



Economic Burden of Injury in British Columbia

August 2015

BC INJURY research and
prevention unit

Reducing the societal and economic burden of injury in BC

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The British Columbia Injury Research and Prevention Unit (BCIRPU) was established by the Ministry of Health and the Minister's Injury Prevention Advisory Committee in August 1997. BCIRPU is housed within the Developmental Neurosciences and Child Health (DNCH) cluster at the Child and Family Research Institute (CFRI), BC Children's Hospital. BCIRPU is supported by CFRI, the Provincial Health Services Authority (PHSA) and the University of British Columbia (UBC). BCIRPU's vision is "to be a leader in the production and transfer of injury prevention knowledge and the integration of evidence-based injury prevention practices into the daily lives of those at risk, those who care for them, and those with a mandate for public health and safety in British Columbia."

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TABLE OF CONTENTS

EXECUTIVE SUMMARY	4
INTRODUCTION	10
APPROACHES TO MEASURING THE COST OF INJURY	10
METHODOLOGY	10
GLOSSARY AND TERMS USED IN THE REPORT	12
OVERVIEW OF INJURY IN BC	13
Total Burden of Injury	13
Intentional and Unintentional Injury	13
Injury by Cause.....	14
Costs of Injury by Cause.....	14
Transport-Related Injuries by Cause and Associated Costs	16
Fall-Related Injuries by Cause and Associated Costs ..	18
Intentional Injuries by Cause and Associated Costs ...	19
Costs of Injury by Health Authority	20
OVERVIEW OF COSTS BY EACH HEALTH AUTHORITY	21
Interior Health Authority	21
Intentional and Unintentional Injury	21
Injury by Cause.....	21
Costs of Injury by Cause.....	21
Transport-Related Injuries by Cause and Associated Costs	23
Fall-Related Injuries by Cause and Associated Costs ..	24
Intentional Injuries by Cause and Associated Costs ...	25
FRASER HEALTH AUTHORITY	27
Intentional and Unintentional Injury	27
Injury by Cause.....	27
Costs of Injury by Cause.....	27
Transport-Related Injuries by Cause and Associated Costs	29
Fall-Related Injuries by Cause and Associated Costs ..	30
Intentional Injuries by Cause and Associated Costs ...	31
VANCOUVER COASTAL HEALTH AUTHORITY	33
Intentional and Unintentional Injury	33
Injury by Cause.....	33
Costs of Injury by Cause.....	33
Transport-Related Injuries by Cause and Associated Costs	35
Fall-Related Injuries by Cause and Associated Costs ..	36
Intentional Injuries by Cause and Associated Costs ...	37
ISLAND HEALTH AUTHORITY	39
Intentional and Unintentional Injury	39
Injury by Cause.....	39
Costs of Injury by Cause.....	39
Transport-Related Injuries by Cause and Associated Costs	41
Fall-Related Injuries by Cause and Associated Costs ..	42
Intentional Injuries by Cause and Associated Costs ...	43
NORTHERN HEALTH AUTHORITY	45
Intentional and Unintentional Injury	45
Injury by Cause.....	45
Costs of Injury by Cause.....	45
Transport-Related Injuries by Cause and Associated Costs	47
Fall-Related Injuries by Cause and Associated Costs ..	48
Intentional Injuries by Cause and Associated Costs ...	48
FURTHER ANALYSES OF BC COSTS	51
BC Costs of Injury by Age and Sex	51
BC Costs of Injury by Cause and Age.....	51
BC Health Care Cost of Injury by Age and Major Causes	53
Fall-Related Costs by Age and Sex.....	53
Transport-Related Costs by Age and Sex	54
Suicide and Self-Harm-Related Costs by Age and Sex	56
Unintentional Poisoning-Related Costs by Age and Sex	56
Violence-Related Costs by Age and Sex	56
Sensitivity Analysis.....	58
Comparisons with Earlier Studies	59
SUMMARY	63
CONCLUSION	64
REFERENCES	66
APPENDIX 1: METHODOLOGY	67
APPENDIX 2: ICD-10 CODE CLASSIFICATIONS BY CAUSE	70

EXECUTIVE SUMMARY

Introduction

Injuries are a significant drain on the resources of the public health system, yet the vast majority are preventable. Injury prevention has been identified as an important priority within British Columbia (BC). The BC Injury Research and Prevention Unit (BCIRPU) is pleased to present the *Economic Burden of Injury in British Columbia*.

The guiding framework document for public health in BC, *PROMOTE, PROTECT, PREVENT: Our Health Begins Here*, includes a specific goal and three objectives for injury prevention. The goal of *a safer province that reduces the risk of preventable injuries* will be achieved through:

1. Building a culture of safety at work, home and play by increasing awareness of injury risks, implementing prevention education and taking priority actions, such as designing and developing safe environments, systems and products.
2. Reduce the incidence of falls, fall-related injuries and fall-related risk factors among seniors in BC through surveillance, enhanced community capacity, public information and evidence-based prevention measures.
3. Reduce the incidence of injuries among children and youth in BC through physical and social environmental modifications and increased awareness of safety-promoting behaviours.

