



Musculoskeletal Injury Tracking and Prevention

**Jurisdictional Review: Key Informant Interview
Analysis
May – July, 2013**

Nova Scotia Health Research Foundation

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Definition of terms

Term	Abbreviation	Definition
Musculoskeletal injury	MSI	Damage to the musculature or skeletal system
Musculoskeletal injury prevention	MSIP	Prevention of MSIs
Jurisdiction	-	A given area of responsibility for an organization. Could consist of a facility, a health region, a province, or an entire country – depending on the mandate and coverage of the organization.
Patient handling activity	-	Activities involving moving, transferring or repositioning patients within a health care setting, generally on the part of a health care professional.
Health and Safety Executive	HSE	Regulatory body in the United Kingdom
Worker's Compensation Board	WCB	Injury compensation body in Canada
Accident Compensation Corporation	ACC	Injury compensation body in New Zealand
Occupational Safety and Health Association	OSHA	Regulatory body in United States of America
Reporting of Injuries, Diseases and Dangerous Occurrences Regulations	RIDDOR	Laws that govern injury reporting in the United Kingdom

Executive Summary

This document summarizes the findings of a jurisdictional review conducted on behalf of the Soteria Strains Working Group (SSWG). Broadly, this review was intended to provide SSWG with an overview of:

1. Programs used to track the occurrence of musculoskeletal injuries (MSIs) resulting from patient handling activities among health care workers in acute care settings;
2. Programs used to prevent or reduce the occurrence of patient-handling MSIs among health care workers in acute care settings;
3. Evaluation methods used to assess the impacts and outcomes of these programs; and
4. Measures and indicators used within these evaluations.

Participants indicated that the development and implementation of MSI prevention programs was challenging, required considerable effort and commitment, but offered a means of reducing the financial and human costs associated with MSIs.

Overall, four key points emerged from the analysis of the interview findings:

1. MSI prevention programs are influenced by the definitions of risk, and injury tracking systems employed by federal or provincial / regional governments, and by the guidelines that direct the provision of health care funding, payment of insurance, and reporting of workplace injuries.
2. Injury tracking systems are most useful when they are computer-based, utilize follow-up measures to ensure the accuracy and completeness of data, and provide sufficient detail to identify the location of and precipitating factors behind workplace injuries.
3. Musculoskeletal injury prevention programs range in their composition, but share a number of underlying principles and core elements. These programs often rely heavily on the data contained in injury tracking systems in order to provide direction to specific preventative activities.
4. While many MSI prevention programs utilize sophisticated monitoring methods to track changes in injury rates over time, formal evaluative processes are uncommon. This stems from an underlying difference between the ways in which health care jurisdictions conceptualize and measure 'change in injury rates', and the ways in which this change is conceptualized and measured in the professional field of evaluation.

1. Introduction

Project background

This document summarizes the findings of interviews conducted as part of a jurisdictional review for the Soteria Strains Working Group (SSWG). These interviews were held between April and July of 2013, and conducted in parallel to a literature review aimed at assessing the treatment of Musculoskeletal Injury Prevention (MSI) prevention in academic and grey literature.

SSWG is a collaboration of Nova Scotia's District Health Authorities, the IWK Children's Hospital, the Workers Compensation Board of Nova Scotia, and AWARE-NS. Broadly speaking, the mandate of SSWG is to improve the quality of health care services provided in Nova Scotia, and to improve the safety and well-being of provincial health care workers. SSWG approaches these goals by supporting the application of effective musculoskeletal injuries prevention programs, with a specific focus on ensuring safe patient handling activities.

This review was initiated in order to support SSWG in their ongoing MSI prevention activities by providing an overview of:

1. Programs used to track the occurrence of musculoskeletal injuries (MSIs) resulting from patient handling activities among health care workers in acute care settings;
2. Programs used to prevent or reduce the occurrence of patient-handling MSIs among health care workers in acute care settings;
3. Evaluation methods used to assess the impacts and outcomes of these programs; and
4. Measures and indicators used within these evaluations.

It is intended that this information will provide SSWG with knowledge of and lessons learned from MSI prevention programs in other jurisdictions, which will be used to support decision-making regarding MSI prevention programs in Nova Scotia.

Overview of review methodology

The semi-structured interview guide was developed by the research team, representatives of SSWG, and the overseeing members of the NSHRF. The guide provided a general structure for the interviews, although some sessions deviated from the guide based on the expertise of the participant in question. A copy of the interview guide can be seen in Appendix A.

Participants were sought from several countries, including Canada, the United States, the United Kingdom, Australia and New Zealand. Potential participants were initially identified through a series of direct referrals from the SSWG, and the NSHRF. Once this list was exhausted, a web search was conducted with the goal of identifying health care organizations that addressed MSI prevention as part of their mandate. Snowball sampling

was also employed: All individuals with whom contact was established were asked to forward recruitment material to colleagues with relevant expertise.

Participation was restricted to individuals involved in the tracking and/or prevention of MSIs, or in the evaluation of MSI prevention programs. Recruitment materials were forwarded to participants prior to the interview and the analysts provided interested parties with an overview of the review methodology and goals. Participants were provided opportunity to ask questions and to request further information regarding project objectives.

All interviews were conducted via telephone, lasted between forty and ninety minutes, and were audio recorded. The analysts also took notes during and after each session. Project data therefore took two forms: audio recordings and field notes.

Atlas.TI software was used to analyze the audio recordings and field notes that comprise the data. The analyst reviewed all audio recordings and extracted relevant sections, which were then organized based on the section of the interview they were taken from, and on the specific issues that were being discussed.

