck to examine direct-care and support staffing levels in residential care facilities. The committee would then recommend minimal staffing levels with an aim to reduce injury rates. The cost-benefit analysis proposed in rec. A4 could be useful in determining appropriate levels.

Rec. A3 Redistribute the physical workload of care aides/LPNs to eliminate bottlenecks and to spread demands more evenly.
We recommend that facilities make efforts to re-organize work routines, on an interdepartmental basis, so that physical loads and tasks are distributed more evenly within shifts and during the week.

Rec. A4 Research the financial benefits of increased staffing as a method of reducing injury expenses.
We recommend that research into costs and benefits of staffing increases be made a priority. Preliminary analysis suggests that a financial benefits argument can be made that, at a certain point, investments in staffing may "pay" for themselves in reduced injuries. See Appendix F for details.

Rec. B1 Educate all concerned parties in the residential care sector about the connection between organizational culture and staff injuries.
We recommend that the findings of this project be widely disseminated, as a first step in promoting best practices in B.C. facilities. An outreach program to managers, planners, policy makers, health and safety officials and committees, union representatives, conferences, and other interested bodies will help to pave the way for recommendation B2.

Rec. B2 Create collaborative intervention teams that support and promote organizational change in designated facilities.
We recommend that intervention teams be formed to assist facilities to re-organize work routines (e.g., to alleviate workload) and strengthen communication and teamwork (e.g., to enhance safe practices). The teams should be collaborative (involving managers, professional, and front-line staff) and would be supported to deliver workshops that facilitate a process of organizational change based on best practices cited in this report and other sources.

Rec. C1 Increase the availability of publicly funded physiotherapy and occupational therapy professionals and assistants to seniors in residential care facilities.
We recommend that regional health authorities make stable and sufficient funding available for OT/PT services on-site in residential care facilities, to benefit seniors and staff alike.

Rec. C2 Tangibly support and promote safe practices and policies, such as "no manual lifting".
We recommend that all facilities be encouraged to develop clear policies on safe working practices, such as a "no manual lifting" policy. We further recommend that facilities be supported with necessary material resources, such as:

1) Annual in-house training for care aides/ LPNs, with wage replacement funds, on safe lifting, transferring, dementia training, and other safety-related subjects.
2) Structural modifications to resident bedrooms and bathrooms to accommodate wheelchairs and mechanical lifts.
3) Funding for sufficient mechanical lift resources to meet the needs of residents, taking into account building layout.

Rec. D1 Ensure that factors relating to organizational culture and staffing are included in accountability processes for residential care facilities and seniors' housing programs.
A number of provincial and national initiatives are underway to create guidelines for healthful workplaces and to establish standards of care for purposes of licensing and accrediting residential care facilities and assisted living programs. We recommend that these initiatives include indicators that address the role of appropriate staffing, work processes, and working relationships in creating healthful and high-quality facilities and assisted living environments.

Section 2. BACKGROUND TO THE PROJECT

2.1 Origins of the project

This project grew out of concerns about extremely high injury rates among care aides and licensed practical nurses in British Columbia's nursing homes. In particular, musculoskeletal and aggression-related injuries were pushing Intermediate Care injury rates as much as 50% higher than rates in the acute care sector (Workers' Compensation Board of B.C., 2000). These injuries have negative consequences for many parties: hardship for injured workers and their families; disruptions for elderly residents; financial and administrative pressures on managers; heavy demands on workers' compensation and rehabilitation services; and soaring direct and indirect costs to B.C.'s healthcare system.

Considerable attention has been paid to occupational hazards in B.C.'s acute care and extended care sectors, yet Intermediate Care has received little scrutiny. The specific risks associated with caring for residents in IC homes were unknown, as were the elements that distinguished a low injury-rate facility from a high injury-rate one. The Hospital Employees' Union (HEU), which represents care aides and LPNs, approached the WCB to fund a comprehensive study of these environments.

The study became a partnership involving numerous stakeholders and a multidisciplinary team of researchers. It was initiated by HEU, and received funding from the Workers' Compensation Board of B.C. and research support from the Occupational Health & Safety Agency for Healthcare in B.C. (OHSAH). An advisory committee of industry, government, health authority, WCB, union, and academic representatives provided oversight and guidance. Additional funding was offered by the Community Alliance for Health Research (CAHR), "Making Healthcare a Healthier Place to Work" – this project was one of a network of nine CAHR studies – organized through OHSAH, the Institute of Health Promotion Research (IHPR), and the School of Nursing at the University of British Columbia (UBC). The CAHR is a project of the Canadian Institutes of Health Research. Researchers at UBC, working through OHSAH and the CAHR, provided expertise in developing the research methodology and analyzing the findings of this study.

2.2 Objectives of the research

The project set out to provide in-depth insights into the reasons for high rates of musculoskeletal (MSI) and aggression-related injuries among front-line staff in Intermediate Care. To this end, the project had a general objective of developing a multidimensional portrait of work conditions, resources, relationships, and practices within these facilities. Of particular importance was a thorough exploration of health determinants related to psycho-social, biomechanical, and organizational factors.

Specifically, the aims of this project were to:

- identify the risk factors associated with injuries among care aides and LPNs in Intermediate Care facilities;
- pinpoint factors that helped to reduce injury risks and enhance quality of worklife;
- define and recommend future interventions for injury reduction and prevention; and
- develop a tailored work organization measurement tool, such as a telephone survey, for use in residential care and other healthcare settings.

2.3 Overview of Intermediate Care in B.C.

Until recently, the province of British Columbia had three categories of long-term care: Personal Care (PC), Intermediate Care (IC), and Extended Care (EC). Intermediate Care is the designation for individuals who can no longer live safely in their own home without considerable assistance, yet are still somewhat mobile. The category has three subdivisions, with IC3 the designation for clients with advanced dementia or very high needs regarding activities of daily living (ADL).

Since the 1990s, the vast majority of seniors in publicly subsidized IC homes have been at IC2 and IC3 levels. Facilities may also care for a few IC1 and EC residents, as well as for a small number of individuals needing palliative or respite care. The province-wide shortage of public residential beds and the current emphasis on maintaining people in their home for as long as possible has meant that, by the time seniors are admitted to an IC facility, their care needs are complex and heavy (Continuing Care, 1999). As in other healthcare settings (Houtman 1994), the demands of the IC workplace have increased in the last decades without a parallel increase in public investment (Continuing Care, 1999).

The residents: IC residents have varying degrees of mobility and independence. Theoretically, they are able to walk, albeit with support. They may also be able to dress, feed, and toilet themselves at times. Indeed, this population is characterized by its wide range of needs and abilities. It is also well understood that IC residents' mental clarity, capacity for self care, and mobility may alter from hour to hour, day to day, and over time. As a consequence, injuries among direct-care staff in IC homes may have less to do with resident handling (e.g., lifting and transferring) and more to do with assisting in the activities of daily living (ADL, e.g., dressing, bathing, toiletting, walking, eating) with an ever-changing and somewhat unpredictable population.

Caregiving is complicated by the fact that the majority of IC residents have some degree of Alzheimer disease or another dementia; Dr. Martha Donnelly, a Vancouver-based geriatric psychiatrist, estimates that 80–85% of seniors in residential care facilities in the Lower Mainland have dementia (interview, May 2001). Many IC facilities have a Special Care Unit (SCU) for people with advanced dementia. The SCU is a secure unit that may include a separate dining room, a wandering path where residents can walk safely while unattended, "quiet rooms" for agitated residents, no intercom interruptions, and other features designed to comfort and protect residents with dementia. Some facilities have early dementia units that are semi-secure.

Residents with dementia may be wanderers or elopers. Others may respond violently or aggressively to a caregiver under certain circumstances. Verbal and physical abuse towards staff is common, a fact well documented in B.C. nursing homes (Boyd,1998). Experts consider the caregiver's approach to be of paramount importance in avoiding misunderstandings and confrontations. Staff are advised to be alert, unhurried, and flexible in their dealings with dementia residents. In general, staffing levels in SCUs are higher than in regular units, reflecting the time-consuming and sensitive nature of this work.

The physical setting: The physical environments of IC facilities present another set of challenges. Many nursing homes were built for residents with less significant needs than today's IC population. Some IC homes were originally constructed as personal care homes, hospitals,

and even barracks. The layout and size of rooms, bathrooms, hallways, elevators, and grounds may not be appropriate for residents using wheelchairs and walkers. These features may exacerbate the risk of staff injuries in a variety of ways, for example: cramped bathrooms that cannot accommodate a mechanical lift; lack of wandering paths or quiet spaces for residents with dementia; and long corridors and remote nursing stations.

The workers: Care aides provide the majority of hands-on, direct caregiving to IC residents. Job descriptions can vary from workplace to workplace, and may include the following: delivering personal care (e.g., dressing, toiletting, shaving, bathing, skin care, etc.); delivering nursing care (e.g., catheter care, specimen collection, dressings); attending care conferences and family meetings, and updating ADL forms; general housekeeping (e.g., cleaning spills, washing wheelchairs); providing some food services (e.g., serving and feeding residents, delivering trays); assisting with movement and ambulation (e.g., lifting, transferring, repositioning, and walking); bed making and some laundry; assisting with recreational and social activities; accompanying residents to appointments; providing emotional contact; and participating in reports and staff meetings. LPNs also perform a range of duties, with the addition of dispensing medications and other nursing procedures.

Care aides and LPNs work under the direction of an RN, often within a unit-based team, and are supervised by a director of care. Facilities require that a care aide have a LTC Aide or Residential Care Attendant credential from a recognized program (or equivalent), but some longstanding workers may have Grade 10 or equivalent only.

Trends in elder care: Since the early to mid 1990s, B.C.'s residential care sector has attempted to move beyond the traditional model of institutional care that emphasized sickness and incapacity, hierarchical staff roles, and rigid scheduling and tasks. In its place is a social model that seeks to create home-like environments, support each senior's capacity for self-care and respect their individuality. This philosophy, variously described as client-centred or resident-focused care, is especially relevant to residents with dementia. The new approach calls for fundamental changes to the role of front-line staff, who are to deliver this flexible and personalized care. Theoretically, care aides and LPNs would work closely with residents in multi-disciplinary teams that respond to individual preferences and sensitivities. Staff would be involved in care planning, and assignments to residents would be permanent or semi-permanent to promote continuity of care.

The B.C. Ministry of Health generally endorsed this model in the early 1990s (Gnaedinger, 2000), but facilities in the province vary quite widely in the extent to which they have adapted their environments and practices to reflect the trend.

2.4 Nature, magnitude, and variability of staff injuries in Intermediate Care

Healthcare workers are known to be at high risk of injury. For 1998, the Workers' Compensation Board of B.C. reported that the province's healthcare workers had an injury rate of 7.4 (number of time-loss injuries per 100 person-years of employment) compared with an injury rate of 4.8 for all B.C. workers (WCB, 2000). In the same year, workers in long term care had an injury rate of 10.5 compared to 7.0 for workers in acute care (WCB, 2002).

Analysis of 1995-1999 WCB databases for IC facilities showed considerable variation among nursing homes. (Facility-level data were available for 79 of 124 Intermediate Care nursing homes in the province.) These 5-year databases showed that aggression-related injuries accounted for 7.1% of total time-loss incidents (ranging 0% to 18.2%) and 6.9% of total timeloss days (ranging 0% to 29.0%) in IC facilities. On average, musculoskeletal injuries (MSI) accounted for 62.1% of total time-loss injuries (ranging from 1.2% to 96.4%) and 71.2% of all time-loss days (ranging from 0.5% to 99.9%) among IC workers. On average among the 79 IC facilities, direct-care staff (RN, care aide, and LPN) accounted for 62.5% of all time-loss injuries (ranging from 6.3% to 83.3%) and 67.7% of total time-loss days (ranging from 1.2% to 99.0%).

Section 3. BACKGROUND TO THE ISSUE

3.1 Stress in the healthcare workforce

Stress and burnout plague the Canadian healthcare workforce. In their survey of job stress among healthcare staff, Sullivan and colleagues (1999) found a disproportionately high level of distress associated with heavy psychological job demands, job insecurity, and low levels of workplace social support among registered nurses, nursing assistants, orderlies, and nursing attendants. A Statistics Canada Labour Force survey found that in 2000, nursing, technical, and support staff in healthcare had more days lost due to illness or injury than any other occupation – and more than double the national average (Akyeampong, 2001). The National Population Health Survey reported that 11% of nursing assistants sought healthcare attention for mental health reasons compared to 7% of other Canadians (CIHI, 2001).

The results of these national surveys were echoed in a recent survey by the Hospital Employees' Union (HEU) (2000) in British Columbia. Among 881 randomly surveyed HEU members, 58% felt either mentally or physically stressed at the end of the workday, "almost always" or "often." Thus, patient-handling workers in Canada, besides having a high risk of injury, may be sicker than the general population and may face higher levels of stress at work, including growing exposure to the psycho-social and organizational stressors linked to high injury rates (SEIU, 1993).

3.2 Stress and injury

Increasingly, evidence is linking stressful tasks and organizational culture as causal factors for work injuries. Numerous investigations within healthcare work settings have shown that psychosocial work conditions, measured at the task level, affect both pain and musculoskeletal injury (MSI) outcomes for patient-handling staff (Bongers et al., 1993). Comprehensive reviews by Koehoorn (1999) and Lagerstrom (1998) identified 10 prospective studies and several high quality case-control studies that showed consistent, clinically significant associations between provision of direct patient care and MSI. Risk factors identified in these studies included heavy physical demands (e.g., lifting and transferring patients); licensed practical nurse (LPN) vs. registered nurse (RN) status; adverse psycho-social work conditions such as high job demands monotonous work, and limited job control; and the degree of social support and job satisfaction.

Recent international studies of female healthcare workers also found that psycho-social exposures independently explain part of the risk for neck, back, and shoulder pain (Ahlberg-

Hulten et al., 1995; Bru et al., 1996) and MSI, even after statistical adjustment for the physical demands of work (Bru et al., 1996; Ekberg et al., 1994; Engel et al., 1996; Fuortes et al., 1994; Josephson et al., 1998; Lagerstrom et al., 1995; Niedhammer et al., 1994). Among nurses in the U.S., Josephson (1998) showed that exposure to adverse psycho-social work conditions in combination with physical demands increased the strength of the association with MSI compared with exposure to adverse psycho-social work conditions or physical demands alone. Similar results were obtained in two studies among workers outside the healthcare sector (Krause et al., 1997, 1998).

Although these factors and task-level stressors have been recognized as important contributors to injury, patient-handling staff in many settings also face rapidly increasing job demands (Houtman et al., 1994; Sullivan et al., 1999) due to downsizing and restructuring. Staff also face increasing exposure to occupational hazards (Yassi, 1998) including violence (Hurlebaus, 1994; Yassi, 2000; Yassi and McLeod, 2001).

3.3 Why are some workplaces healthier than others?

Task-level psycho-social stress, job demands, violence, and other exposures occur within an organizational context. A number of studies have shown that organizations with a "people-oriented" culture have lower injury rates than organizations without these features (Amick et al., 2000a, 2000b; Habeck et al., 1991; Hunt et al., 1993; Shannon et al., 1996). People-oriented work cultures are generally defined by worker participation in decision-making, positive morale, non-adversarial labour relations, and an atmosphere of open communication.

3.3.1 "The Fairness Factor"

Besides the general organizational characteristics associated with lower MSI, a specific characteristic – organizational fairness – is known to be important, not only to workers' health but also for efficient operations, particularly in service sectors. For example, several studies show that workers' perceptions of an organization's fairness are crucial in maintaining staff morale, delivering good service, and maintaining a satisfied customer base (Bowen et al., 1999; Shain and Suurvali, 2000). In a sample of 170 food services workers, Janssen (2000) showed that innovative work behaviour was increased among workers who perceived that the organization rewarded employees fairly in relation to their efforts. Similarly, a U.S. survey of a nationally representative sample of 7,600 registered nurses showed that RNs planning to leave the profession within three years accounted for 14% of the current U.S. nursing work force (American Organization of Nurse Executives, 2002). About 58% percent of these nurses said that higher salary or benefits would "very likely" cause them to reconsider, whereas 50% percent said better staffing and 48% said "more respect from management" would very likely cause them to reconsider.

Fairness is more than equity, impartiality, and lack of bias. It also refers to fair processes and sympathetic relationships. Paradigms of social justice (procedural justice and relational justice, in particular) go beyond traditional markers of status and reward, and consider what organizations gain when individuals believe that they are treated fairly. Procedural justice is associated with perceptions that an organization has fair, consistent policies and procedures that protect employees from arbitrary decision making. Relational justice deals with employees' perceptions about whether communication methods and overall treatment are fair and respectful,

(i.e., modes and qualities of relationships as distinct from actual outcomes).

Procedural justice has been described as an approach that promises "a way of creating more positive social dynamics in difficult situations in which not all parties can receive what they want ..." (Tyler et al., 1997, p. 12). Cohesion, solidarity, and job satisfaction are some of the values pursued. Procedural fairness is likely to be important in healthcare work settings where relationships are central, demands are high, and resources may be scarce. As Tyler et al. (1997) state, "[P]eople are concerned about how decisions are made as well as about what those decisions are" (p. 75) and they may be more satisfied by a fair process than by a favourable result. Requena (2003) found that trust, communication (the ability to share opinions about the work), and influence (the ability to put ideas into practice) are strongly associated with satisfaction, quality of work-life, and workers' sense of personal well-being.

In many ways, procedural and relational justice are rooted in common-sense notions of respect, courtesy, and trust (Shain and Suurvali, 2000). A fair process, for example, may be described as one in which individuals have a chance to speak (to express and control how their "evidence" is presented); believe they are paid attention to; see recognition of their contribution; and perceive that authorities are open to change (Tyler et al., 1997). Tyler further notes that "people do not value having the structural opportunity to speak unless they think what they say is being considered by the decision-maker" (p. 191). In other words, processes must be genuine even if outcomes are less than optimal.

Theorists also suggest that there are links between fairness, group status, and organizational effectiveness. Fair treatment can be a signal that individuals and their associated group are valued. Bowen et al. (1999) observe that fair treatment of employees can lead to "good citizen behaviour"– a willingness to help others, prevent problems, and adapt to changes. The reverse may also be true. "[I]f people are subjected to rude or insensitive treatment, or fail to have wrongs against them avenged, these experiences communicate ... marginal status" (Tyler et al., 1997, p. 186). Perceptions of low status and injustice have implications for individual and collective "efficacy," says Tyler, notably for participation in organizational processes. Essentially, if people believe they cannot change an undesirable situation, they are less likely to initiate or participate in efforts to do so.

A related idea is "the broken promise," which stems from the idea that the employment contract is a series of promises (Tyler et al., 1997). In the broken-promise workplace, employees face organizational obstacles to discharging their duties in a responsible, safe, and/or ethical fashion, and hence feel that management has not lived up to its end of the bargain. Shain (2000) sees a strong connection between workplace stress, poor health and injuries, and unfairness. Essentially, he equates fairness with employment promises that are kept, and unfairness with promises that are not. Examples of these promises are "clear duties, a healthy psycho-social environment; a safe physical environment; a safe system of work; fair treatment – reasonable workload, basic courtesy, respect, reasonable reward ..." (Shain, 2000, p. 28). When these commitments go unfulfilled, and when employees feel actively underappreciated, excluded from decisions, and subjected to unreasonable and unsafe workloads, the result is, in Shain's words, toxic.

The broken promise also signals marginal status (the worker is not valued) with resulting effects of disengagement and damaged self-esteem. As Shain (2000) says, "[J]ust as these psycho-toxic conditions of work are associated with a higher chance of getting ill or being injured, so too are they associated with a lower chance of injured workers making a full and speedy recovery, returning to work and readjusting successfully" (p. 22).

3.4 The determinants of health in the healthcare workplace

Several studies of healthcare organizations demonstrate links between organizational culture and MSI (Cato et al., 1989; Larese et al., 1994; Yassi et al., 2002; Shannon et al., 1996, 2000). One longitudinal study in a medium-sized Ontario hospital undergoing downsizing showed, among workers who remained at the hospital, statistically significant increases in neck and back pain over time. This study indicates that organizations facing downsizing pressures may be particularly vulnerable to MSI (Shannon et al., 2001).

Research on the psycho-social work environment in healthcare has documented that job strain, and particularly heavy workloads, lead to increased sicktime, healthcare costs, job dissatisfaction, and high turnover (Baumann et al., 2001). Nursing studies consistently show that autonomy, improved communications, and respect are positively associated with job satisfaction and other positive views of the work environment (Kangas et al., 1999). Koehoorn et al. (2002), in a comprehensive synthesis of the literature in this area, noted that reasonable workloads, control over work, participation in decision-making, supportive managers, and good communications are the key ingredients to a healthful healthcare workplace, and that these conditions are among the characteristics of "magnet hospitals" – hospitals that both attract and retain staff (Gleason et al., 1999).

Fairness has also been explicitly related to health outcomes in a healthcare workforce. In a recent study of approximately 5,000 Finnish hospital employees, procedural justice and relational justice were strong and independent predictors of self-rated health, minor psychiatric morbidity, and sickness absence (Elovainio, 2002).

Lowe and Schellenberg (2001) discuss how strong employment relations, which are crucial to the quality of worklife as well as to organizational effectiveness, rest on four pillars: trust, commitment, communications, and decision-making influence. They note that the CPRN-Ekos Changing Employment Relationships Survey found that healthcare workers have the weakest employment relations in all four dimensions of any occupation in Canada. This low rating was related to factors such as training, tools, equipment, and job security – all of which are problematic in many Canadian healthcare organizations. The researchers also noted that the four pillars are mutually reinforcing, such that when respondents were asked to identify one change needed, almost half the respondents with strong employment relations wanted no changes, whereas those in weak employment relations wanted better communication, fairness and respect from their managers, and a more supportive work environment (Lowe, 2002).

In conclusion, a convergence of research shows that organizational culture, rewards, resources, and relationships have a major impact on both the well-being of employees and the organization's ability to meet its strategic goals (Lowe, 2002). The ingredients of a desirable place to work, such as respect, fairness, and trust, are embedded in cultures. As summarized by

Koehoorn, Lowe, and colleagues, the evidence has converged on three related points:

1. Investing in people and building human capacity are crucial to an organization's success.
2. Viewing staff as resources rather than as costs is a key element in this approach.
3. Developing human capacity is a continuous process that must be linked to the strategic goals of the organization.

Section 4. RESEARCH DESIGN AND QUESTIONS

4.1 Conceptual framework

This project was designed as a comparative analysis of organizational, psycho-social, and biomechanical factors in eight Intermediate Care facilities, four with relatively low injury rates and four with relatively high rates.

The decision to focus on work environment was based on several factors. Numerous workplace studies demonstrate the association between organizational culture and stress-related injuries such as MSI (see section 3 for details). The dementia literature also identifies psychosocial dynamics as critical to delivering care that is both safe and compassionate. Interviews and focus groups in the project's early stages corroborated the importance of work processes, communication and relationships, and other organizational factors.

The focus on work environment was also supported by an analysis of injury rates in 79 IC facilities in B.C. between 1995-99, based on WCB data. The average injury rate over the five years of the top quartile of "good" performers (i.e., lowest injury rates) was four times better than the average injury rate of the lowest quartile of "poor" performers (i.e., highest injury rates). Given that IC facilities were likely to have similar resident populations and public funding, it seemed improbable that this four-fold difference in injury rates could be wholly attributed to factors such as physical workload, staff composition, or facility layout. The broad influences of organizational culture and psycho-social factors were also likely to be playing important roles.

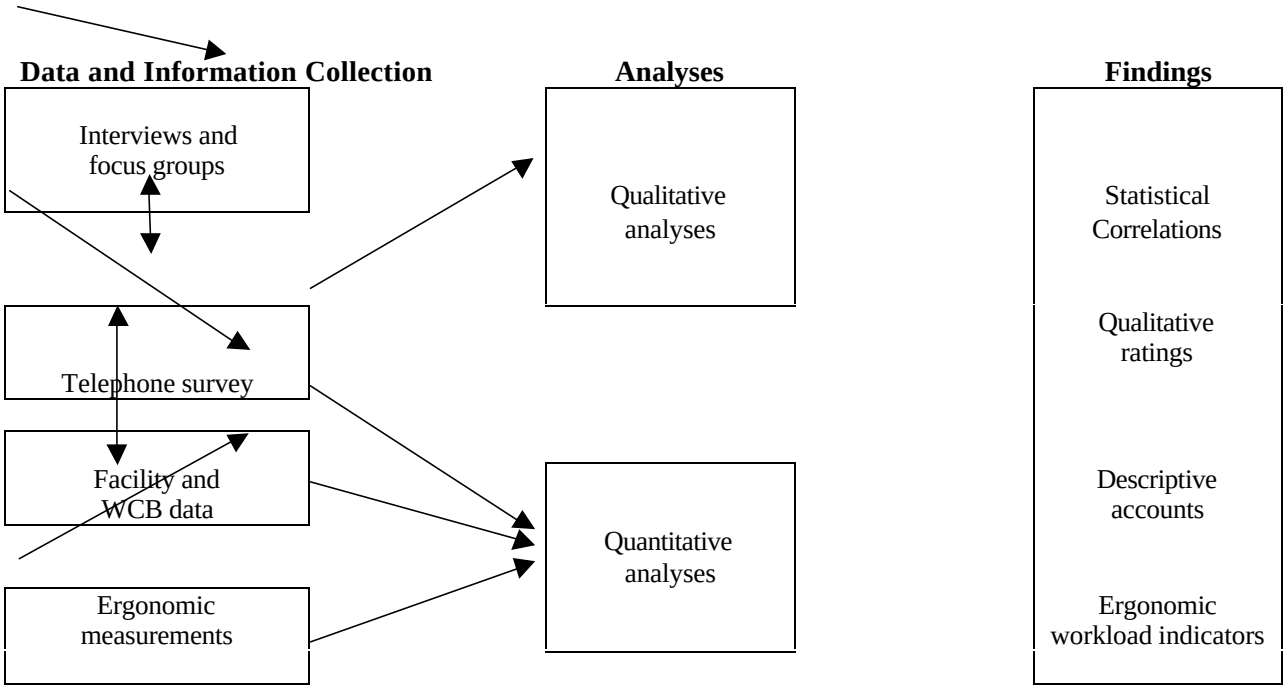
At the same time, evidence suggested that workload in IC homes was quite onerous. Many front-line staff reported that they worked in pain, and the acuity of residents' conditions had increased over the years (Continuing Care, 1999). The research team decided to closely examine issues of workload and job demands, but within a context of organizational culture. The conceptual framework of the project had two key premises:

• Direct-care staff in all Intermediate Care facilities would have a heavy physical workload.
• Low injury-rate facilities would have more successful ways of organizing work than high injury-rate facilities, thus mitigating the risks associated with heavy demands.

4.2 Research design: Multiple methods, multiple levels

The project's goal was to produce a multidimensional view of the Intermediate Care environment. To this end, an interdisciplinary approach was employed that drew on paradigms from epidemiology, nursing, sociology, and kinesiology. Similarly, the project combined a variety of research methods – quantitative, qualitative, and ergonomic – to amplify and compare findings on particular issues. The project gathered information from individuals in different positions within Intermediate Care facilities (managers, RNs, care aides, and LPNs) to ensure that the findings would be grounded in their perceptions and experiences. Organization-level factors were examined (e.g., policies and practices, equipment type and availability, work assignments, and job demands) as were macro-level features (e.g., facility governance, relationships with community organizations and health authorities). Finally, the project analyzed quantitative data at four levels – individual, unit, facility, and by injury-rate group (low injuryrate
facilities called LIRFs and high injury-rate facilities called HIRFs).
The methods used were: 1) quantitative data collection from facilities and the WCB, covering the 30-month study period, January 1, 1999 to June 30, 2001; 2) a telephone survey of care aides and LPNs employed at study facilities as of November 2001; 3) interviews and focus groups with managers and front-line staff conducted between December 2001 and February 2002; and 4) ergonomic data collection conducted between January and February 2002. Figure 4.2 shows the relationships among these methods and the findings.

Figure 4.2 - Diagram of study



4.3 Research questions

The research questions were developed from several sources:

- exploratory focus groups with directors of care and with care aides from several non-study facilities;
- tours and informal interviews at non-study facilities by the ergonomics group;
- phone interviews with geriatricians, rehabilitation professionals, administrators, health and safety personnel, and union representatives; and
- a thorough review of the relevant literature.

Extensive discussions led to research questions covering five major themes:

1) Characteristics of workers and facilities *:* "Do the following factors differ significantly between low and high injury-rate facilities: 1) personal and employment characteristics of workers; 2) facility funding levels; and 3) resident dependency?"

2) Workload and job demands: "Do low and high injury-rate facilities differ in physical workload, staffing levels, and practices relating to work distribution and staff replacement?"

3) Organizational culture: "Do low and high injury-rate facilities differ in how managers elicit participation, foster the care provider's role, and offer support and fair treatment to front-line staff?"

4) Safety environment: "Do low and high injury-rate facilities differ in their investments in developing and maintaining a safety environment?"

5) Community and in-house resources: "Do low and high injury-rate facilities differ in their capacity and practices regarding the provision to residents of activation and rehabilitation programs, other health services, and social and cultural contacts?"

Below are details of these questions. (The figures in parentheses refer to the source of data; 1= quantitative data collection, 2= telephone survey, 3=interviews & focus groups and 4= ergonomic study)

1) Characteristics of workers and facilities[1]

- Demographics of care aides/LPNs: Age, education, marital and family status, and income. (1, 2)
- Employment characteristics of care aides/LPNs: Employment status (full-time, part-time, or casual), seniority, and additional employment elsewhere. (1, 2)
- Per diem funding: The sum of the daily user fee and government funding, per resident. (1)
- Resident dependency: Assessed via the Functional Independence Measurement tool (FIM™
- instrument). (4)

2) Workload and job demands

- Staffing levels: The resident-to-care aide/LPN ratio. (1)
- Perceptions of workload and job demands: Reports and experiences of managers, RNs, and

care aides/LPNs. (2, 3)

- Staff replacement practices: Perceptions of the frequency of working short-handed, and management response to the issue. (2, 3)
- Workload distribution: Perceptions of how equitably workload is divided among care aides/LPNs, and management's response to the issue. (2, 3)
- Utilization of casual workers: The percentage of care aides/LPNs who are casual. (1, 2)
- Burnout and job satisfaction: Perceptions of care aides/LPNs. (2, 3)
- Physical environment: The layout and size of rooms, bathrooms, hallways, wandering path, elevators, etc. (2, 3, 4)
- Physical workload: Measurement of the number of resident lifting, transferring, repositioning, bathing, and bed-making tasks performed per day shift by a sample of four care aides in each facility. (4)
- Biomechanical loads: Measurements of cumulative and peak compression in the lower back and peak muscle activity in the neck/shoulders in care aides over a full day shift. (4)

With respect to the last three items, the ergonomic group speculated that facilities with higher injury rates would have workers who experienced one or more of the following:

- more time in bent and twisted postures (increased spinal loading);
- more lifting, transferring, and assisting of residents (includes frequency and amount of spinal loading);
- more instances of physical aggression (increased spinal loading); and/or
- more instances of unexpected physical loading (e.g., resident falling).

3) Organizational culture

- Communication, participation, and decision-making: The premise was that managers in low injury-rate facilities (LIRF) would make communication with front-line staff a priority and would deploy a variety of information-sharing strategies. In LIRFs, front-line staff would have more opportunities to speak collectively, voice opinions, and influence decisions. (2, 3)
- Fairness and congruency: The premise was that front-line staff in LIRFs would have higher levels of job satisfaction and personal well-being than staff in HIRFs. They would feel more congruency in their role as caregivers, and the philosophy of care would allow staff more flexibility in their dealings with residents. (2, 3)
- Support: The premise was that more support, and more varieties of support, would be available to front-line staff in LIRFs. Staff in LIRFs would show a greater degree of interpersonal trust and cohesiveness than HIRF staff, based in part on policies and practices. (2, 3)

4) Safety environment

- Staff training: The premise was that LIRFs would have more safety training than HIRFs, as well as training that was better integrated into the work routine. (2, 3)
- Safety equipment: The premise was that mechanical lifting equipment and other aids would make no difference to injury rates. (2, 3, 4,)
- Resident handling: The premise was that LIRFs would have better policies, practices, and attitudes towards safe resident handling – i.e., lifting, transferring – than HIRFs, and these would be more actively reinforced by RNs, management, and front-line staff. (2, 3)

- Resident aggression: The premise was that LIRFs would have clearer policies and practices regarding resident aggression than HIRFs. (2, 3)
- Joint Health & Safety Committee: The premise was that LIRFs would have higher functioning, more balanced, and better-informed health and safety committees than HIRFs. (2, 3)

5) Community and in-house resources

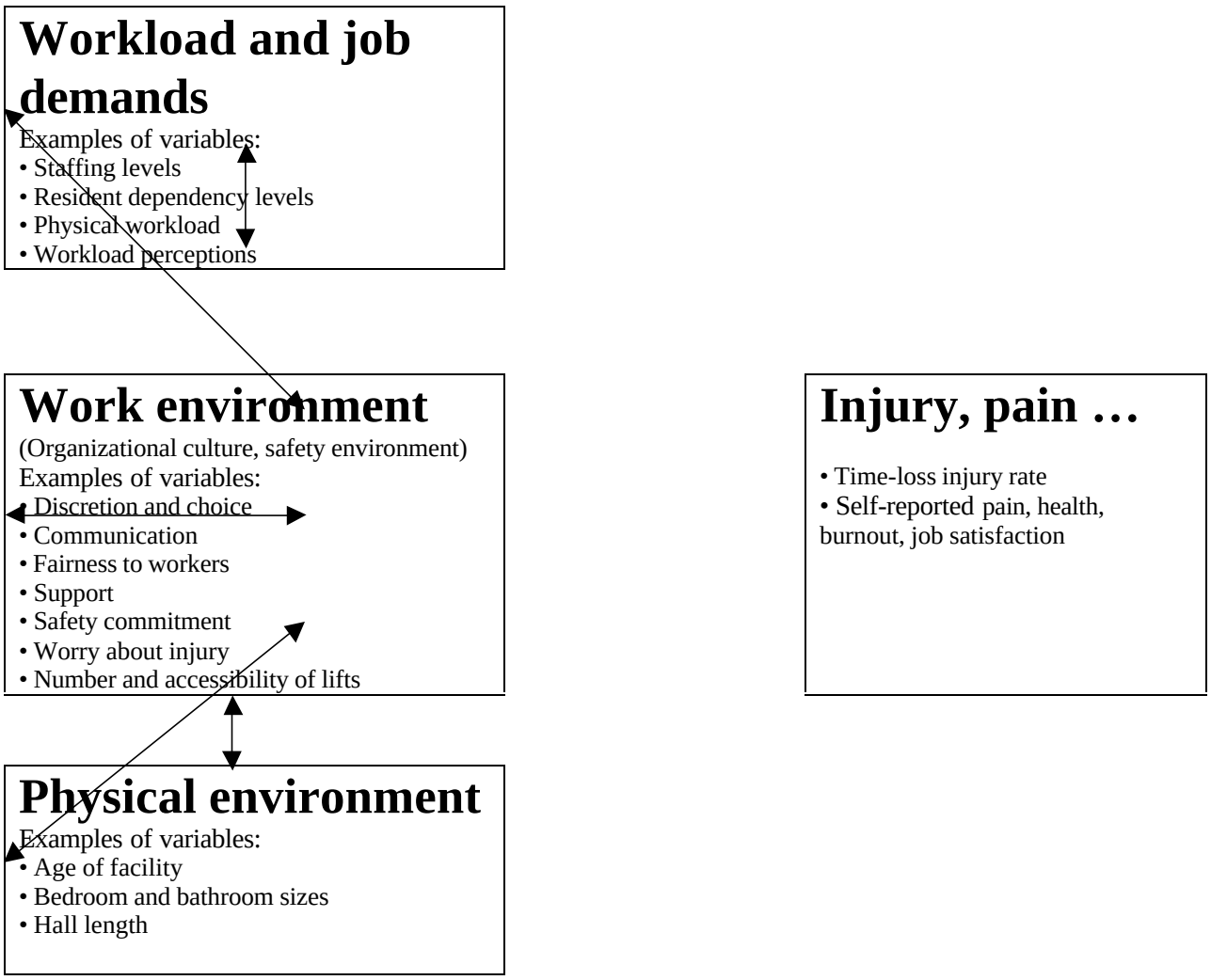
- Budgeting for staff training, resident aids/equipment, and facility upgrades: The premise was that these kinds of investments would positively affect injury rates. Inquiries were made into the governance and board structure of the facilities, to determine who controlled these decisions. (3)
- Relationship to outside health services, regional health authority, and medical coordination: The premise was that most Intermediate Care facilities would have some deficiencies in their access to services for residents. This inadequacy could put front-line staff at risk of injury (e.g., lack of occupational therapy, physiotherapy, and psycho-geriatric services, pressures to place inappropriate residents, etc.). Inquiries were made to determine whether LIRFs and HIRFs had different capacities to manage and access services. (3)
- Resident programming (in-house, community, and volunteer based): The premise was that activation programs and social/recreational contacts can help residents to maintain their physical and emotional well-being, thus reducing the risk of injury for front-line staff. LIRFs would have better programming than HIRFs. (3)
- Specialized staff (clinical, recreation, rehabilitation): The premise was that LIRFs would have a greater and more varied complement of staff dedicated to training and resident services than HIRFs. (3)

For details about the specific items associated with the above categories, please see the Ergonomic Report; Appendix A: Telephone survey; Appendix B: Interview and focus group categories; and Appendix C: List of variables.

4.4 Analytic plan

The analytic plan focused on correlations between the following variables: 1) workload/job demands and time-loss injury, self-reported pain, health, burnout, and job satisfaction; 2) organizational culture and time-loss injury, self-reported pain, etc.; 3) safety environment and time-loss injury, self-reported pain, etc.; 4) physical environment and time-loss injury, self-reported pain, etc.; 5) safety environment and workload/job demands; and 6) physical environment and workload/job demands. (See figure 4.4)

Figure 4.4 – Analytic plan



Section 5. METHODS

5.1 Selection of facilities

The eight facilities were selected based on their injury rates, the injury-rate trend over five years, facility size (number of residents), and community size (population). For the 5-year period 1995 to 1999, the Workers' Compensation Board of B.C. was able to provide data of time-loss injury and facility size for 79 of the 124 Intermediate Care facilities in B.C. To determine community size, population estimates were obtained from Statistics Canada (1996 census) for facility locations.

Linear regression analysis was used to estimate the trend in annual time-loss injury rates over the 5-year period for each facility. Facilities with the highest time-loss injury rates and the largest increasing trend in injury rates, and facilities with the lowest time-loss injury rates and the largest decreasing trend were selected. Four facilities from each group were selected and matched in terms of facility size and community size. The median number of residents in the 79 facilities was used as the cut-off point to identify small and large facilities, and a population of 100,000 persons was used as the cut-off point to identify small and large community size.

The research team sent a letter of invitation to the selected facilities requesting their participation; the letter was followed with a meeting with the facility administrator to explain the purpose and requirements of the study. Two facilities declined to participate. One facility that initially agreed to participate was excluded after it was learned that another workplace study would be conducted concurrently. Using the original selection criteria, three other facilities were selected as replacements. After all eight facilities agreed to participate, signed consent forms were obtained from the facility administrators.

We considered it important to directly inform the care aides and LPNs within the selected facilities about the scope and purpose of the research. A joint meeting was held with front-line staff who were involved in the study facilities as either shop stewards, health and safety committee representatives, or union local executives. The study was explained, questions were answered, and participation was encouraged.

5.2 Facility data collection

Person-specific time-loss injury data for each study facility were obtained from the WCB Claims Cost Statement databases for the 30-month study period, January 1, 1999 to June 30, 2001. These WCB time-loss incident data were cross-checked with time-loss incident records found in the personnel records at each facility. To obtain time-loss injury rates, a denominator was calculated based on the number of hours worked by each resident-handling (care aide and LPN) staff member. In addition, information regarding the duration and causes of time-loss injuries for the 2.5-year study period was obtained. Injuries were categorized into musculoskeletal (MSI) and aggression-related injuries. MSI injuries included sprain injuries and exertion (repetitive motion) injuries. Wage replacement costs and healthcare costs were also obtained directly from WCB Claims Statements. Total cost of each time-loss claim was obtained by adding wage replacement costs to healthcare costs.

A research team member visited the selected facilities and reviewed the relevant personnel record files. A cohort of 560 care aides and LPNs who worked in the facilities in the 30-month study period (January 1999 to June 2001) was identified from personnel records. Demographic information about these workers was obtained, including gender, age, seniority, occupation, and employment status. Each cohort member was assigned a unique study identification number to maintain confidentiality.

Two other variables were also obtained from each facility: the resident-to-worker ratio (an indicator of staffing level) and a Functional Independence Measure score (FIM™ instrument) for each resident (an indicator of residents' care needs). The resident-to-worker ratios were based on applicable full-time equivalent (FTE) positions for care aides and LPNs. The FTE figures were obtained from Essential Services Designation documents for each facility, as negotiated by the Labour Relations Board, Health Employers Association of BC, and Hospital Employees' Union. The research team converted FTE data to the average "staff availability per hour." The resident-to-worker ratio was then obtained by dividing the number of residents by the average staff availability per hour. The day shift ratio was used for analysis because, compared with other shifts, it represented the most favourable staffing level.

The level of resident dependency was significant to the study. The physical and psychological workload of care aides/LPNs could be a function of residents'care needs, which could vary across facilities. To measure resident dependency, researchers obtained a Functional Independence Measure assessment (FIM™ instrument) for each resident in all eight facilities (Guide,1997). The FIM™ instrument is an observational assessment tool used to measure the physical, social, and emotional dependency of patients. The tool is commonly used with patients in rehabilitation settings and has been demonstrated as valid and reliable in a variety of settings (Ottenbacher et al., 1996; Pollack et al., 1996). In this study, the FIM™ was administered as part of the ergonomic study (see section 5.5). Each facility identified one or two care aides who were knowledgeable about all residents; those care aides were trained to use the FIM™ instrument and to rate each resident accordingly. The FIM™ instrument scores were then aggregated to the facility level to obtain a numerical expression of resident dependency at each facility.

5.3 Interviews and focus groups

Each facility's history, external relationships, resources, and organizational culture were investigated through key informant interviews and focus groups with managers, registered nurses (RN), and Hospital Employees' Union staff (HEU). Interviews and focus groups were designed to be a major source of information regarding work organization (practices and policies), psycho-social dynamics, relations to community and health authorities, history and governance, and beliefs about injury causation and prevention. The sessions were organized to solicit many points of view, from administrators and managers, to union representatives and front-line nursing staff.

Interviews and focus groups were conducted between November 2001 and February 2002. Separate key informant interviews of approximately two hours' length were held in each facility with the administrator, director of care, assistant director of care (when applicable), two RNs, and two Hospital Employees' Union representatives from either the Joint Health and Safety Committee (JHSC) or the union local. A three-hour focus group was conducted at each facility with care aides and LPNs who represented a variety of units and job statuses (full time, part time,

and casual).

