Evaluation of the Comprehensiveness of Work-related Musculoskeletal Disorder Prevention Guidelines and its impact on lost-time injury rates in Canada

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Key Terms

- **Musculoskeletal Disorders (MSD)** are injuries and disorders of of the musculoskeletal system such as the muscles, tendons, tendon sheaths, joints, blood vessels, bursa, spinal discs and ligaments in the body[1,2]

- **Work-related Musculoskeletal Disorders (WMSD)** are when these injuries are caused or triggered due to hazards in the work environment such as high force, awkward/static postures, and repetitive motions[1,2]

Key Terms:

- **Lost-Time Injury (LTI) Claim :** An injury where a worker is compensated by a Board/Commission for a loss of wages following a work-related injury, or receives compensation for a permanent disability with or without any time lost in their employment [4]
- ***For example:*** If a worker is compensated for a back injury caused by lifting heavy objects on the job, it is considered a lost-time claim. The worker may be unable to work for a period of time while receiving treatment and rehabilitation.

Background

- According the Public Services Health and Safety Association (PSHSA), Work-related Musculoskeletal Disorders (WMSD) have been consistently reported as the leading type of work injury in the past 10 years[1]

- WMSDs are also a primary factor in increased long-term disabilities in the population, leading to a public health burden as well [3]

According to the Association of Workers Compensation Board of Canada's "Year at a Glance" report, a total of ***6,525 lost-time*** claims were filed in 2023 due to WMSD-related injuries, making it the second-highest category of non-traumatic injury claims for the year [4]

Literature Review: Burden of WMSDs

1

Financial Burden:

Worker Disability, Absenteeism, High-turnover of skilled workers, High claim reimbursements[5,6,7]

2

Health-related Burden:

Fatigue, Reduced Quality of Life, Mobility issues, sleep quality, Chronic pain, Anxiety, Social withdrawal [8,9,10]

