



Report Card on Patient/Resident Handling in British Columbia's Health Care Facilities

**As required by the Memorandum of Understanding
dated March 18/19, 2001 between
the Health Employers Association of British Columbia ("HEABC")
and
the Association of Unions (Facilities Sub-sector)**

May 2003

**Occupational Health and Safety Agency
for Health Care in British Columbia**

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1 EXECUTIVE SUMMARY

In March 2001, the Health Employers Association of British Columbia (“HEABC”) and the Association of Unions (Facilities Sub-sector) (“the unions”) signed a memorandum of understanding (MOU) that outlines the actions they will take to eliminate, where possible, manual lifting. The MOU requires the Occupational Health and Safety Agency for Healthcare in British Columbia (OHSAH) to, among other things: “...Produce an annual report card on the progress to date, including specific recommendations for the coming year.” This document is the first report card produced under the MOU.

1.1 Status of Measures Outlined in the MOU

The MOU had certain requirements and they are reported upon below in this sub-section.

1.1.1 Financing Framework for Equipment

OHSAH estimated the costs of ceiling lift installation over every bed in directly managed and affiliated facilities throughout the province to be about \$125 million. Against these requirements, the following incremental funds have been pledged thus far.

- The Ministry of Health Services (MOHS) distributed \$15 million under the Nursing Retention Strategy in late 2001;
- The Workers’ Compensation Board of British Columbia (WCB) has pledged to distribute up to \$6 million on the acute care rate group surplus, upon application by the health authorities; and
- Health Authorities have thus far spent at least \$1.5 million from other sources.

The MOU and the funding that came with it have been received with enthusiasm at facilities throughout the province: “like manna from heaven” in the words of one facility manager.

1.1.2 Industry Guidelines for Safe Patient/Resident Handling;

OHSAH has distributed 4 documents that constitute the “clear industry guidelines for safe patients/residents handling” called for in the MOU:

- *Musculoskeletal Injury Prevention Program: Implementation Guide;*
- *Safe Patient & Resident Handling: Acute & Long Term Care Sectors Handbook;*
- *Reference Guidelines for Safe Patient Handling;* and
- *Patient/Resident Ceiling Lift Program: Program Guide.*

In late 2001, the inter-agency Provincial Ceiling Lift Program Steering Committee deferred the development of program materials specific to the use of overhead lifts in home care settings until the program materials applicable to acute care and long term care facilities were well-established.



1.1.3 Occupational Health and Safety Committees

In almost all of the facilities in which ceiling lifts have been installed, workers have been involved in decisions around the configuration of ceiling lifts. Some of these facilities have also sought the input of their workers in deciding where to allocate the lifts among the highest priority areas. These consultations were more often made in regular department meetings and in working groups than in the joint OH&S committees. In most facilities, the joint OH&S committees are involved in the monitoring of ceiling lift performance.

Several workers and managers took the initiative to point out that they did this because it made good sense, not because they were told to by the MOU or by any other means.

1.1.4 Lifting Equipment in New Facilities

The inter-agency Provincial Ceiling Lift Program Steering Committee approved the *Design Guidelines for Installation of Overhead (Ceiling-Mounted) Lift Systems for Persons* that were developed by OSHAH. These guidelines were passed on to the Capital Planning and Programming Branch of the Ministry of Health Services in early 2002.

1.1.5 Annual report card

This report card is the first produced by OHSAH since the MOU was executed; it covers activities in 2001 and 2002.

1.2 **Scope and Method**

The report card includes:

1. *Input-based and activity-based information on the ceiling lift programs and other programs undertaken by the health authorities, including the funds spent under ceiling lift installation programs and the degree to which ceiling lifts have penetrated health care facilities in British Columbia; and*
2. *Output-based and performance-based information, including the changes in the incidence of musculoskeletal injuries MSI that have taken place due to patient handling since ceiling lift programs and other programs were commenced and an estimate of the extent to which these changes are attributable to ceiling lifts and other interventions.*

To isolate, in a rigorous way, the impacts of ceiling lifts and other interventions on MSI from the impacts of other causal factors, OHSAH developed a model of musculoskeletal injuries due to patient handling (MSI), a description of which is appended in Section 8 of the report card. This model is one way that a relationship between multiple causal factors and MSI incidence can be specified. There are others; recent literature suggests that workload and organisational culture may have major impacts on patient handling MSI.

1.3 **Equipment Program Activity**

The reported data cover about 22,800 beds in 210 facilities throughout British Columbia, equivalent to about $\frac{2}{3}$ of the 35,000 beds funded by the Ministry of Health in 2001.

While full reports on expenditures were not obtainable, it appears that about 85% of the \$16.5 million available through to late 2002 was spent on lifts, about 10% was spent on electric beds and about 5% was spent on floor lifts.

Electric beds have been acquired over the past decade and their penetration into British Columbia health care facilities is largely complete. As of late 2002, there were about 15,000 electric beds in the 210 reporting facilities, with over ½ of these facilities containing only electric beds and only about 40 facilities with no electric beds.

The use of floor lifts varied widely through the 210 reporting facilities as of late 2002. Collectively they had 1750 floor lifts which, assuming 1 floor lift covers 5 beds, are sufficient to cover about 8750 beds. While fewer than 45 facilities have no floor lifts at all, only about 25 facilities have enough floor lifts to achieve a ratio of 1 floor lift for 5 beds. There is, on average, 1 floor lift for each 13 beds throughout the province.

There were about 2300 ceiling lifts installed in the 210 reporting facilities as of late 2002. The installation of this equipment is still in its very early stages: less than a dozen facilities have full ceiling lift coverage and $\frac{2}{3}$ of the facilities have no ceiling lifts. The coverage ratio achieved thus far is about 2 beds per ceiling lift; this implies that ceiling lifts covered about 4500 beds in the reporting facilities. With no constraints on installation other than the availability of funds, health authorities continue to install ceiling lifts at a brisk rate and their number is expected to reach about 4000 in 2003/04.

The OHSAH ceiling lift program guide contains ceiling lift budget information that estimates the cost of installing ceiling lifts to be about \$6,000 in a new double room and about \$10,000 in an older double room, including the costs of renovations. The unit costs for about 1250 ceiling lifts installed within the past 12 months suggest that the ceiling lift installations that are retrofitted into existing facilities cost about \$8,000 and ceiling lifts installed during the construction of new facilities cost as little as \$3,000.

1.4 Lifting Policies and Training Activity

Lifting policies in the facilities reflect a persistence of manual lifting that is expected with the incomplete equipment coverage that has been achieved thus far. Most facilities with mechanical lifts have developed and implemented policies that follow on the template contained in the OHSAH program guide but only a few facilities with full lift coverage have removed their manual lifting policies. Where manual lifting persists, facilities are meeting the requirement for a risk assessment to be in place prior to lifting a patient.

Almost all facilities offer initial training, usually of about 4 hours' duration, to new staff required to handle patients either manually or with lifts. However, almost ½ of the reporting facilities offer no regular refresher training in patient handling to their staff. After workers have received their initial training, ongoing compliance with patient lifting policies is usually left to their supervisors.



1.5 Changes in Musculoskeletal Injuries due to Patient Handling (MSI)

Over 200,000 people were employed in British Columbia's healthcare sector in 2001, about 10% of British Columbia's workforce. The incidence of injuries among healthcare sector workers in British Columbia is very high: healthcare employers lost over 280,000 person-days of work and absorbed costs of over \$30 million arising from non-HCO claims¹ made in 2000 alone.

Patient handling MSI continue to be the single largest type of injury in the healthcare sector, as the data for the 210 reporting facilities and for all facilities that are directly managed by the health authorities indicates.

Table 1: Summary of Patient Handling MSI

	<i>Number of Claims</i>	<i>Days Lost to Date</i>	<i>Cost of Claims to Date</i>
Reporting Facilities, 1999/00	1542	67,000	\$8.4 M
All Directly-Managed Facilities, 1999	1845	120,000	\$14.5 M
Reporting Facilities, 2001/02	1576	68,500	\$7.5 M
All Directly-Managed Facilities, 2001	1911	104,500	\$12.5 M

These data are by no means perfect; their many limitations are described in Section 15 and Section 16 of the report card. The analyses in the report card use these data as a representative sample and attempt to isolate the effect that each programmed intervention has had on patient handling MSI from the effects of other factors. The results are strong, as far as statistical results go, but they are statistical results nonetheless; they are not necessarily the truth about the whole. Nowhere are these limitations more obvious than in comparisons among the health authorities.

The age of workers and their previous injuries play significant roles in patient handling MSI. Middle-aged workers sustain more injuries than either young or old workers: the 45-54 year-old age group makes up about 20% of the provincial workforce but, in healthcare, sustains about 30% of the patient MSI claims and almost 40% of the days lost. The mean age of patient MSI claimants is about 41 years, virtually unchanged since 1997: while the workforce is ageing, that portion of the workforce that sustain patient handling MSI is not. Some limited data, shown in Section 14, suggest that almost ¼ of

¹ "Non-HCO claims", or Non-Health-Care-Only claims, are WCB parlance for those claims on which WCB compensated claimants. A HCO (Health-Care-Only) claim is one in which only health care treatment costs were paid on behalf of the claimant. In this report, "all non-HCO claims" means time-loss claims in the health care sub-sector attributed to all injury types, and "patient handling claims" or "patient handling MSI" mean time-loss claims in the health care sub-sector attributed to musculoskeletal injuries arising from patient handling.

the patient handling MSI claims over a four-year period were made by workers making more than one claim – far more than should occur at random. Unfortunately, variations in age and previous injuries from one facility to another could not be measured due to the *Freedom of Information and Protection of Privacy Act* (R.S.B.C.).

Long the near-monopoly of nurses and their assistants, patient handling MSI are spreading to home support workers: they accounted for 5% of 1996 patient handling MSI claims and 15% of 2002 patient handling MSI claims in the health care sub-sector.

The type of facility (long-term care beds were thought to generate more MSI than acute care beds) and the facility's age (older buildings were thought to have more awkward floor layouts) had no impact on patient handling MSI from one facility to another; nor did the mere presence or absence of MSI programs (MSIP) or training programs.

Electric beds had no effect on the variation of patient handling MSI among facilities because they are so ubiquitous: too few facilities lack them to properly measure the impact of their absence. As a practical issue, such a measure is not necessary since the health authorities have largely completed their investments in electric beds.

Floor lifts also had no effect on the patient handling MSI, from one facility to the next, and this result is not so easily explained away. There is wide variety among the facilities in terms of their floor lift coverage, yet patient handling MSI are not lower in those facilities that have more floor lifts available in them. Perhaps this result confirms what facility managers and workers may already know, given that so little of the available funding was spent on floor lifts.

In contrast, ceiling lifts have an association bordering on statistical significance with lower patient handling MSI in British Columbia's healthcare facilities. The 20 facilities with high ceiling lift coverage experienced, on average, less than 1 day lost per bed due to patient handling MSI in 2001/02, significantly less than the average of 3 days lost per bed in all facilities. Only 2 of the 12 facilities that experienced more than 10 days lost per bed had ceiling lifts and those 2 facilities had covered only a small proportion of their beds. As more ceiling lifts penetrate into more health care facilities, this association should grow stronger.

1.6 Lifting Equipment and Workplace Culture

With ceiling lift installations in their early days, the manual lifting of patients and residents is still widespread in British Columbia's health care facilities. Even where floor and ceiling lifts are fully available, workers still manually lift patients up to 20% of the time, usually in what they call "emergency situations". There are pockets of cultural resistance to no-manual-lift policies, mostly in emergency and diagnostic departments.

While 5 facilities with full ceiling lift coverage in 2002 enjoyed reductions in their patient handling MSI from 1999/00 to 2000/01, the 15 facilities with high-but-partial ceiling lift coverage did not. Facility managers and workers confirm this result: they report that, in facilities with ceiling lifts in one area and not others, up to 50% of the patient lifts are still done manually in the area covered by ceiling lifts. Incomplete lift coverage in a facility is a significant impediment to re-aligning its workplace culture towards no manual lifting.



1.7 Recommendations

With less than ¼ of the funding required for a comprehensive ceiling program throughout the province secured thus far, the parties to the MOU should pursue more funds. Health authorities are already putting the bulk of the funds available into ceiling lifts, rather than floor lifts and electric beds, and they should continue to do so.

Workplace culture must be altered along with the installation of ceiling lifts and complete ceiling lift coverage in a facility is a prerequisite to altering its workplace culture. This suggests a re-thinking of how the installation of ceiling lifts is prioritised: rather than starting with the areas of highest risk through many facilities, it may be better to completely install ceiling lifts in one facility after another, moving from the highest to the lowest risk facilities.

Now that the program material for facilities is well established, OHSAH should develop the ceiling lift program material for community care.

Only a few facilities have complete ceiling lift coverage thus far and it is premature to judge the efficacy of ceiling lifts. The report card process should be continued. This report card contains several recommendations intended to improve access to data under the *Freedom of Information and Protection of Privacy Act* (R.S.B.C.) and to streamline future data collection and analysis.

2 REQUIREMENTS OF THE MEMORANDUM OF UNDERSTANDING

In March 2001, the Health Employers Association of British Columbia (“HEABC”) and the Association of Unions (Facilities Sub-sector) (“the unions”) signed a memorandum of understanding (MOU) that outlines the actions they will take to eliminate, where possible, manual lifting.

“The parties agree to establish a goal of eliminating all unsafe manual lifts of patients/residents through the use of mechanical equipment, except where the use of mechanical lifting equipment would be a risk to the well-being of patients/residents.

The Employer shall make every reasonable effort to ensure the provision of sufficient trained staff and appropriate equipment to handle patients/residents safely at all times, and specifically to avoid the need to manually lift patients/residents when unsafe to do so. If the use of mechanical equipment would be a risk to the well-being of the patient/residents, sufficient staff must be made available to lift patients/residents safely.

The parties agree to take the following immediate steps through the Occupational Health and Safety Agency for Healthcare to achieve this goal throughout the sub-sector:

- a) Work in partnership with the Workers’ Compensation Board, the Ministry of Health and others to establish a financing framework to make funds available to purchase the necessary mechanical equipment;
- b) Finalize and distribute clear industry guidelines for safe patients/residents handling;
- c) Encourage the full participation of the local joint Occupational Health and Safety Committee in the development, implementation and on-going monitoring of this goal;
- d) Recommend to the Ministry of Health that all new health care facilities be equipped with appropriate lifting equipment; [and]
- e) Produce an annual report card on the progress to date, including specific recommendations for the coming year.”²

² Memorandum of Understanding between Association of Unions and Health Employers Association of British Columbia. Re: Manual Lifting. Signed March 18/19, 2001.

See also: Memorandum of Agreement between Health Services and Support Community Sub-sector Association of Bargaining Agents and Health Employers Association of British Columbia. Re: Prevention of Musculo-Skeletal Injuries. Dated March 29, 2001.



3 ACTIVITIES UNDER INTERVENTIONS TO REDUCE PATIENT HANDLING MSI

All six of the health authorities provided information on the number of electric beds, floor lifts and ceiling lifts installed in their facilities. The Vancouver Coastal Health Authority arranged for Providence Health Care to report separately, and they are shown in this report as a separate entity. The reported data cover about 22,800 beds in about 210 facilities³ across the province, about $\frac{2}{3}$ of the 35,000 beds in the province reported by the Ministry of Health in 2001, of all types in directly managed and affiliated facilities.

Table 2: Beds included in the Analysis⁴

	<i>Fraser</i>	<i>Interior</i>	<i>Northern</i>	<i>Providence</i>	<i>Provincial</i>	<i>Van Coastal</i>	<i>Van Island</i>
Acute Care	2083	1189	591	696	330	1835	1717
Extended Care	2193	5548	839	847	0	1388	1394
Other	178	651	101	25	949	16	210
	4454	7388	1531	1568	1279	3239	3321

While these figures imply that about $\frac{1}{3}$ of beds in the province are not included in the study, there are several points to consider before concluding that the data is substantially incomplete:

- Many beds have been eliminated between early 2001 and late 2002;
- The definition of what constitutes a bed is not always consistent, as health authorities define beds more on the activities that involve patient handling and the Ministry of Health defines beds based on what was funded; and
- Facilities operated by organisations affiliated with the health authorities are not uniformly reported since health authorities are not directly accountable for worker injuries in those facilities.⁵

Some of the facilities managers that were interviewed for this report card indicated that their counts of functional beds, i.e. those beds for which staff and other resources are available, is often less than the bed counts “that appear on paper”. One facility, for example reports about 100 beds on paper but only about 75 of those beds are useable. These facilities managers report that the count of useable beds can vary from one day to the next, depending on the availability of resources.

³ Facilities range considerably in size, from 2 beds at the Port Alice Hospital to 950 beds at Vancouver General Hospital. Also, facilities are not uniformly defined in this report card: in some cases, wings and lodges that are parts of larger facilities are reported separately and sometimes they are aggregated within the larger facilities.

⁴ Source: Data collected by OHSAH from Health Authorities, November 2002 - March 2003.

⁵ Affiliates are responsible for the safety and health of their workers. Health authorities purchase services from the affiliates.

3.1 Penetration of Electric Beds and Lifts into Health Care Facilities

This report card is focussed on three classes of equipment that are considered necessary to effectively reduce patient handling MSI:

- Beds with powered devices, usually electric motors, rather than manually-operated cranks to alter the height and inclination of the mattress;
- Portable floor lifts, including tub lifts; and
- Overhead ceiling lifts.

Table 3 summarises the inventories of these equipment in the reporting facilities as of late 2002.

Table 3: Electric Beds and Lifts reported for the Analysis⁶

	<i>Fraser</i>	<i>Interior</i>	<i>Northern</i>	<i>Providence</i>	<i>Provincial</i>	<i>Van Coastal</i>	<i>Van Island</i>
Electric beds	3781	4084	1226	1464	448	1766	2193
Ceiling lifts	377	772	35	107	40	399	585
Floor and other lifts	390	389	150	152	22	381	257

In late 2002, almost 15,000 of the 22,800 beds in the 210 reporting facilities were electric beds. No attempt has been made to define what kinds of electric beds are considered adequate for reducing patient handling MSI. A few of the reporting facilities consider the electric beds that were purchased in 1990 in a province-wide procurement program to be inadequate for the control of patient handling MSI and they are using Nursing Retention Strategy funds to replace those beds. However, most of the program managers who are questioned on this reported that they were still replacing manual-crank beds.

There were about 2,300 ceiling lifts in the 210 reporting facilities as of late 2002. Ceiling lifts, depending on the configuration of their tracks, can be used such that one ceiling lift covers more than one bed. The data from those reporting facilities that explicitly reported their coverage – how many ceiling lifts covered how many beds – shows that ceiling lift coverage ranged from around 1.5 beds per ceiling lift to about 3.5 beds per ceiling lift, with most facilities reporting coverage between 1.5 to 2 beds per ceiling lift. In extended care installations in the Fraser Health Authority and in the Vancouver Island Health Authority, each ceiling lift installed has covered about 2.2 beds on average. This suggests that ceiling lifts, as of late 2002, effectively covered about 4,500 beds.