This report measures the occurrence and cost of injuries in 2010, the most recent provincial data available, and compares the results to earlier studies using 1998 and 2004 data. The main goal of this report is to provide an update of economic costs of injuries in BC, with an understanding of detailed costs by age group and sex, and to compare the current economic costs of injury to that of earlier years.

With this report, BCIRPU has quantified the annual burden that injury places on British Columbians and the health care system. A further analysis has been provided at a regional level to provide more detailed information to regional health authorities regarding the specific costs of injury in their jurisdictions. Detailed breakdown by age group and sex, as well as leading causes of injury has also been provided. A comparison of previous economic analyses has been made to understand change in injury costs over time. Though many attempts have been made to quantify the burden of injury, it is still a difficult task to quantify and attach economic costs to the greater burden of pain, diminished potential, and loss experienced by injured British Columbians and their families.

Key Findings

- » Injuries cost British Columbians **\$3.7 billion** in 2010.
- » Injuries cost **\$422,479** per hour, 24 hours per day, seven days per week.
- » Unintentional injuries accounted for **\$3.1 billion** or 83% of the total cost of injuries in 2010; of that, **\$2.0 billion** were direct costs to the health care system.
- » Permanent disabilities were the greatest cause for both direct and indirect costs of injuries in 2010.
- » The highest total costs related to deaths were from suicide at **\$209 million**.
- » Fall-related injuries resulted in the highest hospital costs at **\$415 million**, and a total cost of **\$1.2 billion**.
- » The highest cost per death in 2010 was for deaths resulting from violence at **\$463,804**.
- » Cost of injuries for males was higher than for females at **\$2.2 billion** versus **\$1.5 billion**.
- » Total injury costs per capita were highest among youth aged 15-24 years at **\$1,185**, followed by older adults aged 65+ years at **\$965**.
- » Health care cost per capita were highest among older adults aged 65+ years at **\$965**, followed by youth aged 15-24 years at **\$572**.
- » On average, one British Columbian dies as a result of injury every **4.4 hours**.
- » In 2010, **2,009** lives were lost, **34,998** people were hospitalized and **456,390** were treated in emergency departments as a result of injury.
- » Transport incidents accounted for almost 25% of total costs from injuries among youth 15-24 years, of which 59% were motor vehicle incident costs.

Methodology

The methodology used in this report is based on Canada's Economic Burden of Injury Report, using the BC version of the Electronic Resource Allocation Tool (ERAT) with additional methodology incorporated to account for specific injury patterns in BC.

This report presents findings based on data analyzed from the following injury data sources: death data from BC Vital Statistics, hospitalization data from Discharge Abstract Database, emergency room visit data from National Ambulatory Care Reporting System, permanent disabilities from injury estimated using both hospitalized and emergency room visit and coefficients derived from the study of *Miller et al.*, (1995) [17], population and life expectancy data from Statistics Canada CANSIM, and BC Statistics.

Direct costs include all goods and services used for the diagnosis, treatment, continuing care, rehabilitation, and terminal care of patients who suffered injuries. In addition, direct costs also include mortality costs, estimated on a complete episode of potential events due to an injury-related death.

Indirect costs are defined as the value of economic output lost because of illness, injury-related work disability, or premature death. [7, 9, 11, 12] These costs include all of the productivity lost to society due to injuries that prevent individuals from performing their regular activities. Indirect costs were not calculated for people aged 65 years and older as they were assumed to have left the work force.

Parachute Canada, in partnership with the Conference Board of Canada, has released the *Cost of Injury in Canada Report*. [13] The report includes calculations of the cost of injury using 2010 death, hospitalization and non-hospitalization data. Although the calculations for BC in the national report are similar to calculations in this report, the cost estimates differ. For a detailed breakdown of the differences in cost estimates and data sources, please refer to Appendix 1–Methodology in this report.

Main Findings

Injury outcomes by intent (Table 1)

There were 2,009 lives lost due to injury in BC in 2010; 70% resulted from unintentional injuries and 28% of the deaths were intentional. There were 34,998 who were hospitalized for treatment and 456,390 who received emergency department treatment.

Table 2: Total, direct and indirect costs of injury by intent, BC, 2010 (\$ millions)

Intent	Total Costs	Direct Costs	Indirect Costs
Unintentional	\$3,062	\$2,018	\$1,044
Intentional	\$581	\$239	\$343
Undetermined Intent/Other	\$57	\$32	\$25
Total	\$3,701	\$2,289	\$1,412

Note: Numbers are rounded, therefore totals may not sum exactly.

Costs by intent (Table 2)

The total economic burden of injury in BC amounted to \$3.7 billion—83% of that total was attributable to unintentional injuries and 16% due to intentional injuries. Direct costs of all injuries totalled \$2.3 billion, with 88% of the total being attributable to unintentional injuries and 10% being from intentional injuries. Indirect costs of injuries totalled to \$1.4 billion with 73% attributable to unintentional injuries and 25% to intentional injuries.

