Work-Related Injuries in Middle-Aged and Older Workers in Newfoundland and Labrador

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WorkplaceNL
Health | Safety | Compensation

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Acknowledgements

This research was supported by WorkplaceNL. It was made possible using data collected by the Canadian Longitudinal Study on Aging (CLSA) [Baseline Tracking Dataset Version 3.4; Comprehensive Dataset Version 4.0; Follow-up 1 Tracking Dataset Version 1.0 and Follow-up 1 Comprehensive Dataset Version 1.0]. Funding for the Canadian Longitudinal Study on Aging (CLSA) is provided by the Government of Canada through the Canadian Institutes of Health Research (CIHR) under grant reference: LSA 94473 and the Canada Foundation for Innovation.

We wish to thank Scott Nowicki for his assistance in data analysis, Connie Deng for NOC coding, and Alison Fung for graphic design of infographics.

Executive Summary

Background

Middle-aged and older workers (i.e., those aged 45 years and older) offer many benefits to employers. These benefits include significant knowledge, skills, work experience, and a strong work ethic as a result of increasing life and work experience, greater control of language, ability to solve complex problems, motivation to learn, and less absenteeism. These strengths contribute to a reduced risk of workplace injuries for middle-aged and older workers compared to other age groups.

Older workers, however, may also pose significant challenges for employers, including increased risk for specific types of injuries. When older employees can no longer meet the demands of the job because of reduced mobility, functional ability, and the development of chronic health conditions associated with aging, their risk for severe work-related injuries increases.

It is critically important to understand the prevalence of work-related injury rates in older workers in Canada, and Newfoundland and Labrador, specifically, because the percentage of actively working older adults in this province has increased dramatically over the last 20 years. From 1995 to 2015, the proportion of seniors, aged 65 years and older, working tripled in Newfoundland and Labrador (from 4.0 to 15.5%), which was the greatest increase in older workers amongst all Canadian provinces.

In addition to understanding the incidence of injuries in Newfoundland and Labrador, the purpose of this report was to learn more about the factors that increase the risk of injury in the population of workers aged 45 years of age and older, physical and mental health outcomes, and use of health services as the result of work-related injuries.

Methods

This study was based on ***Canadian Longitudinal Survey on Aging (CLSA)*** data. CLSA is the largest and most in-depth study on aging ever conducted in Canada. The CLSA is based on a national, randomly selected sample of over 50,000 Canadian men and women, ages of 45-85 years, at recruitment. The CLSA includes a wide range of socio-demographic and health-related measures. At the time of this study, we used measures from the ***Baseline Questionnaire*** of the CLSA and the follow-up ***Maintaining Contact Questionnaire*** administered about 18 months later. Of the 51,250 middle-age and older adults who had a baseline assessment and one follow-up assessment, 3,470 were from Newfoundland and Labrador.

Key Findings

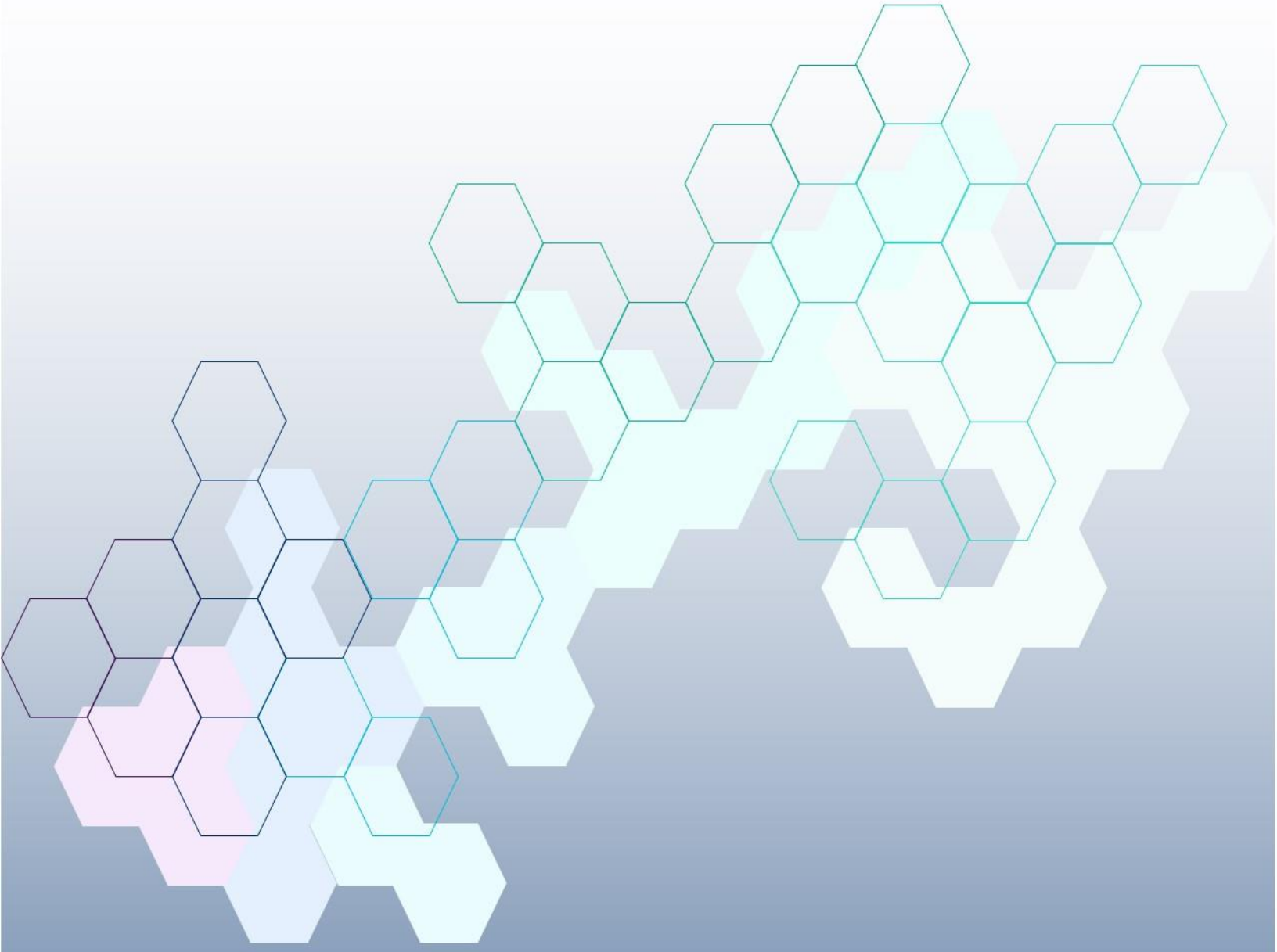
- The incidence of work-related injuries in middle-aged and older workers in Newfoundland and Labrador was 262 per 10,000, which was the lowest rate of all Canadian provinces.
- Most of the work-related injuries in middle-aged and older workers in Newfoundland and Labrador were classified as sprains or strains (24.8%). Other work-related injuries were classified as musculoskeletal pulls or tears (includes herniated disc, and torn muscles and tendons) (18.2%) and all other injury types (33.0%).
- Of the middle-aged and older workers with injuries, 52% reported occupations characterized by work inside of a building and 48% reported occupations characterized by work outside.
- The largest proportion of middle-aged and older workers with work related injuries in Newfoundland and Labrador reported occupations requiring the use of equipment, machinery, and tools.
- Of those middle-aged and older workers with work-related injuries in Newfoundland and Labrador, 56.7% had less than a post-secondary level education, whereas 25.4% had at least some post-secondary education.
- In Newfoundland and Labrador, the likelihood of work-related injuries was higher for: (a) workers aged 45-54-years vs 55-85-year-olds (i.e., 85.9% of work-related injuries were among those who were between the ages of 45 and 54 years), (b) those who worked non-regular work schedules as opposed to day schedules, and (c) smokers.
- Additional risk factors emerged when conducting analyses for Canada as a whole, which may be due to the larger sample size. For Canada, the likelihood of work-related injuries

was increased for: (a) workers aged 45-54-years, (b) men, (c) those with lower personal income, (d) those working non-regular schedules or working full-time, (e) those with a mood disorder, (f) those with vision problems, and (e) smokers.

- Among middle-aged and older workers in Canada, having work-related injuries was associated with several outcomes, including higher levels of psychological distress, lower life satisfaction, and decreased odds of reporting good general health and aging healthy. Work-related injuries also increased the likelihood of emergency department visits and overnight hospitalizations within about 18 months after the work-related injury.

Conclusions

The findings presented in this report contribute to our greater understanding of factors associated with work-related injuries among middle-aged and older workers in Newfoundland and Labrador and Canada as a whole. As injury incidence rates are an indicator of the safety performance at workplaces, such information can be useful for planning future health and safety measures at work and emphasize the need to engage both men and women in prevention of workplace injury and to improve health outcomes as a result of work-related injuries.



1 Chapter Introduction

Chapter 1: Introduction

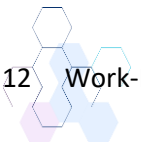
Middle-Aged and Older Canadians in the Workforce

Canada's population is aging. In 2016, there were 5.9 million (or 16.9%) seniors (i.e., older adults aged 65 years or older) living in Canada (Statistics Canada, 2016b). By 2036, seniors are projected to constitute approximately 25% of the Canadian population (Statistics Canada, 2014b). Not only have the number and proportion of seniors in the general population increased, seniors are also now healthier and living and working longer than those from previous generations (Canadian Institutes for Health Information, 2011). As a result, the labour force participation rate for older adults in Canada has increased significantly over the last decade (Statistics Canada, 2014b).

In 2003, 15.5% of adults aged 65-69 years participated in the labour force and this proportion increased to 25.5% in 2013. For adults aged 70 years and older, the labour force participation rate was 4.1% in 2003, which increased to 6.7% in 2013 with more than 200,000 Canadians in this age range working in public or private sectors during this time (Statistics Canada, 2014b). According to the 2016 Census, 19.8% of Canadians aged 65 years and older reported working on a part-time, part-year, or full-time basis and 5.9% of Canadian seniors worked all year on a full-time basis in 2015 (Statistics Canada, 2017a).

Although the percentage of actively working older adults increased in every province from 1995 to 2015, the increases in the Atlantic Provinces were the highest. In fact, the number of seniors working tripled in Newfoundland and Labrador (from 4.0% to 15.5%) over this period (Statistics Canada, 2017a).

At the same time, a substantial proportion of middle-aged Canadians retired early—before 65 years of age. The *Canadian Longitudinal Study on Aging* (CLSA, n.d.) data has indicated that up to a third of individuals aged 45 to 64 years, depending on the province, are retired. Unemployment rates are also quite high in this age group, particularly in Newfoundland and Labrador, with 13.3% of CLSA participants aged 45-64 years reporting unemployment.



Interestingly, analysis of CSLA data revealed that 23.1% of Canadians returned to work after retirement, with financial considerations reported most frequently as the reason for return to work among retirees (Khan & Memon, 2016).

Benefits and Challenges Associated with an Older Workforce

Middle-aged and older workers offer many benefits to employers. Middle-aged and older workers have often acquired significant knowledge, skills, work experience, and possess a strong work ethic with increasing life and work experience (Warr, 1994). Older workers also bring many other positive characteristics to the workplace, including greater control of language, ability to solve complex problems, greater motivation to learn, and less absenteeism (see Bohle et al., 2010 for reviews; Ilmarinen, 2001). These strengths may account for the finding of reduced risk of work-related injuries in middle-aged and older workers compared to other age groups (Bande & López-Mourelo, 2015; Chau et al., 2014; Choi, 2015; Guest et al., 2014; Morassaei et al., 2013; Robertson-More et al., 2015; Wuellner et al., 2011).

Older workers may also pose significant challenges for employers, including health-related issues which may result in sick and disability leaves (Taimela et al., 2007). Furthermore, older workers may be at greater risk for specific types of injuries that are more serious in nature (Okunribido et al., 2011; Savinainen et al., 2010). Such injuries require long durations to heal and are associated with higher costs, more serious medical diagnoses, or greater fatality (Algarni et al., 2015; Canadian Centre for Occupational Health and Safety, 2016; Fan, Mcleod, et al., 2012; Mallon & Cherry, 2015; Pransky et al., 2005; Schwatka et al., 2012). For example, fractures and other injuries associated with falls are more common in older than younger Canadian workers (Fan, Mcleod, et al., 2012). Serious work-related injuries for older workers may occur more frequently in high stress or physically demanding occupations (Silverstein, 2008), such as law enforcement (Gershon et al., 2002), construction (Schwatka et al., 2012), and agriculture (Nilsson et al., 2010). Work-related injuries that are classified as more severe may occur when older employees can no longer meet the demands of the job (see Laflamme & Menckel, 1995; Silverstein, 2008) because of reduced mobility, functional ability, and the development of chronic health conditions associated with aging.

Gaps Identified in the Literature

Data on the rates and types of work-related injuries among the general population of Canada have been collected (Safe Work, 2015; Tucker & Keefe, 2018, 2019). Tucker and Keefe (2018, 2019) reported work fatality and lost-time injury rates by Canadian province, demonstrating important differences between provinces. For example, the average lost-time injury rates for Newfoundland and Labrador were the lowest at 1.74 and 1.69 (per 100 full-time equivalent employees) for 2012-2016 and 2013-2017, respectively, and the lost-time injury rates for Manitoba were the highest at 3.10 and 3.00 per 100 full-time equivalent employees). However, the authors did not include information on other factors, such as injury rates for specific age groups. Indeed, information on work-related injuries among differing groups of middle-aged and older workers is limited or inconsistent across studies (Stoesz et al., 2020).

These gaps in the literature demonstrate a need to delve deeper into work-related injury rates in relation to other factors, such as demographic and socioeconomic characteristics, injury type, and working conditions. Moreover, relatively little is known about the factors that increase the risk of injuries among the population of middle-aged and older workers, their physical and mental health outcomes, and their use of health services as the result of work-related injuries in Newfoundland and Labrador or nationally.

Goals and Objectives

Our study aimed to address the identified knowledge gaps, with a focus on Newfoundland and Labrador, with comparisons to other Canadian provinces or Canada as a whole as appropriate. Given its high proportion of older workers (Statistics Canada, 2017a), Newfoundland and Labrador represent an interesting case study and comparator to other Canadian provinces and Canada.

The present research had five primary objectives:

(1) To describe the characteristics of Newfoundland and Labrador CLSA participants and compare them to Canada as a whole,

(2) To examine the incidence of work-related injuries among middle-aged and older workers in Newfoundland and Labrador and the other provinces,

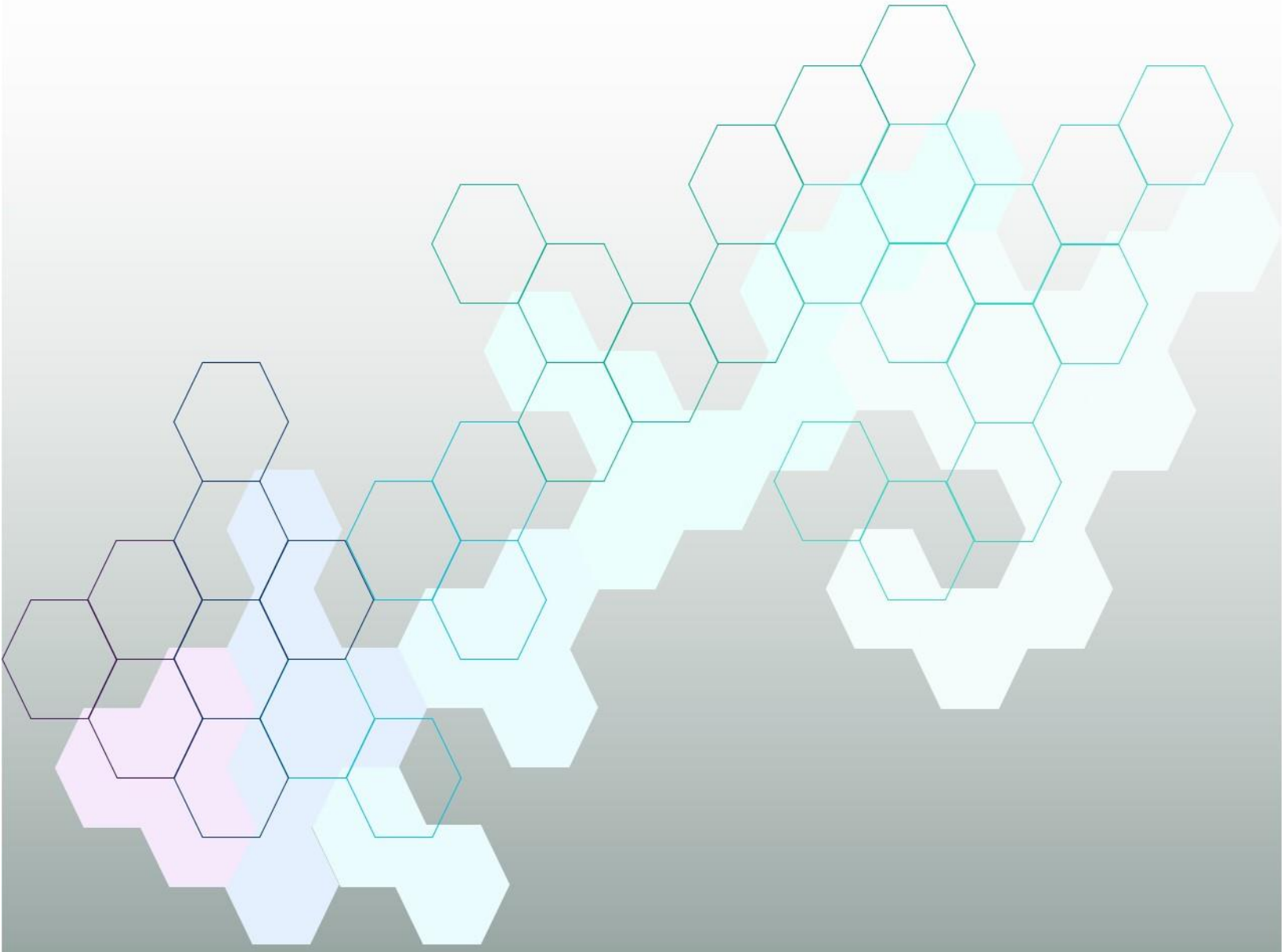
(3) To describe the characteristics (e.g., demographic, socio-economic, and health-related) associated with work-related injuries among middle-aged and older workers in Newfoundland and Labrador and compare these to the whole of Canada,

(4) To identify the factors (e.g., demographic, socio-economic, and health-related) that

are associated with work-related injuries among middle-aged and older workers in Newfoundland and Labrador and Canada as a whole, and

(5) To examine the associations between work-related injuries and various health outcomes, including self-rated general health, self-rated mental health, and use of health services by middle-aged and older adults as a result of work-related injuries in Canada.

By addressing these research objectives, we hoped to provide useful information at the provincial *and* national levels on the nature of work-related injuries among middle-aged and older workers. The information may provide useful information to individuals, organizations, and government to support the healthy and active aging and prevent work-related injury in Newfoundland and Labrador.



2 Chapter Methodology

Chapter 2: Methodology

This chapter provides a summary of the study methodology and includes descriptions of the data sources, measures, and approaches to data analyses.

There is no universal definition of an older worker and definitions vary widely in the research literature. Therefore, we focused on examining the data obtained from adults aged 45-85 years and refer to them as middle-aged and older workers throughout this report to acknowledge that the data reflects the findings from a wide age range of individuals.

Data Sources

Data from the *Canadian Longitudinal Survey on Aging (CLSA;* 2020) was obtained to address the five research objectives for the present study (see Goals and Objectives on p. 14). CLSA is the largest and most in-depth study on aging ever conducted in Canada. The main aim of the CLSA is to find ways to help Canadians to live long and well, and to understand why some Canadians age in a healthy fashion whereas others do not. CLSA is a longitudinal study of a large, national randomly selected sample of about 50,000 Canadian men and women, aged 45-85 years, who could read and speak either French or English at the time of recruitment. Individuals are currently being followed for a period of 20 years until 2033 or until their death.

The CLSA sample consists of two groups.

(1) The **CLSA Tracking Cohort** consisted of a random sample of Canadians aged 45-85 years recruited from the ten provinces (*N* = 21,241). Data were collected using the ***CLSA Baseline Questionnaire***, which was administered via computer-assisted telephone interviews (CATI) from four CATI sites. Individuals living in long-term care institutions and those with cognitive impairment were excluded from the CLSA.

(2) The **CLSA Comprehensive Cohort** consisted of a random sample of Canadians aged 45-85 years selected from the populations residing within 25 km of data collection sites in 10 cities (*N* = 30,097). Baseline information was also gathered using the CLSA Baseline Questionnaire administered and completed via CATI. Participants were then asked to visit one of several data collection sites to provide physical, biological, and clinical data as part of their baseline assessments.

Approximately 18 months following the CLSA baseline interview, the ***Maintaining Contact Questionnaire*** was administered to collect additional information for the CLSA Tracking and the CLSA Comprehensive Cohorts. As of June 2018, the CLSA participants had a baseline assessment and one follow-up assessment.

For the purpose of the present study, data from the *CLSA Baseline Questionnaire* and the *Maintaining Contact Questionnaire* for the CLSA full sample (*N* = 51,250) were examined. Of the 51,250 middle-age and older adults who had a baseline assessment and one follow-up assessment, **3,470 resided in Newfoundland and Labrador**.

Study Measures

CLSA collects a wide range of data through telephone surveys (e.g., information on socio-demographic characteristics), clinical (e.g., cognitive tests) and physical examinations (e.g., bone density test).

During the CLSA Baseline Questionnaire, several questions were asked regarding work-related injuries, physical and mental health problems that may result from injury, and health care use. Below, we describe the measures examined to address our five research objectives (see Goals and Objectives on p. 14).

Sociodemographic Characteristics

Demographic and lifestyle measures including age (years), sex (male, female), marital status (married, living with a partner in a common law relationship, single, never married, or never living with a partner, widowed, divorced/separated), country of birth (Canada, outside of Canada), location of residence (urban, rural), and language most spoken at home (English, French, other) were collected from CLSA participants.

Socio-economic status including education (less than secondary graduation, secondary graduation, some post-secondary, post-secondary degree or diploma) and total annual

household income (less than $20,000; $20,000-49,999; $50,000-99,999; $100,000-149,999; $150,000 or more) were collected from CLSA participants.

Labour Force Participation

Current labour force participation. Responses to the CLSA survey question, “Are you currently working at a job or business? This included part-time jobs, seasonal work, contract work, self-employment, or any other paid work regardless of the number of hours worked” was used to determine the current labour force participation. A binary variable was defined based on yes or no responses to classify participants as (1) currently working and (2) not currently working.

Current working status. The survey respondents working at the time of the survey were asked, “What is your current working status? If you are self-employed, choose full-time or part time, as appropriate.” The response options were: (1) Employed all of the time (that is, 30+ hours/week); (2) Employed most of the time (that is, > 20 but < 30 hours/week); (3) Employed some of the time (that is, < 20 hours/week); and (4) Don’t know/No answer/Refused. A categorical variable was defined based on the responses to classify survey respondents as (1) full-time employee, (2) part-time employee, and (3) missing.

Working schedule. The survey respondents working at the time of the survey were asked, “Which of the following best describes your working schedule?” The response categories were: (1) Daytime schedule or shift; (2) Evening shift; (3) Night shift; (4) Rotating shift, changing periodically from days to evenings or nights; and (5) Seasonal, on-call or casual, no pre-arranged schedules, but called as need arises.

A categorical variable was defined based on the responses to classify the respondents as (1) working daytime schedule or shift and (2) other types of work schedules or shifts.

Length of time worked at current employer. Survey respondents were asked, “How long have you worked with your present employer or in your current business?” The response options were: (1) Less than 1 year; (2) From 1 year to less than 3 years; (3) From 3 years to less than 5 years; (4) 5 years or more; and (5) Don’t know/No answer/Refused. A categorical variable was defined to indicate the length of time worked at the current business: (1) less than 5 years; (2) 5 years or more; and (3) missing.

Type of work. Survey respondents who were working at the time of the survey were asked the open-ended question, “What type of work do you do?” We coded these open-ended responses in conjunction with the business or industry section information (described below) according to the National Occupational Classification (NOC) coding system (Government of Canada, 2020). Responses were classified into 10 broad occupational categories: management; business,

finance, and administrative; natural and applied sciences; health; education, law and social, community and government services; art, culture, recreation, and sport; sales and service; trades, transport, and equipment operators; natural resources, agriculture and production; and manufacturing and utilities. These classifications were coded by two independent coders, and interrater agreement between them was calculated. Coding conflicts were discussed until resolved. From these codes, we extracted job characteristics from each occupation category.

Business or industry sector. Survey respondents who were working at the time of the survey were asked the open-ended question, "What business or industry sector are you in?" As noted, this information was taken into account during the NOC coding process described above. Both variables were used in the coding process simultaneously.

Injuries

The CLSA contains items to collect information about activity-limiting injuries as a way to examine the presence of serious injuries. Of particular importance for this study were the responses to questions asking participants if they were injured in the past 12 months and whether that injury occurred at work.

Activity-limiting injuries. Survey respondents were asked the yes or no question, "In the last 12 months, have you had any injuries that were serious enough to limit some of your normal activities? For example, a broken bone, a bad cut or burn, a sprain or a poisoning." A binary variable was defined to classify respondents as (1) Experienced activity-limiting injuries and (2) Did not experience any activity-limiting injuries.

Cause of injury. Survey respondents were asked to indicate the causes of all of their injuries. The potential response categories were: (1) Fall, (2) Motor Vehicle Collision (including injuries sustained as a pedestrian), (3) An incident in your workplace, (4) None of the above, and (5) Don't know/No answer/Refused. A binary variable was defined to describe the cause of injury as (1) Work-related (as a result of an accident in workplace), (2) Not work-related, and (3) Missing.

Type of activity when injured. Survey respondents were asked to indicate the type of activity that they were doing when they were injuries. The potential response categories were: (1) Sports or physical exercise (include school activities); (2) Leisure or hobby; (3) Working at a job or business (including travel to or from work); (4) Household chores, other unpaid work or education; (5) Sleeping, eating, personal care; (6) Other; and (7) Missing.

Work-related injuries. For the purpose of this study, we used information on "cause of injury" and "type of activity when injuries" to identify persons with a history of work-related injuries.

Respondents who reported that their cause of injury was “an accident in their workplace”, or reported that they were “working at a job or business including travel to or from work” when injured were classified as those with a history of work-related injury.

Type of injury. Survey respondents were asked, “What type of injury did you have?” The potential responses were (1) Broken or fractured bones; (2) Burns, scald, chemical burn; (3) Sprain or strain; (4) Puncture, animal bite (open wound); (5) Bruise; (6) Scrape, blister; (7) Concussion or other brain injury; (8) Poisoning; (9) Injury to internal organs; (10) Discomfort; and (11) Other. A binary variable was also defined to describe survey respondents’ type of injury as (1) Less severe (i.e., Sprain or strain; Cut; Bruise; Scrape, blister; Discomfort; Other) and (2) More severe (i.e., Multiple injuries; broken or fractured bones; Burns, scald, chemical burn; Dislocation; Puncture, animal bit (open wound); Concussion or other brain injury; Poisoning; Injury to the internal organs; Musculoskeletal pulls or tears; Nerve damage; Inflammation).

Health Measures

Self-rated general health. Survey respondents were asked, “In general, would you say your health is excellent, very good, good, fair, or poor?” A binary variable was defined to categorize self-rated overall health into one of two groups (1 = Excellent, very good, or good; 2 = Fair or poor).

Self-rated mental health. Survey respondents were asked, “In general, would you say your mental health is excellent, very good, good, fair, or poor?” A binary variable was defined to describe self-rated mental health into one of two groups (1 = Excellent, very good, or good; 2 = Fair or poor).

Self-rated healthy aging. Survey respondents were asked, “In terms of your own healthy aging, would you say it is excellent, very good, good, fair, or poor?” A binary variable was defined to describe self-rated healthy aging into one of two groups (1 = Excellent, very good, or good; 2 = Fair or poor).

Eye-sight rating. Survey respondents were asked, “Is your eyesight, using glasses or corrective lens if you use them excellent, very good, good, fair, or poor?” Responses were coded into one of two categories (1 = Excellent, very good, or good; 2 = Fair or poor).

Hearing rating. Survey respondents were asked, “Is your hearing, using a hearing aid if you use one excellent, very good, good, fair, or poor?” Responses were coded into one of two categories (1 = Excellent, very good, or good; 2 = Fair or poor).

Chronic Conditions

Chronic conditions were classified as long-term conditions that were diagnosed by a health professional. A categorical variable was defined to describe the type of chronic conditions that the survey respondents reported as (1) Neurological conditions, (2) Cardiac/cardiovascular health problems, (3) Arthritis, (4) Osteoarthritis, (5) Respiratory, (6) Mood disorder, (7) Anxiety, (8) More than one category.

Neurological conditions included (1) memory problems, (2) dementia or Alzheimer's disease, (3) Parkinsonism or Parkinson's disease, (4) multiple sclerosis, (5) epilepsy, and (6) migraine headaches.

Cardiac/cardiovascular health problems included (1) high blood pressure or hypertension; (2) diabetes, borderline diabetes or high blood sugar; (3) heart disease, including congestive heart failure (CHF); (4) angina (i.e., chest pain due to heart disease); (5) heart attack or myocardial infarction; (6) peripheral vascular disease or poor circulation in your limbs; (7) stroke or cerebrovascular accident (CVA); (8) a mini-stroke or Transient Ischemic Attack (TIA); and (9) suffer from the effects of a stroke, CVA, or TIA.

Arthritis included (1) Rheumatoid arthritis or (2) Any other type of arthritis.

Osteoarthritis included (1) Osteoarthritis in the knee, (2) Osteoarthritis in the hip, or (3) osteoarthritis in one or both hands.

Respiratory illnesses included (1) Asthma, (2) Emphysema, (3) Chronic bronchitis, and (4) Chronic obstructive pulmonary disease.

Mood disorder**.** Survey respondents were asked the yes or no question, "Has a doctor ever told you that you have a mood disorder, such as depression (including manic depression), bipolar disorder, mania, or dysthymia?" A binary variable was defined to indicate the presence of a mood disorder.

Anxiety disorder**.** Survey respondents were asked, the yes or no question, "Has a doctor ever told you that you have an anxiety disorder such as a phobia, obsessive-compulsive disorder or a panic disorder?" A binary variable was defined to indicate the presence of an anxiety disorder.