2. Demographic composition of participants

A total of thirty-five individuals participated in this review. Thirty-one participants completed one-on-one interviews, two participated in one interview together, and two provided written feedback. Participants occupied a wide range of positions, including employee trainers who worked directly with frontline staff and regional or government program directors. The educational and professional backgrounds of these individuals included physiotherapy, ergonomics, physical education and nursing. A small number of participants were academics working in research or educational institutions.

A number of participants were employed in positions directly pertaining to the tracking and prevention of MSIs. Participants who occupied positions that dealt specifically with acute care settings were in the minority. Overall, participants described a wide range of job tenure, from upwards of ten years, to only a few weeks. Many had been with their respective organization for far longer than they were in their current position.

3. Results

Workplace injury tracking systems

Broadly speaking, injury tracking systems are used to direct the application of resources, target injury prevention initiatives, and orient the activities of individuals working in the field of workplace injury prevention. Injury tracking systems support all components of MSI prevention identified during this study, from the identification of risk factors to monitoring changes in injury rates over time. Participants reported that the types of data collected through tracking systems shapes the kinds of incidents that can be retroactively identified, which in turn has a significant impact on the formation of workplace safety

priorities within a jurisdiction, the allocation of funds, resources and personnel, and the types of injury prevention programs that are initiated.

External oversight, internal responsibility, and national injury tracking

Many participants discussed the issue of ‘external oversight,’ ‘internal responsibility,’ and the regulation of workplace injury prevention, reporting and tracking. External oversight refers to the extent to which federal or provincial government bodies, insurance regulators, or regional oversight organizations govern the tracking and prevention of MSIs. These regulations represent factors that individual MSI prevention programs must account for. ‘Internal responsibility’ was the term some participants used to describe the factors of injury tracking and MSI prevention that a jurisdiction was able to determine itself. Participants alluded that MSI program structure is determined by a combination of external requirements, and internal decision-making. What is not mandated externally is determined internally. (Please note that the use of ‘internal responsibility’ in this context differs from the IRS referred to in section two of Nova Scotia’s Occupational Health and Safety Act. The application of this term in the present document is based on language used by participants outside of Nova Scotia; the IRS is a regulation specific to Nova Scotia.)

Participants voiced concern that the criteria some external injury tracking systems utilize to determine whether to track an individual case can result in loss of data and complicate the retroactive identification of MSIs. For example, the national Reporting of Injuries, Diseases and Dangerous Occurrences Regulations (RIDDOR) reporting system of the United Kingdom (UK) was described as only tracking injuries that result in either 1) death, 2) a major injury (fracture, amputation, unconsciousness, etc.), or 3) more than seven lost work days (Also see <http://www.hse.gov.uk/riddor/>). The American Occupational Safety and Health Administration (OSHA) reporting system was described as only tracking injuries that result in seven or more lost workdays. A provincial injury tracking system in Ontario only reports injury rates by sector type (healthcare vs. forestry), but not by facility.

Some respondents felt that the selection criteria used to determine which injuries to track with these systems limits their coverage of MSIs, or their ability to retroactively identify particular factors such as workplace location. This becomes relevant to the identification of priorities and provision of funding: in some jurisdictions, only prevention programs aimed at mitigating externally identified risk factors were allocated government funding.

Other participants identified external tracking systems as valuable resources: American participants identified differences between State-level workers compensation coding systems (ie. C16) and Federal systems (ie. ICD9). Despite being separate systems, at least one participant indicated that there was sufficient overlap between these systems to permit the comparison of data between states. Several Canadian participants suggested that nationally standardized WCB coding systems permit comparison of injury rates across health regions and provincial borders. Similar comments were made about the RIDDOR system in the UK.

4. Structure of workplace injury tracking systems

Integration of computer-based systems for tracking workplace injuries

Participants reported a range in the degree to which employee injury tracking systems utilized computer-based entry, storage and retrieval. Some systems are primarily paper-based, while others are entirely computer-based. Participants found paper record systems problematic, as retroactive extraction of information is difficult given that it must be done manually. Participants believed electronic databases mitigate the difficulties associated with paper-based systems, however, the time needed to transcribe forms from paper to computer was seen as a limitation.

The majority of participants indicated that systems using computer-based data collection and storage were preferable to those based on paper-based collection. The main reason for this was the ease with which MSI cases can be retroactively identified and extracted using built-in search functions. MSI data is often extracted using automated search functions integrated into the data system itself. Extraction of MSIs resulting from patient handling activities is based on criteria indicating injury type (location on body, type of pain), and cause (lifting a patient, slip or trip).

Collection and storage of injury tracking data

Overall, participants suggested the utility of injury tracking systems is largely dependent on the degree to which the data permitted examination of precipitating factors, the event itself, and outcomes. Incomplete or incorrectly completed forms were identified as a significant challenge in accurately tracking workplace injuries. This issue is addressed in two main ways: first, by having employees enter data with the assistance of a manager, MSI specialist, or call center agent. Second, some tracking systems utilize follow-up investigations aimed at correcting entry mistakes or completing empty fields. These investigations are discussed in section 5.

The injury tracking systems described by participants collect a range of data points, ranging from event details, types of pain experienced following the injury, other symptoms experienced, to the work tasks that precipitated the injury in question. Appendix B provides some examples of the kinds of data collected within other jurisdictions. It is important to note that jurisdictions differ in the types of data collected, the ways in which it is encoded (narrative text field or drop down menu), and the importance placed on individual data points. Some participants stated that this poses challenges when jurisdictions compare their injury rates with each other.