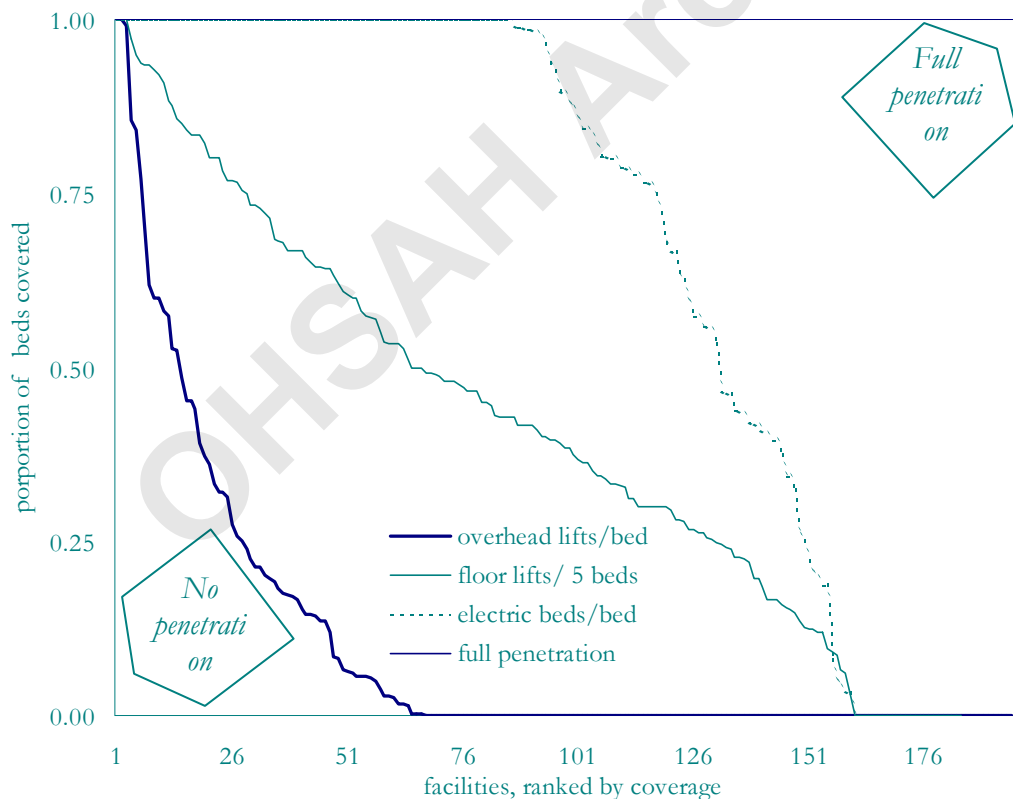
⁶ Source: Data collected by OHSAH from Health Authorities, November 2002 - March 2003.



There were about 1,750 floor lifts and other lifts in the reporting facilities as of late 2002. Floor lifts are portable and can be used to lift and transfer several patients, providing coverage of several beds.

Figure 1 gives a more comprehensive view of the penetration of electric beds, floor lifts and ceiling lifts into the 1999 of the reporting facilities for which data were available, as of late 2002. This figure shows two dimensions of penetration: breadth, a measure of how many of the reporting facilities are using these three types of equipment, and depth, a measure of the coverage of beds by equipment in each facility. In this figure, the individual reporting facilities have been arranged in order of their coverage: the proportion of their beds that are electric beds and to the proportion of beds around which either floor lifts or ceiling lifts are available to lift and transfer patients. These proportions range from a high of 1, in which all beds in the facility are covered, down to 0, in which none of the beds are covered. In this figure, conservative assumptions are made with respect to coverage: one ceiling lift covers only one bed and that one floor lift covers only three beds⁷.

Figure 1: Penetration of Ceiling Lifts, Floor Lifts and Electric Beds



⁷ Some facilities report their target coverage ratios for floor lifts are much higher, around eight beds per floor lift. The reported data shows that at a ratio of eight beds per floor lift, about 35 of the 210 reporting facilities would have more lifts than were required to cover all of their beds.

The two dimensions of penetration in Figure 1 are shown by the position of the line for each of the three types of equipment. The farther the line is to the right, the more facilities have that type of equipment. The higher the line, the more complete is each facility's coverage from that equipment. If no facilities had any ceiling lifts, that line would be an "L" shape into the lower left-hand corner. If all facilities had ceiling lifts and each facility had enough lifts to cover all of its beds, the line would be an inverted "L" shape into the upper right-hand corner.⁸

Figure 1 shows that penetration of electric beds is well advanced: the bottom of the curve for electric beds intersects the "0" (no coverage) axis at the 161st of 199 reporting facilities, meaning only 38 of those facilities have no electric beds, and the top of the curve intersects the "1" (full coverage) axis at the 93rd of 199 facilities, meaning that almost half of those facilities have only electric beds. Some of the multi-level care facilities report that their plans are to stop short of full electric bed coverage. Psychiatric wards, for example, are considered by some facility managers to not require electric beds. Some paediatric units use cribs, rather than beds.

The penetration of floor lifts is more complex: the bottom of the curve for floor lifts intersects the "0" (no coverage) axis at the 162nd of 199 reporting facilities but the top of the curve intersects the "1" (full coverage) axis at the 5th of 199 facilities. Most facilities have some floor lifts but only limited coverage, i.e. there is significantly less than 1 floor lift for every 3 beds in these facilities. If that assumption was incorrect and complete floor lift coverage was achieved at some other ratio of lifts to beds, then the curve for floor lifts would be near the horizontal for those many facilities with full coverage at that ratio. However, this is not the case: the curve for floor lifts slopes steadily downward, implying that the ratio of floor lift coverage is different through all of the reporting facilities. There are three possible explanations for this result:

1. The penetration of floor lifts is still progressing, and progressing in a way such that facilities are acquiring one or two lifts at a time rather than acquiring what they need all at once;
2. The penetration of floor lifts is largely complete but there is a wide range of opinion among the facilities as to how many beds one floor lift can adequately cover; or
3. The penetration of floor lifts has slowed as facilities stop acquiring floor lifts before they have achieved complete coverage.

Long-established prior use of floor lifts seems to be paving the way for the adoption of ceiling lifts. Workers and managers in facilities with full floor lift coverage say that, by and large, floor lifts have been the foundation of a "well-ingrained culture among nurses for the use of lift assists." However, workers find the floor lifts to be of limited use in the repositioning of patients, where they report ceiling lifts to be significantly more effective.

⁸ These lines are called Lorenz curves.



The curve for ceiling lifts shows the pattern expected of a program in its early stages: a steep curve on the left side of the figure, implying that relatively few facilities have acquired lifts but, as they do, they are moving towards complete coverage of their beds. The curve for ceiling lifts intersects the “0” (no coverage) axis at the 66th of 199 reporting facilities and the top of the curve intersects the “1” (full coverage) axis at the 4th of 199 facilities.

Managers and workers in several of the facilities that have completed their ceiling lift programs were questioned about the penetration of floor lifts and ceiling lifts. These facilities report that certain beds, mostly maternity beds (*ante partum* and *post partum*), will never have ceiling lifts installed above them. Some facilities are experiencing difficulties with installations in operating rooms and medical imaging areas, where there are conflicts in equipment configurations. Solutions are being sought where these conflicts exist, such as lighter operating room tables that can be moved to a place in the operating room where a lift can be used. In the absence of such solutions, these beds will go without ceiling lifts.

Some extended care facilities purchased portable ceiling lifts that can be moved from one set of tracks to another and thus service more than one room. Management and workers in one facility that has operated with portable motors for several months have reconsidered their decision and plan to acquire additional motors, to eliminate the movement of motors among sets of tracks. Other facilities that have attempted to save money by sharing ceiling lifts among track systems report that their attempts have not been effective.

As ceiling lifts are installed in facilities, the floor lifts that were previously used in those facilities are usually redeployed: sometimes to another facility within the health authority that has no lifts but, often, at least some of the floor lifts are retained. Some facilities report that they use floor lifts for lifts and transfers in hallways and others have moved them from wards to diagnostic areas. Few, if any, facilities have reached a point in their use of ceiling lifts where floor lifts are considered disposable. Because there will always be areas, such as hallways and common areas, where ceiling lifts are not installed it is unlikely that floor lifts will be completely eliminated.

Some facilities whose staff were interviewed had employed floor lifts for long periods of time before the installation of ceiling lifts. Such facilities with prior full coverage of floor lifts report that their staff have easily and willingly made the transition from floor lifts to ceiling lifts.

3.1.1 Installation Schedules for Ceiling Lifts

With some exceptions, mostly in the Interior and Fraser Health Authorities, few ceiling lifts were installed prior to 2001, when the funds from the Nursing Retention Strategy were made available. The rate of ceiling lift installation picked up sharply during 2001/02 and is expected to remain strong through 2002/03. Table 4 contains data that, while not complete, is believed to be representative of the rates of installation during the past three years.

Table 4: Ceiling Lift Installation Rates⁹

	2000/01	2001/02	2002/03	All Years	Table 3 Totals
Fraser	27	46	78	151	377
Interior	36	298	569	903	772
Northern	1	40	n/a	41	35
Providence	0	0	111	111	107
Provincial	0	40	11	51	40
Van Coastal	0	14	366	380	399
Van Island	0	32	542	574	585
	64	470	1666	2200	2318

Installation records, reported in Table 4, report a total of 2,200 ceiling lifts installed. That is slightly less than the 2,300 ceiling lifts in the health authorities' ceiling lift inventories, shown in Table 3. The difference suggests that either some installations made in the last three years are not reported or that some installations pre-date 2000/01.¹⁰

Some of the health authorities provided information on their intentions with respect to future installations, which are subject to budget constraints and various approvals:

- Fraser Health Authority may install a further 140 lifts during 2003/04.
- Interior Health Authority plans to have about 1,400 lifts installed by the end of 2004. Based on the reported inventory of lifts as of late 2002, this implies a further 500 ceiling lifts may be installed through the two years 2003 and 2004.
- Vancouver Island Health Authority expects to install a further 100 ceiling lifts in 2003/04.

With these projections, and the presumption that further installations that are as yet unreported will take place in the northern and lower mainland areas, it is reasonable to project that about 4,000 ceiling lifts may be installed by the end of 2004. Depending on the assumed coverage ratios, taken here as falling between 1.5 and 2 beds per lift, between 6,000 and 8,000 beds would be covered by ceiling lifts by the end of 2004, representing approximately 17% to 22% coverage.

As is fully outlined in Section 9, the most severe constraint on the rate at which ceiling lifts can be installed is the availability of funds.

⁹ Source: Data collected by OHSAH from Health Authorities, November 2002 - March 2003.

¹⁰ These data are shown in the both Table 3 and Table 4 as the health authorities reported them. They are known to be under-stated in some cases: WCB funded 40 ceiling lifts at the Queen's Park Care Centre in the Fraser Health Authority during 2000/01, Nanaimo General Hospital had ceiling lifts installed in two wings in 2000/01. Providence Health Care is believed to have installed some ceiling lifts prior to 2002/03. These discrepancies illustrate the disconnect that is sometimes found in the reporting of data between the financial and the clinical aspects of these programs.



3.1.2 Manual Lifting

The penetration data have the clear implication that manual lifts and transfers are still taking place in acute care and long term care facilities throughout the province.

Most facilities with full ceiling lift coverage are trying to consciously and formally eliminate manual lifts. Few, however, have succeeded in this.¹¹ At least one health authority reported that, in facilities with complete ceiling lift coverage, occasional manual lifts in transfers occur in what their staff called “emergency situations” in which lifting equipment was not immediately available. Another facility with complete ceiling lift coverage reports that up to 20% of their lifts are still manual lifts, as workers try to save time. One facility with full lift coverage allows occasional manual lifts on the grounds of “compassion and patient comfort”. It is clear that the necessary apparatus for safe manual lifting – risk assessments, procedures, resources and training – will have to be maintained by most facilities for the foreseeable future. One area where this is needed, said the staff in one facility that is well-advanced with ceiling lifts, is a protocol for patients who fall to the floor during rehabilitation exercises.

The interviews turned up some evidence that leaving facilities with only partial mechanical lift coverage for any long period of time can frustrate the process of cultural change among the staff. Facilities with partial coverage of ceiling and floor lifts find it difficult to effectively promote a no-manual-lift culture: one facility with full lift coverage in only one of four wings reports that about ½ of the lifts in the fully covered wing are still being performed manually.¹²

While most health authorities have policies in place that require a minimum of 2 staff to fully lift a patient, there are few systems in place besides education and training to ensure that a minimum of 2 staff are available and, when available, they are used. Most facilities and health authorities leave the decision as to how many staff are required to lift a patient to the staff that must perform the lift. At least one health authority systematically involves their OH&S staff in assessing the number of staff required to make manual lifts. Based on their interviews, the staff in emergency departments appear to be those who are most likely to attempt a one-on-one lift or transfer.

Lifting policies require that, where manual lifts persist, workers perform risk assessments prior to undertaking the lifts. Not all health authorities have patient assessment

¹¹ One OHSAH staff member charged with the collection of data writes: “Regarding the use of funds and setting a deadline for the implementation of lifts (from my observations) some facilities have neglected the importance of placing an effective ceiling lift program in place in conjunction with the installation of lifts. Pressed to install lifts prior to the deadline has resulted in several facilities to over look the planning and implementation process of a program to ensure successful use of lifts and meeting the key objective of this whole initiative, the implementation of a ‘No manual lifting policy’.”

¹² One OHSAH staff member charged with the collection of data writes: “... for facilities with ceiling lifts in place, MSIP and ceiling lift support programs varied considerably. For instance, [one care centre] has implemented the no lift policy within there MSIP program and has put in place an extensive program. However, their neighbors, [a hospital] who also have ceiling lifts installed, have not yet implemented the no manual lift policy within their policy and procedures. In fact, manual lifts still occur in wards where lifts are accessible!”

guidelines: a uniform and explicit risk assessment tool that workers can and must use to assess the risks of manual lifts and transfers. Workers and managers in all of the interviewed facilities report that systematic risk assessments are made regularly. In-services, discussions and short-duration training with respect to risk assessments appear to be wide-spread through the facilities. OH&S staff perform spot check risk assessments in high risk areas but these assessments are often after the fact. Some facilities have an occupational therapist assess each patient or resident for risks and their assessments are made available to other workers on charts or activities of daily living (ADL) sheets.

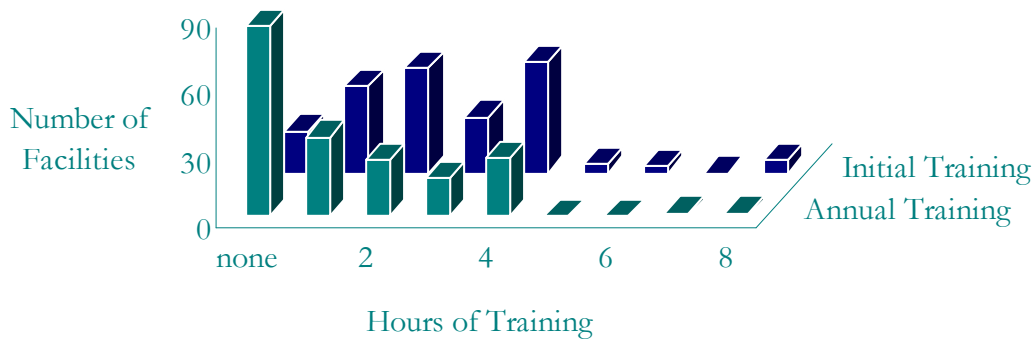
Health authorities report that they have developed no-manual-lifting policies that follow on the template contained in the *Patient/Resident Ceiling Lift Program: Program Guide*. These policies cannot be universally implemented until penetration rates of ceiling lifts have increased considerably over where they are today. Most of the facilities managers who have complete ceiling lift coverage report that no-manual-lift policies are included in their documentation and in their training, and that manual lifting policies and procedures have been removed. In a few of the facilities with full lift coverage, management have directed staff to not perform any manual lifts. Only in a few instances do these new policies explicitly refer to the MOU; most managers and workers that were interviewed took the initiative to say that they are making these changes in policy because they make good sense, not because they are being told to make them.

There are pockets of resistance to the cultural change that must accompany the presence of ceiling lifts or floor lifts. These pockets are sometimes aligned with their function: medical imaging departments in several facilities with good lift coverage still persist in performing manual lifts – “they still don’t get it” was one co-ordinator’s comment – and some emergency department personnel appear to be continuing manual lifts and transfers despite the ready availability of lifts. One emergency department manager stated unequivocally: “In the emergency department manual lifts are necessary for all lifts.”

About 195 of the 205 reporting facilities included data on the patient handling components of their training programs: both the initial training provided when new staff are hired, or when new procedures are developed, and annual refresher training.¹³ In Figure 2, these facilities are assigned to categories according to the length of the training that they offer.

¹³ One OHSAH staff member charged with the collection of data writes: “Almost all facilities [in one health authority] were not able to pin-point exactly how many hours of initial patient handling training they provide, so this data is [sic] an educated guess by them.”



Figure 2: Initial and Annual Training in Patient Handling

While there are only about 16 facilities that report they offer no initial training – a number so low that it could be dismissed as a result of reporting errors – almost ½ of the reporting facilities offer no formal refresher training to patient handling staff. Workers and managers in the facilities interviewed generally confirmed this result.

3.2 Expenditures

In 2001 OHSAH estimated¹⁴ a total cost upwards of \$125 million to install ceiling lifts over about 35,000 beds in directly managed and affiliated health care facilities throughout the province.

In September 2001 the Ministry of Health Services distributed \$15 million for the procurement of electric beds and overhead lifts, as part of the government's Nursing Retention Strategy, and distributed those funds as shown in Section 8. In early 2002, the ministry confirmed that health authorities could carry unspent funds over the end of the 2001/02 fiscal year.

In August 2002, the Workers Compensation Board of British Columbia approved the release of \$6 million from the acute care group reserve. The six health authorities are compiling the work plans required by WCB before those funds can be released. WCB expects to release these funds in the summer of 2003.

OHSAH set out to collect data that would account for the sources and uses of funds in the ceiling lift programs throughout the province, specifically the allocation and expenditure of the \$15 million from the Nursing Retention Strategy. This information proved difficult to collect in some regions and a complete and cohesive estimate of the source and use of funds is not available.