Costs in millions by type and injury outcome (Figure 1)

A majority of direct costs were attributable to injuries causing permanent disability at \$959 million dollars, followed by injuries causing hospitalization at \$675 million, and injuries

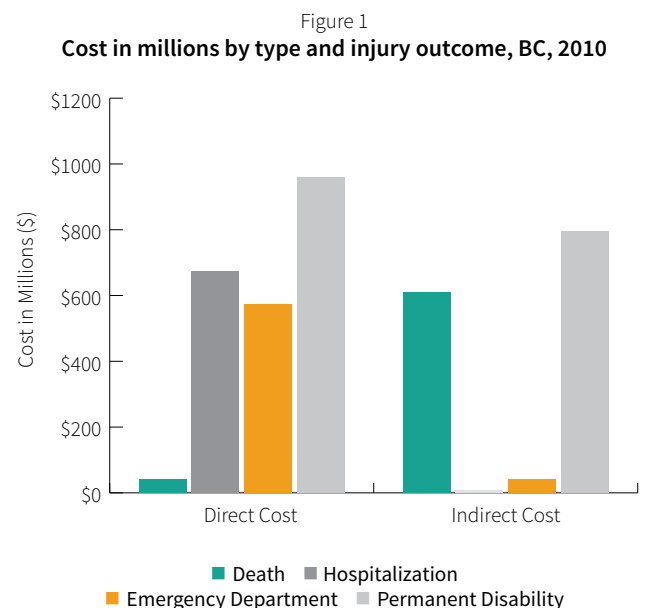


Table 1: Injury by intent and injury outcome, BC, 2010

Intent	Deaths	Hospitalized Treatment	Emergency Room Visit	Permanent Partial Disability	Permanent Total Disability
Unintentional	1,416	30,198	436,433	6,915	565
Intentional	561	4,186	17,272	900	61
Undetermined Intent/Other	32	614	2,686	133	8
Total	2,009	34,998	456,390	7,948	634

Table 3: Number of injury deaths, death rates, total costs, costs per capita and health care costs per capita by cause, BC, 2010

Cause	Deaths	Death Rate (per 100,000)	Total Costs (\$ millions)	Total Cost Per Capita	Health Care Cost Per Capita
Falls	552	12.36	\$1,222	\$274	\$215
Transport Incidents	352	7.88	\$658	\$147	\$83
Unintentional Poisoning	351	7.86	\$245	\$55	\$15
Suicide/Self-Harm-Poisoning	129	2.89	\$236	\$53	\$29
Suicide/Self-Harm-Other	375	8.40	\$188	\$42	\$5
Violence	57	1.28	\$157	\$35	\$19
Other Injuries	193	4.32	\$994	\$223	\$146
Total	2,009	44.99	\$3,701	\$829	\$512

Note: Health care cost per capita calculated using direct costs only. Other injuries include drowning, fire/burns, struck by/against sport equipment, other unintentional injuries and undetermined intent/other.

Table 4: Total cost by cause and injury outcome, BC, 2010 (\$ millions)

Cause	Cost of Injury Deaths	Cost of Hospitalized Treatment	Cost of Emergency Room Visits	Cost of Permanent Disability	Total Costs
Falls	\$38	\$415	\$193	\$577	\$1,222
Transport Incidents	\$153	\$109	\$69	\$327	\$658
Unintentional Poisoning	\$155	\$17	\$8	\$66	\$245
Suicide/Self-Harm-Poisoning	\$47	\$29	\$4	\$156	\$236
Suicide/Self-Harm-Other	\$162	\$7	\$2	\$18	\$188
Violence	\$26	\$18	\$14	\$98	\$157
Other Injuries	\$68	\$87	\$326	\$513	\$994
Total	\$649	\$682	\$615	\$1,756	\$3,701

Note: Numbers are rounded, therefore totals may not sum exactly. Other injuries include drowning, fire/burns, struck by/against sport equipment, other unintentional injuries and undetermined intent/other.

requiring emergency room treatment at \$573 million. Most indirect costs were attributable to injuries causing permanent disability, costing \$796 million, followed by injuries causing death, which cost \$609 million.

Injury deaths, death rates, total costs, costs per capita, by cause (Table 3)

Among all causes of injury-related deaths in 2010, falls had the greatest number of deaths (n=552); the highest death rate (12.36 per 100,000); the highest total costs (\$1.2 billion), and the highest health care cost per capita (\$215).

Transport incidents had a health care cost of \$83 per capita with a total cost of \$658 million. Unintentional poisoning and suicide by poisoning were significant causes of economic burden: unintentional poisoning deaths cost \$245 million, while suicide by poisoning cost \$236 million in 2010.

Total cost by cause and injury outcome (Table 4)

Total costs for each cause by injury outcome provide insight into the aggregated total cost of injury in the province in 2010, indicating the most costly causes of injuries.