Psychological Distress

Psychological distress. Survey respondents were asked a series of 10 questions based on the *Kessler Psychological Distress Scale*, which is designed to identify the risk of generalized anxiety and depression (Kessler et al., 2003). An overall score (*min* = 10; *max* = 50) is calculated by

summing the coded responses (1 = None of the time to 5 = All of the time) (Andrews & Slade, 2001).

Depression

Depression. Survey respondents were asked a series of 10 questions about feelings of depression, loneliness, hopefulness for the future, and restless sleep felt in the past week, which are based on the *Center for Epidemiological Studies Depression Scale (CESD-10)* (Andresen et al., 1994). Responses to questions such as, "How often were you bothered by things that usually don't bother you?" included (1) All of the time, (2) Occasionally, (3) Some of the time, and (4) Rarely or never. An overall score is calculated by recoding and summing the responses (*min* = 10; *max* = 30). Scores of ≥ 10 indicate a positive screen for depressive symptoms. A binary variable was defined to indicate the presence of depression.

Posttraumatic Stress Disorder (PTSD)

Survey participants were asked to respond to a series of four questions related to PTSD, which were based on the Primary Care Posttraumatic Stress Disorder (PC-PTSD) screening instrument (Prins et al., 2003). Questions include: "In your life, have you ever had any experience that was so frightening, horrible, or upsetting that in the past month, you:

(1) Have had nightmares about it or thought about it when you did not want to?
(2) Tried hard not to think about it or went out of your way to avoid situations that reminded you of it?
(3) Were constantly on guard, watchful, or easily startled?
(4) Felt numb or detached from others, activities, or your surroundings?"

Respondents who answered yes to any of the questions were classified as having experienced PTSD. A binary variable was defined to indicate the presence of PTSD.

Life Satisfaction

Satisfaction with life was measured using an adapted version of the 5-item Satisfaction with Life Scale (SWLS) (Diener et al., 1985), which includes items such as, "In most ways, my life is close to my ideal" and "I am satisfied with my life." Survey respondents were asked to rate their responses by selecting one of three possible responses (agree, disagree, neither agree nor disagree). Based on each response, respondents were asked to elaborate on the extent of their agreement or disagreement. Scores for each item ranged from 1 to 7. If any item on the SWLS is missing, the overall score (min: 5; max: 35) and the classification are set to missing for the CLSA.

Health-Related Behaviours

Smoking behaviour. The CLSA participants were asked about their smoking behaviour. Based on the responses provided, each participant was classified as a (1) Daily smoker; (2) Occasional smoker, but former daily smoker; (3) Occasional smoker; (4) Former daily smoker, but non-smoker now; or (5) Never smoked. A binary variable was defined as: (1) Occasional smoker/Former daily smoker/Former occasional smoker/Never smoked (a whole cigarette); or (2) Daily smoker/Occasional smoker (former daily smoker).

Alcohol use. Survey respondents were asked the question, "About how often during the past 12 months did you drink alcohol?" Responses were classified into one of three categories: (1) Regular drinker (almost everyday/1-5 times per week/1-3 times per month) (2) Occasional drinker (< 1 per month), and (3) Did not drink in the last 12 months. A binary variable was defined: (1) Did not drink in the last 12 months/Occasional drinker; or (2) Regular drinker (at least once a month).

Health Care Utilization

In the *Maintaining Contact Questionnaire*, participants were asked the following yes or no questions:

(1) "During the past 12 months, have you had contact with any of the following about your physical or mental health?
   (a) Family doctor?
   (b) Medical specialist (such as a cardiologist, gynaecologist, psychiatrist, or ophthalmologist)?
   (c) Psychologist?
   (d) Optometrist?
   (e) Physiotherapist, occupational therapist, or chiropractor?
   (f) Social worker"

(2) "Have you been seen in an Emergency Department during the past 12 months?"

(3) "Were you a patient in a hospital overnight during the past 12 months?"

We defined two binary variables based on the responses to these questions about contacting a family doctor and a psychologist to describe the study participants' healthcare use at follow-up. Refused, don't know, and missing responses were coded as missing. These binary variables served as outcome measures for addressing Research Objective 4, which is described in Chapter 7: Outcomes of Work-Related Injuries in Newfoundland and Labrador.

Data Analysis

Research Objective 1

Our first objective was to describe the characteristics of Newfoundland and Labrador CLSA participants and compare them to Canada as a whole, as a way to determine whether and how participants from Newfoundland and Labrador differ from the Canadian sample as a whole. We also compared the CLSA sample to 2016 Census data on select variables as way to determine the similarity of the results.

Research Objective 2

Our second objective was to examine the incidence of work-related injuries among middle-aged and older workers in Newfoundland and Labrador and the other provinces. We also compared characteristics of individuals with work-related injuries (e.g., age, income) across provinces. We calculated work-related injury incidence rates for the past 12 months per 10,000 population using Equation 1.

Equation 1. Calculation of work-related injury incidence rates for the past 12 months per 10,000 population.

$$\frac{\begin{array}{c}\text{number of people}\\ \text{who worked and}\\ \text{reported work related injuries}\end{array}}{\begin{array}{c}\text{number of people}\\ \text{who worked in the last 12 months}\\ \text{or recently retired}\end{array}} \times (10{,}000)$$

To determine the number of people who worked in the last 12 months, we used responses to the question, “In what year did you last have a paid job or operate a business or farm?” For those who reported currently retired, we look at their year of retirement and compared that to the year of their CLSA interview. If the difference was maximum 1 year, then those individuals were included in the denominator for the calculation of incidence rates.

Weighted Rate Ratios (RR) and their 99% CIs were used to determine statistically significant differences across provinces. Results are presented in Chapter 4: Incidence of Work-Related Injuries in Newfoundland and Labrador.

Research Objective 3

Our third objective was to describe the characteristics (e.g., demographic, socio-economic, and health-related) associated with work-related injuries among middle-aged and older workers in Newfoundland and Labrador, as compared to Canada as a whole.

We conducted cross-tabulations of each factor and work-related injuries. The “trimmed weights” were applied to obtain the weighted frequencies and proportions. The "analytic weights," which adjust for the CLSA complex survey design, were used to obtain the Rao and Scott chi-square goodness-of-fit test statistic. For Newfoundland and Labrador, 95% CIs were used, and 99% CIs were used for the data for Canada.

Research Objective 4

Objective 4 was to identify the factors (e.g., demographic, socio-economic, and health-related) associated with work-related injuries among middle-aged and older workers in Newfoundland and Labrador and Canada as a whole. We addressed this objective by building on Research Objective 3, with the results of the bivariate analyses informing the selection of variables used for conducting multivariate logistic regression.

The significant variables from the bivariate analyses were then entered into a multivariate logistic regression model to see what variables predict work-related injuries. Adjusted odd ratios (AOR) and their 99% CIs were used to identify significant predictors of work-related injuries among middle-aged and older workers in Canada. Due to low sample size, adjusted odd ratios (AOR) and their 95% CIs were used to identify significant predictors of work-related injuries among middle-aged and older workers in Newfoundland and Labrador. These results are summarized in Chapter 6: Predictors of Work-Related Injuries in Newfoundland and Labrador.

Research Objective 5

Our final objective was to examine the associations between work-related injuries and a range of health outcomes, including self-rated general health, self-rated mental health, and use of health services by middle-aged and older adults as a result of work-related injuries in Newfoundland and Labrador and across Canada.

We developed and tested multivariate regression models to examine the independent effects of work-related injuries on middle-aged and older workers’ self-rated overall health, self-rated mental health, psychological distress, and their subsequent health care use (hospitalization, use of emergency department). Adjusted odd ratios (AOR) and their 99% CIs were used to

identify significant predictors of self-rated overall health, self-rated mental health, and subsequent health care use among middle-aged and older workers in Canada. Due to low sample size, we were not able to conduct these analyses for Newfoundland and Labrador specifically. The results are summarized in Chapter 7: Outcomes of Work-Related Injuries in Newfoundland and Labrador.

For the descriptive analyses, sampling weight was applied to obtain population estimates. Analytical weight variable was used and applied to the data for any statistical modeling and testing.

Software Requirements

SAS program version 9.4 was used to conduct the proposed analyses.

Ethics

Data access for the present study was approved by the CLSA Data Access Committee and data were provided to the research team once a data sharing agreement between the University of Manitoba and McMaster University was in place. The access approval process at the CLSA is consistent with existing legislations and regulations regarding privacy and confidentiality of information. The Health Research Ethics Board of the University of Manitoba approved the study protocol.

Chapter 3

Profile of Middle-Aged and Older Adults in Newfoundland and Labrador

Chapter 3: Profile of Middle-Aged and Older Adults in Newfoundland and Labrador

In this chapter, we describe sociodemographic and lifestyle characteristics, health-related behaviours, and the health status of the middle-aged and older adults in Newfoundland and Labrador who participated in the CLSA. This includes individuals who worked and those who did not work. We also compared their profile to that of the CLSA participants of the same age residing across Canada (see Table 6 in Appendix A. Profiles of Middle-Aged and Older Adults in Newfoundland and Labrador and Canada for details).

Sex and Age Distributions

The data from Newfoundland and Labrador included nearly equal proportions of men and women (see Figure 1) and the percentage of respondents in each age group decreased with increasing age (see Figure 2). The sex and age distributions for CLSA participants in Newfoundland and Labrador were similar to those estimated for Canada as a whole.

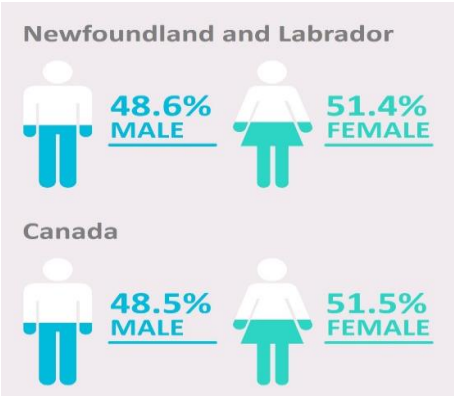


Figure 1. Sex distribution of middle-aged and older adults in Newfoundland and Labrador and Canada.

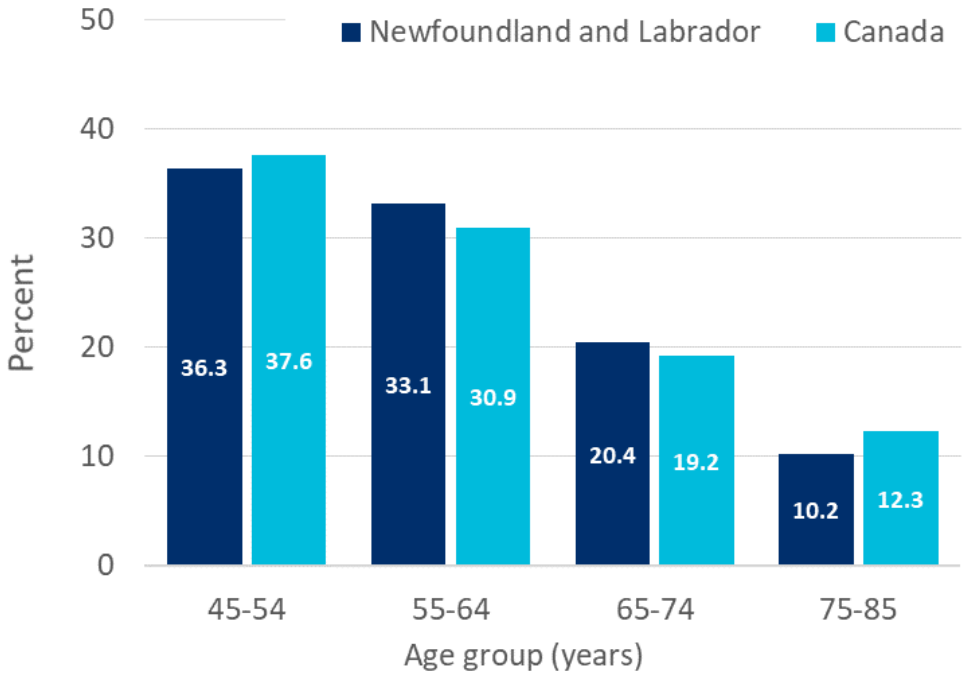


Figure 2. Age distribution of middle-aged and older adults in Newfoundland and Labrador and Canada.

Country of Birth and Language

A large proportion of CLSA participants in Newfoundland and Labrador self-identified that Canada was their place of birth (95.8%) (see Figure 3, left panel) and speaking English most often at home (99.7%), followed by other languages (0.2%) and French (0.1%).

These findings stand in contrast to the data on CLSA participants in all of Canada, where 84.5% identified as being born in Canada (see Figure 3, right panel) and 73.4% reported speaking English, 24.7% speaking French, and 1.9% speaking other languages. In comparison to 2016 Census data, which show that 76.6% of the Canadian population of all ages were Canadian citizens by birth (Statistics Canada, 2017b), CLSA participants are therefore slightly more likely to be Canadian born.

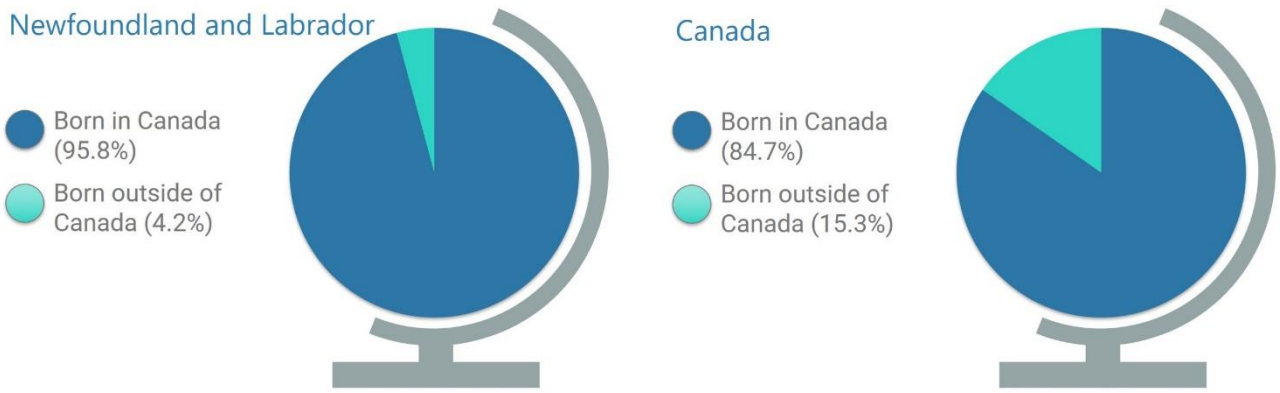


Figure 3. Country of Birth of Middle-Aged and Older Adults in Newfoundland and Labrador and Canada.

Martial Status

The majority of middle-aged and older adults in Newfoundland and Labrador reported being married or living with a partner in a common law relationship (78.8%), whereas the remainder reported being single (6.6%), widowed (6.9%), or divorced or separated (7.8%) (see Figure 4, top panel).

Among CLSA participants from across Canada, 47.8% reported being married or in a common law relationship, 6.6% being single, 7.1% widowed, and 10.2% being divorced or separated (see Figure 4, lower panel).

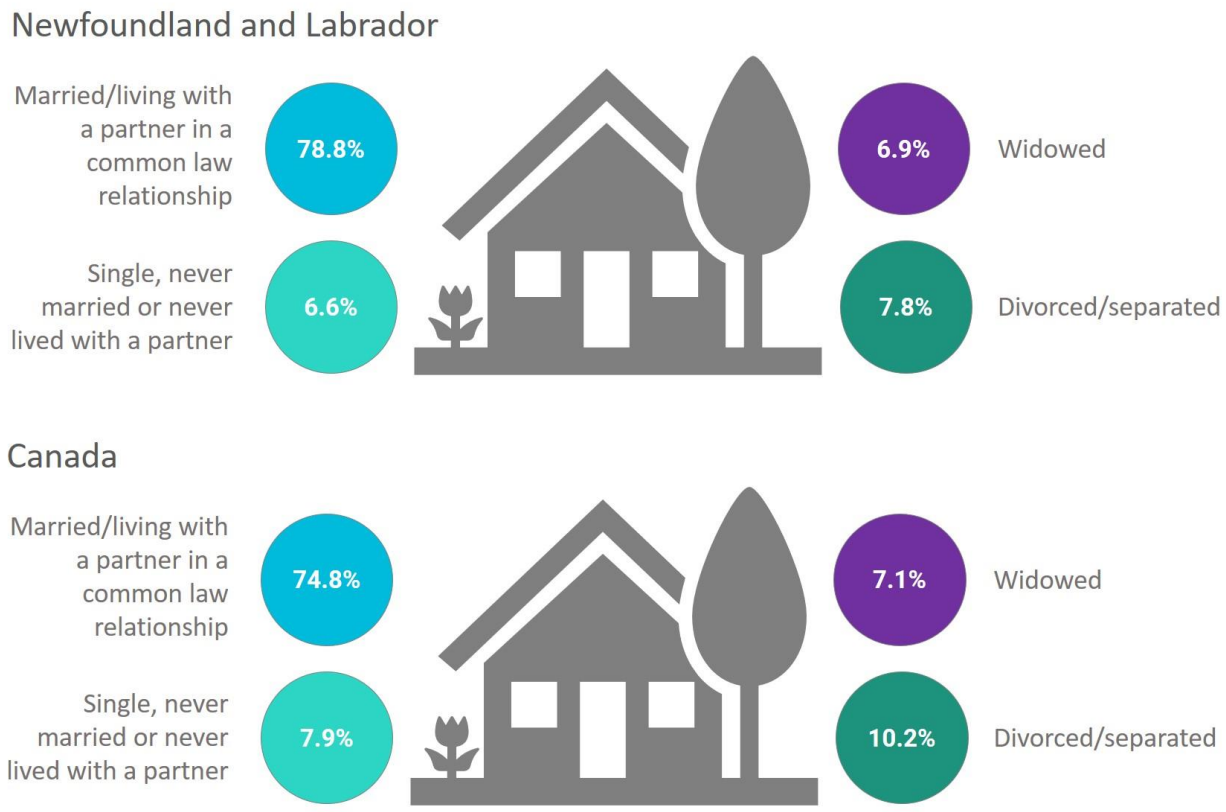


Figure 4. Marital status of middle-aged and older adults in Newfoundland and Labrador and Canada.

Urban and Rural Residence

The majority of middle-aged and older adults in Newfoundland and Labrador reported living in urban areas (79.5%) as opposed to living rurally (20.5%) (see Figure 5). It is noteworthy that our estimates for Newfoundland and Labrador stand in contrast to the 2016 Census report that only 58.1% of the population of Newfoundland and Labrador live in urban areas and 41.9% live rurally (Statistics Canada, 2016a). This difference, however, can be partially explained by the fact that we report the information for middle-aged and older adults only and the percentages for urban and rural residence based on 2016 Census data are for all ages living in Newfoundland and Labrador.

Our estimates for middle-aged and older adults in Canada, however, are consistent with the 2016 Census data showing that 81.3% of the Canadian population live in urban areas and 18.7% live rurally (Statistics Canada, 2014a). Nearly all the population growth in Newfoundland and Labrador and across Canada has been limited to the major cities.

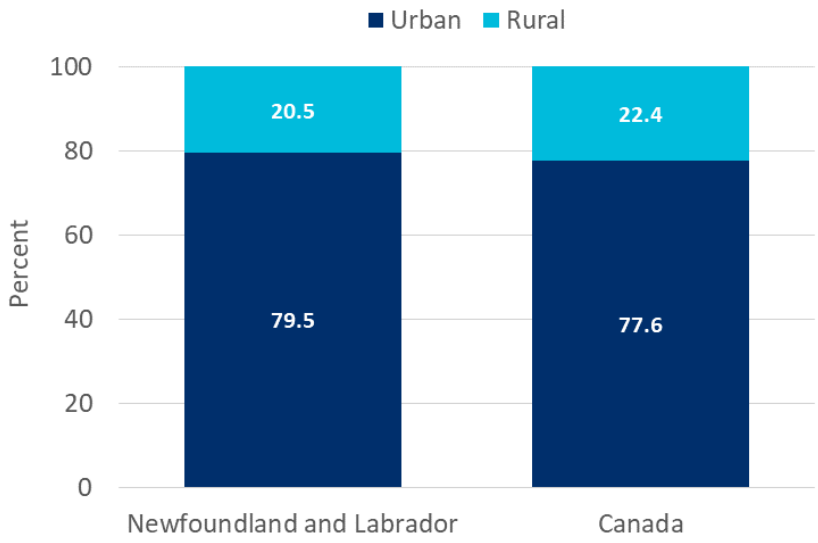


Figure 5. Urban and rural living for middle-aged and older adults in Newfoundland and Labrador and Canada.

Education

A large proportion of middle-aged and older adults from Newfoundland and Labrador reported having earned a post-secondary degree/diploma (75.2%), whereas 4.6% reported some post-secondary education, 11.4% reported secondary school graduate but no post-secondary, and 8.9% reported less than secondary school education (see Figure 6). This finding is consistent with the findings for the CLSA participants of the same age from across Canada (72.5%, 7.06%, 12.6%, and 7.2%, respectively across the four levels of education), and those for all the CLSA participants reported previously (Raina et al., 2018).

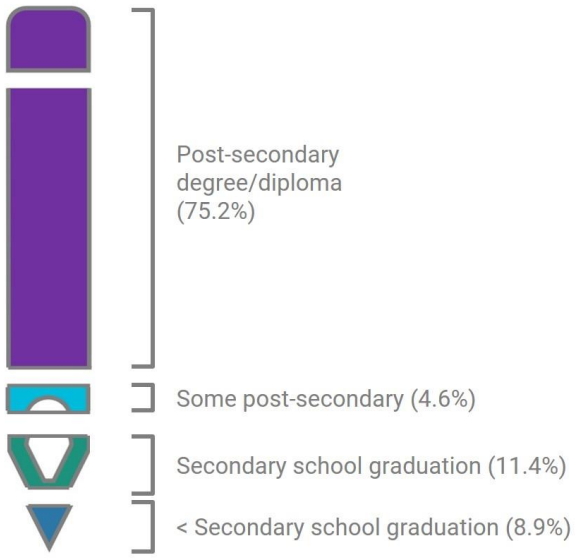


Figure 6. Education levels of middle-aged and older adults in Newfoundland and Labrador.

Income, Work Status, and Retirement

The income levels for middle-aged and older adults in Newfoundland and Labrador mirror those reported across Canada. Figure 7 shows that over one third of middle-aged and older adults earned between $50,000 and $100,000 per year (33.9% in Newfoundland and Labrador and 36.1% in Canada). Nearly one third earned between $20,000 and $50,000. A smaller proportion of middle-aged and older adults earned $100,000 or more at the time of the survey.

These findings for income are in line with the findings that approximately half of middle-aged and older adults reported not being retired or were only partly retired (Newfoundland and Labrador: 49.0%, 9.3%; Canada: 51.7%, 9.8%, respectively). Approximately 41.5% of middle-aged and older adults in Newfoundland and Labrador reported being completely retired. Similarly, 38.6% of middle-aged and older adults in Canada reported being completely retired. See Figure 8.

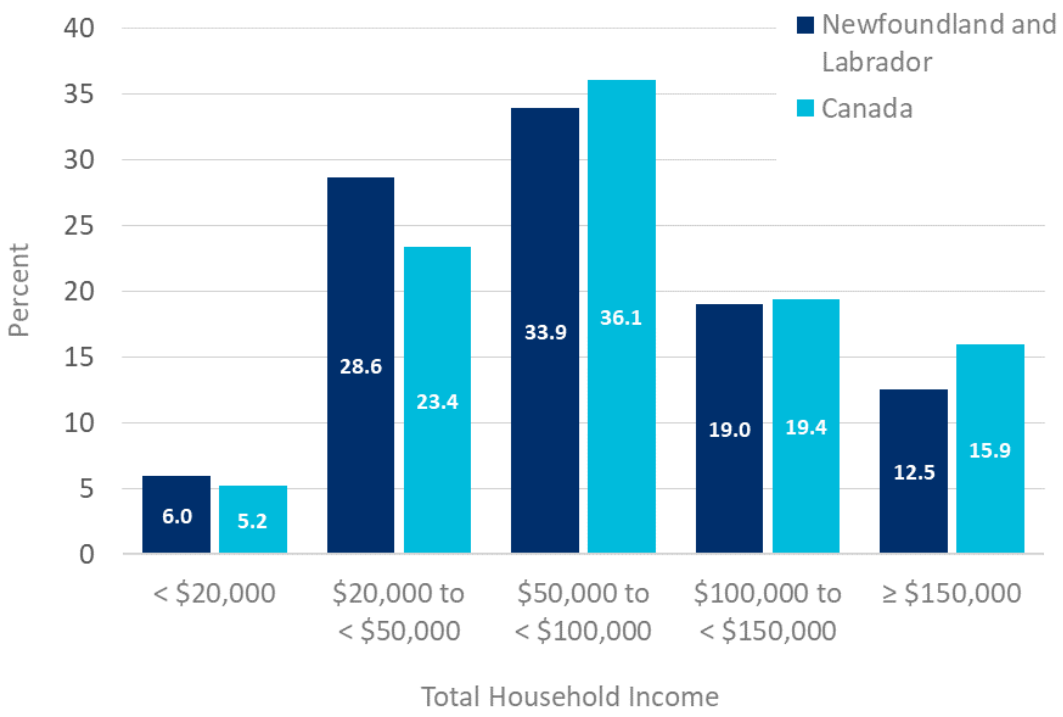


Figure 7. Total household income of middle-aged and older adults in Newfoundland and Labrador and Canada.

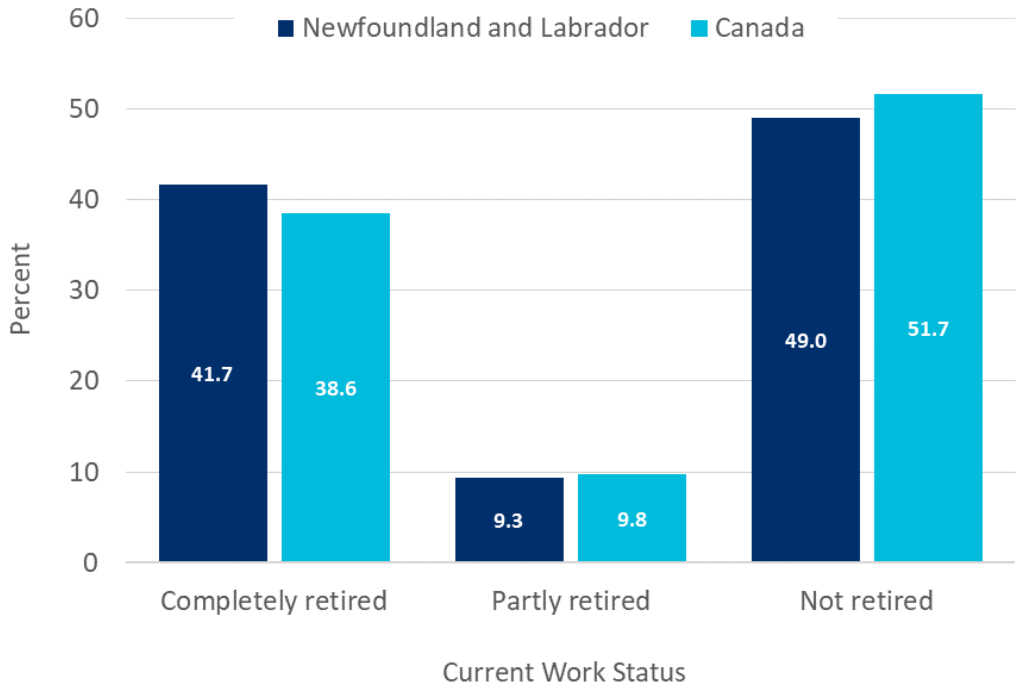


Figure 8. Current work status of middle-aged and older adults in Newfoundland and Labrador and Canada.

Health Status and Health-Related Behaviours

In general, self-reported ratings of general health and mental health were consistent between the CLSA participants from Newfoundland and Labrador and those from across Canada. A large proportion of middle-aged and older adults at the provincial and national levels rated their general and mental health as Excellent/Very Good/Good (Newfoundland and Labrador: 86.4%, 96.1%; Canada: 88.5%, 95.7%, respectively) (see Figure 9).

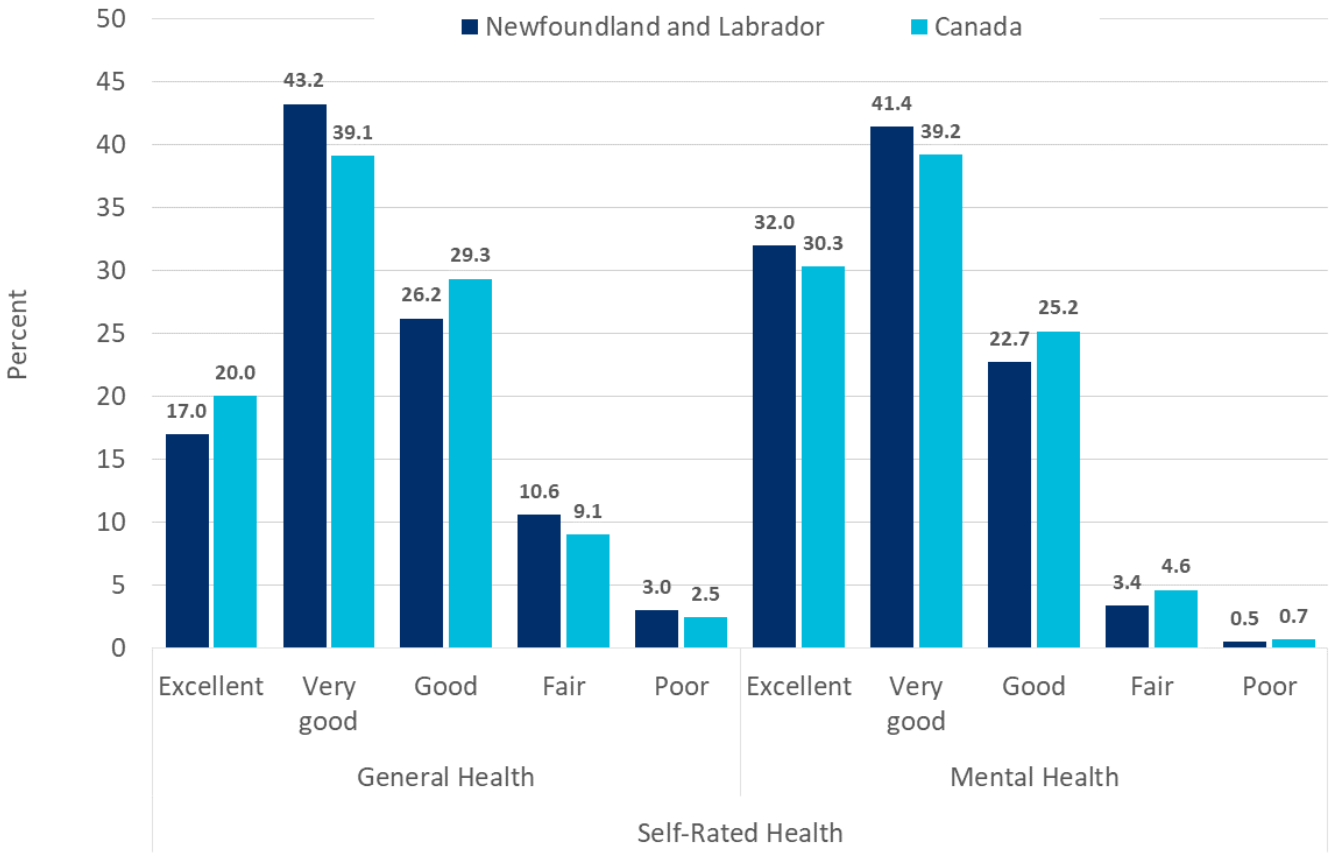


Figure 9. Self-ratings of general and mental health of middle-aged and older adults in Newfoundland and Labrador and Canada.