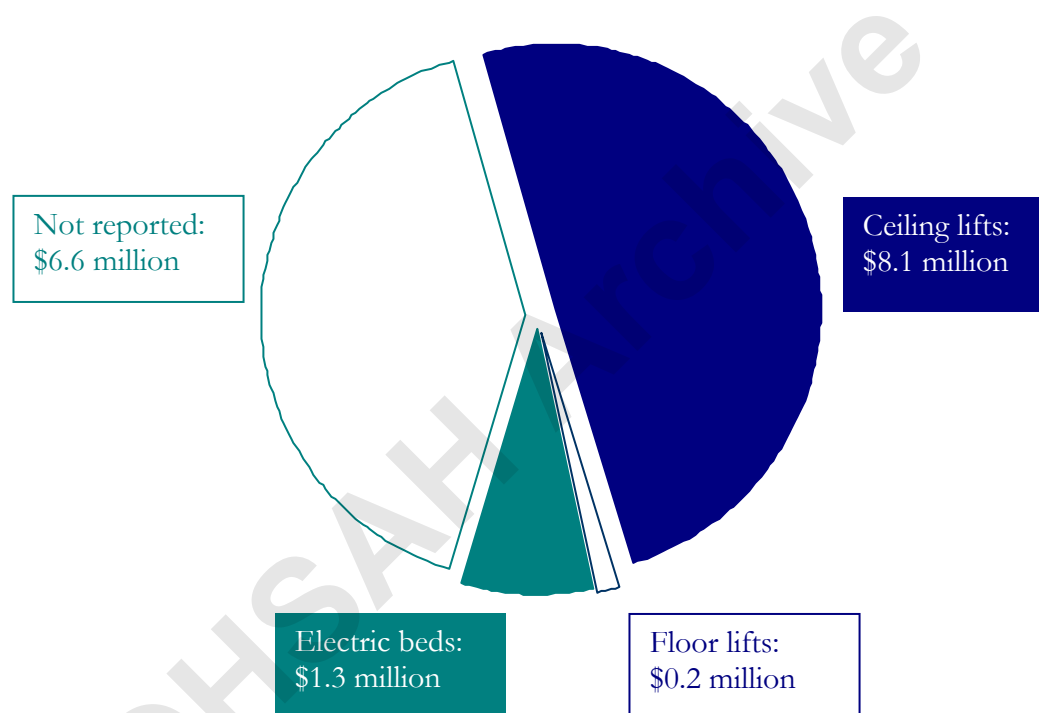
With respect to the sources of funds, the data collected shows that some health authorities have added funds from other sources to top up the \$15 million from the Nursing Retention Strategy. At least \$575,000 was obtained from regional districts, at least \$100,000 from hospital foundations and at least \$600,000 from WCB and other public

¹⁴ Perrin, Thorau & Associates (2001). Financing Options for Patient Lift and Transfer Equipment in the B.C. Healthcare Sector. Occupational Health and Safety Agency for Healthcare in British Columbia (OHSAH), Vancouver.

agencies. In this partially complete data, funds from all sources thus totalled to about \$16.3 million.

Detailed allocations or expenditures at the facility level could be collected from 66 of the 210 reporting facilities, most of which are located in the Fraser Health Authority and Interior Health Authority. These detailed allocations or expenditures accounted for about \$9.7 million of the \$16.3 million identified in the sources of funds. The use of those funds among ceiling lifts, floor lifts and electric beds is shown in Figure 3 below.¹⁵

Figure 3: Sources and Uses of Funds, 2001/02 and 2002/3¹⁶



3.3 Costs of Ceiling Lift Installations

OHSAH's ceiling lift program guide¹⁷ contained estimates of the renovation, procurement and installation costs that health authorities may expect to incur in their ceiling programs. The large number of actual ceiling lift installations during the past year provides a useful check on the budget estimates included in the program guide.

¹⁵ One OHSAH staff member charged with the collection of data writes: "It was common to hear that the infrastructure of many facilities did not adequately support the demands of installing ceiling lifts. Thus many facilities felt it was more appropriate to put funding towards mechanical devices and electrical beds."

¹⁶ Source: Data collected by OHSAH from Health Authorities, November 2002 - March 2003.

¹⁷ Perrin, Thorau & Associates: Patient/Resident Ceiling Lift Program, Draft Program Guide. August 2001.



The program guide provided the following estimates:

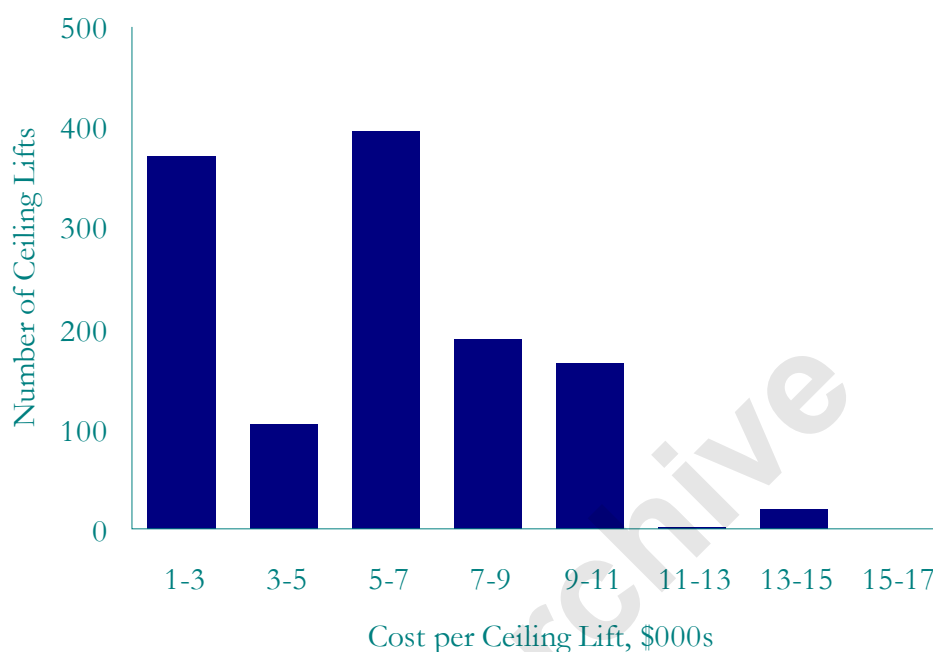
- Basic ceiling lift procurement and installation costs, prior to renovations or extensions to bathrooms, ranging from \$9,600 per lift in quadruple rooms to \$3,500 per lift in single rooms;
- Additional costs for extensions to bathrooms, ranging from \$2,000 to \$3,750 per lift; and
- Cost of renovating the rooms in which lifts are to be installed ranging from \$0 to \$3,500 per lift.

Applying the guidelines to an installation in a hypothetical double room, including an extension to a dedicated bathroom and requiring the median renovation requirements would result in the estimated costs shown in Table 5.

Table 5: Estimated Costs for Ceiling Lift in a Hypothetical Double Room

Purchase and Basic Installation	\$6,200
Bathroom Extension	\$2,800
Associated Renovations	\$1,700
Total	\$10,700

In Figure 4, the unit costs for those 1250 ceiling lifts that were installed within the last 12 months, and for which both the total costs and the number of lifts installed at the facility level are reported, are arranged in a histogram by unit cost.

Figure 4: Unit Costs of Ceiling Lift Installations in the Last 12 Months¹⁸

In Figure 4, the \$1,000 to \$3,000 unit cost interval is dominated by 298 ceiling lifts installed at a large urban hospital, as part of new construction, at an average unit cost that fell between \$2,500 and \$3,000.

All of the health authorities report that they have acquired ceiling lifts through competitive tendering processes.

Health authority program managers report that their recent experiences have brought them to apply a budget unit cost of about \$8,000 per lift, including all retrofits, as a rule of thumb. These managers expect that unit costs will go up, as their retrofitting programs move on to progressively older and more complex facilities, then go down as they complete the retrofitting of existing facilities and their programs consist of keeping pace with new construction. About ½ of the health authorities report that they have master standing agreements in place with ceiling lift suppliers that set prices between 5 and 10 years forward. In some of these agreements, prices rise by a defined measure of inflation.

One health authority was able to provide detailed expenditures broken out by object of expenditure. These data showed that the costs of initial training in the operation of and maintenance of ceiling lifts was equal to about 10% of the all-in installation costs.

3.4 Worker Participation in Ceiling Lift Installations

From its inception, the many parties to the provincial ceiling lift program were strongly agreed on the need for meaningful worker participation in the design of the ceiling lift installations with which they would work. More generally, the

¹⁸ Source: Data collected by OHSAAH from Health Authorities, November 2002 - March 2003.



theme of worker participation and bilateral cooperation permeated all aspects of the patient handling MOU: one of the objectives is to “encourage the full participation of the local joint Occupational Health and Safety Committee in the development, implementation and ongoing monitoring of this goal”.

All health authorities and almost all reporting facilities advise that they have involved their workers in the selection and configuration of their ceiling lifts. In facilities where the joint OH&S committee was unable or unwilling to be part of this process, worker focus groups were set up expressly for this purpose. Those facilities that have regular department meetings report that they tended to use those venues more often than the joint OH&S committees to involve workers in the prioritisation – which units would receive them first – and configuration of ceiling lifts.

Many of the managers and workers involved with the decision to install ceiling lifts took the liberty to say that they have used a worker participation model because it makes good common sense, not because it is a requirement of the MOU or of funding eligibility under a provincial program. Managers at more than one health authority made the same comment about the ceiling lift program as a whole: they are doing it because it makes good sense, not because they were told to do it.

By and large, the joint OH&S committees have been involved in the installation of ceiling lifts. The committees have, in most facilities, reviewed the technical assessments and designs that have been formulated by the OH&S staff, the health authorities’ clinical professionals – usually ergonomists or occupational therapists – and the ceiling lift suppliers. In some of the facilities, these clinical professionals are already members of the joint OH&S committee and the committee delegated certain decisions to them. All of the health authorities report that the joint committees are overseeing the processes by which the health authorities are monitoring the effectiveness of the ceiling lifts. In one health authority, joint committees have final approval over configuration decisions.

Several staff at the facility level would like to see the joint committees receive training that is specific to making decisions around the investment in and configuration of lifts.

3.5 Ongoing Operation of Overhead Lifts in Facilities

Almost all of the ceiling lifts currently in use are still under warranty and, in some health authorities, the purchase contract requires the supplier to provide semi-annual preventative maintenance on ceiling lifts. Some of the authorities have set up their own preventative maintenance programs; their staff are trained in simple repairs by the suppliers.

There have been about 6 incidents reported in which a ceiling lift malfunctioned: in each case, the ceiling lift uncontrollably rose to the ceiling and the motor did not stop when the ceiling was reached. This resulted in burnt-out motors and, in some cases, an awkward extraction of the patient from the lift. The supplier has repaired the malfunctioning lifts and has fitted them with cut-out switches. One failure was caused by improper installation of ceiling lift track.

4 RESULTING CHANGES IN PATIENT HANDLING MSI

This section contains data on MSI due to patient handling, before and after the installation of ceiling lifts. The fiscal year 1999/00 was taken as a base year, in which MSI due to patient handling would include no significant effects from the presence of ceiling lifts. The 12 months ending March 21, 2002 were taken as representing the first year of the province-wide ceiling lift program.

The attribution of non-HCO claims to patient handling is not a straight-forward exercise: each health facility applies qualitative judgement to its own data, which is the subject of a recommendation in this report. The methods used in this report for the attribution of WCB data to patient handling is appended in Section 11.

Over 200,000 people were employed in British Columbia's healthcare sector in 2001, about 10% of British Columbia's workforce.¹⁹ About one-third of healthcare sector employment occurs in hospitals.

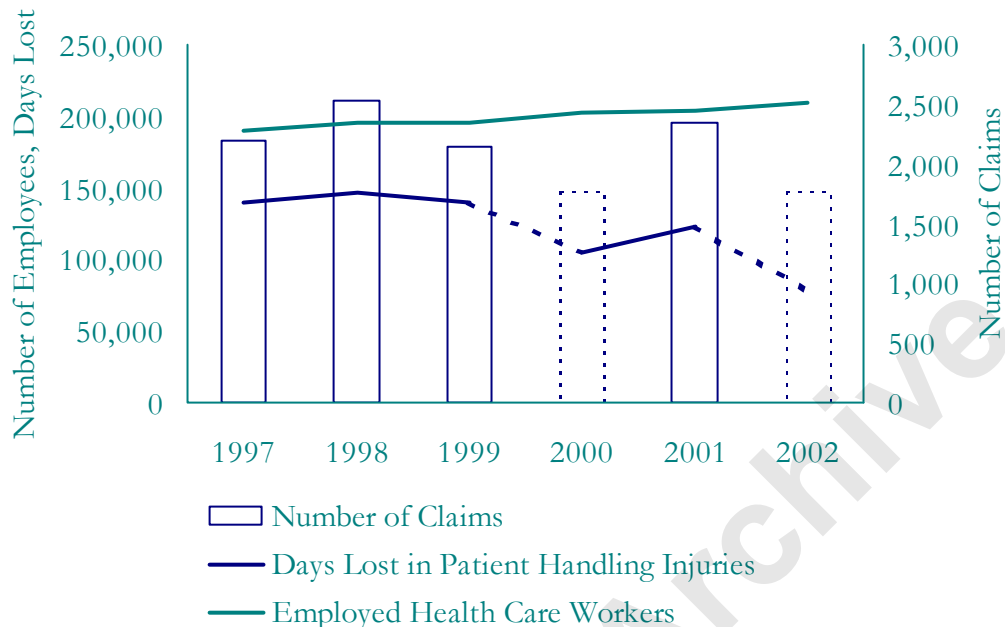
The incidence of injuries among healthcare sector workers in British Columbia is very high. The injury rate (the number of time-loss claims accepted by the WCB per 100 workers employed full-time for one year) is 4.4%, significantly higher than the 3.2% average for all British Columbia employment sectors during. During the period of 1998 to 2002, healthcare workers made over 40,000 non-HCO claims that resulted in over 2 million person-days of work lost to their employers and claim costs of almost \$300 million for the WCB.²⁰

The figures and tables in this section use data supplied to OHSAH by WCB. Because some proportion of non-HCO claims arising from injuries in any given year are still "open" – i.e. there is an expectation of further costs to be accrued – one, two or even several years after the injury, the costs and days lost recorded against those claims will change from month to month, as WCB refreshes its internal business data warehouse with monthly frequency. For this reason alone, the total costs of non-HCO claims, the days lost associated with those claims and even the number of claims are likely to differ from one report to another. As a result, what are represented as claims statistics for any year in this report cannot be expected to reconcile with like data presented in another publication.

19 Ministry of Finance and Corporate Relations, Province of British Columbia. [2002 British Columbia Financial and Economic Review](#).

20 Workers' Compensation Board of British Columbia. [Health Care Industry: Focus Report on Occupational Injury and Disease](#). 2000.



Figure 5: Claims Related to Patient Handling, 1997 to 2002²¹

The years, 2000 and 2002 are highlighted to identify them as years in which the data are suspect, albeit for different reasons:

- The proportion of non-HCO claims that are missing codes for occupation, source of injury and type of injury is much higher in 2000 (about 30%) than other years²²; and
- A significant portion of the non-HCO claims arising from injuries that occurred in 2002 have yet to have their first compensation payment made, and they are not included in the data. As a result, these estimates for 2002 are under-stated.

In retrospect, 1998 may have been a peak year for the number and severity of patient handling injuries: while employment in the health and welfare services sector has continued to grow in British Columbia²³, the extent and the number of patient handling injuries has declined since then.

The decline in the number of patient handling MSI claims and in the total days paid on those claims masks an adverse trend in the severity of the claims themselves: claims related to patient handling injuries are, on average, becoming longer. The trend has implications for the analyses in the report card and the trend is explored in section 11.

²¹Based on claims data supplied by Workers' Compensation Board of British Columbia, March 2003 and April 2003.

²² See Table 20: Separation of Non-HCO Patient Handling MSI from 2nd Extraction.

²³ Statistics Canada. *Labour Force Survey*. 2001

5 ATTRIBUTION OF PATIENT HANDLING MSI TO THE INTERVENTIONS

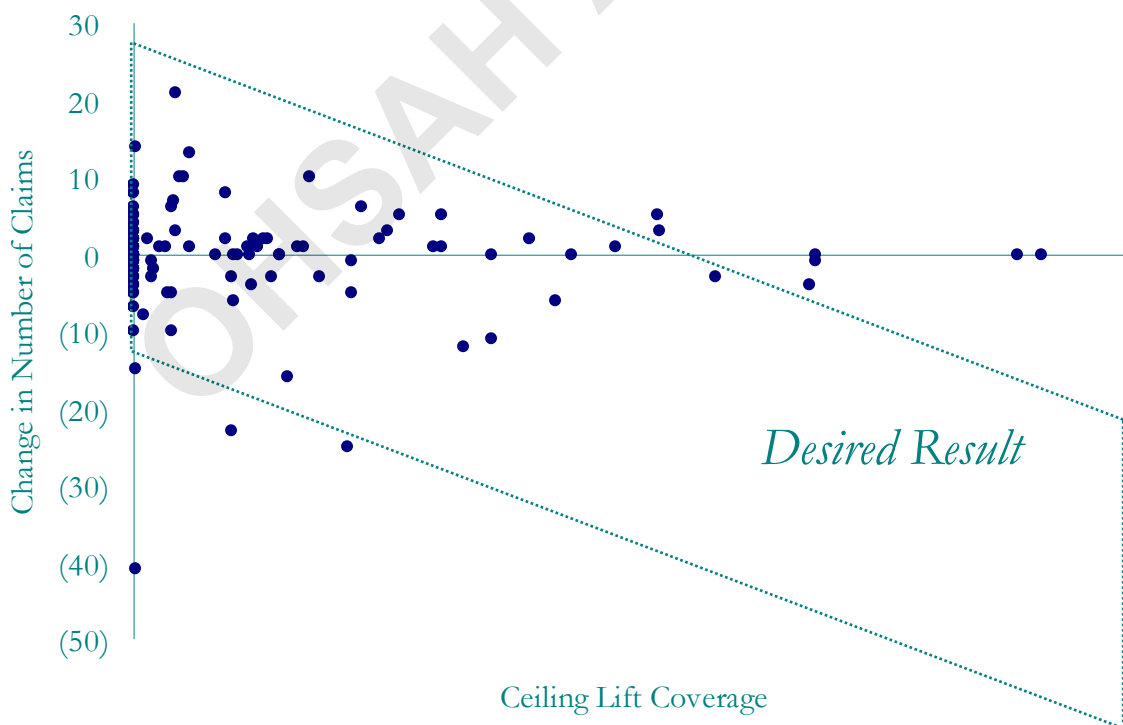
This section presents analyses that test the attribution of the changes in patient handling MSI between 1999/00 and 2001/02 to specific interventions. These analyses are necessary because any positive effects of these interventions may be masked by the overall trends in patient handling MSI over the period.

The association of injuries to causal factors can be approached on two levels: the injuries suffered by an individual; or the injuries suffered by all individuals working in a facility. The model used in this study can be adapted to either level. Ideally, analyses of risk should focus on the individual but, in this case, the limitations of the data prevent that. The analyses in this section examine the aggregate of patient handling MSI claims in each facility, and why that aggregate varies from one facility to another.

5.1 Changes in Injuries and Ceiling Lift Coverage since 1999

A simple analysis over the time period is to assess the correlation between the coverage achieved by ceiling lifts and the change in the number of patient handling MSI claims from 1999/00 to 2001/02. This correlation is shown in Figure 6. Because this is an analysis over time, the measurement of patient handling MSI must be restricted to the number of claims which, as outlined in section 11, does not adequately reflect the scope of injuries.

Figure 6: Ceiling Lift Coverage and Changes in Patient Handling MSI Claims²⁴



²⁴ Source: Data collected by OHSAH from Health Authorities, November 2002 - March 2003.