Total death costs

- The major causes of injury leading to total death costs were suicide (poisoning and other) at \$209 million, unintentional

poisoning at \$155 million, and transport incidents at \$153 million.

Total hospitalized treatment costs

- The major causes of injury contributing to total hospitalized treatment costs were falls at \$415 million and transport incidents at \$109 million.

Total emergency room visit costs

- Leading costs for major causes of injury included falls at \$193 million and transport at \$69 million.

Total costs for permanent disability

- The major causes of injury contributing to total permanent disability costs for major causes of injuries included falls and transport incidents at \$577 and \$327 million respectively.

Costs per injury outcome and cause (Table 5)

Among the major causes of injury, violence resulted in the highest cost per injury death, at \$463,804 per death. The second most costly major cause of death was unintentional poisoning at \$440,268 followed by transport incidents at \$434,717 per death. The top three most expensive costs per major cause of hospitalized treatment were transport incidents (\$22,393), falls (\$21,807), and self-harm by other means (\$19,494). Although less in magnitude compared to hospitalized treatment costs, the leading cost per emergency

Table 5: Cost per injury outcome and cause, BC, 2010

Cause	Cost per Death	Cost per Hospitalized Treatment	Cost per Emergency Room Visit	Cost per Permanent Disability
Transport Incidents	\$434,714	\$22,393	\$1,798	\$252,569
Falls	\$68,233	\$21,807	\$1,417	\$164,860
Unintentional Poisoning	\$440,268	\$12,624	\$1,088	\$221,808
Suicide/Self-Harm-Poisoning	\$367,912	\$11,381	\$1,019	\$272,780
Suicide/Self-Harm-Other	\$431,054	\$19,494	\$1,683	\$306,442
Violence	\$463,804	\$13,804	\$1,129	\$299,034
Other Injuries	\$351,332	\$15,714	\$1,264	\$202,782
Total	\$322,831	\$19,485	\$1,347	\$204,566

Note: Numbers are rounded, therefore totals may not sum exactly. Other injuries include drowning, fire/burns, struck by/against sport equipment, other unintentional injuries and undetermined intent/other.

room visit were transport incidents (\$1,798), self-harm by other means (\$1,683) and falls (\$1,417). The cost per permanent disability case was highest for self-harm by other means (\$306,442), and violence (\$299,034).

Costs of injury by cause

The majority of the total costs of injuries in BC in 2010 were due to falls at \$1.2 billion or 33% of total costs, while the costs for transport incidents were \$658 million or 18% of total costs. Costs for all forms of suicide and self-harm were \$424 million or 11% of total costs, costs for unintentional poisoning were \$245 million or 7% of total costs, and costs for violence were \$157 million or 4% of total costs. This information can be further explained by Table 8 in the main report.

Falls made up \$960 million or 42% of the direct costs of injuries in BC in 2010, followed by other unintentional injuries at \$578 million or 25%, and transport incidents at \$370 million or 16% of the direct costs. Other causes of direct costs of injury included suicide/self-harm (\$155 million or 7%), violence (\$84 million or 4%). This information can be further explained by Table 8 in the main report.

Table 7: Total, direct and indirect costs of injury by health authority, BC, 2010 (\$ millions)

Health Authority	Total Costs	Direct Costs	Indirect Costs
Interior	\$736	\$437	\$299
Fraser	\$1,225	\$767	\$457
Vancouver Coastal	\$664	\$423	\$241
Island	\$676	\$428	\$248
Northern	\$354	\$201	\$153
Unspecified	\$47	\$32	\$14
BC Total	\$3,701	\$2,289	\$1,412

Note: Numbers are rounded, therefore totals may not sum exactly.

Transport incidents accounted for the greatest proportion of indirect costs at \$288 million or 20% of indirect costs, followed by suicide and self-harm at \$269 million or 19%, falls at \$262 million or 19%, and other unintentional injuries at \$261 million or 19%. This information can be further explained by Table 8 in the main report.

Table 6: Injury outcome by health authority, BC, 2010

Health Authority	Deaths	Hospitalized Treatment	Emergency Room Visit	Permanent Partial Disability	Permanent Total Disability
Interior	465	7,149	89,043	1,619	129
Fraser	621	11,620	153,953	2,622	210
Vancouver Coastal	353	6,471	79,907	1,428	114
Island	399	6,516	84,991	1,443	114
Northern	171	2,775	43,082	719	57
Unspecified	0	467	5,415	118	10
BC Total	2,009	34,998	456,390	7,948	634

*Less than 5 numbers suppressed due to small counts.

Costs of injury by Health Authority (Tables 6 & 7)

Table 6 presents a summary of the number of injuries by health authority (HA). Table 7 presents the summary of the direct and indirect costs by health authority. A further breakdown for costs for each health authority is available in the report.