Some participants indicated that ‘narrative description fields’ make it possible to obtain the information necessary to outline incident details. Narrative fields were seen as useful for identifying precipitating factors, existing workplace risks, and preventative follow-up measures. This data was therefore considered valuable even if it was collected over several interview sessions with the injured staff member. Within some jurisdictions, narrative data is transcribed to drop-down or check-box format in order to facilitate retroactive retrieval.

Injury tracking data is often utilized to initiate follow-up investigations. This will be discussed in greater detail in section 5.

Characterization of cost and time off work

Participants described a variety of means for calculating costs associated with employee injuries, and time off work resulting from injuries. Appendix C lists some of the factors used in the calculation of these costs, and outlines jurisdictional differences in how calculations are made.

Many of the differences in the calculation of ‘cost’ are associated with the insurance structure to which jurisdictions subscribe. Participants from self-insured facilities stressed the importance of keeping detailed records regarding associated costs. Calculation of time lost was noted to be somewhat dependent on the integration of the injury tracking system with human resource records.

Integration of injury tracking system with other data sets

Many participants discussed the integration of injury tracking systems with other data sets, including facility or region-specific human resources systems, and external sets such as those compiled by WCBs for the purposes of tracking compensation costs, or national injury tracking systems. Participants indicated that data set integration allows injury prevention specialists to assess a broader range of factors that contribute to injury occurrence, support employee rehabilitation, or provide greater depth to data analysis. For example, linking to employee training records might reveal relationships between staff training and injury. Integrating tracking systems across regions can facilitate inter-jurisdictional comparisons and collaboration. For example, national workplace injury coding standards in Canada (ie. CSA Z795) can facilitate the comparison of injury rates between provinces. Provincial standards for tracking can allow for comparison between industries, such as healthcare and forestry.

5. Initiation and structure of MSI prevention programs

Initiation of MSI prevention programs

In many jurisdictions, the extent to which individual risk factors or injury types (such as patient handling and MSIs) are identified for targeted prevention programming is based on the ways in which injuries are represented in injury tracking systems. In particular, injury prevention priorities are set based on the overall number of injuries of each type, the costs incurred by each injury, and the ‘severity’ that each injury type was considered to represent. “Risk areas” are therefore identified through the monitoring of ongoing injury rates, and in particular the associated financial burden, were seen by participants as central to this process. Rates and costs are compared between injury types (MSIs vs. slips-and-trips), between facilities, and between types of health care services (long-term care vs. acute care). MSI prevention specialists or Human Resource administrators

identify these risk areas using a combination of facility specific injury tracking data, WCB data, and insurance claim records. In some instances, the process of priority identification is influenced by external regulators, as discussed in section 3.

The majority of participants did not report specific goals or milestones for reducing MSIs in their jurisdictions. Others stated their underlying goals involve the elimination of all musculoskeletal injuries. In support of these goals, safe patient handling standards ranged from ‘minimal lift’ to ‘zero lift’. Some jurisdictions orient their goals around reducing ‘preventable injuries,’ considering those defined as ‘unpreventable’ to be outside their control. A minority of participants described specific injury reduction targets, usually defined in terms of reducing injuries by a specific amount within a specific period of time.

Participants who reported specific MSI prevention goals indicated that these goals are driven by a combination of higher-order priorities, such as external regulations and guidelines, the availability of funding, and ongoing injury tracking both internal and external to the jurisdiction in question. Jurisdiction-specific priorities are determined on an annual or semi-annual basis by senior management, who identify priorities through examination of tracking systems, particularly the injury rates, associated costs, and total time lost.

Program structure

Injury prevention programs described by participants varied in the extent to which they focused on MSIs. Some jurisdictions consider MSI prevention alongside other injury types, while others isolate it as a specific risk area. Other programs focused entirely on MSI prevention. Within MSI prevention programs, some focus on material handling as well as patient handling, while others treat these two categories separately. Therefore, patient handling is a stand-alone priority in some jurisdictions, and a facet of an overarching injury prevention program in others.

Jurisdictions differ in how they ‘roll out’ their programming. Some implement policies and programming on a facility-by-facility basis, tailoring programs to each setting. Other programs are based on care type (ie. long-term or acute care). A third approach is to apply a single injury prevention program uniformly to all care types and facilities within the jurisdiction.

Components of MSI prevention programs

The MSI prevention programs described by participants consist of a number of components, although there was considerable overlap between many of the facets of individual programs. Broadly, these program components can be broken into two levels: 5 overarching considerations for all program elements, and 7 discrete (yet interrelated) program elements.

Overarching considerations discussed by participants include:

1. The specificity or generality of MSI prevention program elements,
2. The integration and conceptualization of ‘culture of safety,’
3. Whether a preventative or reactive approach to injury prevention is applied,
4. Integration of peer-based training and leadership, and
5. The presence of employee positions directly pertaining to MSI prevention.

1. Specificity or generality of MSI prevention program elements

Participants indicated a range in MIP program specificity, from programs provided in a standardized manner to all employees within a facility or care type, to programs tailored to suit the tasks workers engage in within particular units. Benefits of standardization reported by participants include the ability of staff to move between settings and maintain a standing knowledge of safe patient handling procedures, and reduced time and costs associated with extensive training and implementation procedures. Benefits of specific programming include the identification of specific risk factors, and the provision of MSI prevention and patient handling skills that meet the needs of health care workers in diverse settings.