In terms of health-related behaviours, 14.5% of middle-aged and older adults in Newfoundland and Labrador reported that they did not drink in the last 12 months, whereas 18.8% and 66.7% indicated occasional and regular (at least once per month) drinking, respectively. Similarly, 11.3% of middle-aged and older adults in Canada reported not drinking in the last 12 months, and 14.1% and 74.6% indicated they drank occasionally or regularly, respectively.

Summary

The sociodemographic, lifestyle, and health characteristics of middle-aged and older adults of Newfoundland and Labrador were similar in many ways to the middle-aged and older adults from across Canada. One exception was country of birth, where the proportion of middle-aged and older adults in Newfoundland and Labrador who were born in Canada was higher than the proportion observed for the CLSA participants of the same age from across Canada. These findings are consistent with the most recent national census, which indicates that the population of Newfoundland and Labrador (and the entire Atlantic region) is generally less diverse than other regions in Canada (Statistics Canada, 2017b).

Chapter 4

Incidence of Work-Related Injuries in Newfoundland and Labrador

Chapter 4: Incidence of Work-Related Injuries in Newfoundland and Labrador

We begin this chapter by providing an overview of the labour force participation across the provinces. The remainder of the chapter focuses on the incidence of work-related injuries among middle-aged and older workers in Newfoundland and Labrador and in the other provinces in Canada. In this study, workers with histories of work-related injuries were identified based on their responses to two injury-related questions on the CLSA. Those who reported an activity-limiting injury that was caused by "an accident in their workplace", or reported that they were "working at a job or business including travel to or from work" when injured.

To calculate work-related injury incidence rates, we divided number of people who worked in the last 12 months and reported work-related injuries by the number of people who worked in the last 12 months or recently retired. The estimated incidence rates were reported per 10,000 people working either full-time, part-time, or recently retired.

Middle-Aged and Older Workers in Newfoundland and Labrador

As shown in Figure 10, 49.5% of middle-aged and older adults in Newfoundland and Labrador were working or had recently retired at the time of the CLSA survey. This proportion of middle-aged and older workers is slightly less than the proportions observed in the other Canadian provinces, with Alberta having the largest proportion of CLSA participants who were working or recently retired at the time of the survey.

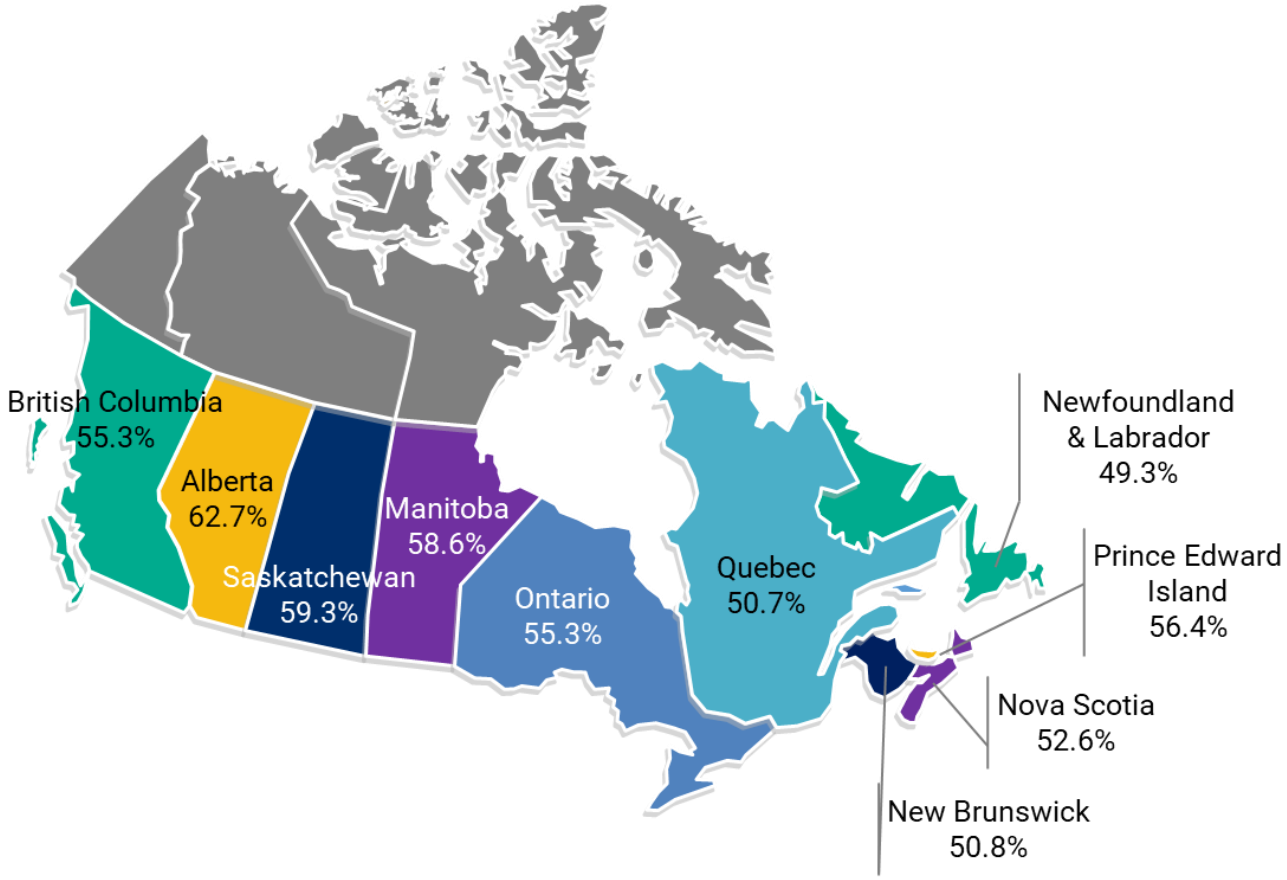


Figure 10. Proportion of middle-aged and older workers working or recently retired in each Canadian province.

Incidence of Work-Related Injuries

The incidence rates of work-related injuries in middle-aged and older workers were the lowest for Newfoundland and Labrador (262 per 10,000) and the highest in British Columbia (498 per 10,000) (Figure 11; see also Table 9 in Appendix C. Incidence of Work-Related Injury in Middle-Aged and Older Workers in the Provinces of Canada). Overall, the incidence of work-related injuries in middle-aged and older workers was estimated to be 361 per 10,000 for Canada.

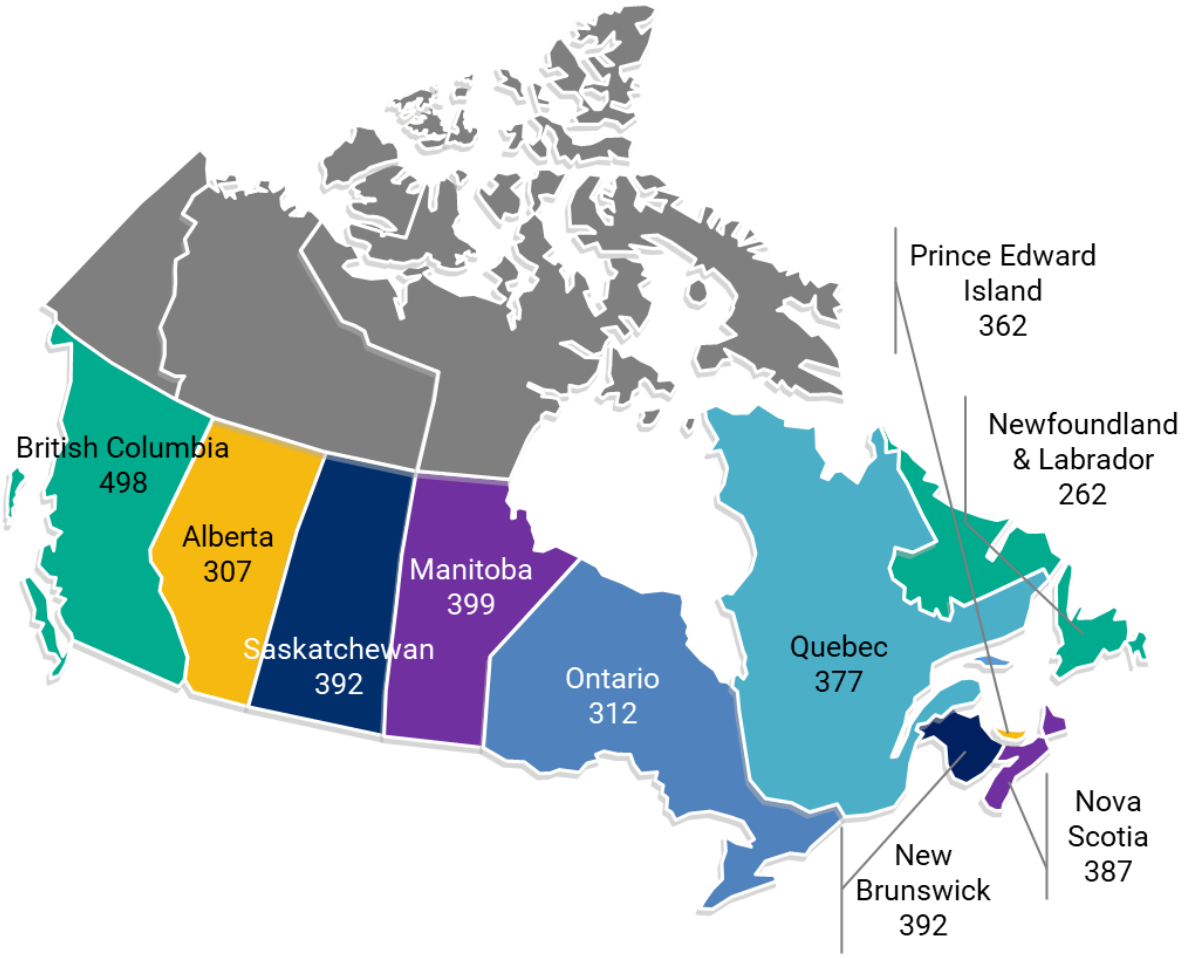


Figure 11. Incidence of work-related injuries per 10,000 middle-aged and older workers by Canadian province.

Injury Type for Newfoundland and Labrador

Most of the work-related injuries reported by middle-aged and older workers in Newfoundland and Labrador were classified as sprains or strains (24.8%). Other work-related injuries were classified as musculoskeletal pulls or tears (includes herniated disc, and torn muscles and tendons) (18.2%) and all other injury types (33.0%).

Occupational Characteristics of Injured Workers in Newfoundland and Labrador

Of the middle-aged and older workers with work-related injuries in Newfoundland and Labrador, the characteristics of their type of work and type of business or industry that they worked in were identified (see Labour Force Participation on p. 19). Nine broad occupational categories were identified: (1) management; (2) business, finance, and administrative; (3)

natural and applied sciences; (4) health; (5) education, law and social, community and government services; (6) art, culture, recreation, and sport; (7) sales and service; (8) trades, transport, and equipment operators; and (9) natural resources, agriculture and production. Percentages are not reported due to small sample sizes in each category.

Location. Of the middle-aged and older workers with injuries, 52% reported occupations characterized by work inside of a building and 48% reported occupations characterized by work outside.

Body position. Of the middle-aged and older workers with injuries, 26% had occupations requiring sitting; 43% had occupations requiring sitting, standing, and/or walking; and 26% had occupations requiring other types of body positions (e.g., bending, stooping, kneeling, crouching).

Type of hazard. Based on the NOC codes (Government of Canada, 2020), the type of hazard associated with the occupation was identified for injured middle-aged and older workers in Newfoundland and Labrador. Due to the small proportion of workers, we present the hazards in order of ***increasing*** proportion among workers: exposure to radiation; flying particles and falling objectives; fire, steam, hot surfaces; dangerous chemical substances; biological agents; electricity; dangerous locations; and equipment, machinery, and tools.

Age and Sex

In terms of age group, we found that the majority of work-related injuries in Newfoundland and Labrador among the middle-aged and older workers occurred among those who were between the ages of 45-54 years (85.9%) than 55-85 years (14.1%) (see Figure 12). A similar pattern was found for other provinces in that larger proportion of those with work-related injuries fall in the younger age group, however, these proportions seem to be smaller than that for Newfoundland and Labrador.

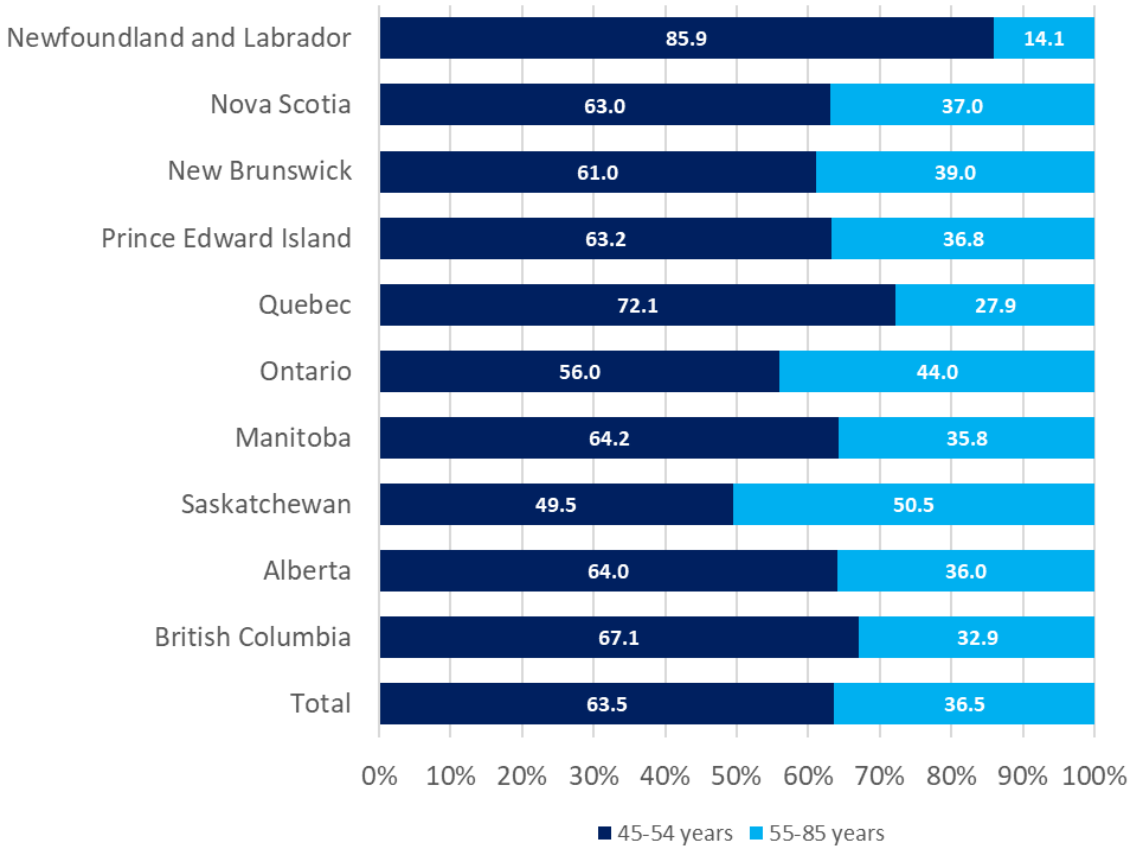


Figure 12. Age distribution of middle-aged and older workers with work-related injuries by Canadian province.

Of those middle-aged and older workers with work-related injuries in Newfoundland and Labrador, 48.1% were female and 51.9% were male (see Figure 13). Similar balanced sex distributions were also observed in New Brunswick, Manitoba, and Saskatchewan. In the provinces of Nova Scotia, Alberta, and British Columbia, the proportion of males with work-related injuries appears to be higher than the proportion of females.

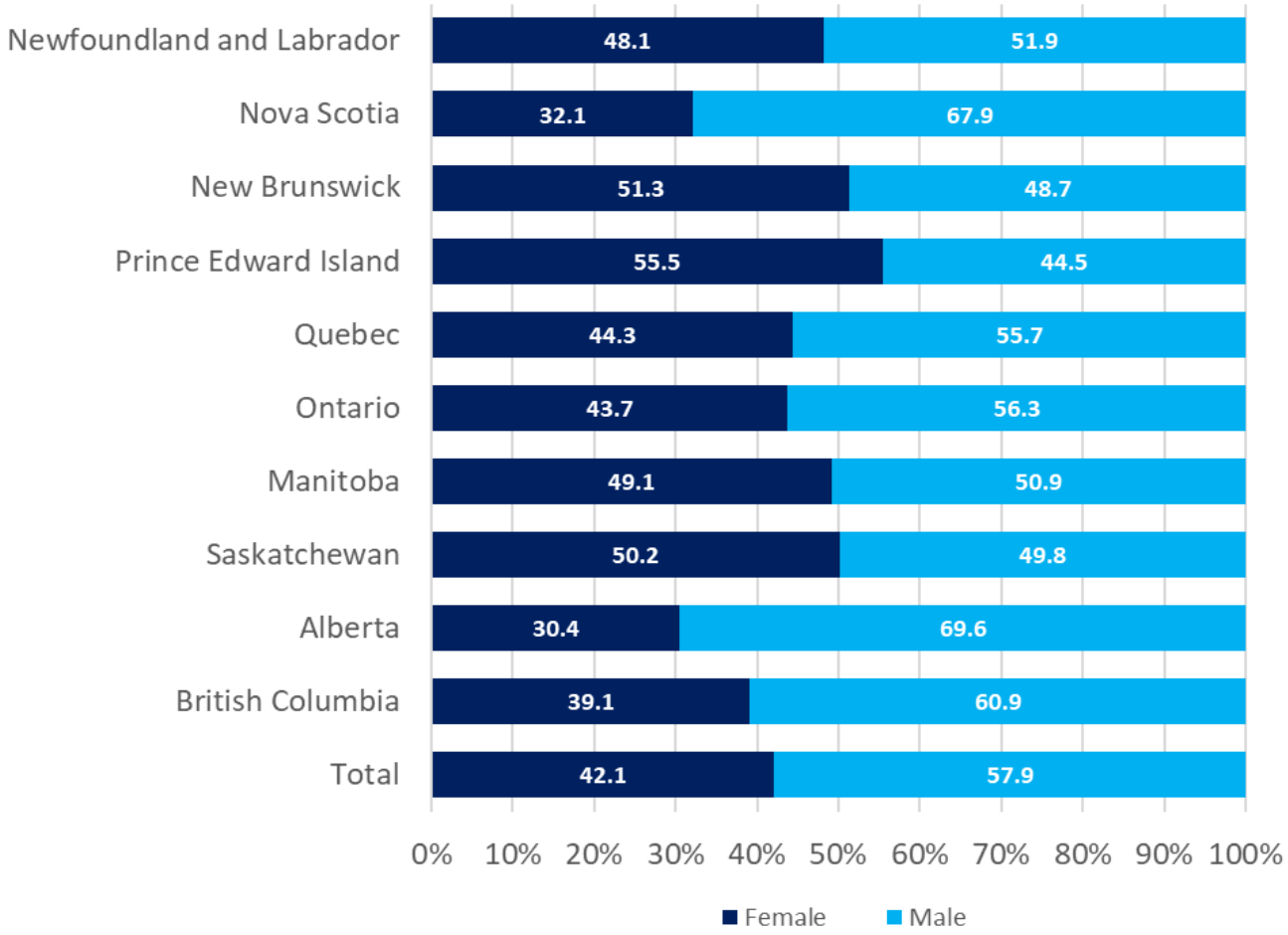


Figure 13. Sex distribution of middle-aged and older workers with work-related injuries by Canadian province.

Income and Education

Of those middle-aged and older workers with work-related injuries in Newfoundland and Labrador, 5.4% reported an annual household income of < $50,000 (see Figure 14). The general pattern across all other provinces is that the proportion of middle-aged and older workers with work-related injuries reporting an annual household income of < $50,000 is greater than 10.9% and less than 25.2%. Of note is the finding that 36.7% of those injured in Nova Scotia reported household incomes of < $50,000.

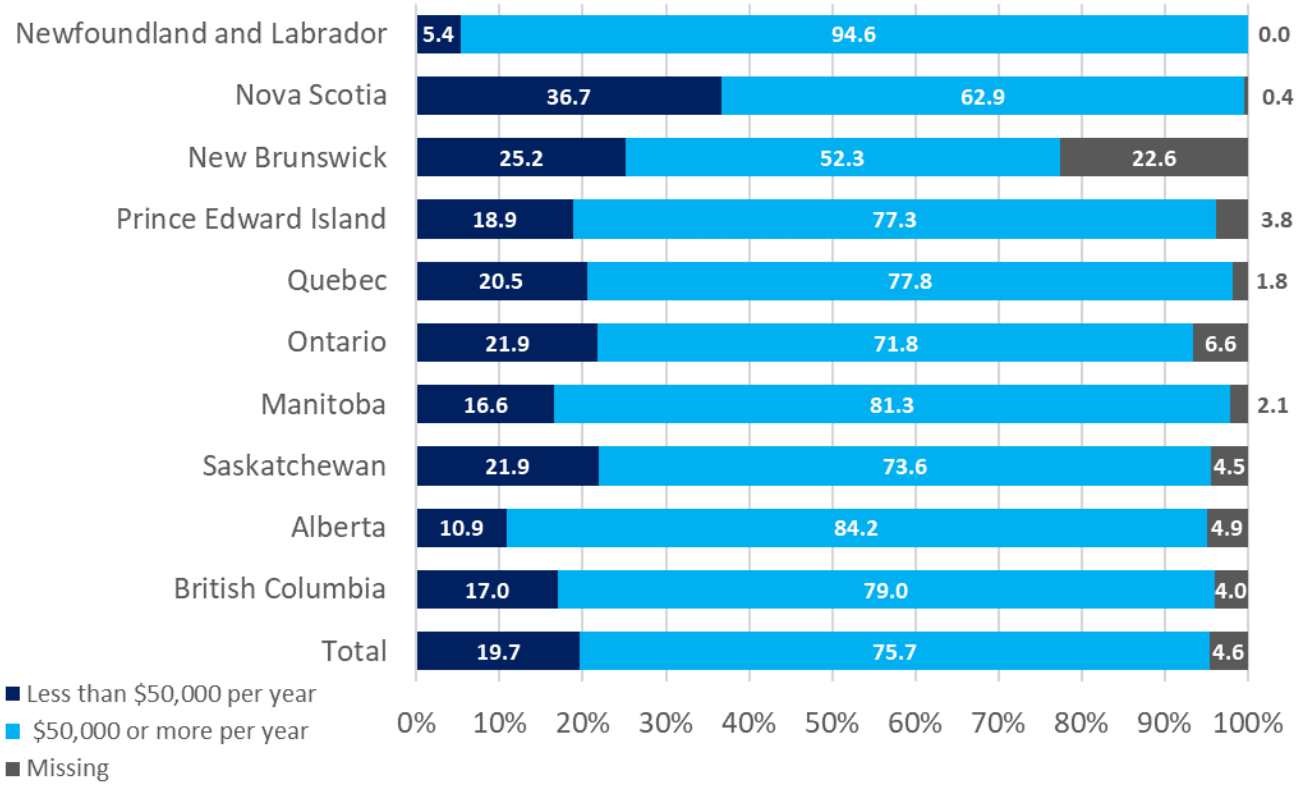


Figure 14. Total household income of middle-aged and older workers with work-related injuries by Canadian province.

Of those middle-aged and older workers with work-related injuries in Newfoundland and Labrador, 56.7% had less than a post-secondary level education, whereas 25.4% had at least some post-secondary education (Figure 15). This pattern of results is fairly consistent across all the Canadian provinces, with the exception of Nova Scotia, where the proportion of those with less than a post-secondary level education is higher than all other provinces.

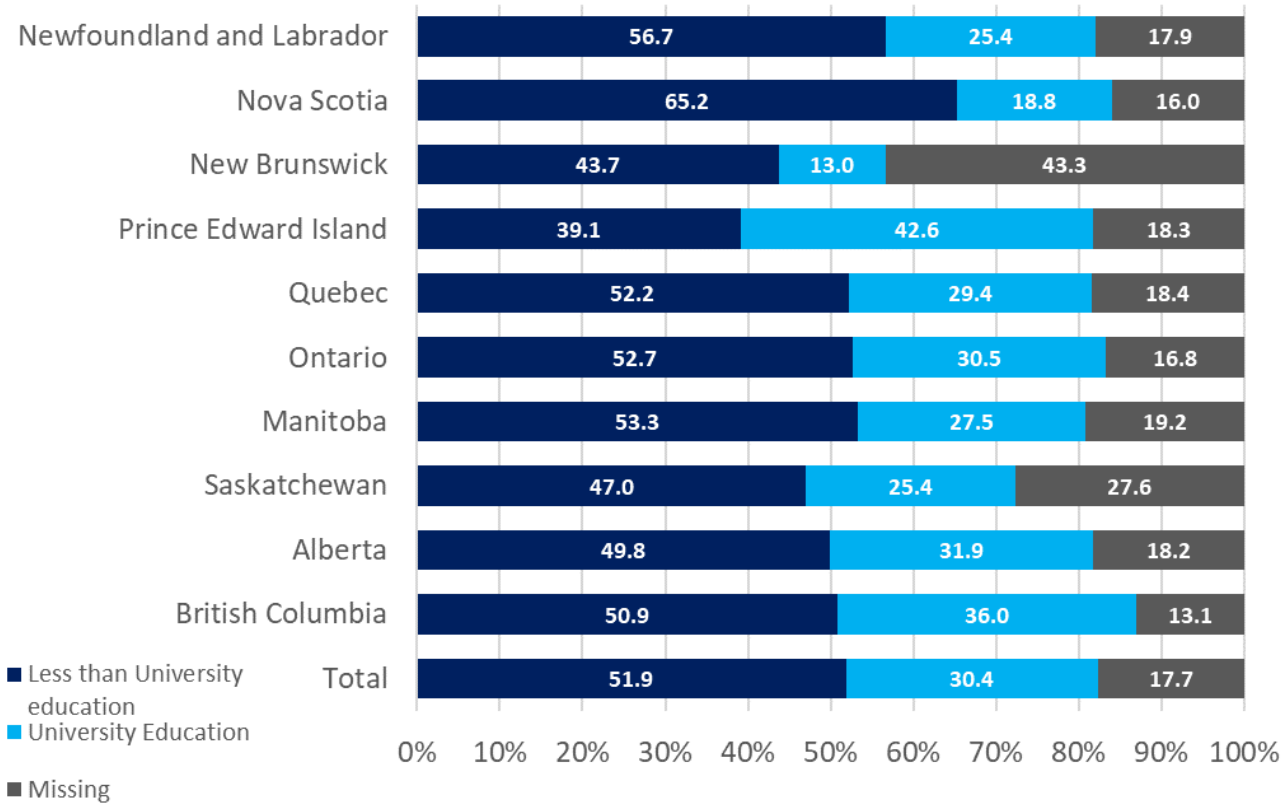


Figure 15. Education distribution of middle-aged and older workers with work-related injuries by Canadian province.

Working Status and Schedule

Of those middle-aged and older workers with work-related injuries in Newfoundland and Labrador, a large proportion (98.5%) were working full time (see Figure 16). In general, of those who are injured across all provinces, a large proportion of workers reported full-time employment status.

In terms of work schedule, similar proportions of middle-aged and older workers with work-related injuries in Newfoundland and Labrador reported working day shifts (43.5%) and night/casual shifts (42.4%) (see Figure 17). This pattern was somewhat different in other Canadian provinces where more of the injured workers were working day shifts.

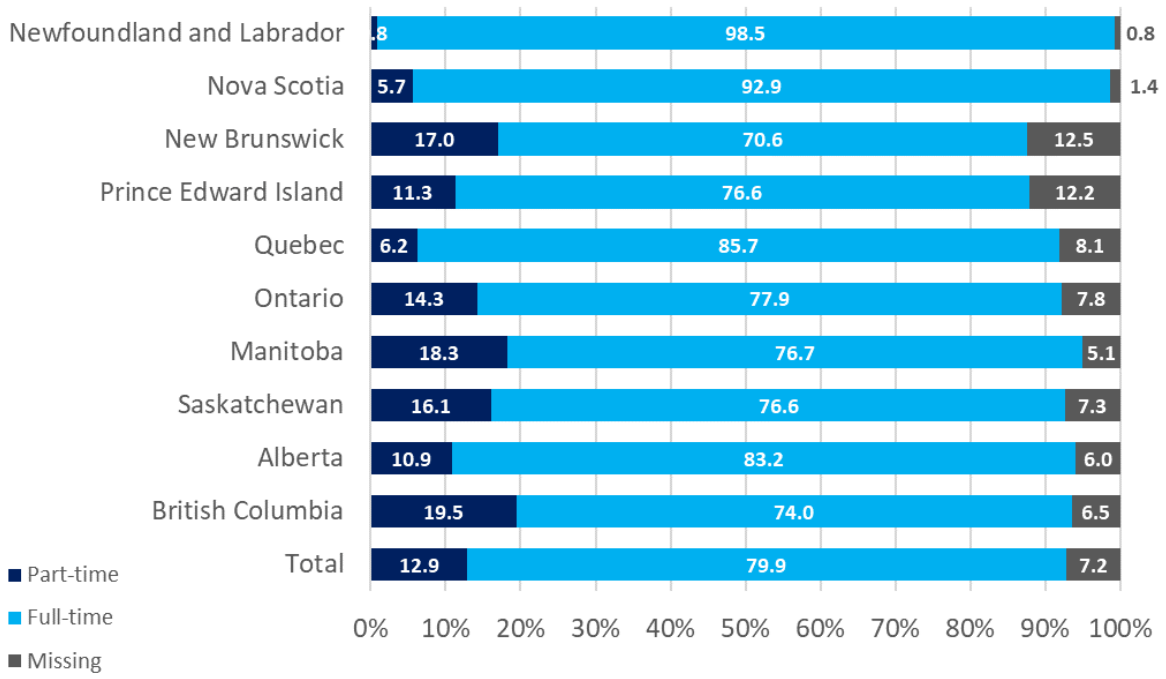


Figure 16. Employment status of middle-aged and older workers with work-related injuries by Canadian province.