Costs of injury by age and sex

The total cost of injuries for males amounted to \$2.2 billion, compared to the cost of injuries for females at \$1.5 billion. Per capita costs of injury were \$994 for males and \$665 for females. Health care cost per capita for males was \$564 and \$461 for females. Total cost per capita was highest among youth aged 15-24 years at \$1,185, however health care cost per capita was highest among older adults aged 65+ years at \$965 followed by youth aged 15-24 years at \$572. Among males, the highest total cost per capita was among ages 15-24 years at \$1,511. Among females, the highest total cost per capita was among ages 65 years and over at \$1,102. This information can be further explained by Table 72 in the main report.

Health care costs of injury by age and cause (Figure 2)

For children 0-14 years old, the highest health care costs of injury were attributable to falls, which comprised of 41%

of total cost for that age group. Transport-related costs accounted for 22% of all youth injury health care costs while 20% were for falls, and 11% were suicide/self-harm-related injuries. The highest health care costs among adults 25-64 years were for falls, accounting for 29% of total health care costs. Transport-related costs among the 25-64 years age group accounted for 21% of total health care costs. For ages 65+ years, highest injury costs were for falls, comprising 76% of total costs.

Costs of injury by age, sex and cause

Fall-related injury costs were higher for males than females in all age groups except for older adults (65+ years), where costs for females (\$317 million) were almost twice the cost for males (\$169 million) in that age group. This information can be further explained by Table 75 in the main report.

Men accounted for more injury costs due to transport incidents than did women, with higher differences in cost between men and women observed in adults (25-64 years). The costs for transport incidents among male adults were \$276 million and for females were \$123 million. This information can be further explained by Table 77 in the main report.

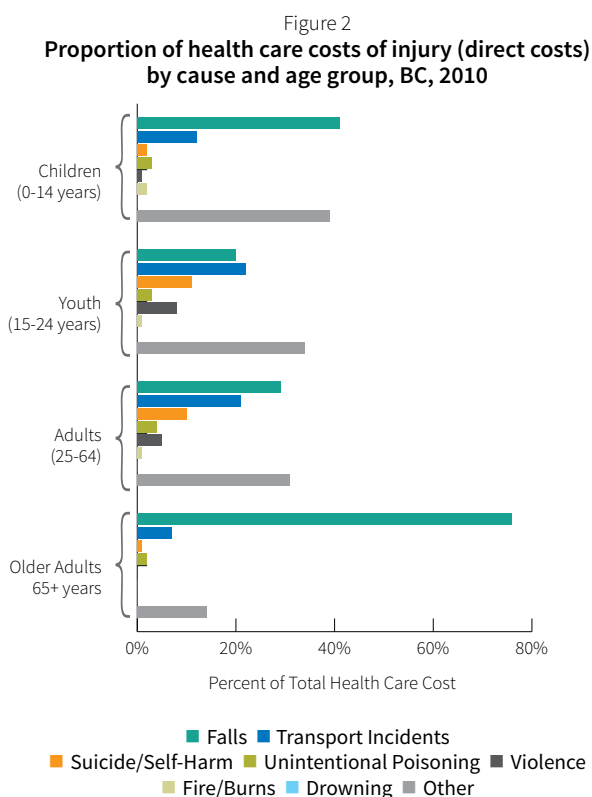
Male youth and adults accounted for more of the total injury costs due to suicide and self-harm in BC in 2010 than did females. Suicide and self-harm costs for male youth (15-24 years) were \$59 million and adults (25-64) were \$183 million, compared to female youth at \$50 million and adults at \$71 million. Children and older adults made up only a small fraction of the total costs. This information can be further explained by Table 79 in the main report.

Adults (25-64 years) accounted for 76% of all unintentional poisoning costs, with males accounting for approximately two thirds of these costs. Costs for unintentional poisoning among adult males were \$115 million. This information can be further explained by Table 81 in the main report.

Violence-related costs were greatest among adults aged 25-64 years at \$96 million. Furthermore, within the same age group, males accounted for 83% of violence-related costs. Costs for violence-related injury among male adults were \$80 million. This information can be further explained by Table 83 in the main report.

Injury costs comparison over time

Costs for all causes of injury deaths, after adjusting for costs from previous years, have increased between 2004 and 2010, with a greater increase in intentional injury death costs than



unintentional injury, possibly driving the increase in total injury death costs. The overall intentional injury costs were double the increase of unintentional injury costs from 2004 to 2010.

Costs of hospital treatment have also increased over the last seven years since 2004. In particular, among unintentional injuries, hospitalization costs for falls, motor vehicle incidents and drowning have all increased by more than 50%.

Despite total unintentional injury death rates showing downward trends from 1998 to 2010, the rates for falls and poisoning have shown an increase over the last three years from 2008, and rates for suicide have shown an increase over the last four years from 2007.

Concluding Remarks

In order to address the changing landscape of injury burden in BC over time, it is important to monitor the frequency, rates and costs of injury by cause of injury as well as age and sex.