2. The integration and conceptualization of ‘culture of safety’

The importance of building a culture of safety was a key issue for respondents. A culture of safety is believed to be the factor that motivates employees to use lifts, apply skills, seek help from each other, and report injuries in a timely and accurate manner. Participants saw culture of safety as being valuable for securing institutional support for MSI prevention initiatives. Within the context of this review, a workplace with a culture of safety is one where all employees are committed to the ongoing success and sustainability of MSI prevention programs. Culture of safety can be assumed to incorporate all elements of workplace safety, although only those pertaining to MSI prevention were discussed during the review. This component of safety culture was indicated as being closely related to the production and dissemination of injury / intervention reports, as discussed below.

One challenge pertaining to culture of safety is balancing the focus on patient safety with that placed on worker safety. Many participants implied that the long-standing culture of health care emphasizes the safety of patients over that of employees. This culture encourages staff to engage in handling activities that can lead to MSIs. Unsafe activities are enacted in order to ‘keep patients safe’ or ‘improve service quality,’ for example, catching a falling patient despite the hazards posed by sudden shock of bearing a patient’s full weight. Based on this idea, tying worker safety into patient safety was identified by participants as a key component of promoting a culture of safety. Participants concluded that stressing the importance of staff member’s wellbeing, and its relevance to the long-term quality and sustainability of patient care can help overcome this issue.

3. Preventative or reactive approach to injury prevention

Many program elements take either a preventative or reactive approach to MSI prevention. Participants described preventative strategies that are intended to remove workplace hazards before MSIs occur, or provide employees with the skills and

knowledge necessary to avoid injuries. Reactive strategies focus on limiting injury reoccurrence through identifying and removing factors that precipitated a prior injury. Both approaches utilize the data stored in injury tracking systems. Preventative measures combine this data with findings from previous MSI prevention research and programming to deduce risk factors present in a workplace. These risks are then removed whether or not they have caused an injury. Reactive measures use tracking data to identify the risk factors that caused a specific injury or cluster of injuries within a jurisdiction, direct follow-up assessments, and initiate corrective actions.

Given the descriptions provided by participants, preventative measures utilize aggregate injury tracking data to identify potential risk factors, while reactive measures utilize aggregate data as well as individual cases to identify risks that have caused injuries within the jurisdiction in question. For example, incorporating the installation of ceiling lifts when remodeling a hospital room would be an example of a preventative strategy, while installing these lifts as a post-injury corrective measure would be a reactive strategy.

4. Integration of peer-based training and leadership

Many MIP programs make use of peer leaders who are selected from front-line units and provided training regarding the prevention of MSIs. This approach is based on the idea that as these individuals understand the risk factors present within their unit, they would be in the best position to integrate injury prevention principles within unit activities. Peer leaders also participate in the identification of injury hazards, implementation of interventions, and execution of follow-up investigations and audits.

5. The presence of employee positions directly pertaining to MSI prevention

Many participants discussed the importance of having staff positions pertaining directly to the prevention of MSIs including MIP coordinators, advisors, or consultants. Individuals occupying these positions oversee the day-to-day management of injury prevention initiatives in terms of enforcement, accountability. They also provide education and support for managers, and/or staff. Individuals in these positions may be employed in specific facilities, on a regional basis, or by oversight organizations.

Specific program elements consisted of recurring MSI prevention strategies implemented in numerous jurisdictions, albeit not always in the same manner. The section below discusses the common trends in MSI prevention programming, as well as some common differences. Specific program elements described by participants included:

1. Incorporating MSI prevention and safe patient handling in facility design;
2. The purchase and use of lift-assist equipment;
3. The provision of training for employees;
4. The presence of institutional policies related to MSI prevention and/or safe patient handling;
5. Instituting regular assessments of injury risk posed by various work activities;
6. Instituting assessments of patient conditions to identify safe handling procedures;

7. Implementing root cause investigations of injury causes; and
8. Implementing systematic audits of work sites.

1. Incorporating MSI prevention and safe patient handling in facility design

Some participants indicated that their jurisdictions address the prevention of MSIs by focusing on the layout of workspaces within which patient handling activities take place. Some facilities utilize the expertise of ergonomists in workspace design, with the goal of ensuring sufficient space for patient handling activities, and for the use of patient handling aids such as lifts. Participants stressed the importance of ensuring that room is available for maneuvering and storing mobile lifts, slider sheets, and other equipment. Some jurisdictions incorporate the installation of ceiling lifts, with a few jurisdictions going as far as to set specific goals for lift coverage, ranging from only installing lifts in units reporting high injury rates, to full coverage of all units where patient handling activities occur regardless of reported injury rate. For this reason, building structures must be able to accommodate the weight of the lifts, and the patients in question.

Some participants indicated challenges regarding facility design, particularly those who work in older buildings that had not been constructed with these factors in mind. While some said that it was possible to modify existing building structures, others stated that this was not possible due to financial pressures or structural limitations. Bathrooms were seen as being particularly problematic given their size or use by large numbers of patients.

2. Purchase and use of lift-assist equipment

Several participants stated that the goal of ‘full ceiling lift coverage’ of all beds within their facilities had either been achieved, or it was anticipated that it would be achieved within the foreseeable future. Other participants discussed the purchase and utilization of equipment intended to ease patient handling activities. Overall, the equipment was viewed as a central component of safe patient handling, although equipment alone is seen as insufficient to ensure safety. The cost of purchasing new equipment was often offset by the long-term savings resulting from reduced injuries amongst staff and patients. However, cost remains a prohibitive factor for many jurisdictions.