Interviews and focus groups were semi-structured, using scripts based on the research questions, which in turn were derived from the literature review, preliminary focus groups with managers and workers, and interviews with experts. Focus groups and interviews were conducted by two qualitative researchers at each workplace during regular daytime working hours. A total of 39 interviews and 8 focus groups were held across the study facilities. Sessions were taped and extensive notes were taken. The material was then organized thematically for content analysis.

5.4 Telephone survey

A telephone survey of care aides and LPNs was used to obtain information about workers' educational history, work history, work environment perceptions, health-related perceptions, and job satisfaction. To develop the phone survey, we conducted a comprehensive Medline survey (1970 to 2001) of validated instruments used to measure job satisfaction, task-level job strain, and organizational-level stressors in healthcare settings. These instruments included demand/control questions measuring psycho-social conditions of work, the Maslach Burnout Inventory (Maslach et al., 1997), various instruments measuring organizational-level work stressors, and the B.C. Health Benefit Trust's "Risk Assessment Tool: Employee Survey" (2000) on aggressive behaviour by residents, which explores critical incidents, staff training, attitudes, communication, and policies on incidents and follow-up. As well, questions assessing pain were developed based ona validated National Institute of Occupational Health and Safety instrument (Bernard et al., 1994).

The phone survey was piloted in September 2001 with 26 care aides and LPNs at a non-study Intermediate Care facility in Vancouver. The pilot data were analyzed, along with respondents' comments regarding wording, length, missing elements, and overall tone. The survey was then modified into a final version (see Appendix A).

The final survey comprised 155 items divided into eight major sections: 1) personal characteristics; 2) employment information; 3) organizational culture; 4) working with abusive and aggressive residents; 5) safety environment; 6) physical environment; 7) emotional response to work environment and job satisfaction; and 8) self-reported health, pain, and injury status. Most items were presented as statements requiring a response on a 4-point Likert scale, though there were also open-ended questions.

Participating facilities gave the research team lists of the home addresses and telephone numbers of cohort members. Letters of contact outlining the project and inviting participation were mailed to care aides and LPNs in mid November 2001.

Nine part-time interviewers were hired and trained in early November. Interviewers worked from their homes and were closely supervised by the qualitative research coordinator. A follow-up meeting was held in mid December 2001 to discuss problems, standardize coding techniques, and exchange phone lists.

The majority of phone surveys were completed between mid November 2001 and February 2002. Altogether, 310 care aides and LPNs participated in the survey. The average response rate

across all facilities was 72% of workers; response rates for individual facilities ranged from 58% to 84%. The average for low injury-rate facilities was 74%; the average for high injury-rate facilities was 70%. Each survey was reviewed for accuracy prior to data entry.

5.5 Ergonomic data collection

The main purpose of the ergonomic measurements was to obtain objective data on physical workloads experienced by care aides at the study facilities. State-of-the-art portable electro-myography instruments were used to measure muscle activity in the lower back (lumbar) and neck/shoulder (trapezium) region. Surface electromyography (EMG) sensors were taped to the skin at these sites on both sides of the body. The four channels of EMG were collected at 1000 Hz, averaged, and stored every 100 msec in a self-contained portable EMG data collection unit (Me3000P Mega Electronics Inc.) worn by the care aide in a fanny pack.

The lumbar muscle activity was then converted to cumulative spinal compression using a calibration taken with a 15 kg load held by the subjects at 60 degrees of flexion. Total cumulative spinal compression for the seven hours was expressed as mega-newtons per second. Both lumbar and neck/shoulder peak muscle activity were determined by exporting the EMG files to ASCI databases and expressing these as amplitude probability distribution functions (APDF). Peaks were expressed as the 99_{th} percentile APDF. In addition, for lumbar EMG, the percent of duration of activity that EMG peaks exceeded 3400 newtons was calculated for each time period in the day. The National Institute for Occupational Safety and Health (NIOSH) in the U.S. consider 3400 newtons as a cut-off for lumbar compression above which risk of back injury increases in populations (the NIOSH Action Limit).

Four care aides at each facility participated in the ergonomic measurement, resulting in a total of 32 workers across the eight facilities. The study was thoroughly explained to participating workers, and their consent was obtained before proceeding. The research team originally intended to measure the workloads for workers on "typical" units of each facility, but these units proved difficult to identify. Instead, the director of care and an HEU representative at each facility were asked to choose the unit considered the most "physically demanding." They were then asked to approach care aides in this unit who had more than one year's experience in the facility and who had been free of back pain for three months. Workers meeting these criteria were invited to participate.

The ergonomic measurement was conducted at the facilities between January 17 and February 15, 2002. Care aides were instrumented and observed for a full day shift, with two workers studied each day over a two-day period. Ergonomists documented the main tasks performed by the study subjects, including the number of resident lifts and transfers, repositionings, baths, utilization of mechanical lifts, and beds made. Any unusual occurrences were also documented.

The ergonomists also interviewed each care aide, collecting demographic information, history of previous injuries and pain, subjective assessments of workload during the day, and perceptions of number of tasks performed. Care aides were asked about any problems with the testing equipment and whether the day was "typical" of their workload. Ergonomists also made observations about facility design and equipment availability, such as number of lifting devices. To obtain an objective estimate of physical environment, hall length/width and resident

bedrooms and bathrooms were measured. For details, see the Ergonomic Report.

5.6. Qualitative data analyses

For each facility, information from the interviews and focus group were subjected to content analysis based on a broad range of subject areas. The content was assembled into an intra-facility narrative table that compared views and experiences of interviewees within the facility. A key features chart was also created for each facility, based on information from the interviews and focus group and from documents such as annual reports and resident handbooks. This chart offered a succinct profile of each facility's external relationships (with health authorities, community organizations, and the WCB) as well as the facility's history, style of governance, physical design, and programming (see Appendix D).

To enable comparisons across low injury-rate and high injury-rate facilities, a single inter-facility table was constructed using information from the eight intra-facility tables. This comparative table was organized around the project's key research questions regarding work environment (organizational culture, safety environment, workload/demand, and in-house and community resources). The inter-facility table, along with the key features charts, were then subjected to a partially blinded rating process by five members of the research team, who were asked to rate each category within each facility on a 4-point scale (poor, moderate, good, and very good). Inter-rater reliability was tested and found to be high. Each rated category was then assigned a numeric value. The combined scores of the four low injury-rate facilities (LIRFs) were compared with the combined scores of the four high-injury-rate facilities (HIRFs). Based on the degree of numerical spread between the two groups, the categories were assigned a "difference value" thus:

0–4-point spread: no meaningful difference between LIRFs and HIRFs
5–9-point spread: minor difference between LIRFs and HIRFs
10 –14-point spread: moderate difference between LIRFs and HIRFs
over 15-point spread: major difference between LIRFs and HIRFs

5.7 Quantitative data analysis

There were two quantitative data sets produced for this study: 1) the data that characterized each facility (facility-level data) such as injury rate and staffing level, and 2) the data that characterized each worker (individual-level data) such as age, seniority, perceptions of work environment and personal well-being, and ergonomic workloads. Since this study focused on the facility-level characteristics that may relate to the facility's injury rate, the facility-level data were mainly used for the analyses. The individual-level data, including workers' demographic information and perceptions, were aggregated for each facility to represent the characteristics of each facility, and then used as facility-level data.

The multi-item perception variables were created from the initial analyses of phone survey data using exploratory factor analyses. For example, the variable "perceived workload pressure" was obtained by averaging four highly related phone survey items. The calculation of such variables was done for each worker and then the scores were aggregated for each facility to obtain the facility-level workers' perceptions.

With the facility-level data, Pearson Product Moment Correlation Coefficients were calculated

between personal characteristics, perceptions of the work environment, and other health-related variables such as time-loss injury rate and self-reported pain, health, burnout, and job satisfaction. These results are the main quantitative results. Individual level data were also analyzed where appropriate. For example, independent samples t-tests were conducted to compare workers between LIRFs and HIRFs in workers' personal characteristics and perceptions of the work environment. Cross-tabulation and chi-square statistics were also used, where appropriate, to examine relationships between two categorical variables at the individual-level. If results using analyses of individual-level data led to the same conclusions and overlapped with those of facility-level data analyses, the individual-level analyses results were not presented.

Ergonomic measurements were aggregated within each facility to obtain facility-level measures and were used in the correlation analyses. Peak and cumulative loads were also compared across five periods of the day shift (pre-breakfast, breakfast, pre-lunch, lunch, and post-lunch), which helped to define when the workload was heaviest. Further ergonomic analyses were undertaken to compare peak and cumulative loads with data from other studies to indicate overall risk of injury and pain. For details, see the Ergonomic Report.

5.8 Limitations of study

This study was limited by the following factors: the nature and size of the study sample; the number of workers in the ergonomic study; the time ordering of the data collection; the number of workers available for the telephone survey; and the challenges of collecting complete data.

The nature and size of the study sample: The Workers' Compensation Board of B.C. was able to provide facility-level data on injuries for 79 of 124 Intermediate Care facilities in the province (1995–99); facility-level data for the other 45 nursing homes were not readily available due to changes relating to regionalization and amalgamation. Thus, the research team selected the study facilities from a less-than-complete pool.

As cited in section 4.1, a four-fold difference in injury rates was found between the best performers (i.e., facilities with the lowest injury rates) and the worst performers (i.e., facilities with the highest injury rates) among these 79 IC facilities. The low and high injury-rate facilities in this study did not represent these extremes, for reasons of geographic constraints and refusals to participate. This was not a limitation of the study per se, but does bear noting.

The small sample size of eight facilities places limits on the generalizability of the results. It restricted the study to bivariate analyses because it was not possible to perform multivariate analyses or control for confounding variables.

Ergonomic study: The ergonomists followed four workers at each facility over a day shift to collect data on muscle activity. Data collection was limited to workers who had a minimum of one year's experience in the facility and who had been free of pain in the previous three months. Although the results may be generalizable to other workers at the facility, the small sample size produced the same limitations to the analysis as described above.

Time ordering: Various sources of data and information were collected during and for different time periods. The quantitative injury and demographic data for the cohort were collected for the

period January 1, 1999 through June 30, 2001. The telephone survey, interviews, and focus groups were conducted between mid November 2001 and February 2002. The ergonomic assessments were conducted between January 17 and February 15, 2002. The healthcare sector in B.C. has been in considerable flux (new policies, contract negotiations, unilateral changes to collective agreements, etc.) and workers' perceptions and experiences, as well as those of managers and administrators, are likely to have changed somewhat between early 1999 and early 2002. Qualitative researchers made an effort to offset the effects of current events when interviewing and surveying respondents, but some historical bias may have entered due to time ordering.

Worker availability for telephone survey: The time order also affected the availability of workers for the phone survey. Data on 560 workers employed during the 2.5 years of the study period were collected, but some workers (103 or 18.4%) had ceased to be employed at their facility and thus were unavailable for the telephone survey in November, 2001. The average response rate by available workers was 72.3% (ranging from 58% to 84%). Overall, 55.4% of the 560 workers employed during the 2.5-year study period were surveyed (ranging from 41.5% to 71.2% in each facility).

A comparison of surveyed workers to non-surveyed workers showed that non-surveyed workers were more predominantly of casual status, had less experience at the facility, and had fewer "worked hours" during the study period. There were no gender differences, and age comparisons were not feasible due to missing data for the non-surveyed workers. The telephone survey data is likely representative of regular full-time and part-time workers. The telephone survey data were compared with the focus group and interview data to confirm the consistency of the findings.

Data collection challenges: Many of the study facilities did not have computerized records of their personnel and injury data. The research team had to extract these data from paper records and cross-reference them with several sources to ensure that no data were missed. In the case of employee absenteeism data, the researchers were unable to collect complete data because one facility had merged with a multi-site entity and facility-specific data were unavailable for a seven-month period of the study. For this reason, the researchers were unable to estimate correlations between sickness absenteeism, time-loss injury rates, and the perception variables.

SECTION 6. FINDINGS

Table 6.1 – Summary profile of the eight facilities

	Low injury-rate facilities (LIRF)				High injury-rate facilities (HIRF)			
	Willow Home †	**Elm Home**	**Larch Home**	**Cherry Home**	**Juniper Home**	**Poplar Home**	**Sumac Home**	**Alder Home**
Injury rate*	16.30	17.77	19.43	20.65	24.28	33.95	44.26	71.12
Number of residents	130	101	131	80	117	160‡	66	95
Special Care Unit?	yes	yes	yes	yes	yes	yes	no	no
Age of facility	1985	~1980	1970	1961	~1983	1989	1967	~1970
Ownership and governance status	Nonprofit	Nonprofit	Public facility (amalgamated with regional health authority 1997)	Public facility (amalgamated with regional health authority 1998)	Nonprofit	Private facility (owned since 1998 by national corporation)	Public-private partnership (since 1995)	Nonprofit
Private-pay beds?	no	no	no	no	no	~80% private	20% private	no
Size of community	>100,000	<100,000	>100,000	<100,000	>100,000	<100,000	<100,000	>100,000
Per diem funding**	$128	$129	$108	$119	$130	$133	$116	$110
Resident-to-worker ratio!	13:1	11:1	12:1	11:1	13:1	16:1	18:1	15:1
Average dependency of residents§	77.74	69.08	80.43	70.03	72.25	78.93	79.15	71.67

Notes:

† The facility names are pseudonyms.

* Time-loss injury claims for care aides and LPNs per 100 person years (over study period, 1999–mid-2001) with FTE denominator.

‡ Averaged 139 residents in 2001.

** The sum of the daily user fee and government funding, per resident.

! Number of residents-to-care aide/LPN, averaged on day shift across all units. Please note: The actual ratio varies depending on the specific unit and the specific time of day (i.e., overlapping shifts).

§ Based on the FIM™ instrument. The Functional Independence Measure instrument assesses the physical and mental capacity of a resident out of a score of 126. The lower the score, the higher the dependency.

6.1 OVERVIEW OF THE EIGHT FACILITIES

Table 6.1 offers a summary profile of features of the eight study facilities, arranged in ascending order with regard to injury rate. As explained in the Methods section, the facilities were divided into two groups based on their injury records: low injury-rate facilities (LIRFs) and high injury rate facilities (HIRFs). The two groups were further divided according to number of residents (large and small) and community population size (large and small).

As Table 6.1 shows, other features varied among the eight facilities. The era of the buildings ranged from the early 1960s to the late 1980s. All but two facilities had Special Care Units for residents with advanced dementia. There was an assortment of ownership and governance structures: four facilities were owned and operated by non-profit societies; two were public facilities amalgamated with local hospitals; one was owned by a corporate chain; and one was a public-private partnership. The latter two facilities had a mix of private-pay and public beds, whereas the other facilities had public beds only.

Staffing levels are shown in Table 6.1 as resident-to-worker ratios (care aides and LPNs) averaged for the day shift across all units within the facility. The average Functional Independence Measure (FIM™ instrument) score of residents within the facility is also given. The FIM™ instrument gauges the physical and mental capacity of a resident out of a score of 126; the lower the score, the higher the resident's dependency.
The significance of these features is examined in upcoming sections.

6.1.2 Reported and time-loss injuries during the study period

The absolute number of reported injuries at the eight facilities ranged from 44 to 66 in the 30-month study period (Table 6.1.2). Most reported injuries occurred during resident handling (over 70%). The most common type of reported injury was musculoskeletal (over 50%) except at Juniper Home. Aggression-related incidents accounted for between 6.1% and 48.4% of reported injuries; in all but two instances, the aggression occurred during resident handling.

The number of time-loss injuries ranged from 19.7% to 65.9% of reported injuries. As with reported injuries, the majority of time-loss injuries occurred while handling residents and were MSI. The number of time-loss days associated with these injuries, adjusted by FTE, was higher on average at high injury-rate facilities (HIRFs) than at low injury-rate facilities (LIRFs). Time-loss injury rates had a wide range. During the study period, Willow Home at the low end had 16.30 time-loss injuries per 100 person years and Alder Home at the high end had 71.12 time-loss injuries per 100 person years.

LIRFs had slightly fewer aggression-related injuries compared with HIRFs: 24.4% vs. 38.5%. However, there were no significant differences between LIRFs and HIRFs regarding aggression-related reported injuries [$X_2(1)= 3.61$, $p= .057$] or aggression-related time-loss injuries [$X_2(1)= 0.06$, $p= .814$].

Table 6.1.2 – Reported and time-loss injuries during study period (1999–mid 2001)

	Low injury-rate facilities (LIRF)				High injury-rate facilities (HIRF)			
	Willow Home	**Elm Home**	**Larch Home**	**Cherry Home**	**Juniper Home**	**Poplar Home**	**Sumac Home**	**Alder Home**
Number of reported injuries	50	57	48	66	64	44	53	65
MSI (% of reported injuries)	38 (76.0%)	34 (59.6%)	30 (62.5%)	45 (68.2%)	13 (20.3%)	28 (63.6%)	30 (56.6%)	35 (53.8%)
Resident handling (% of reported injuries)	40 (80.0%)	43 (75.4%)	38 (79.2%)	49 (74.2%)	45 (70.3%)	31 (70.5%)	42 (79.2%)	52 (80.0%)
Aggression-related (% of reported injuries)	12 (24.0%)	16 (28.1%)	11 (22.9%)	4 (6.1%)	31 (48.4%)	3 (6.8%)	16 (30.2%)	18 (27.7%)
Incident rate for all reported injuries	50.93	67.54	49.08	104.85	91.40	51.51	180.43	140.09
Number of time-loss injuries (% of reported injuries)	16 (32.0%)	15 (26.3%)	19 (39.6%)	13 (19.7%)	17 (26.6%)	29 (65.9%)	13 (24.5%)	33 (50.8%)
MSI (% of time-loss injuries)	14 (87.5%)	13 (86.7%)	11 (57.9%)	11 (84.6%)	5* (29.4%)	20 (69.0%)	10 (76.9%)	19 (57.6%)
Resident handling (% of time-loss injuries)	16 (100%)	13 (86.7%)	15 (78.9%)	10 (76.9%)	7* (41.2%)	22 (75.9%)	9 (69.2%)	26 (78.8%)
Aggression-related (% of time-loss injuries)	5 (31.3%)	0 (0%)	4 (21.1%)	0 (0%)	1 (5.9%)	2 (6.9%)	0 (0%)	7 (21.2%)
Time-loss days	681	1257	797	799	1090	1990	401	2171
Time-loss days per FTE	**17.34**	**35.75**	**20.37**	**31.73**	**37.56**	**57.83**	**34.13**	**118.91**
Time-loss injury rate (100 person yrs)	**16.30**	**17.77**	**19.43**	**20.65**	**24.28**	**34.01**	**44.26**	**71.12**

* Nine of 17 time-loss injuries at Juniper Home were not coded as to cause**.**

6.1.3 Characteristics of the eight facilities and their workers

The following sections examine some basic characteristics of the eight study facilities and their care aides/LPNs; please refer to Table 6.1.3.

Table 6.1.3 – Characteristics of eight facilities and their workers (care aides and LPNs)

	Low injury-rate facilities (LIRF)				High injury-rate facilities (HIRF)			
	Willow Home	**Elm Home**	**Larch Home**	**Cherry Home**	**Juniper Home**	**Poplar Home**	**Sumac Home**	**Alder Home**
Characteristics of workers								
Number of workers in study	87	76	97	79	65	70	34	52
Average age of workers (years)	40.5	42.2	39.4	41.9	40.4	37.0	39.5	40.1
% of care aides with formal credential*	92.7	81.0	90.0	88.9	96.0	100.0	83.3	97.2
Seniority: Average number of years at facility	**8.45**	**7.82**	**5.99**	**5.88**	**7.17**	**4.40**	**5.32**	**5.99**
% of workers who are casual	48.2	36.2	50.5	57.7	49.2	39.4	35.6	59.2
% of workers working more than 37.5 hours/week*	32.7	30.8	43.2	26.8	17.4	30.0	35.3	18.9
Characteristics of facilities								
Average dependency of residents (FIM™ score)	77.7	69.1	80.4	70.0	72.3	78.9	79.2	71.7
Per diem funding	$128	$129	$108	$119	$130	$133	$116	$110
Resident-to-worker ratio	13:1	11:1	12:1	11:1	13:1	16:1	18:1	15:1

* From phone survey (n. 310) Note: Shaded row indicates significant difference between LIRFs and HIRFs.

6.1.3.1 Personal characteristics of care aides and LPNs

We explored whether there were differences between workers at LIRFs and HIRFs, to determine whether individual age and marital and family status were associated with injury rates. We also compared care aides and LPNs in the study facilities with their cohort in British Columbia, using a report from the Hospital Employees' Union (HEU, 2000). The HEU study was a random sample of 1,000 regular and part-time HEU members surveyed by the polling company McIntyre and Mustel in March 2000.

We did not find any significant differences in age, marital status, and number of dependents between workers in LIRFs and HIRFs. Compared with the HEU membership sample, workers in this study were similar in marital status but were generally younger and had less work experience. The HEU sample did not include casual workers (unlike this study), which might account for the observed differences in age and experience.

We found no significant difference between care aides in LIRFs and HIRFs with respect to having completed a formal care aide educational program. However, a higher percentage of workers in HIRFs had received the current Residential Care Aide credential: 64.2% of HIRF workers compared with 46.5% of LIRF workers. The RCA program was introduced in 1991 and includes dementia training in the curriculum, unlike the older Long Term Care attendant program.

6.1.3.2 Employment characteristics of care aides and LPNs

We examined whether a heavy utilization of casual workers was associated with higher injury rates. We speculated that casual workers might have less familiarity with people (residents, coworkers, and supervisors) and with the facility's policies and practices. This lack of familiarity could, in turn, give rise to heightened injury risks for casual and regular workers alike.

The percentage of casuals in the study was relatively large, ranging from 35.6% to 59.2%. We found that LIRFs, in fact, tended to have a greater percentage than HIRFs. However, there was no significant statistical difference between LIRFs and HIRFs with respect to utilization of casual workers.

We examined the number of care aides/LPNs at each facility who were working more than the standard work week of 37.5 hours. We speculated that these workers could be more vulnerable to injury due to being physically or emotionally overextended from employment elsewhere. Among the 310 workers in the phone survey, we found that 30.6% of respondents were working more than the standard work week, but there was no obvious association with injury rates. Indeed, more LIRF workers were working longer hours: 34.7% of LIRF respondents compared with 24.8% of HIRF respondents. The difference, however, was not statistically significant.

We also examined the issue of seniority, where we found a significant difference between LIRFs and HIRFs. Individual-level analysis revealed that LIRF workers were more experienced at their facility (mean = 6.87 yrs) than HIRF workers at their facility (mean = 5.71 yrs).

6.1.3.3 Characteristics of residents

To determine whether the varying needs of residents influenced the risk of staff injury, we examined whether there were significant differences between resident populations in LIRFs and HIRFs. The FIM™ instrument was used to gauge the dependency level of all residents in the eight facilities (i.e., the residents' physical health, mobility, and cognitive capacity). The lower the score out of 126, the greater the dependency.

Despite small variations in dependency, we found no statistically significant difference between residents in LIRFS and HIRFs (Table 6.1.3). Basically, facilities had similar resident populations in terms of the amount and kind of care they required.

6.1.3.4 Per diem funding

It was important to know if managers were facing different constraints, obligations, and opportunities for budgeting for staffing, resident programming, equipment purchases, and staff training – factors that could be associated with injury risks. For this reason, we examined whether there were significant differences in per diem funding levels between LIRFs and HIRFs. Table 6.1.3 shows the per diem funds available for each resident (the figure is the sum of the daily user fee and government funding).

We found that per diems were not significantly different between LIRFs and HIRFs. An attempt was made to compare the property costs incurred by each facility, but we were unable to obtain complete data.

6.1.3.5 Staffing levels

We examined whether staffing levels of care aides/LPNs varied between LIRFs and HIRFs, and found a highly significant difference. Table 6.1.3 shows the resident-to-worker ratio (the number of residents per care aide/LPN on the day shift, averaged across all units within the facility). The ratios vary from 11:1 at Cherry Home and Elm Home (LIRFs) to 18:1 at Sumac Home (HIRF). The mean resident-to-worker ratio at LIRFs was a third better than at HIRFs: 12:1 at LIRFs compared with 16:1 at HIRFs. Other findings on staffing, workload, and job demands are presented in upcoming sections. Please see Appendix F for an exploratory analysis of the relationship between injury rate, staffing levels, and financial benefits.

6.1.3.6 Special Care Units

Special Care Units, for residents with advanced dementia, are distinct environments within Intermediate Care facilities. We examined their characteristics regarding residents' needs, workers' time-loss injury rates, and staffing levels (Table 6.1.3.6). All the study facilities had SCUs except Sumac Home (HIRF) and Alder Home (HIRF).

Not surprisingly, residents in SCUs had much lower FIM™ scores than residents in regular units and thus were significantly more dependent ($t(17)= -7.72$, $p< .001$). In the six facilities with SCUs, the SCUs had higher time-loss injury rates than the regular units (the sample was too small to test for statistical significance). However, it is interesting to note that the SCU injury rates rates for these six facilities were substantially lower than the injury rates in Sumac Home and Alder Home; indeed, the two facilities without SCUs had the highest time-loss injury rates in the study .

Staffing levels in SCUs, as expressed in the resident-to-worker ratio (day shift), were significantly better in SCUs than in regular units ($t(17)= -6.4$, $p=< .001$). Poplar Home, with the third highest time-loss injury rate, had the poorest resident-to-worker ratio of any of the SCUs. Juniper Home, with the fourth highest time-loss injury rate, had a better resident-to-worker ratio for its SCUs but the poorest ratio among regular units in the study.

Table 6.1.3.6 – Special Care Units: Time-loss injury rates and staffing levels

	Low injury-rate facilities (LIRF)				**High injury-rate facilities (HIRF)**			
	Willow Home	**Elm Home**	**Larch Home**	**Cherry Home**	**Juniper Home**	**Poplar Home**	**Sumac Home**	**Alder Home**
Special Care Unit (SCU)	yes	yes	yes	yes	yes	yes	no	no
Average dependency of residents§ (FIM™ score):								
SCU	57.60	47.59	46.95	44.90	48.23	55.26	N/a	N/a
Regular unit	87.58	73.65	87.48	86.56	79.21	86.23	79.37	71.67
Time-loss injury rate:								
SCU	19.70	23.85	33.77	19.84	30.13	33.49	N/a	N/a
Regular unit	12.65	12.71	12.65	18.07	19.93	34.24	44.26	71.12
Resident-to-worker ratio:								
SCU	8:1	6:1	8:1	9:1	6:1	10:1	N/a	N/a
Regular unit	19:1	12:1	14:1	19:1	20:1	19:1	18:1	15:1

§ See Table 6.1 for an explanation of FIM™ instrument

6.1.4 Key findings on characteristics of facilities and workers

To summarize, we found no significant differences between LIRFs and HIRFs with respect to:

- age, marital, and family status of workers;
- employment status of workers (i.e., regular or casual);
- education of workers;
- percentage of workers who worked more than an average work week;
- dependency level of residents; and
- per diem funding.

We found significant differences in two areas only:

- **Seniority:** Workers at LIRFs had more seniority than workers at HIRFs (a little over one year).
- **Staffing levels:** LIRFs had significantly better staffing levels than HIRFS (LIRFs assigned a third fewer residents per care aide/LPN than HIRFs).

6.2 WORK ENVIRONMENT

The following findings are drawn from the study's multiple sources of data and information:

- facility and WCB data;
- telephone survey;
- interviews and focus groups; and
- ergonomic measurements.

See sections 4.2 and 4.4 for diagrams and information about how these findings were interrelated.

6.2.1 Workload and job demands

6.2.1.1 Workload and job demands, and relationships with time-loss injury rates, pain, burnout, health, and job satisfaction

We measured workload via a variety of methods: 1) staffing levels (resident- to-worker ratio); 2) ergonomic indicators of physical workload for four care aides in each facility; these indicators included cumulative spinal compression (lower back), peak spinal compression (lower back), and peak muscle activity (neck/shoulders), number of tasks performed (resident transfers, repositioning, bed-making, etc.), and perceptions of emotional and physical exertion; and 3) workload perceptions such as work pressure, physical demands of the job, and working short-staffed, measured from 310 care aides and LPNs in the telephone survey. (See Appendix C for details of variables.)

In general, the telephone survey and ergonomic study showed that workload variables had strong relationships with time-loss injury rates and with self-reported pain, burnout, health, and job satisfaction (Table 6.2.1.1).

We found a strong relationship between staffing levels and time-loss injury rates. As mentioned previously, HIRFs had lower care aide/LPN staffing levels – workers were taking care of more residents – than LIRFs (see Table 6.1.3). We also found strong relationships between staffing levels and self-reported burnout, pain, and job satisfaction; health was also correlated with

staffing. In short, workers in poorer staffed facilities reported more pain and burnout, poorer personal health, and less job satisfaction.

With respect to physical ergonomic measurements, we found that workers in HIRFs had significantly higher cumulative spinal loads for their lower back (the sum total of all bending and lifting over the day, expressed as a compressive load on lumbar discs). These workers also experienced moderately more pain in any part of their body. Peak spinal compression, which represents single high-loading events such as transferring a resident, was also higher in care aides in HIRFs. Interestingly, peak neck/shoulder muscle activity was not associated with injury rates but was strongly correlated with workers' reports of more burnout, poorer health, and less job satisfaction.

Table 6.2.1.1 – Workload and job demands, and time-loss injury rates, pain, burnout, health, and job satisfaction

Workload and job demands	Time-loss Injury Rate	Pain	Burnout	Health	Job Satisfaction
Staffing:					
Resident-to-worker ratio	+*	+	+*	-	-*
Physical workload†					
Cumulative spinal compression (lower back)	+*	+			
Peak spinal compression (lower back)	+*				
Peak muscle activity (neck/shoulder)			+*	-*	-*
Number of tasks	+*	+*	+	-	
Perceptions:					
Work pressure	+*	+*	+	-*	-*
Workload	+*		+*	-	-
Physical demands of job		+*	+	-*	-
Working short-staffed		+			
Exertion†	+*		+		-*

Explanation of symbols:
+ means positive relationship between 2 variables with correlation between 0.5 and 0.7
+* means strong positive relationship between 2 variables with correlation larger than 0.7
– means negative relationship between 2 variables with magnitude of correlation between -0.5 and -0.7
– * means strong negative relationship between 2 variables with magnitude of correlation larger than -0.7
blank means weak or no correlation (smaller than ±0.5) between 2 variables
See Appendix E for actual correlations. †From ergonomic study

All physical ergonomic measures were moderately associated with staffing levels. In other words, HIRFs had fewer workers and consequently HIRF care aides had higher cumulative spinal compression, higher peak spinal compression, and higher peak muscle activity in the neck/shoulder region.

The number of tasks performed by a care aide in a day was strongly related to both injury rates and pain, and moderately related to burnout and poorer health. We also found that the total number of tasks, total transfers, and total repositionings in a day were strongly correlated with cumulative and peak spinal compressions (lower back) and to a lesser extent with peak neck/shoulder muscle activity (see Ergonomic Report for details).

Care aides in the ergonomic study were asked to rate their emotional and physical exertion at the end of the day. Not surprisingly, workers in HIRFs rated their exertion higher than workers in LIRFs; this higher rating was also strongly associated with less job satisfaction and moderately associated with more burnout.

The telephone survey mirrored these findings. There were strong correlations between care aide/LPNs' perceptions of their workload and job demands and time-loss injury rates. Workers at HIRFs had more negative perceptions of their workload and demands than workers at LIRFs. These workers also reported more pain and burnout, poorer personal health, and less job satisfaction. Working short-staffed was also moderately associated with pain. The most significant factors were:

- Work pressures: HIRF workers were more likely to agree that they did not have enough time to do their job; that they were too rushed to work safely; that they often did not have enough time to use a mechanical lift; and that their facility did not have enough staff to provide good quality care;
- Workload: HIRF workers were more likely to report that they were working too hard on the job; and
- Physical demands of the job: HIRF workers were more likely to rate their demands as heavy to very heavy.

Once again, several of these perceived workload variables were associated with higher levels of cumulative compressive and peak loads.

A strong picture emerges from these findings. In HIRFs, workers are dealing with poorer staffing levels than workers in LIRFs yet face the same level of resident demands. As a result, they perform more transfers, repositionings, and related tasks. This heavier task load translates into more peak and cumulative loading on their muscles. HIRF workers also report more pain and burnout, poorer health, less job satisfaction, and higher levels of exertion, workload pressure, and physical demands.

6.2.1.2 Qualitative findings on workload and job demands

The interviews and focus groups explored many issues related to workload and job demands. The content analysis of the sessions divided this domain into three main categories: 1) experiences and attitudes related to staffing levels and general workload demands on care aides/LPNs; 2) the facility's practices around replacing workers when someone calls in sick or leaves work early (i.e., preventing short staffing); and 3) the facility's response to uneven workload among different units or teams (i.e., distributing workload). See Appendix B for details.

We found a major difference between LIRFs and HIRFs regarding staffing levels and workload demands (Table 6.2.1.2). These findings were consistent with the telephone survey, ergonomic study, and data regarding actual staffing ratios. In short, care aides/LPNs at HIRFs both had a heavier workload and *felt* the demands of that heavier workload. We also noted that all facilities had at least some concerns about the adequacy of their staffing levels, especially in light of the growing needs of the nursing home population.

We found a minor difference regarding workload distribution, with managers in LIRFs doing a

somewhat better job of equalizing the workload among their staff than managers in HIRFs. We found no difference in staff replacement practices: managers in all facilities were doing a good to very good job of ensuring that absent staff members were replaced, either by calling in a casual or by offering overtime work and pay.

Table 6.2.1.2 – Workload and job demands
Qualitative ratings from interviews and focus groups

		Low injury-rate facilities (LIRF)				High injury-rate facilities (HIRF)			
	Difference between LIRF and HIRF	Willow Home	Elm Home	Larch Home	Cherry Home	Juniper Home	Poplar Home	Sumac Home	Alder Home
WL1. Staffing levels and workload demands on Care Aides / LPNs	major difference (26 / 9)*	good 8	good 8	mod. 5	mod. 5	mod. 3	poor 2	poor 1	mod. 3
WL2. Replacement practices & short-staffing	no difference (30 / 29)	very good. 9	good 7	good 7	good 7	good 8	good 7	good 6	good 8
WL3. Workload distribution	minor difference (22 / 15)	good 7	good 6	mod. 5	mod. 4	mod. 5	mod. 3	mod. 3	mod. 4

* Rating score, LIRF/HIRF. See Appendix B for details.

Below is a closer examination of what interview and focus group participants said about staffing levels.

• Care Aide/LPN staffing levels

The circumstances depicted in "WL1 – Care Aide/LPN staffing levels" give some sense of the differences between LIRFs and HIRFs. Elm Home (LIRF) had relatively good front-line staffing levels, at least in part because managers had taken steps to add another care aide position by forgoing the social worker position and tapping into the health region's resources. Workers and the director of care agreed that staffing in the SCU was satisfactory but that the regular units needed more personnel. Rather than talking about a generally overwhelming workload, workers at Elm Home referred to the variability of the load, the increased needs of the residents, and the importance of a regular partner. Workers at Larch Home (LIRF) and Cherry Home (LIRF) had an overall sense that staffing levels were too low; in both facilities, managers and RNs agreed with this assessment. At Larch Home, the problem was largely focused on building design (many storeys, isolated workers) and an 18-minute gap between day and evening shifts, a result of budgetary constraints and a major source of workload stress to workers. At Cherry Home, the ever-increasing care needs of residents was the major concern. Workers at Willow Home, the other LIRF, had a nuanced response to the staffing issue: "The workload varies, but if people work in a team, it doesn't matter how much the work is, it goes well" (Willow Home care aide).

In contrast, Sumac Home (HIRF) had a serious across-the-board staffing problem. The director of care recognized the issue as did the RNs, who were sincerely worried about the well-being of care aides. Care aides saw the problem as systemic. Not only were direct-care staffing levels low at Sumac, but so too were housekeeping and laundry personnel; the shortages often affected the duties of care aides. The administrator mildly acknowledged that more care aides would be better. In two other HIRFs, workers also had an overall sense that staffing levels were

inadequate. Workers in the fourth HIRF (Juniper Home) saw major problems everywhere but in the Special Care Unit.

Managers in these HIRF facilities had a mixed view. At Alder Home the administrator said that staffing levels were problematic, but the director of care saw challenges in the evening shift only. The reverse was true at Poplar Home, where the administrator saw no problems with staffing levels, but the director of care acknowledged that, with more residents at the IC3 level, "we'll have to work on our staffing." In other words, management within three of the four HIRFs did not have a unified concern about staffing levels, whereas front-line workers at all four HIRFs viewed staffing as a major problem.

WL1 – Care Aide/LPN staffing level (Staffing levels)

Elm Home (LIRF)	Sumac Home (HIRF)
Resident-to-worker ratio: 11:1	**Resident-to-worker ratio: 18:1**
Administrator: We used to have a part-time social worker but the position was eliminated to get another care aide. **Director of Care:** We have more Extended Care residents than before, so we increased our staffing in the spring 2001. The region was willing to provide more staffing in exchange for us keeping the EC residents, and so we requested this. We need more staffing, especially in the non-dementia unit – increased care aide hours would be good. **Care Aides & LPNs:** "The workload varies. Every day is different depending on the residents' condition." If we're short regular staff, the residents are more agitated because they may not know the worker (especially in the SCU). The workload is also harder if you don't have your regular partner. The workload is very heavy in the general unit. From 10:30 am onward there are only two care aides on the floor, taking breaks into consideration. The SCU staffing level is okay at the moment. For example, it makes a big difference with two residents in hospital now, because there's less work. It's still heavy, but you know when they return it will be heavier. Your own expectation of how you do the job has changed because the workload is heavier. "Obviously every facility is understaffed." **RNs:** The evening shift care aide works a lot, and we need another. We're also short on LPNs, and it's very bad when one's off sick.	**Administrator:** "Our staffing is adequate but could be better ... The staff would probably say they are overworked." A better ratio would be another care aide for days and another care aide for nights. **Director of Care**: The ratio of residents to staff is too high, given the needs of the residents. I'd like to see two more FTEs so that care aides can work together as a team. **Care Aides:** "The staffing level stinks – it's inhumane to residents, an affront to their dignity." Residents are changing: they need more evening care, which translates into more personal laundry due to incontinence and spilling food. They need more help getting to bed. We make and change beds. We clean messes on the floor before housekeeping comes. We take garbage out. We serve tea, coffee, and juices in the dining room. There's spotty coverage by housekeeping and laundry on stats and weekends, so we end up doing some of [those jobs] when we run out of things. "We're spread too thin." **RNs:** It's too much work for the care aides. We're very concerned – their risk of injury is high, and they're young too. There's a very big problem for the night shift care aide (12:30 am to 8:30 am). It's totally intense at 6:30 in the morning after being up all night – "it's dreadful."

6.2.2 Organizational culture

6.2.2.1 Organizational culture and relationships with time-loss injury rates, pain, burnout, health, and job satisfaction

Workers' responses to many organizational culture variables showed strong relationships with time-loss injury rates and self-reported pain, burnout, health, and job satisfaction (Table 6.2.2.1). Facilities whose workers had more positive perceptions of the organizational culture had lower time-loss injury rates. These LIRF workers also reported less pain, better personal health, and more job satisfaction. The most significant factors were:

- Discretion and choice: LIRF workers were more likely to agree that they could make choices about how they did their work, depending on a resident's mood.
- Fairness to workers: LIRF workers were more likely to agree that their supervisor acted fairly in conflict situations and in general, and that management would deal with unsafe working conditions.
- Management support: Specifically, LIRF workers were more likely to agree that management would support them in a caring way if they were injured.

Table 6.2.2.1 – Organizational culture and time-loss injury rates, pain, burnout, health, and job satisfaction

Organizational culture	Time-loss Injury Rate	Pain	Burnout	Health	Job Satisfaction
Communication		-			
Discretion and choice	-*	-	-*	+	+*
Fairness to workers	-*	-			
Favouritism towards residents	+	+*			
Quality of care	-	-	-*	+*	+*
Adequacy of attention	-	-*	-	+*	+*
Management support	-*	-			+
Supervisor support	-				
Co-worker support					
Union support				+	

For explanation of symbols, see Table 6.2.1.1. For correlations, see Appendix E.

Other significant factors relating to lower injury rates and health and well-being variables were:

- Adequacy of attention to residents, and quality of care: LIRF workers were more likely to agree that their facility had enough staff to provide good quality care and did indeed provide good to excellent care.
- Favouritism towards residents: LIRF workers were more likely to agree that management did not show favouritism towards individual residents, an indicator of fairness.
- Supervisor support: LIRF workers were more likely to agree that there was cooperation between care aides and supervisors, and that their supervisors listened to what they had to say.

Not all variables showed significant relationships. Workers' perceptions of co-worker support and union support did not show significant associations with time-loss injuries and other health and well-being variables, with the exception of union support, which was positively correlated with self-reported health.

6.2.2.2 Qualitative findings on organizational culture

The interviews and focus groups explored many issues relating to organizational culture. Content analysis of the sessions divided this domain into three main categories: 1) communication, participation, and decision-making (e.g., the nature of staff and team meetings, information-sharing practices, etc.); 2) issues of fairness and congruency (e.g., workers' perceptions of their role and effectiveness as care providers, the facility's philosophy of care, etc.); and 3) support on the interpersonal level (e.g., the degree of support, cooperation, and conflict between various staff members). See Appendix B for details.

Table 6.2.2.2 – Organizational culture
Qualitative ratings from interviews and focus groups

		Low injury-rate facilities (LIRF)				High injury-rate facilities (HIRF)			
	Difference between LIRF and HIRF	**Willow Home**	**Elm Home**	**Larch Home**	**Cherry Home**	**Juniper Home**	**Poplar Home**	**Sumac Home**	**Alder Home**
OC1. Communication, participation, and decision-making	major difference (31/15)	very good. 10	very good. 9	mod. 4	good 8	good 7	mod. 3	mod. 3	poor 2
OC2. Fairness and congruency	major difference (30 / 11)	very good. 10	very good. 9	mod. 5	good 6	mod. 5	poor 2	poor 2	poor 2
OC3. Support	major difference (29 / 13)	very good. 10	very good. 9	mod. 4	good 6	good 7	poor 1	poor 2	mod. 3

* Rating score, LIRF/HIRF. See Appendix B for details.

We found major differences between LIRFs and HIRFs in these three categories (Table 6.2.2.2), with LIRFs obtaining much more positive ratings than HIRFs. These findings were largely consistent with the telephone survey results cited in 6.2.2.1.
Below is a closer examination of several key organizational culture issues.