OLS regression confirms what Figure 6 suggests: that there is no association between higher ceiling lift coverage and a reduction in the number of patient handling MSI claims between 1999/00 and 2001/02. Had there been such a relationship, it would show in a trend of the data to fall below the X-axis, into the region where the number of claims in 2001/02 was less than the number of claims in 1999/00, towards the right side of the graph.

This result is not as disappointing as it may seem, since it could be explained by hypotheses other than that ceiling lifts are ineffectual:

- Ceiling lifts have penetrated too few facilities to show meaningful results as yet, and these analyses will show better results in the years to come;
- Most of the facilities that have ceiling lifts have had them in place for only a few months, and have not yet completed their adaptations of workplace culture;
- Using the number of claims as the measure of patient MSI masks the positive effect that ceiling lifts may have had on reducing the severity, if not the number, of patient MSI claims;
- The number of patient handling MSI claims in 1999/00, as they were reported by the facilities, may significantly under-estimate the true number of claims.²⁵

5.2 Correlation of Injuries with Different Interventions, 2001/02

In this section, the variation in the severity of patient handling MSI from one facility to another is correlated with different interventions and other factors that might explain the variations. The principle applied in the analysis is to estimate, for each intervention and factor, what impact it has from one facility to another when all other factors are held constant. Of all the analytical approaches used in the report card, it is the one most rigorous in its attempt to isolate and estimate the effects of ceiling lifts, and other interventions, on patient handling MSI.

5.2.1 Limitations in the Data

In order to include the severity of patient handling MSI it is necessary to work with data covering a single year, to eliminate the possible corruption of data by changes in medical treatment procedures, waiting times or administrative processes. Following the analyses in sections 11 and 13, the measure of patient handling MSI used in this section is days lost per bed on claims made in 2001/02. As outlined in section 12, working with 2001/02 understates the days lost and costs because of the high proportion of claims remaining open at the end of the one-year period.

²⁵ Table 23, which is in the appendix that details the collection of data from the facilities, shows that the number of patient handling MSI claims reported through the facilities is the lowest of the three available estimates of the number of claims in or around the fiscal year 1999/00.

5.2.2 Hypothesised Model

The application of ordinary least squares (OLS) multiple regression to the data must be preceded by a hypothesis that lists what variables are expected to explain the variation of days lost per bed from one facility to another. These variables are:

- What proportion of the total beds are acute care beds and what proportion are extended care beds;
- The age of the facility, the expectation being that old facilities will have cramped working spaces that force awkward postures upon staff as they handle patients;
- Hours of initial training provided to staff in safe patient handling practices;
- Hours of annual refresher training
- Whether or not the facility has a MSIP in place; and
- The number of ceiling lifts, the number of floor lifts, and the number of electric beds.

A full description of the model is appended in section 9. That appendix contains two forms of the model: one form for predicting the extent of patient handling MSI in individual workers and one form for predicting the number or extent of patient handling MSI in a facility. Because data on individual patient handling MSI claims were not available for each facility, the latter form is used here.

Of the 210 facilities from which data was collected, 177 facilities reported a full set of data and could be included in this analysis. The data most often missing, and responsible for eliminating about 20 of the facilities from the analysis, was the age of the facility.

5.2.3 Simple Relationships among the Data

The simple relationships between each of the variables listed above (the independent variables) and days lost per bed (the dependent variable) are illustrated in the following figures and tables.



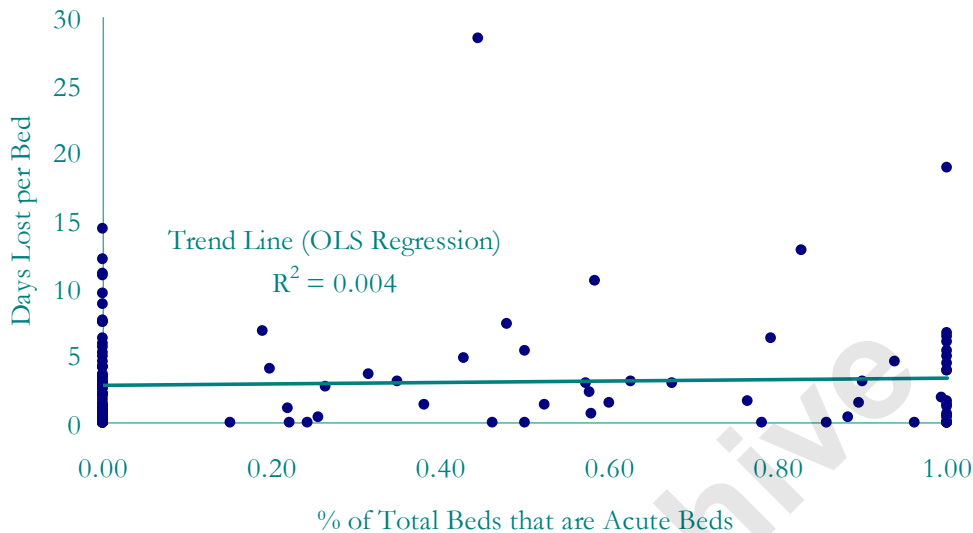
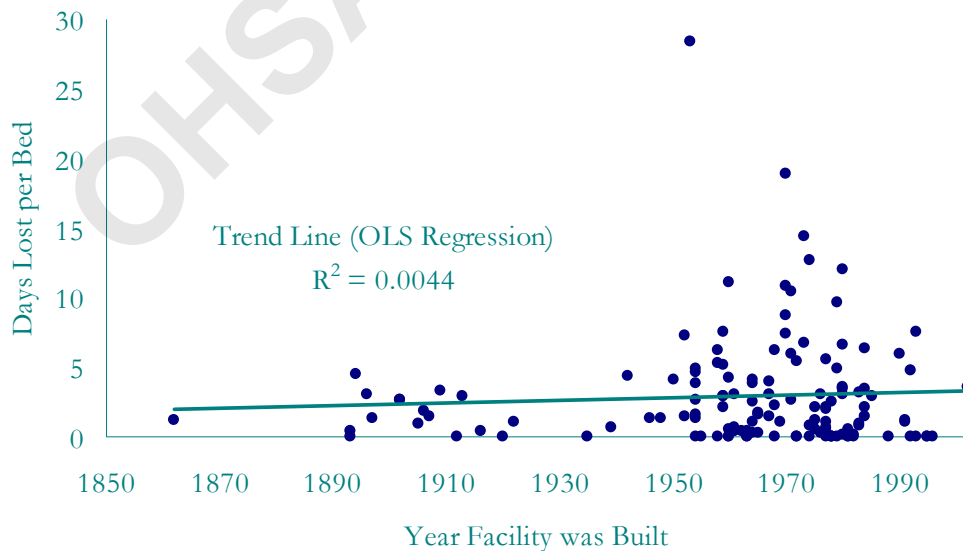
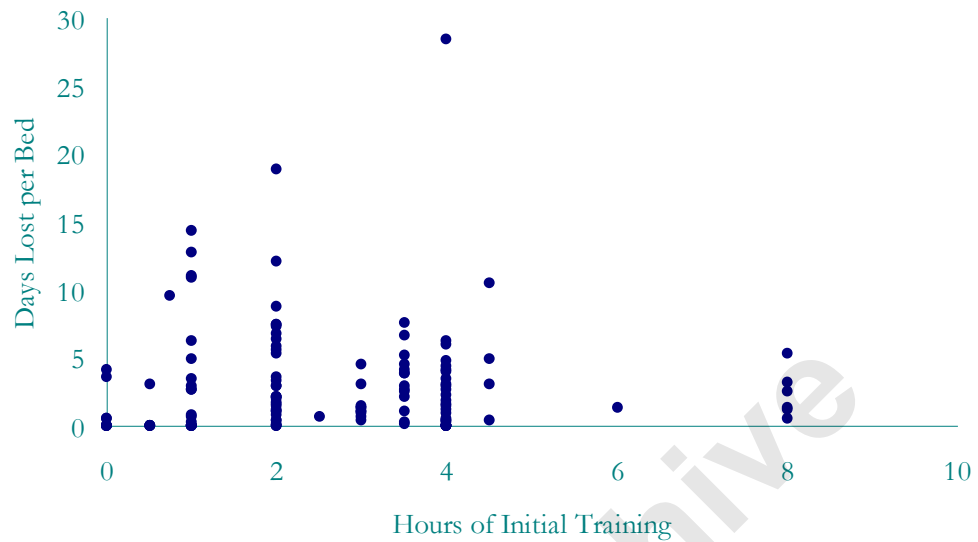
Figure 7: Days Lost per Bed as a Function of the Type of Facility

Figure 7 shows a bipolar distribution: 99 facilities that have no acute care beds (and, mostly, are extended care facilities) 26 facilities that have only acute care beds and 53 facilities with a mix of acute care and other beds. An F-test on the acute care facilities and the extended care facilities confirms that there is no statistically significant difference in the days lost per bed between these two types of facilities.

Figure 8: Days Lost per Bed as a Function of the Age of the Facility

It was expected that the severity of patient handling MSI would be lower in more modern facilities but Figure 8 shows that the age of the facility has no significant effect on days lost per bed.

Figure 9: Days Lost per Bed as a Function of Initial Training



There appears, in Figure 9, to be an association more intensive initial on-the-job training in safe patient handling practices and lower days lost per bed. However, only 17 facilities offer more than 4 hours of training, which is not enough to establish a statistically significant trend. About 15 facilities reported initial on-the-job training hours as “0”.

Figure 10: Days Lost per Bed as a Function of Refresher Training

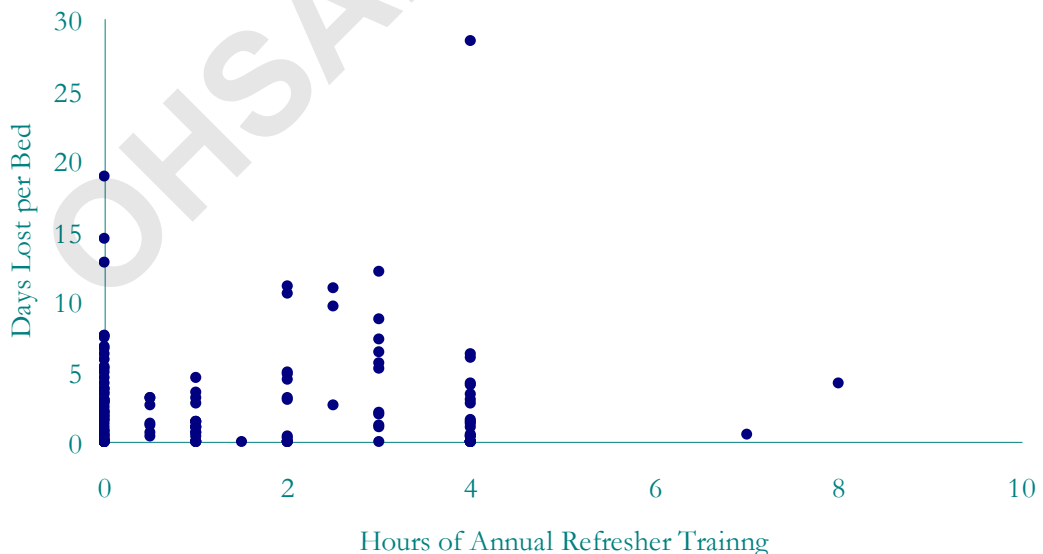


Figure 10 indicates an association between more refresher training and lower days lost per bed. However, only 2 facilities offer more than 4 hours of training, which is not enough to establish a statistically significant trend. Surprisingly, about 50 facilities reported refresher training hours as “0”.



Table 6: Impact of MSIP on Days Lost per Bed²⁶

	<i>MSIP in Place</i>	<i>No MSIP in Place</i>
Number of Facilities	129	48
Average Days Lost per Bed	2.8	2.4

WCB *Ergonomics (MSI) Requirements*²⁷ require that employers have a proactive process in place to manage MSI that should include a systematic assessment of risks and a quantitative evaluation of performance. Many health care facilities use their MSIP to satisfy these requirements and the *Musculoskeletal Injury Program: Implementation Guide*, issued by OHSAH as part of its guidelines for the healthcare industry, meets and exceeds these requirements.

Almost ¼ of the facilities reported that they had no MSIP in place. This is consistent with the commentary provided by the OH&S managers in the health authorities: while some authorities have a uniform MSIP in place for all facilities, or are in the process of implementing one, other authorities – e.g. those that have inherited facilities from a polyglot of old health regions and councils – have MSIPs that vary from one facility to another. In some facilities where MSIP are currently being developed, some components of the MSIP have been implemented rather than held until the entire MSIP is completed. Some of the managers and workers that were interviewed were not aware of an MSIP in their facility – one manager confessed to not knowing what an MSIP is – but almost all of these workers and managers were aware of and had participated in what they called “back programs” offered in their facilities.²⁸

With no consistent measures available to assess the intensiveness or the extensiveness of MSIP, facilities were merely asked to report whether they had one, with the results as shown in Table 6. Within these data, the presence of an MSIP appears to have no effect²⁹ on the severity of patient handling MSI.

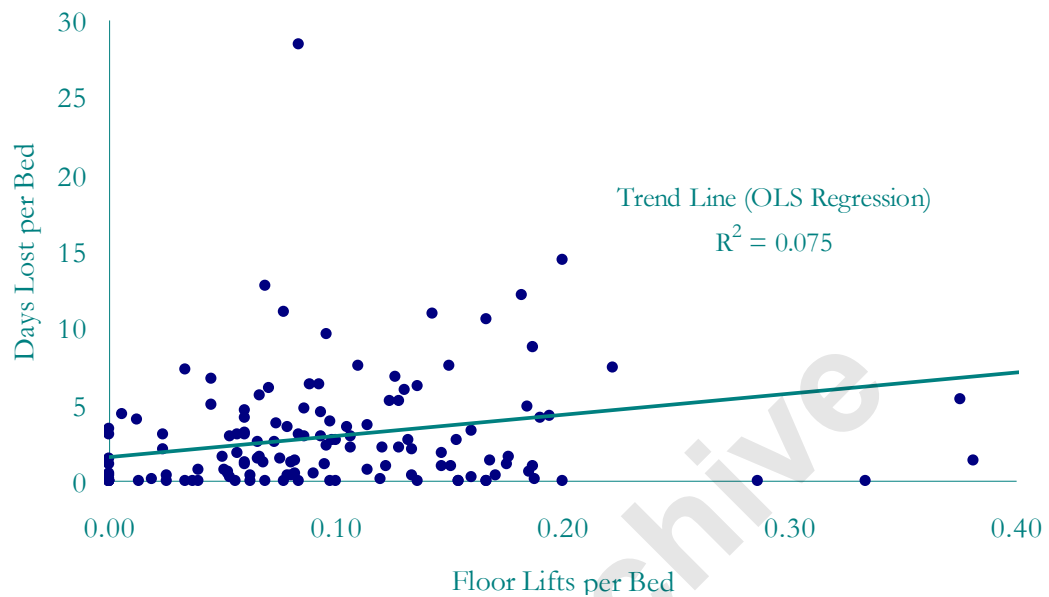
²⁶ Source: Data collected by OHSAH from Health Authorities, November 2002 - March 2003.

²⁷ *Ergonomics (MSI) Requirements, Occupational Health and Safety Regulation* (B.C. Reg. 296/97 and B.C. Reg. 185/99) Part 4. The risk assessment specifications are in sections 4.48 and 4.49.

²⁸ One OHSAH staff member charged with the gathering of data writes: “The definition of MSIP Program differs greatly amongst the facilities in [some health authorities]: some don't have a program in place, some facilities have a designated person to run it, while others are coordinated by supervisors or OHS managers. Obviously, the facilities with designated people for MSIP have much better injury prevention systems, and have a better understanding of where their injuries are happening.”

Another OSHAH staff member charged with the gathering of data writes: “... many facilities were also unaware of what MSIP meant.”

²⁹ An F-test confirms that the average days lost per bed in facilities with MSIP in place is not, statistically, significantly different than the average days lost per bed in facilities with no MSIP in place.

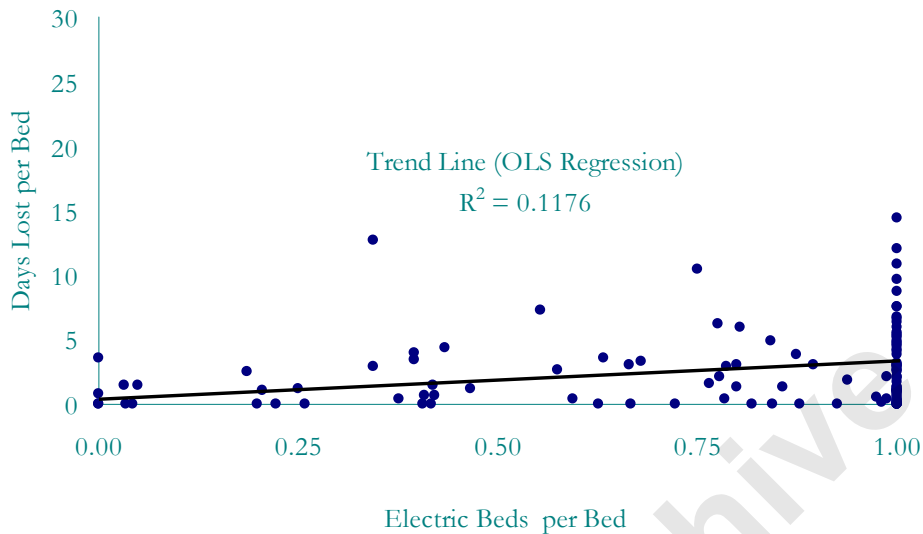
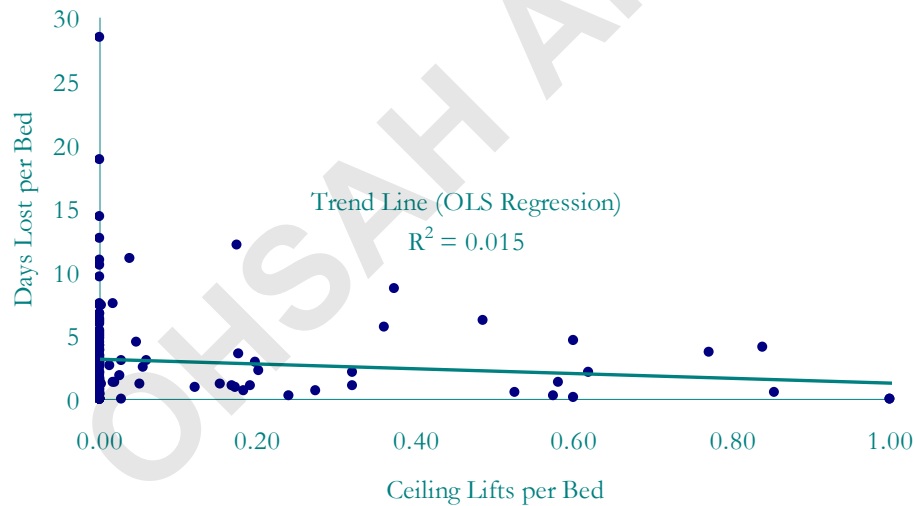
Figure 11: Days Lost per Bed as a Function of Floor Lift Coverage³⁰

While the trend is not statistically significant in these data, Figure 11 shows the trend follows the unexpected direction: that the increased presence of floor lifts appears to be weakly associated with higher days lost per bed.