Literature Review: Preventing WMSDs

Government Regulations

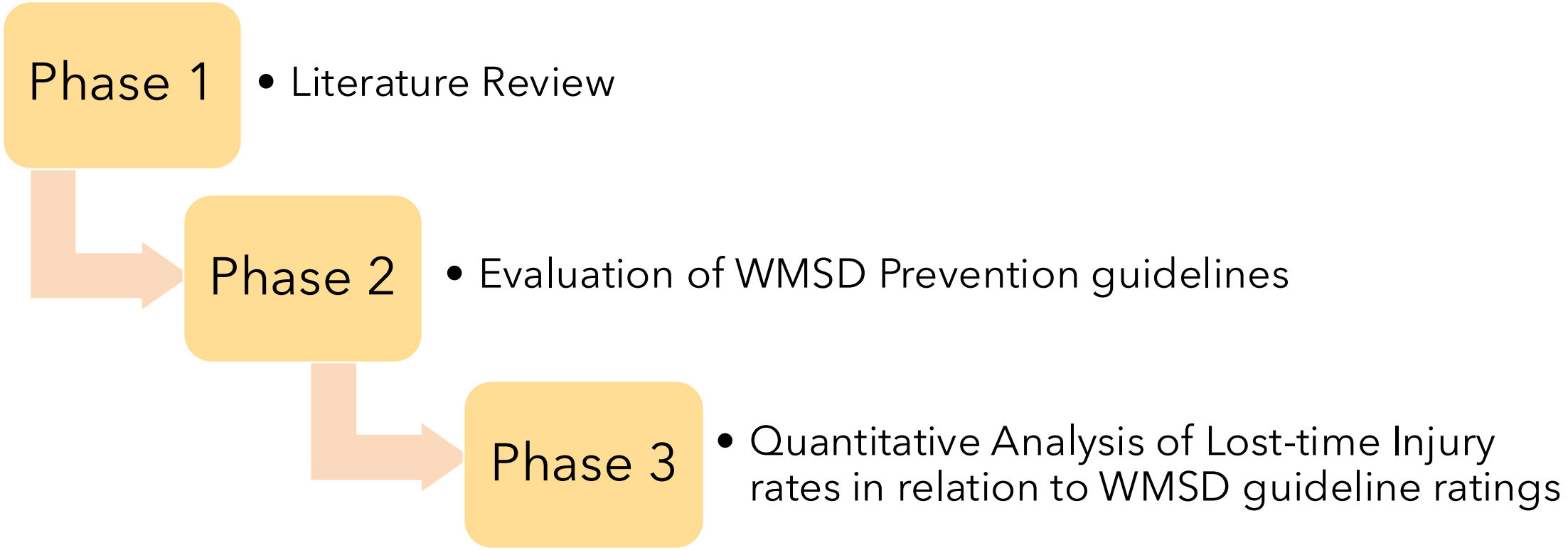
WMSD Prevention Guidelines

Research Topic

The study aims to answer the following research question:

1. How comprehensive are the provincial WMSD prevention guidelines (relative to a gold standard)?
2. Does the comprehensiveness of WMSD prevention guidelines impact WMSD-related injuries in Canada?

Main Phases of Research



Literature Review of Best-practices related to WMSD prevention guidelines

1.Task-Specific and Equipment -related

- Interventions that lead to modification of workstation tools or equipment[10,11]
- E.g., Mechanical Lifts[12] , Cylindrical transfer sheets [13]

2.Work-Organization and Job Design Interventions

- Changes to work hours, job design and leadership competencies [3,10]
- E.g., Supplementary breaks[14], Reporting and triaging of WMSDs [15], Organizational safety culture[16,17]

3.Workplace Environmental Interventions

- Interventions associated with physical and psychosocial environment [10]
- E.g., Resources [18], Lowering stress related to task completion [18], Better social support [19], Managing job demands [19]

Literature Review of Best-practices related to WMSD prevention guidelines

4. Multifactorial Interventions

- WMSD interventions integrate these approaches to simultaneously address multiple risks associated with WMSDs [10,20,21,22,23]
- Effect of seminars, ergonomic assessments, specialized software, physical conditioning and muscle strengthening – where heightened when combined with each other [21]
- Multifactorial kinesiology intervention – training, task-specific, and policy changes demonstrated a significant impact [22]