OC1 – Workers' participation in meetings (Communication, participation, and decision-making)

Elm Home (LIRF)	**Poplar Home (HIRF)**
Director of Care: There are monthly team meetings that include all departments, family, and residents. We also try to have general staff meetings once a month. "We make an effort to involve staff in any issue that affects them – not just consulting, but from the beginning. We use a collaborative, holistic, and open approach." We have special meetings whenever necessary. **Administrator:** If there's a need for staff to meet together to discuss what's happening, they'll call a meeting. **Care Aides & LPNs:** Staff meetings are supposed to be monthly but that hasn't been happening lately. If there's a big issue, we have a meeting. We can add things to the agenda, which is posted well ahead of time. Care meetings are another chance to discuss what's going on in the facility. There's good participation [at meetings], people speak up. There's always the opportunity to raise something that isn't on the agenda. Issues are usually dealt with promptly. If not, we feel okay asking management about them.	**Director of Care:** We try to hold a care aide meeting every month. Meetings usual include a review of policies and procedures and in-services – for example, information about Gentle Care, or about incontinent residents. Meetings are scheduled from 2:30 -3:30 to overlap day and evening shifts. Still, there's a relative lack of attendance. About 11-15 staff show up, usually the people on shift and a few others. Before unionization, about 20-25 showed up. "Their [care aides'] own growth doesn't seem to matter once they've got their ticket." **Administrator:** Staff who are not on shift are paid for 2 hours to attend staff meetings. **Care Aides & LPNs:** Meetings are either monthly or every 6 weeks. Usually people are working the day of the meeting. "She [director of care] forces us to attend." Every meeting is pretty much the same thing: handouts, "demeaning video on hand-washing" – the subject matter is resident care. Usually meetings are the director of care telling us what we've done wrong. It's a one-way meeting, though the odd time someone raises an issue. "She [director of care] is always right. You get in trouble if you talk back."

• Workers' participation in meetings

We found a major difference between LIRFs and HIRFs regarding workers' participation in staff meetings. In the example offered in "OC1 – Workers' participation in meetings," Poplar Home (HIRF) appeared to be doing everything right. Meetings were held regularly and were scheduled to overlap shifts and maximize attendance. The agenda was focused, and off-shift workers were

compensated for their time. In contrast, staff meetings at Elm Home (LIRF) were somewhat irregular and off-shift workers were not offered compensation.

Nevertheless, Elm Home was more successful at running meetings where workers participated, initiated agenda items, or called meetings themselves. The difference was in management's apparent willingness to respond to workers' ideas, to follow up on their concerns, and to treat them as engaged members of the team – a "collaborative and holistic" approach, in the director of care's words. In contrast, the director at Poplar Home appeared to treat workers in a paternalistic fashion: insisting on attendance yet not encouraging participation; "feeding" information yet not being open to feedback.

Most LIRFs and HIRFs reflected this difference, though the particulars varied. In general, workers at LIRFs were far more positive about the usefulness of meetings, whereas workers at HIRFs tended to think meetings were not useful because of management indifference or inaction.

• Care Aide/LPNs' access to information about residents' history of aggression
We found a major difference between LIRFs and HIRFs regarding communication about new residents, specifically information about potential aggression. As exemplified by Poplar Home (HIRF) in "OC1 – Care Aide/LPNs' access to information about residents' history of aggression," workers in three of the four HIRFs reported being poorly informed about a new resident's history of aggression. Their comments included "It's trial and error – you go in and get hit" and "You don't know until you see it yourself." As well, there was usually a gap between how the director of care described the information flow (as quite open) and how RNs and care aides/LPNs described it.

Workers in LIRFs did not have these problems, though some care aides said information about aggression was not always available. But staff in LIRFs said they generally were told the relevant information (either in written form or at verbal report time with the RN) whereas HIRF staff generally were not.

We also looked at each facility's admissions process to see how this may have influenced communication about new residents. Willow Home (LIRF) had more specialized staff available than did Poplar Home. The duties of Willow's social worker and assistant director of care included scrutinizing the history of new residents for potential problems. Willow Home was not necessarily better informed about residents than Poplar – a new resident's documentation may not list a pattern of aggression, or the family may not disclose it – but Willow had more personnel reviewing files and investigating first hand. However, the difference between LIRFs and HIRFs in this regard was small: two LIRFs and one HIRF employed social workers who were involved with admissions.

OC1 – Care Aide/LPNs' access to information about residents' history of aggression (Communication, participation, and decision-making)

Willow Home (LIRF)	Poplar Home (HIRF)
Director of Care: Our social worker does admissions. She is key here: if she has any concerns about aggression or other information from Continuing Care, she will review it with the director of care or assistant director. The social worker and assistant director will do a home visit if there are concerns. Information about aggression is identified on the resident's personal history form and at report time. **RNs:** The information is recorded in the Communication Book; in verbal report at shift change; on the ADLs; and in the care plan. **Care Aides & LPNs:** A new resident's history is emailed to every RN upon admission – the email is taped inside the RN station. The information is also in the ADL book, which is easy to access on some floors and not as easy on others. We're told [about a history of aggression] when the resident comes to the facility. We also read it on the chart. There's good communication, no problems. The RNs are quite good at communicating with us – some will explain the effects of medications	**Director of Care:** I'll let staff know when they're admitted (if the problem is known in advance). The information is written in the care manual and on the ADL sheet in the resident's bathroom. **RNs:** Generally we don't know if a new resident is aggressive. In one case, two RNs greeted a new male resident in the morning, they didn't know his history, and he assaulted them both at the same time. If the RN knows, the information is written in the Care Manual. **Care Aides & LPNs:** Residents are not identified, not even on their chart. We find out first hand, then the information goes on the ADL sheet. Sometimes if the RN sees the behaviour, it gets passed on. We don't even know we are getting new residents let alone their [history]. RNs don't know their status either.

• Involvement of care aides in resident care planning

We found a major difference between LIRFs and HIRFs regarding workers' involvement in care planning. In all LIRFs, care aides attended care conferences for residents. In some facilities, they also attended pre-conference planning meetings with RNs and ad hoc meetings with family members. At three LIRFs, all parties agreed that care aides played a major role in care conferences, developing care plans, and maintaining residents' ADL forms (activities of daily living).

The record at HIRFs was different. At three HIRFs, care aides did not attend the care conference itself, though in two cases they participate din pre-conference meetings. At Poplar Home (see "OC1 – Involvement of care aides in resident care planning"), care aides resented being left out of the care conferences and believed their exclusion was "to save money." In the fourth HIRF, Sumac Home, care aides did attend care conferences "in between answering call bells, coffee breaks, etc."

We considered whether care aides' involvement in care planning was associated with how the facilities assigned staff to residents and units. Our findings showed a possible association. Staff at three LIRFs had permanent assignments to a group of residents – i.e., a primary relationship that involved updating ADL forms and attending care conferences and family meetings – even though they may have cared for other residents on any given day. At the fourth LIRF, staff were permanently assigned to a large unit rather than to specific residents. Among the HIRFs, two had permanent assignments to units and residents, while the other two had neither unit- nor resident-specific assignments.

OC1 – Involvement of care aides in resident care planning (Communication, participation, and decision-making)

Willow Home (LIRF)	Poplar Home (HIRF)
Director of Care: They play a big role. They attend care conferences, help develop care plans, and go to ad hoc meetings with the family. **RNs:** CAs/LPNs present their observations at the care conference. CAs have from two to four primary residents, as do RNs, and are responsible for updating their ADLs. **Care Aides & LPNs**: We attend care conferences for our residents (if you're at work that day, which is most of the time). Our input into care planning is an everyday routine.	**Director of Care**: "That's a weak area." The care plan is drawn up by RN, who writes it up after the care conference. CAs are "theoretically" involved in developing the care plan. RNs are supposed to be reviewing one resident a day with two CAs, but the practice is haphazard. "I have to check up on it." **RNs:** CAs don't attend care conferences. RNs write up the care plan and do the ADLs. We are supposed to pick a resident and discuss their condition on each shift with the CAs but that doesn't always happen. **Care Aides & LPNs**: We have no involvement, no consultation. Not after the care conference, either. The care conference does include kitchen and housekeeping staff, but why not the CAs? We are supposed to write up the ADLs for new residents, a few days after they arrive. Occasionally we do a review of residents with the RN, but the director of care criticizes us for sitting down.

OC2 – Quality of resident care, and beliefs about capacity to deliver good care (Fairness and congruency)

Larch Home (LIRF)	Sumac Home (HIRF)
• Facility's quality of care **Care Aides & LPNs:** We're concerned that the downstairs wandering path is not accessible to SCU residents. **• Beliefs about own capacity to deliver care** **Care Aides & LPNs:** Many complaints about the shortage of staff: "You don't have time to do the work. I hate rushing the residents on the toilet or while washing their face."	**• Facility's quality of care** **Care Aides:** We have many concerns about the lack of activation programs for residents: no walking program, a short exercise program only, and little available when the activity director goes on holidays. We watch them [residents] just sitting between meals, sleeping in chairs. "Sometimes it feels like these residents have no choice." Also concerned about lack of programming for dementia residents and discrimination against some dementia residents, who are not allowed to participate in recreational activities. **• Beliefs about own capacity to deliver care** **Care Aides:** Our heavy workload means not enough time to relate to residents, to give them real choices: "Sometimes you feel like a body mover because there's no time to relate to residents." We need more training for dealing with resident aggression. We have no SCU where you can practise your skills. We tend to treat every resident the same, and that's a problem. Our six-day rotation schedule is not good for resident care: we're exhausted by the sixth day.

• Quality of resident care, and beliefs about capacity to deliver good care

We found a major difference between LIRFs and HIRFs regarding the front-line staff's beliefs about the facility's quality of care and their own capacity to deliver good care.

We did not ask care aides and LPNs direct questions about "quality and capacity" in the focus groups and interviews, as we did in the telephone survey; we believed such questions would be leading. Yet the participants volunteered many comments and held strong opinions about residents' experiences and living conditions, and about their own sense of effectiveness as care providers.

In general, workers at all eight facilities expressed pride in their work and believed their caregiving was very important to residents' emotional and social well-being. At the same time, staff in HIRFs often spoke about problems with programming, residents' choices, and the quality of care they could deliver. In Sumac Home (HIRF), cited in "OC2 – Quality of resident care, and beliefs about capacity to deliver good care," workers had specific worries about the scarcity of programming, discrimination against "trouble-making" residents, their own lack of skills in dealing with dementia, and their exhaustion due to a draining and unpopular six-day rotation. In contrast, workers at Larch Home (LIRF) expressed general concerns about the building design and about being rushed.

In three HIRFs, workers had a cynical attitude towards management's claims about quality of care and respect for residents' choices. Workers at LIRFs did not express this kind of negativity. At all four LIRFs the participants were more likely to talk about challenges in elder care, such as the increasing dependency of residents or low staffing levels; they reflected on problems in the sector rather than expressing doubts about management's sincerity.

• Philosophy of care: Beliefs, training, and the care aide's role

A philosophy of care informs the practices that a facility utilizes to meet the physical, emotional, social, and spiritual needs of their residents. A philosophy (or model) of care may be formal and explicitly articulated (i.e., Gentle Care, a systematic approach to dementia care) or it may be informal and draw from various sources and strategies. Two facilities in this study – Elm Home (LIRF) and Juniper Home (HIRF) – had consciously embraced the Gentle Care model and made major investments of time and money for staff training. The other facilities were less specific in their approaches.

In general, there were no notable differences between LIRFs and HIRFs regarding the kind of philosophy embraced or the extent of formal training for staff. In both injury-rate groups, some facilities had a definite philosophy and formal training, and others had less explicit messages and modes of transmission. But we did find a major difference in how well absorbed and accepted ideas and messages were, with workers in LIRFs showing greater understanding and identification with their facility's philosophy of care than workers in HIRFs.

In the example in "OC2 – Philosophy of care: Beliefs, training, and the care aide's role," the most striking thing about Alder Home (HIRF) was the gulf between the administrator's description of the model (in which responsibility and input were encouraged at the team level) and the staff's (in which being "responsible" often meant getting blamed for problems with residents, and teamwork with RNs was elusive at best). At Alder Home, questions about the philosophy of care elicited remarks about needing to defend the interests of the residents and feeling blamed and unsupported by management. In contrast, workers at Willow Home (LIRF) talked about teamwork, the importance of patience and individualized approaches, and respecting residents' desire for privacy. In short, they expressed engagement with their role as care providers within a team, rather than a beleaguered feeling of being caught between a theory and a critical manager.

OC2 – Philosophy of care: Beliefs, training, and the care aide's role (Fairness and congruency)

Willow Home (LIRF)	Alder Home (HIRF)
• Philosophy of care **Administrator:** There's no set model. Our focus is that residents are treated and supported with dignity and respect. Training: This philosophy has been with us since Day 1. During orientation, new staff get a review of our mission and philosophy. "We constantly review, 'What have we done for the residents?' I would hate to think that staff aren't in synch with our philosophy. But a few people see it as a job, rather than as a role in someone's life." **Care Aides & LPNs:** Our #1 role is to cater a service to the residents so that they feel this is their own home. To preserve their dignity, to deliver the best care we can possibly deliver, to "give them privacy, which is what they really want and which is very hard to deliver." Training: You encounter the philosophy during orientation; it's posted in the elevator, and there's some discussion at meetings. But there's not a whole lot of discussion or training except when there's a problem or you go out of line. **• Care aide's role** **Director of Care:** "The care aide is probably the most important component of the nursing team. They provide the first approach, the first listening, the first contact [with the resident]. How they approach the resident will determine how the resident does throughout the day. A lot depends on whether the care aide is resident focused or task focused." **Care Aides & LPNs:** Our role is to be "very loving, helping, caring. You want to treat residents the way you treat your own family; your approach should be patient, unhurried. The residents are the same as a family member – you have to get to know them, everyone is different – you have to be patient, give them time." "We work as a team – a whole family, you help each other. And like a family, you have your fights, ups and downs – that's the spice of the relationship. The whole [facility] is your family: you spend most of your time here, after all. You have to feel that way to do the work – you have to be attached."	**• Philosophy of care** **Administrator:** We haven't embraced a particular model (like Eden) but have brought in parts of various ones. We're team-based, with an emphasis on the individuality of all – respect for individuals regarding care, individualized care planning, and best practices. Training: We embarked on a strategic renewal (SR) process [several years ago] with a consultant. We formed a SR committee with representatives from family, the board, unions, and all departments – they worked on our mission and goals. Various Quality Assurance Teams were established (e.g., care teams, H&SC team). The team model provides for more dialogue and input into solutions – people acquired both input and responsibility. It isn't so much up to management to fix all problems. "Not everyone likes this change – some workers are resistant to change, would sooner find fault with anything new," or have a difficult time with team participation. **Care Aides & LPNs:** The philosophy is to respect residents and tend to their needs, give them the best care we can give. Sometimes we are the ones who have to stand up for the residents, defend their wants against the RNs. Training: No training was provided [re: philosophy of care]. **• Care aide's role** **Director of Care:** They do almost all the daily care of people who need assistance. They're the eyes and ears of the nurse – a very important part of the care team. **Care Aides & LPNs:** From management's actions, we understand that our role is "to look after the resident no matter what – to never question the resident, even if they're physically or verbally abusive. The resident is always right." In our own view, "We have the most important role because we take care of the residents' spiritual, physical and emotional needs. You share the last years of their lives. We're as close as family – like family, we tease them, banter back and forth, ask them what's wrong. Sometimes we are the only friend they might see for weeks on end."

Workers at Sumac Home (HIRF) said there were no discussions or training about a model of care. At Poplar Home (HIRF), care aides described being "handed pages from the Gentle Care book," which they were expected to read but had not ("no one has seen it"). Workers at three LIRFs also described very little formal exposure to ideas. In contrast with HIRF workers, however, all had a fairly clear sense of the facility's values and expectations (from orientations and from ongoing messages at meetings and other encounters with managers) and all felt 'in synch' with the philosophy. Elm Home, the fourth LIRF, had an explicit Gentle Care model that staff members were committed to, even though they viewed parts of the philosophy and training as unrealistic.

OC3 – Management support of care aides/LPNs (Support)

Cherry Home (LIRF)	Alder Home (HIRF)
Director of Care: I find the care aides easy to work with. They are genuinely caring about the residents and their job performance. We have an open relationship. **Care Aides & LPNs:** The director of care is very accessible, very open to talk to. We have lots of contact, we do approach her. She totally acknowledges our skills, calls us in to help with special meetings with family members. She understands the demands on us, but sometimes her hands are very tied. "She's spread thin," doesn't [always] come out on the floor and deal with problems, which are left to staff to sort out.	**Director of Care:** Our relationship is open – it's been worked on a lot. Care aides are quite willing to come and talk to me. **Care Aides & LPNs:** You can talk to the director of care but whether you get respect or follow-up is another question. Sometimes going to talk to her is used against you in the future. Management can be antagonistic, demoralizing. The director "swore and yelled" at staff in a pre-planned way and said she "thought maybe that would get through to people." They [management] complain that we're not doing enough – they don't acknowledge the demands.

• Management support of care aides/LPNs

We found a major difference between LIRFs and HIRFs regarding the quality of management support to care aides and LPNs.

Support from managers and supervisors can help to mitigate the strain of a demanding job. In nursing homes, the director of care can provide both instrumental (practical) and interpersonal (social) support to frontline staff. We examined several forms of instrumental support (such as policies and practices on resident aggression and the use of mechanical lifts – see more in sec. 6.2.3. Safety Environment). We also asked managers and front-line staff how they perceived their relationships with regards to accessibility, conflict, and cooperation. Their answers to these direct questions were analyzed along with other relevant comments made during the interviews and focus groups.

In general, workers in LIRFs reported more open, sympathetic, and responsive relationships with their directors of care than workers in HIRFs. At three LIRFs, staff considered their directors to be approachable, knowledgeable about the demands they faced, good communicators, and likely to try and change things when asked. In the example of Cherry Home ("OC3 – Management support of care aides/LPNs"), staff recognized that managers did not always have the power or means to alter a situation, but workers nevertheless felt generally heard and valued. At the fourth LIRF, workers viewed their director as being too stressed and busy; they described her as tending to dismiss problems by saying "there's no money."

In contrast, workers at three HIRFs reported difficult to hostile relationships with their directors of care (in one facility, with the previous director). At Alder Home, workers said that although they could approach their director, the experience or outcome was often unpleasant. At Juniper Home, the previous director was described as "dismissive and apathetic," telling her staff, "I don't want any problems walking in my door." At Poplar Home, staff described a general climate of distrust, including favouritism between the director and some care aides. The director mirrored this distrust in her own statements, reporting, "The care aides don't like me walking around because I'll see something that needs to change. They get busy and hopping when I'm around." At the fourth HIRF, Sumac Home, workers were accustomed to approaching their directors of care over the years, but perceived them as relatively powerless to influence the owner/operator, who was frequently preoccupied with other business affairs off site.

• RN support of care aides/LPNs

Several LIRFs and HIRFs revealed difficulties with the RNs' performance as team leaders. Directors of care were frustrated that some RNs did not play a more dynamic role – e.g., give direction to care aides, problem solve situations with residents – or that they acted in a bossy or superior manner towards care aides. Care aides resented both this superior attitude and the failure of some RNs to provide hands-on help with residents. In several facilities they described casual and younger RNs as less aloof and more helpful. Some RNs and managers talked about pressures created by the RN shortage and the onerous demands on RNs due to the heavy medication needs of residents.

OC3 – RN support of care aides/LPNs (Support)

Willow Home (LIRF)	Poplar Home (HIRF)
Care Aides & LPNs: The relationship with RNs is good to fair, on the whole. It depends on the individual RN. Some are hands-on, some only do the bare minimum. Some harmony, some conflict. Quite often the RN acts like a boss. For example, some RNs won't do any manual work. If a resident has fallen, they're likely to tell a care aide to go pick them up rather than doing it themselves; the same with messes right in front of them.	**Care Aides & LPNs:** Two of the RNs are good, the rest are not. There's no teamwork, they really look down on us. Some RNs won't even touch the residents – no help with hands-on care. Some RNs refuse to help us (e.g., with lifts). One RN finds lots of work to do a few minutes right before the end of shift because she's disorganized (e.g., demanding that we get residents' urine samples).
RNs: We have good teamwork. It also depends on the RN's personality – some cause conflict, tell others what to do without being sensitive. If there's a problem, the RN will tell the care aide and they're responsive; no frustrations or difficulties.	**RNs:** The relationship is pretty good. But one RN supervises a lot and is not helpful to the care aides – she's very paperwork-oriented and doesn't help with the physical workload. The director of care pits RNs against each other by referring to this RN as a role model. There's lots of dividing and conquering here.
Management:* There are some legitimate concerns raised by care aides about the effectiveness of unit leadership by some RNs. Not all RNs "get" the team approach – some think they're better than other staff. Care aides do not always have an attitude of trust, confidence, and respect towards RNs, and sometimes this is justified. ** Observations of the administrator and the director of care, combined.*	**Management:*** Care aides often complain that RNs aren't giving them good direction, are just giving out meds, or are on the phone all weekend. So the director of care "baby-sits" the RNs and the RNs "baby-sit" the care aides. "If I don't keep on top of them, they don't do the work." RNs should do more than delegate tasks (i.e., should do hands-on care) since this would help develop a sense of team. On the other hand, most RNs are approachable and do follow-up [to concerns]. As team leaders, the RNs are expected to direct the care aides but don't always. It's left to the director of care to be the bad guy because the RNs don't want to be the heavy.

There was no clear distinction between LIRFs and HIRFs, both of which expressed some dissatisfaction with the lack of support shown by RNs towards care aides. Yet two HIRFs also gave evidence of a more widespread support problem. Nursing staff at Poplar Home (OC3 – "RN support of care aides/LPNs") talked about the director's favouritism and authoritarian style. This style was evident in management's own comments about the situation (e.g., "bad guy" ... "babysitting"). At another HIRF, care aides described the RNs as lacking in teamwork, being rude, and having a superior attitude ("They're professionals and we don't know anything"), which were qualities they also attributed to the administrator. Other facilities, LIRF and HIRF alike, held a more balanced view of the relationship and were more likely to attribute problems to individual personalities.

6.2.3 Safety environment

6.2.3.1 Safety environment and relationships with time-loss injury rates, pain, burnout, health, and job satisfaction

Workers' responses to safety environment variables were strongly associated with their reports of pain, burnout, personal health, and job satisfaction (Table 6.2.3.1). The only appreciable relationship with injury rates was a moderate association with safety commitment, which was also strongly correlated with pain and job satisfaction:

- Safety commitment: LIRF workers were more likely to agree that their facility invested time and money to improve staff safety; that senior managers were active in the health and safety committee; that managers would deal promptly with unsafe working conditions; and that their supervisors talked to them about working safely.

As Table 6.2.3.1 shows, the safety environment category included variables relating to worries about being injured on the job and accessibility of mechanical lifts (how easy lifts were to retrieve when needed). Overall, workers who had a positive perception of these variables showed less pain and burnout, better health, and more job satisfaction.

Table 6.2.3.1 – Safety environment and time-loss injury rates, pain, burnout, health, and job satisfaction

Safety environment	Time-loss Injury Rate	Pain	Burnout	Health	Job Satisfaction
Safety commitment	-	-*	-		+*
Worry about work injury		+*	+*	-*	-*
Accessibility of mechanical lifts		-*	-	+	+
Number of residents per mech. lift**		+		-*	-

For explanation of symbols, see Table 6.211. For correlations, see Appendix E.
** From quantitative data

We also found a strong correlation between the "number of residents per mechanical lift" variable and workers' self-reported health (i.e., the more residents per lift, the poorer the health). This variable was moderately correlated with pain and job satisfaction. In short, workers' pain was higher, their health was poorer, and their job satisfaction was lower in facilities with fewer mechanical lifts (i.e., in HIRFs).

6.2.3.2 Safety environment and workload and job demands

In general, we found significant relationships between safety environment variables and workload and job demand variables (Table 6.2.3.2).

Lower staffing levels, as expressed in the resident-to-worker ratio, were strongly correlated with workers' perceptions that their facility had less commitment to safety and with worries about getting injured on the job. Lower staffing levels were also moderately correlated with less access to mechanical lifts.

We found that staff's perceptions of work pressures were strongly correlated with perceptions of management's commitment to safety, worries about getting injured, and access to mechanical lifts; these were also correlated with workers' sense of physical demands. Working short staffed was moderately correlated with worry about injury, perceived safety commitment, and access to lifts.

Table 6.2.3.2 – Safety environment, and workload and job demands

Workload and job demands	Safety commitment	Worry about work injury	Accessibility of mech. lift	# of residents per mech. lift**
Staffing:				
Resident-to-worker ratio	-*	+*	-	
Physical workload†				
Cumulative spinal compression (lower back)	-			
Peak spinal compression (lower back)				
Peak muscle activity (neck/shoulder)		+	-	+
Number of tasks	-	+	-	
Perceptions:				
Work pressure	-*	+*	-*	+
Workload				
Physical demands of job	-	+*	-	+
Working short-staffed	-	+	-	
Exertion†				

For explanation of symbols, see Table 6.2.1.1. For actual correlations, see Appendix E.
† From ergonomic study. ** From quantitative data

Higher cumulative compressive loads on the lower back were related to facilities where workers believed there was less commitment to safety by management. Similarly, workers' heightened worries about injury and perceptions of less access to mechanical lifts were related to higher peak neck/shoulder muscle activity and greater number of tasks. The number of residents per mechanical lift showed a moderate relationship with higher peak neck/shoulder muscle activity and with workers' views of their work pressure and physical demands. Peak spinal compression in the lower back, as well as perceptions of exertion and workload, did not show any considerable relationship with safety environment variables.

As noted earlier, the number of residents per mechanical lift was strongly associated with self-reported health and moderately correlated with self-reported pain and job satisfaction.

6.2.3.3 Dementia training

Previous research in B.C. (Boyd, 1998) has shown that most aggression-related incidents involve residents with dementia; thus we examined whether workers had received any training on the subject. We speculated that a worker's understanding of dementia and familiarity with appropriate approaches could affect not only the quality of resident care, but the worker's vulnerability to injury. The telephone survey asked respondents about their formal education and about whether they had received training about dementia and Alzheimer disease since receiving their credential as care aides/LPNs. The results show no significant difference between LIRFs and HIRFs regarding whether workers had received dementia training, although the training was from different sources.

As noted in section 6.1.3.1, dementia training is included in the current Residential Care Aide (RCA) program, introduced to British Columbia in 1991. (The pre-1991 program, Long Term Care attendant, did not include dementia training.) A higher percentage of HIRF workers had completed the RCA program: 64.2% of HIRF workers compared with 46.5% of LIRF workers.

Table 6.2.3.3a – Dementia training since completing care aide credential

	No training	Some training	Total
Low injury-rate facility (LIRF) Count and % within group	60 (32.1%)	127 (67.9%)	187 (100.0%)
High injury-rate facility (HIRF) Count and % within group	60 (48.8%)	63 (51.2%)	123 (100.0%)
Total	120 (38.7%)	190 (61.3%)	310 (100.0%)

Table 6.2.3.3a shows that, since completing their formal care aide training, a higher percentage of LIRF workers (67.9%) had received training on dementia than HIRF workers (51.2%). Further analysis showed that a higher percentage of LIRF workers had received this training at the study facility itself (63% of LIRF workers compared with 45% of HIRF workers).

When the two training sources are combined, there was no significant difference between workers in LIRFs and HIRFs as to whether they had received any training about dementia (Table 6.2.3.3b). The next section offers additional information about staff training.

Table 6.2.3.3b Any dementia training (with credential and/or since credential)

	No training	Some training	Total
Low injury-rate facility (LIRF) Count and % within group	26 (13.9%)	161 (86.1%)	187 (100.0%)
High injury-rate facility (HIRF) Count and % within group	18 (14.6%)	105 (85.4%)	123 (100.0%)
Total	44 (14.2%)	266 (85.8%)	310 (100.0%)

$X^2 = .03$, p = .857

6.2.3.4 Qualitative findings on safety environment

The interviews and focus groups examined many issues relating to safety. We divided this domain into five main categories: 1) staff training (safe lifting and transferring techniques, understanding dementia, dealing with aggression, etc.); 2) the number and kind of safety equipment at the facility (from mechanical lifts to transfer belts); 3) safe resident handling (policies and practices relating to the use of lifts, two-person transfers, etc.); 4) dealing with potentially aggressive residents (policies and practices to prevent and deal with such incidents); and 5) the facility's joint health and safety committee (JHSC), including membership, meetings, agendas, activities, and attitudes. See Appendix B for details.

We found a major difference in how facilities did follow-up after incidents of resident aggression, with LIRFs doing a much better job than HIRFs (Table 6.2.3.4).

We found moderate differences in two areas: 1) LIRFs had more mechanical lifts and more accessible lifts, and 2) LIRFs had clearer and stronger policies on safe resident handling (i.e., use of mechanical lifts) and did a better job of supporting workers to comply with the policy.

There was a minor difference between LIRFs and HIRFs regarding their joint health and safety committees (JHSC), with LIRFs on average having slightly more effective and cooperative committees than HIRFs. It should be noted that most facilities, regardless of injury rate, had less than dynamic Joint Health and Safety Committees.

We found no difference between LIRFs and HIRFs in the area of staff training (our questions dealt with in-house and regional training in the last two years). All facilities made safety-oriented training such as back care or dealing with aggression available to their staff. There were differences in the extent of staff coverage (although training for part-time and casual workers was usually haphazard) and in whether training was done in-house or via an off-site regional program. But overall, there was no meaningful difference between LIRFs and HIRFs. On the surface, this finding appears to contradict the telephone survey regarding dementia training (see 6.2.3.3), yet the survey confined itself to the question of dementia training, whereas the interviews and focus groups asked about safety training in general in the last three years.

Table 6.2.3.4 – Safety environment
Qualitative ratings from interviews and focus groups

		Low injury-rate facilities (LIRF)				High injury-rate facilities (HIRF)			
	Difference between LIRF and HIRF	Willow Home	Elm Home	Larch Home	Cherry Home	Juniper Home	Poplar Home	Sumac Home	Alder Home
SE1. Staff training	no difference (26 / 22)	good 8	good 7	mod. 4	good 7	good 7	mod. 5	mod. 4	good 6
SE2. Safety equipment (mechanical lifts)	moderate difference (28 / 14)	very good. 10	very good. 9	mod. 3	good 6	poor 1	mod. 5	poor 2	good 6
SE3. Safe resident handling (policies and practices)	moderate difference (28 / 16)	good 8	good 8	good 6	good 6	mod. 4	mod. 3	poor 1	good 8
SE4. Resident aggression (policies and practices)	major difference (28 / 9)	very good. 10	good 8	mod. 4	good 6	mod. 5	poor 2	poor 1	poor 1
SE5. Joint Health & Safety Committee	minor difference (20 / 13)	very good. 10	poor 2	poor 2	good 6	mod. 3	mod. 3	poor 2	mod. 5

See Appendix B for details.

Below is a closer examination of the safety environment categories that showed moderate to major differences between LIRFs and HIRFs.

• Adequacy and accessibility of mechanical lifts
We found a moderate difference between LIRFs and HIRFs regarding mechanical lift resources. Nursing staff use mechanical lifts to move residents who cannot fully support themselves during lifts and transfers, both in planned situations, such as transferring from a chair, toilet, or bed, and after falls. Mechanical lifts are available in two main types: sit-to-stand and total lifts. Most are powered by electric batteries, and many use slings of various sizes and types.

In general, LIRFs had better lift resources than HIRFs. The resident-to-lift ratios were better (see Ergonomics Report), lifts were more accessible, and the types of lifts were more useful. Willow Home was exemplary (“SE2 – Adequacy and accessibility of mechanical lifts”), whereas the other LIRFs had a mixed range of resources.

SE2 – Adequacy and accessibility of mechanical lifts (Safety equipment)

Willow Home (LIRF)	Juniper Home (HIRF)
• Resident-to-lift ratio: 18.5:1 • 7 lifts altogether – 2 on each floor, 1 on ground floor • 3 sit-to-stand lifts, 4 total lifts. **Care Aides & LPNs:** We're generally satisfied with the lifts. We have lifts on every floor – they're very accessible, kept in the centre of each floor, and in the proper place about 95% of the time. The lifts are "dirt simple" to use, and there are in-services on how to use them. **RNs:** We have all the equipment we need – lots of lifts – we just need to educate staff on the importance of using these resources to reduce injuries.	• Resident-to-lift ratio: 58.5:1 • 2 lifts shared between 3 floors • 1 sit-to-stand lift, 1 total lift. **Care Aides & LPNs:** We don't have enough lifts or the right kind of lifts – we're lifting heavy residents without proper equipment. The lifts are shared between floors, and when you need to search for them, both you and the resident get frustrated. Some people haven't been properly trained on lifts – there's no ongoing training. **RNs:** One lift requires a second person – it's lots of work and it's a problem finding another staff person to help. It takes a care aide more time to go and get a lift than to just [lift manually] with another person or by themselves.

Three HIRFs were short on equipment, although Poplar Home and Sumac Home had acquired new lifts in 2000–2001 after numerous complaints from workers. In both facilities, administrators acknowledged that lift shortages had been a serious problem. Sumac Home was still lacking a sit-to-stand lift, despite repeated requests from staff.

Having lifts and being able to utilize them are two different issues. Staff in two LIRFs talked about problems using lifts in cramped bedrooms and bathrooms. In common with the workers at Juniper Home (HIRF), workers at Larch Home (LIRF) were frustrated by searching for lifts on multiple floors, waiting for elevators, and generally feeling rushed.

SE3 – Policy and practices regarding mechanical lifts (Resident handling)

Elm Home (LIRF)	Sumac Home (HIRF)
Director of Care: We have a `no manual lift' policy for most situations. Staff are about 70% compliant. When someone is not compliant, I "sic" the physiotherapist on them, or talk to them myself. **RNs:** Staff use the lifts properly. When they don't use the lifts, it's mostly when residents are being newly assessed. When a care aide is not in compliance, we will stop them and explain what a better way would be and why. If the staff person doesn't listen, we will get the director of care to speak with them. **Care Aides & LPNs:** We are not allowed to lift people ourselves, we must use the mechanical lifts. There's a `no manual lift' policy. The director of care wrote the policy in the communication book. We're pretty compliant with the no-lift policy – but not always. Workers remind one another, you feel fine telling a co-worker. One care aide might mention it to another care aide if they see them lifting incorrectly; if there's no response they will notify the RN or director of care.	**Director of Care:** Until recently, there was no policy on use of mechanical lifts. A policy is now being introduced which calls for use of mechanical lift in some situations. About half the staff (care aides and RNs) are not compliant with the new approach. If a care aide is non-compliant, I will talk to them, document it, and use progressive discipline if necessary. **RNs**: Our existing lift is inappropriate for the heavy resident who falls. Also, lifts don't always work. Care aides often try to lift people manually – that's their default mode. Staff feel rushed – it takes three times as long to get the lift and use it. Some care aides report non-compliance to the RN or director of care. We talk to them right away. But some RNs and care aides are too close to each other, which makes enforcement hard. **Care Aides:** There was no policy until recently. A note in the RN station lists residents who are 'mechanical lift only,' but the list is outdated – it never changes. Our compliance is so-so, but it's getting better. But we get mixed messages about how to handle residents. There's no back-up or enforcement from RNs or the director of care, though it's needed. We're frustrated by lack of follow-up around one care aide who "always lifts alone." There are reminders from care aides [who follow safe practices] and none from care aides who don't. It's very individualistic. A few workers are not team players.

• Policy and practices regarding mechanical lifts

The utilization of mechanical lifts is affected by policies and practices, as well as by actual equipment and ease of use. We found a major difference between LIRFs and HIRFs regarding "no manual lifting" policies and enforcement of these policies by managers, RNs, and peers.

Policies: Three LIRFs had clear "no manual lifting" policies, which were well understood by staff. The fourth LIRF was moving towards such a policy and, in the meantime, workers understood that they were to use a lift with all non–weight-bearing residents. In contrast, only two HIRFs had definite policies (verbal only, in one case), of which staff were well aware. The other two HIRFs, including Sumac Home, had no set policy as shown in "SE3 – Policy and practices regarding mechanical lifts." The administrator at Poplar Home (HIRF) believed in a case-by-case approach to lifting, despite an official corporate policy from head office that dictated no manual lifting. Poplar's director of care, however, had delivered a very strong message about using lifts ("She read us the riot act about not being covered by WCB [if we didn't use a lift]," said a care aide), and staff appeared to have received the message.

Compliance: There was no clear difference between LIRFs and HIRFs in care aide/LPNs' assessments of their own compliance with lift policies. At two LIRFs the staff reported fairly good compliance; the other two LIRFs has staff who admitted to being only about 50 percent compliant. Similarly, the staff at two HIRFs said they had fairly good compliance (at Poplar Home, since the purchase of new lifts), whereas the care aides/LPNs at the two other HIRFs said that they did not. The directors of care usually had similar assessments, though at Willow Home the director had a more positive view ("80 percent compliant) than the care aides did ("50 percent"). It is interesting to note that the ergonomists noted minimal and inconsistent use of mechanical lifts by care aides in all study facilities.

Time pressures, inability to find a partner, inaccessible lifts, crowded rooms, old or inadequate equipment, and poor personal judgment were the main reasons given by care aides for non-compliance. These reasons were shared across facilities but HIRFs were more likely to emphasize being rushed: "The job's got to be done. If you need to lift [manually], you lift" (Juniper Home care aide).

Enforcement: There was a major difference around enforcement and follow-up to non-compliance. To begin, however, it is important to note that workers at two LIRFs and one HIRF said that managers and RNs were largely unaware of whether lifts were used: in general, supervisors and team leaders literally could not see what care aides did with the residents. "The RNs don't leave their desk and they don't know the ADLs – they don't know what we're doing with residents" (Poplar Home care aide). A care aide at Cherry Home (LIRF) had a more amicable view of the visibility situation: "The director and RNs never actually see [non-compliance], so it's hard to re-enforce things. But one RN is very supportive and helpful."

In general, workers at LIRFs reported follow-up, reminders, and guidance from managers and RNs if they were noncompliant. LIRFs were more likely to take an educational approach. At Willow Home, care aides described how "usually another care aide will remind you and help you to do it right [lift]. If they refuse, you tell the RN." The assistant director of care could also get involved ("She'll talk to you casually, pull you aside."). Willow's director of care said, "The

staff are not disciplined – it's seen as an educational opportunity."

In general, workers at HIRFs complained about a lack of follow-up ("Management doesn't know who needs to be targeted, they send a general memo instead," said a Juniper Home care aide). At two HIRFs, directors of care expressed concerns that the RNs were not doing an effective job of enforcing safe lifting practices and monitoring care aides.

SE4 – Policies and practices dealing with resident aggression (Resident aggression)

Elm Home (LIRF)	Alder Home (HIRF)
Director of Care: We have a preventive emphasis – "anticipate, prevent, leave the resident alone." The policy is written in the manual. Follow-up: We try to problem solve. If someone doesn't follow policy, I would meet with them, discuss how to change things, perhaps sign them up for a Gentle Care workshop. Ultimately, we'll use progressive discipline. **RNs:** Our approach is part of the Gentle Care teaching – "leave the resident alone and give them time to mellow." Information about incidents is communicated in the report book and on the resident's chart. Follow-up: If someone is hit or kicked, the RN will talk strategies with them to avoid it in the future. **Care Aides & LPNs:** If a resident is really combative, you back off and come back later. We pass the information on to the RN, and it goes in the RN notes, which everyone sees. Incident reports are used to record the resident's behaviour, if unexpected; however if the incident happens in the SCU, that's "just the way it is", it happens so frequently, you don't [do an IR], just tell the RN what's going on. Follow-up: The resident is observed. The director of care might strategize with you on how to avoid future incidents, maybe change your assignment. Workshops on aggressive behaviour are considered part of the support – there are lots of in-services on dementia.	**Director of Care:** [When a resident seems agitated] the care aide should go away and come back later. We expect care aides to observe that standard. "If someone gets struck, I'll want to know what they were doing at the time." Follow-up: An incident report is produced, and I check into it – I'll sometimes talk to the cognitive resident who has been aggressive, go over expectations, draw up a contract [re: behaviour]. I may facilitate a meeting between the resident and the care aide involved. **RNs:** We don't have a policy or procedure, we haven't been told anything. The care aides attended a 1-hour workshop on aggressive behaviour in which they learned what to do – learned to stand back. Follow-up: After an incident the director of care does follow-up; if the resident is cognitive, she speaks to the family and care aide involved. But we don't find out what the follow-up is or the end result. **Care Aides & LPNs:** Yes, there's a policy but we're not sure what it says. We're supposed to write up an incident report (IR)and give it to the RN, or tell the RN and have them write it up or not. The IRs are colour coded for tracking purposes (e.g., if a resident is violent or non-violent) but this rarely gets done. We rarely fill out IRs because we're used to the behaviour and don't have time. Follow-up: Management acts like incidents are nothing. We don't know where the IR goes – we don't see it, there's no follow-up.

• Policies and practices dealing with resident aggression

Physical and verbal abuse from residents is not uncommon in Intermediate Care homes. Residents may become agitated or aggressive for many reasons: physical pain, emotional distress and frustration, dementia and other mental illnesses, and sometimes a history of violent behaviour.

The research team examined the issue from several angles. The interviews and focus groups revealed a very major difference between LIRFs and HIRFs regarding practices around resident aggression.

In general, LIRFs and HIRFs had similar formal policies on dealing with potentially aggressive residents. Most directors of care spoke about the importance of approach, leaving agitated residents alone – backing off – and returning when the resident had calmed down, and filling in incident reports (IR). Most also spoke about doing some kind of follow-up after a serious incident. Workers in both LIRFs and HIRFs agreed that it was unrealistic to fill out an incident

report for every episode of verbal or physical abuse: incidents were too common, especially in Special Care Units.

Yet there were major differences between LIRFs and HIRFs regarding how well workers understood the existing policies; their perceptions about whether follow-up was genuine; and their sense of whether managers would blame them for incidents. In the example in "SE4 – Policies and practices dealing with resident aggression," staff at Elm Home (LIRF) saw themselves included in the follow-up; the director of care would sometimes problem solve with them. They also considered their training in Gentle Care to be an aspect of follow-up. Workers at Elm did not talk about being blamed or ignored when reporting an aggressive incident, nor did workers at two other LIRFs.

In contrast, RNs and care aides at Alder Home (HIRF) did not have a clear picture of the formal policy, and they did not perceive follow-up and support after incidents to be genuine. The care aides felt largely ignored around aggressive incidents. During the interview the director of care made a mistrustful remark about "standards" and checking up on what happened. Workers in the three other HIRFs also reported a lack of visible follow-up. In two facilities they described feeling unsupported and blamed by management ("It's your own fault [if you get hit]" – Juniper Home care aide, referring to the former director of care).

Although we found major differences between LIRFs and HIRFs in practices and attitudes in the aftermath of abusive episodes, the study data on aggression-related injuries and incidents were not especially informative.

6.2.3.5 Incidents of abuse in relation to injury rates

The research team wondered if workers in HIRFs were more exposed to resident aggression, which could account both for actual injuries and for heightened stress, which is associated with musculoskeletal injuries. Yet as shown previously in Table 6.1.2, the study data on reported and time-loss injuries did not yield any significant differences between HIRFs and LIRFs regarding aggression.

Table 6.2.3.5 – Injury rates and experience of physical abuse from resident (in month prior to survey)

	No experience of abuse	**Some experience of abuse**	**Total**
Low injury-rate facilities (LIRF) Count and % within group	58 32.0%	123 68.0%	181 100.0%
High injury-rate facilities (HIRF) Count and % within group	27 24.5%	83 75.5%	110 100.0%
Total	**85** **29.2%**	**206** **70.8%**	**291** **100.0%**

X^2 =1.52, p=.218

The telephone survey explored whether there was a difference between workers in LIRFs and HIRFs regarding their experiences of abuse. Table 6.2.3.5 shows that workers in HIRFs reported more incidents of physical abuse from residents than workers in LIRFs. To be exact, 75.5% of HIRF workers reported one or more incidents of physical abuse during the month prior to the telephone survey compared with 68% of LIRF workers. The difference, however, was not

statistically significant.