3. Provision of training for employees

While participants considered employee MSI prevention training to be important, a number of participants indicated the weight given to employee training has decreased in recent years. Participants reported an increasing focus on facility design, equipment purchase, and building a culture of safety.

Other considerations regarding training relate to the location of training delivery, whether or not training sessions overlap with employee work schedules, and the extent to which training is tailored to suit specific employee tasks, or implemented in a standardized form across numerous positions and responsibilities. The specificity of training was often discussed as having to be balanced against standardization. It was suggested that providing training applicable to a staff member’s job can provide instruction on patient handling activities most relevant to their work. However, some participants suggested

that training that focuses on too many specific details at the expense of transferrable skills might place staff at risk when they are faced with unfamiliar patient handling situations.

Some participants also discussed the growing importance that educational institutions are placing on training students in safe patient handling and MSI prevention. Participants described this as positive. One academic participant suggested that novice health care professionals were likely to adapt the practices already prevalent in the work place upon entry. In other words, school-based training might not ensure safe practices in the workplace, as institutional culture can exert an influence over the kinds of behaviors novice health care workers exhibit.

4. Presence of institutional policies related to MSI prevention and/or safe patient handling

Participants considered MIP policies to be a guide for performing patient handling activities and for emphasizing the importance of adhering to safety procedures. For example, participants who described ‘zero lift policies’ said that these regulations outline how staff are expected to perform patient handling activities; minimal lift policies on the other hand, were reported as outlining criteria for determining whether lifts assists should be used or not.

Policies also provide a means of conceptualizing accountability. Several participants identified the importance of ensuring role clarity regarding patient handling (ie. who should be handling patients, and when), and follow up assessments (ie. who should conduct assessments, and the kinds of things that should be included in reports). Related, participants indicated that it was important to ensure that policies were accessible and comprehensible to staff members, that all employees are aware of all relevant guidelines, and that all employees understand how these guidelines translate into their own work activities.

5. Instituting regular assessments of injury risk posed by various work activities

Several participants stated that their jurisdictions had standardized measures for the risks posed by given work tasks. Patient handling activities are often included within these risk calculations. Generally speaking, the calculation of risk utilizes injury-tracking data, by comparing the frequency with which a given task occurs (ie. transferring patients from a bed to a chair) with the frequency of injuries that occur as a result of that task.

Some calculations of risk incorporate a measure of the severity of injury outcomes, in terms of time off of work, and in some cases the subjective suffering experienced by the injured employee, or the extent to which their work or personal lives are disrupted. Risk ratings are used proactively to identify work-related hazards, and direct staff members to utilize specific procedures to minimize likelihood of injury occurring.

6. Instituting assessments of patient condition to identify safe handling procedures

Many jurisdictions train staff to assess the condition of patients before engaging in handling activities. These proactive assessments provide staff with the opportunity to identify and mitigate potential risks across a variety of handling tasks. Some jurisdictions

utilize coded tags or signs to indicate patient condition and signal the recommended handling procedures. These signs are hung above the patient's bed. Some jurisdictions enter patient assessment data into their injury tracking systems in order to determine what kinds of patients contribute to MSI rates.

It was indicated that implementing patient assessments in acute care poses unique challenges, particularly regarding the high rate at which patients progress through acute care. A patient could be entered into acute care, assessed regarding patient handling, and then quickly discharged or sent to another care unit. It was also reported that the condition of acute patients fluctuates over a short period of time. Due to the administration of anesthetic, an acute patient could quickly progress from being able to support his or her own weight, to being completely unconscious, and then to a state that requires varying degrees of movement assistance. Participants noted this means patient assessments would need to be carried out at regular intervals, as opposed to only at the patient's point of entry into care.

7. Root cause investigations of injury causes

Root cause investigations are initiated based on the identification of injuries within the workplace, through the employee injury tracking system. Many facilities initiate general follow-up procedures that are conducted by unit managers under the direction and oversight of human resources or workplace safety administrators. In facilities employing staff with mandates pertaining directly to MSI prevention or patient handling, these individuals often conduct or assist in follow-up assessments for incidents identified as MSIs and/or as being relevant to patient handling. Investigations may involve only the injured individual, or they may incorporate managers and other staff within the unit. This is done in order to take proactive steps to ensure that other employees do not experience a similar injury.

Participants stated that follow up assessments are not necessarily initiated for all reported injuries. In some jurisdictions, investigations are initiated based on ratings of severity as dictated in the corresponding injury tracking system. For example, one such system rated injuries on a scale of zero to five, with five being the most severe, and follow-up assessments only being initiated for cases rated three or higher.

8. Systematic audits of work sites

Recurring worksite audits were described as occurring at regular intervals such as 'every six months', or 'once a year'. During audits, individual work sites are examined to identify potential risk factors in terms of facility design or equipment coverage, to ensure that employees are adequately trained to fulfill their responsibilities within their given environment, and in some instances to assess compliance with equipment use, training, and policy. Audits incorporate the use of measures such as surveys, direct observation, and employee interviews. Systematic audits are often conducted by staff who occupy positions directly pertaining to MSI prevention or patient handling.