Next phase: Evaluation of WMSD Prevention Guidelines

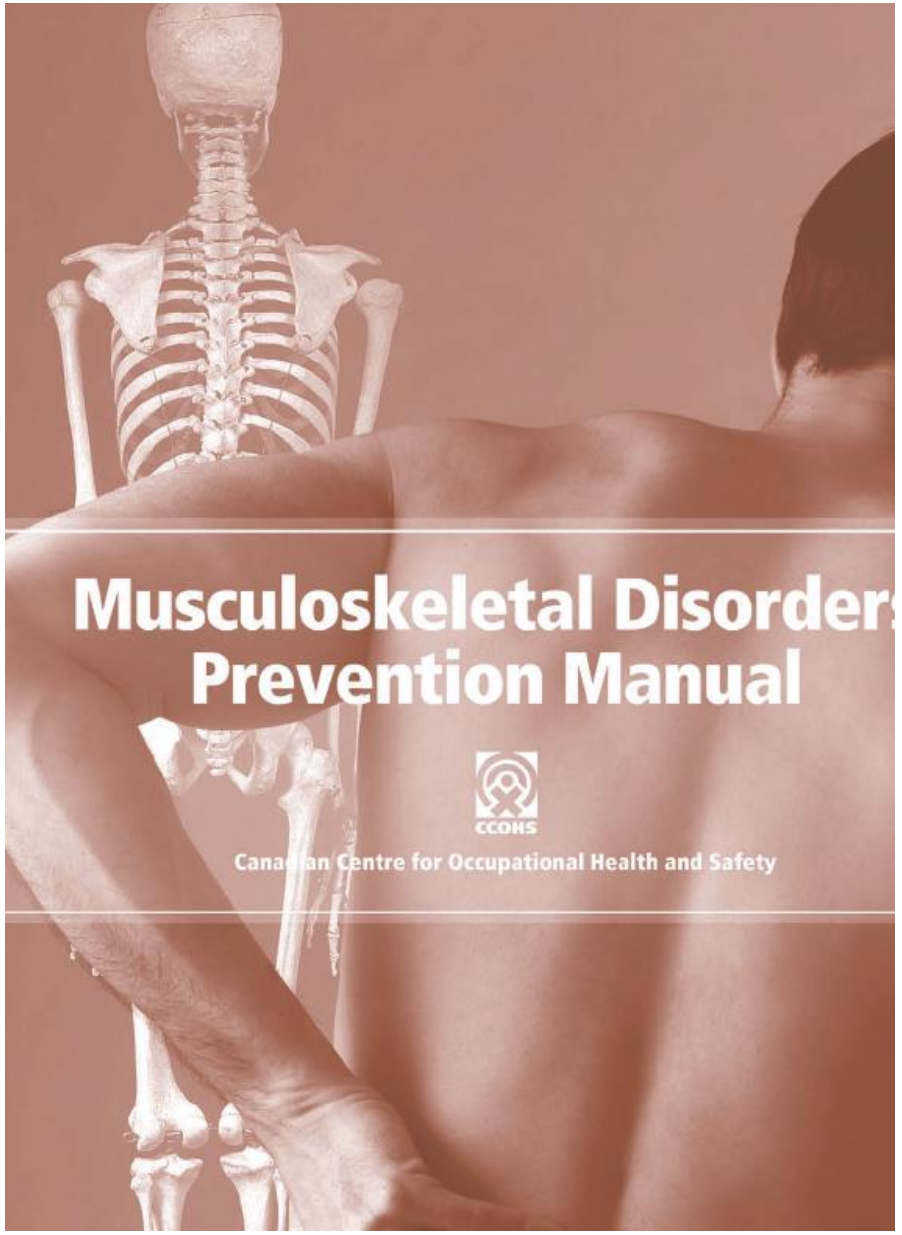
Establish the Canadian Centre for Occupational Health and Safety (CCOHS) : *Musculoskeletal Disorders Prevention Manual* as a best practice resource for WMSD prevention guidelines

Evaluation criteria (grading rubrics) developed from the CCOHS manual (gold standard)

All WMSD prevention guidelines were identified, compiled and rated as per grading rubrics relative to the CCOHS gold standard

CCOHS Manual as the gold standard

- Credibility of its governing body [24]
- Historical significance [24]
- Comprehensive coverage [24]
- Evidence-based research [24]
- Widespread national influence [24]
- Development and Review of CCOHS resources [24]



Development of grading rubrics

Content **(30)**	Comprehensiveness **(5)**	Applicability and Practicality **(5)**	Clarity, Structure and layout, Engagement, Visual aids and Examples **(2.5 each x 4 = 10)**
• All sections of the CCOHS manual	• Planning • Training • Risk identification • Control measures • Communication	• RE-AIM Framework[28] • World Health Organization practical guide for program implementation[26,27] • Centre for Disease Control and Prevention framework for program evaluation[25]	• Suitability Assessment of Materials (SAM) [29,30]

Guideline only focused on one sector and not applicable to other sectors **(-2.5 marks)**