Figure 12 shows the same unexpected trend for electric beds: the increased presence of electric beds appears to be weakly associated with higher days lost per bed. Again, this trend is statistically insignificant. The penetration rates of electric beds into the reporting facilities is so high, with all of the beds in over ½ of the reporting facilities being electric beds, that electric beds may have ceased to be a differentiating factor in patient handling MSI.

³⁰ Source: Data collected by OHSAH from Health Authorities, November 2002 - March 2003.



Figure 12: Days Lost per Bed as a Function of Electric Bed Coverage³¹**Figure 13: Days Lost per Bed as a Function of Ceiling Lift Coverage³²**

With only 68 of the reporting facilities having any ceiling lifts, it is not surprising that the presence of ceiling lifts does not have a statistically significant effect on the severity of patient handling MSI. The trend in the data, however, does follow the expected and desired direction and there are, as yet, no facilities with high coverage rates that also have a high number of days lost per bed.

³¹ Source: Data collected by OHSAH from Health Authorities, November 2002 - March 2003.

³² Source: Data collected by OHSAH from Health Authorities, November 2002 - March 2003.

5.2.4 Multiple Regression Analysis

The figures and tables in section 5.2.3, each showing the simple relationship between one of the independent variables and days lost per bed due to patient handling MSI, indicate that none of the independent variables have a strong relationship with the dependent variable. These indications do not bode well for the multiple regression among these variables and, indeed, a simple linear OLS multiple regression returns an adjusted R^2 of only 0.10³³ along with an F-test result that rejects the model as having any statistical significance.

The regression results for each of the variables, shown in Table 7, again confirm the impressions conveyed in the figures and tables in section 5. All of the independent variables were specified such that their coefficients should be less than 0, i.e. the higher the value of the independent variable, the lower the value of the dependent variable – days lost per bed.

Table 7: Multiple Regression Results, with all Independent Variables³⁴

<i>Independent Variable</i>	<i>Expected Sign of Coefficient</i>	<i>Estimated Sign of Coefficient</i>	<i>T-Statistic</i>	<i>Interpretation</i>
% of Acute Care Beds	-	+	0.16	Perverse and insignificant
Age of the Facility	-	+	0.01	Perverse and insignificant
Hours of Initial Training	-	-	-0.67	Expected but insignificant
Hours of Annual Training	-	+	0.27	Perverse and insignificant
MSIP is in place	-	+	0.33	Perverse and insignificant
Number of Ceiling Lifts	-	-	-1.86	Expected, barely significant
Number of Floor Lifts	-	+	1.53	Perverse and insignificant
Number of Electric Beds	-	+	2.81	Perverse but significant

The multiple regression analysis returned the expected sign for only two of the eight independent variables: hours of initial training and ceiling lift coverage. For the other six independent variables, the sign of the coefficient was positive, implying the perverse result that increased presence of the intervention was associated with increases in the severity of patient handling MSI.

Any interpretation of the signs of the coefficients must be qualified by the statistical significance of the estimated values of the coefficients. The statistical significance of

³³ Meaning at only 10% of the variation in days lost per bed, from one facility to another, is explained by variation in the eight independent variables from one facility to another.

³⁴ Source: Data collected by OHSAH from Health Authorities, November 2002 - March 2003.



each of the coefficients is assessed with a t-test³⁵. The t statistics, shown in Table 7, suggest that the signs of the coefficient are significant only for electric beds and marginally significant for ceiling lifts.³⁶

In summary, ceiling lift coverage is the only one of eight independent variables for which the estimated result is intuitively correct and which has any statistical significance.

In a subsequent multiple regression, all of the independent variables were removed except for the three types of capital equipment funded under the Nursing Retention Strategy: ceiling lifts, floor lifts and electric beds. Restricting the model to these three independent variables does not materially change the results, as shown in Table 8.

Table 8: Multiple Regression Results, with Lifts and Electric Beds Only³⁷

<i>Independent Variable</i>	<i>Expected Sign of Coefficient</i>	<i>Estimated Sign of Coefficient</i>	<i>T-Statistic</i>	<i>Interpretation</i>
Number of Ceiling Lifts	-	-	-1.90	Expected, barely significant
Number of Floor Lifts	-	+	1.60	Perverse and insignificant
Number of Electric Beds	-	+	2.91	Perverse but significant

Clearly, the overall statistical performance of the model was not good, leading to the conclusion that the model is mis-specified. There are three possible sources of mis-specification: the independent variables are wrong; the mathematical form of the model (simple linear relationships in this case) is wrong or the data are incorrect.

The results for the impact of ceiling lifts on the severity of patient handling MSI are premature, given that there are still too few facilities with high coverage rates to provide statistically robust estimates. This conclusion with respect to ceiling lifts would be the same regardless of the model's overall statistical performance.

One of the variables identified in early specifications of the model was the history of previous injury among workers who were making claims for patient handling MSI. Intuitively, the inclusion of previous injuries as an independent variable makes good sense, given the clinical argument that a previous injury leaves a worker more susceptible to recurrent injury. This variable was not included in the model because there was no way to collect data on the injuries of individual workers over periods of several years: few facilities appear to store and are able to retrieve data in this fashion and WCB, which has that ability, would not release identification numbers for individual claimants due to

³⁵ The t-tests in this report use a $p = 0.05$ level of significance.

³⁶ The t-test, or Student test, dictates that the null hypothesis that the coefficient is 0, i.e. the independent variable has no impact on the dependent variable can be rejected only if t falls outside the range of +2 to -2.

³⁷ Source: Data collected by OHSAH from Health Authorities, November 2002 - March 2003.

concerns about contravention of the *Freedom of Information and Protection of Privacy Act* (R.S.B.C.).

This hypothesis is explored further in Section 14, with the conclusion that there is a statistically significant tendency for workers, once injured, to be injured again. This is worthy of further analyses and is the subject of one of the recommendations in the report card.

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6 RECOMMENDATIONS

The principal conclusions are found in Sections 1.3 through 1.6. In this section, the recommendations that are summarised in Section 1.7 are described in more detail.

The MOU requires that the report contain specific recommendations for the coming year. The recommendations made here can be grouped under the five program steps that are stipulated in the MOU.

6.1 Financing Framework for Equipment

With less than ¼ of the funding required for a comprehensive ceiling program throughout the province secured thus far, the parties to the MOU should pursue more funds. To add to the funding options already available³⁸, there is now sufficient evidence of a positive economic return from ceiling lifts to form the basis of a business case for the endowment of a revolving fund for ceiling lift installation from hospital foundations or other sources.

6.1.a. While OHSAH is not responsible for the arrangement of funding for ceiling lifts, OHSAH could provide supporting documentation to facilities on the benefits of ceiling lift usage. This could be done using the statistical results of the report card to estimate a return on investment (“ROI”) that would be earned through the installation and use of ceiling lifts, or by providing guidance to facilities using a ROI template. In addition, support has already been provided through scientific evaluations of ceiling lift programs that have been conducted at specific sites.

6.1.b. If the calculations are done in 6.1.a. and the estimated ROI is greater than the prevailing rate of return (“ROR”) on long-term investments (currently 3% to 4% per annum) then OHSAH could canvass health authorities, MOHS and WCB on the feasibility of a pooled loan program, in which an initial endowment of capital from the funding agencies is paid back over time from the savings associated with the reduction in patient handling MSI (a “revolving fund”).

Health authorities are already putting the bulk of the funds available into ceiling lifts, rather than floor lifts and electric beds, and they should continue to do so. This recommendation is targeted at the health authorities. Other than continuing to produce program materials and promoting the program through some of the other implementation measures proposed here, no response is required of OHSAH. If future report cards are done, they may continue to monitor the division of expenditures among ceiling lifts, floor lifts and electric beds.

6.2 Industry Guidelines for Safe Patient/Resident Handling;

Workplace culture must be altered along with the installation of ceiling lifts and complete ceiling lift coverage in a facility is a prerequisite to altering its workplace culture. This suggests a re-thinking of how the installation of ceiling lifts is prioritised: rather than starting with the areas of highest risk through many facilities, it may be better to

³⁸ Perrin, Thorau & Associates (2001). [Financing Options for Patient Lift and Transfer Equipment in the B.C. Healthcare Sector](#). Occupational Health and Safety Agency for Healthcare in British Columbia (OHSAH), Vancouver.

completely install ceiling lifts in one facility after another, moving from the highest to the lowest risk facilities.

Health authority and facility managers should closely monitor the extent to which emergency departments and diagnostic departments embrace no-manual-lift policies and the associated mechanical lifting equipment. This recommendation is targeted at the health authorities. OHSAH may offer assistance to the health authorities in monitoring these departments (and others identified by the health authorities) and developing solutions to ensure safe patient handling practices.

OHSAH should procure or develop operating guidelines and training materials that are specific to ceiling lifts. The ideal format for these materials would be videos that contain a series of demonstrations and lessons, each of which is no longer than 10 minutes in length so that they may be used during regular department meetings and break periods.

- 6.2.a. OHSAH could canvass health authorities to better understand what education and training gaps may exist, and offer assistance in facilitating a process to develop best practices for the operation and use of ceiling lifts. Alternatively, OHSAH could provide support in the dissemination and sharing of any best practices that already may be available and in use within the health authorities.

OHSAH's ceiling lift program guidelines³⁹ provide for about 3 slings per ceiling lift to provide diversity in the types of slings and a sufficient cycle time in which the slings are laundered. While 3 slings per ceiling lift are proving to be sufficient in ward settings, they are not sufficient in departments that process a high throughput of patients: e.g. operating rooms, emergency departments and diagnostic departments. Such departments need other solutions – more slings, quicker laundering arrangements or sling liners – and OHSAH should ensure such solutions are available.

- 6.2.b. OHSAH could work with stakeholders to further identify sling issues and solutions they may have developed. OHSAH could make other facilities aware of any solutions that have been developed for such problems. If it is determined that no solutions have been found, OHSAH could work with stakeholders to further investigate solutions, and subsequently alter its program material accordingly and notify stakeholders of the change.

With the program material for facilities well established, OHSAH should develop the ceiling lift program material for community care. An outline for such material is included in Section 7 of this report card.

- 6.2.c. OHSAH could canvass health authorities and community care agencies as to whether they support the recommendation. In particular, the Interior Health Authority could be consulted since it will install a large number of ceiling lifts in the community over the next year. Preliminary

³⁹ Perrin, Thorau & Associates (2002). *Patient/Resident Ceiling Lift Program: Program Guide*. Occupational Health and Safety Agency for Healthcare in British Columbia (OHSAH), Vancouver.



findings from OHSAH's Homecare Initiative should also be taken into consideration, particularly from those agencies involved in the ceiling lift registry. If these stakeholders concur with the recommendation then OHSAH could develop a Community Care Ceiling Lift Program Manual, under the direction of the Provincial Ceiling Lift Program Steering Committee and using a similar process as was used to develop the program manual for ceiling lift use in health care facilities.

6.3 Occupational Health and Safety Committees

In those facilities where they are not dysfunctional, the joint OH&S committees are involved in the implementation and monitoring of equipment programs. There are no further recommendations with respect to these committees, so no response is required from OHSAH. OHSAH however, may offer support to those joint OH&S committees that require assistance in the implementation and on-going use of safe patient handling programs, particularly through OHSAH's joint committee education development (JCED) program.

6.4 Lifting Equipment in New Facilities

Design guidelines for new facilities are completed⁴⁰ and there are no further recommendations with respect to new facilities. Since there are no recommendations, no response is required from OHSAH. However, OHSAH may continue to research and make available to the health authorities design guidelines for new facilities that take into account ceiling lift installations and general ergonomic design principles.

6.5 Annual Report Card

Only a few facilities have complete ceiling lift coverage thus far and it is premature to judge the efficacy of ceiling lifts. The requirement for an annual report card should be continued.

The memorandum of understanding (MOU) that contains the requirement for an Annual Report Card on patient handling will cease to exist when the current collective agreement expires. This recommendation is targeted at HEABC and the Association of Unions; to implement it, they would have to continue the requirement for a Report Card in a new MOU attached to the next collective agreement. No implementation response is required of OHSAH. However, OHSAH staff wish to call attention to the time-consuming nature of this task. OHSAH could canvass the health authorities to discuss data collection methods, particularly with respect to the data reporting requirements for the \$6 million provided by the WCB for patient handling equipment this year.

The 2004 report card should include the use of slings and the mechanical condition of floor lifts in its focus. The maintenance and mechanical performance of ceiling lifts, as their warranty periods expire, should be included in the focus of the 2005 report card.

⁴⁰ OHSAH (2002) [Design Guidelines for Installation of Overhead \(Ceiling-Mounted\) Lift Systems for Persons.](#)

- 6.5.a. If future report cards are completed, they may take into account activities related to ceiling lift maintenance, warranty periods, ceiling lift malfunctions and breakdowns, etc. OHSAH could canvass the health authorities to determine how to best collect such data if further report cards are conducted.

The inability of OHSAH to obtain claimant ID fields in patient handling claims data forced a modification of the statistical model away from a focus on the injury history of individual workers and towards the aggregate performance of facilities. This approach was not successful. Starting in the 2004 report card, the model should be applied not to facilities but to a sample of the population of high-risk individuals. This application of the model will require all claims data to include both the claim ID# and claimant ID# for each claim. WCB and OSHAH should work together to complete whatever steps are necessary, including modifications to the *WCB/OHSAH Data Access Agreement (2001)*, to ensure that WCB can and will routinely supply claims data to OHSAH that includes these fields.

If it is determined that the report card requirement should continue, OHSAH may take these steps to implement this recommendation:

- 6.5.b. Modify the statistical methodology through a working group from the health authorities and confirm the resulting data requirements;
- 6.5.c. Identify with WCB the legal and procedural requirements for OHSAH to obtain claimant ID# then modify the OHSAH/WCB Data Access Agreement accordingly;
- 6.5.d. Enter into agreements with each health authority, patterned after the research agreements outlined by the Office of the Information and Privacy Commissioner, under which OHSAH is provided individual claimant data other than the claimant's name from either WCB or the authorities themselves.

More generally, OHSAH should take all steps necessary to ensure that it fully complies with the *Freedom of Information and Protection of Privacy Act (R.S.B.C.)*, including the completion of a data access agreement that conforms to the provisions of the *Act* with each of the agencies that supplies data for the report card.

- 6.5.e. OHSAH should document its procedures for the collection, storage and destruction of individual-level claims data, ensuring that they reflect the guidelines published by the Office of the Information and Privacy Commissioner.

The collection of data for this report was labour-intensive. Most managers and workers reported that the collection of data, expected to be difficult in any circumstances, was made more complicated by the recent reorganization of health authorities. The following recommendations are intended to streamline future data collection and analysis in the future:

- OHSAH should develop guidelines for the definition of a patient handling injury that could be used by facility staff to identify and track which of their non-HCO claims are patient handling MSI;



- OHSAH could canvass the health authorities to identify exactly what discrepancies (in definition) exist and possible solutions towards improved standardization
- To improve the accounting for mechanical lift program expenditures, health authorities should assign project codes to those expenditures;
 - OHSAH may write a letter to the OH&S manager of each health authority, with copies to the CFO of each health authority, to make this request
- There being no need to directly reconcile patient MSI claims information to program expenditure information, all future report cards should collect OH&S data on a calendar year basis and program expenditure information on a fiscal year basis;
 - This change should be communicated to the OH&S manager of each health authority in a routine manner. More generally, OHSAH could meet with OH&S managers as a group to consult with them on changes to the report card procedures (if future report cards are conducted)
- OHSAH should develop better measures of worker mobility around beds and bathrooms than the age of the facility and dates of major renovations;
- OHSAH should develop measures of the intensity of effort and the effectiveness of the result of MSIPs;
- A future report card should assess the impacts of the participation of workers in training, education and program design in more detail.
 - Data pertaining to the above measures were collected for this Report Card, but were difficult to analyze due to variability and difficulty in accurately assessing. OHSAH could canvass the health authorities to identify measures that are more feasible to collect and assess.

6.6 Other Recommendations

One health authority requested that OHSAH compile information on what interventions have been effective in reducing patient handling MSI in other jurisdictions.

- 6.6.a. This health authority has already been advised where to find the relevant literature review on the OHSAH website. More generally, OHSAH can use this recommendation as an opportunity to remind stakeholders of the resources currently available to them through OSHTips, HEALnet and other areas of the OHSAH website. OHSAH will continue to investigate best practices that have been implemented nationally and internationally, and make this information available to the health authorities.

7 APPENDIX: CLIENT HANDLING IN HOME CARE

Since May 2001, the Occupational Health and Safety Agency for Healthcare in British Columbia (OHSAH) has developed program material and promoted the commitment of incremental funding for ceiling lifts in health care facilities throughout British Columbia. OHSAH has done this work under the general direction of a multi-agency Ceiling Lift Program Steering Committee.

In September 2001, the steering committee deferred work in support of overhead lifts in home care and community care. Home care and community care were considered low priorities because of their relatively low injury costs and their administrative complexities. The steering committee directed OHSAH to first develop program material for health care facilities.

Since then, health authority managers and workers who participated in the development of ceiling lift program materials have continued to advocate for the development of materials specific to home care, even as the ceiling lift material was adapted to serve in both facility and home care settings. Also, there is an increasing awareness that overhead lifts in home care might reduce the admissions to hospitals of home care clients suffering from complications of prolonged bed confinement or accidental falls.

With the main body of ceiling lift program material essentially complete, OHSAH could now dedicate resources to extending the program material into home care. OHSAH should do so, under the general direction of the steering committee, by producing those program materials that are not transferable from facility-oriented materials, or are missing completely:

1. A *clinical study*, similar in scope to the WCB/OHSAH study conducted at St. Joseph's Hospital, to estimate reductions in worker injuries and reductions in client admission rates that are attributable to overhead lifts;
2. A *business case*, based on the clinical study, for the use of overhead lifts in home care and community care settings;
3. A recommended *program management model* that deals with asset management (equipment registration) and liability issues that arise among health authorities, contracted service delivery agencies, their employees and their clients;
4. A draft *compliance policy*, to define the regulatory bases for the rights of the client to refuse overhead ceiling lifts in their home and the rights of health authorities, their contracted service delivery agencies and their employees to require the use of overhead lifts in their client's homes;
5. A summary review of *potential sources of funding* for overhead ceiling lifts in home care; and
6. A *promotional plan*, including field visits and a mobile equipment cupboard.