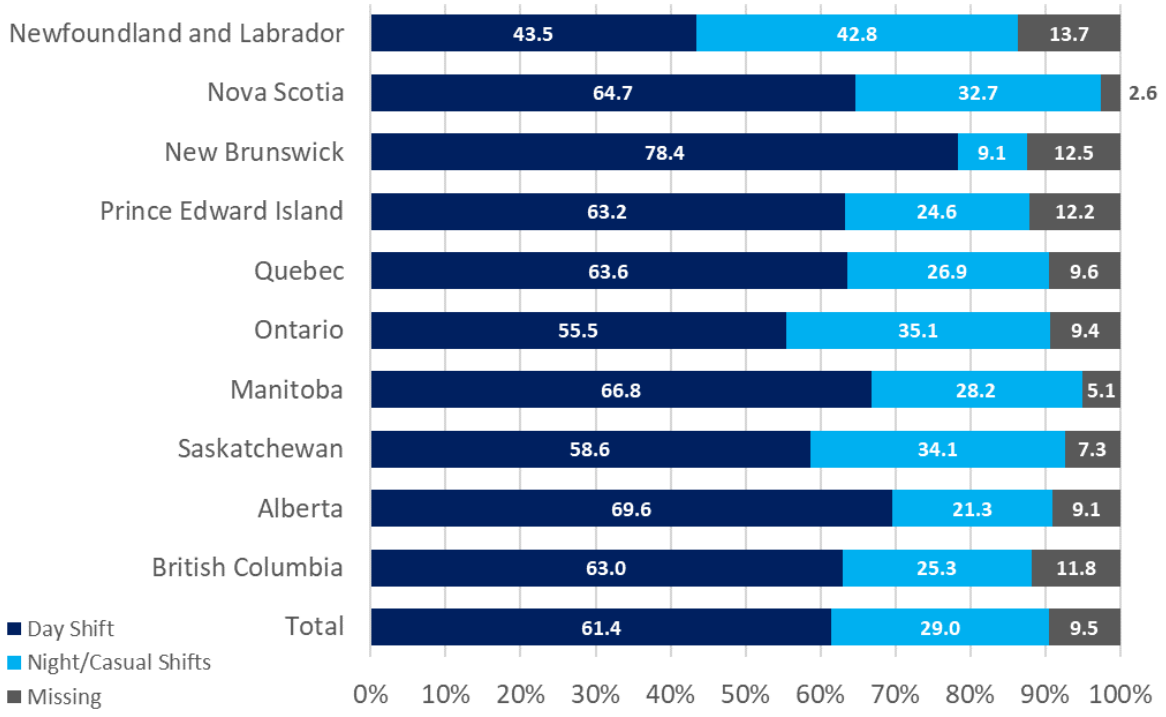


Figure 17. Work schedule of middle-aged and older workers with work-related injuries Canadian province.

Of the middle-aged and older workers with work-related injuries in Newfoundland and Labrador, 13.7% had worked at their current job for less than 5 years (see Figure 18). A similar proportion was observed in the other Canadian provinces, with the exception of New Brunswick and Alberta where the proportions were greater than 29%.

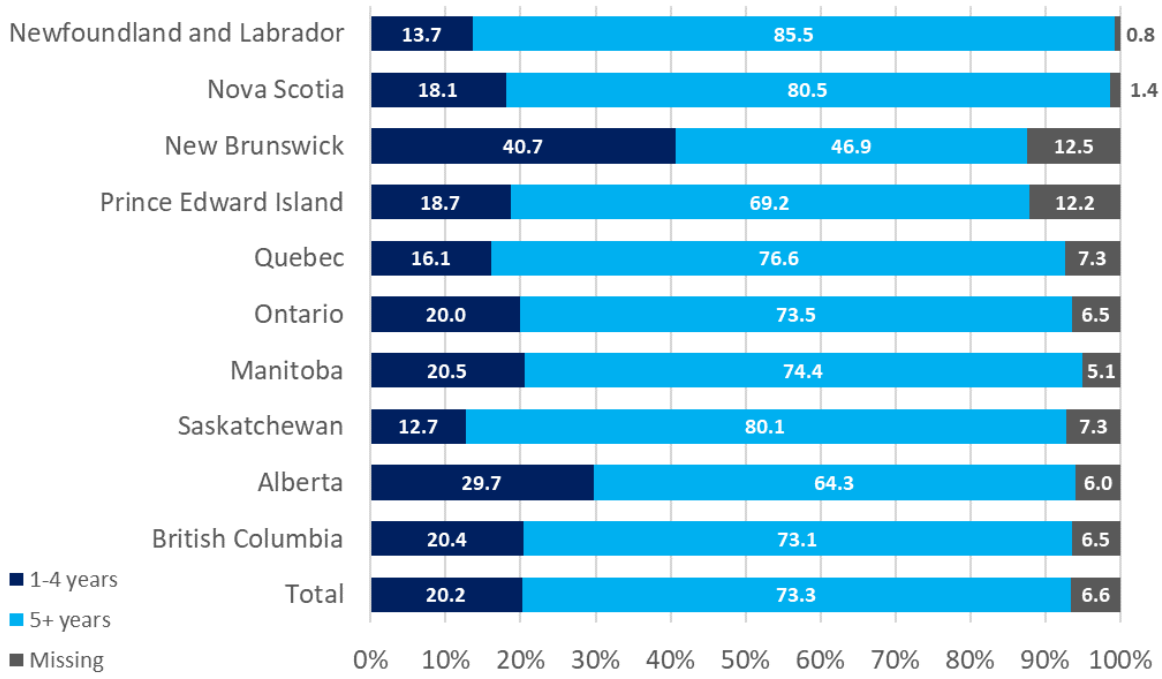


Figure 18. Years worked for middle-aged and older workers with work-related injuries by Canadian province.

Summary

The incidence rate for work-related injuries among middle-aged and older workers in Newfoundland and Labrador is lower compared to other provinces in Canada. The majority of work-related injuries in Newfoundland and Labrador among the middle-aged and older workers experienced by those between the ages of 45-54 years than 55-85 years. There was also a similar balanced sex distribution. As injury incidence rate is an indicator of the safety performance at a place of work, this finding is beneficial for planning future health and safety measures at work, emphasizing the need to engage both male and female workers. This chapter also highlights the provincial differences of demographic factors such as age and gender, socio-economic factors such as income and education and labour force participation

characteristics that are more likely to expose an individual to get injured at work. Although the size of labour force varies from province to province, the factors associated with work-related injuries are similar across Canada.

Chapter 5

Profile of Middle-Aged and Older Workers with Work-Related Injuries in Newfoundland and Labrador

Chapter 5: Profile of Middle-Aged and Older Workers with Work-Related Injuries in Newfoundland and Labrador

In this chapter, we present the provincial profile of work-related injuries among middle-aged and older workers for Newfoundland and Labrador and compare it to that for Canada as a whole. For a comprehensive set of results, please refer to Table 7 for Newfoundland and Labrador and Table 8 for Canada in Appendix B. Profiles of Older Workers with Work-Related Injuries in Newfoundland and Labrador and Canada.

Age and Sex

We found a significant association between work-related injuries and age group in Newfoundland and Labrador [$\chi^2(3) = 11.8$, $p < .001$] (see Figure 19). The proportion of workers aged 45-54 years was greater among those with work-related injuries (85.9%) than among those without injuries (58.2%). A similar pattern was found for Canada as a whole [$\chi^2(3) = 13.4$, $p < .001$], although the age difference was less pronounced (63.5% vs 57.9%). Thus, in relative terms, injury risk is higher for 45-54-year-olds than 55-85-year-olds.

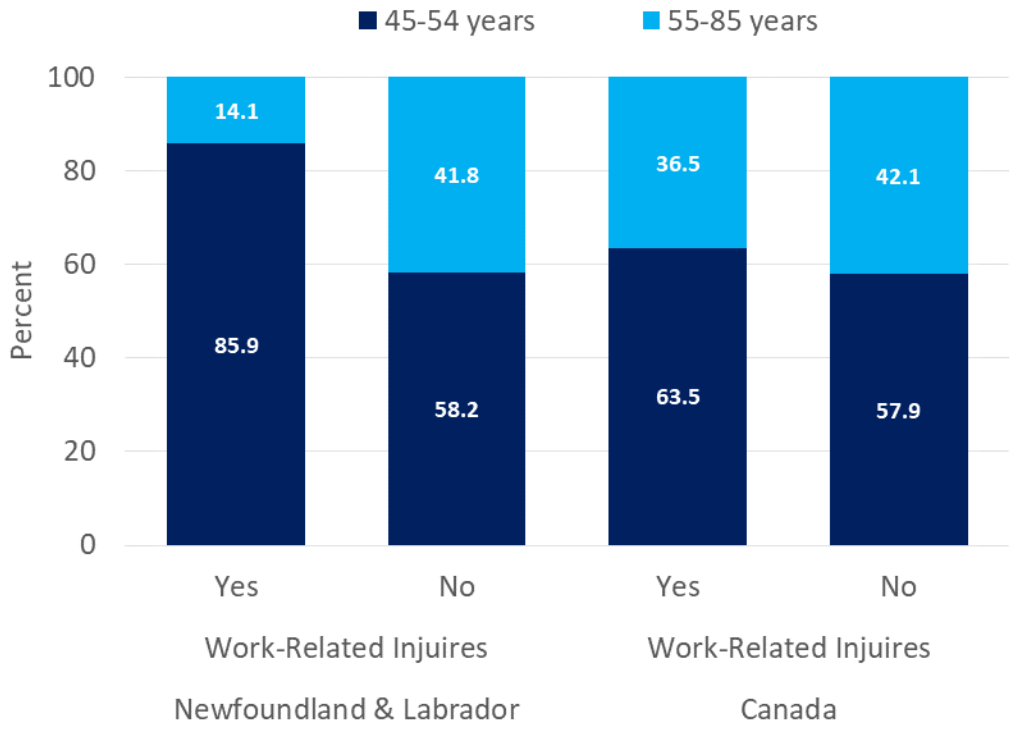


Figure 19. Age distribution by work-related injury of middle-aged and older adults in Newfoundland and Labrador [$\chi^2(3) = 11.8$, $p < .001$] and Canada [$\chi^2(3) = 13.4$, $p < .001$].

We did not find evidence of sex differences in those with and without work-related injuries for Newfoundland and Labrador [$\chi^2(3) = 2.03$, $p > .01$] or Canada [$\chi^2(3) = 3.6$, $p > .01$] (see Table 6 in Appendix A. Profiles of Middle-Aged and Older Adults in Newfoundland and Labrador and Canada).

Marital Status

A small but statistically significant association between marital status and work-related injuries was found for middle-aged and older workers in Canada [$\chi^2(3) = 11.0$, $p < .001$] but not for Newfoundland and Labrador [$\chi^2(3) = 0.0$, $p > .01$] (see Figure 20).

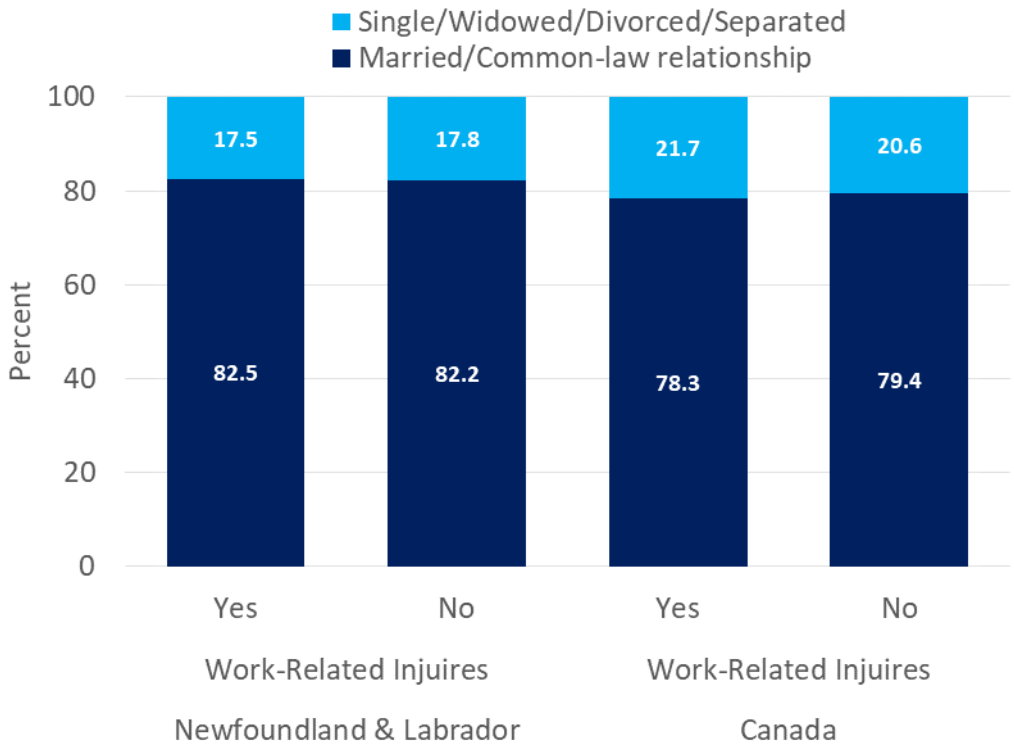


Figure 20. Marital status and work-related injury of middle-aged and older workers in Newfoundland and Labrador [$\chi^2(3) = 0.0$, $p > .01$] and Canada [$\chi^2(3) = 11.0$, $p < .001$].

Income and Education

We found significant associations between work-related injuries of middle-aged and older workers and their total household income [$\chi^2(3) = 19.7$, $p < .0001$] and total person income [$\chi^2(3) = 30.4$, $p < .0001$] for Canada. These associations were not significant for Newfoundland and Labrador [$\chi^2(3) = 0.3$, $p > .01$; $\chi^2(3) = 0.0$, $p > .01$, respectively] (see Figure 21 and Figure 22).

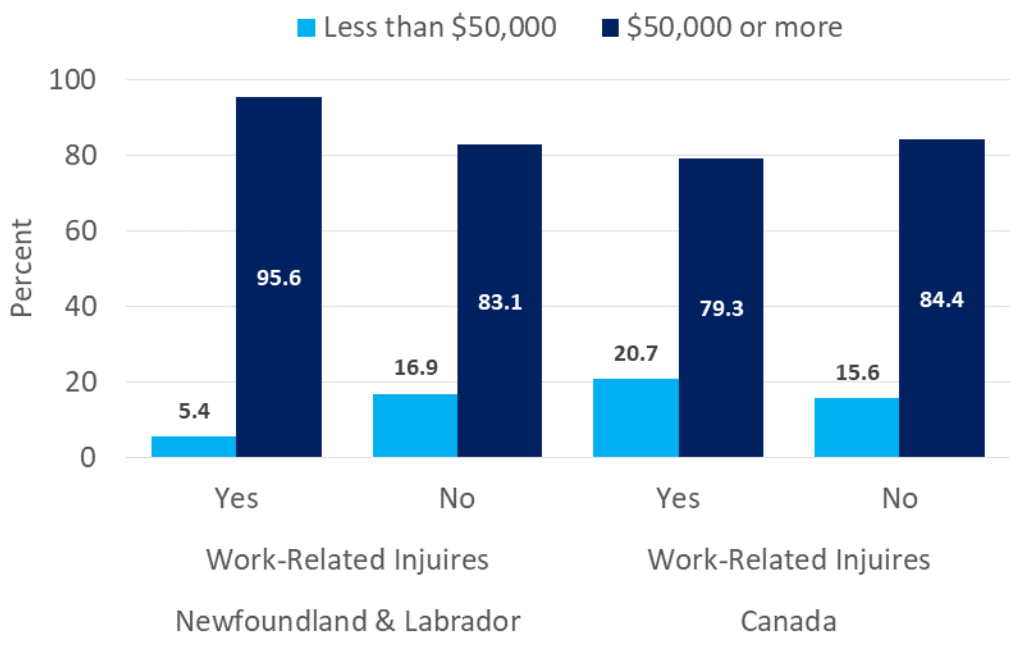


Figure 21. Significant association between total household income and work-related injuries of middle-aged and older workers in Canada [$\chi^2(3) = 19.7, p < .0001$] but not in Newfoundland and Labrador [$\chi^2(3) = 0.3, p > .01$].

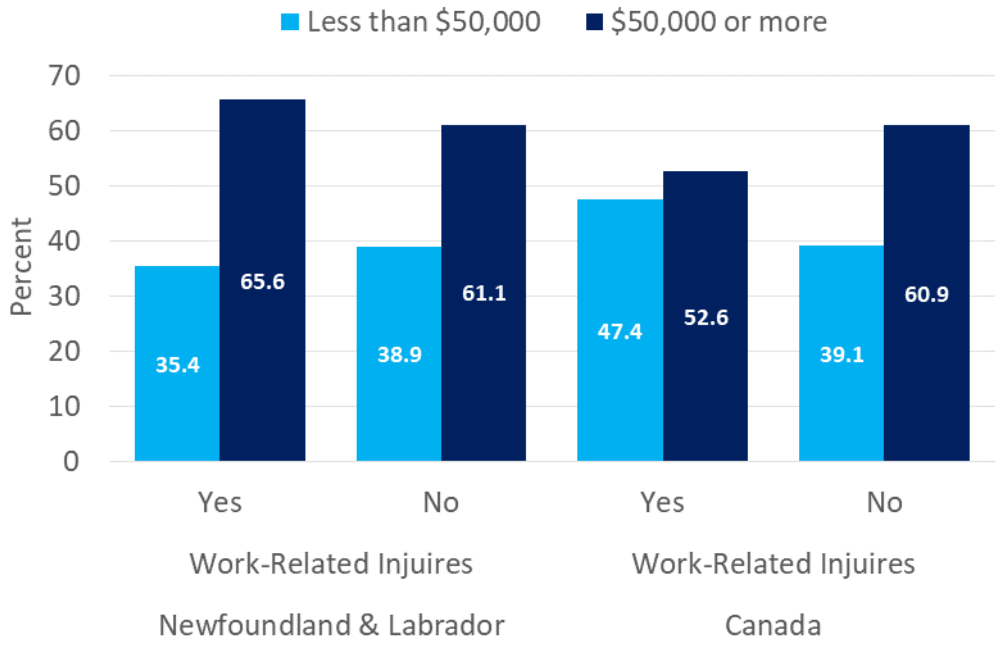


Figure 22. Significant association between total personal income and work-related injuries of middle-aged and older workers in Canada [$\chi^2(3) = 30.4, p < .0001$], but not in Newfoundland and Labrador [$\chi^2(3) = 0.0, p > .01$].

A significant association between education and work-related injuries of middle-aged and older workers was found for Canada [$\chi^2(3) = 6.8$, $p < .01$] but not for Newfoundland and Labrador [$\chi^2(3) = 2.4$, $p > .01$] (see Figure 23).

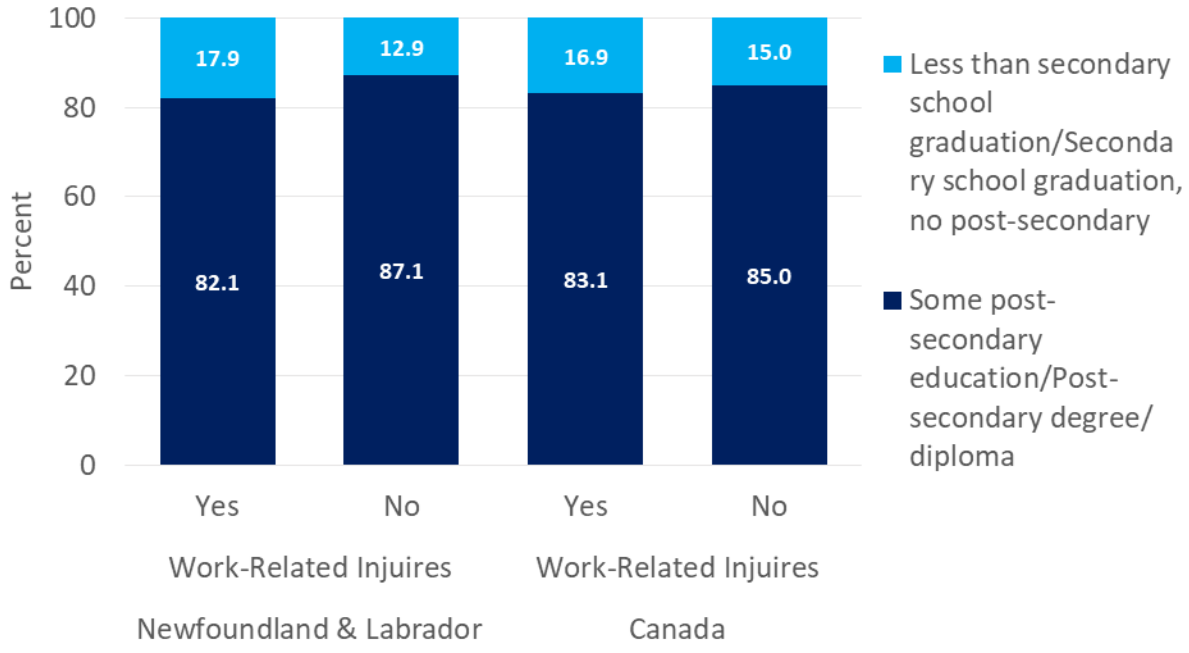


Figure 23. Significant association between education and work-related injuries of middle-aged and older workers in Canada [$\chi^2(3) = 6.8$, $p < .01$] but not in Newfoundland and Labrador [$\chi^2(3) = 2.4$, $p > .01$].

Working Status and Schedule

We found significant associations between work-related injuries of middle-aged and older workers and their current work schedule in Newfoundland and Labrador [$\chi^2(3) = 6.7$, $p < .01$] and Canada [$\chi^2(3) = 43.5$, $p < .0001$] (see Figure 24). Middle-aged and older workers with work-related injuries were more likely to be working schedules other than daytime hours.

A significant association between work-related injuries and current employment status was also observed for middle-aged and older workers in Newfoundland and Labrador [$\chi^2(3) = 5.2$, $p < .01$] and Canada [$\chi^2(3) = 7.1$, $p < .01$] (see Figure 25). The proportion of middle-aged and older workers employed 30+ hours per week was higher among those with work-related injuries (99.2%) than among those who did not have an injury (89.9%).

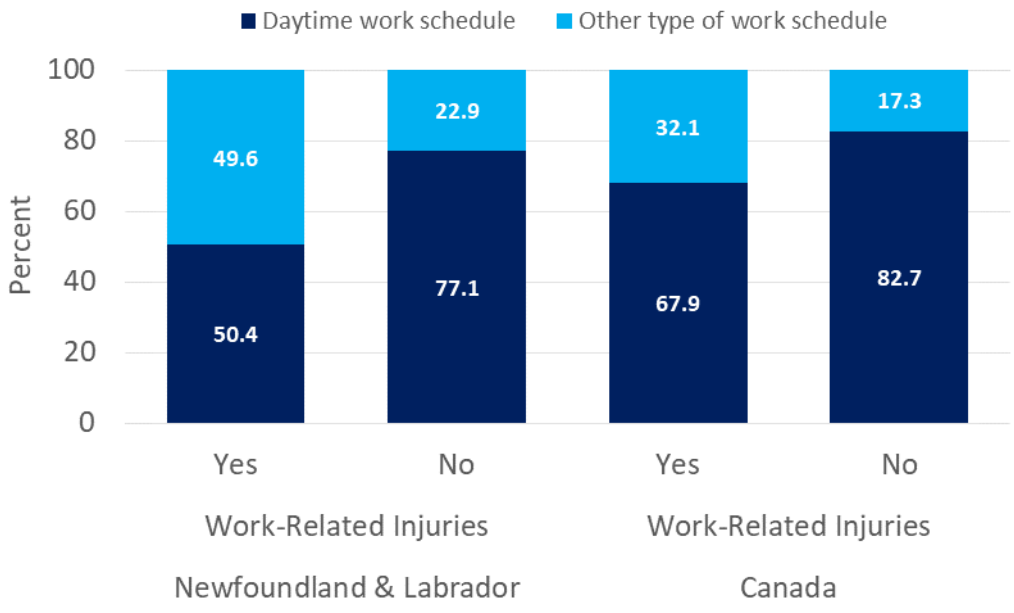


Figure 24. Significant associations between current work schedule and work-related injuries in middle-aged and older workers in Newfoundland and Labrador [$\chi^2(3) = 5.2, p < .01$] and Canada [$\chi^2(3) = 43.5, p < .0001$].

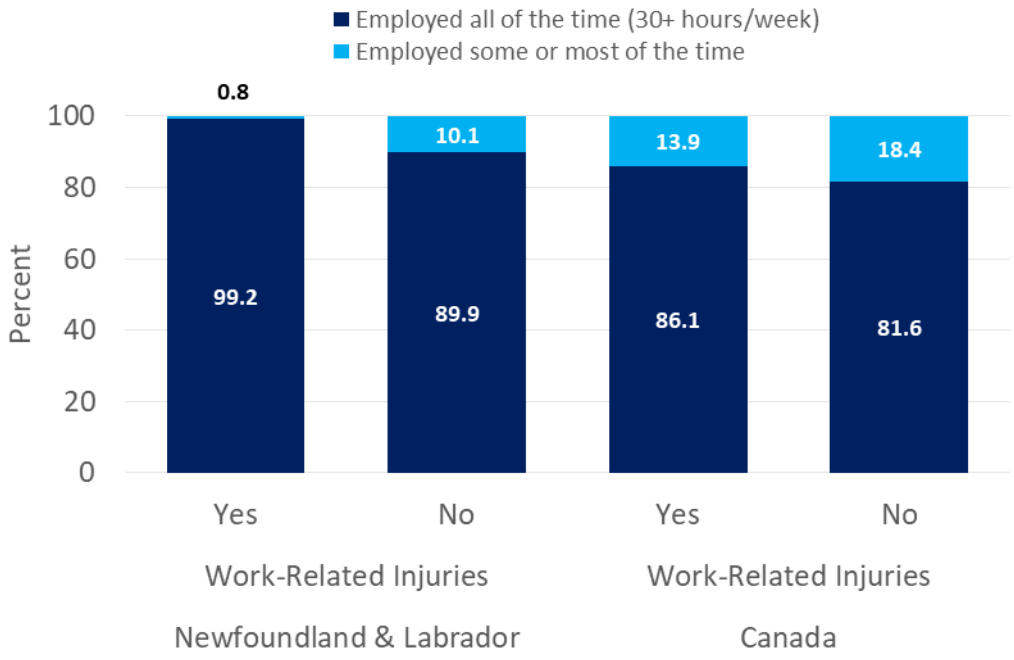


Figure 25. Significant associations between current employment status and work-related injuries in middle-aged and older workers in Newfoundland and Labrador [$\chi^2(3) = 5.2, p < .01$] and Canada [$\chi^2(3) = 7.1, p < .01$].

Together, these results suggest strongly that irregular work schedules with more hours worked in any given week are important factors associated with work-related injuries for middle-aged and older workers. We explore this further in Chapter 6: Predictors of Work-Related Injuries in Newfoundland and Labrador.

Health Measures

Mental Health

Compared to those without work-related injuries, a greater proportion of CLSA participants in Newfoundland and Labrador who reported work-related injuries rated their mental health as fair/poor (5.7%) than did those without injuries (3.1%) [$\chi^2(3) = 4.4$, $p < .01$]. This association was not apparent for Canada as a whole [$\chi^2(3) = 5.2$, $p > .01$] (see Figure 26).

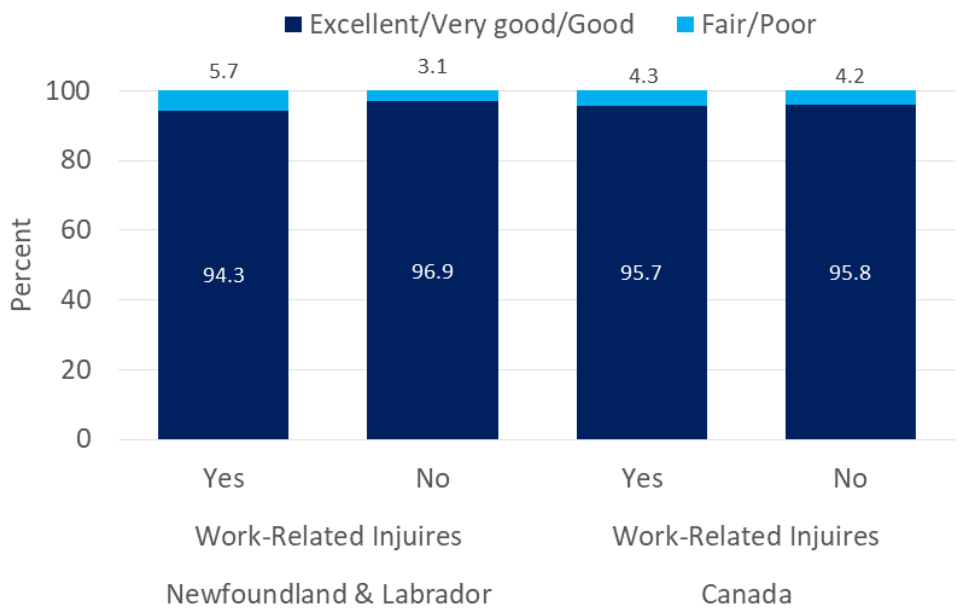


Figure 26. Perceived mental health of middle-aged and older workers with work-related injuries in Newfoundland and Labrador [$\chi^2(3) = 4.4$, $p < .01$] and Canada [$\chi^2(3) = 5.2$, $p > .01$].