6.2.4 Physical Environment

6.2.4.1 Physical environment and time-loss injury rates, pain, burnout, health and job satisfaction

We examined whether LIRFs and HIRFs differed in their physical layout in ways that could contribute to injury rates. Most Intermediate Care homes in British Columbia were constructed with other purposes and populations in mind. Indeed, only two of the study facilities had been built since 1985 – Willow Home (LIRF) and Poplar Home (HIRF). The others were originally designed to provide anything from supportive-style housing in a multi-storey setting (Larch Home) to personal care for seniors with much greater mobility and independence (Sumac Home). As a result, Intermediate Care facilities often have room dimensions, halls, elevators, and other building features that are challenging to residents and workers alike, especially when using wheelchairs and mechanical lifts.

We found some relationships between the physical environment variables and workers' reports of pain, health, and job satisfaction. However, most relationships were moderate in magnitude and not statistically significant (Table 6.2.4.1). There was no relationship between physical environment and time-loss injury rates.

It is worth noting that bedroom size and bathroom size were found to be significant in the ergonomic study (see Ergonomic Report). A small bedroom and bathroom were correlated with higher cumulative compression in the lower back and with more peak spinal compression and peak neck/shoulder muscle activity. Care aides in the ergonomic study confirmed this finding when they stated that delivering care in small bathrooms and bedrooms was more demanding and difficult. Longer halls were also problematic; this variable was moderately associated with poorer health and, as we note below, with more peak neck/shoulder muscle activity.

Table 6.2.4.1 – Physical environment and time-loss injury rates, pain, burnout, health, and job satisfaction

Physical environment	Time-loss Injury Rate	Pain	Burnout	Health	Job Satisfaction
Age of facility	-	-*	-		+*
Bedroom size		+*	+*	-*	-*
Bathroom size		-*	-	+	+
Hall length		+		-*	-

For explanation of symbols, see Table 6.2.1.1. For actual correlations, see Appendix E.

6.2.4.2 Physical environment, and workload and job demands

The physical environment and workload variables showed some significant relationships. Consistent with the findings in section 6.2.4.1, bedroom and bathroom size showed negative relationships with workload variables (Table 6.2.4.2). Workers in facilities with larger bedrooms and bathrooms perceived their workload and physical demands to be not as heavy. Workers in facilities with longer halls had higher peak neck/shoulder muscle activity and heavier perceived physical demands. Among workload variables, peak spinal compression and peak muscle activity in the neck/shoulder region, work pressure, and perceived physical demands of the job all showed notable relationships with the physical environment variables.

Table 6.2.4.2 – Physical environment, and workload and job demands

Workload and job demands	Age of facility	Bedroom size	Bathroom size	Hall length
Staffing:				
Resident-to-worker ratio		N/a	N/a	N/a
Physical workload†				
Cumulative spinal compression (lower back)		-		
Peak spinal compression (lower back)		-	-	
Peak muscle activity (neck/shoulder)		-	-	+
Number of tasks		-		
Perceptions:				
Work pressure	+	-*	-*	
Workload				
Physical demands of job	+		-	+
Working short-staffed				
Exertion†		-	-	

For explanation of symbols, see Table 6.2.1.1. For actual correlations, see Appendix E.
† From ergonomic study. ** From quantitative data

6.2.4.3 Qualitative findings on physical environment

Although the interview and focus group participants were not asked direct questions about the physical environment of their facility, they nevertheless raised many concerns about building design and fittings/furnishings (bathtubs, beds, call bell systems, etc.). Content analysis of their comments focused on people's experiences and perceptions of the ergonomic and safety challenges in those areas. We found no difference between LIRFs and HIRFs regarding perceptions of building design and fittings/furnishings. This lack of difference was largely because equal numbers of LIRFs and HIRFs rated "poor" and "good" in this area (Table 6.2.4.3).

Facilities that rated poor faced many problems. Workers and sometimes managers talked about how the physical environment affected the workload (e.g., long corridors; running to answer call bells; waiting for elevators; line-ups outside wheelchair-accessible washrooms) and put workers at risk for injury (e.g., small or cluttered bedrooms; cramped bathrooms; insufficient room for mechanical lifts and wheelchairs; lack of electric beds). Participants in several facilities commented on the lack of a wandering path for residents with dementia. In general, workers in the poor-rated facilities believed that the physical environment was inappropriate for their residents' needs.

Table 6.2.4.3 – Physical environment
Qualitative ratings from interviews and focus groups

		Low injury-rate facilities (LIRF)				High injury-rate facilities (HIRF)			
	Difference between LIRF and HIRF	Willow Home	Elm Home	Larch Home	Cherry Home	Juniper Home	Poplar Home	Sumac Home	Alder Home
WL4. Physical environment	no difference (16/14)	good 6	good 7	poor 1	poor 2	good 6	good 6	poor 1	poor 1

See Appendix B for details.

6.2.5 Community and In-House Resources

The interviews and focus groups explored a range of issues relating to the facilities' resources, both in-house and community based. We divided this domain into four main categories: 1) the facility's expenditures on staff training; equipment such as lifts, electric beds, and bathtubs; and capital projects such as building renovations, installations, and construction; 2) relationships with healthcare providers such as the community mental health team, acute care hospital, continuing care coordinators (especially regarding placements), and the facility's medical coordinator; 3) programming for residents (in-house and community-based), volunteer coordination, and associations with religious, ethnic, and neighbourhood communities; and 4) the complement of specialized staff providing services to residents, and the nature of their contact with front-line workers. (See Appendix B for details.)

We speculated that a facility's capacity to provide residents with recreation, activation, rehabilitation, and clinical services – as well as social and cultural contacts – would be positively related to low injury rates. For example, activation programs can help to maintain residents' muscle tone and mobility, making them less dependent on staff and less vulnerable to falls. Physiotherapists, occupational therapists and assistants not only help to sustain residents' strength and flexibility, they can also advise RNs and care aides about safe ways to work with particular conditions. Recreation therapists can provide mental and social stimulation that help to offset depression. A strong volunteer and community presence can also contribute to residents' overall emotional and spiritual well-being, which in turn may enhance their physical capacity.

On the clinical front, a medical coordinator can play an important role in avoiding the hazards of poly-pharmacy and in pain management (residents' aggressive behaviour is often associated with pain and delirium). An assistant director of care can focus on individualized problem-solving of clinical issues and play a role in monitoring and mentoring front-line staff. Access to timely geriatric mental health services is desirable, as is a good relationship with acute care providers, especially regarding discharge practices and information sharing.

We examined whether LIRFs and HIRFs faced different pressures from continuing care personnel vis à vis the placement of new residents, which could lead to situations that overburdened RNs and other front-line staff. Finally, we explored the issue of expenditures for staff training, residents' aids and equipment, and facility upgrades – again, factors that could influence workers' vulnerability to injury. We asked administrators informal questions about such expenditures in the period 1998-2000 (i.e., we relied on verbal responses rather than an independent audit of financial records).

We found no clear pattern between LIRFs and HIRFs with the exception of a minor difference in one area: LIRFs had better programming for residents (Table 6.2.5). There were, however, sharp divisions among the eight facilities as a whole. One facility (Willow Home LIRF) showed very good ratings in all categories. Two others – Elm (LIRF) and Juniper (HIRF) – rated positively almost across the board. All other facilities tended to rate considerably less favourably.

Table 6.2.5 – Community and in-house resources
Qualitative ratings from interviews and focus groups

		Low injury-rate facilities (LIRF)				High injury-rate facilities (HIRF)			
	Difference between LIRF and HIRF	**Willow Home**	**Elm Home**	**Larch Home**	**Cherry Home**	**Juniper Home**	**Poplar Home**	**Sumac Home**	**Alder Home**
CR1. Budgeting for staff training, resident aids & equipment, and facility upgrades	no difference (27 / 27)	very good. 9	very good. 8	mod. 4	good 6	good 8	good 7	good 6	good 6
CR2. Relationships to outside health services, continuing care personnel, and medical coordinator	no difference (27 / 23)	very good. 9	good 8	mod. 5	good 5	very good. 9	good 7	mod. 4	mod. 3
CR3. Resident programming	minor difference (28 / 19)	very good. 10	good 8	mod. 3	good 7	good 7	mod. 5	mod. 3	mod. 4
CR4. Specialized staff	no difference (23 / 21)	very good. 10	mod. 5	mod. 5	mod. 3	good 8	mod. 4	mod. 3	good 6

See Appendix B for details.

Section 7. DISCUSSION

The aim of this research was to understand the organizational, psycho-social, and biomechanical risk factors associated with injury rates in Intermediate Care facilities. Our focus was not on the specific causes of workers' injuries. Rather, the task was to analyze and compare the *environments* in which injuries were more or less likely to occur. This study fits an ethnographic model, in which the research team asked: What makes some Intermediate Care facilities safer and healthier places to work than others?

The question was approached from multiple perspectives, using a variety of tools. The researchers examined the nature of the work itself (e.g., caring for elderly people in an institutional setting); the biomechanical demands of the job (e.g., ergonomic measurement of cumulative and peak compression in the lower back, and peak muscle activity in the neck/shoulders); the psycho-social dimensions of the workplace (e.g., relationships, beliefs, and perceptions of managers and staff); the organizational culture of the facility (e.g., policies, practices, support systems, and resources); and the physical setting (e.g., building layout).

The study was designed as a comparison between high and lower injury-rate facilities. Most data were aggregated for purposes of correlation and comparison. Data from a telephone survey with front-line staff, administrative data from facilities and WCB, and an ergonomic study of care aides were used to compare the four high injury-rate facilities (HIRF) with the four low injury-rate facilities (LIRF). The content of focus groups and interviews with managers and staff were analyzed to allow general comparisons between these two different groups of facilities.

The study sample of eight facilities was small. Nevertheless, our findings revealed strong patterns throughout all facets of the research. In general, we found that LIRFs had organizational

cultures and staffing levels that differed significantly from those of HIRFs. Our working hypotheses – that work organization and workload would figure prominently in risk factors for injuries in Intermediate Care – were substantiated. The following discussion considers the context of these findings, the connections among various findings, the overall picture that emerges, and the implications for residential care in B.C.

7.1 Intermediate Care: The context

Intermediate Care facilities serve elderly persons who are partially mobile and often suffering from dementia. Care aides and LPNs spend most of their time assisting residents in the activities of daily living (ADLs): dressing, toiletting, bathing, walking, transferring, and eating. Many residents use a walker or a wheelchair. Individuals have varying abilities for self-care, and those abilities may change from hour to hour, day to day. Dementia alters their cognitive, social, and emotional dispositions. Physical pain, emotional distress, confusion, and delirium can make some residents agitated and aggressive; others may have a previous history of abusive behaviour. Age and illness eventually take their toll, and many residents die in their IC home.

On the surface, it is not surprising that workers in IC facilities have high injury rates. The work itself has demanding and stressful qualities. On the task level, care aides and LPNs must assist, lift and transfer elderly residents, many of whom have shifting abilities and moods, do unpredictable things, and may be very heavy or in pain. Intermediate Care facilities are rarely purpose-built. They often have small bedrooms, long corridors, cramped bathrooms, and no wandering paths where residents with dementia can safely walk unattended. Finally, care aides and LPNs have relatively low-status, high-demand jobs within hierarchical organizations.

Intermediate Care settings, then, are almost a textbook recipe for musculoskeletal injuries, which are widely associated with high job strain. Yet there are sizeable differences in injury rates among IC facilities. Our research shows that these differences are related to the work environment, and specifically to organizational culture and workload.

7.2 Characteristics of facilities and workers

To begin, it was determined that basic features relating to the study facilities probably did not play a role in the variation in injury rates. We found similarities between LIRFs and HIRFs regarding: 1) workers' characteristics (e.g., demographics, employment history, and education – with the sole exception of seniority); 2) residents' degree of dependency, and 3) per diem funding (the sum of the user fee and government funding, per resident). Thus, these factors were not confounders in the analysis: the personal qualities of staff and residents were not exacerbating risks, nor was there, on the surface, a fiscal disparity between high and low-injury rate facilities. Similarly, the findings about the physical environment of the facilities showed no clear pattern of difference. Two LIRFs had very challenging building layouts as did two HIRFs; two of each had good physical layouts. Thus, this factor was not contributing to the marked differences in injury rates.

7.3 Workload and job demands: More than a physical load

Staffing levels, biomechanical measurements of physical loads, perceptions of work pressures, and beliefs and experiences regarding job demands – all these showed strong associations with workers' injury rates and well-being. Workers in HIRFs reported poorer health, less job

satisfaction, more pain, and more burnout. They were also more likely to report that they felt pressured, rushed, and worried about being injured on the job.

The research showed that HIRF workers had a solid factual basis for feeling the way they did. Staffing levels in HIRFS were considerably less favourable than in LIRFs: an average of 16 residents per care aide/LPN (HIRFs) on day shift compared with 12 residents per care aide/LPN (LIRFs). The disparity had real consequences that were clearly captured in the ergonomic study. Workers in HIRFs performed more tasks, had higher peak compression and higher cumulative compression in their lower back, and had higher peak muscle activity in their neck/shoulder region than workers in LIRFs. The higher peak spinal compressions meant that the risk of disc injury, according to the NIOSH Action Limit, was greater among HIRF workers than LIRF workers. Not surprisingly, workers in HIRFs more frequently reported having pain that was moderate to severe than did workers in LIRFs.

Concerns about workload and staffing levels were common to all facilities, but there were differences between HIRFs and LIRFs in how workload was discussed in focus groups and interviews. Wear-and-tear on the body and vulnerability to injury were obvious worries, but low staffing produced a cascade of other risks. Care aides at Alder Home (HIRF) talked about being rushed and sometimes unable to focus: “You’re trying to do two or three things at once – there’s too much on your mind, and you’re not always able to be cautious.” The administrator at Alder said that staffing levels were problematic and that lack of attention to safety and details was a prime cause of injury. In general, workers at HIRFs reported being:

- frequently too rushed to look for lift equipment;
- often unable to find a partner to help with a transfer or lift; and hence
- likely to take short cuts (i.e., not use safety precautions).

Low staffing in HIRFs was accompanied by other negative features. Despite the heavy workload, HIRF workers reported that managers tended not to acknowledge the demands on them. “The administrator doesn’t [say anything],” said a care aide at Sumac Home (HIRF). “ We get more thank you’s from residents and other staff.” LIRF workers generally reported a different experience, even if they didn’t always get relief. “Management realizes the demands but there’s only so much they can do about it,” said a care aide at Larch Home (LIRF).

Also associated with workload were concerns about the quality of care for residents. These concerns were not isolated to HIRFs. “Sometimes we feel guilty, treating people like machines,” said a care aide at Cherry Home (LIRF). But workers in *all* HIRFs were concerned that the heavy workload interfered with their ability to give unhurried, personalized care to their elderly clients. They saw the situation as unfair to residents and stressful for themselves. “It’s a shame there’s no time to talk [to residents],” said a care aide at Juniper Home (HIRF). “They’re just room numbers, cattle.”

Workload pressures, according to other sources, are a serious issue in publicly subsidized residential care facilities throughout the province (Continuing Care, 1999). The review of Continuing Care services in B.C. stated that “[the] overall increase in care needs of clients makes it much more difficult for staff to manage their already large case loads” (p. 10). At least part of the problem is attributable to the level of public funding, which is based on guidelines for B.C.

nursing homes established in 1979. As the Continuing Care review states, "The funding system for Continuing Care contains serious weaknesses" (p. 13) relating to inflexible per diems, lack of consistent coverage for medication and equipment needs, and regional differences.

Yet the problem is not just outdated funding formulae. Facilities are funded on a global basis, which means that they have discretion in how to allocate resources. Per diem grants were not significantly different among the eight study facilities. (We were unable to obtain complete information about property costs and cannot comment on that factor.) Our research suggests that LIRFs devote more of their financial resources to direct care staffing than HIRFs, which may be interpreted as a reflection of organizational priorities.

Willow Home (LIRF) is an example of this prioritizing. During a discussion of staffing levels, the administrator observed, "We are doing very well compared with other facilities. We reduced management positions [in 1990 and in 1999] and dietary positions [in 1997] in order to allocate to direct care instead." Shifting resources was not without ramifications; the administrator also noted that support staff "were feeling threatened and resentful" due to losses in the kitchen. The director of care at Willow echoed the need to focus on direct care. "It's a laughable amount of work," the director said regarding her own workload, yet she intended to take a cut in hours because "I can't see cutting care staff without also cutting my own [position]."

The issues of staffing and job demands go beyond physical workload. In HIRFs, management's failure to acknowledge heavy demands was read by workers as a sign of disrespect, as were low staffing levels themselves. In HIRFs, feeling too rushed to spend quality time with residents was stressful and discouraging. As will be seen below, issues of respect, fairness, and trust also arose while examining the work environment as a whole.

7.3.1 Financial benefits analysis

The findings of a strong relationship between injuries and staffing levels led the research team to conduct a statistical analysis regarding the potential financial benefits of hiring more staff as a means of reducing injuries. The preliminary analysis suggests that savings in direct and indirect compensation costs could offset the expense of additional staff (see Appendix F).This analysis is based on a very small sample. Further research into costs and benefits is warranted and could contribute to a discussion of setting minimum staffing levels.

7.4 Work environment: The interplay of policies, practices, and relationships

In any workplace, the manner in which jobs are designed and work processes are organized may influence the hazards that employees face. Injury risks may be offset by support mechanisms, decision-making and problem-solving approaches, and communication methods, to name a few. The role of organizational culture in safety outcomes is well recognized. Arguably, organizational culture is especially critical in work sites that involve complex human interactions, such as Intermediate Care facilities with their mix of vulnerable elderly people, friends and family members, volunteers, and staff.

Our research found considerable evidence that, in general, the organizational culture of LIRFs had features that tended to promote safer work practices, cooperative working relations, and a positive outlook towards caregiving. The features were multi-faceted and tangible. For

instance, LIRFs were workplaces in which:

- care aides had involvement in resident care planning (care conferencing) and in maintaining ADLs;
- meetings were more likely to be a two-way street between staff and managers, with workers participating, taking initiative to propose agenda items, and believing that their concerns would be addressed;
- staff saw their managers as approachable, good communicators, and likely to try and change things when asked;
- policies on the use of mechanical lifts were well communicated and enforced in a supportive manner;
- more and better mechanical lifts were available and accessible;
- serious incidents of resident aggression tended to be followed up in a visible manner;
- workers saw their managers as generally fair in their dealings with residents and staff: favouritism towards residents was not an issue, nor was blame or distrust of workers;
- resident programming and services were more substantial than at HIRFs; and
- workers reported being "in synch" with the facility's philosophy of care and had a generally positive view of the quality of care being delivered, albeit amid many pressures.

In LIRFs, management's approach to resident care and services appeared to have a correspondingly positive impact on workers' well-being, as expressed in injuries, self-reported pain, burnout, health and job satisfaction. Overall, a picture emerged that suggests links between organizational effectiveness, lower injury rates, and better quality of worklife.

The connection between organizational effectiveness and workers' well-being has surfaced in other studies. NIOSH has recognized that job stress and organizational health are linked; Sauter (1996) observed, "The concept is not simply that these two dimensions – organizational performance and worker well-being – are compatible, but that they are mutually reinforcing" (p. 250). Healthcare studies have established links between employee satisfaction and patient outcomes. This study appears to support the idea that fairness, congruency, and efforts to fulfil the employment "promise" – essentially, creating a match between what a caregiver is expected to provide and what they are able to provide – are associated with safer work environments. Managers, workers, and residents interact in Intermediate Care environments that have spoken and unspoken contracts (promises) about quality care, equitable treatment, compassionate responses, open communication, supportive action, and personal safety. LIRFs appear better able to honour those contracts – to keep the promise – by providing the necessary tools, mechanisms, and supports.

An example of this pact is the involvement of care aides in resident care planning. Among facility personnel, care aides have the most sustained and intimate involvement with residents. The director of care at Willow Home (LIRF) described their role in this manner:

> "The care aide is probably the most important component of the nursing team. Care aides provide the first approach, the first listening, the first contact [with the resident]. How they approach the resident will determine how the resident does throughout the day. A lot depends on whether the care aide is resident focused or task focused."

A care aide at Willow described her role in more heartfelt terms: "Very loving, helping, caring.

You want to treat residents the way you treat your own family. Your approach should be patient, unhurried ... you have to feel that way to do the work – you have to be attached."

Care aides at Willow Home attended care conferences, as did care aides at all other LIRFs. Willow staff also had regular input into care planning, attended ad hoc meetings with family members, and had permanent assignments to residents, which included updating their ADLs. In the Willow focus group, care aides described a procedural change one of them had instigated. She had suggested that the facility wait a week before drawing up the ADLs for new residents, to give them a chance to settle in; the RNs had agreed to this idea. At Elm Home (LIRF), care aides felt able to speak directly to activity workers and the dietician about resident concerns. For example, a care aide at Elm had learned that a resident liked pets, so she suggested that the activity workers start a pet program. Another care aide discovered that a resident was Catholic and arranged for a priest to visit her.

These are examples of management tapping into care aides' knowledge both in a structured manner (at care conferences) and by encouraging initiative and interaction among the whole care team – all in the service of benefiting residents. Indeed, administrators and directors of care at Willow and Elm had high expectations of their staff *and* gave them numerous avenues of input and support. Support in LIRFs manifested in many forms, from following up on incidents of resident aggression to dealing promptly when an unsafe working condition was reported. (The Joint Health and Safety Committee at Elm was not especially effective largely because informal ways of dealing with problems worked well – i.e., staff talked directly to the administrator, who tended to act on their concerns.) Input at LIRFs also took many forms, from formal roles in care conferencing, to more participation in staff meetings, to reporting a greater sense of choice and discretion in dealings with residents.

Managers and workers in LIRFs tended to be more trusting of one another, which could be seen as an extension of the trust and fairness built into work processes. Workers also had a more favourable view of the facility's philosophy of care, unlike workers in HIRFs who often were quite cynical.

7.4.1 Philosophy of care

This research suggests that formal training and formal communications (e.g., workshops) are neither sufficient nor even necessary to embed a philosophy of care in a facility. Only two study facilities (one LIRF, one HIRF) had consciously embraced a particular approach – Gentle Care (GC) – whereas others had drawn from eclectic sources (GC, the "Eden" model, etc.). More important factors seemed to be consistent and respectful practices and relationships, and a striving for high standards of care that did not pit residents and their needs against workers and their needs. LIRFs tended to have a consistency between how management expected their workers to relate to residents and how management related to workers. Further, managers in LIRFs tended to see front-line staff as *the means* by which they would achieve their objectives as care providers, hence the framework of more open channels of communication, more respectful interactions, and more substantial resources.

A theme repeated at several study facilities, by many different participants, was the challenge for care aides and LPNs to be less task oriented and more process oriented – i.e., to work *with* the

individual resident, rather than to simply perform task after task. This is not a simple issue. Some older care aides, after years of working in traditional nursing homes with strict lines of authority, may be unaccustomed and unwilling to take on the decision-making role implicit in process-oriented care. Other workers find themselves in situations where the message about being non-task oriented is at odds with reality, especially when staffing levels are inadequate or other personnel (RNs and food services, notably) are unprepared to support this flexibility.

Care aides at Juniper Home (HIRF) spoke about the challenges. Flexibility, they said, means constant juggling. "We're circus performers cum care aides cum psychologists," said one worker. Another talked about the unpredictable nature of the workload due to resident choices. "Your stress level in the morning can be very high," she said. "It's like hitting all the green lights on the way to work one day, and all the red lights the next." In short, managers cannot expect their workers to be resident-focused without providing mechanisms for facility-wide coordination and cooperation. At Willow Home (LIRF), where care aides and LPNs reported a good degree of flexibility, the floor teams were a multidisciplinary group consisting of care aides, LPNs, RNs, and therapeutic, recreation, and housekeeping staff.

7.4.2 Resources for residents

In general, LIRFs offered their residents somewhat better programming than HIRFs. Two facilities in particular, Elm and Willow, did a very good job of providing in-house programming and of tapping into community resources. Elm Home was part of a network of seniors' services and housing, and enjoyed proximity to a seniors' centre. Elderly volunteers from the centre, for example, helped with Elm's walking program by accompanying residents around the corridors. Willow Home had established a charitable foundation to raise funds for a variety of resident aids and services, including:

- increased medical coordinator hours;
- pharmacist services;
- purchases of mechanical lifts, bath tubs, electric beds, and transfer belts;
- enhanced security system (portable companion phones);
- therapeutic programming (music, horticultural, and walking);
- physiotherapist services;
- 20 hours a week of pastoral care; and
- dementia training for staff.

Both Willow and Elm had active boards of directors and vital community connections, which contributed to their abilities to provide this enhanced programming. "[The board] keeps me on my toes," said the administrator at Willow Home. "There's an expectation that anything presented to the board will include how it benefits residents."

7.4.3 The importance of Special Care Units

Gerontology experts recognize that dedicated Special Care Units (SCU) for people with advanced dementia are valuable to a facility as a whole. The specialized features of such units – relating to physical safety, stimulation, programming, and staffing levels – have benefits for residents and staff both within and outside the SCU. People with advanced dementia may have greater tolerance for each other's behaviour; they may, for example, have lost their sense of "ownership" and be relatively unconcerned about personal belongings. In contrast, non-dementia

residents may be very disturbed if someone repeatedly wanders into their room; hence the importance of keeping the two groups apart. Residents with advanced dementia often require a great deal of re-directing and intervening by staff. If this results in non-dementia residents receiving little attention or rushed treatment, they too may become agitated or aggressive. Basically, the presence of a well-staffed SCU will theoretically offer all IC residents an environment and level of attention appropriate to their needs, while the lack of an SCU may cause disruptions, stress, and work pressures that are upsetting to everyone (Maureen Hogg, RN Community Assessor, Mount St. Joseph Short Stay Assessment and Treatment Centre, interview May 2001).

Six of the eight study facilities had SCUs. The two facilities without SCUs had the highest injury rates in the study. (It is important to bear in mind that, although the dependency of residents in SCUs was greater than non-SCU residents, the average dependency of all residents was similar across all facilities. In other words, the lack of an SCU was not a reflection of lower resident needs). In the case of one facility (Alder Home), the physical shape of the building made the creation of an SCU difficult. Management at Alder Home attempted to deal with the situation in a few ways. Alder would not admit people who were at risk of elopement, special programming was offered for the residents with advanced dementia, and a separate, "quiet" dining room had recently been constructed for them. The other non-SCU facility, Sumac Home, did not report any such accommodations. Rather, the facility had constructed a new wing in the late 1990s, largely for private-pay residents.

In the other six facilities, all the SCUs had significantly better staffing levels than regular units. Managers clearly recognized the greater dependency of SCU residents and set the resident-to-worker ratio accordingly. The study found that the injury rate in a facility's SCU was higher than the rate in the same facility's regular units – in some cases considerably higher although it was not possible to test the statistical significance (see section 6.1.3.6 in Findings). SCUs are clearly risky places for workers, and the lack of an SCU appears to heighten the risk considerably.

7.4.4 Resident aggression – incidence and aftermath

The impetus for this project derived, in part, from a study of resident aggression in B.C.'s residential care facilities (Boyd, 1998). Our research examined the issue from several angles. The telephone survey asked care aides/LPNs about the frequency of abusive incidents (verbal and physical), their training around dementia, incident reports and follow-up, and their beliefs about vulnerability to aggression. Interviews and focus groups explored policies, practices, and perceptions with managers, RNs, and front-line staff.

The data were not especially informative regarding differences between LIRFs and HIRFs. There were no significant findings around the percentage of reported aggression-related incidents and time-loss claims. The telephone survey responses showed that 75.5% of HIRF workers experienced one or more incidents of physical abuse in the previous month compared with 68% of LIRF workers. Although these figures show that workers face considerable exposure to abuse, there was no significant statistical difference between HIRFs and LIRFs.

A real difference, however, did lie in how facilities dealt with incidents. In general, managers in LIRFs kept their workers better informed about a resident's history of aggression and responded

in more visible and supportive ways to serious incidents (e.g., arranging follow-up with a mental health team, or using an in-house tracking system). Workers in HIRFs, in contrast, often reported feeling blamed for incidents and unaware of any follow-up. Care aides at Juniper Home (HIRF) described the dynamic with the former management. "You can't defend yourself if a resident strikes you," said one worker. "It isn't fair – even if you automatically defend yourself or hit the person back, you're *fired*. But you're only human, you can't always control your reaction. You have feelings." Another care aide said, "When you get hurt, you're told it's part of the job – yet there are no consequences for the [aggressive] resident." Still another said, "You're on your own."

Workers in all facilities questioned the idea of filling out an incident report for every occasion – it wasn't considered realistic or useful. But they did want information, follow-up, acknowledgement, and a caring response, and these were generally available to workers in LIRFs.

7.4.5 Training and education

Although training was cited as a useful preventive measure in every facility, by managers and workers alike, we are unable to make firm statements about the roles that education and training play in injury rates in these eight study facilities. (Nor is the literature on the subject clear regarding body mechanics training and injury prevention.) For example, about 90% of care aides/LPNs in the telephone survey had been trained in the use of mechanical lifts. Most workers in LIRFs and HIRFs had received training to work with dementia, though they tended to acquire the training from different sources: LIRFs were more likely to provide some dementia training for their workers (63% of LIRF respondents vs. 45% of HIRF), whereas HIRF workers were more likely to have received it as part of their formal education (47% of LIRF respondents vs. 64% of HIRF).

All parties, from administrators to front-line staff, agreed that continuous training around safe working practices would be valuable. The most desirable training would use skilled trainers (whether in-house, peer, or expert), be hands-on (practical rather than simply theoretical or in pamphlet form), reinforced at least annually, and available to all workers (wage replacement would help to ensure this, or at least scheduling training to overlap day and afternoon shifts – e.g., 2:00 pm to 3:00 pm). Some facilities noted the value of physio- and occupational therapists, not only in maintaining and restoring residents' capabilities, but in instructing staff in safe and appropriate ways of working.

One LIRF offered an example of an innovative and apparently effective approach to safety training. Cherry Home (LIRF) adopted a "train the trainer" program for MSI prevention, in which a core group of care aides and RNs were trained by the regional physiotherapist; Cherry Home was amalgamated with the local hospital, and thus had access to a staff physiotherapist. The director of care formed the group by inviting participation from individuals who represented a variety of body types (e.g., short, tall) and experiences (e.g., formerly injured, well respected). These volunteers met and decided how they wanted to be compensated for their time, when to train, and what their vision/approach would be for the program. The group trained with the physiotherapist for six months; thereafter, they trained their co-workers on transferring and lifting techniques, with each worker having at least one mandatory session. Cherry Home had

some difficulties finding staff time for these sessions, but the region eventually reimbursed them for half the training time after seeing the program's effectiveness (the physiotherapist had tracked injuries pre- and post-training).

7.4.6 Safety policies and practices

The study showed a network of correlations between injury rates/well-being and safety policies, practices, attitudes, and resources. The picture that emerges is of LIRFs with somewhat clearer policies (e.g., "no manual lifting"), backed up with better and more numerous resources (e.g., mechanical lifts), more constructive enforcement (e.g., educational in tone), and a work environment that was less rushed (e.g., higher staffing levels) and more flexible (e.g., discretion about working with residents and more likelihood that management and RNs would support those choices). The study suggests that neither policies nor equipment alone are sufficient to promote safe working habits. A "safety environment" is just that: a complex set of interrelated conditions and values.

The ergonomists in the study observed that the use of mechanical lifts was minimal in all study facilities and was inconsistent among care aides in the same facility. Participants in focus groups and interviews tended to agree that compliance with no-lifting policies was spotty. Nevertheless, LIRFs appeared to be managing the challenge more effectively with a combination of better resources, more consistent reinforcement, and better staffing.

7.4.7 The impact of ownership and governance status

The study examined the governance and ownership status of the study facilities to determine whether these factors played a role in injury rates. The eight study facilities represented a mix. Four were stand-alone non-profit facilities, owned and operated by charitable organizations, with a variety of founders (e.g., a church, a service club, etc.). Two other facilities had originally been independent non-profits and were now amalgamated with the regional health authority and administered by the local hospital. One facility was a for-profit facility owned by a national corporate chain. The eighth facility had been a non-profit until the mid 1990s, when licensing board problems led to it becoming a public-private partnership. These last two facilities – Poplar Home and Sumac Home – were HIRFs.

Administrators in all eight facilities were asked about the role of boards and owners in fundraising, planning, and budgeting. We were interested in whether injury rates were associated with a facility's ability and practices regarding investments in equipment and aids, capital improvements, and staff training. Administrators and directors of care were also asked about relationships with regional personnel and programs (e.g., mental health teams, continuing care assesors, training programs). Among other things, we wondered if injury rates were associated with these connections or lack thereof, and whether governance and ownership were influential.

As Section 6.2.5. in Findings shows, there were no clear patterns between LIRFs and HIRFs regarding these matters. (It is important to note that the budgeting category, CR1, encompassed capital, training, and equipment expenditures in the last three years, and that the differences in mechanical lift resources did not stand out.) However, a number of noteworthy issues did arise concerning the mix of private and public beds in a single facility.

Mixing private and public: Two study facilities (Poplar and Sumac) had both private-pay and publicly subsidized beds. In both facilities, managers and front-line staff said that they treated private-pay and subsidized residents the same regarding quality of care, services, and access to programming. Nevertheless, dynamics between residents and staff may arise in mixed settings. For example, care aides in Poplar Home (HIRF) said that some private-pay residents feel they should be getting better care than other residents and will sometimes pressure staff to give them "special attention." The administrator at Poplar acknowledged that residents who pay thousands of dollars per month can have different expectations than others.

Another issue concerned the negative effects of low demand for private beds, a situation faced by Poplar Home. The facility had ongoing difficulties filling its private-pay beds and then keeping them filled. Poplar had a high turnover of short-term private-pay residents, placed by families who were, in the words of the administrator, "at the end of their rope" for a bed but unable to sustain the monthly fees. The family would move their relative out as soon as a subsidized bed became available. This high turnover meant that nursing staff were constantly dealing with new residents, many of whom were arriving from stressful situations and not staying long enough to acclimatize to their new home. Poplar's administrator estimated that, in the year 2001, 45% to 65% of the private-pay beds were temporary placements of 3 to 12 months' duration.

Another effect of the vacancy problem was that the facility was actively soliciting subsidized placements. "We're looking for more business [from the health authority]," said Poplar's administrator. These placements were also temporary: from two days to three months but often only a week, according to Poplar's director of care. The facility, she said, was helping to relieve regional pressures created by early hospital discharges. This situation had several repercussions: 1) the director of care was extremely busy soliciting and administering the short-term placements; 2) pre-screening of residents was not possible, and the facility relied exclusively on information from continuing care; 3) placements arose suddenly, which made workload somewhat unpredictable; and 4) continuity of care was difficult because staff were dealing with unfamiliar residents who came and went frequently.

Allocation of resources: Sumac Home (HIRF) was the other study facility with a mix of public and private beds. Sumac Home was a private-public partnership, owned by the municipality and leased to the administrator's private firm. The majority of Sumac's beds were public. The private beds were in a new wing, constructed by the administrator after assuming control of the facility. As mentioned previously, Sumac Home did not have a Special Care Unit despite having residents who would benefit from such a specialized environment. Arguably, a better "investment" in the facility would have been a dedicated SCU rather than a private-pay wing.

Miscellaneous features of private or mixed facilities: In the study, Poplar and Sumac had some features in common, unlike the other study facilities:

- no medical coordinator, at the time of the interviews;
- belated acquisition of mechanical lifts (both had recently made such purchases); and
- little community involvement (i.e., volunteers, programming).

Features of amalgamated facilities: The two amalgamated non-profit facilities, Larch and Cherry, also shared some features. Facility administration was based off-site, and front-line staff

generally regarded senior management as being distant and inaccessible. At Larch Home, care aides observed that "not as much management was happening" compared with before amalgamation, including less communication and "more secrecy." Staff morale had declined among care aides. People had a sense that promised improvements had not materialized and uncertainty had increased. The RNs, in contrast, believed the amalgamation had improved access to resident services, and they were simultaneously proud to be part of a hospital and worried about "being too small."

Cherry Home presented a different picture, yet with related themes. "The administration is not really part of the chain of command you would take your concerns to," said a care aide. "We have no idea who our bosses are – our managers are spread across too many facilities," said another. Staff morale had suffered because of amalgamation. In part the problem related to identity – not wanting to attend amalgamated staff parties or do gift exchanges. Staff also had a sense that, overall, management and supervision had deteriorated, as had the building's upkeep, equipment, and supplies.

7.5 A conceptual framework

This research has given rise to a conceptual framework that encapsulates our understanding of what makes some residential care facilities safer and healthier workplaces than others. To begin, it is essential to bear in mind the distinctive qualities of these work sites and, hence, of the work itself.

Each Intermediate Care facility is *a home*: a communal residence in which elderly individuals sleep, bathe, visit, roam, worry, dream, play, quarrel, eat, and sometimes die. These are not ordinary workplaces. Nor are they ordinary healthcare facilities where patients come and go. The work takes place in someone's home, by someone's bed, at someone's dinner table.

Unlike an ordinary home, however, there is loss built into these sites. Residents experience the loss of privacy, personal space, mental and physical abilities, and loved ones. The losses are ongoing. The administrator at Willow Home articulated this when she described the care aide's role:

> "Their role is to recognize that the resident is an individual, a human being with emotions, not "that resident with Parkinson's." And to understand that residents are vulnerable to staff and to their surroundings, and that the residents don't [necessarily] want to be here and are dealing with a tremendous amount of loss."

This is not to say the homes are unfortunate places. It merely recognizes the emotional and spiritual dimensions (and demands) of the workplace. This is not like caring for people who will go home soon or get better.

The work of front-line staff is intimate and personal. They touch, toilet, dress, bathe, and feed residents, each of whom is a unique and changeable human being in the last stages of his or her life. The work is customized. To be done well, it requires compassion and sensitivity as well as skills related to geriatric conditions. In particular, residents with dementia must be approached with sensitivity and flexibility. A nursing home does not lend itself to industrial organization or to cookie-cutter work processes.

The customized quality of the work is recognized by the sector, at least in theory. British Columbia has acknowledged the trend to replace the old-style institutional model of long term care with more home-like, personalized, and flexible environments. Maxims about honouring the dignity and uniqueness of each resident are well established. Also entering the lexicon are ideas about how workers should conduct themselves vis à vis residents. Of particular importance is the idea of being resident-oriented, rather than task-oriented. It isn't *what* you do, it is *how* you interact. A staff person doesn't merely do the work, he or she is expected to do it in a manner that respects individual preferences, acknowledges personal space, encourages the capacity for self care, and stays alert to changing needs, moods, and abilities from hour to hour, day to day.

This study shows that managers who view their front-line staff as key members of the team that delivers this model of care – i.e., who see their workers as responsible and capable – are likely to have practices and policies that promote a safer work environment, cooperative relations, and a positive outlook on caregiving. The key ingredients in such workplaces are (in no particular order – these factors are inter-related):

1. An engaged environment
2. A substantive philosophy of care
3. Concrete policies and practices

1. **Engaged environment** means:
multidisciplinary teamwork is cultivated
- feedback and initiative are encouraged, by participatory meetings and by manager responsiveness
- flexibility with residents is supported, by RNs and personnel in other departments
- problems are visibly followed-up

2. **Substantive philosophy of care** means:
- clear and realistic expectations about the model of care
- backed up by training that does not idealize working conditions, but rather works with them
- values are modelled by managers in dealings with staff, in a climate of mutual respect, trust, and fairness

3. **Concrete policies and practices** means:
- policies are clear and visible, e.g., no manual lifting
- policies are consistently monitored and enforced by peers, RNs, and managers
- staffing levels are appropriate
- mechanical lifts are accessible
- programming and services for residents are comprehensive
- training and staff development are ongoing and inclusive

Table 7.5 offers a detailed description of this paradigm, based on findings from this study.

7.5 Conceptual framework:
What makes some facilities safer and healthier workplaces than others?

Observations about high-functioning LIRFs	• teamwork is strong and multi-disciplinary in approach • staff are more likely to take initiative • RNs are more likely to support flexibility and respond to care aides' concerns about residents • in general, problems are visibly followed up by RNs and mgmt. • staff have positive attitude towards challenges of job, rather than cynicism or distrust	• clear and realistic expectations about the philosophy of care: it is a work in progress rather than a *fait accompli* • backed up by explicit training or reinforced by "value messages" that are perceived as trustworthy (i.e., more than rhetorical) • values are modelled by mgmt. In dealings with staff	• clear and visible policies (on use of mechanical lifts, for example) • enforced by whole team: peers, RNs, and mgmt. • appropriate staffing levels (as good as it gets) • sufficient, accessible, and appropriate mechanical lifts • comprehensive programming and services for residents

General ideas	• staff are viewed as agents, as a resource – mgmt. recognizes the centrality of frontline staff to resident care • there is a "respectful hierarchy:" roles are acknowledged, and roles fit together rather than being at odds • people are candid about conflicts and shortcomings; there is little or no structural resentment	• beliefs, goals, projects are real ("mgmt. walks the talk") and realistic (rather than token or idealistic) • the philosophy is actively applied • praxis: the goal is to have a consistent practice of putting beliefs into action	• policies and practices are conspicuous, observable, visible • communicated clearly – staff know what is expected of them, and are supported, instructed, and reminded • "practices" includes material and human resources: staffing levels, mechanical lifts, programming for residents, training for staff, etc.
CONCEPTS	**- Interactional -** **(how people relate)** **ENGAGED ENVIRONMENT**	**- Philosophical -** **(why people do what they do)** **SUBSTANTIVE PHILOSOPHY**	**- Practical -** **(how they do it)** **CONCRETE PRACTICES**

Atmosphere	• respectful, courteous • collaborative (people are brought on side, rather than left feeling outside) • fair-minded, empathetic • mgmt. is accessible • trusting (honest efforts, few charges of "lip service")	• high expectations of self and others • honest about limitations • dynamic (not static, always room for improvement)	• consistent (not haphazard or dependent on individual) • resourceful (tap into existing resources or create opportunities) • practical (material results)
Actions	• exchange information (ask for and give) – consult, communicate • teach (not blame) • support workers, acknowledge demands • involve staff – utilize their skills and	• deliberate implementation or reinforcement of values • consider the big picture (not just little pieces) – work towards comprehensive	• provide human resources, materials, and training • communicate verbally (in person), as often as necessary • reinforce by multiple avenues

	capabilities	changes • try to model values in all settings (between management/staff; between staff/families; between residents/staff)	(on paper, in person, at meetings, etc.) • visible follow-up, tracking, and evaluation are built into actions and policies

7.6 Looking to the future

Although some IC facilities have higher injury rates than others, it is important to reiterate that injury rates are high throughout the residential care sector. Managers in the eight study facilities, irrespective of injury rate, referred to pressures in Intermediate Care that could be influencing this sector-wide problem:

- heavier resident demands in the last decade, especially regarding dementia;
- RN shortages, which affect supervision and reinforcement issues;
- lack of wage replacement funds to ensure continuous and comprehensive safety training;
- scarcity of specialized personnel – e.g., physiotherapists, occupational therapists, nurse educators, assistant directors of care, and rehabilitation aides – to provide services to residents and to help in building a safety culture; and
- low staffing levels, especially in regular units and on night shift.