6. Evaluation of MSI prevention programs, and other contemporary challenges

Evaluation of musculoskeletal injury prevention programs

While many participants suggested that injury prevention programs were regularly evaluated, their application of the term ‘evaluation’ differed from the definition utilized in the professional field of evaluation. Formal evaluation procedures were rare within the jurisdictions included in this review, although many participants described sophisticated monitoring procedures. For this reason, it is difficult to comment on the barriers associated with MSI prevention program evaluations. Generally speaking, when participants discussed evaluation, they did so in terms of:

1. Monitoring injury rates over time, or comparing injury rates between two or more jurisdictions through the analysis of data contained in injury tracking systems as described in section 4; or
2. Assessing and auditing specific activities, facilities and risk factors present in hospital areas as discussed in section 5.

Overall, the most clearly articulated difference between monitoring of injury rates and the evaluation program outcomes (in the professional sense) had to do with how change is conceptualized. In the former, it tends to deal more with the number of injuries over a given period of time, while in the latter; it has to do with showing that the program in question is able to produce a greater change in injury levels following the evaluation. Evaluations report on the effectiveness of the intervention over repeated applications, rather than the change in injury rates produced by an individual application of the same intervention.

Many participants stressed the importance of preparing and disseminating evaluation and monitoring reports throughout their jurisdiction. These reports focus on changes in the injury rates within the jurisdiction, and less frequently the results of specific MSI prevention programs and evaluations. Reporting schedules were varied from quarterly to bi-annually. Overall, regular reporting of MSI rates and the impact of MSI prevention programs were indicated as being critical in ensuring institutional support from the executive level to that of the frontline health care worker.

Reports are often disseminated upward through corporate structure to managers, Human Resource departments, and senior management. These reports focus on injury rates, associated costs, and changes in either of these two measures. The purpose of these reports is to keep senior management aware of ongoing injury prevention initiatives and overall injury rates. Many participants considered the dissemination of reports to senior management to be an invaluable means of securing high-level support.

Reports are also provided to frontline staff through their healthcare units. These reports focus on changes in injury rates, and are intended to keep staff apprised of successful

injury prevention programs, to provide staff with feedback regarding the reduction of the frequency of and costs associated with MSIs in their unit, and to highlight areas where improvement is necessary.

Contemporary challenges and programming gaps identified during review

The purpose of this review was to examine the current state of MSI prevention and safe patient handling initiatives pertaining to acute care settings. Based on this goal, three key issues were identified during the review. These are:

1. The lack of MSI prevention initiatives focused on acute care;
2. The inclusion of the professional field of evaluation within MSI prevention programs; and
3. Pressures related to demographic trends and an aging workforce.

1. The lack of MSI prevention initiatives focused on acute care

Few participants discussed the prevention of MSIs resulting from patient handling activities specifically as it related to acute care. Many participants indicated that their work, or the existing work of which they were aware, focuses on health care in general, or long-term care. Those that did discuss acute care did so insofar as individual program elements are adapted to fit acute care settings. These participants often alluded to specific challenges associated with adapting their programs to acute care settings. Other participants implied that in their jurisdiction, work focused on acute care is in its initial phases.

2. The inclusion of the professional field of evaluation within MSI prevention programs

Because many injury prevention programs do not appear to be initiated with evaluation in mind, it becomes difficult to retroactively identify barriers and points of success. Even when an intervention incorporates a broad range of physical, social and organization factors, without incorporating measures to assess the impact of each program element in (some degree) of isolation it is difficult, if not impossible, to hone in on the strongest components of a program, or to isolate those components that require modification.

3. Pressures related to demographic trends and an aging workforce

Participants alluded to challenges posed by national demographics shifting towards an older population and workforce. Participants suggested that this shift will place greater burden on the health care system in terms of the overall number of patients requiring care, and through the increased susceptibility of older health care workers to MSIs, primarily as a result of chronic musculoskeletal stress. However, it was also suggested that shifting demographics represents a means for promoting MSI prevention as a health care priority: the challenges associated with the aforementioned demographic shift will make preventing MSIs and reducing their severity a critical component of ensuring the functioning and sustainability of the health care system.

7. Conclusion

Overall, participants outlined a wide range of considerations that must be addressed when developing and implementing a MSI prevention program, and implied that these decisions must be made within the context of each specific jurisdiction. External factors can shape long-term sustainability in unanticipated ways, and potentially facilitate or inhibit the ongoing success of injury prevention programming.

Many participants referenced one critical component of MSI prevention initiatives: long-term institutional commitment to the reduction of MSIs. Commitment is critical in that few MSI prevention programs were indicated as being created perfect. Many programs contain shortcomings that participants were eager to discuss. Participants also voiced curiosity in learning how other jurisdictions handled similar issues to those that they faced. These challenges represent a necessary aspect of the injury prevention process, and addressing these challenges was described as means of ensuring successful outcomes and long-term sustainability. Participants stressed that the process of enacting successful MSI prevention programs would be long and difficult, although the potential benefits are vast, whether defined in financial, organizational, or personal terms.

Appendix A: Interview guide

1.1 Introduction

Thank you for participating in this interview. We are interested in hearing the strategies used in your jurisdiction to:

1. Evaluate and document musculoskeletal injuries resulting from patient lift, transfer, and repositioning; and
2. To assess the success of programs intended to prevent or reduce musculoskeletal injuries related to these activities among health care workers.

We are conducting interviews on behalf of the Nova Scotia Soteria Strains Working Group (NS Soteria) and the Nova Scotia Health Research Foundation (NSHRF). The purpose of these interviews is to gather evidence on evaluation methods used to track the success of injury prevention strategies that have been implemented in other jurisdictions to reduce the incidence of musculoskeletal injuries resulting from patient handling activities (eg. lifting, transferring, repositioning and turning). Specifically, we are interested in learning about:

1. Musculoskeletal injury prevention programs that have been implemented in your jurisdiction;
2. The current evaluative frameworks that are applied in your jurisdiction to assess the outcomes of these injury prevention programs; and
3. The measures that are used as indicators of success for these programs .