8 APPENDIX: DISTRIBUTION OF MOHS FUNDS IN SEPTEMBER 2001⁴¹

North Okanagan	\$410,000
Okanagan Similkameen	\$1,225,000
Thompson	\$250,000
Fraser Valley	\$850,000
South Fraser	\$1,550,000
Simon Fraser	\$2,100,000
Central Vancouver Island	\$800,000
Northern Interior	\$165,000
Vancouver/Richmond	\$3,425,000
North Shore	\$800,000
Capital	\$1750,000
Elk Valley and South Country	\$27,000
Cranbrook	\$90,000
Kimberley	\$55,000
Columbia Valley	\$15,000
Creston and District	\$112,000
Golden	\$15,000
Nelson and Area	\$100,000
Castlegar and District	\$55,000
Arrow Lakes/Upper Slokan Valley	\$27,000
Greater Trail	\$150,000
Boundary	\$50,000
South Cariboo	\$20,000
Central Cariboo Chilcotin	\$65,000
Quesnel and District	\$90,000
Bella Coola and District	\$3,500
Sunshine Coast	\$85,000
Powell River	\$95,000
Sea to Sky	\$30,000
Comox Valley	\$250,000
Campbell River/Nookta	\$57,000
Mount Waddington	\$5,000
Central Coast	\$3,500
South Peace	\$100,000
North Peace	\$40,000
Fort Nelson-Liard	\$5,000
Bulkley Valley	\$30,000
Upper Skeena	\$5,000
Terrace and Area	\$35,000
Kitimat and Area	\$20,000
North Coast	\$30,000
Q.C./Haida Gwaii	\$10,000
Nisga'a Valley	\$0
Snow Country	\$0
Stikine	\$0
	\$15,000,000

⁴¹ Program and Capital Planning Branch, Ministry of Health Services, 2002.

9 APPENDIX: CONSTRAINTS ON CEILING LIFT INSTALLATION RATES

A ceiling lift installation rate of over 1,500 units is projected for 2002/03. If 10,000 ceiling lifts were sufficient to cover the 17,000 acute care and long term care beds that are directly managed by the health authorities then continued installations at that rate would see full coverage of all those facilities achieved in 5 to 7 years. A further 10 years would be required to complete all affiliated facilities.

Throughout the implementation of ceiling lift programs in the reporting facilities, some have voiced concerns about the ability of ceiling lift suppliers to sustain the current rate of installation. A particular and oft-mentioned constraint is the supply of certified installers. The reporting facilities and the OH&S managers in the health authorities were questioned closely about their perceptions of the industry's capacity. None of the respondents in these interviews identified supplier capacity as a constraint on the rate at which ceiling lifts could be installed. The respondents identified other, internal constraints as rate-limiting:

- The availability of funds; and
- The capacity of management to meet the complex requirements of communication and co-ordination.

Although the latter constraint is somewhat exacerbated by the intensive requirements of the worker participation model, the respondents emphasised that their capacity to manage a major development project under any model is very limited due to the competing demands placed upon them.

The managers in some facilities reported that the renovation and – in some cases – conversions of rooms⁴² have taken a long time to plan and to execute. While this does not appear to have significantly constrained the rate of ceiling lift installation, it has delayed the start of installation programs in some instances.

Some suppliers indicate that the ceiling lift installation rates they can sustain will depend on the architecture of the facilities, as the focus of some health authorities turns to older buildings, and the extent to which the resources of the suppliers may be diverted to other sectors, e.g. municipal recreation and housing facilities.

⁴² The staff in one facility found that their semi-private rooms were too small to use ceiling lifts over two beds, so these rooms were converted to private rooms.



10 APPENDIX: ASSESSMENT METHODOLOGY

The extent of MSI arising from patient handling in health care facilities is a function of several variables. The risk assessments used for patient handling are useful as guidelines in the specification of these independent variables in any multiple regression designed to estimate the extent of patient handling MSI.

One set of such guidelines exist in the *Ergonomics (MSI) Requirements* that are set in regulation⁴³:

- “The following factors must be considered, where applicable, in the identification and assessment of the risk of MSI:
- a. The physical demands of the work activities, including
 - i. The force required,
 - ii. Repetition,
 - iii. Duration,
 - iv. Work postures, and
 - v. Local contact stresses;
 - b. The aspects of the layout and condition of the workplace or workstation, including
 - i. Working reaches,
 - ii. Working heights,
 - iii. Seating, and
 - iv. Floor surfaces;
 - c. The characteristics of the objects handled, including
 - i. Size and shape,
 - ii. Load condition and weight distribution, and
 - iii. Container, tool and equipment handles;
 - d. The environmental conditions, including cold temperature;
 - e. The following characteristics of the organisation of work;
 - i. Work-recovery cycles,
 - ii. Task variability, and
 - iii. Work rate.”

The *Ergonomics (MSI) Requirements* are generic to all industries and cannot be expected to explicitly define all the causal factors that are specific to patient handling MSI. There are many publications that provide guides to risk assessments that are specific to patient handling and reflect generalities of the *Ergonomics (MSI) Requirements*, in that they focus risk assessments on: the task, the load, the environment, the worker and other factors such as the condition of the patient/resident. Some of these publications are listed in the bibliography of the *Patient/Resident Ceiling Lift Program Guide* produced by OHSAH.

⁴³ *Ergonomics (MSI) Requirements, Occupational Health and Safety Regulation* (B.C. Reg. 296/97 and B.C. Reg. 185/99) Part 4. The risk assessment specifications are in sections 4.48 and 4.49.

Throughout the model specifications the following terms are used:

MSI_{PH} =	Either: [1] The costs of claims resulting from MSI due to patient handling that are reported during period t , divided by the number of employees; or [2] The injury rate (the number of claims per 100 person-years worked) of MSI due to patient handling reported during period t ; or [3] The days lost in claims or the cost of claims.
TYPE_{FACILITY} =	The type of facility: long-term care, acute care or intermediate care, as a proxy for all of the attributes of the load: the physical demands of the lift, the condition of the work place and the condition of the patient
AGE_{FACILITY} =	The physical characteristics of the bedroom and bathroom, represented by the age of the facility;
LIFTREP =	The mean frequency of lifts (or transfers or repositioning) performed by one worker in one hour of shift time, taken as a proxy for all the attributes of the work recovery cycle and the organisation of work;
NUM_{WORKER} =	The number of workers required by the facility's policy to lift a patient.
TRAIN_{START} =	The hours of initial training that workers receive in the lifting and transferring of patients.
TRAIN_{ANNUAL} =	The hours of ongoing regular training that workers receive in the lifting and transferring of patients.
MSIP =	A dummy variable that designates those facilities that have a MSI management plan in place, as a proxy for the attributes of proper management and training programs for MSI.
ΣMSI_{t-k} =	The history of all previous MSI due to patient handling sustained by the same workers, measured as the sum of the costs of all claims resulting from MSI due to patient handling that are reported during the previous 10 years;
AGE_{WORKER} =	The mean age of those workers who are required to routinely lift or transfer patients, taken as a proxy for all of attributes of the condition of the workers and their ability to lift;
OCCUPATION =	The occupational category of the worker, as a proxy for their professional training in the areas of MSI and risk assessment;
YEARS_{WORKER} =	The years of service for each worker, as a proxy for the cumulative effects of previous lifts, transfers and other loads;
COVER_{CEILING} =	The number of ceiling lifts in a facility, divided by the corresponding number of beds in that facility;
COVER_{OTHER} =	The number of other mechanical lifts in a facility, divided by the corresponding number of beds in that facility; and
COVER_{BED} =	The number of electrical/mechanical beds that are not in need of replacement for ergonomic reasons, divided by the corresponding number of beds in that facility.



10.1 Model as Specified for Individual Workers

The extent of MSI for an individual worker due to patient handling in any given period t is specified to be:

$$\text{MSI}_t = f(\text{TYPE}_{\text{FACILITY}}, \text{AGE}_{\text{FACILITY}}, \text{LIFTREP}, \text{NUM}_{\text{WORKER}}, \text{TRAIN}_{\text{START}}, \text{TRAIN}_{\text{ANNUAL}}, \text{MSIP}, \Sigma\text{MSI}_{t-k}, \text{AGE}_{\text{WORKER}}, \text{OCCUPATION}, \text{YEARS}_{\text{WORKER}}, \text{COVER}_{\text{CEILING}}, \text{COVER}_{\text{OTHER}}, \text{COVER}_{\text{BED}})$$

This model has some serious limitations in its ability to represent the extent of patient handling MSI experienced by an individual worker. For several of the variables, facility statistics are being used as proxies for individual statistics, e.g. the variable ΣMSI_{t-k} relates to the historical incidence of injury in the facility, not to the individual's history of injury; and training refers to the extent of facility training, not to the individual's level of training. It is possible that this model is incorrectly specified, in that it may be a model of patient handling MSI in facilities that is mixed with a few parameters that refer to the individual.

Such concerns are moot in this report card because some of the data required to estimate the expression above are not available. The expression requires MSI claims data that are disaggregated to the individual worker for all of the workers in a facility. While public bodies can release such information to research partners under the *Freedom of Information and Protection of Privacy Act* (R.S.B.C.) if the unique identifiers of workers and patients are removed, the data is not retrievable in many facilities.

10.2 Model as Specified for Facilities

Sufficient data on the total patient handling MSI in each facility is available, so a model that attempts to predict totals by facility is specified in this sub-section. This model is used for the analyses presented in section 5.

When estimating the total MSI in a facility (or any other organisational unit, such as an employer or a region), all of the attributes of the patients and the workers are assumed to be constant across the facilities and regions included in the data. Assuming that the attributes LIFTREP , $\text{AGE}_{\text{WORKER}}$, ΣMSI_{t-k} , OCCUPATION , $\text{YEARS}_{\text{WORKER}}$ and $\text{NUM}_{\text{WORKER}}$ are constant reduces the expression to:

$$\text{MSI}_{\text{PH}} = f(\text{TYPE}_{\text{FACILITY}}, \text{AGE}_{\text{FACILITY}}, \text{TRAIN}_{\text{START}}, \text{TRAIN}_{\text{ANNUAL}}, \text{MSIP}, \text{COVER}_{\text{CEILING}}, \text{COVER}_{\text{OTHER}}, \text{COVER}_{\text{BED}})$$

This model is an example of one way in which such a function can be specified. Recent literature suggests that workload and organisational culture may also have major impacts on patient handling MSI. Appropriate indicators for these variables have not yet been finalised and incorporated into this facilities-level model.

11 APPENDIX: THE LENGTH OF PATIENT HANDLING MSI CLAIMS

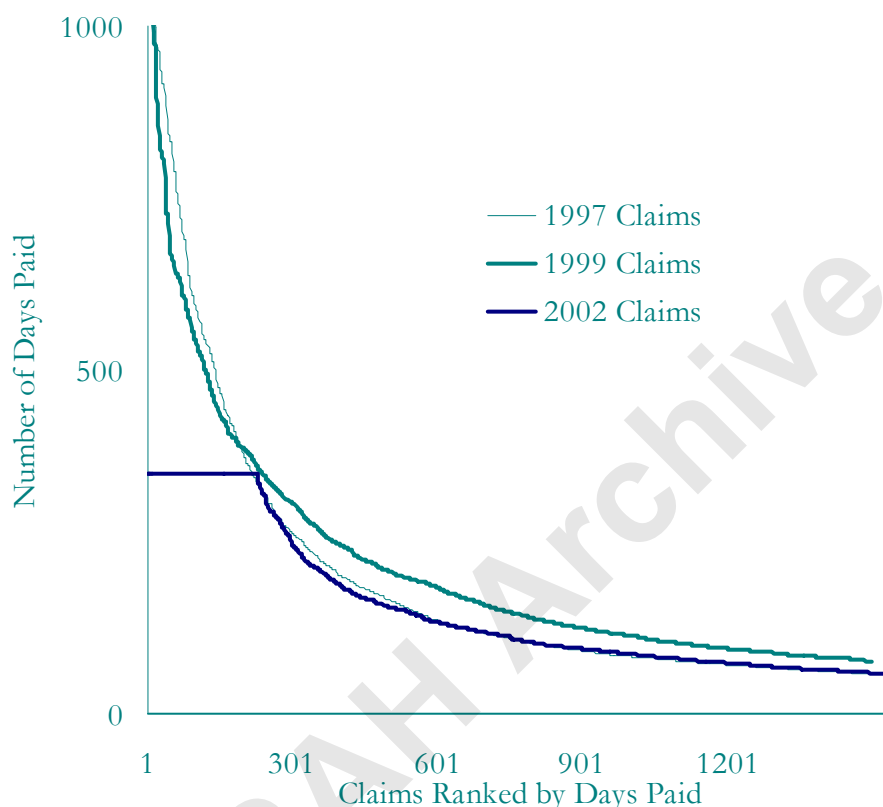
Figure 14: The Lengthening of Patient MSI Claims, 1996 to 2001⁴⁴

Figure 14 shows the individual patient handling MSI claims in each of three years, arranged by the days paid out on each claim. Long claims appear to the left side of the figure, and short claims appear towards the right side of the figure. The scale is truncated, such that the few claims with over 300 days paid and the many claims with less than 5 days paid are not shown.

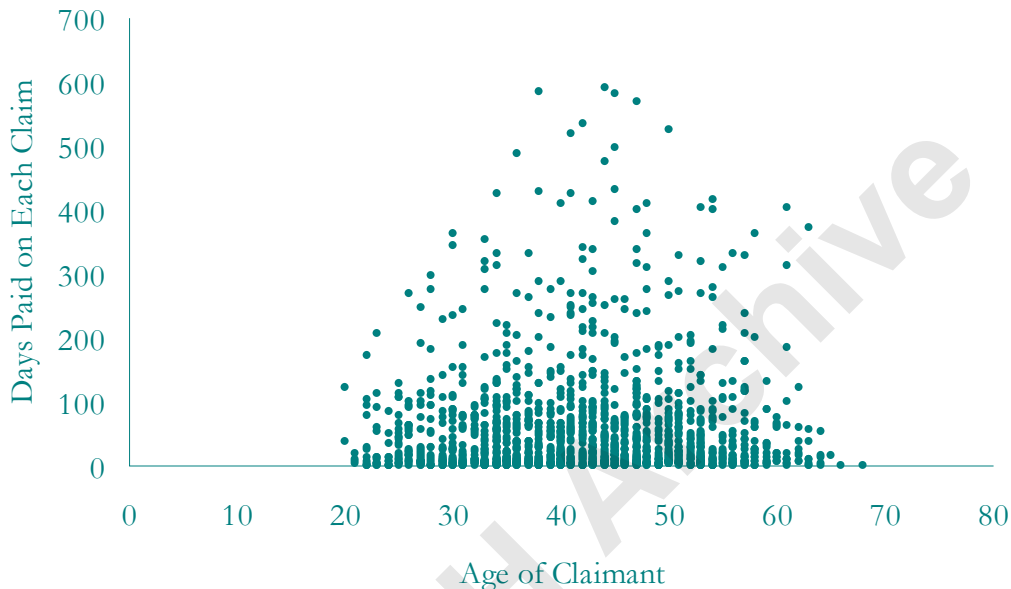
Next to the ideal of no patient handling MSI claims at all, the desirable outcome is that claims are short and workers return to work as early as possible. From 1997 to 1999 however, workers injured while handling patients were off work for longer periods: the 300 longest claims averaged 190 days in 1997 and 260 days in 1999. Data for 2002 is truncated at 300 days, since many of those claims are still open. The data for 2001, not shown in the figure, appear to be following the trend of 1999. The length of the claims ranked from 300th to 900th in length averaged 30 days in 1997, 60 days in 1999 and 55 days in 2001.

⁴⁴Based on claims data supplied by Workers' Compensation Board of British Columbia, March 2003 and April 2003



The trend of each patient handling injury claim to become longer and more expensive bears some investigation. One plausible hypothesis that can be investigated with these data is the increasing age of the workforce and of those workers who are being injured.

Figure 15: Year 2000 Patient Handling MSI Claims, Arranged by Age of Claimant⁴⁵



There is no significant relationship between the age of the claimant and the length of the patient handling MSI claim, as illustrated by Figure 15 and confirmed by an estimate of the sample's covariance in the year 2000, the most recent year for which the claimants' ages are available. Also, the mean age of claimants increased only slightly between 1996 and 1999: from 40 years to 41 years.

There are differences in the patient handling MSI claim patterns at either end of the age spectrum. Young workers, aged 15 to 24 years, tend to avoid the few long-term claims filed by old workers, aged 45 to 64 years⁴⁶

⁴⁵Based on claims data supplied by Workers' Compensation Board of British Columbia, March 2003 and April 2003

⁴⁶ These age categories are used by Statistics Canada and the British Columbia Ministry of Finance in their reports of labour force statistics.

Table 9: Patient Handling MSI Claims from Young and Old Workers, Year 2000⁴⁷

	<i>15-24 years</i>	<i>25-44 years</i>	<i>45-54 years</i>	<i>55-64 years</i>
Number of Claims	42	893	476	154
As % of all Claims	3%	60%	30%	10%
% of British Columbia Workforce ⁴⁸	15%	55%	20%	10%
Average Days Paid on Claims	36	56	58	52

However, old workers do not appear to be significantly more prone to injury: their proportion of claims generally matches their presence in the workplace. The age group whose incidence of injury most exceeds their work place presence are the middle-aged workers, aged 45 to 54 years.⁴⁹ Workplace culture explains this result: in many facilities, managers and workers reported that older front-line workers tend to move or be moved towards jobs that involve less patient handling.

One prevalent factor in the pattern of patient handling MSI claims across worker ages is the propensity for workers who have been injured in the past to become injured again. This proposition is explored in Section 14.

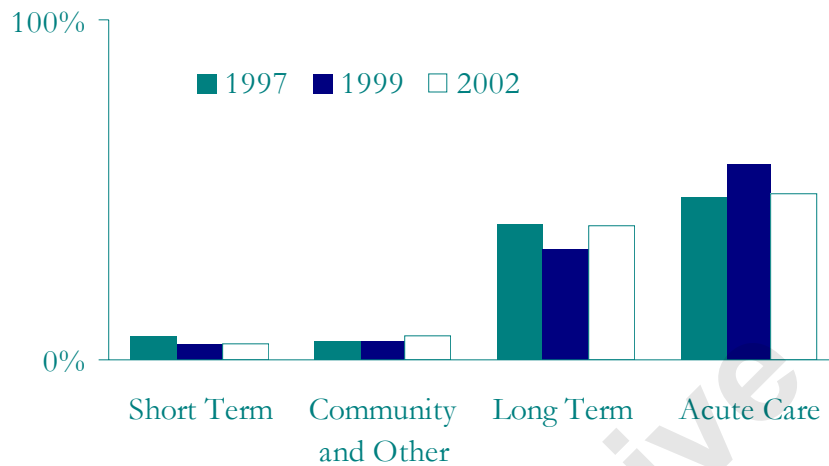
Other hypotheses to explain the lengthening of patient handling MSI claims could be that there have been large shifts in the proportions of claims coming from certain occupational groups or certain types of facilities. However, there do not appear to have been significant shifts in these other attributes of claims filed since 1996 that might explain the longer claims filed in 1999.