Total **= 50**

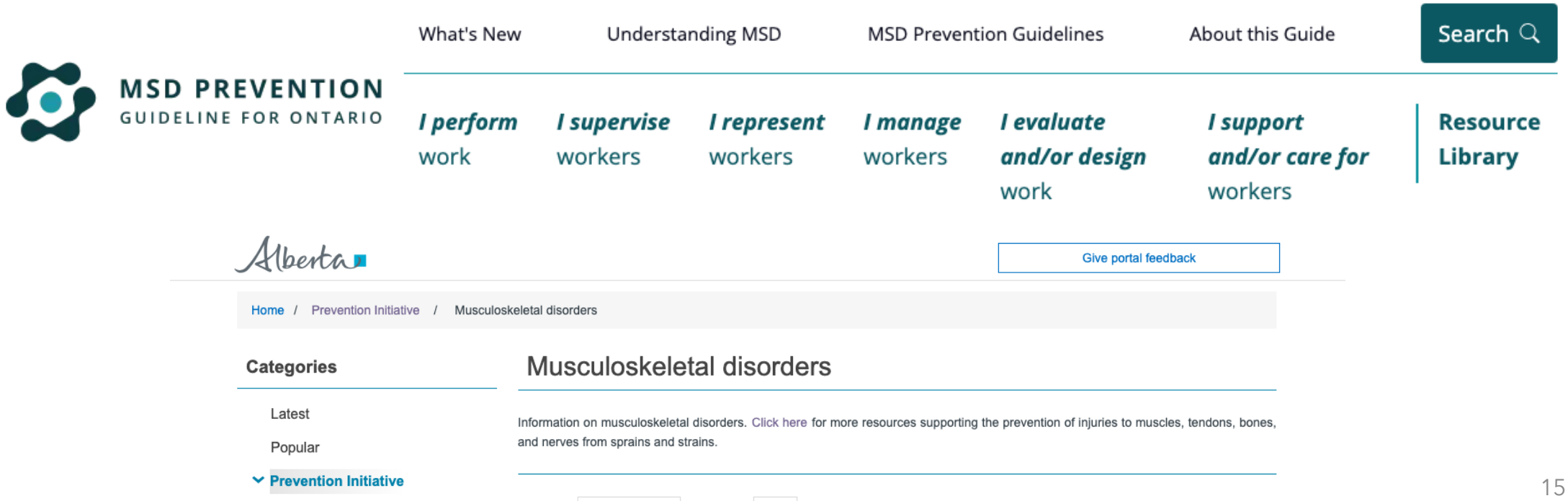
Identification and Compilation of WMSD Guidelines throughout Canada

To gather relevant guidelines, an initial scan was conducted using a systematic Google search with specific search terms:

- "Workplace musculoskeletal disorder prevention guideline (province name),"
- "Ergonomic workplace musculoskeletal disorder prevention guideline (province name),"
- "Musculoskeletal disorder prevention guidelines in (province name)."

WMSD Prevention Guidelines

In this study, WMSD prevention guidelines refer to resources published by provincial governments, worker's compensation boards and governing bodies on their official websites



Methods: Review and Evaluation all guidelines

After compiling all relevant guidelines, a detailed review was conducted.