This study shows that facilities can cultivate organizational cultures that mitigate these pressures. Yet the pressures remain and are likely to increase. The province of British Columbia is moving towards major changes in public access to residential care facilities. The designations Intermediate Care and Extended Care are slated to be eliminated and replaced by a new designation, Complex Care. A new assessment process is being introduced, and only clients with serious needs will be admitted to publicly subsidized beds, namely persons with advanced dementia and those nearing the end of life. In the near future, residential care facilities will become de facto Special Care Units in their entirety.

The significance of this change and its possible impact on staff injuries and quality of worklife cannot be overstated. As discussed earlier, existing SCUs are better staffed than regular units in recognition of the heightened needs of residents with advanced dementia. The research found significantly better staffing levels in SCUs compared with regular units throughout the study facilities. The injury rate within a facility's SCU was higher than the rate within regular units in the same facility, but still lower than the injury rate in facilities with no SCU. Presumably, the extra staffing was preventing the SCU injury rate from rising even higher. The implication is clear: Residential care facilities of the future will need better overall staffing than facilities today.

Section 8. Conclusions and Recommendations

8.1 Preamble

This study makes a unique contribution to the healthcare workplace in part because of its interdisciplinary approach and in part because of its focus on nursing homes. Most studies of organizational culture, particularly in relation to injury outcomes, have dealt with generic dimensions such as "senior management buy-in to health and safety" or "good labour relations climate" in industrial sectors (e.g., Amick, 2002; Hunt et al., 1993; Shannon et al., 1996). These studies were useful because of their large sample sizes and because they forced managers and

policy makers to recognize the importance of organizational-level determinants of injury and well-being. Yet they were general in scope and lacked in-depth exploration of sector-specific features.

This project allowed for a detailed examination of the salient dimensions of work environments in B.C.'s Intermediate Care facilities. The research had several innovative features. Firstly, the examination of organizational culture incorporated issues of fairness and congruency (social justice), which are not usually investigated in work organizational studies but are increasingly recognized as necessary to a meaningful analysis. As well, ergonomists performed quantitative measurements of care aides' physical loads, and these data were then combined with organization-level data. Finally, the findings on organizational culture were linked to unusually accurate and objective injury data.

Among health promotion researchers, an emerging consensus calls for more integrative approaches to work organization, in which workers and managers are jointly involved in creating health-promoting environments. Rising workloads and demands in healthcare have made it more difficult to enact this kind of change. As documented by Lowe (2002), the longer-term benefits of greater staff involvement in workplace planning and quality improvement have been cancelled by the negative impacts of short-term cost-cutting during restructuring and downsizing. Nevertheless, the change-management literature is unequivocal: the enabling conditions for the transformation needed in healthcare settings include teamwork, worker participation, and genuine communication. The recommendations on organizational culture offered in this report are thus consistent with current trends in the occupational health, health promotion, and management literature.

8.2 Recommendations

A. WORKLOAD and JOB DEMANDS

Our findings showed significant relationships between workload, injury rates, and workers' reports of well-being. These relationships were evident in:

- **Staffing levels:** Resident-to-care aide/LPN ratios differed substantially between high and low injury-rate facilities. HIRFs averaged 16:1 residents to staff compared with 12:1 residents to staff at LIRFs (average day shift across all units).
- **Physical workload:** On average, workers in HIRFs had significantly higher cumulative compression on their lower back than workers in LIRFs. This higher spinal compression was also strongly correlated with days lost per FTE and MSI injury rates. Other studies show that this degree of cumulative compression creates a substantial risk of low back pain. Further, HIRF workers showed a trend towards higher peak compression in their lower backs and higher peak activity in their neck/shoulders.
- **Perceptions:** Workers in HIRFs had more negative perceptions of their job demands and workload pressures. They were more likely than other workers to believe that they didn't have enough time to get their work done, to work safely, to find a partner, or to use a mechanical lift. They also reported more pain, more burnout, poorer personal health, and less job satisfaction.

We therefore recommend that the appropriate stakeholder(s):

Rec. A1 Mandate the reporting of staffing levels in residential care facilities
Rationale: Residential care facilities throughout British Columbia appear to receive roughly the same per diem funding, yet care aide/LPN staffing levels vary considerably. These disparities in direct-care staffing are linked to injury rates among workers and to the overall quality of work life.

We recommend that staffing levels be reported and made available in facilities, on an annual basis. This will enable comparisons by family members, residents, managers, health authorities, caregivers, and the community as a whole. Reporting should include a numerical breakdown of direct care, clinical, and support staff levels.

To ensure valid and meaningful comparisons across facilities, we further recommend the adoption of a standardized province-wide method of measuring and reporting staffing levels.

Rec. A2 Examine staffing levels across B.C. and recommend province-wide standards
We recommend that a province-wide committee be struck to examine direct-care and support staffing levels in residential care facilities. The committee would then recommend minimal staffing levels with an aim to reduce injury rates. The cost-benefit analysis proposed in rec. A4 could be useful in determining appropriate levels.

Rec. A3 Redistribute the physical workload of care aides/LPNs to eliminate bottlenecks and to spread demands more evenly
Rationale: In all facilities in this study, front-line staff faced very heavy – and potentially risky – physical demands at particular times of the day. For example, pre-breakfast and pre-lunch were especially intense periods of transferring, dressing, toiletting, and bathing residents, as well as bed making. During these periods, workers showed significantly higher peak loads on their lower backs and necks/shoulders than at other times.

We recommend that facilities make efforts to re-organize work routines, on an interdepartmental basis, so that physical loads and tasks are distributed more evenly within shifts or during the week. For such measures to succeed, we suggest a coordinated approach in which managers, RNs, direct-care staff, and support staff jointly re-examine their practices, needs, and expectations. Recommended approaches include introducing more flexibility into schedules and allowing workers more discretion to determine when and how best to fulfill tasks.

Rec. A4 Research the financial benefits of increased staffing as a means of reducing injury costs
Rationale: Injuries are a serious fiscal drain on the whole residential care sector, regardless of the injury rate in a specific facility. This study demonstrates a strong relationship between staffing levels and injuries, which suggests that increased staffing could lead to reduced injuries. A preliminary analysis also suggests that a financial benefits argument can be made that, at a certain point, investments in staffing may "pay" for themselves in reduced injuries (see Appendix F).

We recommend that research into the costs and benefits of staffing increases be made a priority.

B. WORK ENVIRONMENT

Our findings also showed strong relationships between the overall work environment and workers' injury rates and well-being. These relationships were evident in:

- **Organizational culture:** Facilities with lower injury rates had more visible and consistent practices around information sharing, problem solving, policy dissemination and monitoring, and follow-up to concerns. Workers in LIRFs reported more supportive and trusting relationships between managers and front-line staff. Managers in LIRFs had high expectations of their staff as care providers and backed up those expectations with tangible supports, open communication, and respectful interactions.

- **Safety environment:** Facilities with lower injury rates had more consistent and clear policies/practices regarding resident aggression. The same was true regarding "no manual lift" policies/practices, which were backed up with accessible mechanical lifts. In contrast to HIRFs, workers in LIRFs reported being less worried about getting injured on the job

and believed that their managers had a stronger active commitment to safety. Overall, these same workers reported less pain, less burnout, better health, and more job satisfaction.

• **Organizational effectiveness:** Facilities with lower injury rates showed more capacity to deliver on the promises of their philosophy of care. Front-line staff in LIRFs were more involved in care planning and reported more positive views of the philosophy of care, the overall quality and fairness of service to residents, and their own effectiveness and flexibility as caregivers. In general, LIRFs' programming for residents was better than that of HIRFs (e.g., recreation, rehabilitation, volunteer contacts).

We therefore recommend that the appropriate stakeholder(s):

Rec. B1 Educate all concerned parties in the residential care sector about the connection between organizational culture and staff injuries
Rationale: Managers in LIRFs have leadership styles and practices that try to "bring out the best" in their staff and seem to translate into workers with fewer injuries, less pain and burnout, greater job satisfaction, and more trust. In general, these practices can be characterized as realistic, collaborative, concrete, visible, consistent, and supported by material and human resources.

As a first step in promoting best practices in B.C. facilities, we recommend that the findings of this project be widely disseminated, in person and through various media, to managers, planners, policy makers, health and safety officials and committees, union representatives, conferences, and other interested bodies. This outreach program will help to pave the way for interventions (B2, below). We recommend that the information be framed within the paradigm of "Engaged Environment – Substantive Philosophy – Concrete Practices."

Rec. B2 Create collaborative interventions that support and promote organizational change in designated facilities.
Rationale: Information is not enough. Facilities also need support to implement organizational change. Efforts to re-arrange work routines (e.g., to alleviate workload) or to strengthen communication and teamwork (e.g., to enhance safe practices) are more likely to succeed if the process is:

- intensive (a sustained, face-to-face process within a facility at all levels); and
- collaborative (involving managers, professional, and front-line staff).

After the sectoral groundwork has been laid with recommendation B1, we recommend that interventions be launched. One possible intervention at the regional level would be the formation of a collaborative team that represents all parties (director of care, RN, and care aide) and thus speaks with the authority of practical experience. This team would be supported to develop and deliver workshops that facilitate a process of organizational change based on best practices cited in this report and other sources.

We recommend that such interventions be piloted in a supportive health region, within facilities that have demonstrated an interest in organizational renewal. Regional buy-in will be essential to

the success of interventions, as will piloting and evaluation stages.

C. RESOURCES

The following recommendations are based on injury prevention ideas that emerged repeatedly during interviews and focus groups, and in interviews with experts in geriatric care.

We recommend that the appropriate stakeholder(s):

Rec. C1 Increase the availability of publicly funded physiotherapy and occupational therapy professionals and assistants for seniors in residential care facilities

Rationale: Seniors in residential care facilities often do not have access to public OT/PT services. This lack of rehabilitation hastens the decline of their mobility, muscle tone, confidence, and overall capacity for self-care, all of which increase the demands on, and risks to, front-line staff. Managers see an important role for OT/PT professionals and assistants in prevention and education: helping to sustain residents' strength and flexibility, and advising RNs and care aides about safe ways to work with particular conditions.

We recommend that regional health authorities make stable and sufficient funding available for OT/PT services on-site in residential care facilities, to benefit seniors and staff alike.

Rec. C2 Tangibly support and promote safe practices and policies, such as "no manual lifting"

Rationale: In this study, low injury-rate facilities tended to have "no manual lifting" policies that were clear, widely understood, and reinforced by reminders and advice from managers and RNs. These facilities also had more mechanical lifts per resident *and* lifts that were easier to access. This combination – a clear policy, effectively monitored and tangibly supported – illustrates the triad of policy, relationship, and concrete resources that seems so important to injury prevention.

We recommend that all facilities be encouraged to develop clear policies on safe working practices, such as a "no manual lifting" policy. We further recommend that facilities be supported with necessary material resources, such as:

1) Annual in-house training for care aides/ LPNs, with wage replacement, on safe lifting, transferring, dementia training, and other safety-related subjects.
2) Structural modifications to resident bedrooms and bathrooms to accommodate wheelchairs and mechanical lifts.
3) Funding for sufficient mechanical lift resources to meet the needs of residents, taking into account building layout.

D. ACCOUNTABILITY

The following recommendation arises from two trends in Canadian health care: 1) calls for increased public accountability, and 2) a growing understanding of the relationship between patient outcomes and healthful workplaces.

We recommend that the appropriate stakeholder(s):

Rec. D1 Ensure that factors relating to organizational culture and staffing are included in

accountability processes for residential care facilities and seniors' housing programs
Rationale: Our findings strongly suggest a connection between staffing levels, organizational effectiveness, and quality of work life. This is compatible with research from other jurisdictions on "magnet" hospitals, which attract and retain nursing staff (due to exemplary employment practices and working conditions) *and* have lower patient mortality. In general, connections between resident outcomes and organizational culture are being recognized. A significant body of residential care research has also found links between staffing levels and resident outcomes; in particular, the Health Care Financing Administration of the U.S. Congress has advocated minimal staffing levels on the grounds that "there may be critical ratios of nurses to residents below which nursing home residents are at a substantially increased risk of quality problems" (HCFA, 2000, E.S.7).

A number of provincial and national initiatives are underway to create guidelines for healthful workplaces and to establish standards of care for purposes of licensing and accrediting residential care facilities and assisted living programs.

We recommend that these initiatives include indicators that address the role of appropriate staffing, work processes, and working relationships in creating healthful and high-quality facilities and assisted living environments. These performance indicators would, in effect, offer direction to employers wanting to create quality residences that would also be "workplaces of choice" for nursing and support staff.

Examples of such indicators include:

- the involvement of care aides in care planning and family meetings;
- the use of multiple communication methods to convey and monitor safety policies; and
- the ability of workers to exercise discretion in their dealings with residents.

This research report could be used as a resource in developing indicators for residential care and assisted living.

Appendices

Appendix A: Telephone Survey
Reducing Injuries in Intermediate Care

Employee ID
Length of interview [# of minutes]
Name of interviewer: _____
Name of facility: _____
Today's date:_____
Time survey starts: _____
Introductory blurb
Hello, my name is [_____] and I'm calling about the research project to reduce staff injuries in nursing homes. We sent you a letter recently – do you remember receiving it? The letter explains the project, which is trying to find ways to prevent injuries among Care Aides and LPNs.

I'm a research assistant connected to the University of British Columbia. The idea for this project came from the Hospital Employees' Union, and most of our funding is from the Workers' Compensation Board.

We're phoning every Care Aide and LPN at [*name of facility*], as well as employees at 7 other nursing homes in B.C. We want to ask about working conditions at [*name of facility*] and about your work history. The survey was written by independent researchers – your employer had nothing to do with it.

If you do the survey, your name and information will be kept in the strictest confidence. You won't be identified in any research report; in fact, no individuals will be identified anywhere. The information you share with us will NOT be given to your employer, the union, the WCB, or anyone else.

Also, if you don't want to answer a question, you can say so and we'll just go on to the next one.
The survey takes about 30 minutes. Is this a good time, or would you rather I called back at a better time?
{Schedule new time]

***[If proceeding}* Do you have any questions before we start?**

To begin, I have some questions about your work history.

EMPLOYMENT INFORMATION

e1 Are you: [ ] a Care Aide1 **(89.4%)** or [ ] an LPN2 **(10.6%) [n = 310]**

e2 What year did you first start working as a Care Aide/LPN? _____yr. **[n = 310]**
(fill in year)
(median: 1993; 8 years in occupation)

e3 And what year did you start working as a Care Aide/LPN at [*name of facility*]? **[n = 310]**
_____yr. **(median: 1995; 6 years at facility)**
(fill in year)

e4 At *[name of facility]*, do you work: **[n = 310]**
[ ] full-time regular1 **(45.8%)** [ ] part-time regular2 **(18.1%)** [ ] casual3 **(36.1%)**
[ ] other; please specify:4 _____

e5 *[If regular]* What year did you become a regular employee?
[n = 194]
_____yr. **(median: 1997; 4 years as regular)**
(fill in year)

e6 In the last 4 weeks, what shift or shifts did you usually work? **[n = 310]**
[ ] days only (e.g., 7am–3pm)1**(26.3%)** [ ] afternoons (*aka evenings* – e.g., 3pm–11pm)2**(20.5%)**
[ ] nights only (e.g. 11pm–7am)3**(10.1%)**
[ ] days and afternoons (*evenings*) 4**(16.2%)**
[ ] days and nights5**(8.8%)** [ ] afternoons (*evenings*) and nights6**(2.0%)** [ ] all three7**(7.7%)**
[ ] mornings only [e.g., 6 am –10pm]8**(1.3%)** [ ] afternoons only [e.g., 3p –7pm]9**(0.0%)**
[ ] other; please specify:10 _____ **(7.1%)**

e7 How often do you vary the shift or shifts that you work? *[Do you have a regular rotation of shifts – e.g., a week on days, next week on evenings, then back to days – or does it change all the time?]*
[ ] never1**(41.9%)** [ ] seldom2**(14.8%)** [ ] sometimes3**(13.2%)** [ ] most of the time4**(26.8%)**
[ ] *not applicable*97**(2.6%)** [ ] *don't know* 98**(0.0%)** [ ] *no reply*99**(0.6%) [n = 310]**

e8 In the last year, how many hours **per week** did you work on average at *[name of facility]*?**[n = 310]**
_____hrs.**(median: 36 hours per week)**
(fill in number of hours)
[ ] *not applicable*97**(0.3%)** [ ] *don't know* 98**(4.6%)** [ ] *no reply*99**(0.6%)**

e9 During the last 4 weeks, which unit/floor/wing did you spend **most** of your time on? **[n = 310]**
1. _____
2. _____ *[code 97 if only one unit]*
[ ] many units/everywhere 10 [ ] *not applicable*97

e10 How often do you work with [*other*] casuals? **[n = 310]**
[ ] never1**(3.2%)** [ ] seldom2**(14.8%)** [ ] sometimes3**(45.5%)** [ ] most of the time4**(35.5%)**
[ ] *don't know* 98**(1.0%)** [ ] *no reply*99**(0.0%)**

e11 In last year, has the number of shifts that you work with [*other*] casuals: **[n = 310]**
[ ] decreased a lot1**(1.0%)** [ ] decreased a little2**(5.5%)** [ ] stayed about the same3**(44.8%)**
[ ] increased a little4**(26.8%)** [ ] increased a lot5**(14.8%)**
[ ] *not applicable*97**(1.9%)** [ ] *don't know* 98**(5.2%)** [ ] *no reply*99**(0.0%)**

e12 In the last year, how often have you worked short-staffed – without the full number of employees on shift?
[ ] never1 **(20.6%)** [ ] seldom2**(31.3%)** [ ] sometimes3**(30.6%)** [ ] often4**(14.8%)**

[ ] *not applicable*97 **(0.3%)** [ ] *don't know* 98 **(1.9%)** [ ] *no reply*99 **(0.3%) [n = 310]**
e13 In last year, has the number of shifts that you worked short-staffed: **[n = 310]**
[ ] decreased a lot1 **(2.3%)** [ ] decreased a little2 **(7.7%)** [ ] stayed about the same3 **(53.5%)**
[ ] increased a little4 **(3.5%)** [ ] increased a lot5 **(19.0%)**
[ ] *not applicable*97 **(7.1%)** [ ] *don't know* 98 **(5.8%)** [ ] *no reply*99 **(1.0%)**

e14 In general, how would you describe the quality of care delivered to residents at **[n = 310]**
[*name of facility*]?
[ ] excellent1 **(26.1%)** [ ] very good2 **(36.1%)** [ ] good3 **(23.9%)** [ ] fair4 **(8.1%)**
[ ] poor5 **(4.8%)** [ ] *don't know* 98 **(1.0%)** [ ] *no reply*99 **(0.0%)**

e15 Are you working at another nursing home or another health-care job at this time? **[n = 310]**
[ ] yes1 **(31.3%)** [ ] no2 **(68.4%)** [ ] *no reply*99 **(0.3%)**

e16 [*If yes*] In the last year, how many hours a week on average did you work at this other health-care job?
[n = 100]
_(median: 25 hrs/wk)_hrs. [ ] *don't know* 98 **(5.0%)** [ ] *no reply*99 **(5.0%)**
(open-ended – fill in number of hours)

e17 Are you working at any other paid jobs at this time? **[n = 310]**
[ ] yes1 **(6.5%)** [ ] no2 **(91.9%)** [ ] *not applicable*97 **(0.3)** [ ] *no reply*99 **(1.3%)**

e18 [*If yes*] In the last year, on average how many hours a week did you work elsewhere? **[n = 10]**
(median: 16 hrs/wk) [ ] *don't know* 98 **(10.0%)** [ ] *no reply*99 **(10.0%)**
(open-ended – fill in number of hours)

ORGANIZATIONAL CULTURE and PSYCHO-SOCIAL FACTORS

Now I want you to think about your job at *[name of facility]* in the last year. I'm going to read some statements, and I want you to say whether you disagree or agree with them.

You have 4 choices: you can strongly disagree, or you can just disagree. Or, you can strongly agree or just agree. Here's the first statement:

c1 If you had a friend who needed a job, you would recommend they apply at [*name of facility*].
[ ] strongly disagree1 **(3.2%)** [ ] disagree2 **(9.7%)** [ ] agree3 **(61.0%)** [ ] strongly agree4 **(25.8)**
[ ] *don't know* 98 **(0.0%)** [ ] *no reply*99 **(0.3)**
[n = 310]

c2 In general, your boss is fair to everyone. **[n = 310]**
[ ] strongly disagree1 **(7.7%)** [ ] disagree2 **(35.8%)** [ ] agree3 **(51.6%)** [ ] strongly agree4 **(16.5%)**
[ ] *don't know* 98 **(4.2%)** [ ] *no reply*99 **(1.0%)**

c3 In general, you have enough time to get your work done. **[n = 310]**
[ ] strongly disagree1 **(10.3%)** [ ] disagree2 **(35.8%)** [ ] agree3 **(41.6%)** [ ] strongly agree4 **(11.9%)**
[ ] *don't know* 98 **(0.3%)**

c4 You feel that your job security is good. **[n = 310]**
[ ] strongly disagree1 **(7.4%)** [ ] disagree2 **(26.1%)** [ ] agree3 **(53.2%)** [ ] strongly agree4 **(8.7%)**
[ ] *not applicable*97 **(1.3%)** [ ] *don't know* 98 **(2.9%)** [ ] *no reply*99 **(0.3%)**

c5 In general, you feel appreciated by the family members of residents. *[i.e., respected, treated well, acknowledged when they visit.]* **[n = 310]**
[ ] strongly disagree1 **(0.3%)** [ ] disagree2 **(6.1%)** [ ] agree3 **(62.9%)** [ ] strongly agree4 **(28.7%)**
[ ] *don't know* 98 **(1.9%)**

c6 You are able to make choices about how to take care of residents from day to day. **[n = 310]**
[ ] strongly disagree1 **(3.9%)** [ ] disagree2 **(17.4%)** [ ] agree3 **(61.6%)** [ ] strongly agree4 **(17.1%)**

c7 At *[name of facility]*, employees can count on their union.*[i.e., depend on, get help from]*.**[n = 310]**
[ ] strongly disagree1 **(1.9%)** [ ] disagree2 **(8.1%)** [ ] agree3 **(58.7%)** [ ] strongly agree4 **(18.4%)**
[ ] *don't know* 98 **(12.3%)** [ ] *no reply*99 **(0.6%)**

c8 Care aides and LPNs at [*name of facility*] get along with each other regardless of their racial or ethnic differences. **[n = 310]**
[ ] strongly disagree1 **(5.5%)** [ ] disagree2 **(13.2%)** [ ] agree3 **(58.7%)** [ ] strongly agree4 **(20.3%)**
[ ] *don't know* 98 **(1.3%)** [ ] *no reply*99 **(1.0%)**

c9 If you want to, you can talk to a senior administrator at *[name of facility]*. **[n = 310]**
[ ] strongly disagree1 **(3.2%)** [ ] disagree2 **(8.7%)** [ ] agree3 **(61.6%)** [ ] strongly agree4 **(22.6%)**
[ ] *not applicable*97 **(0.3%)** [ ] *don't know* 98 **(3.5%)**

c10 [*name of facility]* treats some residents better than others. **[n = 310]**
[ ] strongly disagree1 **(17.7%)** [ ] disagree2 **(47.7%)** [ ] agree3 **(22.9%)** [ ] strongly agree4 **(6.1%)**
[ ] *not applicable*97 **(0.3%)** [ ] *don't know* 98 **(4.8%)** [ ] *no reply*99 **(0.3%)**

c11 Your supervisor listens to what you have to say. **[n = 310]**
[ ] strongly disagree1 **(5.2%)** [ ] disagree2 **(14.2%)** [ ] agree3 **(59.0%)** [ ] strongly agree4 **(18.1%)**
[ ] *don't know* 98 **(3.2%)** [ ] *no reply*99 **(0.3%)**

c12 In general, care aides [*and LPNs*] help each other out at [*name of facility]*. **[n = 310]**
[ ] strongly disagree1 **(2.6%)** [ ] disagree2 **(12.9%)** [ ] agree3 **(58.4%)** [ ] strongly agree4 **(23.5%)**
[ ] *don't know* 98 **(2.3%)** [ ] *no reply*99 **(0.3%)**

c13 You have choices about whether or not to do certain tasks, depending on the resident's mood *[like whether to get them out of bed, or dressed*]. **[n = 310]**
[ ] strongly disagree1 **(2.9%)** [ ] disagree2 **(17.1%)** [ ] agree3 **(61.6%)** [ ] strongly agree4 **(16.8%)**
[ ] *not applicable*97 **(0.3%)** [ ] *don't know* 98 **(0.6%)** [ ] *no reply*99 **(0.6%)**

c14 *[Name of facility]* has enough staff to provide residents with good quality care. **[n = 310]**
[ ] strongly disagree1 **(14.5%)** [ ] disagree2 **(40.6%)** [ ] agree3 **(36.8%)** [ ] strongly agree4 **(6.8%)**
[ ] *don't know* 98 **(1.3%)**

c15 There is a lot of cooperation between Care Aides and supervisors. **[n = 310]**
[ ] strongly disagree1 **(4.2%)** [ ] disagree2 **(24.8%)** [ ] agree3 **(58.7%)** [ ] strongly agree4 **(7.4%)**
[ ] *don't know* 98 **(4.5%)** [ ] *no reply*99 **(0.3%)**

c16 If you wanted to take a training course, your employer would support you. **[n = 310]** [*Any course. Support means, for example, that management would let you take time off, would reschedule your shifts ...*]
[ ] strongly disagree1 **(3.9%)** [ ] disagree2 **(12.6%)** [ ] agree3 **(43.5%)** [ ] strongly agree4 **(12.3%)**
[ ] *not applicable*97 **(0.3%)** [ ] *don't know* 98 **(26.8%)** [ ] *no reply*99 **(0.6%)**

c17 *[Name of facility]* does a good job of living up to its philosophy of care. **[n = 310]**
[ ] strongly disagree1 **(2.3%)** [ ] disagree2 **(13.9%)** [ ] agree3 **(66.8%)** [ ] strongly agree4 **(15.2%)**
[ ] *there is no philosophy of care*5 **(0.0%)** [ ] *don't know* 98 **(1.3%)** [ ] *no reply*99 **(0.6%)**

c18 Your supervisor acts fairly when there is conflict between employees. **[n = 310]**
[ ] strongly disagree1 **(6.1%)** [ ] disagree2 **(17.4%)** [ ] agree3 **(46.5%)** [ ] strongly agree4 **(11.6%)**
[ ] *don't know* 98 **(18.4%)**

c19 When you need help with a resident, you can ask a co-worker for assistance. **[n = 310]**
[ ] strongly disagree$_1$ **(0.3%)** [ ] disagree$_2$ **(2.3%)** [ ] agree$_3$ **(59.0%)** [ ] strongly agree$_4$ **(38.4%)**

c20 If a family member complains about the care of their relative, your supervisor will listen to your side of the story. **[n = 310]**
[ ] strongly disagree$_1$ **(2.9%)** [ ] disagree$_2$ **(8.1%)** [ ] agree$_3$ **(61.6%)** [ ] strongly agree$_4$ **(14.8%)**
[ ] *don't know* $_{98}$ **(12.3%)** [ ] *no reply*$_{99}$ **(0.3%)**

c21 *[Name of facility]* involves employees in planning and decision making. **[n = 310]**
[ ] strongly disagree$_1$ **(3.9%)** [ ] disagree$_2$ **(23.5%)** [ ] agree$_3$ **(54.5%)** [ ] strongly agree$_4$ **(8.1%)**
[ ] *don't know* $_{98}$ **(9.4%)** [ ] *no reply*$_{99}$ **(0.6%)**

c22 When you are concerned about a resident's health or behaviour, you feel comfortable telling your supervisor. **[n = 310]**
[ ] strongly disagree$_1$ **(1.6%)** [ ] disagree$_2$ **(3.2%)** [ ] agree$_3$ **(65.8%)** [ ] strongly agree$_4$ **(29.4%)**

c23 If you had a safety concern, you would feel comfortable telling your union representative about it. **[n = 310]**
[ ] strongly disagree$_1$ **(0.6%)** [ ] disagree$_2$ **(2.3%)** [ ] agree$_3$ **(61.9%)** [ ] strongly agree$_4$ **(30.0%)**
[ ] *don't know* $_{98}$ **(4.5%)** [ ] *no reply*$_{99}$ **(0.6%)**

c24 If you need to change your shift or schedule, your supervisor will try to accommodate you.**[n = 310]**
[ ] strongly disagree$_1$ **(1.6%)** [ ] disagree$_2$ **(14.5%)** [ ] agree$_3$ **(57.1%)** [ ] strongly agree$_4$ **(15.5%)**
[ ] *not applicable*$_{97}$ **(4.2%)** [ ] *don't know* $_{98}$ **(6.5%)** [ ] *no reply*$_{99}$ **(0.6%)**

c25 Your residents have higher care needs than others at *[name of facility]* because of their **physical** frailty. **[n = 310]**
[ ] strongly disagree$_1$ **(1.0%)** [ ] disagree$_2$ **(25.8%)** [ ] agree$_3$ **(51.6%)** [ ] strongly agree$_4$ **(13.5%)**
[ ] *not applicable*$_{97}$ **(3.2%)** [ ] *don't know* $_{98}$ **(3.2%)** [ ] *no reply*$_{99}$ **(1.6%)**

c26 Your residents have higher care needs than others at *[name of facility]* because of their **mental** frailty.
[ ] strongly disagree$_1$ **(0.6%)** [ ] disagree$_2$ **(24.8%)** [ ] agree$_3$ **(47.4%)** [ ] strongly agree$_4$ **(18.7%)**
[ ] *not applicable*$_{97}$ **(3.2%)** [ ] *don't know* $_{98}$ **(3.5%)** [ ] *no reply*$_{99}$ **(1.6%)**
[n = 310]

c27 Employees can express their opinions at staff meetings. *[i.e., they can if they want to.]* **[n = 310]**
[ ] strongly disagree$_1$ **(2.3%)** [ ] disagree$_2$ **(7.4%)** [ ] agree$_3$ **(63.9%)** [ ] strongly agree$_4$ **(19.7%)**
[ ] *not applicable*$_{97}$ **(0.3%)** [ ] *don't know* $_{98}$ **(6.1%)** [ ] *no reply*$_{99}$ **(0.3%)**

c28. If you ask for a special leave, it's not hard to get one. ***[Note:** Do not ask casuals ; code as 97.]*
[ ] strongly disagree$_1$ **(2.6%)** [ ] disagree$_2$ **(14.2%)** [ ] agree$_3$ **(34.5%)** [ ] strongly agree$_4$ **(8.7%)**
[ ] *not applicable*$_{97}$ **(31.9%)** [ ] *don't know* $_{98}$ **(7.7%)** [ ] *no reply*$_{99}$ **(0.3%)**
[n = 310]

c29 You are told about changes that directly affect your job. [*e.g., when equipment is broken, or about a new policy, or a new supervisor...*] **[n = 310]**
[ ] strongly disagree$_1$ **(4.2%)** [ ] disagree$_2$ **(18.4%)** [ ] agree$_3$ **(63.2%)** [ ] strongly agree$_4$ **(11.0%)**
[ ] *don't know* $_{98}$ **(1.6%)** [ ] *no reply*$_{99}$ **(1.6%)**

c30 *[Name of facility]* lets you choose the shift that works best for you. **[n = 310]**
[ ] strongly disagree$_1$ **(13.9%)** [ ] disagree$_2$ **(35.5%)** [ ] agree$_3$ **(28.1%)** [ ] strongly agree$_4$ **(6.1%)**
[ ] *not applicable*$_{97}$ **(13.9%)** [ ] *don't know* $_{98}$ **(2.6%)**

WORKING with RESIDENTS Who May Become ABUSIVE or AGGRESSIVE

Now we're going to change the subject. I'm going to ask some questions about working with residents who may become abusive or frightening towards you.

First, I want you to think about VERBAL incidents, like when a resident swears at you, or yells, makes a threat, or says a nasty personal remark.

How many times have you experienced a verbal incident like that with a resident **[n = 310]**

a1 • in the last week?

A1 - recoded

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1 never	96	17.1	31.0	31.0
	2 1 or 2	81	14.5	26.1	57.1
	3 3 to 10	82	14.6	26.5	83.5
	4 more than 10	30	5.4	9.7	93.2
	97 not applicable	15	2.7	4.8	98.1
	98 don't know	3	.5	1.0	99.0
	99 no reply	3	.5	1.0	100.0
	Total	310	55.4	100.0	
Missing	System	250	44.6		
Total		560	100.0		

a2 • in the last 4 weeks? **[n = 310]**

A2 - recoded

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1.00 never	57	10.2	18.4	18.4
	2.00 1 or 2	51	9.1	16.5	34.8
	3.00 3 to 10	79	14.1	25.5	60.3
	4.00 more than 10	96	17.1	31.0	91.3
	97.00 not applicable	15	2.7	4.8	96.1
	98.00 don't know	8	1.4	2.6	98.7
	99.00 no reply	4	.7	1.3	100.0
	Total	310	55.4	100.0	
Missing	System	250	44.6		
Total		560	100.0		

Now I want you to think about PHYSICAL experiences, like when a residents hits at you, or grabs, kicks, bites, scratches, or throws something, or is sexually inappropriate – including when they JUST TRY these things, too.

How many times have you experienced a physical act like that with a resident **[n = 310]**
a3 • in the last week?

A3 - recoded

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1 never	147	26.3	47.4	47.4
	2 1 or 2	75	13.4	24.2	71.6
	3 3 to 10	56	10.0	18.1	89.7
	4 more than 10	13	2.3	4.2	93.9
	97 not applicable	15	2.7	4.8	98.7
	98 don't know	1	.2	.3	99.0
	99 no reply	3	.5	1.0	100.0
	Total	310	55.4	100.0	
Missing	System	250	44.6		
Total		560	100.0		

a4 • in the last 4 weeks? **[n = 310]**

A4 - recoded

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1.00 never	85	15.2	27.4	27.4
	2.00 1 or 2	75	13.4	24.2	51.6
	3.00 3 to 10	80	14.3	25.8	77.4
	4.00 more than 10	51	9.1	16.5	93.9
	97.00 not applicable	15	2.7	4.8	98.7
	98.00 don't know	1	.2	.3	99.0
	99.00 no reply	3	.5	1.0	100.0
	Total	310	55.4	100.0	
Missing	System	250	44.6		
Total		560	100.0		

a5 • How often do you think these kinds of verbal and physical incidents are related to your race or ethnicity [*i.e., do you experience abuse that feels racist in nature*]? **[n = 310]**

[ ] never[1] **(61.3%)** [ ] seldom[2] **(17.4%)** [ ] sometimes[3] **(12.6%)** [ ] often[4] (**4.2%)**
[ ] *not applicable*[97] **(2.6%)** [ ] *don't know* [98] **(1.6%)** [ ] *no reply*[99] **(0.3%)**

a6 • Do you worry about being blamed if a resident has been abusive towards you? **[n = 310]**

[ ] never[1] **(59.4%)** [ ] seldom[2] **(10.3%)** [ ] sometimes[3] **(22.9%)** [ ] often[4] **(6.1%)**
[ ] *not applicable*[97] **(0.3%)** [ ] *don't know* [98] **(1.0%)**

Now I'm going to read you some statements, and I want you to say if the statement is true. You have four choices: It can be never true; seldom true; sometimes true, or true most of the time or often. Okay? Here's the first statement:

a7 • You are told when a **new** resident has a history of being aggressive or abusive.(*i.e., they are identified to you*)

[n = 310]

[ ] never[1] **(4.2%)** [ ] seldom[2] **(8.7%)** [ ] sometimes[3] **(22.9%)** [ ] most of the time[4] **(63.5%)**
[ ] *don't know* [98] **(0.6%)**

a8 • You worry about being wrongly accused of injuring a resident. **[n = 310]**

[ ] never[1] **(47.1%)** [ ] seldom[2] **(17.4%)** [ ] sometimes[3] **(25.8%)** [ ] often[4] **(9.0%)**
[ ] *don't know* [98] **(0.6%)**

a9 • You are told when an abusive incident occurs just before your shift. **[n = 310]**

[ ] never[1] **(5.2%)** [ ] seldom[2] **(8.4%)** [ ] sometimes[3] **(20.6%)** [ ] most of the time[4] **(64.8%)**
[ ] *don't know* [98] **(0.6%)** [ ] *no reply*[99] **(0.3%)**

a10 • You are confident in your ability to work safely when a resident is being physically aggressive *[like when they pinch, spit, slap, bite, etc.*) **[n = 310]**

[ ] never[1] **(3.2%)** [ ] seldom[2] **(8.4%)** [ ] sometimes[3] **(25.5%)** [ ] most of the time[4] **(62.6%)**
[ ] *don't know* [98] **(0.3%)**

a11 • You worry about accidentally hurting a resident when you are trying to avoid being hurt by *them.*

[ ] never[1] **(20.6%)** [ ] seldom[2] **(15.8%)** [ ] sometimes[3] **(40.3%)** [ ] often[4] **(21.9%)**
[ ] *not applicable*[97] **(0.3%)** [ ] *don't know* [98] **(1.0%)**

[n = 310]

a12 • There are residents in your facility who should live somewhere else because their mental health needs are too great.

[ ] never[1] **(9.7%)** [ ] seldom[2] **(15.8%)** [ ] sometimes[3] **(44.5%)** [ ] most of the time[4] **(28.7%)**
[ ] *don't know* [98] **(1.3%)**

[n = 310]

a13 • You are told when a resident has a new illness (such as a urinary tract infection) or when their chronic condition takes a turn for the worse.

[ ] never[1] **(1.0%)** [ ] seldom[2] **(5.2%)** [ ] sometimes[3] **(17.7%)** [ ] most of the time[4] **(75.8%)**
[ ] *don't know* [98] **(0.3%)**

[n = 310]

Now I want you to think again about when a resident may be physically or verbally abusive.

a14 • Do you know your facility's policy for reporting aggressive or abusive behaviour? **[n = 310]**
[ ] yes[1] **(86.8%)** [ ] some[2] **(7.4%)** [ ] no[3] **(5.5%)** [ ] *no reply*[99] **(0.3%)**

a15 • *[If yes or some]* How often does your supervisor follow that policy? **[n = 310]**
[ ] never[1] **(1.6%)** [ ] seldom[2] **(6.8%)** [ ] sometimes[3] **(12.3%)** [ ] most of the time[4] **(60.3%)**
[ ] *not applicable*[97] **(6.5%)** [ ] *don't know* [98] **(12.3%)** [ ] *no reply*[99] **(0.3%)**

a16 • If *you* don't follow the policy, does your supervisor remind you? **[n = 310]**
[ ] never[1] **(11.0%)** [ ] seldom[2] **(6.8%)** [ ] sometimes[3] **(14.5%)** [ ] most of the time[4] **(51.0%)**
[ ] *not applicable*[97] **(7.7%)** [ ] *don't know* [98] **(8.4%)** [ ] *no reply*[99] **(0.6%)**

a17 • How often do you report when a resident has been verbally or physically aggressive? **[n = 310]**
[ ] never[1] **(1.6%)** [ ] seldom[2] **(7.4%)** [ ] sometimes[3] **(12.9%)** [ ] most of the time[4] **(75.5%)**
[ ] *not applicable*[97] **(1.9%)** [ ] *don't know* [98] **(0.3%** [ ] *no reply*[99] **(0.3%)**

a18 • {*If never or seldom]* If you don't usually report these incidents, why is this? [*Major reason , or most common reason only. Respondent volunteers answer; prompt only if necessary]* **[n = 310]**

Reason for not reporting abusive incidents

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	incident report too long	3	.5	1.0	1.0
	no follow-up so why bother	4	.7	1.3	2.3
	incidents too frequent	8	1.4	2.6	4.8
	don't have time	2	.4	.6	5.5
	resident didn't mean anything by it	13	2.3	4.2	9.7
	not applicable	276	49.3	89.0	98.7
	no reply	4	.7	1.3	100.0
	Total	310	55.4	100.0	
Missing	System	250	44.6		
Total		560	100.0		

Now I want you to think about the training you've had for working with elderly people.

a19 • **[*Ask Care Aides only*]** Have you completed a recognized Care Aide program or equivalent? *[like the Long Term Care Aide or Residential Care Aide program offered at colleges.]* **[n = 310]**
[ ] yes[1] **(81.6%)** [ ] no[2] **(7.7%)** [ ] *not applicable*[97] **(1.9%)** [ ] *no reply*[99] **(8.7%)**

a20 • *[If yes]* What year did you complete the Care Aide program? __**(median: 1993)**_yr. **[n = 253]**
[ ] *no reply*[99] **(0.4%)** *[fill in year]*

a21 • *[If yes]* Did you take it at a community college [*public*] or at a private college/school?
[ ] public community college[1] **(59.8%)** [ ] private [2] **(39.0%)** **[n = 253]**
[ ] *don't know* [98] **(0.8%)** [ ] *no reply*[99] **(0.4%)**

a22 • ***[Ask Care Aides and LPNs]*** Have you had any other training for working with people with dementia and Alzheimer's disease? *[since your Care Aide or LPN program.]*

[n = 310]

[ ] yes[1] **(61.3%)** [ ] no[2] **(38.4%)** [ ] *don't know*[98] **(0.0%)** [ ] *no reply*[99] **(0.3%)**

a23 • [*If trained*] What year did you most recently get this training? **[n = 194]**

(*for residents with dementia, etc.*) __**(median: 2000)**__yrs

[ ] *don't know* [98] **(0.5%)** [ ] *no reply*[99] **(2.1%)**

a24 • Were you trained in ways to reduce your **own** risk of injury? *[like recognizing when a resident could strike out, or leaving them alone if they're agitated.)*

[n = 310]

[ ] yes[1] **(48.7%)** [ ] no[2] **(22.9%)** [ ] *not applicable*[97] **(26.5%)** [ ] *don't know* [98] **(1.0%)**

[ ] *no reply*[99] **(1.0%)**

a25 • Did this training help you to work more safely with residents? **[n = 310]**

[ ] no[1] **(2.9%)** [ ] a little[2] **(11.0%)** [ ] quite a lot[3] **(21.0%)** [ ] a lot[4] **(36.5%)**

[ ] *not applicable*[97] **(27.1%)** [ ] *don't know* [98] **(0.3%)** [ ] *no reply*[99] **(1.3%)**

a26 • If you were the victim of an abusive or frightening incident, who would you go to for support at work? *{Respondent volunteers answer; prompt only if necessary*] **[n = 310]**

If victim of an abusive situation at work, who do you get support from?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	supervisor	68	12.1	21.9	21.9
	RN team leader	174	31.1	56.1	78.1
	shop steward	9	1.6	2.9	81.0
	co-worker	55	9.8	17.7	98.7
	not applicable	1	.2	.3	99.0
	don't know	2	.4	.6	99.7
	no reply	1	.2	.3	100.0
	Total	310	55.4	100.0	
Missing	System	250	44.6		
Total		560	100.0		

SAFETY ENVIRONMENT

Now I want to ask you some questions about safety and other working conditions at [*name of facility*]. Thinking back over the last year, please say whether you disagree or agree with the following statements. As usual, you have 4 choices: you strongly disagree; you just disagree; You strongly agree; or you just agree.