⁴⁷Based on claims data supplied by Workers' Compensation Board of British Columbia, March 2003

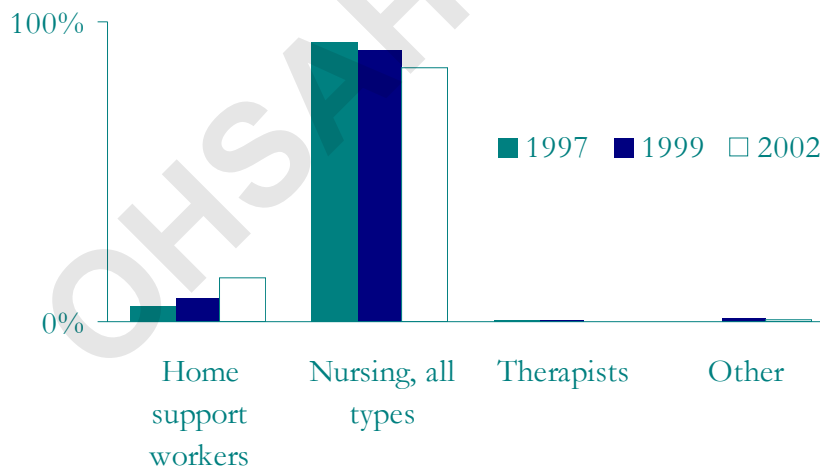
⁴⁸ The age distribution of workers who must handle patients may not correspond to the age distribution of all workers in the British Columbia workforce. For example, most patient-handling staff require a diploma or a degree so there are likely to be very few such staff in the 15-24 year age category.

⁴⁹ An occupational therapist interviewed for this report commented: "for health care workers, like most people, 45 is an average age: 30-year-old expectations coming up against 60-year old limitations."



Figure 16: Days Lost on Patient Handling MSI Claims, by Type of Facility⁵⁰

The three years shown do not show a significant change in the proportions of patient handling MSI occurring in different types of facilities. However the breakdown of days paid by occupation tells a different story.

Figure 17: Days Paid on Patient Handling Claims, by Occupation⁵¹

Over the last six years, there has been an increase in the proportion of patient handling MSI claims generated by home care workers in the health care classification unit. Some, and perhaps most, of this increase could be accounted for by the reclassification of most

⁵⁰Based on claims data supplied by Workers' Compensation Board of British Columbia, March 2003 and April 2003.

⁵¹Based on claims data supplied by Workers' Compensation Board of British Columbia, March 2003 and April 2003.

home support workers from the local government and home support services classification unit to the health care classification unit in WCB statistics. However, some growing claims from home support workers can be attributed to the shifting burden of health care onto community care: most of the data reclassification took place in 2001 and 2002 and the increasing proportion attributed to home support workers can be traced to 1999.

While the increase in home care sector patient handling MSI is noteworthy in itself, and the subject of a recommendation in this report, it does not account for the increase in the mean days per claim: home care workers claims had, on average, 35 days in 2001 while all claims in that year had, on average, 50 days.

Another hypothesis, one that cannot be tested with the available data, is that the lengthening of patient handling MSI claims does not reflect either an increase in the severity of injuries or the ability of workers to recover from them, but administrative delay. It is plausible that the time required to seek and receive treatment in British Columbia's health care system, for a given injury, increased from 1996 to 1999. It is also plausible that the time required to seek and receive payments from the WCB, including the time required to appeal decisions, also increased from 1996 to 1999.⁵²

Table 10 summarises patient handling MSI data collected from the reporting facilities.

Table 10: MSI due to Patient Handling⁵³

<i>Health Authority</i>	<i>1999/00</i>			<i>2001/02</i>		
	<i>Number of Claims</i>	<i>Days Lost</i>	<i>Cost of Claims (\$M)</i>	<i>Number of Claims</i>	<i>Days Lost</i>	<i>Cost of Claims (\$M)</i>
Fraser ⁵⁴	303	17,688	1.7	361	24,118	1.9
Interior	435	18,248	1.9	427	12,814	1.6
Northern	134	3,743	0.5	140	4,228	0.5
Providence	84	3,509	0.5	92	3,435	0.5
Provincial	49	1,528	0.2	79	3,415	0.4
Vancouver Coastal	330	17,352	1.9	236	16,335	1.9
Vancouver Island	207	4,675	1.7	241	4,128	0.7
Total	1542	66,743	8.4	1576	68,473	7.5

⁵² WCB staff think this is a plausible explanation for at least some of the changes in days lost and the cost of claims.

⁵³ Source: Data collected by OHSAAH from Health Authorities, November 2002 - March 2003.

⁵⁴ 1999 data for the Fraser Health Authority is understated. 15 facilities could report data only for the 4-month period from December 1999 to March 2000.



Little stock should be placed on what appear, in Table 10, to be variations in the costs of patient handling MSI from one health authority to another or costs in any one authority from one period to another.⁵⁵ These data represent only reporting facilities, not all facilities, and cannot be taken as accurate measures of any one health authority's experience or performance. Also, the trends in these data over the period are increasing, opposite to the trends illustrated in Figure 5, which is compiled from data supplied by WCB.⁵⁶

Casual inspection of these data suggest that, despite the interventions of the last three years – increased training, implementation of MSIP and the increased use of both floor and ceiling lifts – that the frequency and severity of patient handling MSI have continued to increase. This may mislead the reader into concluding that those interventions have been ineffective. However, it is possible that, without these interventions, patient handling MSI would have increased at an even faster rate. Such a finding would support the notion that the interventions have had a positive effect, and the analyses in Section 5 are designed to assess this possibility.

⁵⁵ One OHSAH staff member charged with the collection of data writes: “Prior to 2001, any form of an injury tracking was nearly non-existent, with the exception for a few facilities. As a result, data collection resulted in searching and flipping through binders of incident reports to retrieve this information.”

⁵⁶ See Table 23 for a detailed comparison of data obtained from WCB and data collected from facilities.

12 APPENDIX: DAYS LOST, THE COST OF PATIENT HANDLING MSI CLAIMS AND THE SEVERITY OF INJURIES

There is no direct measure of the severity of a patient handling injury that is collected in the facilities' or WCB data, so a proxy for severity must be chosen from along the three choices available: the number of patient handling MSI claims, days lost and the cost of claims.

Figure 18: Correlation of Days Lost and Cost of Claims, 2001/02⁵⁷

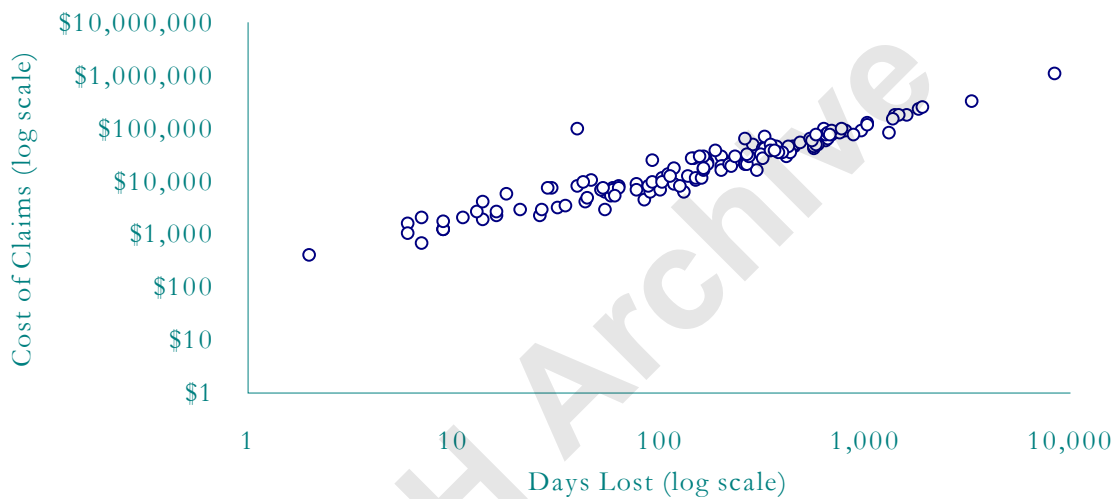
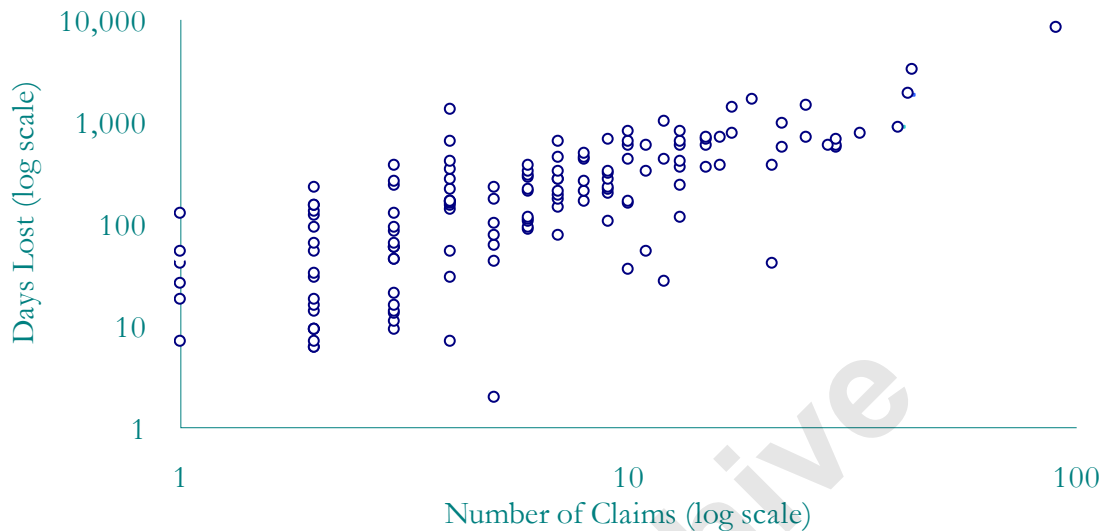


Figure 18 indicates there is a high correlation between days lost and the cost of claims in the 2001/02 patient handling MSI claims data. Either of these two variables could be used as proxies for each other.

⁵⁷ Source: Data collected by OHSAH from Health Authorities, November 2002 - March 2003.



Figure 19: Correlation of Number of Claims and Days Lost, 2001/02⁵⁸

Unfortunately, the correlation between the number of patient handling MSI claims in each facility and the sum of the days lost in those claims is not so high, as illustrated in Figure 19.⁵⁹

The analysis of injury data in Section 11 demonstrates that neither days lost nor the cost of patient handling MSI claims can be relied upon to measure the severity of injuries across a long span of time, since both days lost and the cost of claims are influenced by the changes in the times required to receive treatment, to navigate the claims administration process or changes to treatment and rehabilitation paradigms. The alternative is to rely upon the number of claims to represent the severity and the cost of injuries. However, the number of claims is a poor predictor of days lost, the cost of claims and – by assumption – the severity of injuries.

The limitations on using days lost as a measure of the medical severity of an injury does not prevent it from being used as a measure of all impacts of an injury on individuals. The medical severity of the injury is one impact among others, including economic impacts and impacts on family and social units. Days lost can also be used as a measure of the impacts on the facilities in which those individuals work, even over long spans of time.

These limitations have a fundamental impact in shaping the analytical approaches used in section 5. The analysis of the changes in patient handling injuries over time in section

⁵⁸ Source: Data collected by OHSAH from Health Authorities, November 2002 - March 2003.

⁵⁹ Both Figure 18 and Figure 19 use logarithmic scales. These scales are superior for comparing many low values with a few high values, as are found through these data, but they change the visual interpretation of the data. On linear scales, a straight line implies that the units are changing in the same proportion, e.g. for each one unit increase on the X-axis, there is a constant change in the number of units on the Y-axis. On logarithmic scales, a straight line implies that the percentages are changing in the same proportion, e.g. for each one percent increase on the X-axis, there is a constant percentage change on the Y-axis.

5.1 is restricted by using the number of claims as the only measure of patient handling MSI. The more comprehensive analysis in section 5.2 is restricted to a single time period, 2001/02, which allows days lost to be used as the measure of patient handling MSI.

OHSAH Archive



13 APPENDIX: PATIENT HANDLING INJURIES AND THE SIZE OF FACILITIES

All three measures of patient handling MSI – number of claims, days lost and cost of claims – are aggregated for each individual facility. The most influential variable on the incidence of patient handling MSI will be the number of beds: all other variables being equal, larger facilities with more beds will experience more patient handling MSI. For this reason, each of the MSI data used in section 5 is corrected for the size of facility. This subsection examines the relationships among beds, FTEs and size in the reporting facilities so that the most appropriate correction can be applied.

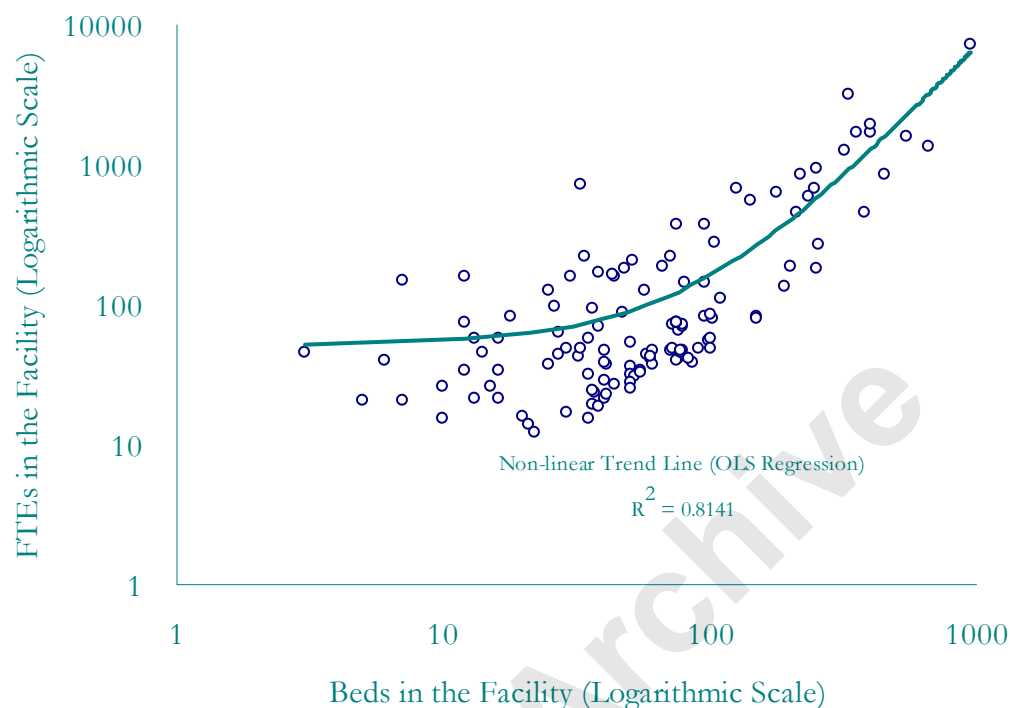
There are two available measures of the size of facilities: the number of beds and the number of FTEs. 202 of the reporting facilities include data for the number of beds the number of patient handling MSI and the days lost due to patient handling MSI in 2001/02. FTE counts are unavailable for about 30 of these facilities.

FTE counts are not reliable data. There is no uniformly consistent way to separate those staff who routinely handle patients from other staff, so it was not possible to collect a count of patient handling FTEs from all facilities on a consistent basis. This subject was discussed with OH&S program managers and facility managers at some length. Some of the facilities reported the number of beds and, by their own criteria, the FTEs of staff that handle patients. Their reports suggest that, typically, about 1 FTE to 1.5 FTEs of patient handling staff are required per bed in acute care and long-term care facilities. Given that FTE coverage of 24 hours per day and 7 days per week requires about 5 staff members per FTE, this implies that these facilities would have between 5 and 8 patient handling staff per bed. One health authority reports that its staff that handle patients represent about $\frac{2}{3}$ of the staff that work in its facilities.

While some facilities could not report their FTEs, they could report their total payroll and an estimated average salary. For those facilities, FTEs were estimated from total payroll. Most of the facilities managers that were interviewed on their FTE counts were able to report both their total FTEs and their patient handling FTEs with some approximations on their part.

Very few of the facilities managers and workers that were interviewed reported that their had been significant changes in either the number of beds or the number of “patient care” FTEs in their facilities. While beds and patient care FTEs are being reduced in facilities that are slated for closure, most of the facilities that are remaining open appear to have some stability in their bed counts and their FTE counts between 1999 and 2002.

The correlation between the total number of beds and the FTEs in the 150 reporting facilities for which these data are available is shown in Figure 20.

Figure 20: Relationship between Beds and FTEs⁶⁰

The relationship between the total number of beds in a facility and the FTEs in that facility is not a simple one: the R^2 of the OLS regression is improved from 0.64 to 0.81 when the relationship is allowed to be non-linear, as it is in Figure 20. This suggests that there is a statistically significant difference in the FTEs per bed as the number of beds varies.⁶¹

The relationship between the number of beds and FTEs was not significantly improved by adding other plausible variables:

- Older facilities may require more staff to work in less efficiently designed space; and
- Facilities with a high proportion of acute care beds may require more staff.

Adding these two variables improved the adjusted R^2 by only 0.03 (3%) and t-tests on the coefficients indicated that, while the proportion of acute care beds may be a

⁶⁰ Source: Data collected by OHSAH from Health Authorities, November 2002 - March 2003.

⁶¹ An observer who is familiar with production cost functions might infer that Figure 20 demonstrates the behaviour predicted by classical economic theory: that there is an optimal size for health care facilities at which labour inputs are minimised; in this case, at something less than 100 beds. Such a claim would be dangerous and misleading if it was based solely on the analysis in this report card. Such a question is beyond the scope of this report card and this analysis, intended only to identify adequate measures of facility size, ignores the many and complex issues that must be included in a proper analysis of optimal health facility size.



statistically significant ($t=3.43$) factor in determining the number of FTEs in a facility, the age of the facility was not ($t=-1.6$).

In some health authorities, managers and workers report that many facilities have closed, and the number of beds in acute care and long term care facilities have been reduced, but the number of staff employed and the FTEs of staff time used have not changed significantly from 1999 to 2001. In at least two health authorities, however, FTEs have been reduced during the past two years. FTEs in facilities across the province are expected to decrease over the next two years, as some services are contracted out.

The data suggest that neither beds nor FTEs is a clearly superior measure of the size of facilities. Since the bed counts are simpler to collect and there is a more complete set of bed counts for the reporting facilities than there are FTE counts, the number of beds is used in the analyses in section 5.

Table 11: Costs of Patient Handling MSI Claims in Reporting Facilities, 2001/02⁶²

<i>Health Authority</i>	<i>Number of LTC and Acute Beds</i>	<i>Cost of Claims 2001/02 (\$M)</i>	<i>Cost of Claims (\$ per bed)</i>
Fraser	4454	1.9	\$425
Interior	7388	1.6	\$220
Northern	1531	0.5	\$330
Providence	1568	0.5	\$320
Provincial	1279	0.4	\$310
Vancouver Coastal	3239	1.9	\$585
Vancouver Island	3321	0.7	\$210
Total/Average	22780	7.5	\$330

Little stock should be placed on what appear, in Table 11, to be variations in the costs of patient handling MSI from one health authority to another. These data represent only reporting facilities, not all facilities. As the data was collected by survey, there is a margin of error in relation to the numbers collected, but the margin of error is equal among all of the health authorities. The data are in a very large sample, representing most of the facilities in each health authority, and the levels and trends that they show should hold true. Thus the data are strong enough to indicate that a particular health authority is or is not doing well but are not strong enough to make exact rankings and numerical comparisons.