Collective efforts to reduce the occurrence, social and financial burden of injuries are needed in order to contribute to a sustainable health care system in the future.

There are different perspectives that can be adopted when looking at injury costs. For someone charged with the responsibility to mitigate health system costs, an investment in the prevention of falls among older adults, or transport-related injury among youth ages 15-24 years, and suicide—the main drivers of the health care costs related to injury—would be prudent. For someone focused at the population and economic growth level of the province, injury prevention should be targeted at ages 25-55 years, as this population contributes to productivity and the human capital costs which drive the indirect costs.

The economic analyses indicate that not only is injury prevention beneficial at a population level, but it is also beneficial at the high risk level. In order to achieve significant savings through injury prevention, it would be strategic to focus on prevention efforts for reducing injury hospitalizations, emergency care, and permanent disability for fall-related injuries among those ages 65+ years; and to focus on transport-related deaths, hospitalizations, emergency care, and permanent disability among ages 15-64 years.

The evidence in this report demands further attention and action to reducing the burden of injuries in BC. Continued surveillance and research, together with the implementation of effective injury prevention education, engineering and enforcement strategies are necessary to stem the human

and economic burden that injuries exact. Given that the vast majority of injuries are both predictable and preventable, support for injury prevention in BC represents a prudent investment.

INTRODUCTION

Injuries are a significant drain on the resources of the public health system, yet the vast majority are preventable. The SMARTRISK Foundation, now Parachute Canada, has published four major studies – one in 1998, a second in 2001, a third in 2009, and a fourth in 2015 – which provide details of the economic burden of injuries in Canada, including data and information for British Columbia (BC).[1-4] These reports highlight the increasing costs, both social and economic, associated with preventable injuries. Information from these reports has been used by policy planners and community partners to reduce disability and mortality rates among BC residents.

This report measures the occurrence of injuries in 2010 in BC and compares these results to the earlier findings. The main goals of this report are to:

1. Provide an update of the economic costs of injuries in BC.
2. Provide detailed economic costs by age group and sex.
3. Compare the current economic costs of injury to those of earlier years.

The purpose of this report is to enable the calculation of the broader social burden of injury in BC, with respect to the cost of the treatment of injuries in the health care system, and the human costs of years of life lost and diminished labour market productivity and earnings. The successful promotion of injury prevention strategies can significantly lower the costs to the health care system, both in the short and long term.

APPROACHES TO MEASURING THE COST OF INJURY

The foundation to measuring the burden of injury or death is based on the core principle that everyone should live a long life in full health. As a result, researchers seek to measure the gap between ideal health and real life status using the estimation of years of life lost due to premature death (YLLs) and years lived with disability (YLDs).[5] **Disability-adjusted life year (DALY)** is a common metric for measuring disease burden or injury and uses number of years lost in order to include the impact of both premature death and health problems among those who are alive. DALYs for injuries are calculated as the sum of the YLL in the population and YLD for incident cases of the injury. An economic cost of the burden of injury is then established by assigning a dollar cost per DALY.[6]

There are many other approaches that have been used to measure the cost of injury. One method is the **cost-of-illness (COI) approach** that captures the economic impact of injury

by taking into account direct and indirect costs such as: personal medical care costs (e.g. diagnosis, procedures, drugs and treatment); non-medical costs (e.g. transportation costs); nonpersonal costs (e.g. education, communication and research); and income losses. Pain and suffering are also sometimes included in this approach.[7]

Another method is the value of lost output: the **economic growth approach**. This method estimates the projected impact of injury on aggregate economic output, Gross Domestic Product (GDP) and overall economic growth by considering the effect of these injuries in the reduction of production levels, labour and capital.[7] Furthermore, in their study, Gabbe, et. al (2014) used **value of statistical life year (VSLY)** which is an estimate of the social willingness to pay to reduce disability or premature death.[6] By placing an economic value on the loss of health itself, this approach goes beyond the impact of injuries on GDP alone.

Each of these methods views the economic burden from a different perspective, focuses on different cost components, refers to different timeframes, relies on distinct underlying data and assumptions, and in some cases focuses on different types of injuries. This report uses an **incidence costing, human capital** and a **societal perspective approach** to measure the economic burden of injuries in Canada.[4] This methodology has been used for many years to calculate the cost of injuries in Canada and the provinces. The approach allows for the determination of ‘opportunity costs’^a to society. By translating injury and premature injury-related deaths into direct and indirect costs,[8-10] estimates can be made which are an approximation of what society would gain if the injuries and injury-related deaths associated with these costs were prevented. Using this methodology allows for consistency in the reporting of costs and enables the comparison across provinces and years.

METHODOLOGY

Using the most recent provincial data available, the costs associated with the total number of BC residents injured in 2010 was assessed across the lifetime of the injured individuals.[4] This report distinguishes and measures both direct costs—the monetary value of the resources used to treat the injured person, and indirect costs—the value that has been lost to society due to the injury.