Although the result for Canada in terms of perceived mental health was non-significant, there was a significant association between work-related injuries and the presence of anxiety [$\chi^2(3) = 7.8$, $p < .01$] or mood disorder [$\chi^2(3) = 19.2$, $p < .0001$] (see Figure 27 and Figure 28). This was not the case for Newfoundland and Labrador [Anxiety: $\chi^2(3) = 2.3$, $p > .01$; Mood disorder: $\chi^2(3) = 1.8$, $p > .01$].

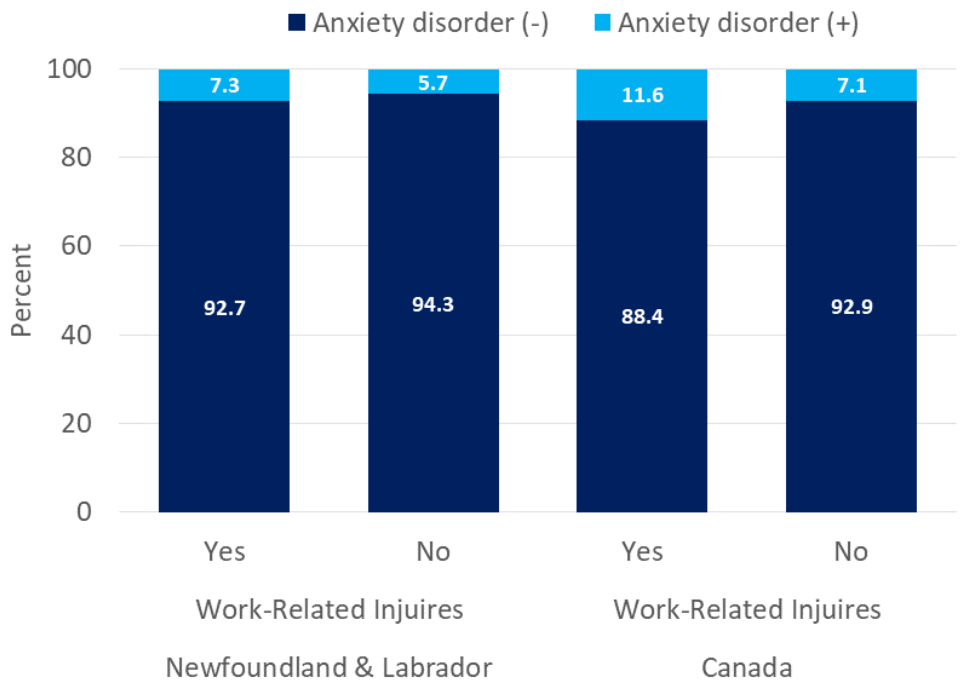


Figure 27. Significant association between anxiety and work-related Injuries in Canada [$\chi^2(3) = 7.8, p < .01$] but not in Newfoundland and Labrador [$\chi^2(3) = 2.3, p > .01$].

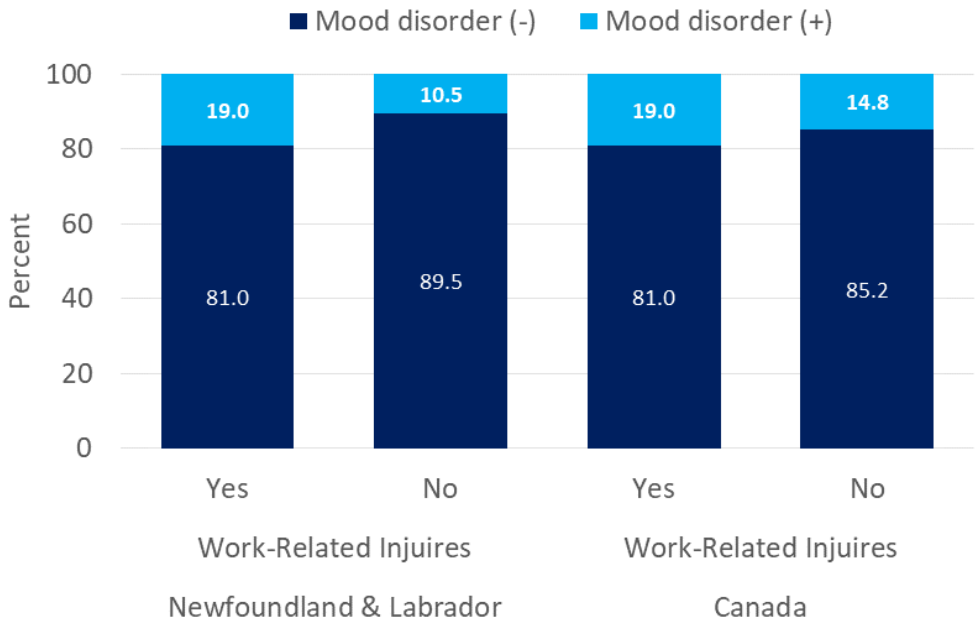


Figure 28. Significant association between mood disorder and work-related injuries in Canada [$\chi^2(3) = 19.2, p < .0001$] but not for Newfoundland and Labrador [$\chi^2(3) = 1.8, p > .01$].

The *Center for Epidemiological Studies Depression Scale (CESD-10)* (Andresen et al., 1994) and a cut-score ≥ 10 was used to indicate a positive screen for depressive symptoms among the CLSA participants. Only the results from Canada indicated an association between symptoms of depression and work-related injuries in middle-aged and older adults [$\chi^2(3) = 23.1$, $p < .0001$] (see Figure 29).

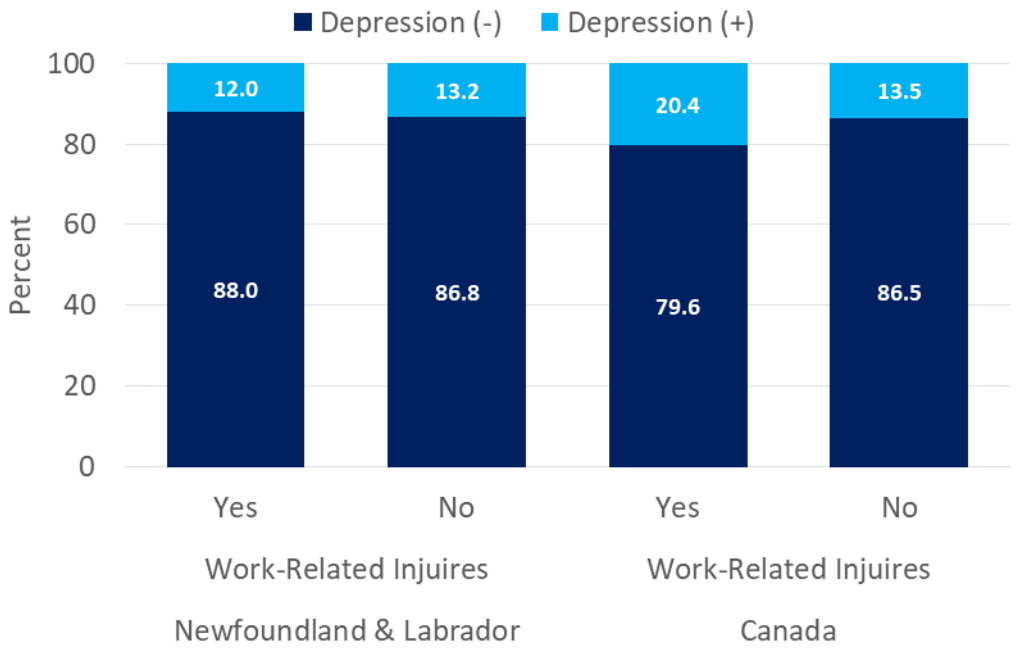


Figure 29. Significant association between depression and work-related injuries in middle-aged and older workers in Canada [$\chi^2(3) = 23.1$, $p < .0001$] but not in Newfoundland and Labrador [$\chi^2(3) = 2.1$, $p > .01$].

Post-Traumatic Stress Disorder (PTSD)

Survey participants were asked to respond to a series of four questions related to PTSD, which were based on the Primary Care Posttraumatic Stress Disorder (PC-PTSD) screening instrument (Prins et al., 2003). A response of 'yes' on any question was an indication of PTSD symptomology (for a description, see Posttraumatic Stress Disorder (PTSD) on p. 23). Middle-aged and older workers with work-related injuries were significantly more likely to report symptoms associated with PTSD for Canada [$\chi^2(3) = 6.5$, $p < .01$] but not for Newfoundland and Labrador [$\chi^2(3) = 0.0$, $p > .01$] (see Figure 30).

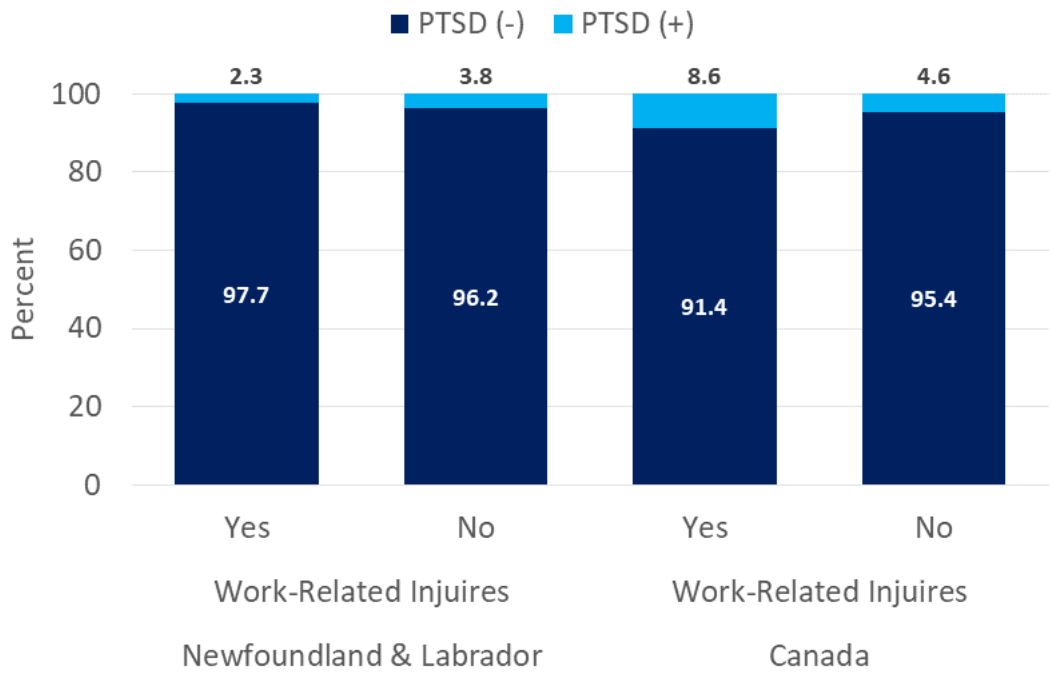


Figure 30. Significant association between the Indication of Post-Traumatic Stress Disorder (PTSD) in middle-aged and older workers with work-related injuries in Canada [$\chi^2(3) = 6.5$, p < .01] but not in Newfoundland and Labrador [$\chi^2(3) = 0.0$, p > .01].

Self-rated General Health and Healthy Aging

The association between self-rated general health and work-related injuries was significant for middle-aged and older workers across Canada [$\chi^2(3) = 16.9$, $p < .0001$] but not for Newfoundland and Labrador [$\chi^2(3) = 0.0$, $p > .01$] (see Figure 31). As can be seen in Figure 31, the proportion of individuals who reported their physical health as fair/poor was higher among those with work-related injuries (12.5%) rated their compared to those without work-related injuries (7.2%). Similarly, the association between self-rated healthy aging and work-related injuries was significant for middle-aged and older workers across Canada [$\chi^2(3) = 23.2$, $p <$ .0001] but not for Newfoundland and Labrador [$\chi^2(3) = 0.0$, $p > .01$] (see Figure 32).

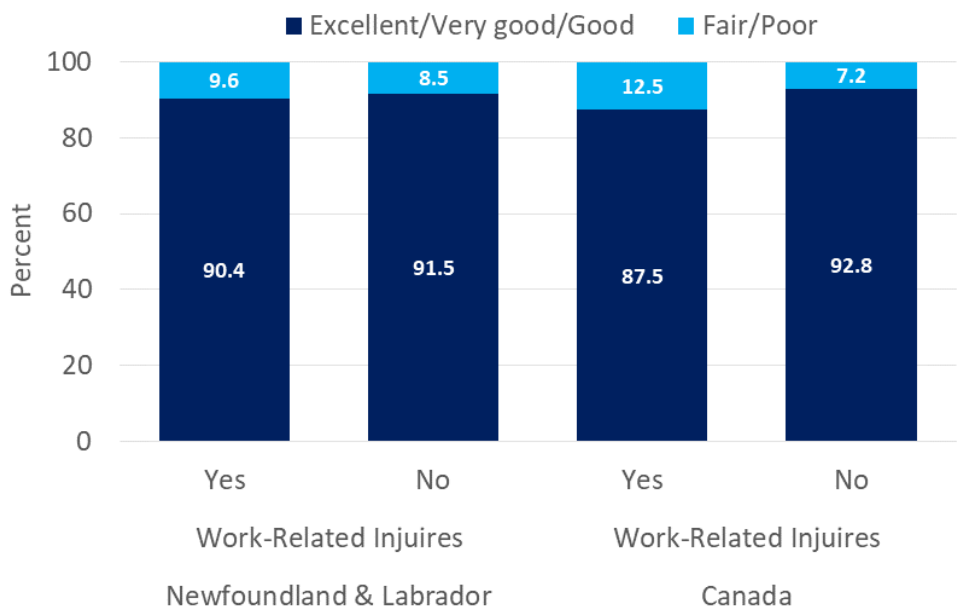


Figure 31. Significant association between self-rated general health of middle-aged and older workers and work-related injuries in Canada [$\chi^2(3) = 23.2$, $p < .0001$] but not for Newfoundland and Labrador [$\chi^2(3) = 0.0$, $p > .01$].

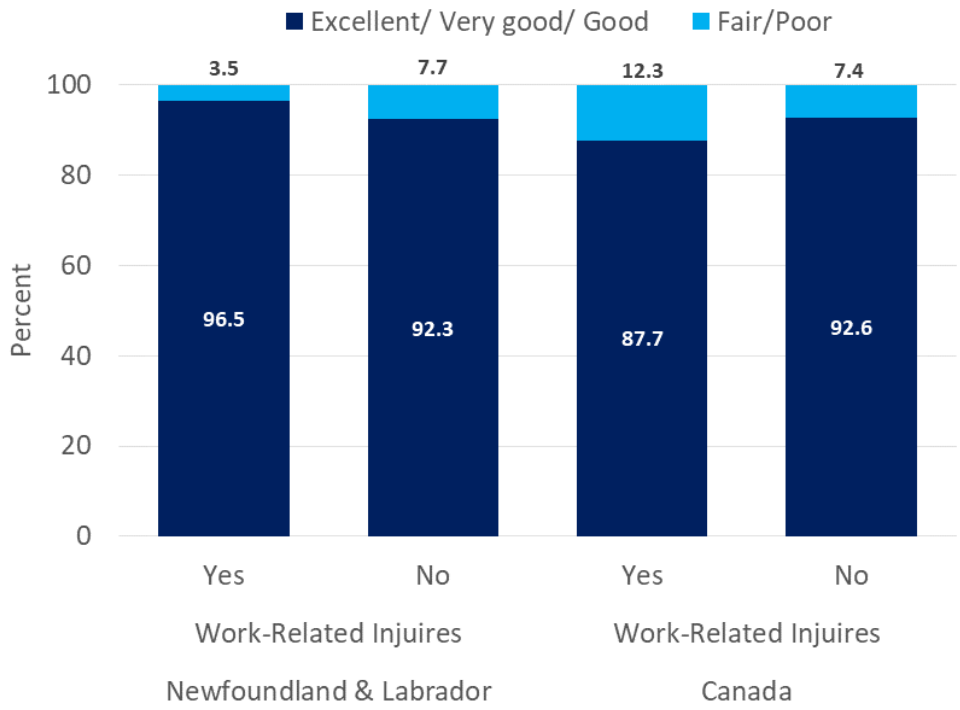


Figure 32. Significant association between self-rated healthy aging and work-related injuries for middle-aged and older workers in Canada [$\chi^2(3) = 23.2$, $p < .0001$] but not for Newfoundland and Labrador [$\chi^2(3) = 0.0$, $p > .01$].

Vision and Hearing

Among the CLSA participants, a greater proportion of the middle-aged and older workers who experienced work-related injuries compared to those who did not reported their eye-sight to be fair, poor, or non-existent in Newfoundland and Labrador [10.4% vs 5.1%; $\chi^2(3) = 9.4$, $p < .001$] and Canada [10.8% vs 6.4%; $\chi^2(3) = 16.9$, $p < .0001$] (see Figure 33).

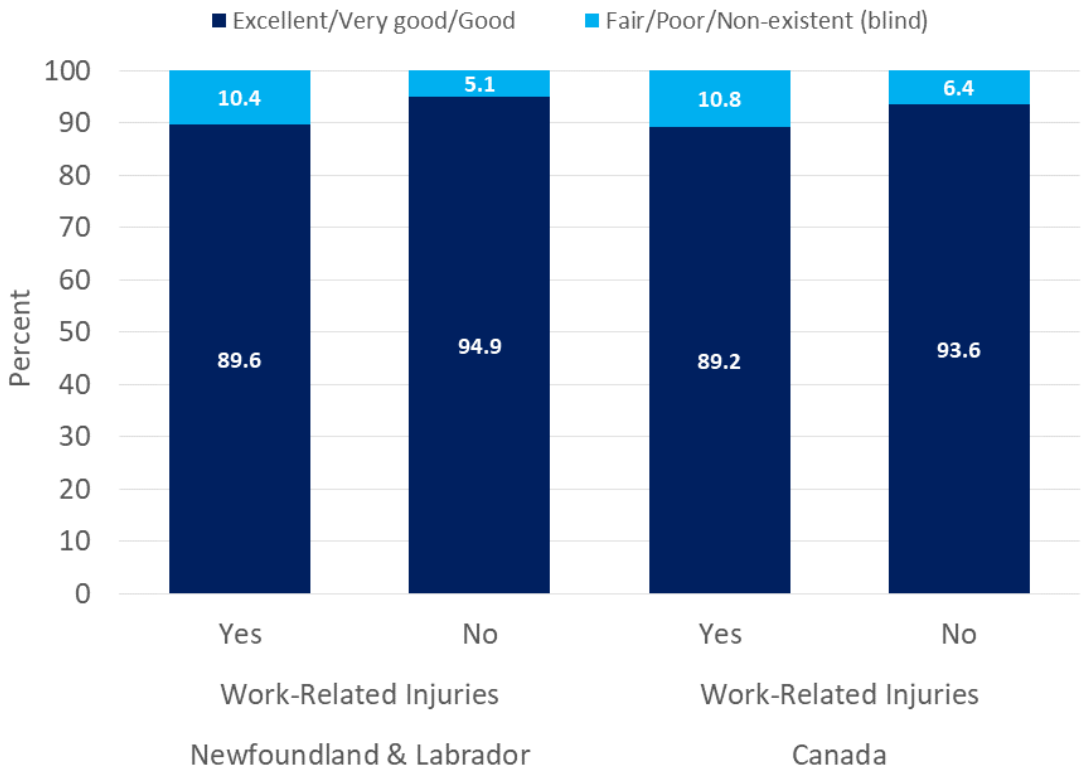


Figure 33. Significant associations between vision status and work-related injuries of middle-aged and older workers in Newfoundland and Labrador [$\chi^2(3) = 9.4$, $p < .001$] and Canada [$\chi^2(3) = 16.9$, $p < .0001$].

We did not find an association between hearing and work-related injuries in middle-aged and older workers in Newfoundland and Labrador [$\chi^2(3) = 0.7$, $p > .01$] and Canada [$\chi^2(3) = 0.6$, $p > .01$].

Health-Related Behaviours

The proportion of smokers (daily or occasional smokers), relative to non-smokers (former daily smokers, occasional smokers, and those who had never smoked) was higher among those who reported work-related injuries than among those without injuries in Newfoundland and

Labrador (19.0% vs 11.7%) [$\chi^2(3) = 4.9$, $p < .01$] and Canada (15.7% vs 10%) [$\chi^2(3) = 26.6$, $p < .0001$] (see Figure 34). No association between drinking behaviour and work-related injuries was observed for Newfoundland and Labrador [$\chi^2(3) = 0.1$, $p > .01$] or Canada [χ^2 (3) = 3.9, $p > .01$].

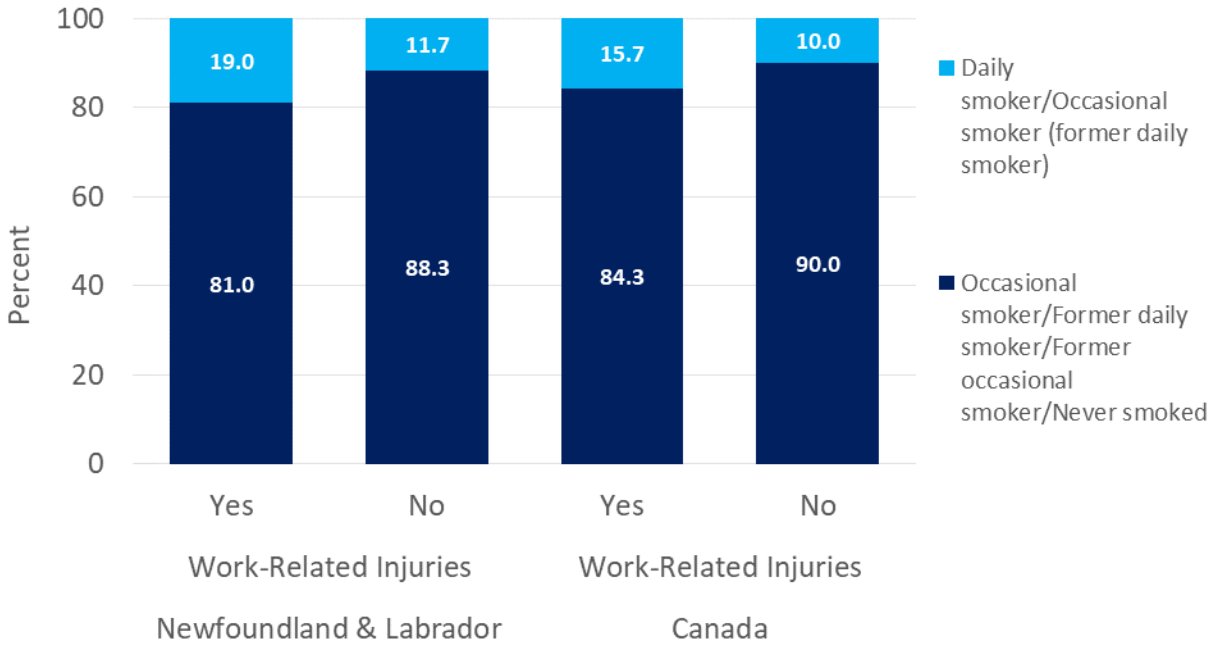


Figure 34. Significant associations between smoking behaviour and work-related injuries of middle-aged and older workers in Newfoundland and Labrador [$\chi^2(3) = 4.9$, $p < .01$] and Canada [$\chi^2(3) = 26.6$, $p < .0001$].

Summary

Several sociodemographic, physical and health factors, and health-related behaviours were significantly associated with work-related injuries among middle-aged and older workers in Newfoundland and Labrador and those in Canada. Although the patterns were found to be quite similar in terms of direction of association, the magnitude of association and levels of significance for some variables were different among workers from Newfoundland and Labrador than those observed from across Canada. These differences may be attributable, at least in part, to differences in sample sizes.

In Newfoundland and Labrador, work-related injuries were associated with younger age (45-54 years old); not having a day-time work schedule; working more hours (rather than part-time); rating mental health as fair or poor; having vision problems; and smoking.

Across Canada, work-related injuries were associated with younger age; being single/widowed/divorced; having a lower household or personal income and education level; not having a day-time work schedule; working more hours (rather than part-time); anxiety and mood disorder; PTSD; depressive symptoms; rating physical health and healthy aging as fair or poor; and vision problems.

Findings presented in this chapter fill in an existing knowledge gap, and provide information on the demographic, socio-economic and health-related characteristics that are associated with work-related injuries among middle-aged and older workers in Newfoundland and Labrador and Canada. The modifiable characteristics can be the target of injury prevention and safety promotion programs. For example, vision problems can be determined through regular annual vision tests and corrections must be followed-up. Employers must also pay particular attention to the signs and symptoms of depression and other mental health problems and include mental health assessment in regular check-ups for their employees.

Chapter 6

Predictors of Work-Related Injuries in Canada and Newfoundland and Labrador

Chapter 6: Predictors of Work-Related Injuries in Newfoundland and Labrador

The focus of this chapter is to identify risk factors of work-related injuries among older workers. In doing do, we build on the bivariate analyses presented in Chapter 5, which informed the selection of variables used for conducting multivariate logistic regression. The significant variables from the bivariate analyses were entered into a multivariate logistic regression model to see what variables predict work-related injuries. Adjusted odd ratios (AOR) and their 99% CIs were used to identify significant predictors of work-related injuries among middle-aged and older workers in Canada. Due to low sample size, adjusted odd ratios (AOR) and their 95% CIs were used to identify significant predictors of work-related injuries among middle-aged and older workers in Newfoundland and Labrador.

Factors Associated with Work-related Injury in Newfoundland and Labrador

Our analysis of the data from Newfoundland and Labrador showed that the odds of middle-aged and older workers having a work-related injury was significantly associated with being younger (age 45-54 years vs. 55-85 years) [AOR = 2.68; $p < .05$], working non-regular hours [AOR = 2.53; $p < .05$] and smoking [AOR = 2.21; $p < .05$] (see Table 1).

Table 1. Predictors of Work-Related Injuries in Newfoundland and Labrador Using Data from the Canadian Longitudinal Study on Aging (CLSA)

Effect	Odds Ratio Estimate	95% CI	
Age (years)			
45-54 years	2.676*	1.227	5.834
Sex			
Male	0.676	.342	1.335
Current work schedule			
Evening/night/rotating shift, seasonal, on call, or casual but called as need arises	2.534*	1.219	5.269
Type of Smoker			
Daily smoker/Occasional smoker (former daily smoker)	2.212*	1.000	5.019

Notes:

Work-related injuries studied among those who were employed

CI = confidence interval; *$p < .05$

Reference categories: Participants aged 55-85 years; Males; Non DCS; Working daytime schedule or shift; Occasional smoker/Former daily smoker/Former occasional smoker/Never smoked

Factors Associated with Work-related Injury in Canada

The odds of a work-related injury for middle-aged and older Canadians as a whole was significantly associated with being male [AOR = 1.261, $p < .01$], being single, divorced, or separated [AOR = 1.23, $p < .01$], having lower personal income [AOR = 1.65, $p < .01$], working non-regular schedules [AOR = 1.71, $p < .01$], working full-time [AOR = 1.81, $p < .01$], having a mood disorder [AOR = 1.37, $p < .01$], having vision problems [AOR = 1.54, $p < .01$], and being a smoker [AOR = 1.47, $p < .01$] (see Table 2).