⁶² Source: Data collected by OHSAH from Health Authorities, November 2002 - March 2003.

14 APPENDIX: THE RECURRENCE OF INJURY IN HIGH-RISK WORKERS

While individual claimant ID numerals could not be collected over the period of this analysis, from 1999/00 to 2001/02, there were available some older data covering the years 1996 to 2000 inclusive. The field values⁶³ of these data are of dubious integrity – they are old and incomplete – but the claimant ID numerals are retrievable for about 8,750 patient handling claims over those five years. These appear to represent most of the patient handling MSI claims made over the period.

To test the hypothesis that previous injuries are a significant factor in the incidence of injuries, the individual claimant ID numerals, which covered a range of about 1.9 million numerals over 8,754 patient handling MSI claims, were arrayed against 8,754 numerals that were randomly generated across the same range of 1.9 million numerals. How often individual numerals recurred in these two sets of data were compared; if individual numerals recurred no more often in the claimant ID numerals than they did in the random numerals, then the hypothesis that previous injury leads to further injury could be rejected.

Table 12: Recurrence of Claimant ID Numerals, 1996-2000, across the Full Range⁶⁴

<i>Number of times that the same numeral occurs</i>	<i>Claimant ID, 1996-2000</i>	<i>Random Numbers</i>
Twice	1,297	26
Three times	239	0
Four times	50	0
Five times	11	0
Six times	2	0
Seven times	0	0

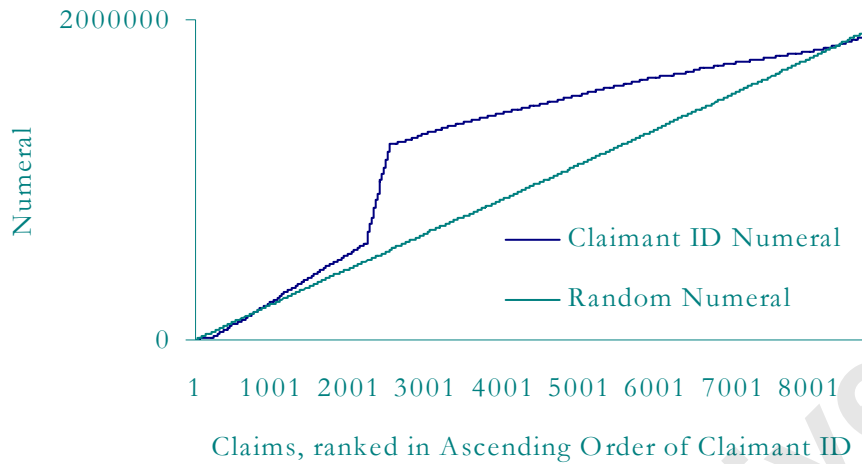
Table 12 demonstrates that, obviously, this is not so: certain claimant ID numerals recur far more frequently in the 1996-2000 patient handling MSI claims data than they do in the random numerals.

To test whether this result is caused by a systematic assignment of claimant ID numerals, the ranges of those numerals and of the randomly-generated numerals are plotted in Figure 21.

⁶³ The field values include specifics of the claimants, age, gender, occupation, place of employment as well as information on the injury.

⁶⁴ Source: Data collected by OHSAH from Health Authorities, November 2002 - March 2003.



Figure 21: Comparison of Rank-Ordered Claimant ID with Random Numerals⁶⁵

Some system of assignment has resulted in relatively few claimant ID numerals between the values of 650,000 and 1,200,000 appearing in these data so, to ensure the validity of the estimates in Table 12, they are replicated in Table 13 for only the 6682 claims with claimant ID numerals above 1.2 million.

Table 13: Recurrence of Claimant ID Numerals, 1996-2000, above 1,200,000⁶⁶

<i>Number of times that the same numeral occurs</i>	<i>Claimant ID, 1996-2000</i>	<i>Random Numbers</i>
Twice	891	31
Three times	159	0
Four times	31	0
Five times	7	0
Six times	1	0
Seven times	0	0

There is a statistically significant tendency in these data for the individual claimants to make multiple claims for patient handling MSI. This suggests that the history of previous injury should be included in the model as an independent variable. The most robust approach would be to not use facilities as the basic unit by which individual claims data are aggregated, as is done in this report, but to use claims history as the basic unit of aggregation: individual claims would be bundled together according to their association with previous claims. The effect of interventions on each of these groups would then be assessed over time. Unfortunately, the up-to-date data for patient handling MSI does not include claimant ID numerals, so this analysis is not possible at the moment.

⁶⁵ Source: Data collected by OHSAH from Health Authorities, November 2002 - March 2003.

⁶⁶ Source: Data collected by OHSAH from Health Authorities, November 2002 - March 2003.

15 APPENDIX: DATA RECEIVED FROM WCB

WCB provided detailed information on health-care sector⁶⁷ claims, under the *WCB/OHSAH Data Access Agreement (2001)*, for the calendar years 1997 through 2002. These data are organised such that there is one record for each claim, with the following fields.

Table 14: Field Definitions in WCB Claims Data⁶⁸

Year	Year in which the first STD payment was made
Tracking ID	Unique number assigned to that claim, but not WCB “Claim ID” or “Claimant ID”
CU	Classification unit (cu) number that the employer is in
Employer ID	Unique number assigned to each employer
Employer Legal Name	Legal name of the employer
Location Code	A code for the WCB-defined region in which the injury occurred.
Injury Date	Date on which the injury occurred
First STD Paid Date	Date on which the first STD payment was made.
Non-HCO Yr	Year in which the injury occurred
Worker Age	Age of the claimant on the injury date
Gender	Gender of the claimant on the injury date
Claim Cost Total	Amounts paid on claims other than ‘health care only’ (HCO) claims, i.e. all claims that have wage loss benefits paid on them, from the first STD paid date to March 2003
Days Lost Total	Wage loss days paid from the first STD paid date to March 2003
Occupation Code	Statistics Canada occupation code of the claimant on the date of the injury
Occupation Text	WCB standard text associated with the Statistics Canada occupation code
Accident Level 2 Code	WCB Code that identifies the accident type
Accident Level 2 Text	WCB standard text associated with the accident code
Nature of Injury Level 3 Code	WCB code that identifies the nature of the injury
Nature of Injury Level 3 Text	WCB standardized text associated with the above code
Source of Injury Code	WCB code that identifies the objects involved in the incident: patients are considered as ‘involved objects’.
Source of Injury Text	WCB standard text associated with the source of injury code
Body Part Level 2 Code	WCB code that identifies the body part injured
Body Part Level 2 Text	WCB standard text associated with the body part code
ICD9 Code	World Health Organization International Classification of Diseases code for the nature of injury
ICD9 Text	World Health Organization International Classification of Diseases standardised text for the nature of injury

⁶⁷ All those non-HCO claims reported through employers in the WCB sub-sector 7660.

⁶⁸Based on claims data supplied by Workers’ Compensation Board of British Columbia, March 2003



The claimant ID was not made available due to concerns about the applicability of the *Freedom of Information and Protection of Privacy Act* (R.S.B.C.). This limits the extent to which this data can be used to analyse previous injuries as a predictor of current injuries.

The 2002 data is the last set that WCB will be able to issue using the same employer codes and names as are used in the 1997 – 2002 data.

WCB provided two extracts of its data for this report card, each of which had minor flaws:

- In the first extraction, upwards of $\frac{1}{3}$ of the non-HCO claims were not coded with respect to occupation, type of accident or nature of injury; and
- In the second extraction, the principal discriminator used was the year in which benefits were first paid, not the year of injury.

Some non-HCO claims may be missing from second extraction due to the additional constraint of the year in which benefits were first paid being placed upon it. This is borne out in a comparison of the total number of patient handling MSI claims in the two extractions, summarised in Table 15 below.

Table 15: Comparison of First and Second Data Extractions by Year of Injury⁶⁹

	1997	1998	1999	2000	2001	2002
All claims, first extraction	7924	9511	10555	10426	10560	10561
All records, second extraction	7356	8248	8275	8377	8204	6375

The difference between the two extractions of the same data become more marked in the more recent years, presumably because WCB has yet to make its first payment on a higher proportion of claims in recent years.⁷⁰ The second extraction contained 912 claims for which injuries occurred between 1978 and 1996 but the first payments were made between 1997 and 2002.

Notwithstanding these limitations, the second extraction is far more accurate and, as such, it is the source from which WCB data is used throughout the report card.

Claims due to patient handling are not classified as such in the WCB data. For this report card, those claims that are likely to be claims for MSI due to patient handling are extracted from the full data. Eliminating all claims that are attributed to occupations, accident types and injury types that are unlikely to be associated with patient handling accomplishes this.

⁶⁹Based on claims data supplied by Workers' Compensation Board of British Columbia, March and April 2003

⁷⁰ Of the 47,747 non-HCO claims in the second extraction of data, payments started one year after the injury for 3,627 claims (8%), two years after the injury for 331 claims (1%) and between 3 and 18 years for 371 claims (1%).

The principal discriminator among patient handling MSI and other non-HCO claims are the sources of injury. Table 16 summarises the sources of injury that were considered as eligible for patient handling MSI.

Table 16: Examples of Eligible Sources of Injury⁷¹

<i>Code</i>	<i>Description</i>
57300	Patient or Resident of Health Care Facility
57900	Person other than Injured or Ill Worker, NEC
57901	Customer

Only a certain subset of all the occupations that work in health care facilities were assumed to be handling patients as part of their duties. These occupations are summarised in Table 17. Significantly large occupational groups such as housekeepers were eliminated as they are not required to handle patients.

Table 17: Examples of Eligible Patient-Handling Occupations⁷²

<i>Statistics Canada</i>	
<i>Code</i>	<i>Occupation</i>
G818	Home support worker
D042	Physiotherapist, speech therapist
D043	Occupational therapist
D233	Practical nurse, nurse's aide, ward attendant
D312	Nursing assistants
D112	Registered nurse
D111	Supervisor, nursing occupations
F154	Community welfare sports supervisor
D215-D218	X-ray technician, radiology, sonograms, etc.

Several types of accidents that these occupational groups incur are unlikely to be caused by patient handling and they are deleted from the data on that basis. Some of these accident types, such as falls and assaults, account for a significant proportion of accidents in these occupational groups. Those accident types that are left in the data as possibly due to patient handling are summarised in Table 18.

⁷¹Based on claims data supplied by Workers' Compensation Board of British Columbia, April 2003

⁷²Based on claims data supplied by Workers' Compensation Board of British Columbia, April 2003



Table 18: Examples of Eligible Patient-Handling Types of Injury⁷³

26	Application of force
22	Over-exertion
23	Repetitive motion
21,29	Bodily reaction

Lastly, non-HCO claims were eliminated where the injuries were to body parts that made it unlikely that the injury had been caused by patient handling, e.g. injuries to the face, eyes or feet. Some injury types, such as lacerations, were also eliminated.

Using these criteria, non-HCO claims were eliminated from the WCB data for each year to leave those claims that, likely, are claims for MSI due to patient handling. The extraction of these claims is summarised in Table 19 for the first extraction of data and in Table 19 for the second extraction.

Again, the second extraction of data is considered to be far more accurate and it the source of the WCB data used throughout the report card. The comparison of the first and second extractions in these tables is intended only to permit the classifications of patient handling MSI in the first extraction to generally confirm and support the classifications of patient handling MSI in the second extraction.

Table 19: Extraction of Non-HCO MSI due to Patient Handling from WCB Data⁷⁴

	1996	1997	1998	1999	2000	2000/01	2001/02
All Records	6416	7924	9511	10555	10426	10560	10561
No accident or occupation codes	2843	3606	3790	5550	6405	3417	3419
Available for analysis	3573	4318	5721	5005	4021	7143	7142
Eligible occupations	2066	2921	3365	3354	2464	4105	4122
Ineligible accident types	-639	-1204	-1287	-1365	-891	-1580	-1698
Ineligible sources of injury						-685	-559
Ineligible injury types	-11	-8	-4	-4	-3	-3	-3
Patient handling MSI	<u>1416</u>	<u>1709</u>	<u>2074</u>	<u>1985</u>	<u>1570</u>	<u>1837</u>	<u>1862</u>
As % of available for analysis	40%	40%	36%	39%	39%	26%	26%
As % of all records	22%	22%	22%	19%	15%	17%	17%

A consistently larger number of likely patient handling MSI claims is found in the second extraction of data, primarily because “source of injury” codes are available in these data for all years 1997 to 2002.

⁷³Based on claims data supplied by Workers’ Compensation Board of British Columbia, April 2003

⁷⁴Based on claims data supplied by Workers’ Compensation Board of British Columbia, March 2003

Table 20: Separation of Non-HCO Patient Handling MSI from 2nd Extraction⁷⁵

	1997	1998	1999	2000	2001	2002
All Records, second extraction	7356	8248	8275	8377	8204	6375
No accident or occupation codes	<u>562</u>	<u>93</u>	<u>1444</u>	<u>2548</u>	<u>3</u>	<u>0</u>
Available for analysis	6794	8155	6831	5829	8201	6375
Eligible sources of injury	2773	3183	2697	2199	2988	2346
Ineligible accident types ⁷⁶	-536	-607	-495	-395	-595	-530
Ineligible occupations	<u>-36</u>	<u>-43</u>	<u>-50</u>	<u>-32</u>	<u>-39</u>	<u>-39</u>
Patient handling MSI	<u>2201</u>	<u>2533</u>	<u>2152</u>	<u>1772</u>	<u>2354</u>	<u>1777</u>
As % of available for analysis	32%	31%	31%	30%	29%	28%
As % of all records	30%	31%	26%	21%	29%	28%

⁷⁵Based on claims data supplied by Workers' Compensation Board of British Columbia, April 2003

⁷⁶The majority of these were assaults by patients or residents, followed by "struck by object".



16 APPENDIX: DATA COLLECTED FROM FACILITIES

OHSAH, with considerable assistance and co-operation from the health authorities and the facilities that operate within them⁷⁷, collected information from claims files in the facilities and health authorities. The information collected at the facility level is summarised in Table 21.

Table 21: Data Collected from the Health Authorities and their Facilities

of Ceiling lifts installed in 2000/01, 2001/02 and 2002/03
 # of Ceiling lifts planned for installation in 2003/04
 Coverage: # of beds over which ceiling lifts were available in 2002
 \$ expended on ceiling lifts in 2000/01, 2001/02 and 2002/03
 \$ committed for ceiling lifts in 2003/04

In 2002:

of long term care beds
 # of acute care beds
 # of other beds, e.g intermediate care
 age of facility
 FTEs, e.g, payroll/average salary
 Hours of patient handling training that new hires receive
 Hours of annual refresher training in patient handling
 Is there an MSIP in place? (Yes/No)
 # of Overhead Lifts
 # of Floor and Other Lifts
 # of Electric Beds

In Each of 1999/00 and 2001/02

of patient handling MSI claims
 Cost of patient handling MSI claims: compensation costs, health care costs, and
 rehabilitation costs
 Total lost days

⁷⁷ One OHSAH staff member charged with the collection of data writes: "I had a fairly easy time gathering data, with respect to people willing to help me out. I didn't have anyone who was hesitant to pass on data or information. This may be due to the fact that almost all of the facilities knew of OHSAH, although some did require an explanation of what we actually do. I also found that the smaller facilities [in non-urban areas] were very friendly and willing to help, often taking time out of their day to help me pull files or organize them."

Table 22: Summary of Patient Handling MSI Data⁷⁸, 2001/02

	<i>Fraser</i>	<i>Interior</i>	<i>Northern</i>	<i>Providence</i>	<i>Provincial</i>	<i>Van Coastal</i>	<i>Van Island</i>
# of Claims	361	427	140	92	79	236	241
Days Lost or Paid	24,118	12,814	4,228	3,435	3,415	16,335	4,128
Cost of Claims	\$1.9M	\$1.6M	\$0.5M	\$0.5M	\$0.4M	\$1.9M	\$0.7M

Comparison of the data between this data set and the WCB data set gives some reassurance about the manners in which the WCB data were extracted and the high degree of completeness that the facility data were able to obtain. Table 22 shows that the facilities reported, through the health care authorities, a total of 1576 claims as patient handling MSI claims in the fiscal year 2001/02. This is about 85% of the 1862 claims extracted from the WCB data for the same fiscal year, as shown in Table 23. The percentage should be less than 100% since those claims extracted from the WCB data represent the maximum number of MSI claims that could be attributed to patient handling. The WCB data also includes claims generated in affiliate facilities, operated by societies that are outside the direct management of those the health authorities.

Table 23: Comparison of WCB data (excluding Private Employers) and Facility Data

	<i>Number of Claims⁷⁹</i>	<i>Days Lost</i>	<i>Cost of Claims</i>
Facilities Data, 1999/00	1542	67,000	\$8.4 M
First WCB Extraction, 1999	1711	108,000	\$12.5 M
Second WCB Extraction, 1999	1845	120,000	\$14.5 M
Facilities Data, 2001/02	1576	68,500	\$7.5 M
First WCB Extraction, 2001/02	1549	78,000	\$8.6 M
Second WCB Extraction, 2001	1911	104,500	\$12.5 M

Not all of the facilities returned data, and not all of the data was usable. The extraction of usable data is summarised in Table 24, which shows how many facilities returned data and the reasons that data from some facilities had to be excluded from the analyses.

⁷⁸ Source: Data collected by OHSAH from Health Authorities, November 2002 - March 2003.

⁷⁹ Patient handling MSI claims.



Table 24: Extraction of Data for Statistical Analyses from Raw Facility Data⁸⁰

	<i>Fraser</i>	<i>Interior</i>	<i>Northern</i>	<i>Providence</i>	<i>Provincial</i>	<i>Van Coastal</i>	<i>Van Island</i>
Number of Facilities Used in Analysis							
Facilities Canvassed	48	113	48	8	13	23	42
Home Care	-6	-22	-10	0	0	-5	-7
Outpatient	0	-5	-6	0	-5	0	-2
Inpatient Facilities	42	86	32	8	8	18	33
No claims data	-3 ⁸¹	-1	-1	0	0	-2	-5
Aggregated claims	0	-2	0	0	0	0	-2
Units in analysis	39	83	31	8	8	16	26
Number of Units Used in Analysis for which Some Data was Missing							
No building age	3	16	0	0	0	0	3
No FTEs	5	14	2	8	0	0	1
No lifts/electric beds	1	11	0	2	0	2	2

⁸⁰ Source: Data collected by OHSAH from Health Authorities, November 2002 - March 2003.

⁸¹ 15 units in South Fraser could only report patient handling MSI claims data for Dec 1999 to March 2000, then April 2001 to March 2002

ABOUT THIS DOCUMENT

The Occupational Health and Safety Agency for Healthcare (OHSAH), which operated from 1998-2010, was a precursor to SWITCH BC. Conceived through the Public Sector Accord on Occupational Health and Safety as a response to high rates of workplace injury, illness, and time loss in the health sector, OHSAH was built on the values of bipartite collaboration, evidence-based decision making, and integrated approaches.

This archival research material was created by OHSAH, shared here as archival reference materials, to support ongoing research and development of best practices, and as a thanks to the organization's members who completed the work.

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