In this manner, we are hoping to provide NS Soteria with information regarding the ways in which various jurisdictions typically evaluate the success of strategies aimed at reducing injuries. Through analysis of these interviews we hope to identify what variables are measured in various jurisdictions, and any barriers associated with evaluating strategies to reduce these injuries.

1.2 Privacy and Confidentiality

The discussion will be audio recorded for the purpose of accuracy during analysis and write up of findings. The audio recording will not be shared with anyone outside the jurisdictional review team, which consists of employees and representatives of NSHRF. The resulting audio file will be password protected and maintained by the review team. The interview will be used to inform decision-making around the development of an evaluation plan for assessing the impact of a prevention program on musculoskeletal injuries resulting from patient lift, transfer and repositioning; however, original raw data (i.e., the audio recording and interviewer's notes) will not be shared with anyone outside the review team.

Some additional points before we begin:

1. The interview might not follow the exact order of questions presented in this document.
2. Some questions might seem repetitive during the interview, depending on the framework used in your jurisdiction / organization or the way that the interview unfolds. Just let me know if you feel you have covered a topic as much as you can.
3. It is possible that you might not be able to answer some questions, either because you do not know the answer, or are not permitted to provide the requested information. Feel free to say that you are not able to answer a given question, and we can move on to the next one.

1.2 Demographics

1. What type of organization do you represent?
 - a. Government
 - b. Non-government
 - c. Private
 - d. Other, please specify
2. What is your current position or title?
 - a. How long have you been working in this position?
 - b. Can you describe for me where your position fits within your organization?
3. Can you give me a general description of your experience with musculoskeletal injury prevention and the evaluation of these efforts?
 - a. Can you tell me about your involvement with the prevention of musculoskeletal injuries among employees?
 - b. Can you give me an overall picture of your knowledge and expertise in this area?

2. Documentation and tracking of employee injuries

The success of programs designed to minimize the risk of musculoskeletal injuries resulting from patient handling activities (defined as activities associated with assisting and moving patients, eg. Lifting, transferring, and repositioning) are often defined by the incidence and impact of musculoskeletal injuries amongst employees. These questions are designed to identify your current framework with identifying these events and their causes, as well as barriers, ease of access, and potential stakeholders of the information.

1. Within the jurisdiction or organization you represent, what approaches are used to document and track musculoskeletal injuries resulting from patient lift, transfer, and repositioning activities?
 - a. Do you have a structured framework developed to document when an employee sustains a musculoskeletal injury?
 - b. What are the criteria used to 'define' an injury sustained by an employee as a musculoskeletal injury?
2. Is information collected that would allow for the retroactive identification of musculoskeletal injuries resulting from patient handling activities?
 - a. Is this information reflected in any records kept in your jurisdiction/organization?
3. What are the methods you use to gather this information?
4. Employee injuries are often documented in a case report style. Retroactively gaining specific information about these injuries therefore involves transcribing information from these documents. If one wanted to determine whether or not a patient handling activity caused the injury, and where the injury occurred, how would you go about extracting this information from your records?
 - a. Can you tell me about any potential barriers of your framework?
 - b. If you were to attempt to gain this information how would you evaluate these barriers?
5. The impacts or effects of musculoskeletal injuries are often characterized by the cost of the injury, or time off work. However, jurisdictions have different definitions and calculations of these. If applicable, how do you evaluate the:
 - a. Cost of the injury?
 - b. Time off work (including, time off, time in transitional duties, return to full duties)?
6. To what extent is technology incorporated into this evaluation process. Eg. Electronic database, organizational structure of this database?
 - a. Use of binary coding, or metadata?

3. Musculoskeletal injury prevention programs

The goal of this interview is to understand how jurisdictions evaluate the implantation of programs designed to minimize the risk of musculoskeletal injuries occurring from

patient handling activities. The following questions are therefore intended to provide insight into how your jurisdiction goes about preventing musculoskeletal injuries during patient handling activities, and the evaluation strategies that you use to assess the outcomes of these prevention strategies.

1. Can you tell me about how your organization approaches the prevention of musculoskeletal injuries?
 - a. Are there any specific programs in place to prevent these injuries?
 - i. Purchase and use of new equipment designed to minimize load?
 - ii. Use of a training program for proper techniques and scenarios?
 - iii. Incorporating national or international guidelines into policies and/or procedures' (eg. NIOSH 23kg/50lb max lifting limit)
2. What are the overall goals of this program?
3. How do you define success for this prevention program?

4.1 Evaluation Methods

1. Does your jurisdiction or organization currently have a methodology for evaluating prevention strategies aimed at reducing the occurrence of musculoskeletal injury resulting from patient handling activities among health care workers?
 - a. Can you provide a general overview of this evaluation program?
 - b. Is there a specific evaluation framework being implemented?
 - i. Ie. Formative, summative, process?
 - c. What are the specific goals of this evaluation?
2. What types of data do you collect for evaluative purposes?
 - a. What are the metrics that you apply?
 - i. Surveys, review of internal data sources, etc?
3. What are the differences and similarities between this framework and the one used for documenting and tracking musculoskeletal injuries?
4. What is the general procedure that you use for conducting this evaluation?
 - a. You mentioned that you collect ... (List data from question 2a). How do you go about collecting this data?
5. What resources does this program require?
6. Who are the stakeholders that you involve in this evaluative process?