Here's the first statement:

s1 • [*Name of facility*] invests time and money to improve safety for employees. **[n = 310]**
[ ] strongly disagree[1] **(5.5%)** [ ] disagree[2] **(19.4%)** [ ] agree[3] **(54.2%)** [ ] strongly agree[4] **(13.5%)**
[ ] *don't know* [98] **(7.4%)**

s2 • If you had a problem with working conditions, you could talk to your shop steward about it.**[n = 310]**
[ ] strongly disagree[1] **(0.3%)** [ ] disagree[2] (**3.9%)** [ ] agree[3] (**62.6%)** [ ] strongly agree[4] **(30.6%)**
[ ] *don't know* [98] **(1.9%)** [ ] *no reply*[99] **(0.6%)**

s3 • Top managers at [*name of facility*] are actively involved in health and safety programs.**[n = 310]**
[ ] strongly disagree[1] **(1.6%)** [ ] disagree[2] **(14.5%)** [ ] agree[3] **(58.4%)** [ ] strongly agree[4] **(12.6%)**
[ ] *don't know* [98] **(12.9%)**

s4 • You have the same workload as other care aides at *[name of facility]. [i.e., you are* **assigned** *the same workload as others.]*
[n = 310]
[ ] strongly disagree[1] **(3.9%)** [ ] disagree[2] **(23.9%)** [ ] agree[3] **(57.7%)** [ ] strongly agree[4] **(11.9%)**
[ ] *don't know* [98] **(2.3%)** [ ] *no reply*[99] **(0.3%)**

s5 • [*If disagree*] Is your workload: [ ] heavier?[1] **(12.9%)** [ ] varies?[2] **(11.9%)**
[ ] lighter?[3] **(3.5%)** [ ] *not applicable*[97] **(71.3%)** [ ] *no reply*[99] **(0.3%) [n = 310]**

s6 • Safety equipment like mechanical lifts are kept in good working order. **[n = 310]**
[ ] strongly disagree[1] **(1.6%)** [ ] disagree[2] **(9.0%)** [ ] agree[3] **(67.7%)** [ ] strongly agree[4] **(20.3%)**
[ ] *don't know* [98] **(1.3%)**

s7 • In your job, getting hit or being verbally abused are to be expected. **[n = 310]**
[ ] strongly disagree[1] **(5.8%)** [ ] disagree[2] **(13.5%)** [ ] agree[3] **(66.1%)** [ ] strongly agree[4] **(13.9%)**
[ ] *don't know* [98] **(0.3%)** [ ] *no reply*[99] **(0.3%)**

s8 [*If agree*] You accept this as a normal part of the job. **[n = 310]**
[ ] strongly disagree[1] **(3.5%)** [ ] disagree[2] **(15.5%)** [ ] agree[3] **(53.5%)** [ ] strongly agree[4] **(8.4%)**
[ ] *not applicable*[97] **(18.4%)** [ ] *no reply*[99] **(0.6%)**

s9 • When employees report an unsafe working condition, steps are promptly taken to improve the situation. **[n = 310]**
[ ] strongly disagree[1] **(3.9%)** [ ] disagree[2] **(23.5%)** [ ] agree[3] **(55.5%)** [ ] strongly agree[4] **(11.0%)**
[ ] *don't know* [98] **(5.8%)** [ ] *no reply*[99] **(0.3%)**

s10 • You have been trained in the proper use of the mechanical lifts at [*name of facility*].**[n = 310]**
[ ] strongly disagree[1] **(0.6%)** [ ] disagree[2] **(8.4%)** [ ] agree[3] **(66.8%)** [ ] strongly agree[4] **(24.2%)**

s11 • Your supervisor talks to you about safe work practices. **[n = 310]**
[ ] strongly disagree[1] **(2.6%)** [ ] disagree[2] **(23.2%)** [ ] agree[3] **(59.0%)** [ ] strongly agree[4] **(11.9%)**
[ ] *don't know* [98] **(2.9%)** [ ] *no reply*[99] **(0.3%)**

s12 • You are too rushed to work safely. **[n = 310]**
[ ] strongly disagree[1] **(4.2%)** [ ] disagree[2] **(38.4%)** [ ] agree[3] **(43.2%)** [ ] strongly agree[4] **(13.2%)**
[ ] *don't know* [98] **(0.3%)** [ ] *no reply*[99] **(0.6%)**

s13 • You know who is on the health and safety committee at [*name of facility*]. **[n = 310]**
[ ] strongly disagree[1] **(3.2%)** [ ] disagree[2] **(32.4%)** [ ] agree[3] **(52.3%)** [ ] strongly agree[4] **(9.0%)**
[ ] *don't know* [98] **(3.2%)**

s14 • If an employee gets injured, management will support them in a caring way. **[n = 310]**
[ ] strongly disagree[1] **(5.5%)** [ ] disagree[2] **(11.3%)** [ ] agree[3] **(59.7%)** [ ] strongly agree[4] **(7.7%)**
[ ] *don't know* [98] **(15.8%)**

HEALTH & INJURY STATUS

Now I want to ask a few questions about your own health.

h1 • In general, how would you describe your health? **[n = 310]**
[ ] poor[1] **(1.6%)** [ ] fair[2] **(6.8%)** [ ] good[3] **(33.2%)** [ ] very good[4] **(35.8%)** [ ] excellent[5] **(22.6%)**

h2 • Over your career as a Care Aide [*LPN*], have you ever taken time off work because of a work injury? **[n = 310]**
[ ] yes[1] **(53.5%)** [ ] no[2] **(46.5%)**
If no, go to h6

h3 • *[If yes,]* How many different times? [*have you taken time off due to a work injury]:* **[n = 167]**
(median: 2 times) times *[open-ended; fill in number of times]*
[ ] *don't know* [98] **(0.6%)**

h4 • How many days in total did this time off add up to? – please estimate. **[n = 166]**
(median: 60 days) days *[fill in number of days – convert months to days]*
[ ] *don't know* [98] **(1.6%)**

h5 • Did any of these work injuries happen in the last 12 months? **[n = 166]**
[ ] yes[1] **(38.5%)** [ ] no[2] **(61.5%)**

Now, please say how often the following statements are true for you. You have the usual 4 choices: never true; seldom true; sometimes true, and often true.

h6 • You worry about getting hurt or injured at work. **[n = 310]**
[ ] never[1] **(14.8%)** [ ] seldom[2] **(19.7%)** [ ] sometimes[3] **(40.3%)** [ ] often[4] **(25.2%)**

h7 • You have called in sick because you were too tired to work that day. **[n = 310]**
[ ] never[1] **(59.4%)** [ ] seldom[2] (**16.1%)** [ ] sometimes[3] **(22.3%)** [ ] often[4] **(1.9%)**
[ ] *no reply*[99] **(0.3%)**

h8 • You feel confident in your ability to work safely (*e.g., when transferring a resident*). **[n = 310]**
[ ] never[1] **(1.3%)** [ ] seldom[2] **(3.2%)** [ ] sometimes[3] **(17.1%)** [ ] often[4] **(78.1%)**
[ ] *don't know* [98] **(0.3%)**

h9 • You have called in sick because you needed to take care of a child or other relative. **[n = 310]**
[ ] never[1] **(60.0%)** [ ] seldom[2] **(20.3%)** [ ] sometimes[3] **(18.1%)** [ ] often[4] **(1.6%)**

h10 • You have come to work even though you felt a little sick. **[n = 310]**
[ ] never[1] **(10.6%)** [ ] seldom[2] **(15.8%)** [ ] sometimes[3] **(47.4%)** [ ] often[4] **(26.1%)**

h11 • You have called in sick because you had too many aches and pains to work that day.**[n = 310]**
[ ] never[1] **(47.4%)** [ ] seldom[2] **(21.6%)** [ ] sometimes[3] **(26.8%)** [ ] often[4] **(4.2%)**

Now I want to ask some questions about pain.>

h12 • In the ***last*** year, have you had any **physical** pain or discomfort that was **moderate or unbearable**? *[i.e., pain that was more than mild.]* **[n = 310]**
[ ] yes[1] **(53.2%)** [ ] no[2] **(46.5%)** [ ] *don't know* [98] **(0.3%) If no, don't know or no reply, go to next page.**

h13 • *[If yes]* Where was this moderate to unbearable pain?

Check T	h13.1 Lower back	h13.2 Upper back	h13.3 Neck	h13.4 Shoulder	h13.5 Arm, wrist, hand	h13.6 Legs	h13.7 Elsewhere
ys[1]	**(22.9%)**	**(9.0%)**	**(5.5%)**	**(18.7%)**	**(7.7%)**	**(10.6%)**	**(8.4%)**
no[2]	**(77.1%)**	**(91.0%)**	**(94.5%)**	**(81.3%)**	**(92.3%)**	**(89.4%)**	**(91.6%)**
	[n = 310]	[n = 310]	[n = 310]	[n = 310]	[n = 310]	[n = 310]	[n =310]

h14 • How often did you have this pain in the last year? *[Probe for an answer using these options.]* [n = 310]

Check T	h14.1 Lower back	h14.2 Upper back	h14.3 Neck	h14.4 Shoulder	h14.5 Arm, wrist, hand	h14.6 Legs	h14.7 Elsewhere
Constantly[1]	**(2.9%)**	**(2.6%)**	**(0.6%)**	**(3.2%)**	**(2.3%)**	**(2.3%)**	**(1.0%)**
Daily[2]	**(2.6%)**	**(1.3%)**	**(2.3%)**	**(4.5%)**	**(2.9%)**	**(3.2%)**	**(1.9%)**
Once a week[3]	**(7.1%)**	**(3.2%)**	**(2.3%)**	**(3.2%)**	**(0.6%)**	**(2.6%)**	**(1.6%)**
Once a month[4]	**(3.2%)**	**(0.6%)**	**(0.3%)**	**(1.9%)**	**(0.0%)**	**(1.6%)**	**(1.0%)**
Every 2 to 3 months[5]	**(3.2%)**	**(1.0%)**	**(0.3%)**	**(2.6%)**	**(0.6%)**	**(0.3%)**	**(0.6%)**
Every 4 to 5 months[6]	**(1.6%)**	**(0.0%)**	**(0.0%)**	**(0.6%)**	**(0.3%)**	**(0.0%)**	**(0.0%)**
Every six months or less[7]	**(2.3%)**	**(0.3%)**	**(0.6%)**	**(1.9%)**	**(0.3%)**	**(0.6%)**	**(2.3%)**
Not Applicable	**(77.1%)**	**(91.0%)**	**(93.5%)**	**(81.9%)**	**(92.9%)**	**(89.4%)**	**(91.6%)**
	[n = 310]	[n = 310]	[n = 310]	[n = 310]	[n = 310]	[n = 310]	[n = 310]

h15 • On average, how long did this pain last? *[Probe for an answer using these options.]* **[n = 310]**

Check T	h15.1 Lower back	h15.2 Upper back	h15.3 Neck	h15.4 Shoulder	h15.5 Arm, wrist, hand	h15.6 Legs	h15.7 Elsewhere
Less than 1 hr[1]	**(2.3%)**	**(1.0%)**	**(0.3%)**	**(0.3%)**	**(0.6%)**	**(1.3%)**	**(0.6%)**
1 hr to 1 day[2]	**(7.4%)**	**(3.5%)**	**(1.6%)**	**(6.1%)**	**(1.6%)**	**(2.9%)**	**(2.6%)**
more than one day to 1 wk[3]	**(8.1%)**	**(2.6%)**	**(2.6%)**	**(5.2%)**	**(1.6%)**	**(1.9%)**	**(3.2%)**
more than one wk to 1 month[4]	**(2.3%)**	**(0.6%)**	**(0.3%)**	**(1.6%)**	**(0.0%)**	**(1.0%)**	**(0.6%)**
more than one mo. to 5 mo.[5]	**(0.3%)**	**(0.0%)**	**(0.6%)**	**(1.3%)**	**(1.0%)**	**(0.6%)**	**(0.3%)**
more than six months long[6]	**(2.3%)**	**(1.3%)**	**(0.6%)**	**(3.2%)**	**(2.3%)**	**(2.9%)**	**(0.6%)**
Not Applicable	**(77.4%)**	**(91.0%)**	**(93.9%)**	**(82.3%)**	**(92.9%)**	**(89.4%)**	**(91.9%)**
	[n = 310]	[n = 310]	[n = 310]	[n = 310]	[n = 310]	[n = 310]	[n = 310]

h16 • How would you rate the physical demands of your job, on a scale of 1 to 7, with 1 as very light demands, and 7 as very heavy demands? **[n = 310]**

[ ]1[1] **(0.6%)** [ ]2[2] **(0.6%)** [ ]3[3] **(4.2%)** [ ]4[4] **(12.3%)**
[ ]5[5] **(27.1%)** [ ]6[6] **(22.3%)** [ ]7[7] **(32.3%)**
[ ] *no reply*[99] **(0.6%)**

h17 • What do you think is the hardest physical aspect of your job? *[Respondent volunteers answer; prompt only if necessary*]
[n = 310]

PHYSICAL ENVIRONMENT

Now I want you to think about the equipment you use. Please say whether you disagree or agree with the following statements. You have the usual 4 choices: strongly disagree; just disagree; strongly agree; and just agree .

p1 • Residents have wheelchairs that fit them well *[i.e., their feet touch the floor, the chair is not too big, not too small].* **[n = 310]**
[ ] strongly disagree[1] **(8.1%)** [ ] disagree[2] **(24.8%)** [ ] agree[3] **(56.5%)** [ ] strongly agree[4] **(9.0%)**
[ ] *not applicable*[97] **(0.3%)** [ ] *don't know* [98] **(1.3%)**

p2 • Mechanical lifts are easy to get when you need them. **[n = 310]**
[ ] strongly disagree[1] **(5.2%)** [ ] disagree[2] **(28.7%)** [ ] agree[3] **(52.9%)** [ ] strongly agree[4] **(12.6%)**
[ ] *don't know* [98] **(0.6%)**

p3 • Furniture and aids for residents are usually well-maintained and in good shape. **[n = 310]**
[ ] strongly disagree[1] **(3.5%)** [ ] disagree[2] **(21.0%)** [ ] agree[3] **(67.1%)** [ ] strongly agree[4] **(8.1%)**
[ ] *don't know* [98] **(0.3%)**

p4 • You often don't have enough time to use a mechanical lift. **[n = 310]**
[ ] strongly disagree[1] **(8.7%)** [ ] disagree[2] **(40.6%)** [ ] agree[3] **(36.8%)** [ ] strongly agree[4] **(11.9%)**
[ ] *not applicable*[97] **(0.3%)** [ ] *don't know* [98] **(1.6%)**

FEELINGS and JOB SATISFACTION:

Now I want you to think about how you feel about your job. Please say how often the following statements are true for you. You have the usual 4 choices: never true; seldom; sometimes; or true most of the time.

f1 • You feel that you do a lot of worthwhile things in this job. **[n = 310]**
[ ] never[1] **(0.0%)** [ ] seldom[2] **(1.0%)** [ ] sometimes[3] **(6.8%)** [ ] most of the time[4] **(91.9%)**
[ ] *don't know* [98] **(0.3%)**

f2 • You feel very tired when you have to face another day at work. **[n = 310]**
[ ] never[1] **(15.8%)** [ ] seldom[2] **(28.7%)** [ ] sometimes[3] **(44.2%)** [ ] most of the time[4] **(11.3%)**

f3 • You don't really care what happens to some residents. **[n = 310]**
[ ] never[1] **(92.9%)** [ ] seldom[2] **(5.2%)** [ ] sometimes[3] **(1.3%)** [ ] most of the time[4] **(0.6%)**

f4 • You understand how your residents feel about things. **[n = 310]**
[ ] never[1] **(0.0%)** [ ] seldom[2] **(1.3%)** [ ] sometimes[3] **(23.9%)** [ ] most of the time[4] **(74.8%)**

f5 • You've become more cold-hearted toward people since you took this job. *[i.e, callous, unfeeling]*
[ ] never[1] **(81.9%)** [ ] seldom[2] **(7.1%)** [ ] sometimes[3] **(7.7%)** [ ] most of the time[4] **(2.6%)**
[ ] *don't know* [98] **(0.6%)** **[n = 310]**

f6 • You feel that you're working too hard on the job.
[ ] never[1] **(15.5%)** [ ] seldom[2] **(12.9%)** [ ] sometimes[3] **(48.4%)** [ ] most of the time[4] **(22.9%)**
[ ] *don't know* [98] **(0.6%)** **[n = 310]**

f7 • You can easily create a relaxed atmosphere with your residents.
[ ] never[1] **(0.6%)** [ ] seldom[2] **(8.4%)** [ ] sometimes[3] **(24.5%)** [ ] most of the time[4] **(66.1%)**
[ ] *don't know* [98] **(0.3%)** **[n = 310]**

f8 • You treat some residents as if they were impersonal objects. *[i.e., like they were things, not human beings.]* **[n = 310]**
[ ] never[1] **(89.0%)** [ ] seldom[2] **(5.2%)** [ ] sometimes[3] **(4.8%)** [ ] most of the time[4] **(0.3%)**
[ ] *no reply*[99] **(0.6%)**

f9 • You feel that you're at the end of your rope. *[i.e., like you can't take it any more, you've had enough.]*
[ ] never[1] **(54.8%)** [ ] seldom[2] **(12.9%)** [ ] sometimes[3] **(28.4%)** [ ] most of the time[4] **(2.3%)**
[ ] *don't know* [98] **(0.3%)** [ ] *no reply*[99] **(1.3%)** **[n = 310]**

f10 • You feel really good about taking care of your residents. **[n = 310]**
[ ] never[1] **(0.0%)** [ ] seldom[2] **(1.0%)** [ ] sometimes[3] **(4.2%)** [ ] most of the time[4] **(94.8%)**

f11 • You worry that this job is hardening you emotionally: **[n = 310]**
[ ] never[1] **(55.8%)** [ ] seldom[2] **(11.6%)** [ ] sometimes[3] **(29.0%)** [ ] most of the time[4] **(2.9%)**
[ ] *no reply*[99] **(0.6%)**

f12 • You feel that residents blame you for some of their problems. **[n = 310]**
[ ] never[1] **(44.5%)** [ ] seldom[2] **(14.8%)** [ ] sometimes[3] **(36.8%)** [ ] most of the time[4] **(3.2%)**
[ ] *don't know* [98] **(0.3%)** [ ] *no reply*[99] **(0.3%)**

f13 • You get praise and recognition for a job well done. **[n = 310]**
[ ] never[1] **(10.6%)** [ ] seldom[2] **(17.4%)** [ ] sometimes[3] **(37.4%)** [ ] most of the time[4] **(34.2%)**
[ ] *no reply*[99] **(0.3%)**

f14 • There is a lot of laughter at *[name of facility]*. **[n = 310]**
[ ] never[1] **(2.3%)** [ ] seldom[2] **(15.2%)** [ ] sometimes[3] **(41.0%)** [ ] most of the time[4] **(41.3%)**
[ ] *no reply*[99] **(0.3%)**

f15 • What do you think is the hardest **emotional** part of your job? *[what do you find most emotionally difficult about your work?] [Respondent volunteers answer; prompt only if necessary*] **[n = 310]**

Describe the hardest emotional part of your job

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	too rushed to deliver proper care	26	4.6	8.4	8.4
	too rushed to give personal attention	12	2.1	3.9	12.3
	unable to deliver proper care for other reasons	8	1.4	2.6	14.8
	seeing resident in pain	17	3.0	5.5	20.3
	death of resident	91	16.3	29.4	49.7
	when resident dies alone	6	1.1	1.9	51.6
	lonely resident	9	1.6	2.9	54.5
	resident neglected/mistreated by family	6	1.1	1.9	56.5
	resistive/aggressive resident	19	3.4	6.1	62.6
	unequal treatment of residents	1	.2	.3	62.9
	when co-workers nasty towards each other	4	.7	1.3	64.2
	lack of support/respect from co-workers	8	1.4	2.6	66.8
	lack of support/respect from supervisor	6	1.1	1.9	68.7
	lack of support/respect from management	4	.7	1.3	70.0
	lack of respect/appreciation from family visitors	5	.9	1.6	71.6
	other	20	3.6	6.5	78.1
	seeing deterioration of residents	50	8.9	16.1	94.2
	being around family visitors (upset, not understanding) rel	8	1.4	2.6	96.8
	don't know	8	1.4	2.6	99.4
	no reply	2	.4	.6	100.0
	Total	310	55.4	100.0	
Missing	System	250	44.6		
Total		560	100.0		

DEMOGRAPHICS

We're almost finished now – thanks for your patience! I need to ask a few questions about yourself.

d1 • *Gender* (*ask only if you are uncertain*). [ ] female[1] **(89.4%)** [ ] male[2] **(10.6%)** **[n = 310]**

d2 • What year were you born? __**(median: 1958)**__ yr. [ ] *no reply*[99] **[n = 310]**

d3 • What is your current marital status? **[n = 310]**
[ ] never married/single[1] **(19.4%)** [ ] married or common-law[2] **(61.3%)** [ ] separated[3] **(5.2%)**
[ ] divorced[4] **(11.3%)** [ ] widowed[5] **(1.9%)** [ ] other[6] **(0.3%)** [ ] *no reply*[99] **(0.6%)**

d4 • Do you have children or other dependents living at home? **[n = 310]**
[ ] yes[1] **(58.7%)** [ ] no[2] **(41.3%)**

d5 • [*If yes*] How many were living with you in the last year? _**(median: 2)**_ **[n = 191]**
[open-ended; fill in number]
[ ] *not applicable*[97]

d6 • What is your highest level of education? **[n = 310]**

Highest level of education

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	some high school	5	.9	1.6	1.6
	completed high school	7	1.3	2.3	3.9
	RCA certificate	76	13.6	24.5	28.4
	LTC aide certificate	52	9.3	16.8	45.2
	some college courses	33	5.9	10.6	55.8
	college diploma	30	5.4	9.7	65.5
	LPN diploma	17	3.0	5.5	71.0
	some university	18	3.2	5.8	76.8
	completed baccalaureate	39	7.0	12.6	89.4
	Nursing degree	21	3.8	6.8	96.1
	Masters degree	10	1.8	3.2	99.4
	medical doctor	2	.4	.6	100.0
	Total	310	55.4	100.0	
Missing	System	250	44.6		
Total		560	100.0		

d7 • In the next 6 months, do you have plans to leave your Care Aide/LPN position at *[name of facility]*? **[n = 310]**
[ ] yes[1] **(8.7%)** [ ] maybe[2] **(8.4%)** [ ] no[3] **(81.3%)**
[ ] *don't know* [98] **(1.3%)** [ ] *no reply*[99] **(0.3%)**

d8 • If you could be retrained for a different job *[other than Care Aide or LPN]*, would you do so? **[n = 310]**

[ ] yes[1] **(53.9%)** [ ] maybe[2] **(15.2%)** [ ] no[3] **(30.0%)**
[ ] *don't know* [98] **(0.6%)** [ ] *no reply*[99] **(0.3%)**

d9 • Have you ever tried to be retrained for a different job? *[other than Care Aide/LPN]* **[n = 310]**

[ ] yes **(21.6%)** [ ] maybe **(78.1%)**
[ ] *don't know* [98] **(0.3%)**

d10 • Have you ever had a request for retraining turned down by [*name of facility*]? **[n = 310]**

[ ] yes **(3.9%)** [ ] maybe **(90.0%)**
[ ] *don't know* [98] **(5.5%)** [ ] *no reply*[99] **(0.6%)**`

d11 • What was your total personal income for the last year, before taxes and deductions? **[n = 310]**

[ ] under $10,000[1] **(2.6%)** [ ] 10,000 – 19,999[2] **(7.7%)** [ ] 20,000 – 29,999[3] **(14.5%)**
[ ] 30,000 – 39,999[4] **(39.0%) (** [ ] 40,000 – 49,999[5] **(18.1%)** [ ] 50,000 – 59,999[6] **(2.6%)**
[ ] 60,000 – 69,999[7] **(1.9%)** [ ] 70,000 – 79,999[8] **(0.3%)** [ ] over 80,000[9] **(0.0%)**
[ ] *don't know* [98] **(9.0%)** [ ] *no reply*[99] **(4.2%)**

d12 • What was the total income of all members of your household last year, before taxes and deductions?

[ ] under $10,000[1] **(0.0%)** [ ] 10,000 – 19,999[2] **(1.0%)** [ ] 20,000 – 29,999[3] **(2.3%)**
[ ] 30,000 – 39,999[4] **(8.4%) (** [ ] 40,000 – 49,999[5] **(11.6%)** [ ] 50,000 – 59,999[6] **(6.8%)**
[ ] 60,000 – 69,999[7] **(12.3%)** [ ] 70,000 – 79,999[8] **(7.7%)** [ ] 80,000 – 89,999[9] **(4.5%)**
[ ] 90,000 – 99,999[10] **(4.8%)** [ ] over 100,000[11] **(2.9%)**
[ ] *not applicable*[97] **(18.4%)** [ ] *don't know* [98] **(13.5%)** [ ] *no reply*[99] **(5.8%)**

[n = 310]

d13 • How would you describe your ethnic background? *(e.g., English, Philippino, Chinese, German, First Nations, Indo-Canadian, French-Canadian, etc)* **[n = 310]**

Ethnic background

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Canadian	128	22.9	41.3	41.3
	Anglo-Canadian	12	2.1	3.9	45.2
	French-Canadian	7	1.3	2.3	47.4
	Aboriginal-Canadian (First Nations, Metis, Inuit)	1	.2	.3	47.7
	Phillipino	47	8.4	15.2	62.9
	Iranian	4	.7	1.3	64.2
	other Middle-East heritage	1	.2	.3	64.5
	Indo-Canadian	26	4.6	8.4	72.9
	Vietnamese	1	.2	.3	73.2
	Korean	3	.5	1.0	74.2
	Chinese	15	2.7	4.8	79.0
	other Asian heritage	8	1.4	2.6	81.6
	other European heritage	27	4.8	8.7	90.3
	American	1	.2	.3	90.6
	Latin American heritage (Hispanic/Latino)	11	2.0	3.5	94.2
	Afican heritage	4	.7	1.3	95.5
	Fijian	9	1.6	2.9	98.4
	Pacific Island heritage	1	.2	.3	98.7
	other	2	.4	.6	99.4
	West Indian/Caribbean	2	.4	.6	100.0
	Total	310	55.4	100.0	
Missing	System	250	44.6		
Total		560	100.0		

d14 • Were you born in Canada? **[n = 310]**
[ ] yes[1] **(46.8%)** [ ] no[2] **(53.2%)**

d15 • *[If no]* What year did you move to Canada? ___**(median: 1985)**___yr **[n = 166]**
[ ] *not applicable*[97] [ ] *don't know* [98] [ ] *no reply*[99]

d16 • What is your mother tongue? [i.e., *the first language you spoke at home]* **[n = 310]**

Mother tongue

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	English	152	27.1	49.0	49.0
	Tagalog (Philippines)	49	8.8	15.8	64.8
	Ilocano (Philippines)	1	.2	.3	65.2
	Ilongo (Philippines)	1	.2	.3	65.5
	Punjabi	19	3.4	6.1	71.6
	Hindi	12	2.1	3.9	75.5
	Urdu	1	.2	.3	75.8
	other Indian language	3	.5	1.0	76.8
	Vietnamese	1	.2	.3	77.1
	Korean	2	.4	.6	77.7
	Chinese	15	2.7	4.8	82.6
	other asian language	4	.7	1.3	83.9
	German	7	1.3	2.3	86.1
	French	5	.9	1.6	87.7
	Spanish	10	1.8	3.2	91.0
	Polish	4	.7	1.3	92.3
	other European language	15	2.7	4.8	97.1
	Farsi	4	.7	1.3	98.4
	other Middle Eastern language	1	.2	.3	98.7
	African language	4	.7	1.3	100.0
	Total	310	55.4	100.0	
Missing	System	250	44.6		
Total		560	100.0		

And now, the last question:

d17 • On the whole, how satisfied are you with your job? **[n = 310]**
[ ] very satisfied[1] **(44.8%)** [ ] moderately satisfied[2] **(41.3%)**
[ ] a little dissatisfied[3] **(11.6%)** [ ] very dissatisfied[4] **(1.6%)**
[ ] *don't know* [98] **(0.3%)**[ ] *no reply*[99] **(0.3%)**

That's all the questions. Thank you very much for doing this. Do you have any questions or comments about this survey? *[The survey itself, or comments about injuries, risks and prevention]*

My supervisor may phone you to confirm that this interview took place. Also, if you have any questions about the survey, you can call her, Nancy Pollak, at 604-301-1310. Thanks again, and goodbye.

Time survey ends: _____ *{Please fill in length of interview on front page.}*

To Be Completed by Interviewer

r1 • Respondent's cooperation:
[ ] cooperative[1]
[ ] indifferent[2]
[ ] uncooperative[3]

r2 • Quality of interview:
[ ] high quality[1]
[ ] adequate quality[2]
[ ] questionable[3]

r3 • Reason for poor cooperation, interview interference, or questionable quality (*up to 3 reasons):*

[ ] language difficulties (ESL, etc.)[1]
[ ] noise[2]
[ ] presence of children[3]
[ ] presence of spouse[4]
[ ] presence of others[5]
[ ] phone calls[6]
[ ] tired / sleepy[7]
[ ] bored /impatient[8]
[ ] hostile[9]
[ ] breaks (for eating, cooking)[10]
[ ] illness[11]
[ ] hearing problem[12]
[ ] who knows?[13]
[ ] other; please specify:[14]_____ main reason: GGr3

I declare that this interview was conducted in accordance with the instructions I received from the research team. I agree to keep confidential the respondent's name, answers, and comments; I will also not reveal the name of the facility.

_____
interviewer's signature

Appendix B: Interview and focus group categories

1. Workload and job demands

WL1. Staffing levels and workload demands on care aides/LPNs: This category examined perceptions of management, care aides/LPNs, and RNs regarding the staffing level of care aides/LPNs; their assessments of its adequacy, workload pressures, and comments about preferred staffing levels.

WL2. Replacement practices & short-staffing: This category examined: 1) facility policy and practice regarding replacing absent workers (whether through over-time or use of casuals); and 2) management and care aide/LPN perceptions of the incidence of short-staffing.

WL3. Workload distribution: This category examined management and care aide/LPN perceptions of how workload varied among different units or teams, and management's efforts to distribute work evenly (e.g., the use of Added Care, or moving workers to different units in response to increased dependency of some residents).

WL4. Physical environment: This category examined 1) management and care aide/LPN perceptions about physical layout and ergonomic challenges facing staff and residents; and 2) researchers' observations about the physical layout and design of the facility.

2. Organizational culture

OC1. Communication, participation, and decision-making: This category examined: 1) the frequency and nature of staff, unit, and team meetings, and care aide/LPNs' perceptions of whether they have input at meetings and follow-up to their concerns; 2) the involvement of care aide/LPNs in resident care planning; 3) their access to information about residents' history of aggression; 4) care aide/LPNs' perceptions of whether their observations and concerns about residents are responded to, by RNs and management; and 5) care aide/LPNs' perceptions of their input into work schedules and rotation.

OC2. Fairness and congruency: This category examined: 1) management and care aide/LPN beliefs about the facility's philosophy of care, the training that accompanied the philosophy, and the degree of flexibility and discretion available to care aides/LPNs (in theory and practice); and 2) care aide/LPN perceptions about the facility's quality of care and their own capacity to deliver a high standard of care; in particular, their perception of whether resident ADLs and care plans were up to date.

OC3. Support: This category examined a series of relationships, with each party commenting on the quality of support and responsiveness (follow-up to concerns) they experienced. The relationships were between: 1) administrator and director of care; 2) administrator and care aide/LPNs and between director of care and care aides/LPNs; in particular, the parties were asked to describe attitudes and actions regarding injuries and injury claims, and care aides/LPNs were asked if management acknowledged the demands on front-line staff; 3) RNs and care aides/LPNs; in particular care aides/LPNs were asked to describe the assistance they received with resident care; and 4) care aides/LPNs and their union representatives.

3. Safety environment

SE1. Staff training: This category examined: 1) the content and frequency of training re: resident aggression, body mechanics, back care, dementia, and other relevant subjects, in the last two years; 2) how and by whom the training was delivered, and who attended; and 3) management and care aide/LPN perceptions about front-line staff's orking knowledge and skills.

SE2. Safety equipment: This category examined: 1) the number and kind of lifts at each facility, and 2) management and care aide/ LPN perceptions about the adequacy and accessibility of lifts.

SE3. Commitment to safe resident handling: This category examined: 1) formal policies regarding lifting and transfers (e.g., a "no manual lift" policy; residents designated as 2-person transfers only, etc.); 2) care aide/LPN

perceptions of these policies, their degree of compliance, their reasons for non-compliance (if applicable), and consequences of non-compliance; 3) management perceptions of the same; 4) perceptions of front-line staff's knowledge and skill regarding safe body mechanics; and 5) peer support and peer reinforcement to work safely and abide by policies.

SE4. Resident aggression: This category examined: 1) formal policies regarding incidents of verbal or physical abuse by residents; and 2) management and care aide/LPN perceptions of the facility's actual practices after such incidents, with a particular focus on incident tracking and follow-up.

SE5. Joint Health & Safety Committee: This category examined: 1) the frequency of JOHSC meetings; 2) participation of senior management and their perceptions of the committee; 3) participation of HEU members and whether they had received H&S training; 4) kind and number of initiatives handled by the committee, and raised by whom; and 5) care aide/LPN perceptions of whether the JOHSC was effective (i.e., results or follow-up to concerns).

4. Community and In-house Resources

CR1. Budgeting for staff training, resident aids/equipment, and facility upgrades This category examined: 1) budgeting for equipment and aids relating to resident handling (e.g., mechanical lifts, electric beds, bathtubs, transfer belts, etc.), capital projects and facility upgrading, and staff training in the last three years; and 2) funding source(s) for these expenditures (e.g., regional funding pools for bed replacement; corporate contributions, monies raised through local or affiliated charitable foundations, and operational funding).

CR2. Relationship to outside health services, regional health authority, and medical coordination This category examined 1) management's view of their relationship with Continuing Care personnel regarding information about prospective residents and placements; 2) management and front-line staff perceptions of acute care services, particularly relating to frequency of hospitalization and problems with early discharges or improper medications; 3) management perception of the facility's relationship with the local mental health team; 4) the facility's access to OT/PT services, via both regional and in-house (contract) staff; and 4) the status, role, and expertise of the facility's medical coordinator, particularly his or her contact (if any) with residents and staff.

CR3. Resident programming – access to in-house, community, and volunteer programs This category examined 1) in-house activation and stimulation programs for residents, particularly the presence of a walking program and other noteworthy features; 2) management and care aide/LPN perceptions of the adequacy of these programs; and 3) the role of volunteers and community resources at the facility, particularly the involvement of a religious or ethnic community, service group, or neighbourhood.

CR4. Specialized staff – clinical, recreation, rehabilitation: This category examined whether a facility had: 1) an assistant director of care or clinical practice leader position (or equivalent) and, if so, their role in staff training and safety reinforcement; 2) in-house or contract positions for social worker, OT/PT, music and other recreational therapists, activation workers, and other personnel; and 3) the means by which the facility obtained or funded these positions (e.g., via amalgamation with regional health services, private fundraising, corporate owner, etc.).

Appendix C: List of variables

Name	Description	Source
Injury rate and well-being		
Time-loss injury rate	Number of time-loss injuries per 100 workers working full time for a year (100 person years).	Facility and WCB records
MSI time-loss injury rate	Number of time-loss musculoskeletal injuries per 100 workers working full time for a year (100 person years).	Facility record
Time-loss days per FTE	Number of days lost per FTE due to time-loss injury.	Facility record
Time-loss days per claim	Average number of days lost per time-loss injury.	Facility record
Pain	Percentage of workers who experienced pain or discomfort, defined by NIOSH as moderate or extreme pain that occurred once or more a month or lasted more than one week, on any body part, for previous year, items h12–h15.	Telephone survey
Burnout	Workers' emotional and physical exhaustion – mean of 6 items (Rel. = .73) f2, f6, f9, f11, h7, h11. Based on Maslach Burnout Inventory.	Telephone survey
Health	Workers' self-reported health status – single item h1.	Telephone survey
Job satisfaction	Workers' satisfaction with current job – single item d17.	Telephone survey
Workload and job demands		
Staffing:		
Resident-to-worker ratio	Number of residents per care aide/LPN, averaged across all units for day shift.	Facility record LRB, HEU, HEABC
Average dependency of residents	Physical and mental dependence of residents, assessed by the Functional Independence Measurement tool (FIM™ instrument).	
Physical workload:		
Cumulative spinal compression (lower back)	Total estimated compression to the spine from accumulated bending and lifting in a day shift.	Direct measurement
Peak spinal compression (lower back) Peak muscle activity (neck/shoulder)	The peak level of muscle activity represented by the highest 1% of all muscle activity in the lower back and neck/shoulder muscles, recorded in a day shift.	Direct measurement
Number of tasks	Number of tasks done by care aides in the ergonomic study in a day shift (e.g., resident transfers, lifts and repositions, making beds, and bathing).	Direct observation
Number of transfers	The number of resident transfers done by care aides in the ergonomic study in a day shift.	Direct observation
Perceptions:		
Work pressure	Having sufficient time/staff to do work – mean of 4 items (Rel. = .74) c3, c14, p4, s12.	Telephone survey
Workload	Working too hard on job – single item f6.	Telephone survey
Physical demands of job	Rating physical demands of the job – single item h16.	Telephone survey
Working short-staffed	Frequency of working without full staff complement – single item e12.	Telephone survey
Workload distribution	Workload in relation to residents' care needs – mean of two items (Rel. = .80) c25, c26.	Telephone survey
Exertion	Physical/emotional exertion after shift as reported by 31 ergonomic subjects.	Interview

List of variables (continued)

Name	Description	Source
Organizational culture		
Communication	Degree of communication and participation between workers and supervisor/administrators – mean of 5 items (Rel. = .78) c9, c11, c21, c27, c29.	Telephone survey
Discretion and choice	Degree of discretion at work – single item c13	Telephone survey
Fairness to workers	Management's fairness to workers – mean of 4 items (Rel. = .83) c2, c18, s9, s14	Telephone survey
Favouritism towards residents	Facility's favouritism towards residents – single item c19.	Telephone survey
Quality of care	Description of quality of care at facility – single item e14.	Telephone survey
Adequacy of attention	Adequacy of staffing to provide good quality care to resident – single item c14.	Telephone survey
Management support	Management support of staff in workers' injury situations –single item s14.	Telephone survey
Supervisor support	Supervisor support of workers – mean of 3 items (Rel. = .83) c11, c15, c18.	Telephone survey
Co-worker support	Degree of cooperation among care aides/ LPNs – single item c12	Telephone survey
Union support	Union representatives' support of workers– mean of 3 items (Rel. = .74) c7, c23, s2.	Telephone survey
Number of grievances	Average number of grievances at facility per year per 100 workers	Union record
Safety environment		
Safety commitment	Degree of management's commitment to safety issues – mean of 4 items (Rel. = .81) s1, s3, s9, s11.	Telephone survey
Worry about work injury	Concerns about being injured at work – single item h6.	Telephone survey
Dementia training	Training on dementia, both during formal education and afterwards – 4 items, a19, a20, a22, a23	Telephone survey
Physical abuse	Number of incidents of physical abuse in last month – single item a4	Telephone survey
Accessibility of mech. lift	Ease of getting mechanical lift – single item p2.	Telephone survey
Number of residents per mech. lift	Number of residents per mechanical lift	Facility record
Physical environment		
Age of facility	Age of facility	Interview
Bedroom size	Dimensions of typical bedroom (square metres)	Direct measurement
Bathroom size	Dimensions of typical bathroom (square metres)	Direct measurement
Hall length	Maximum distance between the nursing station and the farthest resident room	Direct measurement
Hall width	Width of hall	Direct measurement

Appendix D: Key features chart

Item	Source (Interview or focus group)
• **Profile of facility** 1. Number of beds 2. Historical origins 3. Significant dates /facts	Administrator Director of care
• **Governance and ownership structure: Describe.** 1. History	Administrator
1. Who is represented on Board? 2. How stable is Board membership? • **How active is Board in:** 3. fund-raising? 4. community outreach & development? 5. capital improvement campaigns? 6. other committees – please describe?	Administrator
7. Describe Administrator's relationship with Board.	Administrator
Budgets & allocation of funds: 1. Who initiates/ controls budgeting process? • Expenditures to following – Describe: 1. Staff training and skill development 2. Purchases of safety equipment (e.g., mechanical lifts, safety belts) 3. Purchases/ upgrades of resident aids (e.g., wheelchairs, safety bars, furnishings, electric beds) 4. Capital improvements	Administrator
• **Relationship to Regional Health Authority re: funding level: Describe.**	Administrator
• **Indirect costs of injuries:** 1. Staff time (payroll, admin., human resources, RNs, etc.)	Administrator
• **Residents** 1. Describe number/level of residents 2. Admissions process: Describe. 3. What proportion of IC3 residents in SCU, what proportion elsewhere? 4. Describe nature of care aide assignment to residents.	Director of care
• **Activation and Stimulation programs (structured or therapeutic). Describe:** 1. Credentials of recreation/activation staff	Administrator
• **Volunteers & Community events and programming** 1. Volunteer Coordinator? Credentials? 2. Connections with community centres, ethnic or religious community?	Administrator
Medical Coordinator / physician services 1. Existing arrangement 2. Qualifications of MC 3. Range of activities 4. Contact with care aides/ LPNs?	Administrator Director of care
• **Any Quality Assurance Program or CQI program? Describe.**	Administrator, Director of care
• **Is facility Accredited? Since when?**	Administrator
• **Is there a Family Council? Describe.**	Administrator
• **Is there a Resident Council? Describe.**	Administrator
• **Staffing** 1. Administrator turnover? 2. Current Administrator 3. Director of care turnover? 4. Current Director of care 5. Other management turnover? 6. Care aide turnover? 7. RN turnover / shortages? 8. Any problems finding casual care aides/ LPNs? 10. Criteria for hiring care aides? 11. Upgrading: Has facility sponsored any care aides to upgrade to RCA standard? 12. Sponsored any care aides to upgrade to LPN status?	Administrator, Director of care
• **Relationship to WCB: General comments.**	Administrator
• **Injuries and physical strain** 1. Does staff talk together about injuries & safety issues? 2. About aches and pains of the job? 3. In general, what is the experience of a worker when injured at facility? Care aide/LPN	Administrator
• **Management concerns in general (unsolicited comments)**	Administrator, Director of care
• **RNs' perspective: Snapshot of "good news / bad news"**	RN
• **Facility design / layout / equipment: Issues for front-line staff.**	RN; Care aide/LPN
• **Resident care: Concerns of front-line staff (unsolicited comments)**	RN; Care aide/LPN

Appendix E: Correlation tables

Table A.6.1.2.0 Correlations: Self-reported health and well-being with time-loss injury variables (facility level)

	Timeloss Injury rate	MSI timeloss injury rate	Time loss days per FTE	Time loss per claim
Burnout	.64	.69	.28	-.58
Job Satisfaction	-.55	-.63	-.20	.63
Self-rated health status	-.30	-.43	.10	.59
Pain lower back	.17	.18	.30	.51
Pain neck	.34	.31	.20	-.03
Pain limb	.30	.34	.07	-.11
Pain any body part	.47	.43	.31	.04

Table A.6.2.1.1a Correlations: Workload and job demand variables with time-loss injury variables (facility level)

	1	2	3	4	5	6	7	8	9	10	11	12	13
Cumulative spinal compression (lower back) (1)													
Peak spinal compression (lower back) (2)	.90**												
Peak muscle activity (3) (neck/shoulder)	.35	.37											
Total # of tasks (4)	.83*	.78*	.61										
Total # of transfer (5)	.63	.41	.40	.60									
Resident-to-worker ratio (all shifts) (6)	.60	.58	.69	.75*	.81*								
Resident-to-worker ratio (days) (7)	.53	.47	.64	.62	.83*	.97**							
Exertion (8)	.69	.83*	.64	.57	.35	.65	.61						
Work Pressure (9)	-.65	-.60	-.73*	-.71*	-.79*	-.76*	-.70	-.61					
Workload (10)	-.22	-.44	-.76*	-.56	-.13	-.67	-.55	-.63	.40				
Workload Distribution (11)	.35	.33	-.22	.31	.05	-.06	-.24	-.03	-.03	.00			
Physical Demands of Job (12)	-.52	-.48	-.68	-.65	-.48	-.50	-.47	-.45	.79*	.26	.30		
Working Short-Staffed (13)	-.50	-.15	.05	-.30	-.82*	-.35	-.44	.05	.47	-.44	-.04	.33	
Time-loss injury rate	.84**	.86**	.42	.79*	.65	.82*	.72*	.76*	-.61	-.56	.39	-.27	-.27
MSI time-loss injury rate	.90**	.86**	.54	.78*	.62	.77*	.74*	.86**	-.62	-.45	.16	-.43	-.32
Time-loss days per FTE	.75*	.79*	.01	.62	.45	.57	.47	.55	-.28	-.34	.52	.02	-.22
Time-loss per claim	.14	.15	-.70	.04	-.20	-.26	-.29	-.31	.47	.36	.27	.27	-.07

* Correlation is significant at the 0.05 level (2-tailed); ** Correlation is significant at the 0.01 level (2-tailed).