Table 2. Predictors of Work-Related Injuries in Canada Using Data from the Canadian Longitudinal Study on Aging (CLSA)

Predictor	Odds Ratio Estimate	99% CI	
Socio-demographic characteristics			
Age (years)			
45-54 years	1.141	0.919	1.417
Sex			
Male	1.261*	1.001	1.590
Province			
Alberta	1.208	0.672	2.170
Saskatchewan	1.126	0.553	2.292
British Columbia	1.721*	1.032	2.868
Manitoba	1.451	0.842	2.501
New Brunswick	0.959	0.434	2.120
Nova Scotia	1.130	0.637	2.006
Ontario	0.711	0.420	1.203
Prince Edward Island	0.971	0.429	2.201
Quebec	1.165	0.696	1.951
Marital Status			
Single, never married, or never lived with a partner/Widowed/ Divorced/Separated	1.225*	1.000	1.561
Total personal income			
Less than $50,000	1.652*	1.277	2.138
Missing/Don't know/Not answered/Refused	1.308	0.671	2.550
Education			
Less than secondary school graduation/Secondary school graduation, no post-secondary	1.048	0.764	1.438
Work-related characteristics			
Current work schedule			
Evening/night/rotating shift, seasonal, on call, or casual but called as need arises	1.714*	1.312	2.240

Predictor	Odds Ratio Estimate	99% CI	
Current working status			
Employed all of the time (30+ hours/week)	1.807*	1.280	2.552
Health-related characteristics			
Anxiety disorder			
Yes	1.307	0.850	2.011
Mood disorder			
Yes	1.368*	1.009	1.854
Eye-sight rating			
Fair/Poor or non-existent (blind)	1.539*	1.079	2.195
Health-related behaviours			
Type of Smoker			
Daily smoker/Occasional smoker (former daily smoker)	1.473*	1.083	2.004

Notes:

[#]work-related injuries studied among those who were employed

CI = confidence interval; *$p < .01$

Reference categories: Participants aged 55-85 years; Females; those living in Newfoundland and Labrador; ; Married/ Living with a partner in a common-law relationship; $50,000 or more personal income; Some post-secondary education/Post-secondary degree/ diploma; working daytime schedule or shift; Employed some or most of the time; No anxiety disorder; No mood disorder; Excellent/ Very good/ Good eye-sight rating; Occasional smoker/Former daily smoker/Former occasional smoker/Never smoked (a whole cigarette)

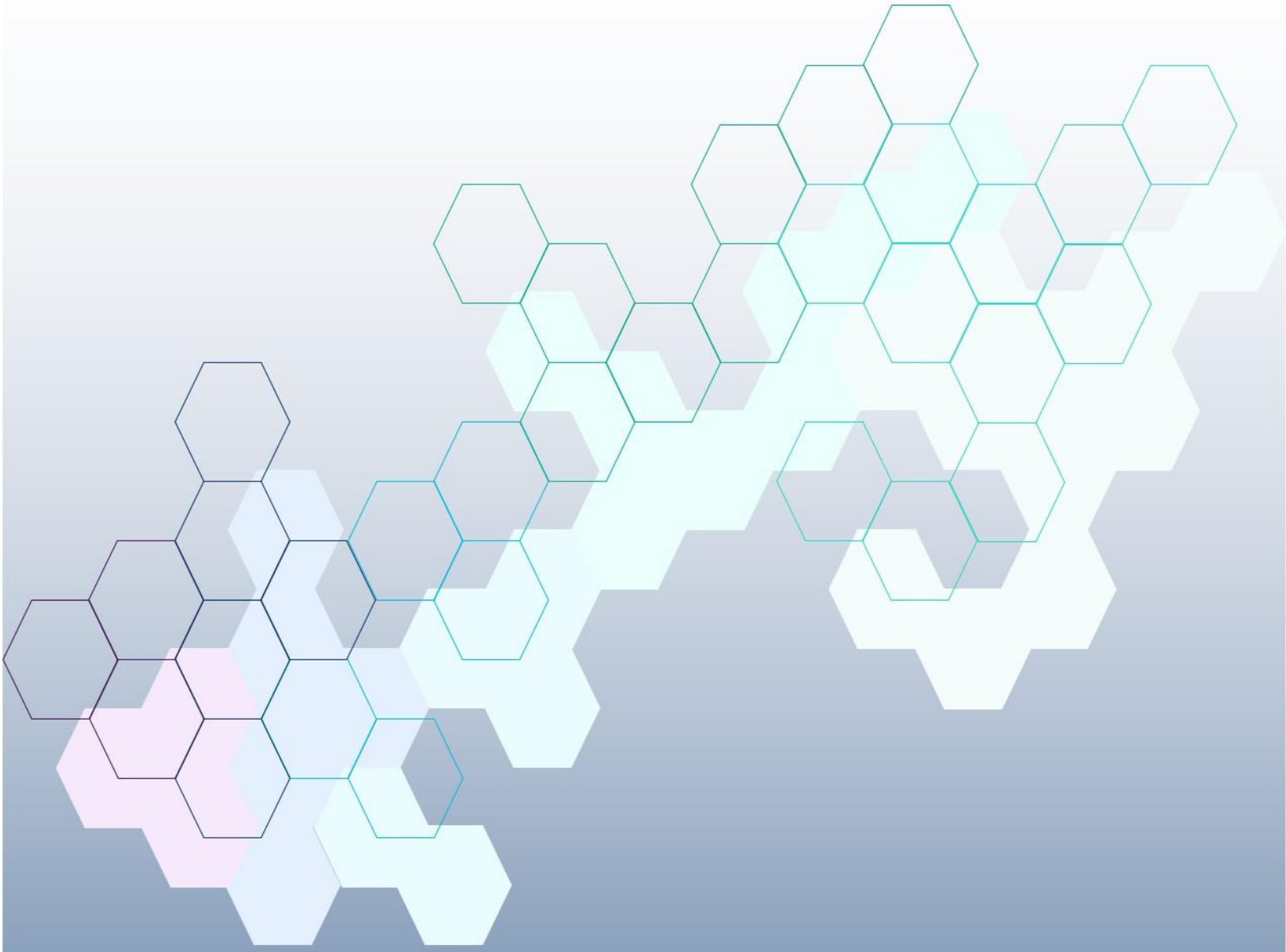
Sample size: (n = 19,999);

Summary

Our analysis of the CLSA data for participants from Newfoundland and Labrador showed that younger age, working non-regular hours, and smoking were associated with increased odds of work-related injuries in middle-aged and older workers in that province. Small sample size prevented us from examining a number of factors that are suggested in the literature contributing to work-related injuries.

In the larger Canadian sample, additional factors were associated with work-related injuries in middle-aged and older workers, including being male, being single, divorced, or separated, having lower personal income, working non-regular schedules, working full-time, having a mood disorder, having vision problems, and being a smoker.

The findings presented in this chapter fill an existing knowledge gap and provide important information about the predictors of work-related injuries among middle-aged and older workers in Newfoundland and Labrador and Canada. This information can be used to develop preventive strategies and educational programs for the workers and employers to reduce the risk of work-related injuries among middle-aged and older workers in Canada. Some of the suggested areas for the development of preventive strategies and educational programs for both workers and employers are mental health and healthy lifestyle.



Chapter 7

Outcomes of Work-Related Injuries in Canada

Chapter 7: Outcomes of Work-Related Injuries in Canada

The focus of Chapter 7 is to examine the associations between work-related injuries and various health outcomes among middle-aged and older workers in Canada.

We developed and tested multivariate regression models to examine the independent effect of work-related injuries on middle-aged and older workers' health care use and health-related outcomes.

Four types of health care utilizations were examined in this study, including:

- over-night hospitalization
- use of emergency departments
- family physician visits
- psychologist visits

Health-related outcomes included:

- self-rated general health
- self-rated mental health
- self-rated healthy aging
- life satisfaction
- psychological distress

For each outcome, predictive models that included work-related injury, age, and sex, plus the provinces and whether the data came from the Comprehensive or Tracking cohort of CLSA (the latter two variables were because of the analytic weights used, as recommended by CLSA) were tested.

Health Services Utilization

As shown in Table 3, work-related injury was significantly associated with increased odds of emergency department visits [AOR = 1.56, $p < .0001$)] and overnight hospitalization [AOR = 1.61, $p < .001$)].

Table 3. Predictors of Health Services Utilization in Middle-Aged and Older Workers

Variables	Family Physician Visits	Psychologist Visits	Emergency Department Visits	Overnight Hospitalization
	OR (99% CI)	OR (99% CI)	OR (99% CI)	OR (99% CI)
Age: 45-54	0.600*** (0.538, 0.669)	1.733*** (1.476, 2.034)	0.901* (0.821, 0.989)	0.547*** (0.467, 0.640)
Sex: Female	1.575*** (1.408, 1.763)	1.238** (1.051, 1.457)	0.997 (0.906, 1.096)	0.965 (0.827, 1.126)
Work-related injuries	1.327 (0.931, 1.892)	1.256 (0.829, 1.904)	1.563*** (1.231, 1.985)	1.613** (1.109, 2.345)
Province				
Alberta	0.544 (0.380, 0.779)	1.917* (1.216, 3.022)	0.810 (0.634, 1.034)	1.035 (0.672, 1.595)
Saskatchewan	0.412 (0.263, 0.647)	0.673 (0.293, 1.547)	0.699 (0.492, 0.993)	1.457 (0.853, 2.489)
British Columbia	0.467 (0.336, 0.648)	1.486* (0.964, 2.291)	0.903 (0.724, 1.127)	1.371 (0.923, 2.037)
Manitoba	0.370 (0.262, 0.523)	0.956 (0.576, 1.586)	0.821 (0.641, 1.052)	1.153 (0.748, 1.776)
New Brunswick	0.464 (0.287, 0.752)	1.582 (0.793, 3.157)	1.379 (0.992, 1.917)	1.254 (0.694, 2.268)
Nova Scotia	0.732 (0.504, 1.063)	1.716* (1.078, 2.731)	0.969 (0.758, 1.240)	1.032 (0.657, 1.622)
Ontario	0.413 (0.299, 0.570)	1.457* (0.951, 2.232)	0.878 (0.708, 1.089)	1.070 (0.722, 1.587)

Prince Edward Island	0.569 (0.334, 0.967)	0.661 (0.248, 1.762)	0.907 (0.626, 1.315)	1.215 (0.662, 2.230)
Quebec	0.259 (0.188, 0.356)	1.964* (1.289, 2.992)	1.132 (0.912, 1.406)	1.521* (1.030, 2.246)

Notes:

Provinces and Comprehensive vs. Tracking cohort are also controlled for in the analyses because of the analytic weights used in the analyses.

CI = confidence interval; *p < .01, **p < .001, ***p < .0001

Reference categories: Participants aged 55-85 years; Males; Not injured while working; those living in Newfoundland and Labrador

Sample sizes for outcome variables: Family Physician Visits (n = 47,699); Psychologist Visits (n = 47,723); Emergency Department Visits (n = 47,707); Overnight Hospitalization (n = 47,748).

Health-Related Outcomes

Our analysis also showed that work-related injury was significantly associated with decreased odds of reporting good general health [AOR = 0.590 (99% CI: 0.416, 0.836, p < .0001) and aging healthy [AOR = 0.554 (99% CI: 0.398, 0.771, p < .0001)] in middle-aged and older workers (see Table 4).

Table 4. Predictors of Health-Related Outcomes in Middle-aged and Older Workers

Variables	General Health	Perceived Mental Health	Healthy Aging
	OR (99% CI)	OR (99% CI)	OR (99% CI)
Age group: 45-54 years	1.092 (0.955, 1.248)	0.767*** (0.646, 0.911)	0.913 (0.799, 1.043)
Sex: Female	1.143* (0.995, 1.312)	0.949 (0.796, 1.131)	1.139* (0.993, 1.306)
Work-related injuries	0.590*** (0.416, 0.836)	0.804 (0.509, 1.268)	0.554*** (0.398, 0.771)
Province			

Alberta	1.106 (0.784, 1.560)	0.810 (0.502, 1.306)	1.144 (0.800, 1.636)
Saskatchewan	0.875 (0.565, 1.356)	0.823 (0.430, 1.576)	0.898 (0.562, 1.435)
British Columbia	0.955 (0.695, 1.312)	0.718 (0.466, 1.107)	0.896 (0.648, 1.240)
Manitoba	1.051 (0.738, 1.496)	0.764 (0.474, 1.229)	0.856 (0.601, 1.220)
New Brunswick	0.781 (0.496, 1.229)	0.779 (0.399, 1.520)	0.814 (0.502, 1.322)
Nova Scotia	0.979 (0.689, 1.392)	0.812 (0.499, 1.319)	0.977 (0.680, 1.403)
Ontario	1.146 (0.840, 1.564)	0.718 (0.469, 1.099)	0.924 (0.674, 1.266)
Prince Edward Island	1.150 (0.687, 1.924)	0.870 (0.427, 1.772)	0.954 (0.566, 1.609)
Quebec	1.112 (0.808, 1.529)	1.219 (0.774, 1.921)	0.906 (0.656, 1.250)

Notes:

Provinces and Comprehensive vs. Tracking cohort are also controlled for in the analyses because of the analytic weights used in the analyses.

CI = confidence interval; *p < .01, **p < .001, ***p < .0001

Outcome variables: Excellent/very good/good vs fair/poor general health; Fair/poor vs excellent/very good/good perceived mental health; Excellent/very good/good vs fair/poor healthy aging

Reference categories: Participants aged 55-85 years; Males; Not injured while working at a job; those living in Newfoundland and Labrador

Sample sizes for outcome variables: General Health (n = 51,206); Perceived Mental Health (n= 51,205); Healthy Aging (n = 51,133)

Next, we examined the association between work-related injury and life satisfaction and psychological distress, which were defined as continuous variables. Two linear regression models were developed. Results from these models are summarized in Table 5. As shown in Table 5, we found that work-related injury was significantly associated with higher levels of psychological distress [Beta Coefficient = 1.05; p < .001], as well as lower ratings of life satisfaction [Beta Coefficient = -1.696; p < .0001] in middle-aged and older workers.

Table 5. Predictors of Life Satisfaction and Psychological Distress in Middle-aged and Older Workers

Variables	Life Satisfaction	Psychological Distress
	Beta Coefficient (99% CI)	Beta Coefficient (99% CI)
Age group: 45-54 years	0.013 (-0.197, 0.223)	0.49*** (0.30, 0.69)
Sex: Female	0.065 (-0.151, 0.282)	0.66*** (0.46, 0.87)
Work-related injuries	-1.696*** (-2.397, -0.995)	1.05** (0.30, 1.79)
Province		
Alberta	0.292 (-0.253, 0.837)	1.031*** (0.537, 1.526)
Saskatchewan	-0.072 (-0.846, 0.702)	-
British Columbia	-0.275 (-0.777, 0.227)	0.633*** (0.242, 1.025)
Manitoba	-0.498* (-1.058, 0.063)	0.439** (0.010, 0.868)
New Brunswick	0.143 (-0.659, 0.945)	-
Nova Scotia	0.050 (-0.523, 0.624)	0.369* (-0.093, 0.831)
Ontario	-0.132 (-0.619, 0.355)	0.598*** (0.207, 0.990)
Prince Edward Island	-0.132 (-1.002, 0.738)	-
Quebec	0.871*** (0.386, 1.355)	1.833*** (1.423, 2.244)

Note. Provinces and Comprehensive vs. Tracking cohort are also controlled for in the analyses because of the analytic weights used in the analyses.

CI = confidence interval; *$p < .01$, **$p < .001$, ***$p < .0001$

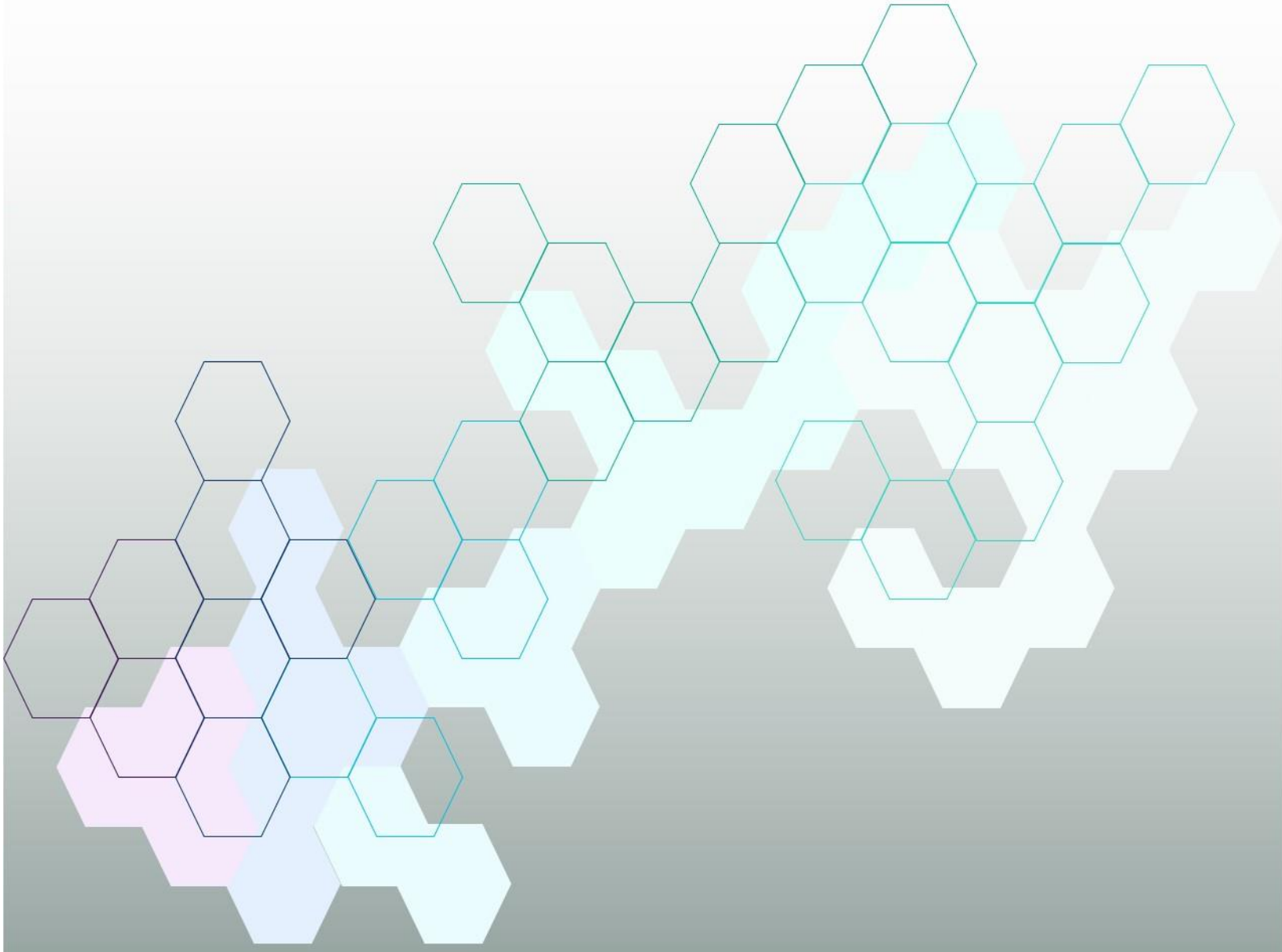
Reference categories: Participants aged 55-85 years; Males; Not injured while working; those living in Newfoundland and Labrador

Summary

The limited number of studies that have examined health outcomes of work-related injuries have found negative physical and mental health consequences as well as reduced overall wellbeing for injured workers. Our findings add to this literature by showing that work-related injuries predicted future emergency department use and hospitalizations. It is important to note here that this increased healthcare use was unlikely to be the direct result of the work-place injury, given that CLSA participants were asked about injuries in the year prior to the

Baseline interview, whereas healthcare use was assessed for the period *following* the Baseline interview.

Work-related injuries were also associated with perceived general health, healthy aging, life satisfaction, and psychological distress when we controlled for the effects of age, sex, and province of residence.



8 Chapter

Discussion and Conclusions

Chapter 8: Discussion and Conclusions

The present research had five primary objectives:

(1) To describe the characteristics of Newfoundland and Labrador CLSA participants and compare them to Canada as a whole,

(2) To examine the incidence of work-related injuries among middle-aged and older workers in Newfoundland and Labrador and the other provinces,

(3) To describe the characteristics (e.g., demographic, socio-economic, and health-related) associated with work-related injuries among middle-aged and older workers in Newfoundland and Labrador, as compared to Canada as a whole,

(4) To identify the factors (e.g., demographic, socio-economic, and health-related) that are associated with work-related injuries among middle-aged and older workers in Newfoundland and Labrador, and Canada as a whole, and

(5) To examine the associations between work-related injuries and various health outcomes, including self-rated general health, self-rated mental health, and use of health services by middle-aged and older adults as a result of work-related injuries in Newfoundland and Labrador and across Canada.

Profile of Middle-Aged and Older Adults in Newfoundland and Labrador

We examined a number of sociodemographic, lifestyle, and health characteristics of middle-aged and older adults in Newfoundland and Labrador who participated in the CLSA and compared them to the Canadian sample as a whole. Overall, we found few differences. One exception was country of birth, where the proportion of middle-aged and older CLSA participants in Newfoundland and Labrador who were born in Canada was higher than the proportion observed for the CLSA participants of the same age from across Canada. These findings are consistent with the most recent (2016) national census, which indicates that the

population of Newfoundland and Labrador (and the entire Atlantic region) is generally less diverse than other regions in Canada (Statistics Canada, 2017b).

Incidence of Work-Related Injuries in Middle-Aged and Older Workers in Newfoundland and Labrador

At the time of the CLSA survey, nearly half of middle-aged and older adults in Newfoundland and Labrador reported working or having recently retired. In other Canadian provinces, this proportion was slightly higher. Amongst these workers, the incidence of work-related injuries was 262 per 10,000 for Newfoundland and Labrador, which was lower than the rates determined for the other Canadian provinces. Our findings are unique in that prior reports have not estimated work-related injuries separately for middle-aged and older adults by province. However, using the lost time injury rate indicator, provincial variations have been observed in previous investigations. According to the 2018 annual report published by provincial Workers' Compensation Boards, the lost time injury rate was 160 per 10,000 in Newfoundland and Labrador, and lower in Ontario (95 per 10,000), Prince Edward Island (142 per 10,000), and Alberta (150 per 10,000), and (Government of Canada, 2019; Guergis et al., 2019; Workers' Compensation Board-Alberta, 2019; WorkplaceNL, 2018, 2019). The provincial work-related injury rate (based on time-loss claims) have been estimated to be highest in British Columbia (219 per 10,000) (WorkSafeBC, 2019) and Manitoba (Association of Workers' Compensation Boards of Canada (AWCBC), 2018).

Although our estimates are somewhat consistent with previous reports, they cannot be compared directly with previous findings due to differences in the methods used to estimate the incidence of work-related injuries. Previous research has estimated incidence rates using data obtained from workers' compensation board databases, which typically collect "lost time" or the compensation that a worker receives for time spent away from the job due to incidents that result in a disability or injury (Association of Workers' Compensation Boards of Canada, 2019; Tucker & Keefe, 2018, 2019). In addition, the methods used to calculate "lost time injury rate" or compensation as a result of disability or injury may be specific to each province. A key limitation of these approaches is under-reporting of claims leading to underestimations of the incidence of workplace injury (Tucker & Keefe, 2019). For example, the lost-time injury rate in Saskatchewan for year 2018 was 199 per 10,000, but the total injury rate was 544 per 10,000 (Saskatchewan Workers' Compensation Board, 2019). Our study findings reflect both lost-time and injuries that did not result in time spent away from work based on the self-report from the middle-aged and older workers. This is crucial in terms of understanding the exact data for work-related injuries and to avoid limitations of under-reporting and jurisdictional or provincial

differences of legislation when interpreting injury incidence rates.

Injury Type for Newfoundland and Labrador

Most of the work-related injuries reported by the middle-aged and older workers in Newfoundland and Labrador were classified as sprains or strains (24.8%), followed by musculoskeletal pulls or tears (includes herniated disc, torn muscles and tendons) (18.2%), and all other injury types (33.0%). Due to our small sample size for Newfoundland and Labrador, we were unable to report a high level of detail in terms of specific injury types, however, our findings are somewhat consistent with the *National Work injury, Disease and Fatality Statistics* report (Association of Workers' Compensation Boards of Canada, 2019). The highest number of lost-time claims by nature or type of injury among workers in Newfoundland and Labrador for 2018 were classified as traumatic injuries to muscles, tendons, ligaments, and joints, followed by surface wounds and bruises, and traumatic injuries to bones, nerves, and the spinal cord. The results presented in the report for injury type were similar in each province and for Canada as a whole.

Socio-Demographic Characteristics of Middle-Aged and Older Workers with Work-Related Injuries

Age

We consistently found that work-related injury risk was higher among 45-54-year-olds than for 55-85-year-olds workers in both Newfoundland and Labrador and in Canada as a whole.

These findings are consistent with previous research showing that rates of injuries increase with age up to a specific age, before dropping. For example, research based on data from the Canadian Workers' Compensation System 2018 showed that the percentage of workers in Newfoundland and Labrador who reported work-related injuries between the age groups of 45-49 years and 50-54 years was greater than that for those between the age groups of 55-59 years, 60-64 years, and 65+ years (Association of Workers' Compensation Boards of Canada, 2019). Fan et al. (2012) examined the rates of serious work-related injuries in British Columbia, Canada using administrative claims data maintained by the Workers' Compensation Board of British Columbia (operating as WorkSafeBC). Overall, the rate of injuries increased with age up to the age of 65 years before falling slightly. For example, the rate of fractures was the lowest for 15-24-year-olds at 1.3, but increased steadily to 2.0 amongst 55-64-year-olds, then dropped slightly to 1.7 for workers ages 65 years and older. For injuries associated with falls, the rate

was 2.1 per 1,000 workers for 15-24-year-olds, increased slightly to 2.8 for 55-64-year-olds, and then dropped to 2.2 for 65+ year-olds. Similar trends across the age groups were seen for injuries from overexertion/repetitive motion and contact with objects.

Smith et al. (2013) examined the data on short- and long-term disability claims (i.e., claims involving time away from work) reported to WorkSafeBC (British Columbia, Canada) in three time periods: 1997−1998, 2001−2002, and 2005−2006. An inverse U-shaped association between age and injuries, such as sprains, strains, and repetitive motion injuries, was evident, with the greatest risk present for men and women aged 35-44 years.

There is fair bit of consistency across studies in that older workers have a reduced risk of work-related injuries compared to other age groups (Bande & López-Mourelo, 2015; Chau et al., 2014; Choi, 2015; Guest et al., 2014; Morassaei et al., 2013; Robertson-More et al., 2015; Wuellner et al., 2011). For example, using data from the Canadian Community Health Survey, Morassaei et al. (2013) found that workers younger than 55 years were significantly more likely to be injured than workers older than 55 years of age. In a retrospective study, Robertson-More and colleagues (2015) found that severely injured adults admitted with a work-related injury to the Foothills Medical Centre, Calgary, Alberta, between April 1995 and March 2013, were younger on average than a comparison group of adults admitted for non-work related injuries. A cross sectional study conducted in Spain, younger adults were found to have a 1.08-1.17 times higher relative risk of workplace injury than older adults (Carrillo-Castrillo et al., 2016). In an Australian study, older workers were able to “maintain their ability to work safely” and had lower rates of workplace injury in heavy industry than their younger cohorts (Guest et al., 2014). Thus, our findings add to the existing body of research on work-place injuries that strongly suggests that fewer older workers experience work-related injures, and that increasing age (after age 55 years) is associated with a decrease risk of injury at work.

Sex

We did not find any significant sex differences in rates of work-related injuries for Newfoundland and Labrador; however, sex was a significant predictor of work-related injury across Canada. Men were at increased odds of reporting a work-related injury. Previous research on sex differences in work-related injuries is relatively sparse and mixed (Stoesz et al., 2020). A Canadian report on work-related injuries among workers reported nearly equal numbers of males and females reporting lost-time injuries in 2018 in Newfoundland and Labrador (Association of Workers’ Compensation Boards of Canada, 2019). In reports using data collected via the Canadian Community Health Survey, males are more likely than females to experience work-related injury (Nowrouzi-Kia et al., 2019; Wilkins & Mackenzie, 2007).

Sex differences in work-related injuries are in much older population of workers or when specific types of work-related injuries were examined (Chen et al., 2013; Fan, Mcleod, et al., 2012; Yang et al., 2016). For example, Chen et al. (2013) found that of all female age groups that endured occupational knee injuries in the US in 2007, those over the age of 55 years had the highest rate, however, the knee injury rates for men decreased as their age increased. Yang et al. (2016) found that female workers had an increased risk for low back pain compared to male workers. The inconsistency between our finding and that of previous research may be due to the fact that in our study, we examined factors associated with all work-related injuries and not only specific types of injuries.

Marital Status

We found a significant association between marital status and work-related injuries among middle-aged and older workers from across Canada. Associations between work-related injuries and marital status have been shown in previous research, with those who were separated, divorced, widowed, or never married being at greatest risk for injury (Algarni et al., 2015; Baidwan et al., 2019).

We did not find a significant association between marital status and work-related injuries among middle-aged and older workers from Newfoundland and Labrador, which could be due to low sample size.

Income and Education

We found significant associations between both total household and personal income and work-related injuries in middle-aged and older workers across Canada (but not for Newfoundland and Labrador), such that lower income was a risk factor for work-related injury. These findings are consistent with previous research. Men with annual incomes of less than $60,000 and women with annual incomes of less than $40,000 have been shown to be at a greater risk for work-related injuries compared to those with higher income levels in Canada (Wilkins & Mackenzie, 2007). In China, living below the poverty line is a significant risk factor for occupational injury resulting in disability (Wang et al., 2015).

Our results also suggest that middle-aged and older workers with lower education levels are at a greater risk for experiencing work-related injuries in Canada. Low education levels as a risk factor for work-related injuries has been documented elsewhere (Froom et al., 1996; Karaguven, 1999). Workers with at least one member in the household having more than secondary education are also less likely to encounter work-related injuries compared to

workers having no household member with secondary education (Statistics Canada, 2014c). The relationship between income and education and work-related injuries is found not to be linear. Pransky et al. (2005), for example, did not find a linear association between income or education levels and work-related injuries; rather, compared to younger workers, a larger proportion of older workers who were both least and most educated had been injured.

Work-Related Characteristics Associated with Injuries in Middle-Aged and Older Workers

Work Schedule and Status

Our analyses revealed significant associations between non-regular work schedules (in both Newfoundland and Labrador and Canada) and working full time (across Canada) and work-related injuries in middle-aged and older workers. It is also possible that more time working simply means that the opportunity for injury increases. Our findings are consistent with those reported previously, where workers with longer durations of work, such as 12-hour shifts or working overtime, have an increased risk for work-related injuries as it induces fatigue impacting cognitive functioning and delayed response time (Dembe et al., 2005, 2008; Folkard & Tucker, 2003). Further, shift work and nonstandard hours have adverse effects on physical and mental health, sleep, work performance, and family and social life of workers of various ages (e.g., Barnes-Farrell et al., 2008; Costa, 2003b, 2003a). Rotating shift work or night work also hamper regular circadian rhythms, decrease efficiency and increase error rates at work (Abdalla et al., 2017). Individuals working several consecutive night shifts are at a greater risk for work-related injuries (Folkard & Tucker, 2003). Interestingly, shift work and higher number of work hours per week may impact women more and/or differently than men because they generally tend to have a greater role in performing domestic duties and find it more challenging to maintain a healthy work-life balance (Valcour, 2007).

In our study, a small proportion (13.7%) of middle-aged and older workers with work-related injuries in Newfoundland and Labrador had worked at their current job for less than 5 years. Similar proportions were observed in the other Canadian provinces (ranging from 12.7 % to 20.5%), with the exceptions of New Brunswick and Alberta where the proportions were greater than 29.5%. Although further analyses suggested that the number of years worked at current job was not a risk factor for work-related injury in middle-aged and older workers, association between these variables have been reported previously for younger workers (Abdalla et al., 2017; Fan, McLeod, et al., 2012). For example, the analysis of data from the 2003 and 2005 Canadian Community Health Survey revealed that workers who were fairly new at their jobs

were unaccustomed to certain job tasks, the work environment, and were more exposed to work-related hazards making them more prone to work-related injury (Morassaei et al., 2013). It may be possible, however, that long-term employees are more experienced with the work and have incorporated safe work habits into their work routines, therefore, may have a lower risk for work-related injury.

Occupational Characteristics

Of those with injuries in Newfoundland and Labrador in our study, a broad range of occupational categories were identified. Of those who were injured, there was largely an equal distribution who worked in occupations characterized by work inside and outside of a building. Moreover, more injured workers reported occupations requiring sitting, standing, and/or walking followed by occupations requiring sitting and those requiring bending, stooping, kneeling, crouching. Middle-aged and older workers with work-related injuries also reported working in occupations where workers are exposure to radiation; flying particles and falling objectives; fire, steam, hot surfaces; dangerous chemical substances; biological agents; electricity; dangerous locations; and equipment, machinery, and tools. The largest proportion of middle-aged and older workers with work related injuries in Newfoundland and Labrador reported occupations requiring the use of equipment, machinery, and tools.