Direct costs include all of the goods and services used for the diagnosis, treatment, continuing care, rehabilitation and terminal care of patients who suffered injuries.[11] In order to document the costs associated with injury, it is essential

^a For this report, opportunity cost is the value of opportunities forgone because of an intervention, action or health outcome (i.e. the direct and indirect costs of injuries).

to have information on the complete episode associated with injury events. This must cover the range of cases from those who die at the scene or at home, or who die upon arrival at hospital, to those who are hospitalized, who undergo outpatient care and nursing home care, and who accrue the services of physicians and other health professionals. The direct costs also include the costs incurred from expenditures of pharmaceutical drugs, rehabilitation treatment and other related costs over long periods of recovery or, in extreme cases, during the remaining period of an individual's life expectancy. Moreover, the direct costs also include the costs of prostheses, appliances, eyeglasses, hearing aids, and speech devices necessary to help the patient overcome or live with the impairments associated with the injury. This category also includes the administrative costs of third-party providers (public and private) who fund these expenses.

Indirect costs are defined as the value of economic output lost because of illness, injury-related work disability, or premature death.[8, 10, 12, 13] These costs include all of the productivity lost to society due to injuries that prevent individuals from performing their regular activities. These costs are calculated by considering the individual's average earnings in relation to the amount of time he or she was unable to work. Indirect costs were calculated for people ages 15-64 years. For children aged 0-14 years, indirect costs were calculated after the age of 14, when it is assumed that they would enter the workforce. Indirect costs were not calculated for people aged 65 years and older as they were assumed to have left the workforce.

In addition to direct and indirect costs there are a number of additional costs associated with injuries that are difficult to quantify. These include pain and suffering, social isolation, and economic dependence. These factors need to be identified as they are the cause of much distress to the lives of injured people and their families. This report did not attempt to quantify these costs, and thus the costs cited will be conservative estimates.

The SMARTRISK Foundation, now Parachute Canada, developed an Electronic Resource Allocation Tool (ERAT) which combines existing data with variables from the literature in order to model the full costs of unintentional and intentional injuries.[4] The ERAT can be updated as new data become available, making it receptive to changes in population, injury incidence, and treatment patterns and costs. This enables researchers and public health officials to allocate resources, develop policies, and make decisions in line with the most up-to-date data available. BCIRPU used

the ERAT tool for BC, generously provided by Parachute Canada, to conduct the cost analysis using current data.

It is important to note that the mortality costs in the ERAT are restricted to indirect costs related to earnings lost due to death over the remaining working life of the individuals had they lived. The methodology in this report includes direct mortality costs estimated on a complete episode of events due to an injury-related death and are summed with the ERAT direct costs to acquire the total direct costs.

For more details on the direct mortality costs, ERAT, data sources and limitations, and the economic approach, please see Appendix 1 – Methodology.

In addition Parachute Canada, in partnership with the Conference Board of Canada, released the *Cost of Injury in Canada* Report in June 2015. The cost estimates for BC in the national report differ slightly from those presented in this report. For a detailed breakdown of the differences in cost estimates and data sources, please refer to Appendix 1 – Methodology in this report.

GLOSSARY AND TERMS USED IN THE REPORT

Age Standardized Rate: A summary of age adjusted death or hospitalization rates that have been standardized to a reference population for the purpose of rate comparisons by sex, regions or over time periods. This enables comparisons between populations with different age distributions.

ATV: All Terrain Vehicle

Death Rate: Number of deaths per 100,000 population.

ERAT: Electronic Resource Allocation Tool

Fire/Burns: Injuries caused by fire and flames; hot appliances, objects or liquids, steam; acid burns. Unintentional burning by fire, smoke and fumes asphyxia; burns due to contact with hot objects, substances or caustics. Excludes fire in machinery, non-stationary transport and other vehicles, watercraft fires, radiation burns and electric current.

Life Expectancy: Measure of how long a person can expect to live based on the year of their birth, their current age and sex.

Other Fall-Related Injuries: Other fall on same level due to collision with or pushing by other person; fall while being carried or supported by other persons; fall involving wheelchair and other walking devices; fall from out or through building or structure; fall from tree; fall from cliff; fall from one level to another (fall from or into cavity, dock, hole etc.); and other fall on same level (bumping against object, fall from or off toilet), and unspecified fall. Majority of these other fall-related injuries included unspecified fall.

Other Transport-Related Injuries: Animal-rider or occupant of animal-drawn vehicle; occupant of railway train or railway vehicle; occupant of streetcar; occupant of special vehicle mainly used on industrial premises; occupant of special vehicle mainly used in agriculture; occupant of special construction vehicle; watercraft-related incidents, excluding drowning and submersion; air and space transport incidents; unknown mode of transport; and unspecified mode of transport.

Other Unintentional Injuries: Struck by object (excluding sports equipment); exposure to animate mechanical forces; other accidental threats to breathing; exposure to electric current/radiation/extreme air temperature and pressure; contact with venomous animals and plants; exposure to forces of nature; overexertion and strenuous/repetitive movements; and accidental exposure to other and unspecified factors.