Table A.6.2.1.1b Correlations: Workload and job demand variables with pain, burnout, health, and job satisfaction (facility level)

	Burnout	Job Satisfaction	Self-Reported Health	Pain lower back	Pain neck	Pain limb	Pain any body part
Cumulative spinal compression (lower back)	.41	-.41	-.37	.16	.57	.57	.67
Peak spinal compression (lower back)	.43	-.41	-.34	.07	.62	.17	.47
Peak muscle activity (neck/shoulder)	.90**	-.81*	-.92**	-.24	.45	.54	.40
Number of tasks	.62	-.47	-.63	.13	.59	.66	.71*
Number of transfer	.59	-.70	-.51	.46	.29	.72*	.77*
Resident-to-worker ratio (days)	.88**	-.89**	-.61	.46	.29	.67	.64
Resident-to-worker ratio (all shifts)	.90**	-.85**	-.65	.34	.40	.68	.68
Exertion	.70	-.71*	-.49	-.08	.46	.08	.25
Work Pressure	.70	.81*	.82*	-.03	-.69	-.63	-.78*
Workload	.80*	.57	.53	.22	-.33	-.24	-.17
Workload Distribution	.22	.38	.33	-.39	-.08	-.24	-.08
Physical Demands of Job	.50	.60	.90**	-.14	-.82*	-.72*	-.79*
Working Short-Staffed	.09	.28	.19	-.55	-.70	-.57	-.62

* Correlation is significant at the 0.05 level (2-tailed); ** Correlation is significant at the 0.01 level (2-tailed).

Table A.6.2.2.1a Correlations: Organizational culture variables with time-loss injury variables (facility level)

	1	2	3	4	5	6	7	8	9	10	11	12
Number of grievances (1)												
Per diem funding (2)	.56											
Communication (3)	-.70	.03										
Discretion and choice (4)	-.13	.61	.52									
Fairness to workers (5)	-.68	.16	.92**	.62								
Quality of care (6)	-.05	.45	.40	.88**	.44							
Favouritism towards residents (7)	.83*	.15	-.67	-.54	-.80*	-.47						
Adequacy of attention (8)	-.18	.47	.59	.75*	.64	.84**	-.56					
Management Support (9)	-.70	.12	.90**	.66	.98**	.51	-.80*	.62				
Union Support (10)	.08	-.08	-.07	.16	-.30	.33	-.003	.22	-.29			
Supervisor Support (11)	-.68	.10	.89**	.43	.96**	.18	-.68	.45	.91**	-.43		
Co-worker Support (12)	-.29	-.15	.42	.15	.11	.11	-.14	.16	.08	.75*	.10	
Time-loss injury rate	.33	-.34	-.45	-.77*	-.73*	-.62	.70	-.56	-.77*	.39	-.61	.36
MSI time-loss injury rate	.19	-.35	-.39	-.70	-.65	-.71	.58	-.65	-.69	.36	-.49	.46
Time-loss days per FTE	.46	-.20	-.42	-.49	-.74*	-.23	.69	-.30	-.72*	.61	-.72*	.43
Time-loss per claim	.52	.48	-.08	.42	-.22	.57	.37	.26	-.11	.37	-.38	.14

* Correlation is significant at the 0.05 level (2-tailed); ** Correlation is significant at the 0.01 level (2-tailed).

Table A.6.2.2.1b Correlations: Organizational culture variables with pain, burnout, health, and job satisfaction (facility level)

	Burnout	Job Satisfaction	Self-Reported Health	Pain low back	Pain neck	Pain limb	Pain any body part
Number of grievances	.14	-.16	.06	.91**	.08	.52	.55
Per diem funding	-.20	.30	.26	.60	-.32	.16	-.10
Communication	-.26	.47	.12	-.72*	-.10	-.50	-.63
Discretion and choice	-.73*	.72*	.61	.04	-.36	-.55	-.61
Fairness to workers	-.33	.46	.11	-.65	-.23	-.43	-.64
Quality of care	-.87**	.87**	.88**	-.01	-.47	-.70	-.66
Favouritism towards residents	.43	-.40	-.32	.69	.45	.71*	.82*
Adequacy of attention	-.55	.72*	.75*	-.26	-.69	-.67	-.85**
Management Support	-.48	.59	.18	-.64	-.21	-.45	-.62
Union Support	-.13	.10	.57	.11	-.20	-.64	-.38
Supervisor Support	-.08	.24	-.17	-.65	-.07	-.22	-.47
Co-worker Support	-.11	-.002	-.15	-.25	.07	-.53	-.38

* Correlation is significant at the 0.05 level (2-tailed); ** Correlation is significant at the 0.01 level (2-tailed).

Table A.6.2.3.1 Correlations: Safety environment with time-loss injury, pain, health, burnout and job satisfaction (facility level)

	Timeloss Injury Rate	MSI Timeloss injury rate	Time loss days per FTE	Time loss per claim	Pain – lower back	Pain – neck	Pain – limb	Pain – any body part	Self-reported health	Job satisfaction	Burnout
Safety Commitment	-.58	-.54	-.36	.22	-.52	-.49	-.80*	-.88**	.64	.78*	.65
Worry about work injury	.31	.40	.04	.50	.28	.34	.90**	.74*	-.84**	-.76*	.72*
Residents per Mechanical Lift	.08	-.04	-.23	-.59	-.27	.57	.52	.53	-.73*	-.51	-.50
Accessibility of mechanical lifts	-.48	-.38	-.20	.45	-.13	-.35	-.71*	-.73*	.63	.68	.61

* Correlation is significant at the 0.05 level (2-tailed); ** Correlation is significant at the 0.01 level (2-tailed).

Table A.6.2.3.2 Correlations: Safety environment variables with workload and job demand variables

	Safety Commitment	Risk of injury	Residents /lift	Accessibility of mech lifts
Cumulative spinal compression (lower back)	-.53	.34	.04	-.40
Peak spinal compression (lower back)	-.40	.13	.03	-.24
Peak muscle activity (neck/shoulder)	-.48	.70	.65	-.53
Number of tasks	-.60	.54	.36	-.55
Number of transfer	-.95**	.80*	.34	-.89**
Resident-to-worker ratio (all shifts)	-.85**	.73*	.42	-.72*
Resident-to-worker ratio (days)	-.87**	.76*	.31	-.69
Exertion	-.37	.23	.10	-.22
Work Pressure	.83*	.77*	.67	-.85**
Workload	.24	.13	.46	-.23
Workload Distribution	.16	.31	.04	-.12
Physical Demands of Job	.62	.71*	.56	-.50
Working Short-Staffed	.69	.59	.002	-.64

* Correlation is significant at the 0.05 level (2-tailed); ** Correlation is significant at the 0.01 level (2-tailed).

Table A.6.2.4.1 Correlations: Physical environment variables with time-loss injury, pain, burnout, health and job satisfaction

	Timeloss Injury Rate	MSI timeloss injury rate	Time loss days per FTE	Time loss per claim	Pain – Lower-back	Pain – neck	Pain – limb	Pain – any body part	Self-reported health	Job satisfaction	Burnout
Age of facility	.06	.24	-.13	-.37	-.40	.57	-.03	.22	-.46	-.25	.06
Room size	-.65	-.52	-.40	.51	.24	-.40	-.24	-.45	.46	.64	-.57
Bathroom size	-.30	-.24	-.07	.44	.32	-.82*	-.15	-.48	.58	.51	-.34
Hall length	-.09	.41	-.13	-.21	-.03	.19	.42	.14	-.61	-.31	.47
Hall width	.15	.09	.32	.48	.92**	-.11	.35	.42	.24	-.06	-.11

* Correlation is significant at the 0.05 level (2-tailed); ** Correlation is significant at the 0.01 level (2-tailed).

Table A.6.2.4.2 Correlations: Physical environment variables with workload and job demand variables

	Age of facility	Bedroom size	Bathroom size	Length of hallways	Width of hallways
Cumulative spinal compression (lower back)	.41	-.52	-.33	-.30	-.14
Peak spinal compression (lower back)	.43	-.52	-.50	-.23	-.05
Peak muscle activity (neck/shoulder)	.34	-.51	-.50	-.64	-.43
Number of tasks	.20	-.50	-.36	-.44	-.02
Number of transfer	.08	-.68	-.28	-.001	-.54
Resident-to-worker ratio	-.05	-.63	-.32	.25	.25
Resident-to-worker ratio (days)	-.08	-.53	-.21	.27	.37
Exertion	.45	-.54	-.51	.38	-.23
Work Pressure	.53	-.83**	-.76*	.19	.003
Workload	.09	-.37	-.31	.38	.42
Workload Distribution	.02	-.39	-.08	.39	.17
Physical Demands of Job	.61	-.34	-.63	.57	.08
Working Short-Staffed	.13	-.33	-.01	.09	.70

* Correlation is significant at the 0.05 level (2-tailed); ** Correlation is significant at the 0.01 level (2-tailed).

Appendix F: Financial benefits analysis: The relationship between injury rates and FTE-to-resident ratios

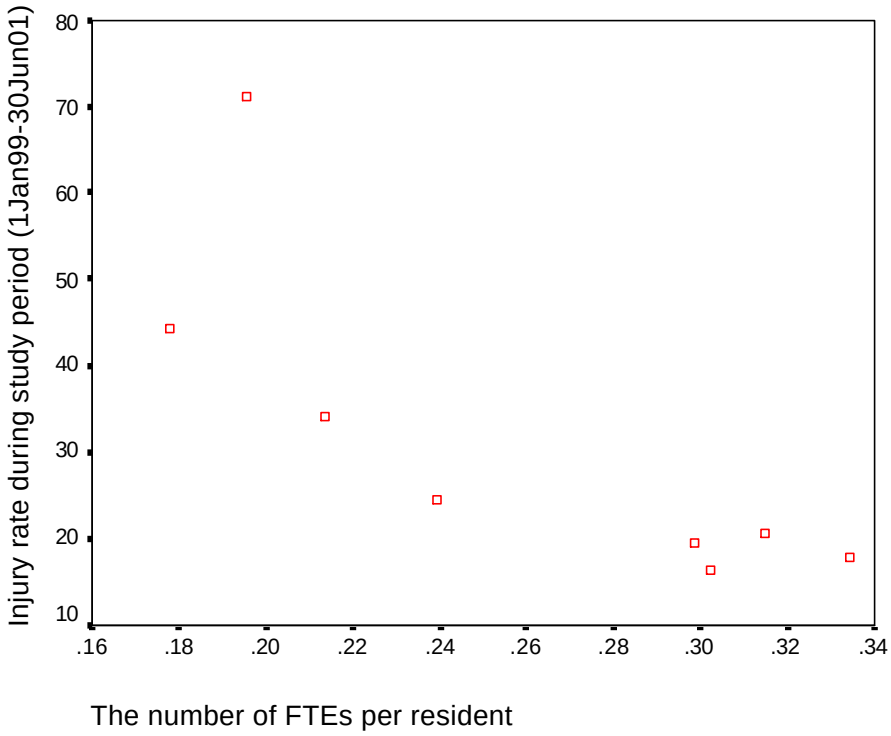


Figure 1. The scatter plot of staff ratio (FTE per resident) and injury rate during the study period

The relationship between staffing ratios (the number of FTE per resident) and injury rates at the facility level were examined in detail. Figure 1 is a scatter plot showing the relationship between the two. Assuming these eight facilities are representative of all Intermediate Care facilities, the scatter plot reveals a strong relationship between staffing ratios and injury rates. In general, facilities with higher staffing ratios (more FTEs per resident) show lower injury rates.

To generalize the relationship between the two variables within the data range most accurately (with minimal error), several mathematical functions were fitted to the data. These results are presented in Table 1(Fitted models and related statistics). Among seven mathematical models, Exponential 2 model fit the data best with the largest R_2 and smallest standard error of estimation (SEE). The equation explaining (predicting) injury rates based on the staffing ratios for the Exponential 2 model is:

$$\text{Injury Rate} = e^{B0 + B1/\text{staff ratio}} = e^{1.42 + .46/\text{staff ratio}}$$

This fitted line is depicted in Figure 2 (Best fitting curve) along with the actual or observed data points. This figure shows that a small increase in staffing ratio may result in a large reduction in injury rate for facilities with low staffing ratios and high injury rates, whereas this is not the case for facilities with high staffing ratios and low injury rates. This implies that increasing staff for HIRFs with low staffing ratios may reduce their injury rates, whereas increasing staff for LIRFs

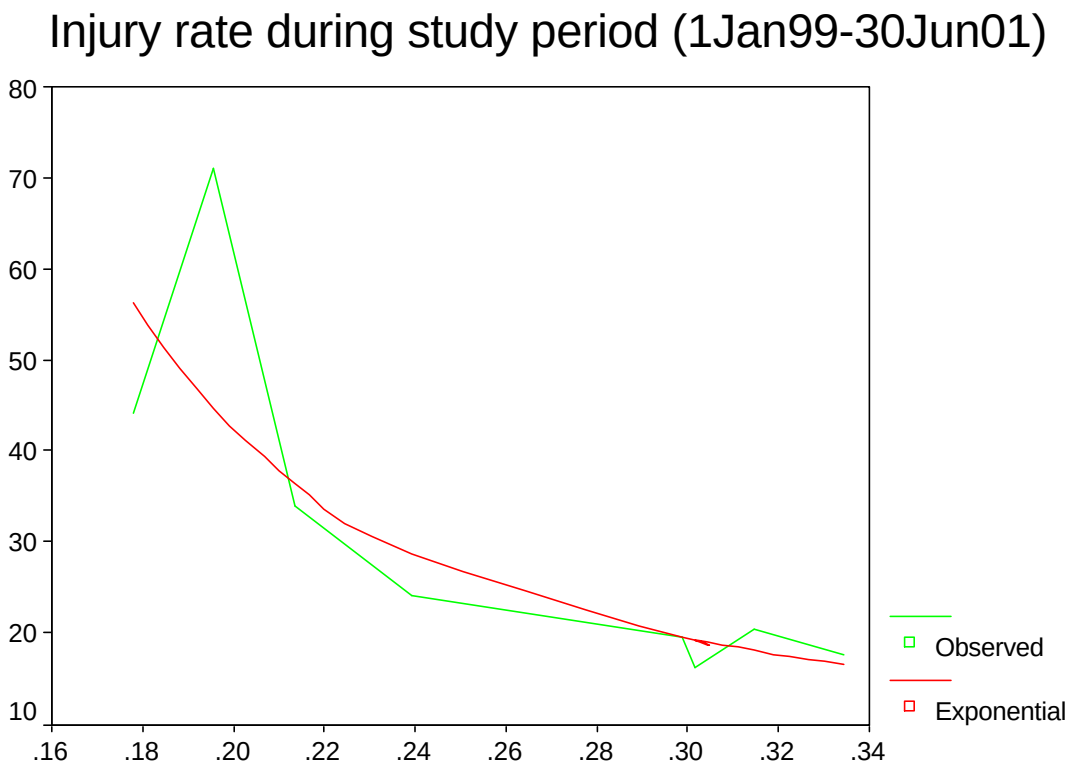
with high staffing ratios may not have an appreciable effect on their injury rate.

Table 1. Fitted models and related statistics

Model	R^2	SEE	B_0	B_1	B_2
Linear	**.64**	**12.26**	**95.68**	**-249.34**	
Quadratic	**.68**	**12.50**	**219.17**	**-1264.01**	**1983.24**
Logarithm	**.65**	**11.93**	**-55.71**	**-63.10**	
Inverse	**.66**	**11.76**	**-31.40**	**15.39**	
Power	**.80**	**.25**	**1.97**	**-1.91**	
Exponential 1	**.78**	**.26**	**194.47**	**-7.58**	
Exponential 2	**.81**	**.24**	**1.42**	**.46**	

These results should be interpreted with caution. First, these statistics are based on only eight facilities, which may not necessarily be representative of IC facilities across the province or of larger population samples of facilities. In addition, a sample size of eight is extremely small for making any specific parameter-related inferences; the estimated parameters may be unstable. For example, the elimination of one facility from the analysis would have a large impact on the results. In this analysis, deleting the facility with the highest injury rate (because it appears to be an outlier) produces a less steep curve, which implies that the gain associated with additional staffing would not be as great. Further, the results for these eight facilities merely identify a relationship between staff ratios and injury rates, and do not imply a causal relationship. Other important determinants of injury rates were not included in the model. Additionally, the timing of the data collection was not appropriate to support causal inferences: the staff ratios were recorded at the end of the study period while injury rates were assessed for the entire study period (30 months). Although there is likely to have been minimal change in staffing, we advise caution because of the nature of the data collection.

Figure 2. Best fitting curve



Appendix G: REFERENCES

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The Ergonomic Report

An Analysis of Physical Work of Care Aides

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E1 Introduction

Early in the project, ergonomists Judy Village, Tony Leyland, and Carol Uy conducted tours and informal interviews at several Intermediate Care facilities (non-study facilities) to gain an understanding of issues relating to physical work, work organization, staffing, resident needs, care aide concerns, health and safety incidents, and administrator concerns. During these visits, each ergonomist was paired with a care aide and permitted to observe them during work activities, ask questions, and record observations. These informal interviews and task analyses were recorded and later discussed by the ergonomics group. The main findings from the on-site research, which helped to focus the next phase of methods development, were that:

- physical demands on care aides can vary tremendously, even when working with the same residents;
- it is impossible to define a "typical" workload or shift;
- resident handling is relatively minimal and thus may not account for many injuries; and
- injuries are multi-factorial, and contributing factors may include facility design, equipment availability, number of tasks performed (resident-care and non-resident-care), and the individual worker's technique and posture.

The ergonomists observed that workload variation occurred between resident assignments (number of residents and their functional capabilities), between two care aides with the same resident assignment, and even with the same care aide and resident assignment on different days. The non-cyclical nature of the job, which results in workloads that vary across and between shifts, raised a challenge in determining and describing the physical work of care aides. Another challenge lay in determining a "typical" workload due to the many variations from numerous demands. Care aides and management were reluctant to describe anything as typical.

Another observation that guided methods development was the relationship between resident acuity (dependence) and the physical demands of the job. Although many determinants may affect this relationship, the ergonomists assumed that caring for more severely dependent and ill residents results in more physically demanding work for care aides. For example, residents who cannot walk, toilet, dress, and feed themselves independently require more attention, which increases physical workload and produces an increased risk of musculoskeletal injury (MSI) for the worker.

Resident handling and incidences of physical aggression were described by the workers and managers as the most common cause of acute back strain. Yet preliminary observations of care aides revealed very few tasks that appeared to involve the high peak spinal loading that can result in acute back strain. As well, reports of physical aggression were said to be relatively rare. However, the ergonomists did observe that care aides were at risk of injury due to repeated and sustained bending and twisting of the spine, such as assisting a resident to dress, eat, toilet, walk, and bathe, and in non-resident care activities such as bed-making.

An extensive review of the ergonomics literature for methods and techniques of measuring physical workload revealed that the majority of methods involved short-cycle work. It was determined that a variety of ergonomic methods would be employed including: collection of information directly from records; measurement of physical layouts within each facility; interviews with care aides; specific questions within the telephone survey; direct observation and

documentation of task performance and frequency of performance; and direct measurement of several determinants of acute and cumulative physical demands. The proposed methods were then evaluated in a three-day pilot test conducted at a non-study Intermediate Care facility. Based on results of the pilot study, the ergonomic methods were modified and detailed research protocols were drafted.

E2 Ergonomic hypothesis and objectives

An ergonomic hypothesis was developed stating that facilities with higher injury rates would have workers who experienced one or more of the following:

- more time in bent and twisted postures (increased spinal loading);
- more lifting, transferring, and assisting of residents;
- more instances of physical aggression; and/or
- more instances of unexpected physical loading (e.g., resident falling).

It was hypothesized that increased spinal loading among workers in facilities with higher injury rates could be due to many possible determinants. The ergonomics group suggested that each of the following factors could have some relationship to physical workload and spinal loading, and would thus need to be measured:

- staffing levels, as measured by resident-to-worker ratios and staffing at heavy times of day;
- acuity or dependence of residents (the number and distribution of residents who require a high level of care);
- layout of facility (e.g., hallway length/width, room dimensions);
- equipment availability (bathing equipment, mechanical lifting equipment, electric beds, etc.);
- number of resident lifting, transferring, and repositioning tasks performed per care aide per day;
- frequency and organization of bathing residents; and
- frequency of bed-making.

The objectives of the ergonomic analysis of physical work of care aides were to:

- determine if there are differences in the physical work load of care aides in high injury-rate facilities compared with low injury-rate facilities; and
- determine the physical work variables related to increased risk of injury, MSI, and musculoskeletal pain.

Physical workload would be determined from the following measures:

- cumulative spinal compression (lower back);
- peak spinal compression (lower back);
- peak neck and shoulder muscle activity;
- total number of transfers, repositions, baths given, and beds made;
- facility design (age of building, length and width of hallways, dimensions of resident rooms and bathrooms);
- ratings of perceived exertion; and
- dependency of residents.

E3 Literature review

Peak spinal loading has been identified as a risk factor for low back disorder by several large epidemiological studies (Marras et al., 1993; Punnett et al., 1991). Each of these studies of the risk factors for MSI of the low back used sophisticated data collection and analysis techniques. The peak risk factors included torso angle of more than 20 degrees, torso velocities, spinal compression, and lumbar moment of force. These studies were conducted using jobs in repetitive work environments that involved relatively short duration work cycles. Punnett et al. (1991) utilized video methods to show that the relative risk of back injury is related to both the amount of trunk bend and the percentage of the work cycle in which the trunk was bent. Although monitoring of posture exposure over several hours of work is technically feasible by video, the methods are very tedious, time consuming, and expensive.

Cumulative spinal loading has also been identified as a risk factor for low back disorder. Kumar (1990) used a structured questionnaire / interview in a retrospective study of 161 Alberta institutional care aides (14 males, 147 females). Those with back pain (6 males, 95 females) were compared to those without back pain (8 males, 52 females). Spinal loading estimates were obtained by using recall, line drawings, and/or a manikin model to obtain estimates of working postures; these postures were then analyzed using a two-dimensional biomechanical model. Cumulative compressive and shear loads were then calculated based on estimates of task duration and frequency. The groups with pain had significantly greater average estimates of cumulative spinal compression (males = 15.6 MN.s, females = 14.5 MN.s) than the no-pain groups (males = 6.6 MN.s, females = 9.3 MNs). Even though the recall approach has the potential to affect the magnitude of the cumulative compression estimates, this is one of the first studies that clearly identified this risk factor in an occupational setting.

Norman et al. (1998) was one of the first large-scale case-control epidemiological studies to look at psycho-social, biomechanical, and demographic risk factors for the reporting of low back pain, including peak and cumulative exposure variables. The study was conducted in an Ontario automotive assembly facility. Independent risk factors identified for the reporting of low back pain were: 1) peak shear force on the lumbar spine; 2) cumulative compression integrated over the duration of the shift; 3) usual (not peak) force on the hands; 4) workers' perceptions of high physical demands, 5) poor workplace social environments; 6) low job control; 7) high (not low) co-worker support; 8) high (not low) job satisfaction; and 9) better education relative to those who performed similar jobs. The odds ratios for the combination of risk factors were 15:1 for low back pain. Extensive biomechanical measurements were made on more than 250 workers over a two-year period with observations ranging from two to eight hours during normal work (104 cases and 130 controls) and representing more than 1,175 assembly and maintenance tasks. All workers were videotaped, and a trained observer identified all occurrences of "substantial" spinal load by estimating the instants of high spinal moments resulting from forward inclined trunk postures and/or high forces on the hands. These postures were then analyzed in a computerized biomechanical model to determine peak spinal loads. The cumulative spinal load for each job was calculated by totaling the cumulative spinal loads estimated for all of the tasks performed for that job. A cumulative load for each task was calculated based on the peak load for the task and the duration of exposure.

Norman et al. (1998) found strong correlations within peak spinal loading variables and within

cumulative loading variables, but poor correlation between the two. This indicates that peak and cumulative loading are measuring different aspects of risk for these jobs. The final multivariate logistic regression model of the biomechanical variables contained four risk factors related to the reporting of low back pain: 1) peak lumbar shear force; 2) peak torso flexion velocity; 3) cumulative lumbar moment over the entire shift; and 4) time averaged usual hand force. For workers exposed to all four risk factors, the odds ratio was more than 6.0. They also reported that very little predictive power was lost by substituting cumulative spinal compression for cumulative integrated lumbar moment in the regression model.

A recent study by Burdolf and van der Beek (1999) discussed the challenge of choosing appropriate assessment techniques for occupational studies of musculoskeletal disorders. They reported data using an inclinometer attached to the trunk of nurses in a Dutch nursing home. The inclinometer, attached at L2-L3, measured eight hours of continuous angular position of the trunk in the sagittal plane (frequency of 16 Hz) and compared this with office workers. Trunk angle was divided into four classes and duration into five classes. The frequency of trunk motion in each class was compared, as was the percentage of trunk postures in a particular angle for a particular time. The researchers reported that not only were nurses more often found in flexed positions greater than 40° (104 times/hour vs. 48 with office workers) and 60° (46 times vs. 10), but nurses also spent more time in these postures than office workers (5% vs. 2.4% and 1.9% vs. 1.0%). The combination of these two factors would tend to result in higher cumulative spinal loading for the nurses compared to the office workers.

Seidler et al. (2001) used a modification of the Kumar (1990) approach to evaluate cumulative occupational exposure of the lumbar spine to lifting, carrying, and working postures with extreme forward bending. A case-control study was conducted between 229 male patients with symptomatic osteochondrosis or spondylosis of the lumbar spine and 197 control subjects. Data were gathered in structured personal interviews. Instead of using a biomechanical model to evaluate specific working postures, cumulative forces to the spine over the entire working lifetime were calculated using a Mainz Dortmund dose model, based on over-proportional weighting of compression force relative to respective duration of lifting. Self-reported estimates of occupational lifting, flexion, and duration were collected, and a lifetime cumulative dose calculated. Seidler et al. (2001) found that working postures with extreme forward bending for up to 1,500 hours (calculated over all working years) was associated with the diagnosis of osteochondrosis or spondylosis (OR 2) and the odds ratio increased to 4.3 for more than 1,500 hours exposure. Combined exposures to lifting or carrying with working postures with extreme forward bending yielded an odds ratio of 16:1. This is one of the first studies to use a cumulative exposure risk factor as an independent variable. The authors noted that, although a pathogenic concept of chronic increases in inter-vertebral pressure has long been considered an important cause of lumbar spinal disease, it has been difficult to quantify. This quantification is relevant in Germany where compensation systems recognize occupational disorders of the lumbar spine due to lifting, carrying, and bending.

Several authors have recently discussed the array of various techniques for measuring workload exposure in musculoskeletal studies (Burdorf and van der Beek, 1999: Wells et al., 1997; Guangyan and Buckle, 1999; Genaidey et al., 1994; van der Beek and Frings-Fresen, 1998; Wells, et al., 1994). Some authors have broadly classified the various assessment techniques into

three categories: subjective judgment by workers, systematic observations, and direct measurements. In the first category, workers respond to questions, usually in self-administered questionnaires, diaries, or interviews. Burdorf and van der Beek (1999) suggest that information collected in this way is subject to systematic bias and lack of precision and that little is known about the factors affecting self reports, such as the relationship with health status. However, Toomingas et al. (1997) found no differential bias in exposure ratings in studies of musculoskeletal disorders where subjects reported both exposure and outcome variables. Wells et al. (1997) stated that with self reports, respondents could identify whether exposure to vibration or lifting stress occurred, but did not tend to give reliable information on either the nature or magnitude of the exposure. The advantages of questionnaire data are the efficient, low resource usage and potentially large sample size.

Various researchers have developed postural recording and assessment tools (e.g., OWAS, RULA) to facilitate the systematic observation approach. These tools are designed to use either direct observation or video recordings as a sampling measure. They are best suited for short-cycle time, cyclical jobs; otherwise, the methods are very time consuming and labour intensive.

Direct measurement, the third assessment category, is generally preferred. It tends to yield specific information regarding the components of a physical load. Equipment costs, set-up time (e.g., calibrations), and analysis time all tend to increase the costs of this approach, and so Burdorf and van der Beek (1999) argue that information of this nature must be integrated with other measures. The trade-off between various approaches is the amount of precision and accuracy in exposure level, duration, and frequency. Burdurf and van der Beek (1999) compared observational measurement (more than two hours) with direct measurement (more than eight hours) for the same day with nurses and office workers. While there were large standard deviations with both measurement techniques, indicating substantial variation in trunk flexion within and between workers, the correlation between the two methods was extremely low or absent. The authors conclude there is a current trend toward quantification of risk factors through direct measures. They also identify the most challenging problem as the optimal utilization of available resources in relation to study design, the risk factors of interest, and the sources of variation in exposure to these risk factors within and between workers.

Wells and Norman et al. (1994 and 1997) have demonstrated an EMG-based, biomechanical approach that allows several external exposure parameters, such as posture, force, and movement, to be combined with the anthropometrics of workers into a single estimate of compressive force at the lumbosacral joint. The resulting force, measured in newtons, is considered a proxy for internal exposure to forces acting on a specific part of the spine. Norman et al. (1998) demonstrated that several parameters of cumulative loading and peak loading were significantly associated with workers who had low back pain. Spinal compression was chosen as the common metric (or consistent measure) for investigating exposure of different jobs since it has biomechanical justification. Spinal compression encompasses many of the risk factors found in other studies such as non-neutral trunk postures and lifting (Wells et al., 1997); in general, spinal compression is strongly related to the trunk moment of force. Marras et al. (1993) found the trunk moment of force to be strongly related to low back disorders. Wells et al. (1997) identified that although injury reports cannot be directly related to spinal motion unit failure, a high loading of the spine is almost impossible to separate from high loads on other spinal tissues

such as muscle and ligament.

Mientjes et al. (1999) recently compared the EMG-based method used by Wells and Norman to videotaped recordings and three-dimensional biomechanical modelling. The authors concluded that EMG normalized to spinal compression per unit of EMG was accurate for assessing exposure to risk of low back injury, especially in prolonged tasks and those free of dominant axial twisting moments. The technique was successful in estimating the probability at a selected spinal compression force in most situations, with EMG averaging 14% higher. The authors concluded that this technique is acceptable for field use because in the field, pure axial twisting is uncommon. The technique is also attractive for field use because workers can perform their jobs, without restriction, in their normal work environment. It also eliminates the need to videotape a worker, which facilitates analysis time and greatly reduces cost.

E3.1 Measuring resident dependency

The ergonomists determined that residents' health and their dependency on care aides for activities of daily living (ADL) dictated a major component of the physical load experienced by workers. A survey of facilities led to the conclusion that ratings of functional independence were not standardized. Some nursing homes utilized specialized occupational or physical therapists to assist with this task and others did not. A review of the literature on standardized tools, informal telephone interviews with leaders in the physical and occupational therapy field, and a closer investigation of existing tools led us to conclude that the Functional Independence Measure – the FIM™ instrument – would be most appropriate (Guide, 1997).[1] (FIM™ © copyright 1997, Uniform Data System for Medical Rehabilitation (UDSMR). All rights reserved. Used with permission of UDSMR University of Buffalo, 232 Parker Hall, 3435 Main St., Buffalo, NY 14214.)

The FIM™ instrument is a one-page assessment tool that considers independence in activities such as self care, sphincter control, mobility, locomotion, communication, and social cognition; it requires approximately 15 minutes of on-site assessment time per resident by a familiar caregiver. The tool's reliability has been demonstrated (Ottenbacher et al., 1996; Pollack et al., 1996). One ergonomist received training on the use of the FIM™ instrument.

E4 Methods

As mentioned previously, pilot tests to help formulate the ergonomic analysis methods were conducted at a separate Intermediate Care Facility (i.e., not one of the eight in the final study) in June 2001. Results of within-subject and between-subject data were analyzed and presented to the research group. The preliminary results and research group feedback allowed the final evaluation protocol and sampling strategy for the ergonomic assessment component to be established.

It was previously determined that a "typical" unit was difficult to identify. In an effort to ensure a reasonable comparison of workload for the ergonomics analysis, the director of care and an HEU representative at each of the eight facilities was asked to choose the unit considered the most "physically demanding." The ergonomists then asked the director or Hospital Employees' Union representative to approach care aides in that unit who had a minimum of one-year experience in the facility and had been free of back pain for three months. Care aides who met these criteria were invited to participate in the study, made aware of the procedures via a written consent form,

and asked to sign the form prior to the ergonomic assessment.

Between January 17 and February 15, 2002, ergonomic assessments were conducted at all eight facilities. At each facility, four care aides from the chosen unit were instrumented and observed, two the first day and two the second day. A return visit to one facility was necessary to collect data on two other care aides due to technical difficulties on one test day.

At the beginning of the day shift (usually 6:00 a.m. to 7:00 a.m.), care aides were brought to a room where the ergonomic testing equipment was based. Care aides were again briefed about procedures; potential risks and informed consent were confirmed. An area of skin was prepared and cleaned with an alcohol wipe over the trapezius muscles of their shoulder and at L3/L4 over the belly of the erector spinae muscles in their lumbar back. Surface electromyography sensors were taped to the skin at these sites on both sides of the body. The four channels of EMG were collected using a self-contained portable EMG data collection unit (Me3000P Mega Electronics Inc.) that was worn by the care aides in a fanny pack. To facilitate checking signal quality during the calibration trials, the raw EMG signals were collected at 1000 Hz and stored in the unit until transferred to a laptop computer. For the trials collected while performing their normal duties, the raw EMG signals were collected at 1000 Hz, full wave rectified and a 100 ms moving average window was used to calculate one sample every 100 ms (i.e., 10 samples per second).

To calculate the lumbar spine compression using the EMG, it was necessary to calculate a "compression normalization" calibration factor for the lumbar EMG. This was obtained by having each care aide bend to a trunk angle of 60° (with respect to the vertical) with their arms hanging straight down. To ensure adequate muscle activation, the care aide was asked to consciously keep the lumbar spine in lordosis. This was facilitated by having them extend their neck in an effort to "look up." While holding this posture, a 15-kg weight was placed in the hands of the care aide for five seconds. Three repetitions of this task were performed. The raw EMG signals were then full wave rectified and a 100 ms moving average window was used to create one sample every 100 ms. Each 5-second portion of the EMG-time history when the subject was holding the 15 kg was identified, and the average EMG, in micro volts (μv), for the middle 3 seconds of this period was calculated. The average of these three values was then calculated.

The care aide's height, weight, and gender were then input into a biomechanical model (4DWatbak, University of Waterloo). The model's mannequin was positioned to match the care aide's calibration posture (60° trunk flexion); the 15-kg mass being held in the hands was also entered. The spinal compression, in newtons (N), which the model determined to be acting at L4/L5, was then recorded. An EMG-to-Compression calibration factor (N/μμv) was then obtained by dividing the L4/L5 compression, as calculated by the biomechanical model, by the average EMG produced in the three repetitions of the calibration posture.

Trapezius (shoulder) EMG data were calibrated at the start of the care aide's first rest break in the morning. The worker stood on a platform and restraining straps were placed snugly over their shoulders. The care aide was then asked to raise their shoulders against the resistance of the straps to exert an isometric, maximal voluntary contraction (MVC) of the shoulder muscles. Three maximal contractions were collected in raw EMG. The average of the three peaks was

used as the maximum, and subsequent trapezius EMG was scaled as a percentage of MVC.

Care aides were instructed to perform their duties as they normally would while wearing the fanny pack and EMG sensors. An ergonomist followed and observed each care aide for the entire shift, respecting residents' privacy and documenting major tasks performed such as making beds, performing manual lifts and transfers, repositioning residents, using mechanical lifting devices, and bathing residents.

The EMG signals were downloaded to a laptop computer after five segments of the day shift: 1) pre-breakfast (shift start to the beginning of breakfast); 2) breakfast; 3) pre-lunch (post-breakfast to pre-lunch); 4) lunch; and 5) post-lunch. At completion of the day shift, an ergonomist interviewed the care aide, collecting demographic information, history of previous injuries and pain, subjective assessments of workload during the day, and estimates of number of tasks performed. Care aides were asked about problems with the testing equipment and whether the day was "typical" of their workload. The ergonomists also gathered information about facility design and equipment, such as number of lifting devices available. Measurements were taken of hallways and resident bedrooms and bathrooms. Later the same or following day, an ergonomist conducted intensive interviews with one or more care aides to determine a FIM™ instrument score for each resident.

E5 Analysis of EMG data

Cumulative spinal compression: The cumulative spinal compression for each trial, for each care aide, was calculated using software provided with the portable EMG system (ME3000P, Version 1.5, Mega Electronics Ltd., Finland) and the "compression normalization" calibration factor. For each trial, the EMG software calculated the integral (or area under the curve) for the low back channel producing a value in μv*s. Multiplying this value by the calibration factor (N/μv) produced the amount of cumulative compression (N*s) associated with that period of activity.

It is possible for a person to stand and not produce any EMG (e.g., while standing upright). This creates an anomaly because, even when standing, the lumbar spine is compressed by the mass of the upper body, which is more than half a person's weight. To correct for this anomaly, a standing cumulative compression bias was added to each of the care aide's compressions. The bias (N*s) was determined by multiplying the lumbar compression (N) while standing upright, as calculated by the biomechanical model, by the length of the care aide's shift in seconds (minus breaks) and then added onto the cumulative compression calculated from the EMG.

It was also typically impossible to collect EMG for the entire shift (e.g., patient care data could not be collected while the worker was being hooked up to the EMG electrodes and having calibrations performed). The amount of time that EMG was not collected was determined by calculating the difference between the shift length in seconds (minus breaks) and the amount of time EMG data were collected. Since the compression pre-breakfast appeared higher than other portions of the day, the measured average cumulative load pre-breakfast was multiplied by any missing time due to instrumentation and calibration and then added to the pre-breakfast cumulative compression. The average spinal compression for the remainder of the day was multiplied by the missing time over the remainder of the day; this value (N*s) was then added to

the value previously calculated for cumulative compression to produce a total shift-long cumulative compression value. Total cumulative compression for a full seven-hour shift was expressed as MegaNewton * seconds (MN*s).

Average compression was determined for each of the five periods in the day by taking the cumulative compression (μv*s) for that time period, multiplying by the calibration factor (N/μv) and adding the appropriate standing bias value (N*s), and dividing by the amount of time that EMG was collected during that period. Average compression is expressed in newtons (N) for comparison between periods of the day. It was also possible to compare average compressions as a percentage of standing compression. This illustrated how the average compression on the lumbar spine, for each time period, compared to compression during normal upright standing. This was calculated for each subject by dividing their average compression for the time period by their standing compression as calculated using the biomechanical model and multiplying by 100. These values were then compared across time periods. Cumulative compression means, medians, and standard deviations were then calculated for the four subjects for each of the eight facilities and compared with other variables.

Peak spinal compression (lower back) and peak neck/shoulder muscle activity: Peak values for both lumbar (lower back) and trapezius (shoulder) EMG data were determined by exporting the EMG files for each care aide, for each time period. Using an EXCEL spreadsheet, each file was converted into an amplitude probability distribution function (APDF). For the trapezius, APDF values at the 10^{th}, 50^{th}, 90^{th}, 95^{th} and 99^{th} percentiles were recorded for comparison with guidelines suggested by Jonsson (1979). For the lumbar EMG, values were taken at the 95^{th} and 99_{th} percentiles. In addition, for lumbar EMG, the percent of duration of activity that EMG peaks exceeded 3400 N was calculated for each time period in the day. The National Institute for Occupational Safety and Health (NIOSH) in the U.S. considers 3400 N as the cut-off above which spinal compression increases risk of back injury.

For purposes of comparison with other variables in the project, the 99_{th} percentile peaks for both lumbar and trapezius muscles were used. For some care aides, data were sometimes missing for breakfast and lunch periods. However, these data were of shorter duration and generally lower in magnitude, and were therefore eliminated in the analysis and presentation of peak data. The 99^{th} percentile APDF for the remaining three periods of the day was recalculated, and this single value for each subject was used in calculation of average peak.

E6 Results and discussion

E6.1 Demographics of ergonomic subjects

In total, 34 subjects from eight facilities participated in the ergonomics evaluation; the additional two subjects were due to a third day at Sumac Home after some data were missed in the first day of testing. Most subjects worked seven hours after break times were deducted. Hence, approximately 230 hours of EMG data were collected over the duration of the testing. Of the 34 subjects, all were female except for four males. Their average age was 46 years (SD 8.8 years); their average height was 161.8 cm (SD 7.6 cm), and average weight was 66.5 kg (SD 12.15). The subjects were generally experienced care aides, with an average of 12.1 years experience (SD 7.6) and an average of 10.6 years experience at the current facility (SD 6.1).