Due to small sample sizes, however, we were unable to determine if any one occupational category or specific set of occupational characteristics was associated with more work-related injuries in middle-aged and older workers. Previous studies have shown that serious work-related injuries for older workers may occur more frequently in occupations associated with high stress or physically demanding tasks or duties (Silverstein, 2008), such as law enforcement (Gershon et al., 2002), construction (Schwatka et al., 2012), and agriculture (Nilsson et al., 2010).

Health-Related Characteristics Associated with Work-Related Injuries in Middle-Aged and Older Workers

Mental Health

Overall, poor perceived mental health was not found to be a significant risk factor for work-related injuries among middle-aged and older workers in Canada. However, significant associations were found between presence of an anxiety or mood disorder, and depressive symptomology with work-related injuries in middle-aged and older workers from across

Canada. More specifically, we found that mood disorder was a significant predictor of work-related injuries even in multivariate analyses controlling for socio-demographic, work-related and health-related characteristics, and behaviour. Mood disorders lead to loss of work productivity in working population (Greenberg et al., 2003). In their model of occupational stressors and mood disorder, Woo and Postolache (2008) explained that work-related stress may trigger latent mood disorder or cause depressive episodes leading to "presenteeism" (i.e., reduced productivity while at work) or "absenteeism" (i.e., productivity loss due to absence from work) and in progressive cases may cause work-related disability and accidents. We also found that middle-aged and older workers with symptoms associated with PTSD were more likely to report work-related injury; however, PTSD was not revealed as a predictor in our multivariate logistic regression. A relationship between PTSD and work-related injuries has been shown previously, and this relationship may be moderated by whether the individual suffered from chronic pain or not (Asmundson et al., 1998).

There were no significant associations between workers' mental health status and their risk of work-related injuries among the smaller samples, such as Newfoundland and Labrador, which is consistent with previous research. For example, using data obtained from the 1995 administration of the Saskatchewan Health and Back Pain Survey, Hincapié et al. (2008) found that the prevalence of depressive symptomology was slightly higher in workers with a history of work-related lower back injury (24.2%) than those without (20.0%), however, the results of the binary logistic regression analysis was not significant in a sample of 1,086 adults aged 20-69 years. It is possible that small sample sizes or using dichotomous variables (depressive symptoms vs. no depressive symptoms) to examine the relationship between mental health variables and work-related injuries hides a true effect.

Vision and Hearing

Compared to those without a work-related injury, middle-aged and older workers who reported work-related injury across Canada were more likely to indicate that their vision was fair, poor, or non-existent. This was also true for Newfoundland and Labrador. However, we did not find any significant association between hearing and work-related injuries in middle-aged and older workers. These findings are somewhat consistent with previous research showing that eyesight and hearing problems may lead to injuries when the job request having good vision and hearing (Zwerling, Sprince, et al., 1998; Zwerling, Whitten, et al., 1998). Together, these findings suggest that as workers' age and changes to their vision and hearing emerge, employers may need to accommodate workers to prevent workplace injuries.

We might have expected to find that other aspects of physical health (e.g., the presence of chronic conditions) to be associated and/or predictive of work-related injuries in middle-aged and older workers. In their systematic review, Okunribido et al. (2011) concluded that older age was associated with an increased risk of musculoskeletal disorders, which may result in higher rates of sprains and strains and repetitive motion injuries as workers age (Savinainen et al., 2010). Data from the Canadian Community Health Survey showed that 89% of older adults aged 65+ years in Canada reported having at least one chronic health condition in 2009. Arthritis and rheumatism are the most common chronic health conditions, affecting 44% of older adults. In addition, chronic health conditions and pre-existing conditions may increase claim costs for older workers (Smith et al., 2014). Smith et al. reported that pre-existing chronic conditions mediated the effects of age on health care expenditures, and this varied by age group. The percentage of the age effect attributed to chronic conditions was 12.4% among 25-34-year-old men, which increased to 26.6% for men over 55+ years. Among women, 14.6% of the age effect on health care expenditures was mediated by chronic conditions in women aged 25-34 years and jumped to 35.9% for women over 55 years.

Fraade-Blanar and colleagues (2017) found that older workers with low physical ability had a 3.91 hazard ratio for occupational injury compared to older workers who had a proper physical ability level for their profession. Importantly, many Canadians are living with more than one chronic health condition. Based on CCHS 2011/12 data, 16.4% of Canadians aged 50-64 and 31.3% of Canadians aged 65+ years have two or more chronic conditions (Roberts et al., 2015).

Older workers may require extended time away from work because of their injuries and are at high risk of re-injury and permanent impairments, which may result in increased health care costs. For example, changes in the physical and mental functional capacity of older nurses may contribute to enduring disabling injuries (Phillips & Miltner, 2015).

Health Behaviours Associated with Injuries in Middle-Aged and Older Workers

Smoking and Drinking

Our analysis of the CLSA data revealed that middle-aged and older workers who were smokers compared to those who were non-smokers were significantly more likely to report work-related injuries in Newfoundland and Labrador and across Canada. We found no associations between drinking behaviour and work-related injuries in Newfoundland and Labrador, or in Canada. Some data shows that risk-taking behaviours, such as smoking and drinking, are related to the incidence of work-related injuries (Statistics Canada, 2014c). Using data from an insurance company, Hartman et al. (2004) found that older farmers and smokers were at

increased risk of bruises, sprains/strains, and fractures while working. Wadsworth et al. (2003) found that smoking, sex, and negative job characteristics were associated with work-related accidents and minor injuries. Hingson et al. (1985) found that average daily intake of five or more drinks was associated with elevated relative risk of accidental injuries, injuries requiring hospitalization, and work-related injuries, when compared to abstainers from alcohol use.

Outcomes of Work-Related Injuries in in Middle-Aged and Older Workers

Using cross-sectional and longitudinal data from the CLSA, we found significant associations between work-related injuries and several health outcomes and use of health services discussed below.

Health-Related Outcomes

Our analysis revealed that work-related injury was significantly associated with decreased odds of reporting good general health and aging healthy. These findings are consistent with the existing literature. For example, poorer health outcomes have been observed in individuals working in environments with various health and safety hazards compared to other workers (Abbas et al., 2010). In the context of healthy aging, although older workers experience fewer injuries at work, but when they are injured, the consequences are more severe than those of their younger counterparts and the resultant injury might be fatal or may require longer recovery periods and higher associated costs. Thus, impacting their overall experience of healthy aging (Pransky et al., 2011; Silverstein, 2008).

In addition, we found that work-related injury was associated with higher levels of psychological distress as well as lower ratings of life satisfaction. Psychological distress was measured 18 months after CLSA participants responded to the Baseline Questionnaire, which asked about work-related injuries. Our findings, therefore, speak to the long-term psychological effects of work-related injuries.

Health Services Utilization

Work-related injury was significantly associated with increased odds of emergency department visits and overnight hospitalization, even when controlling for the effects age, sex and province of residence. A population based study using linked administrative data from publicly funded healthcare and WCB for the population of British Columbia, Canada, found an increase in healthcare use following a workplace injury (Brown et al., 2006). The authors found that injured workers who lost-time used more general practitioner and mental healthcare services and were hospitalized more often 5 years after the injury compared to the year before the

injury and at a higher rate than non-injured workers. There is also evidence of high proportion of emergency department visits following work-place injuries (Tadros et al., 2018). Previous literature indicated that about 20% of all adults seen in an emergency department in Utah, US were as a result of a work-place injury or following worker's compensation (Leonard et al., 1999).

Limitations

Despite the strengths of this study, we acknowledge several limitations. First, several of the measures of the CLSA do not gather fine-grained information that could be useful for determining whether health behaviours or occupation characteristics were associated with risk for workplace injury. For example, the measure of drinking behavior used in the CLSA is limited in that the categories are broad, therefore, it is not surprising that a relationship between drinking frequency and severity of injuries as has been shown in previous research (Gershon et al., 2002; Wadsworth et al., 2003; Wilkins & Mackenzie, 2007). A second limitation of our study may be due to our recategorization of the injury data, which was necessary due to small sample and cell sizes, particularly the data for Newfoundland and Labrador. The small sample and cells sizes also prevented us from exploring specific occupational characteristics, which further prevented us from entering these data into prediction models of work-related injuries. Third, our findings are based on self-reported measures of the CLSA and we did not use data obtained from other sources, for example health administrative data to look at actual healthcare use. Our results may, therefore, be biased due to the problems associated with recall of events, although this issue would likely be consistent across the entire sample of participants, regardless of province and work-related injury status (see also Breslin et al., 2006).

Conclusions

Middle-aged and older workers (i.e., those aged 45 years and older) offer many benefits to employers, but there are health and safety concerns for this population. In this study, we sought to understand the incidence of work-related injury rates in middle-aged and older workers in Canada, and Newfoundland and Labrador, specifically, because the percentage of actively working older adults in this province has increased dramatically over the last 20 years.

In addition to understanding the incidence of injuries in Newfoundland and Labrador, we learned more about the factors that increase the injury risk in the population of workers aged

45 years of age and older, physical and mental health outcomes, and use of health services as the result of work-related injuries.

We analyzed data from 3,470 adults in Newfoundland and Labrador and 51,250 middle-age and older adults in Canada who had a baseline assessment and one follow-up assessment obtained as part of the ***Canadian Longitudinal Survey on Aging (CLSA*)** data. Our analysis of this data revealed several key findings, including:

- The incidence of work-related injuries in middle-aged and older workers in Newfoundland and Labrador was 262 per 10,000, which was the lowest rate of all Canadian provinces. Most of these injuries were classified as sprains or strains (24.8%).
- In Newfoundland and Labrador the likelihood of work-related injuries was higher for (a) workers aged 45-54-years (vs 55-85-year-olds), (b) those who worked non-regular work schedules (as opposed to day schedules), and (c) smokers.
- Additional risk factors emerged when conducting analyses for Canada as a whole, which may be due to the larger sample size. For Canada, the likelihood of work-related injuries was increased for (a) workers aged 45-54-years, (b) men, (c) those with lower personal income, (d) those working non-regular schedules or working full-time, (e) those with a mood disorder, (f) those with vision problems, and (e) smokers.
- Having work-related injuries was associated with several outcomes among middle-aged and older workers in Canada, including higher levels of psychological distress and lower life satisfaction. Work-related injuries also increased the likelihood of emergency department visits and overnight hospitalizations within about 18 months after the work-related injury.

The findings presented in this report contribute to a greater understanding of factors associated with work-related injuries among middle-aged and older workers in Newfoundland and Labrador and Canada. As injury incidence rates are an indicator of the safety performance at workplaces, such information can be useful for planning future health and safety measures at work and emphasize the need to engage both men and women workers in prevention of workplace injury and to improve health outcomes as a result of work-related injuries.

References

Abbas, M. A., Fiala, L. A., Abdel Rahman, A. G., & Fahim, A. E. (2010). Epidemiology of workplace violence against nursing staff in Ismailia Governorate, Egypt. *Ournal of the Egyptian Public Health Association*, *85*(1–2), 29–43.

Abdalla, S., Apramian, S. S., Cantley, L. F., & Cullen, M. R. (2017). Occupation and risk for injuries. *Disease Control Priorities, Third Edition (Volume 7): Injury Prevention and Environmental Health*, 97–132. https://doi.org/10.1596/978-1-4648-0522-6_ch6

Algarni, F. S., Gross, D. P., Senthilselvan, A., & Battié, M. C. (2015). Ageing workers with work-related musculoskeletal injuries. *Occupational Medicine*, *65*(3), 229–237. https://doi.org/10.1093/occmed/kqu213

Andresen, E. M., Malmgren, J. A., Carter, W. B., & Patrick, D. L. (1994). Screening for depression in well older adults: Evaluation of a short form of the CES-D (Center for Epidemiologic Studies Depression Scale). *American Journal of Preventive Medicine*, *10*(2), 77–84.

Andrews, G., & Slade, T. (2001). Interpreting scores on the Kessler Psychological Distress Scale (K10). *Australian and New Zealand Journal of Public Health*, *25*(6), 494–497.

Asmundson, G. J. G., Norton, G. R., Allerdings, M. D., Norton, P. J., & Larsen, D. K. (1998). Posttraumatic stress disorder and work-related injury. *Journal of Anxiety Disorders*, *12*(1), 57–69. https://doi.org/10.1016/S0887-6185(97)00049-2

Association of Workers' Compensation Boards of Canada. (2019). *National work injury, disease and fatality statistics/ Statistiques nationales des accidents, maladies et décès professionnels (2016-2018)*. https://awcbc.org/wp-content/uploads/2020/05/National-Work-Injury-Disease-and-Fatality-Statistics-2016-2018.pdf

Association of Workers' Compensation Boards of Canada (AWCBC). (2018). *Canadian workers' compensation system - year at a glance: Key statistical measures online tool*. https://aoc.awcbc.org/KsmReporting/KsmSubmissionReport/4

Baidwan, N. K., Gerberich, S. G., Kim, H., Ryan, A., Church, T., & Capistrant, B. (2019). A longitudinal study of work-related psychosocial factors and injuries: Implications for the aging United States workforce. *American Journal of Industrial Medicine*, *62*(3), 212–221. https://doi.org/10.1002/ajim.22945

Bande, R., & López-Mourelo, E. (2015). The impact of worker's age on the consequences of occupational accidents: Empirical evidence using spanish data. *Journal of Labor Research*, *36*(2), 129–174. https://doi.org/10.1007/s12122-015-9199-7

Barnes-Farrell, J. L., Davies-Schrils, K., McGonagle, A., Walsh, B., Milia, L. Di, Fischer, F. M., Hobbs, B. B., Kaliterna, L., & Tepas, D. (2008). What aspects of shiftwork influence off-shift well-being of healthcare workers? *Applied Ergonomics*, *39*(5), 589–596. https://doi.org/10.1016/j.apergo.2008.02.019

Bohle, P., Pitts, C., & Quinlan, M. (2010). Time to call it quits? The safety and health of older workers. *International Journal of Health Services*, *40*(1), 23–41. https://doi.org/10.2190/HS.40.1.b

Breslin, F. C., Smith, P., Mustard, C., & Zhao, R. (2006). Young people and work injuries: An examination of jurisdictional variation within Canada. *Injury Prevention*, *12*(2), 105–110. https://doi.org/10.1136/ip.2005.009449

Brown, J., McDonough, P., Mustard, C., & Shannon, H. (2006). Healthcare use before and after a workplace injury in British Columbia, Canada. *Occupational and Environmental Medicine*, *63*(6), 396–403. https://doi.org/10.1136/oem.2005.022707

Canadian Centre for Occupational Health and Safety. (2016). *Aging workforce in Canada infographic*. http://ccohs.ca/products/posters/aging_workforce/

Canadian Institutes for Health Information. (2011). *Health Care in Canada, 2011: A Focus on Seniors and Aging*. https://secure.cihi.ca/free_products/HCIC_2011_seniors_report_en.pdf

Canadian Longitudinal Survey on Aging (CLSA). (2020). Canadian Longitudinal Study on Aging/Etude Longitudinal Canadienne Sur Le Vieillissement (CLSA Elcv). https://www.clsa-elcv.ca/

Carrillo-Castrillo, J. A., Rubio-Romero, J. C., Onieva, L., & Lopez-Arguillos, A. (2016). The causes of severe accidents in the Andalusian manufacturing sector: The role of human factors in official accident investigations. *Human Factors and Ergonomics in Manufacturing*, *26*(1), 68–83. https://doi.org/10.1002/hfm

Chau, N., Dehaene, D., Benamghar, L., Bourgkard, E., Mur, J. M., Touron, C., & Wild, P. (2014). Roles of age, length of service and job in work-related injury: A prospective study of 63,620 person-years in female workers. *American Journal of Industrial Medicine*, *57*(2),

172–183. https://doi.org/10.1002/ajim.22259

Chen, Z., Chakrabarty, S., Levine, R. S., Aliyu, M. H., Ding, T., & Jackson, L. L. (2013). Work-related knee injuries treated in emergency departments in the United States. *Journal of Occupational and Environmental Medicine*, *55*(9), 1091–1099. https://doi.org/10.1097/JOM.0b013e31829b27bf

Choi, S. D. (2015). Aging workers and trade-related injuries in the US construction industry. *Safety and Health at Work*, *6*(2), 151–155. https://doi.org/10.1016/j.shaw.2015.02.002

Costa, G. (2003a). Factors influencing health of workers and tolerance to shift work. *Theoretical Issues in Ergonomics Science*, *4*(3), 4–263. https://doi.org/10.1080/14639220210158880

Costa, G. (2003b). Shift work and occupational medicine: an overview. *Occupational Medicine*, *53*, 83–88. https://doi.org/10.1093/occmed/kqg045

Dembe, A. E., Delbos, R., & Erickson, J. B. (2008). The effect of occupation and industry on the injury risks from demanding work schedules. *Journal of Occupational and Environmental Medicine*, *50*(10), 1185–1194. https://doi.org/10.1097/JOM.0b013e31817e7bf2

Dembe, A. E., Erickson, J. B., Delbos, R. G., & Banks, S. M. (2005). The impact of overtime and long work hours on occupational injuries and illnesses: New evidence from the United States. *Occupational and Environmental Medicine*, *62*(9), 588–597. https://doi.org/10.1136/oem.2004.016667

Diener, E., Emmons, R. A., Larsen, R. J., & Griffin, S. (1985). The satisfaction with life scale. *Journal of Personality Assessment*, *49*(1), 71–75.

Fan, J., Mcleod, C. B., & Koehoorn, M. (2012). Descriptive epidemiology of serious work-related injuries in British Columbia , Canada. *PLoS Medicine*, *7*(6), 1–7. https://doi.org/10.1371/journal.pone.0038750

Fan, J., McLeod, C. B., Koehoorn, M., Morassaei, S., Breslin, F. C., Ibrahim, S. A., Smith, P. M., Mustard, C. A., Amick, B. C., Shankardass, K., Petch, J., Robertson-More, C., Wells, B. J., Nickerson, D., Kirkpatrick, A. W., Ball, C. G., Smith, P. M., Bielecky, A., Mustard, C. A., … Koehoorn, M. (2012). Geographic variation in work injuries: A multilevel analysis of individual-level data and area-level factors within Canada. *Annals of Epidemiology*, *33*(5), 451–455. https://doi.org/10.1097/JOM.0b013e31824e11f7

Folkard, S., & Tucker, P. (2003). Shift work, safety and productivity. *Occupational Medicine*, *53*(2), 95–101. https://doi.org/10.1093/occmed/kqg047

Fraade-Blanar, L. A., Sears, J. M., Chan, K. C. G., Thompson, H. J., Crane, P. K., & Ebel, B. E. (2017). Relating older workers' injuries to the mismatch between physical ability and job demands. *Journal of Occupational and Environmental Medicine*, *59*(2), 212–221. https://doi.org/10.1097/JOM.0000000000000941

Froom, P., Melamed, S., Kristal-Boneh, E., Gofer, D., & Ribak, J. (1996). Industrial accidents are related to relative body weight: The Israeli CORDIS study. *Occupational and Environmental Medicine*, *53*(12), 832–835. https://doi.org/10.1136/oem.53.12.832

Gershon, R. R. M., Lin, S., & Li, X. (2002). Work Stress in Aging Police Officers. *Journal of Occupational and Environmental Medicine*, *44*(2), 160–167. http://ovidsp.tx.ovid.com.uml.idm.oclc.org/sp-3.19.0a/ovidweb.cgi?QS2=434f4e1a73d37e8cd904d31cf75bf472a8e8828228df5fb82f016563cbc9d1ab2cf2b5483ef37a0ff661cadff2b4a108681a929511f78241e630e97b70d7e69c08da4f88493f15b8288df53ed6d630d980249afb401fdf814078b06c7

Government of Canada. (2019). *Occupational health and safety in Ontario April 2017 – March 2018: Appendix A: Statistical charts | Ontario.ca*.

Government of Canada. (2020). *National Occupational Classification (NOC)*. National Occupational Classification (NOC). https://noc.esdc.gc.ca/Home/Welcome/2d4ba451802b42e0b9f49ea1eac06a50?GoCTemplateCulture=en-CA

Greenberg, P. E., Kessler, R. C., Birnbaum, H. G., Leong, S. A., Lowe, S. W., Berglund, P. A., & Corey-Lisle, P. K. (2003). The economic burden of depression in the United States: how did it change between 1990 and 2000? *The Journal of Clinical Psychiatry*, *64*(12), 1465–1475. https://doi.org/10.4088/jcp.v64n1211

Guergis, S., Care Worker, R., Mackenzie, M., Manager, N., Manor, S., & Pei, H. (2019). *Putting People First Workers Compensation Board of PEI 2018 ANNUAL REPORT*.

Guest, M., Boggess, M. M., Viljoen, D. A., Duke, J. M., & Culvern, C. N. (2014). Age-related injury and compensation claim rates in heavy industry. *Occupational Medicine*, *64*(2), 95–103. https://doi.org/10.1093/occmed/kqt166

Hartman, E., Frankena, K., Oude Vrielink, H. H. E., Nielen, M., Metz, J. H. M., & Huirne, R. B. M. (2004). Risk factors associated with sick leave due to work-related injuries in Dutch farmers: An exploratory case-control study. *Safety Science*, *42*(9), 807–823. https://doi.org/10.1016/j.ssci.2004.03.001

Hincapié, C. A., Cassidy, J. D., & Côté, P. (2008). Is a history of work-related low back injury associated with prevalent low back pain and depression in the general population? *BMC Musculoskeletal Disorders*, *9*, 1–10. https://doi.org/10.1186/1471-2474-9-22

Hingson, R. W., Lederman, R. I., & Walsh, D. C. (1985). Employee drinking patterns and accidental injury: A study of four New England states. *Journal of Studies on Alcohol*, *46*(4), 298–303. https://doi.org/10.15288/jsa.1985.46.298

Ilmarinen, J. E. (2001). Aging workers. *Occupational and Environmental Medicine*, *58*(8), 546–

552. https://doi.org/10.1136/oem.58.8.546

Karaguven, U. H. M. (1999). The relationship between work accident, educational backgrounds and stress levels of textile workers. *European Conference on Educational Research*. http://www.leeds.ac.uk/educol/documents/000001146.htm

Kessler, R. C., Barker, P. R., Colpe, L. J., Epstein, J. F., Gfroerer, J. C., Hiripi, E., Howes, M. J., Normand, S.-L. T., Manderscheid, R. W., Walters, E. E., & Zaslavsky, A. M. (2003). Screening for serious mental illness in the general population. *Archives of General Psychiatry*, *60*(2), 184–189.

Khan, M., & Memon, M. (2016). *Labour Transitions: Retirees who return to work*. Canadain Longitutdinal Study on Aging (CLSA) Research Findings: Webinar on Canadians Who Choose to Return to Work Post-Retirement. https://www.clsa-elcv.ca/stay-informed/new-clsa/2016/clsa-research-findings-webinar-canadians-who-choose-return-work-post

Laflamme, L., & Menckel, E. (1995). Ageing and occupational accidents: A review of the literature of the past three decades. *Safety Sciencei*, *21*(2), 145–161.

Leonard, D. R., Suruda, A. J., Cook, L. J., Reading, J., Mobasher, H., & Dean, J. M. (1999). Distinctive emergency department usage for injury for workers' compensation cases in Utah in 1996. *Journal of Occupational and Environmental Medicine*, *41*(8), 686–692. https://doi.org/10.1097/00043764-199908000-00011

Mallon, T., & Cherry, S. (2015). Investigating the relationship between worker demographics and nature of injury on federal department of defense workers' compensation injury rates and costs from 2000 to 2008. *Jourjnal of Occupational and Environmental Medicine*, *57*, S27–S30.

Morassaei, S., Breslin, F. C., Ibrahim, S. A., Smith, P. M., Mustard, C. A., Amick, B. C., Shankardass, K., & Petch, J. (2013). Geographic variation in work injuries: A multilevel analysis of individual-level data and area-level factors within Canada. *Annals of Epidemiology*, *23*(5), 260–266. https://doi.org/10.1016/j.annepidem.2013.03.008

Nilsson, K., Pinzke, S., & Lundqvist, P. (2010). Occupational injuries to senior farmers in Sweden. *Journal of Agricultural Safety and Health*, *16*(1), 19–29. https://doi.org/10.13031/2013.29246

Nowrouzi-Kia, B., Baig, A., Li, A., Casole, J., & Chai, E. (2019). Occupational injury trends in the Canadian workforce: An examination of the Canadian community health survey. *International Journal of Critical Illness and Injury Science*, *9*(1), 29–35. https://doi.org/10.4103/IJCIIS.IJCIIS_43_18

Okunribido, O. O., Wynn, T., & Lewis, D. (2011). Are older workers at greater risk of musculoskeletal disorders in the workplace than young workers? – A literature review. In

Occupational Ergonomics (Vol. 10, Issue 1,2, pp. 53–68). IOS Press. https://doi.org/10.3233/OER-2011-0192

Phillips, J. A., & Miltner, R. (2015). Work hazards for an aging nursing workforce. *Journal of Nursing Management*, *23*(6), 803–812. https://doi.org/10.1111/jonm.12217

Pransky, G. S., Benjamin, K. L., Savageau, J. A., Currivan, D., & Fletcher, K. (2005). Outcomes in work-related injuries: A comparison of older and younger workers. *American Journal of Industrial Medicine*, *47*(2), 104–112. https://doi.org/10.1002/ajim.20122

Pransky, G. S., Loisel, P., & Anema, J. (2011). Work disability prevention research: Current and future prospects. *Journal of Occupational Rehabilitation*, *21*, 287–292. https://doi.org/10.1007/s10926-011-9327-z

Prins, A., Ouimette, P., Kimerling, R., Cameron, R. P., Hugelshofer, D. S., Shaw-Hegwer, J., Thrailkill, A., Gusman, F. D., & Sheikh, J. I. (2003). The Primary Care PTSD screen (PC-PTSD): Development and operating characteristics. *Primary Care Psychiatry*, *9*, 9–14.

Raina, P. S., Wolfson, C., Kirkland, S. A., & Griffith, L. E. (2018). *The Canadian Longitudinal Study on Aging (CLSA) report on healthy aging in Canada*. https://www.clsa-elcv.ca/doc/2639

Roberts, K. C., Rao, D. P., Bennett, T. L., Loukine, L., & Jayaraman, G. C. (2015). Prevalence and patterns of chronic disease multimorbidity and associated determinants in Canada. *Chronic Diseases and Injuries in Canada*, *35*(6), 87–94.

Robertson-More, C., Wells, B. J., Nickerson, D., Kirkpatrick, A. W., & Ball, C. G. (2015). The economic and logistical burden of care for severe work-related injuries in a level 1 tertiary care trauma referral center. *American Journal of Surgery*, *210*(3), 451–455. https://doi.org/10.1016/j.amjsurg.2015.01.023

Safe Work. (2015). *Youth injuries in Manitoba, 2005-2014*. http://safemanitoba.com/sites/default/files/resources/2962_swm_young_worker_injury_prevention_strategy_web.pdf

Saskatchewan Workers' Compensation Board. (2019). *2018 Annual Report*.

Savinainen, M., Nygård, C.-H., Korhonen, O., & Ilmarinen, J. (2010). Changes in physical capacity among middle-aged municipal employees over 16 years. *Experimental Aging Research*, *30*(1), 1–22. https://doi.org/10.1080/0361073049025746

Schwatka, N. V, Butler, L. M., & Rosecrance, J. R. (2012). An aging workforce and injury in the construction industry. *Epidemiologic Reviews*, *34*(1), 156–167. https://doi.org/10.1093/epirev/mxr020

Silverstein, M. (2008). Meeting the challenges of an aging population. *Academic Medicine : Journal of the Association of American Medical Colleges*, *51*, 269–280. https://doi.org/10.1002/ajim.20569.

Smith, P. M., Bielecky, A., Ibrahim, S., Mustard, C., Scott-Marshall, H., Saunders, R., & Beaton, D. (2014). How much do preexisting chronic conditions contribute to age differences in health care expenditures after a work-related musculoskeletal injury? *Medical Care*, *52*(1), 71–77. https://doi.org/10.1097/MLR.0000000000000017

Smith, P. M., Bielecky, A., Mustard, C., Beaton, D., Hogg-Johnson, S., Ibrahim, S., Koehoorn, M., McLeod, C., Saunders, R., & Scott-Marshall, H. (2013). The relationship between age and work injury in british columbia: Examining differences across time and nature of injury. *Journal of Occupational Health*, *55*(2), 98–107.

Statistics Canada. (2014a). *Labour force participation of seniors*. The Daily. http://www.statcan.gc.ca/eng/dai/smr08/2014/smr08_191_2014#a8

Statistics Canada. (2014b). *Population projections for Canada, Provinces and Territories, 2009 to 2036; Canadian demographics at a glance*. The Daily.