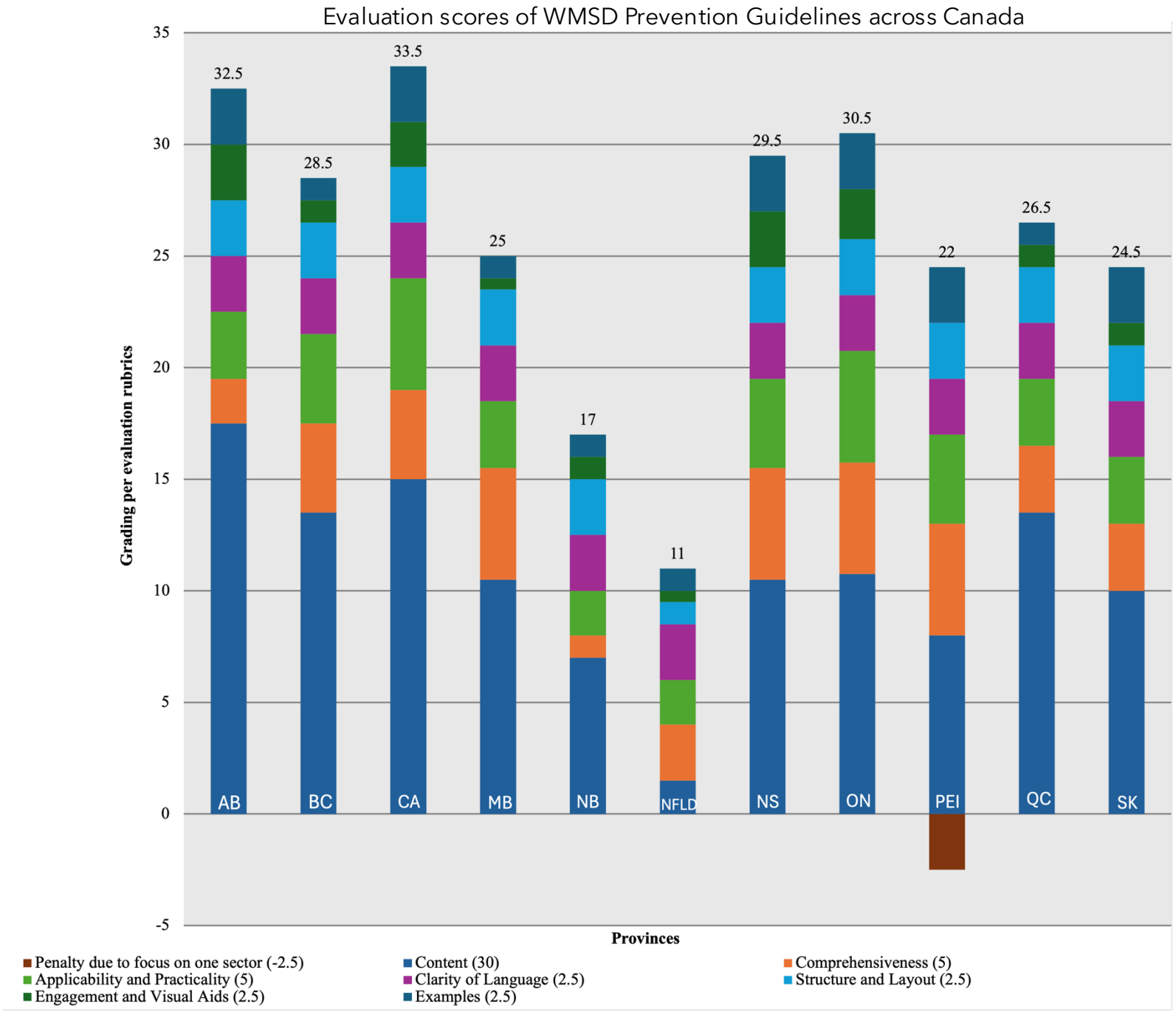
Data was structured in an Excel spreadsheet to identify shared practices and unique features.

Each guideline was evaluated using a grading rubric.

Results: WMSD Prevention Guidelines in Canada

Province	Year	Name	Governing Body
Alberta (AB)	2021	Ergonomics in the workplace: Identifying and controlling MSI hazards OHS information for employers and supervisors	Government of Alberta
British Columbia (BC)	2010	Preventing Musculoskeletal Injury (MSI): A Guide for Employers and Joint Committees	WorkSafe BC
Canada (CA)	2011	Process for implementing ergonomics regulatory requirements	Government of Canada
Manitoba (MB)	2010	Musculoskeletal Injury Prevention- Safety and Health Program Supplement	Safe Work Manitoba
New Brunswick (NB)	2010	Ergonomics Guidelines for Manual Handling- 2nd edition	WorkSafe NB
Newfoundland and Labrador (NFLD)	2020	Implementing MSI prevention programs: Advice from workplaces for workplaces	Institute for Work and Health
Nova Scotia (NS)	2018	Musculoskeletal Injuries (MSIs): How to prevent them in your workplace	WorkSafe Nova Scotia
Ontario (ON)	2018	MSD Prevention Guideline for Ontario	Centre of Research Expertise for the Prevention of Musculoskeletal Disorders (CRE-MSD)
Prince Edward Island (PEI)	2023	MSIP Musculoskeletal Injury Prevention Program Implementation Guide for Health PEI Sites	Health PEI
Quebec (QC)	2013	Work-related Musculoskeletal Disorders (WMSDs) : A better understanding for more effective prevention	Institut de recherche Robert-Sauve en sante et an securite du travail (IRSST)
Saskatchewan (SK)	2023	Musculoskeletal injuries prevention guide	WorkSafe Saskatchewan