- a. Who do you share your evaluation data with, and who does it impact or benefit?
7. In what ways is the resulting data ultimately used?
 8. What does your organization consider to be the barriers and challenges related to the utilization of this evaluation strategy?
 9. Has any documentation been released on the evaluation of a musculoskeletal injury prevention program within your jurisdiction or organization? Could you provide the supporting material, or a link to where it could be found?

4.2 Evaluation Measures

Current literature suggests that data is limited in methods to evaluate if policies are utilized by health care workers. In particular, strategies and measures to assess healthcare worker that we have identified include measurements of competency (that is, one's ability and knowledge to use the injury prevention strategy that fits the current situation) and compliance (that is, their application of injury prevention strategies) related to strategies aimed at prevention musculoskeletal injuries during patient lift, transfers, and repositioning. This is particularly true for workshops on proper lifting techniques, or time constraints reducing compliance of using proper policy/ equipment. Thus, we are particularly interested in the ways in which you evaluate whether or not the prevention strategies utilized in your jurisdiction or organization are implemented by staff.

(Regarding question 2a. :) In the last section, we discussed the types of data that you collected during your evaluation. Now, I would like to discuss those types of data in more detail. Some of the forms of data you mentioned were

1. In what ways do you use these data to assess the success of your injury prevention program?
2. In what ways do you use these data to assess uptake of injury prevention strategies among healthcare workers in your jurisdiction or organization?
 - a. For what reasons did you select these measures?
 - b. Why were these measures chosen over other potential measures?
3. What are the barriers involved in using these measures?
4. What are the strategies that you utilize to overcome them?

5. Strengths and barriers

In conclusion, I would like to know what your jurisdiction or organization considers to be the strengths of the evaluative strategies applied in your jurisdiction or organization to promote the quality of musculoskeletal injury prevention programs.

1. Broadly, what kinds of barriers did your organization encounter during the evaluative process?
 - a. For example, you previously mentioned (Discuss barriers identified in previous questions)
2. What strategies did you implement to address these barriers?
3. The Sotaria Strains group has identified some specific potential factors that they feel could be relevant to the implementation and evaluation of musculoskeletal injury prevention programs throughout Nova Scotia. I would like to ask you about these factors, whether or not you have encountered similar issues, and what you have done in response.
 - a. Were there any barriers encountered in regards to the organizational culture and the implementation and evaluation of musculoskeletal injury prevention programs?
 - i. Strong / weak culture of innovation
 - ii. Strong / weak culture of safety
 - iii. High / low trust environment (ie. reciprocal trust between management and staff)
 - iv. Jurisdiction size & organization structure
4. For example, health care within the province is divided among nine individual health authorities. Each HA is responsible for a given area, and it has been determined that some of these HAs use different methods and measures to document and track musculoskeletal injuries among healthcare workers. It has been suggested that this fragmented data could complicate the evaluation of injury prevention programs. **Have you encountered anything similar in your jurisdiction?**
5. In closing, can you tell me about what your organization now consider to be the overall strengths of the evaluative strategy utilized in your jurisdiction?
 - a. Can you tell me about the kinds of things you have learned during the evaluation process?
 - b. Things you learned while addressing barriers?

Appendix B: Injury tracking data

Types of data collected in employee injury tracking systems, with examples

Type of data	For example; in relation to MSI and patient handling
Demographic description of individual reporting injury	Age, sex, weight
Employment details of individual reporting injury	Facility, unit/ward, position, years with company
Location of incident	Where in the facility, what unit/ward, time of incident / shift when incident occurred
Incident details	Presence of other staff, activity leading to incident (ie. lifting material, assisting patient, walking patient, cleaning, climbing ladder), general incident category (ie. assault, slip-or-trip, near-miss)
Injury details relevant to patient handling	Type of handling activity (lifting, transferring or repositioning), types of equipment used / not used, reason for handling patient
Injury details	Location of pain experienced, other symptoms (ie. sleep loss), range of restricted motion, type of injury (ie. sprain, fracture, puncture)
MSI-specific details	Restriction of motion, description of pain, affected ability to work, other relevant symptoms (ie. sleep loss)
Compliance with facility procedure & policy	Was procedure attempted alone? was equipment used?
Details of patient in question	Patient factors that necessitate support through handling, or complicate patient handling activities (ie. identification of bariatric patients)

Appendix C: Hours lost and financial burden

Calculation of hours lost and financial impact of employee injuries

Variable	Factor	Issues for consideration
Time off of work	Time away from work duties	Is “time away from workplace / disability hours” calculated by Human Resources or Workers Compensation? Is this data available for injury tracking system? Are ‘transitional duties’ or reduced work hours included? Ie. “doing charts” rather than full duties
	Time lost	Calculated based on hourly or daily work attendance? Does system track if employee leaves halfway through a work day?
Financial impact	Medical treatment costs	What constitutes treatment? Doctor bills, rehabilitation costs? Are counseling costs included?
	Replacement staff / interim measures	Are costs incurred regarding the training of replacement staff? Are differences between staff remuneration considered?
	Reactive / preventative measures	Is injured employee provided with additional training, and are costs included in calculation?
	Other associated costs	Are employees reimbursed for travel costs to and from location of treatment? Are there legal costs associated with injury and/or rehabilitation?
	Insurance premiums	How do injury rates influence changes in insurance premiums?