Statistics Canada. (2014c). *Work injuries: Findings*. Health Reports (82-003-XWE, Vol. 18 No. 3). https://www150.statcan.gc.ca/n1/pub/82-003-x/2006007/article/injuries-blessures/4149017-eng.htm

Statistics Canada. (2016a). *Population and dwelling count highlight tables, 2016 Census*. https://www12.statcan.gc.ca/census-recensement/2016/dp-pd/hlt-fst/pd-pl/Table.cfm?Lang=Eng&T=703&SR=1&S=87&O=A&RPP=25

Statistics Canada. (2016b). *Population by sex and age group*. Population by Sex and Age Group. http://www.statcan.gc.ca/tables-tableaux/sum-som/l01/cst01/demo10a-eng.htm

Statistics Canada. (2017a). *Census in brief: Working seniors in Canada* (Issue 98). http://www12.statcan.gc.ca/census-recensement/2016/as-sa/98-200-x/2016027/98-200-x2016027-eng.pdf

Statistics Canada. (2017b). *Focus on Geography Series, 2016 Census. Statistics Canada Catalogue no. 98-404-X2016001. Ottawa, Ontario. Data products, 2016 Census.* https://www12.statcan.gc.ca/census-recensement/2016/as-sa/fogs-spg/Facts-can-eng.cfm?Lang=Eng&GK=CAN&GC=01&TOPIC=7

Stoesz, B., Chimney, K., Deng, C., Grogan, H., Menec, V., Piotrowski, C., Shooshtari, S., & Turner, N. (2020). Incidence, risk factors, and outcomes of non-fatal work-related injuries among older workers: A review of research from 2010 to 2019. *Safety Science*, *126*(March 2019), 104668. https://doi.org/10.1016/j.ssci.2020.104668

Tadros, A., Sharon, M., Chill, N., Dragan, S., Rowell, J., & Hoffman, S. (2018). Emergency department visits for work-related injuries. *The American Journal of Emergency Medicine*, *36*(8), 1455–1458. https://doi.org/10.1016/j.ajem.2018.04.058

Taimela, S., Läärä, E., Malmivaara, A., Tiekso, J., Sintonen, H., Justén, S., & Aro, T. (2007). Self-

reported health problems and sickness absence in different age groups predominantly engaged in physical work. *Occupational and Environmental Medicine*, *64*(11), 739–746. https://doi.org/10.1136/oem.2006.027789

Tucker, S., & Keefe, A. (2018). *2018 Report on work fatality and injury rates in Canada*. https://www.uregina.ca/business/faculty-staff/faculty/file_download/2018-Report-on-Workplace-Fatalities-and-Injuries.pdf

Tucker, S., & Keefe, A. (2019). 2019 Report on work fatality and injury rates in Canada. In *University Of Regina* (Vol. 1). https://www.uregina.ca/business/faculty-staff/faculty/file_download/2018-Report-on-Workplace-Fatalities-and-Injuries.pdf

Valcour, M. (2007). Work-based resources as moderators of the relationship between work hours and satisfaction with work-family balance. *Journal of Applied Psychology*, *92*(6), 1512–1523. https://doi.org/10.1037/0021-9010.92.6.1512

Wadsworth, E. J. K., Simpson, S. A., Moss, S. C., & Smith, A. P. (2003). The Bristol Stress and Health Study: Accidents, minor injuries and cognitive failures at work. *Occupational Medicine*, *53*(6), 392–397. https://doi.org/10.1093/occmed/kqg088

Wang, H., Chen, G., Wang, Z., & Zheng, X. (2015). Socioeconomic inequalities and occupational injury disability in China: A population-based survey. *International Journal of Environmental Research and Public Health*, *12*(6), 6006–6015. https://doi.org/10.3390/ijerph120606006

Warr, P. (1994). Age and job performance. In J. Snel & R. Cremer (Eds.), *Work and aging: A European perspective* (pp. 309–322). Taylor & Francis, LTD.

Wilkins, K., & Mackenzie, S. G. (2007). Work injuries. In *Health reports / Statistics Canada* (Vol. 18, Issue 3). https://www150.statcan.gc.ca/n1/pub/82-003-x/2006007/article/injuries-blessures/4149017-eng.htm

Woo, J. M., & Postolache, T. T. (2008). The impact of work environment on mood disorders and suicide: Evidence and implications. *International Journal on Disability and Human Development*, *7*(2), 185–200. https://doi.org/10.1515/ijdhd.2008.7.2.185

Workers' Compensation Board-Alberta. (2019). *2018 Annual Report Workers' Compensation Board-Alberta*.

WorkplaceNL. (2018). *Advancing a strong safety culture in Newfoundland and Labrador: A workplace injury prevention strategy 2018-2022*. https://workplacenl.ca/site/uploads/2019/06/advancing-a-strong-safety-culture-in-nl.pdf

WorkplaceNL. (2019). *Workplace injuries hurt the most at home*.

WorkSafeBC. (2019). *Serving British Columbians: WorkSafeBC statistics 2018*.

Wuellner, S. E., Walters, J. K., Thomas, S., Rogers, P. F., Leinenkugel, K., Lefkowitz, D., Davis, L. K., Gelberg, K., Zak, M. J., & Castillo, D. N. (2011). Nonfatal occupational injuries and illnesses among older workers --- United States, 2009. *Morbidity and Mortality Weekly Report*, *60*(16), 503–508.

Yang, H., Haldeman, S., Lu, M. L., & Baker, D. (2016). Low back pain prevalence and related workplace psychosocial risk factors: A study using data from the 2010 National Health Interview Survey. *Journal of Manipulative and Physiological Therapeutics*, *39*(7), 459–472. https://doi.org/10.1016/j.jmpt.2016.07.004

Zwerling, C., Sprince, N. L., Davis, C. S., Whitten, P. S., Wallace, R. R., & Heeringa, S. G. (1998). Occupational injuries among older workers with disabilities: A prospective cohort study of the Health and Retirement Survey, 1992 to 1994. *American Journal of Public Health*, *88*(11), 1691–1695. http://www.pubmedcentral.nih.gov/articlerender.fcgi?artid=1508572&tool=pmcentrez&rendertype=abstract

Zwerling, C., Whitten, P. S., Davis, C. S., & Sprince, N. L. (1998). Occupational injuries among older workers with visual, auditory, and other impairments. A validation study. *Journal of Occupational and Environmental Medicine / American College of Occupational and Environmental Medicine*, *40*(8), 720–723. http://www.ncbi.nlm.nih.gov/pubmed/9729756

Appendices

Appendix A. Profiles of Middle-Aged and Older Adults in Newfoundland and Labrador and Canada

Table 6. Profile of Middle-Aged and Older Adults in Newfoundland and Labrador and Canada

Variable	Newfoundland and Labrador				Canada			
	Weighted *n*	%	95% CI[a]		Weighted *n*	%	99% CI	
Age (years)								
45-54	82,307	36.3	33.9	38.6	4,969,192	37.6	36.5	38.7
55-64	75,181	33.1	30.8	35.5	4,086,022	30.9	30.1	31.8
65-74	46,387	20.4	18.6	22.3	2,536,313	19.2	18.5	19.9
75-85	23,136	10.2	9.1	11.3	1,619,870	12.3	11.8	12.7
Total	227,011	100.0			13,211,397	100.0		
Sex								
Female	116,742	51.4	49.0	53.8	6,800,317	51.5	50.5	52.5
Male	110,269	48.6	46.2	51.0	6,411,079	48.5	47.5	49.5
Total	227,011	100.0			13,211,397	100.0		
Marital status								
Single, never married or never lived with a partner	14,923	6.6	5.4	7.7	1,037,877	7.9	7.4	8.3
Married/Living with a partner in a common-law relationship	178,732	78.8	76.9	80.6	9,878,503	74.8	73.8	75.8
Widowed	15,589	6.9	5.9	7.9	939,004	7.1	6.7	7.5
Divorced/Separated	17,716	7.8	6.6	9.0	1,352,370	10.2	9.7	10.7
Total	226,961	100.0			13,207,754	100.0		
Country of birth								

Variable	Newfoundland and Labrador				Canada			
	Weighted *n*	%	95% CI[a]		Weighted *n*	%	99% CI	
Born in Canada	217,400	95.8	95.0	96.6	11,183,840	84.7	83.8	85.6
Born outside Canada	9,591	4.2	3.4	5.0	2,025,383	15.3	14.7	16.0
Total	226,992	100.0			13,209,222	100.0		
Language most spoken at home								
English	226,030	99.7	99.4	99.9	9,666,661	73.4	72.7	74.1
French	321	0.1	0.0	0.3	3,251,378	24.7	24.2	25.1
Other	414	0.2	0.0	0.4	255,232	1.9	1.7	2.2
Total	226,765	100.0			13,173,271	100.0		
Urban/rural classification								
Urban	131,112	79.5	77.2	81.8	9,717,423	77.6	76.6	78.5
Rural	33,860	20.5	18.2	22.8	2,811,525	22.4	21.6	23.3
Total	164,972	100.0			12,528,948	100.0		
Education								
Less than secondary school graduation	20,071	8.9	7.4	10.3	951,459	7.2	6.8	7.7
Secondary school graduation, no post-secondary	25,732	11.4	9.7	13.0	1,659,633	12.6	12.0	13.2
Some post-secondary education	10,474	4.6	3.6	5.6	996,634	7.6	7.1	8.1
Post-secondary degree/diploma	170,217	75.2	73.0	77.3	9,558,211	72.6	71.6	73.6
Total	226,494	100.0			13,165,938	100.0		
Retirement								
Completely retired	94,184	41.7	39.4	44.1	5,073,341	38.6	37.8	39.4
Partly retired	21,026	9.3	7.9	10.7	1,286,015	9.8	9.3	10.3
Not retired	110,617	49.0	46.6	51.4	6,796,183	51.7	50.5	52.8
Total	225,826	100.0			13,155,539	100.0		
Total household income								
Less than $20,000	13,090	6.0	4.9	7.1	650,834	5.2	4.8	5.6
$20,000 or more, but less than $50,000	62,401	28.6	26.4	30.8	2,926,832	23.4	22.6	24.1
$50,000 or more, but less than $100,000	73,960	33.9	31.5	36.2	4,514,693	36.1	35.1	37.0

Variable	Newfoundland and Labrador				Canada			
	Weighted *n*	%	95% CI[a]		Weighted *n*	%	99% CI	
$100,000 or more, but less than $150,000	41,548	19.0	17.1	21.0	2,424,978	19.4	18.6	20.2
$150,000 or more	27,239	12.5	11.0	14.0	1,994,364	15.9	15.2	16.7
Total	218,239	100.0			12,511,702	100.0		
Self-rated general health								
Excellent	38,386	17.0	15.2	18.7	2,643,815	20.0	19.3	20.8
Very good	97,917	43.2	40.9	45.6	5,160,220	39.1	38.1	40.0
Good	59,362	26.2	24.1	28.3	3,870,895	29.3	28.5	30.2
Fair	24,037	10.6	9.1	12.1	1,197,095	9.1	8.5	9.6
Poor	6,734	3.0	2.1	3.8	327,186	2.5	2.2	2.8
Total	226,436	100.0			13,199,211	100.0		
Self-rated mental health								
Excellent	72,651	32.0	29.7	34.3	3,999,560	30.3	29.4	31.2
Very good	93,948	41.4	39.0	43.8	5,174,483	39.2	38.3	40.1
Good	51,501	22.7	20.7	24.7	3,323,662	25.2	24.4	26.0
Fair	7,780	3.4	2.6	4.2	612,520	4.6	4.2	5.0
Poor	1,059	0.5	0.2	0.7	92,191	0.7	0.5	0.9
Total	226,938	100.0			13,202,416	100.0		
Type of drinker								
Did not drink in the last 12 months	31,150	14.5	12.7	16.2	1,451,988	11.3	10.7	11.9
Occasional drinker	40,516	18.8	16.8	20.8	1,814,053	14.1	13.5	14.8
Regular drinker (at least once a month)	143,713	66.7	64.4	69.1	9,588,305	74.6	73.6	75.6
Total	215,379	100.0			12,854,346	100.0		

Note. Missing values excluded.
CI = Confidence interval
[a] Due to the small sample size for Newfoundland and Labrador, a larger *p* value (.05) was used rather than the smaller .01 for the calculation of CIs

Appendix B. Profiles of Older Workers with Work-Related Injuries in Newfoundland and Labrador and Canada

Table 7. Profile of Middle-Aged and Older Workers with Work-Related Injuries in Newfoundland and Labrador who were Employed or Recently Retired.

VARIABLE	Work-related Injuries				X^2
	Yes		No		
	N	% (95% CI)	*N*	% (95% CI)	
Population Characteristics					
Age (years)					
45-54	2,525	85.9 (75.4, 96.5)	63,426	58.2 (54.7, 61.6)	11.8**
55-85	414	14.1 (3.5, 24.6)	45,623	41.8 (38.4, 45.3)	
Total	2,939		109,049		
Sex					
Male	1,524	51.9 (31.1, 72.6)	58,241	53.4 (49.9, 56.9)	2.3
Female	1,414	48.1 (27.4, 68.9)	50,807	46.6 (43.1, 50.1)	
Total	2,939		109,049		
Marital Status					
Single, never married or never lived with a partner/Widowed/ Divorced/Separated	516	17.5 (2.9, 32.2)	19,368	17.8 (15.3, 20.2)	0.0
Married/ Living with a partner in a common-law relationship	2,423	82.5 (67.8, 97.1)	89,630	82.2 (79.8, 84.7)	
Total	2,939		108,998		
Country of Birth					
Born in Canada	2,883	98.1 (95.3, 100.0)	104,346	95.8 (94.6, 97.1)	0.4
Born outside Canada	56	1.9 (0.0, 4.7)	4,518	4.2 (2.9, 5.4)	
Total	2,939		108,864		
Urban/rural Classification					
Urban	2,292	92.2 (83.1, 100.0)	67,082	80.6 (77.3, 83.9)	0.7
Rural	192	7.8 (0.0, 16.9)	16,132	19.4 (16.1, 22.7)	
Total	2,484		83,214		
Total household income					

VARIABLE	Work-related Injuries				X^2
	Yes		No		
	N	% (95% CI)	*N*	% (95% CI)	
Less than $50,000	159	5.4 (0.0, 11.2)	18,056	16.9 (14.2, 19.7)	0.3
$50,000 or more	2,780	94.6 (88.8, 100.0)	88,500	83.1 (80.3, 85.8)	
Total	2,939		106,556		
Total personal income					
Less than $50,000	1,011	34.4 (13.5, 55.3)	41,534	38.9 (35.4, 42.5)	0.0
$50,000 or more	1,928	65.6 (44.7, 86.5)	65,112	61.1 (57.5, 64.6)	
Total	2,939		106,646		
Education					
Less than secondary school graduation/Secondary school graduation, no post-secondary	528	17.9 (0.0, 36.6)	14,082	12.9 (10.4, 15.5)	2.4
Some post-secondary education/Post-secondary degree/ diploma	2,411	82.1 (63.4, 100.0)	94,721	87.1 (84.5, 89.6)	
Total	2,939		108,803		
Duration worked at current job					
Less than 5 years	403	13.8 (0.6, 27.0)	17,479	18.3 (15.4, 21.3)	0.0
5 years or more	2,514	86.2 (73.0, 99.4)	77,890	81.7 (78.7, 84.6)	
Total	2,917		95,368		
Current work schedule					
Daytime schedule or shift	1,278	50.4 (29.1, 71.7)	71,118	77.1 (73.7, 80.4)	6.7*
Evening/night/rotating shift, seasonal, on call, or casual but called as need arises	1,258	49.6 (28.3, 70.9)	21,145	22.9 (19.6, 26.3)	
Total	2,535		92,262		
Current working status					
Employed all of the time (30+ hours/week)	2,895	99.2 (97.7, 100.0)	85,600	89.9 (87.6, 92.2)	5.2*
Employed some or most of the time	22	0.8 (0.0, 2.3)	9,623	10.1 (7.8, 12.4)	
Total	2,917		95,223		
Anxiety disorder					
Yes	215	7.3 (0.6, 14.0)	6,196	5.7 (4.2, 7.2)	2.3
No	2,724	92.7 (86.0, 99.4)	102,742	94.3 (92.8, 95.8)	

VARIABLE	Work-related Injuries				X^2
	Yes		No		
	N	% (95% CI)	*N*	% (95% CI)	
Total	2,939		108,938		
Mood disorder					
Yes	557	19.0 (0.4, 37.5)	11,451	10.5 (8.4, 12.6)	1.8
No	2,382	81.0 (62.5, 99.6)	97,434	89.5 (87.4, 91.6)	
Total	2,939		108,885		
Perceived health (Recoded)					
Excellent/Very good/Good	2,657	90.4 (77.0, 100.0)	99,350	91.5 (89.5, 93.5)	0.0
Fair/Poor	282	9.6 (0.0, 23.0)	9,233	8.5 (6.5, 10.5)	
Total	2,939		108,583		
Perceived mental health (Recoded)					
Excellent/Very good/Good	2,770	94.3 (88.3, 100.0)	105,621	96.9 (95.7, 98.0)	4.4*
Fair/Poor	169	5.7 (0.0, 11.7)	3,427	3.1 (2.0, 4.3)	
Total	2,939		109,049		
Eye-sight rating					
Excellent/ Very good/ Good	2,633	89.6 (81.0, 98.2)	103,414	94.9 (93.3, 96.4)	9.4**
Fair/Poor or non-existent (blind)	306	10.4 (1.8, 19.0)	5,610	5.1 (3.6, 6.7)	
Total	2,939		109,024		
Hearing rating					
Excellent/Very good/Good	2,939	100 (100.0, 100.0)	100,738	92.4 (90.6, 94.2)	0.7
Fair/Poor or non-existent (deaf)	0	-	8,297	7.6 (5.8, 9.4)	
Total	2,939		109,035		
Type of Smoker					
Occasional smoker/Former daily smoker/Former occasional smoker/Never smoked (a whole cigarette)	2,380	81.0 (66.8, 95.2)	96,306	88.3 (86.0, 90.6)	4.9*
Daily smoker/Occasional smoker (former daily smoker)	559	19.0 (4.8, 33.2)	12,742	11.7 (9.4, 14.0)	
Total	2,939		109,049		
Type of drinker					

VARIABLE	Work-related Injuries				X^2
	Yes		No		
	N	% (95% CI)	*N*	% (95% CI)	
Did not drink in the last 12 months/Occasional drinker	993	33.8 (12.2, 55.4)	28,672	27.2 (24.0, 30.5)	0.1
Regular drinker (at least once a month)	1,946	66.2 (44.6, 87.8)	76,720	72.8 (69.5, 76.0)	
Total	2,939		105,392		
Self-rated healthy aging					
Excellent/ Very good/ Good	2,835	96.5 (92.3, 100.0)	100,655	92.3 (90.4, 94.2)	0.0
Fair/Poor	104	3.5 (0.0, 7.7)	8,360	7.7 (5.8, 9.6)	
Total	2,939		109,015		
Memory problem					
Yes	0	-	724	0.7 (0.1, 1.2)	4.3*
No	2,939	100 (100.0, 100.0)	108,325	99.3 (98.8, 99.9)	
Total	2,939		109,049		
Post-traumatic stress disorder (PTSD)					
Yes	69	2.3 (0.0, 5.6)	4,189	3.8 (2.6, 5.1)	0.0
No	2,870	97.7 (94.4, 100.0)	104,731	96.2 (94.9, 97.4)	
Total	2,939		108,920		
Depression based on centre for epidemiological studies short depression scale (DES -D 10)					
Yes	341	12.0 (2.8, 21.2)	14,431	13.2 (10.8, 15.6)	2.1
No	2,498	88.0 (78.8, 97.2)	94,618	86.8 (84.4, 89.2)	
Total	2,839		109,049		
Vision aid used					
Yes	36	1.2 (0.0, 3.6)	2,057	1.9 (0.9, 2.9)	0.0
No	2,903	98.8 (96.4, 100.0)	106,734	98.1 (97.1, 99.1)	
Total	2,939		108,791		
Injury Characteristics					
Cause of Injury					
Physical Strain	1,620	55.5	4,988	44.7	
Other	1,296	44.5	6,162	55.3	
Total	2,917		11,149		

Note. CI = confidence interval; *p < .01, **p < .001, ***p < .0001.

Table 8. Profile of Canadian Longitudinal Study on Aging (CLSA) Participants with and without Work-Related Injuries in Canada who were Employed or Recently Retired.

VARIABLE	Work-related Injuries				X^2
	Yes		No		
	N	% (99% CI)	*N*	% (99% CI)	
Population Characteristics					
Age (years)					
45-54	166,115	63.5 (56.9, 70.2)	4,037,688	57.9 (56.6, 59.1)	13.4**
55-85	95,428	36.5 (29.8, 43.1)	2,941,221	42.1 (40.9, 43.4)	
Total	261,543		6,978,909		
Sex					
Male	151,427	57.9 (50.9, 64.9)	3,650,470	52.3 (51.0, 53.6)	3.6
Female	110,116	42.1 (35.1, 49.1)	3,328,439	47.7 (46.4, 49.0)	
Total	261,543		6,978,909		
Marital Status					
Single, never married or never lived with a partner/Widowed/ Divorced/Separated	56,827	21.7 (16.5, 26.9)	1,436,358	20.6 (19.6, 21.6)	11.0**
Married/ Living with a partner in a common-law relationship	204,614	78.3 (73.1, 83.5)	5,540,550	79.4 (78.4, 80.4)	
Total	261,441		6,976,908		
Country of Birth					
Born in Canada	231,635	88.6 (83.8, 93.4)	5,903,432	84.6 (83.7, 85.6)	5.5
Born outside Canada	29,908	11.4 (6.6, 16.2)	1,071,424	15.4 (14.4, 16.3)	
Total	261,543		6,974,856		
Urban/rural Classification					
Urban	189,845	78.5 (72.0, 85.0)	5,210,183	78.7 (77.5, 79.9)	0
Rural	52,099	21.5 (15.0, 28.0)	1,411,557	21.3 (20.1, 22.5)	
Total	241,944		6,621,740		
Total household income					
Less than $50,000	51,640	20.7 (15.0, 26.4)	1,045,908	15.6 (14.7, 16.5)	19.7***
$50,000 or more	197,975	79.3 (73.6, 85.0)	5,663,622	84.4 (83.5, 85.3)	
Total	249,615		6,709,530		

VARIABLE	Work-related Injuries				X^2
	Yes		No		
	N	% (99% CI)	*N*	% (99% CI)	
Total personal income					
Less than $50,000	120,706	47.4 (40.2, 54.6)	2,653,518	39.1 (37.8, 40.4)	30.4***
$50,000 or more	133,769	52.6 (45.4, 59.8)	4,136,815	60.9 (59.6, 62.2)	
Total	254,475		6,790,333		
Education					
Less than secondary school graduation/Secondary school graduation, no post-secondary	43,972	16.9 (11.8, 22.1)	1,043,678	15.0 (14.0, 16.0)	6.8*
Some post-secondary education/Post-secondary degree/ diploma	215,642	83.1 (77.9, 88.2)	5,920,515	85.0 (84.0, 86.0)	
Total	259,614		6,964,193		
Duration worked at current job					
Less than 5 years	52,706	21.6 (15.5, 27.6)	1,169,066	19.3 (18.2, 20.5)	3.4
5 years or more	191,645	78.4 (72.4, 84.5)	4,873,647	80.7 (79.5, 81.8)	
Total	244,351		6,042,713		
Current work schedule					
Daytime schedule or shift	160,676	67.9 (60.5, 75.4)	4,839,649	82.7 (81.6, 83.8)	43.5***
Evening/night/rotating shift, seasonal, on call, or casual but called as need arises	75,900	32.1 (24.6, 39.5)	1,010,160	17.3 (16.2, 18.4)	
Total	236,576		5,849,809		
Current working status					
Employed all of the time (30+ hours/week)	209,059	86.1 (81.2, 91.0)	4,921,517	81.6 (80.5, 82.7)	7.1*
Employed some or most of the time	33,714	13.9 (9.0, 18.9)	1,108,535	18.4 (17.3, 19.5)	
Total	242,773		6,030,052		
Anxiety disorder					
Yes	30,311	11.6 (6.7, 16.5)	497,587	7.1 (6.5, 7.8)	7.8*
No	231,058	88.4 (83.5, 93.3)	6,472,006	92.9 (92.2, 93.5)	
Total	261,369		6,969,593		
Mood disorder					
Yes	49,578	19.0 (13.8, 24.1)	1,029,271	14.8 (13.8, 15.7)	19.2***

VARIABLE	Work-related Injuries				X^2
	Yes		No		
	N	% (99% CI)	*N*	% (99% CI)	
No	211,731	81.0 (75.9, 86.2)	5,940,911	85.2 (84.3, 86.2)	
Total	261,309		6,970,182		
Perceived health (Recoded)					
Excellent/Very good/Good	228,977	87.5 (82.2, 92.9)	6,471,836	92.8 (92.1, 93.5)	16.9***
Fair/Poor	32,567	12.5 (7.1, 17.8)	502,272	7.2 (6.5, 7.9)	
Total	261,543		6,974,108		
Perceived mental health (Recoded)					
Excellent/Very good/Good	249,939	95.7 (93.3, 98.0)	6,685,872	95.8 (95.3, 96.4)	1.6
Fair/Poor	11,342	4.3 (2.0, 6.7)	290,763	4.2 (3.6, 4.7)	
Total	261,281		6,976,635		
Eye-sight rating					
Excellent/ Very good/ Good	232,947	89.2 (84.8, 93.6)	6,529,416	93.6 (92.9, 94.3)	20.8***
Fair/Poor or non-existent (blind)	28,282	10.8 (6.4, 15.2)	446,238	6.4 (5.7, 7.1)	
Total	261,229		6,975,655		
Hearing rating					
Excellent/Very good/Good	236,097	90.4 (86.3, 94.5)	6,345,401	91.0 (90.3, 91.7)	0.6
Fair/Poor or non-existent (deaf)	25,056	9.6 (5.5, 13.7)	628,140	9.0 (8.3, 9.7)	
Total	261,153		6,973,542		
Type of Smoker					
Occasional smoker/Former daily smoker/Former occasional smoker/Never smoked (a whole cigarette)	220,489	84.3 (79.3, 89.4)	6,253,454	90.0 (89.2, 90.8)	26.6***
Daily smoker/Occasional smoker (former daily smoker)	40,979	15.7 (10.6, 20.7)	694,956	10.0 (9.2, 10.8)	
Total	261,469		6,948,410		
Type of drinker					
Did not drink in the last 12 months/Occasional drinker	69,148	26.8 (20.3, 33.4)	1,464,041	21.4 (20.3, 22.5)	3.9
Regular drinker (at least once a month)	188,453	73.2 (66.6, 79.7)	5,372,025	78.6 (77.5, 79.7)	
Total	257,600		6,836,066		

VARIABLE	Work-related Injuries				X^2
	Yes		No		
	N	% (99% CI)	*N*	% (99% CI)	
Self-rated healthy aging					
Excellent/ Very good/ Good	228,390	87.7 (82.7, 92.7)	6,453,555	92.6 (91.9, 93.3)	23.3***
Fair/Poor	32,065	12.3 (7.3, 17.3)	515,603	7.4 (6.7, 8.1)	
Total	260,455		6,969,158		
Memory problem					
Yes	4,327	1.7 (0.0, 3.3)	68,115	1.0 (0.7, 1.2)	2.6
No	256,875	98.3 (96.7, 100.0)	6,905,818	99.0 (98.8, 99.3)	
Total	261,202		6,973,933		
Positive screening for Post-traumatic stress disorder (PTSD)					
Yes	22,344	8.6 (4.7, 12.4)	319,373	4.6 (4.0, 5.1)	6.5*
No	238,813	91.4 (87.6, 95.3)	6,647,824	95.4 (94.9, 96.0)	
Total	261,158		6,967,197		
Depression based on centre for epidemiological studies short depression scale (DES -D 10)					
Yes	52,967	20.4 (14.3, 26.5)	937,475	13.5 (12.6, 14.4)	23.1***
No	206,904	79.6 (73.5, 85.7)	6,021,582	86.5 (85.6 ,87.4)	
Total	259,871		6,959,057		
Vision aid used					
Yes	16,380	6.3 (2.1, 10.4)	294,388	4.2 (3.7, 4.7)	0.4
No	245,163	93.7 (89.6, 97.9)	6,683,750	95.8 (95.3, 96.3)	
Total	261,543		6,978,138		
Injury Characteristics					
Severity of Injury					
Less severe injury	85,878	57.3 (48.2, 66.4)	465,000	55.0 (51.2, 58.7)	
More severe injury	63,990	42.7 (33.6, 51.8)	381,166	45.0 (41.3, 48.8)	
Total	149,868		846,165		
Cause of Injury					
Physical Strain	95,278	37.6 (30.8, 44.4)	347,647	42.2 (38.4, 46.0)	
Other	158,279	62.4 (55.6, 69.2)	475,977	57.8 (54.0, 61.6)	
Total	253,557		823,624		

Note. CI = confidence interval; *p < .01, **p < .001, ***p < .0001.

Appendix C. Incidence of Work-Related Injury in Middle-Aged and Older Workers in the Provinces of Canada

Table 9. Incidence of Work-Related Injury in Middle-Aged and Older Workers by Canadian Province.

Canadian Province	unweighted *n*	weighted *n*	weighted %
Newfoundland and Labrador	42	2,939	2.6
Nova Scotia	70	8,210	3.9
New Brunswick	21	6,430	3.9
Prince Edward Island	20	1,211	3.6
Quebec	153	62,350	3.8
Ontario	112	87,377	3.1
Manitoba	93	10,316	4.0
Saskatchewan	28	8,781	3.9
Alberta	80	23,747	3.1
British Columbia	172	50,182	5.0
Total	**791**	**261,543**	

Addendum

Work-Related Injuries in Middle-Aged and Older Workers in Newfoundland and Labrador

Brenda M. Stoesz, Shahin Shooshtari, Verena Menec, Caroline Piotrowski, Dimple Bhojwani, Nick Turner

Please see the following articles for further information about the CSLA:

Raina P., Wolfson C., Kirkland S.A., Griffith L.E., Oremus M., Patterson C., Tuokko H., Hogan D., Wister A., Payette H., Brazil K., Shannon H. (2009). The Canadian Longitudinal Study on Aging (CLSA). *Canadian Journal on Aging, Special Issue on the CLSA*, *28*(3), 221-229, https://doi.org/10.1017/S0714980809990055

Raina P, Wolfson C., Kirkland S, Griffith L.E., Balion C., Cossette B., Dionne I., Hofer S., Hogan D., van den Heuvel E.R., Liu-Ambrose T., Menec V., Mugford G., Patterson C., Payette H., Richards B., Shannon H., Sheets D., Taler V., Thompson M., Tuokko H., Wister A., Wu C., Young L. (2019). Cohort profile: The Canadian Longitudinal Study on Aging (CLSA). *International Journal of Epidemiology*, *48*(6), 1752-1753j, https://doi.org/10.1093/ije/dyz173

Revision of Acknowledgement

This research was supported by WorkplaceNL and the Canadian Centre for Advanced Leadership in Business, and was made possible using the data/biospecimens collected by the Canadian Longitudinal Study on Aging (CLSA). Funding for the CLSA is provided by the Government of Canada through the Canadian Institutes of Health Research (CIHR) under grant reference: LSA 94473 and the Canada Foundation for Innovation, as well as the following provinces, Newfoundland, Nova Scotia, Quebec, Ontario, Manitoba, Alberta, and British Columbia. This research has been conducted using the CLSA dataset [Baseline Tracking Dataset

Version 3.4; Comprehensive Dataset Version 4.0; Follow-up 1 Tracking Dataset Version 1.0 and Follow-up 1 Comprehensive Dataset Version 1.0], Application ID 190204.

The CLSA is led by Drs. Parminder Raina, Christina Wolfson and Susan Kirkland. We thank Scott Nowicki for his assistance in data analysis.

Disclaimer

The opinions expressed in this manuscript are the author's own and do not reflect the views of the Canadian Longitudinal Study on Aging.

Data Availability Statement

Data are available from the Canadian Longitudinal Study on Aging (www.clsa-elcv.ca) for researchers who meet the criteria for access to de-identified CLSA data.