Results


Evaluation scores of WMSD Prevention Guidelines across Canada
Grading per evaluation rubrics
35
30
25
20
15
10
5
0
-5
32.5
28.5
33.5
25
17
11
29.5
30.5
22
26.5
24.5
AB
BC
CA
MB
NB
NFLD
NS
ON
PEI
QC
SK
Provinces
Penalty due to focus on one sector (-2.5)
Content (30)
Comprehensiveness (5)
Applicability and Practicality (5)
Clarity of Language (2.5)
Structure and Layout (2.5)
Engagement and Visual Aids (2.5)
Examples (2.5)

Final phase: Quantitative analysis of Lost-time injury rates

Gather data from the Association of Workers Compensation Board of Canada (AWCBC) and the Labour Force Survey (LFS)

Calculate Lost-time claim rates for all provinces with WMSD prevention guidelines

Assess trends of lost-time injury rates and compare them with guideline ratings to assess association between lost-time injury rates and ratings of the guidelines

Association of Worker's Compensation Board of Canada (AWCBC) Data

- Customized request sent to the National Work Injury Statistics Program

Labour Force Survey (LFS) Data

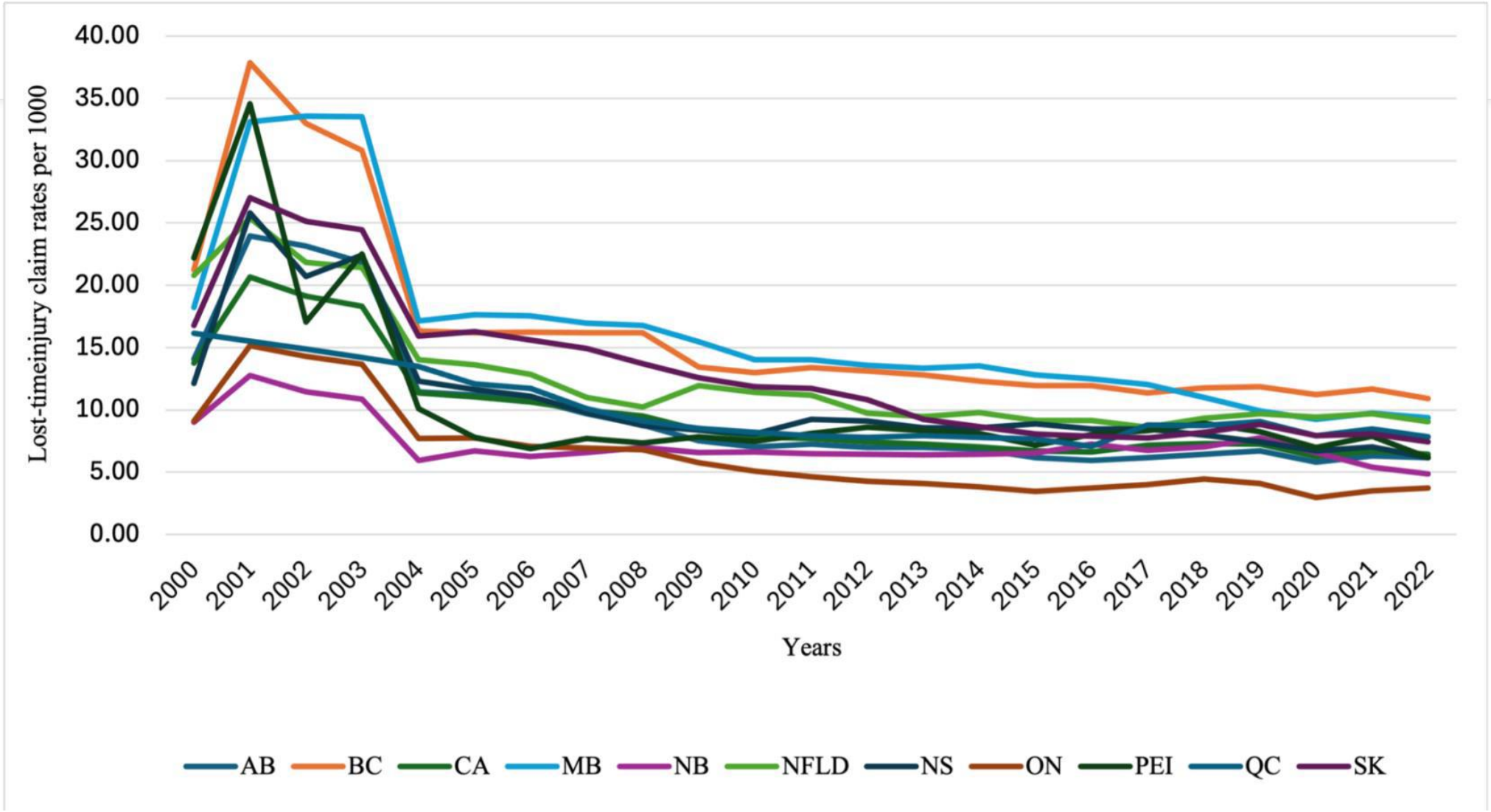
- Monthly Survey
- Monthly data on individuals who worked for pay, profit or unpaid family work, and those who were temporarily absent due to various reasons such as illness, or vacations etc. were included [33]
- Since LFS data was collected monthly, the total numbers for each year were averaged across all months for the evaluation period