Of the 34 care aides, 21 had one or more previous time-loss injuries and 13 had none. Injuries were related to the back (12) or shoulder (9). Seven care aides mentioned pain that was ongoing, and another 17 had one or more incidents of pain at some point in the previous year. Twelve care aides stated that they had been injured due to resident behaviour. When asked about workload at the end of the shift, 2 subjects said the workload had been "light," 17 said "moderate," and 15 said "heavy."

E6.2 Results of cumulative spinal compression (lower back)

Means and standard deviations of cumulative spinal compression for each of the eight facilities are shown in Table E1. The overall mean for high injury-rate facilities (HIRFs) is compared with low injury-rate facilities (LIRFs); the non-significant p-value is shown for a 2-tailed t-test (0.2). The second overall mean and p-value shown is with one HIRF removed from the calculations. The injury rate for this facility was on the borderline between LIRF and HIRF. As Table E1 shows, the difference in the means is significant ($p<0.05$) when this borderline facility is removed.

Table E1 – Cumulative spinal compression (lower back) means (MN*s) and standard deviations for eight facilities

High injury-rate facilities (HIRFs)		Low injury-rate facilities (LIRFs)		P Value
Mean	**(std dev.)**	**Mean**	**(std dev.)**	
22.78 **18.15** **16.51** **13.07**	**(4.65)** **(4.06)** **(3.67)** **(3.09)***	**17.78** **14.17** **11.69** **17.02**	**(5.44)** **(2.71)** **(1.52)** **(5.27)**	
Overall mean: 17.62	**(5.02)**	**Overall mean: 15.39**	**(4.48)**	**0.20**
Overall mean*: 19.14	**(4.66)**			**0.04**

* This facility was removed for the second calculation of differences between the means.

Figure E1 shows the seven-hour cumulative spinal compression for each subject at all facilities compared with the low back pain reporting index. The low back pain index indicates the percentage of the population who are likely to report back pain at a given level of cumulative compression (based on data collected by Norman et al., 1998). For example, at 0.5 on the low back pain index, 50% of workers would likely report low back pain given a cumulative load of 23 MN*s. For comparison purposes, a person who stands upright for a seven-hour day would have a cumulative compression on their spine of 8.15 MN*s. Standing upright with a 13 degree forward bend for seven hours would yield a compression of 16.7 MN*s. Likewise standing upright with 75 pounds in the hands for seven hours would yield a compression of 16.6 MN*s. Therefore, cumulative spinal compression is based on the combination of bending and load handling over the course of a day.

Figure E1 shows levels of cumulative spinal compression ranging from 10.37 to 28.95 MN*s. Based on the index, the care aides' likelihood of reporting low back pain ranged from 26% to 63%, with a mean of 38%. Note also in Figure E1 the distribution of individual subjects according to their facilities. Although some individual subjects with high compression belonged to low injury-rate facilities (and vice versa), the clear trend is that high spinal compression is

associated with high injury-rate facilities.

Figure E1 – Cumulative spinal compression (lower back) for individual subjects compared with low back pain index

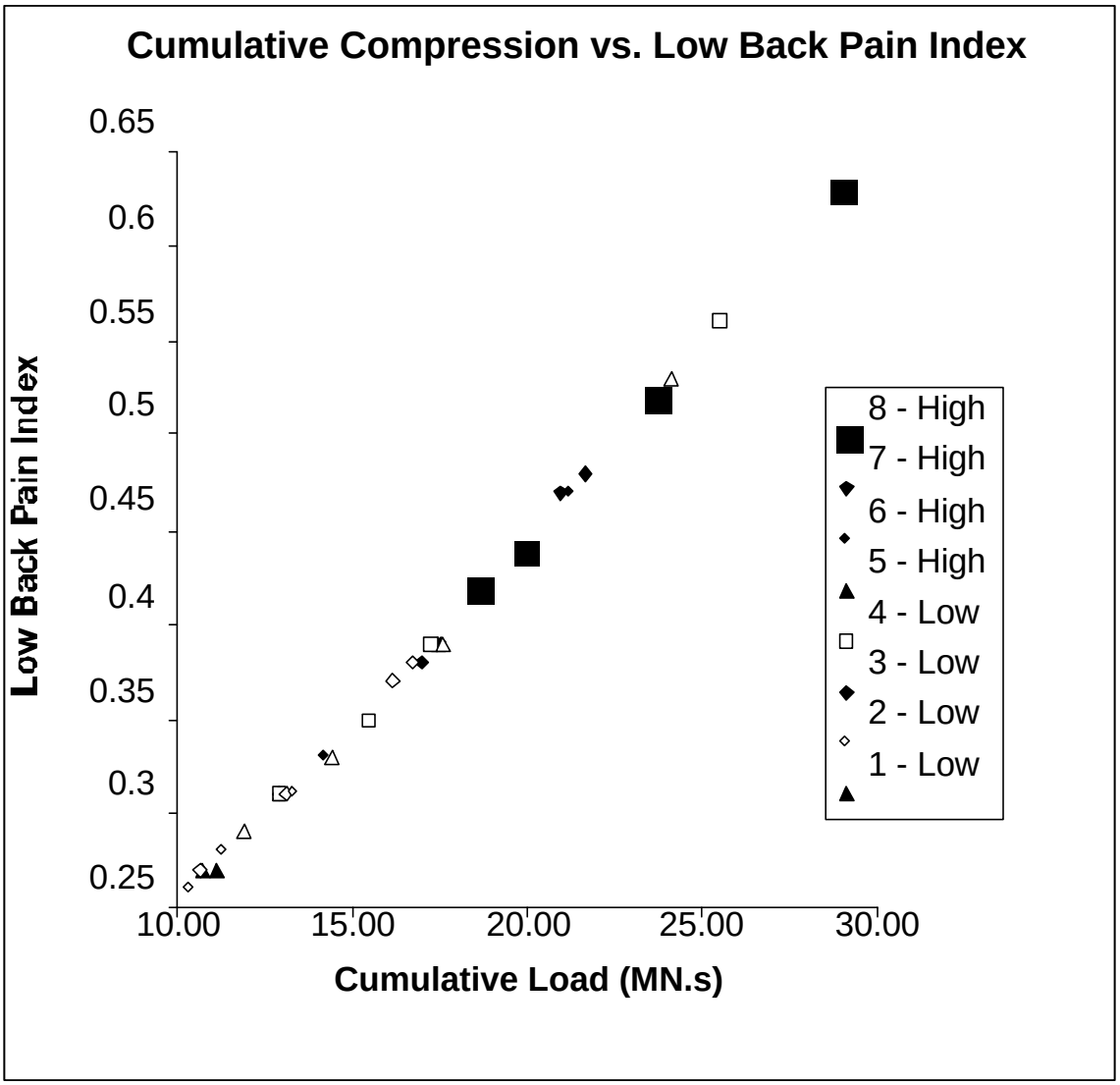


Table E2 shows the means and standard deviations for average spinal compression as a percentage of the subjects' standing compression during the day shift's five time periods. The values thus represent the compression for each period as a percentage above standing compression. Cumulative compression in each time period was converted to average compression by dividing the cumulative value by the total time that EMG was measured. This was done so short periods, such as breakfast and lunch, could be compared with longer periods such as pre-lunch. Average compression for each subject was then divided by the subjects' standing compression, calculated using the Ergowatch biomechanical model for the subjects' mass, height, and gender.

A repeated measures ANOVA compared the five time periods and showed significant results [$F(4.76)=11.412$, $p<0.001$]. Not surprisingly, Table E2 shows that average compression was highest in the pre-breakfast period when residents were being wakened, dressed, transferred to wheelchairs or walkers, toileted, and assisted to the dining hall. Pre-lunch had the second highest compression due to bed-making, assisting residents with toileting and bathing, and sometimes transferring them back to bed for a nap. Further analysis revealed that the mean cumulative compression was different between all pairs of time periods, except between breakfast and post-lunch. In most facilities, post-lunch was a quieter period because many residents were napping, and bed-making and bathing tasks were largely completed.

Table E2 – Average spinal compression represented as percent of standing compression for each time period for eight facilities (combined)

Time period	Mean (%)	Std. dev.	N
Pre-breakfast	**221.95**	**61.82**	**20**
Breakfast	**186.63**	**48.52**	**20**
Pre-lunch	**196.34**	**46.02**	**20**
Lunch	**171.51**	**42.94**	**20**
Post-lunch	**181.14**	**45.68**	**20**

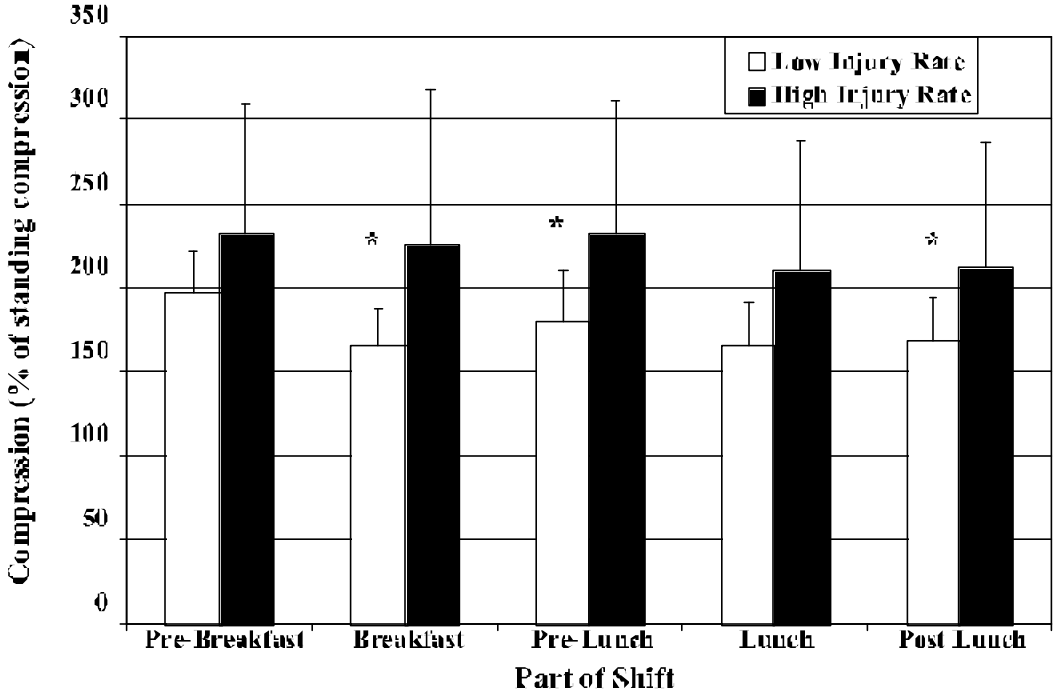
Means and standard deviations for compression at each time period are compared between LIRFs and HIRFs in Table E3 and Figure E2. In all cases, HIRFs had higher average compression for each time period. This was statistically significant ($p<0.05$) for breakfast, pre-lunch, and post-lunch periods. Pre-breakfast showed less differences in average compression between HIRFs and LIRFs ($p=0.11$) but the trend was similar. Most care aides considered pre-breakfast to be the "heaviest" period of the day. Data show that this period is indeed heavy even in LIRFs, with less difference in compression than in other periods. Lunch period, although not statistically significant ($p=0.059$), also showed a similar trend with higher compression in HIRFs.

Table E3 – Mean spinal compression (N) and standard deviations for each time period for low (LIRF) and high (HIRF) injury-rate facilities

Time period and injury rating	N	Mean	Std. dev.	Signif.
Pre-breakfast LIRF	15	197.58	24.96	0.111
Pre-breakfast HIRF	13	232.07	76.58	
Breakfast LIRF	13	165.88	22.15	0.027*
Breakfast HIRF	14	226.67	90.89	
Pre-lunch LIRF	15	180.65	29.46	0.024*
Pre-lunch HIRF	16	232.34	79.23	
Lunch LIRF	14	166.03	25.19	0.059
Lunch HIRF	11	210.11	78.31	
Post-lunch LIRF	15	169.61	25.10	0.042*
Post-lunch HIRF	16	212.46	73.92	

*significant at p<0.05

Figure E2. Mean spinal compressions and standard deviations as a percent of standing compression for each period of the day in low (LIRF) and high (HIRF) injury-rate facilities



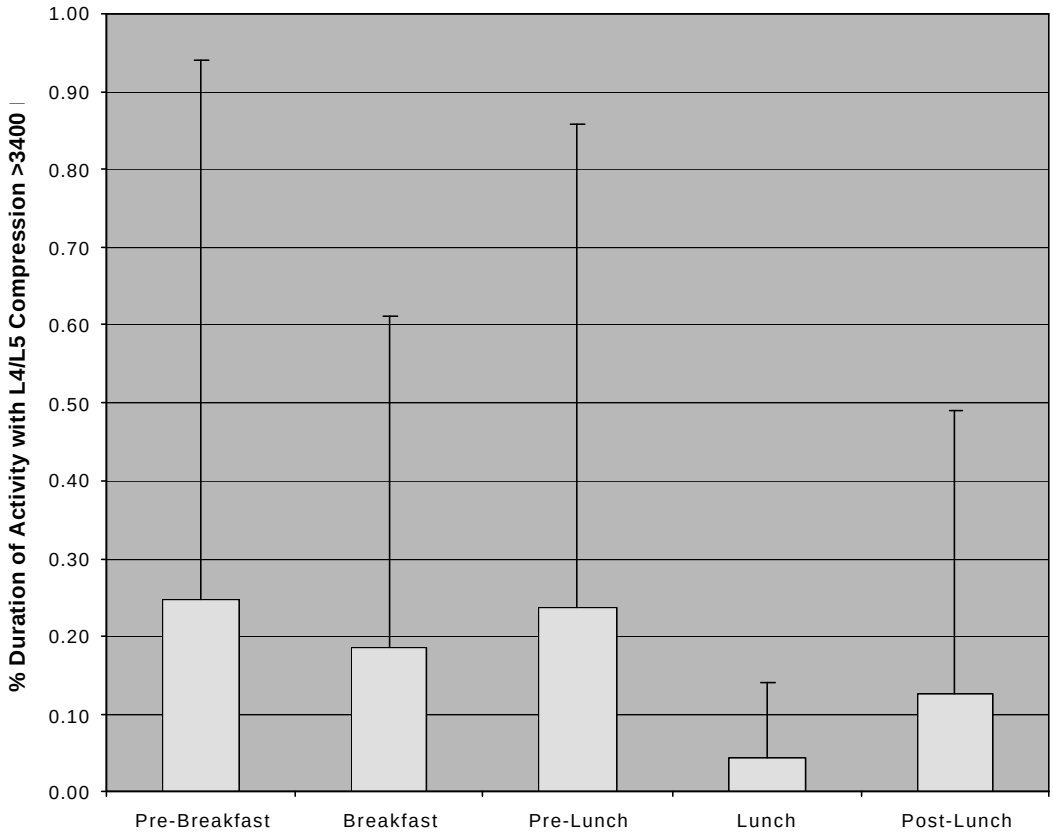
* designates significant differences in compression between LIRFs and HIRFs for this time period

E6.3 Results of peak spinal compression compared with NIOSH Action Limit

Averaged EMG files for each subject, for each time period, were converted into amplitude probability distribution functions (APDF), and peak values were extracted that represent compression values of 3400 N or greater. As mentioned previously, this is the level of compression suggested by the NIOSH Action Limit as the cut-off above which workers are at risk of back injury. EMG values of this magnitude can be caused by high levels of spinal compression, which may be associated with lifting or transferring a resident, reaching across and making a bed, and repositioning a resident in a bed or chair.

Figure E3 shows the percentage of the duration of each time period in which care aides had spinal compression exceeding 3400 N. Despite the large standard deviations in Figure E3, it is once again apparent that peak compressions are occurring mainly during pre-breakfast and pre-lunch periods. For example, the spinal compression exceeds 3400 N for 0.25% of the pre-breakfast period on average. In the 28 trials, the EMG collection during the pre-breakfast period averaged 75 minutes. Thus the average time that 3400 N was exceeded during pre-breakfast was11.25 seconds. Although this may seem to be a very small amount of time, it is important to consider that high spinal compression exertions in most lift and transfer manoeuvres are less than a second in duration.

Figure E3. Percent of duration of each time period that care aides' peak spinal compression exceeds the NIOSH Action Limit (3400 newtons)



E6.4 Results of peak spinal compression (lower back) and peak muscle activity (neck/shoulder) across facilities

To evaluate the differences in peak muscle activity between HIRFs and LIRFs, the 99th percentile amplitude probability distribution function (APDF) was used. Means and standard deviations for both erector spinae (lower back) and trapezius (neck/shoulder) EMG peaks are shown in Table E4. Peak lumbar EMG was converted to normalized compression and is expressed in newtons, while neck/shoulder peaks are expressed as percent of maximum voluntary contraction in micro volts. The 99$_{th}$ percentile APDF was calculated for the entire day by combining data files. Some subjects had missing data for lunch and breakfast (they were on breaks), so these periods were eliminated. Meals generally lasted a short duration – 30 minutes or less – and represented less opportunity for high EMG peaks.

The average peak (99th percentile) neck and shoulder muscle activity at both HIRFs and LIRFs was less than 20% of maximum voluntary contraction. This is well below the 40-60% maximum voluntary contraction recommended by Jonsson (1978) when measured at the 90th percentile. It therefore appears that peak neck and shoulder muscle activity is not problematic.

Table E4 shows that the differences between the means in HIRFs compared with LIRFs were not significant at the p=0.05 level. However, the size of the sample was small. Because both groups reached significance at the 0.1 level and showed higher APDFs for HIRFs, it appears that more subjects may have yielded a result of statistical significance. The trend seems to indicate more peak exertions in lower back and shoulder musculature in HIRFs compared with LIRFs.

Table E4. Peak spinal compression (N) and peak muscle activity (neck/shoulder, 99th percentile APDF) for trapezius in LIRFs and HIRFs over all periods of day (excluding breakfast and lunch)

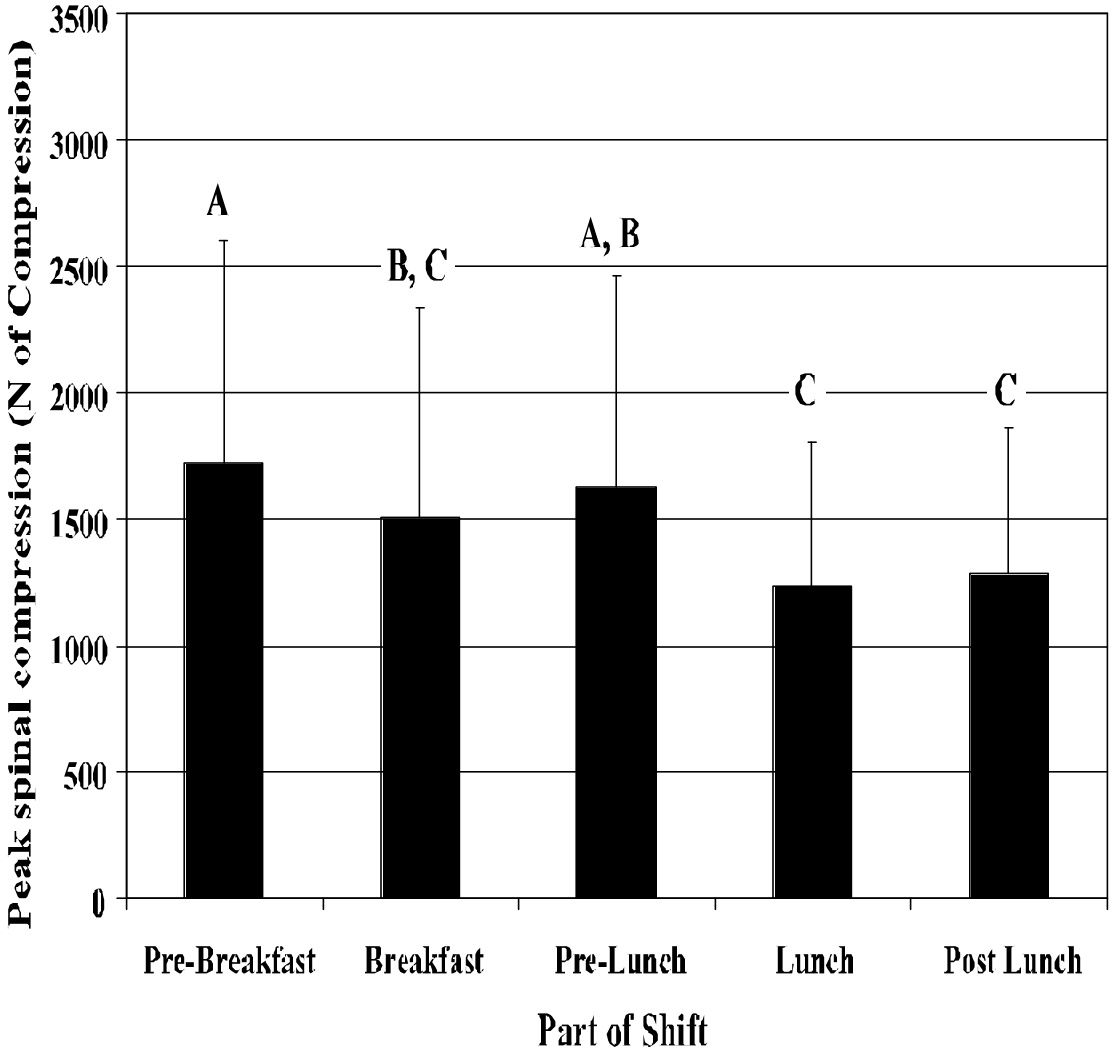
EMG	Injury rating	N	Mean	Std. dev.	Significance (2-tailed)
Erector spinae (N)	LIRF HIRF	**15** **11**	**1396.67** **1877.27**	**657.426** **869.610**	**0.121**
Trapezius (uV)	LIRF HIRF	**15** **13**	**11** **8**	**4.751** **13.717**	**0.075**

A comparison was then done of peak spinal compression and peak muscle activity (neck/shoulder) between time periods. The means and standard deviations for each time periods are shown in Table E5 and in Figure E4. There was a statistically significant difference between the five time periods (p=0.013) in peak spinal compression. Further analysis revealed that pre-breakfast and pre-lunch had the highest peaks and were not different from one another (A on Figure E4). Breakfast and pre-lunch were not significantly different from one another (B on Figure E4). In addition, breakfast, lunch, and post-lunch were also not different from one another and were the lower values on Figure E4.

Table E5 – Peak (99th percentile APDF) spinal compression (N) at five time periods

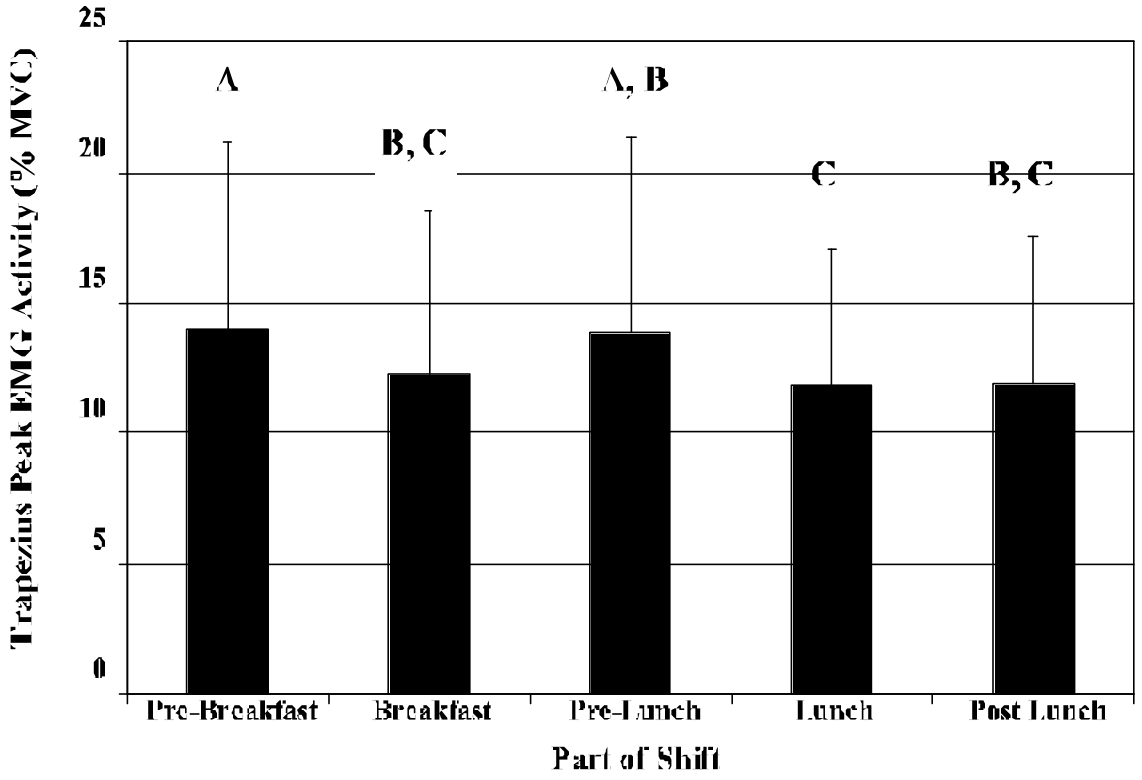
Time period	Mean (N)	Std. dev. (N)
Pre-breakfast	**1727.37**	**877.99**
Breakfast	**1502.63**	**835.21**
Pre-lunch	**1625.79**	**840.89**
Lunch	**1238.95**	**567.44**
Post-lunch	**1282.11**	**582.14**

Figure E4. Mean peak (99th percentile) spinal compression and standard deviation for five time periods



Mean peak neck/shoulder muscle activity in microvolts (99th percentile) and standard deviations are shown in Table E6 and Figure E5. There was again a significant difference between time periods ($p = 0.003$). The trends were similar to peak spinal compressions with highest peak activity in the neck and shoulder in pre-breakfast, followed by pre-lunch. These were not significantly different from one another, but pre-breakfast was different from all other time periods. Lowest muscle activity peaks in the neck/shoulder were during lunch; these peaks were not significantly different from breakfast or post-lunch. There were also no significant differences between breakfast and pre-lunch.

Figure E5 Mean peak muscle activity for neck/shoulder (99th percentile APDF, trapezius) and standard deviation for five time periods (microvolts)



The letters at the top of time periods indicate times that are significantly different from each other, $p < 0.05$.

Table E6 – Peak muscle activity for neck/shoulder (99th percentile APDF, trapezius) for five time periods (microvolts)

Time period	Mean (microvolts)	Std. dev. (microvolts)
Pre-breakfast	**14.00**	**7.17**
Breakfast	**12.32**	**6.31**
Pre-lunch	**13.89**	**7.53**
Lunch	**11.79**	**5.29**
Post-lunch	**11.89**	**5.56**

E6.5 Results of perceived tasks vs. observed tasks

A total of 35 subjects were observed during a full shift. Table E7 shows observed numbers of tasks compared with care aides' perceptions of the number of tasks performed in the shift. The table shows that the range and standard deviations for all tasks are very high. For example, some care aides were observed performing 20 transfers in their shift, while five care aides performed none. Even with the same residents, different care aides performed quite differently in observed tasks. Some care aides were observed to lift, transfer, and reposition residents quite frequently. Other care aides assigned to the same residents spent more time encouraging the resident to be independently mobile; hence, these workers performed very few lifts, transfers, and repositionings. For example, one care aide performed 15 manual lifts and transfers, while three other care aides performed none or one with the same residents.

On average, care aides performed between five and six transfers and a similar number of repositionings per shift. Some care aides did no bathing of residents because their facility had designated bath aides. Others gave up to four baths in a shift.

Table E7 – Observed tasks and perceived tasks performed during shift for 35 care aides

Observed task	Average number	Range	Std. dev.	Perceived task
Transfers	**5.6**	**0-20**	**5.5**	**12.7**
Repositions	**5.5**	**0-16**	**4.7**	**6.6**
Baths	**0.7**	**1-4**	**1.0**	**0.8**
Mechanical lift	**0.4**	**0-5**	**1.0**	**0.3**
Beds made	**6.3**	**0-17**	**5.1**	**N/a**

In general, the use of mechanical lifting devices was minimal: 26 of the 35 care aides made no use of mechanical lifts on the day of observation. At three facilities, none of the subjects used the mechanical lifts, although they did perform manual transfers. In another facility a care aide was observed using a mechanical lift five times and performing only one manual lift during the shift; at the same facility, other care aides performed the majority of their lifts manually (from 7 to 14 times). In general, it appeared that utilization of mechanical aids was at the discretion of the individual care aide rather than a function of facility policy or resident designations.

Perceived numbers of lifts and transfers did not correlate with observed numbers. Care aides said that, on average, they performed 12.7 lifts and transfers during the shift, yet observations by the ergonomists indicated less than half this number (5.5). The mean number of repositionings, baths, and uses of mechanical aids were close to the observed mean number, but there were no significant correlations between the two. This indicates that care aides' perceptions or memories

of tasks do not match what is observed.

E6.6 Correlating ergonomic measures with other study variables

The three major outcomes of the ergonomic analysis – cumulative spinal compression, peak spinal compression, and peak muscle activity (neck/shoulder) – were correlated with variables from the telephone survey and quantitative data collection. Results are shown in Tables E8.1 to E8.5, which group the variables as follows:

- Table E8.1: Injury rates, and self-reported pain, burnout, health, and job satisfaction;
- Table E8.2: Workload and job demands (observed tasks, perceived exertion, resident-to-worker ratio, etc.);
- Table E8.3: Organizational culture (fairness, support, etc.);
- Table E8.4: Safety environment (dementia training, access to mechanical lifts, etc.); and
- Table E8.5: Physical environment (room size, hallway length, etc.).

Table E8.1 Injury rates and self-reported pain, burnout, health, and job satisfaction

	Cumulative spinal Compression (lower back)	Peak spinal compression (lower back)	Peak muscle activity (neck/shoulder)
Time-loss injury rate (study period)	+*	+*	
MSI injury rate	+*	+*	+
Days lost per FTE	+*	+*	
Time-loss days per total claims			+*
Any significant pain	+		
Neck pain in last year		+	
Upper limb pain in last year			+
Health			-*
Burnout (emotional/physical)			+*
Job satisfaction			-*

Explanation of symbols
"+" indicates a positive relationship between two variables with correlations between 0.5 and 0.7 (note that correlations were not rounded up to the highest level, so a 0.49 would not be considered significant).
"+*" indicates a relatively high positive relationship with correlations larger than 0.7.
"-" indicates a negative relationship with the magnitude of correlation between 0.5 and 0.7
"-*" indicates a relatively high negative relationship with correlations larger than 0.7.
A blank space indicates relatively small or no correlation (lower than 0.5).

Injury rates and self-reported pain, burnout, health, and job satisfaction: Table E8.1 shows that both cumulative spinal compression and peak spinal compression are highly correlated with injury rate, MSI injury rate, and days lost per FTE. This suggests that in workplaces where compression to the lumbar spine is high, there are more injuries and more days lost per injury. It is somewhat surprising that compressive load was only moderately related to pain in any body part and was non-significant with low back pain. Pain in the neck was moderately associated with peak spinal compression. The telephone survey used the NIOSH definition of moderate-to-extreme pain recurring at least monthly or lasting longer than seven days (Bernard et al., 1994), a definition that may have been overly exclusive. For example, workers with moderate-to-extreme recurring pain either may no longer be employed at the facility or in fact be off work with an injury; indeed, it would be difficult to perform the job of a care aide with recurrent or extreme

pain. Had we used a definition of "any pain in the last year," we may have seen different results with cumulative and peak spinal compressions.

Peak neck/shoulder muscle activity did not correlate highly with injuries and days lost (and only moderately for MSI injury rate). Instead, there were strong correlations with emotional and physical burnout, and strong negative correlations with job satisfaction and self-reported health (measured in the telephone survey). Workers with higher peak muscle activity in their shoulders and neck were more likely to report poor health, low job satisfaction, and high physical and emotional burnout. This is consistent with experiencing emotional and psychosocial stress as shoulder and neck tension. Workers with higher shoulder and neck muscle activity did report moderately more pain in the upper limbs.

Table E8.2 Workload and job demands

	Cumulative spinal Compression (lower back)	Peak spinal compression (lower back)	Peak muscle activity (neck/shoulder)
Cumulative spinal compression		+*	
Tasks observed (total)	+*	+*	+
Transfers (total)	+		
Repositionings (total)	+*	+*	
Exertion	+	+*	+
Resident-dependency-to-worker ratio	+	+*	+
Work pressure	+	+	+*
Workload			+*
Physical demands of job (rating)	+		+
Resident-to-worker ratio	+	+	+

See Table E8.1 for an explanation of symbols

Workload and job demands: Table E8.2 shows correlations between workload/job demands and ergonomic measures. Actual counts of tasks performed correlated well with cumulative and peak spinal compressions, showing strong relationships for total tasks observed and total repositioning, and moderate relationships with total transfers. Peak neck/shoulder muscle activity also correlated moderately with total tasks observed. Therefore, compression in the spine and muscle activity in the back and neck/shoulder are very much a function of how many tasks are performed. Perceived exertion among care aides in the ergonomic study correlated strongly with peak spinal compression and moderately with cumulative spinal compression and peak neck/shoulder muscle activity. Therefore, workers appear to be more sensitive to the peak demands of their jobs: those with higher spinal peaks reported heavier workloads during their shift. This finding underscores the need to measure both peak and cumulative parameters in the workplace.

When perceptions of workload and job demands from the telephone survey are compared with ergonomic measures, the strongest correlations are with peak neck/shoulder muscle activity. Facilities where workers had higher peak neck/shoulder activity had workers who reported more work pressures and that they were working too hard and had high physical demands. Cumulative spinal compression was moderately related to work pressure and physical demands of the job.

Workload pressure was moderately related to peak spinal compression.

Resident-dependency-to-worker ratios (a gauge of resident demands per worker) were strongly correlated with peak spinal compression and moderately correlated with both cumulative spinal compression and peak neck/shoulder muscle activity. The resident-to-worker ratio (number of residents to care aide/LPN) was moderately correlated with all three ergonomic measures; the day-shift staffing ratio was correlated with cumulative spinal compression and peak neck/shoulder muscle activity. It appears that many of these measures overlap and may in fact corroborate one another. Not surprisingly, low staffing levels were related to more loading. This can be explained by more tasks being performed (e.g., transfers, making beds, repositions) and a greater resident demands (based on more residents per care aide/LPN). This also results in significantly higher ratings of perceived workload, work pressure, and physical demands.

The workload and job demand variables all point toward the same general trend. Facilities with less staff have workers who perform more tasks, feel more work pressure, rate higher physical demands, have higher measures of cumulative compression and peak compression in their lower backs, higher peak muscle activity in their neck and shoulder region – and consequently more injuries.

Table E8.3 Organizational culture

	Cumulative spinal Compression (lower back)	Peak spinal compression (lower back)	Peak muscle activity (neck/shoulder)
Discretion and choice	-	-	-
Fairness to workers	-	-	
Quality of care	-	-	-*
Favouritism towards residents	+	+	
Adequacy of attention	-*	-	-
Management support	-	-	
Supervisor support	-		
Co-worker support		-	

See Table E8.1 for an explanation of symbols

Organizational culture: Table E8.3 shows interesting correlations between physical workload and organizational culture variables, although few are strongly significant. In general, facilities where workers had higher loads to the lower back (cumulative and peak spinal compressions) had workers who reported less discretion and choice, less fairness, lower quality of care and adequacy of attention for residents, less management support (as well as supervisor and co-worker support), and more management favouritism towards residents. This suggests that perceived unfairness and lack of control over the performance of tasks results in more work for the lower back. Peak neck/shoulder muscle activity was higher in facilities where workers also reported less control over their work and lower quality of care and adequacy of attention for residents. Caution is in order due to the small number of measures performed, yet these findings are consistent with the qualitative results from interviews and focus groups.

Table E8.4 Safety environment

	Cumulative spinal Compression (lower back)	Peak spinal compression (lower back)	Peak muscle activity (neck/shoulder)
Dementia training			-
Worry about work injury			+*
Safety commitment	-		
Accessibility of mechanical lifts			-

See Table E8.1 for an explanation of symbols

Safety environment: Table E8.4 shows that few safety environment variables correlated with physical workload measures. Facilities where workers had higher neck/shoulder muscle activity had less dementia training and less accessibility to mechanical lifts (both moderate relationships); these facilities also had workers who worried more than others about being injured on the job (strong correlation). There was also a moderate relationship between facilities with a strong safety commitment and lower cumulative spinal compression.

Table E8.5 Physical environment

	Cumulative spinal Compression (lower back)	Peak spinal compression (lower back)	Peak muscle activity (neck/shoulder)
Bedroom size	-	-	-
Bathroom size		-	-
Hall length			+
Number of residents per mechanical lift			+

See Table E8.1 for an explanation of symbols

Physical environment: Table E8.5 shows moderate associations between physical environment variables and physical workload, with some interesting trends. Bedroom size was negatively correlated with cumulative spinal compression and both peak measures. Bathroom size was also negatively associated with peak spinal compression and peak activity in neck/shoulder muscles. This is consistent with care aides stating that caring for residents (dressing, transferring, etc.) is more difficult and demanding in smaller bedrooms and bathrooms. Hall length was positively associated with peak neck/shoulder muscle activity. This also makes sense if one considers that peak muscle activity could arise when assisting with walking or pushing a wheelchair down a long corridor. A higher number of residents per mechanical lift was also moderately associated with neck/shoulder muscle activity.

E7. Summary and conclusions

Tissue damage occurs when applied load is greater than tissue tolerance. A load that results in pain (a symptom of injury) may be a one-time event or a peak (e.g., a single heavy lift) or it may be cumulative in nature (e.g., the sum of all repeated bending and lifting). The data in this study allowed for assessments of both peak and cumulative muscle activity and for an exploration of how these loads may be related to injury and workers' perceptions. The design of the study also permitted a detailed examination of factors that contribute to both peak and cumulative muscle loading.

Seven main conclusions were drawn from the study, as follows:

1. A clear relationship existed between greater loading on the low back and neck/shoulder muscles and greater risk of injury. Specifically:

- Workers in facilities with higher injury rates (HIRFs) had significantly higher levels of cumulative compression on the lower back, on average. Other studies demonstrate that such compression levels create a substantial likelihood of low back pain. In this study, the likelihood ranged from 26% to 63% of workers (mean = 38%).
- Workers in HIRFs showed a trend towards larger peak levels of spinal compression and peak muscle activity in the neck/shoulder region. The peak compression estimates in the lower back exceeded the NIOSH Action Limit for disc compression, indicating an increased risk of injury.
- Both cumulative and peak spinal compressions were highly correlated with time-loss injury rate, MSI injury rate, and days lost per FTE.
- Cumulative spinal compression was moderately correlated with significant pain.
- Peak spinal compression was moderately correlated with neck pain during the last year.
- Peak neck/shoulder muscle activity was moderately correlated with upper limb pain over the last year.

2. Demands upon care aides varied significantly throughout the day shift. Specifically:

- Average spinal compressions were greatest before meals (pre-breakfast and pre-lunch), when care aides tend to be more physically involved with residents (i.e., transferring, dressing, toileting, making beds, and bathing).
- Average spinal compression during each time period was greater in HIRFs, but the difference was not significant for the pre-breakfast period. This indicates high average compression at both HIRFs and LIRFs during this period.
- Peak spinal compressions and peak neck/shoulder muscle activity levels were significantly greater before meals (pre-breakfast and pre-lunch).

3. Care aides with higher peak muscle activity in their shoulders and neck were more likely to report poor health, low job satisfaction, and more physical and emotional burnout.

4. Increased workload had a significant negative effect on workers' self-reported health and their perceptions of physical demands and organizational culture. Specifically:

- Workload, as measured by staffing levels and resident-dependency-to-worker ratios, was correlated at least moderately with all three ergonomic measures.
- Workload, as measured by total tasks and total repositionings performed, was significantly correlated with both cumulative and peak spinal compressions and moderately correlated with peak neck/shoulder muscle activity.
- Perceptions of exertion correlated strongly with peak spinal compression and moderately with cumulative spinal compression and peak neck/shoulder muscle activity.
- Workers appeared to be more sensitive to the peak demands of their jobs (their perceptions were more strongly correlated with peak spinal compression than cumulative compression). These findings emphasize the need to measure both peak and cumulative loading.
- Workers' perceptions regarding work pressure and high physical demands are related to higher peak neck/shoulder muscle activity and cumulative spinal compression.
- In facilities with higher loads to the lower back, workers reported less discretion and choice,

less fairness, lower quality of care and adequacy of attention for residents, less management support (as well as supervisor and co-worker support), and more management favouritism towards residents.

5. The number of tasks performed by workers and the utilization of mechanical lifts were highly variable among care aides, including workers in the same facility caring for the same residents. Specifically:

- On average, care aides performed 5-6 manual lifts/transfers per day and an equal number of repositionings. However, many workers did none and a few did up to 20 lifts.
- Workers generally perceived themselves to do many more manual lifts than they were observed doing.
- The minimal and inconsistent use of mechanical lifts indicated a general lack of clear policies and enforcement.

6. The safety environment showed moderate correlations with workers' physical workload and perceptions of work organization and culture. Specifically:

- Facilities where workers had higher neck/shoulder muscle activity had less dementia training, reduced accessibility to mechanical lifts, and more worries than others about getting injured on the job.
- There was a moderate relationship between facilities with a strong safety commitment and lower cumulative spinal compression.

7. Facility layout and equipment availability significantly impacts workload. Specifically:

- Working in a restricted physical environment (e.g., small bedroom, small bathroom) increased workload, as reflected by cumulative spinal compression and both peak measures. The increased workload was confirmed by care aides' perceptions.
- Facilities with longer halls were positively associated with peak neck/shoulder muscle activity, as were a greater number of residents per mechanical lift.

This study is among the first of its kind to objectively measure the muscle activity in the lower back and neck/shoulder of care aides for a continuous shift. The findings support the notion that both cumulative spinal compression (due to repeated and prolonged bending throughout a shift) and peak spinal compression and neck/shoulder muscle activity (due to single "heavy" events such as resident repositioning) are key measures of workload and are strongly correlated with injury.

In the study, workers with high cumulative and peak spinal compressions and higher peak neck/shoulder muscle activity worked in situations with lower staffing; they subsequently faced more resident demands and performed more tasks. They also worked in more restricted physical environments with smaller bathrooms and bedrooms, which increased the muscle loading as they performed care. These same workers perceived a higher level of exertion in their shift and reported more work pressure and higher physical demands in their job.

Measured loads on the body were strongly correlated with injury, yet it is important to note that the overall cumulative and peak spinal compressions were high enough, even in low injury-rate facilities, to contribute to low back pain and acute injury. These high loads were especially

evident prior to breakfast, when residents have heavy care needs.

The study showed that both cumulative and peak spinal compressions were important determinants of injury, and thus that two different mechanisms of low back injury may be occurring in care aides. The study also showed that, among these care aides, peak muscle tension in the neck/shoulders was correlated with injury and strongly associated with stress, as manifested in reports of poor health, low job satisfaction, and physical and emotional burnout.

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