Statistics Canada [33]

Methods

Timeline	• 2000-2022
Formula	• Lost-time rate[34] = $\frac{AWCBC\ Lost\ time\ claim\ count}{Labour\ Force\ Data}$
Analysis	• Trends in Lost-time injury rates • ANOVA
Null Hypothesis	• There is no significant difference between the lost-time injury rates across the provinces and guideline ratings

Results: Distribution of lost-time injury rates



Grouping of Guidelines : ANOVA

Name	Province (Evaluation Ratings)
Group A (rating <25)	Newfoundland and Labrador (11) New Brunswick (17) Manitoba(25)
Group B (rating 25 to 29)	Quebec (26.5) Nova Scotia (29.5) British Columbia (28.5)
Group C (rating 30 to 34)	Ontario (30.5) Alberta (32.5) Canada (33.5)
Provinces not included	Prince Edward Island Saskatchewan

Results: ANOVA & Post-hoc Tukey

- The ANOVA results show a statistically significant difference within the groups (p-value < 0.05)
- Group A (rating <25) : 9.24
- Group B (rating 25-29) : 9.79
- Group C (rating 30-34) : 6.06

Post-hoc

- **A Vs C:** A significant difference was found
- **B Vs C:** A significant difference was found
- **A Vs B:** Showed no statistical significance

Group A (rating <25)
Group B (rating 25 to 29)
Group C (rating 30 to 34)

Results: Key findings and Discussion

- CCOHS best practices and provincial WMSD prevention guidelines in Canada use multifactorial interventions to address diverse risk factors.
- Analysis confirms that higher-rated guidelines are associated with fewer lost-time injury claims.
- These results reinforce the need for organizations to adopt comprehensive, evidence-based approaches to WMSD prevention, leveraging free, government-published resources where available.

Limitations

Ratings were subjective

Secondary Data from AWCBC can omit rejected or unfiled cases

CCOHS document published in 2011

Importance of this research

- Novel contribution
- Fills a gap in literature
- Highlights that systematic approaches have significant potential to reduce WMSD related injuries and costs in the workplace
- The study offers valuable insights to the effectiveness of these guidelines on a large scale influencing national policy and practice
- Findings inform future WMSD prevention initiatives, guide resource allocation and improving worker health outcomes, ultimately reducing the economic burden of WMSDs across Canadian workplaces.

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Thank you

Question and Discussions