Pedal Cycle: A vehicle operated solely by pedals includes bicycles and tricycles, also referred to in the text as cycling.

Permanent Partial Disability: Permanently disabled, but able to return to some type of employment.

Permanent Total Disability: Permanently disabled and unable to work.

Potential Years of Life Lost: The total number of years of life lost from an established life expectancy (75 years).

Suicide/Self-Harm-Other: Includes self-harm by hanging, strangulation, and suffocation; drowning and submersion; handgun discharge; rifle, shotgun and larger firearm discharge; other and unspecified firearm discharge; explosive material, smoke, fire and flames; steam, hot vapours and hot objects; sharp object; blunt object; jumping from a high place; jumping or lying before moving object; crashing of motor vehicle; other and unspecified means.

Transport Incident: Involves a device designed primarily for, or being used at the time primarily for, conveying persons or goods from one place to another. This includes land, water, air and space transport.

Unintentional Injury: Injury that is not purposely inflicted, either by the person or anyone else. In the past, unintentional injuries were referred to as accidental injuries.

Undetermined Intent: Injury undetermined whether unintentionally or intentionally inflicted.

Unintentional Poisoning: Includes unintentional overdose of drugs, medicaments and biological substances, poisoning by alcohol, chemicals, house products and other noxious substances. Excludes adverse reactions to drugs used properly and as directed.

Violence: The infliction of fatal or non-fatal injuries by another person, by any means, with intent to kill or injure. Included in violence are assaults and homicide. Injuries resulting from legal intervention and operations of wars are excluded.

Youth: Defined as 15-24 years in this report, however they can also be referred to as youth and young adults.

Notes:

Please note that where applicable, percentages and cost numbers are rounded to the nearest whole number and therefore totals may not sum exactly.

Please note that non-hospitalizations and emergency department visits are used interchangeably throughout the report.

Unless specified, suicide and self-harm include both self-harm from poisoning and other forms of self-harm.

OVERVIEW OF INJURY IN BC

Total Burden of Injury

A total of 2,009 lives were lost in 2010. This is equivalent to one death from injury every 4.4 hours, and an expenditure of \$422,479 per hour, 24 hours per day, seven days per week for all causes of injury. In addition, 34,998 people were hospitalized and 456,390 were treated in emergency departments as a result of injury. A total of 8,582 people suffered injuries that resulted in permanent partial and total disabilities (Table 1).

Injuries cost British Columbians
\$3.7 billion dollars in 2010

Table 1: Injury deaths, hospitalizations, non-hospitalizations, disability and cost, BC, 2010

Number of Injury Deaths	2,009
Number of Hospitalized Treatment	34,998
Number of Emergency Room Visits	456,390
Number of Permanent Partial Disability	7,948
Number of Permanent Total Disability	634
Total Cost (\$ millions)	\$3,701

Intentional injuries made up 28% (n=562) of injury deaths, 12% (n=4,186) of hospitalized injuries, 4% (n=17,272) of emergency room visits, 11% (n=900) of permanent partial disabilities, and 10% (n=61) of permanent total disabilities. The remaining injuries were of undetermined intent (Table 2). Unintentional injuries accounted for \$3.1 billion or 83% of BC's total cost of injuries in 2010 (Table 3). They accounted for \$2.0 billion or 88% of the direct costs, and \$1.0 billion or 74% of the indirect costs.

Table 2: Injury by intent and injury outcome, BC, 2010

Intent	Deaths	Hospitalized Treatment	Emergency Room Visits	Permanent Partial Disability	Permanent Total Disability
Unintentional	1,416	30,198	436,433	6,915	565
Intentional	562	4,186	17,272	900	61
Undetermined Intent/Other	32	614	2,686	133	8
Total	2,009	34,998	456,390	7,948	634

BC's population in 2010 was 4,465,924.^a Injuries accounted for an annual death rate of 45.0 per 100,000 population, an annual hospitalization rate of 783.7 per 100,000, and an estimated 44,082^b total potential years of life lost.^c The total cost for each and every British Columbian in 2010 was \$829 whereas the health care cost was \$512.

Intentional injuries accounted for \$581 million or 16% of the total cost of injuries (Table 3). They made up \$239 million or 10% of the direct costs, and \$343 million or 24% of the indirect costs of injuries. Injuries of undetermined intent accounted for approximately \$57 million and less than 2% of all injury costs across the three categories.

Intentional and Unintentional Injury

Unintentional injuries made up the majority of injuries in BC in 2010: 70% (n=1,416) of injury deaths, 86% (n=30,198) of injury hospitalizations, 96% (n=436,433) of emergency room visits, 87% (n=6,915) of permanent partial disabilities arising from injury, and 89% (n=565) of permanent total disabilities arising from injury were unintentional (Table 2).

Table 3: Total, direct and indirect costs of injury by intent, BC, 2010 (\$ millions)

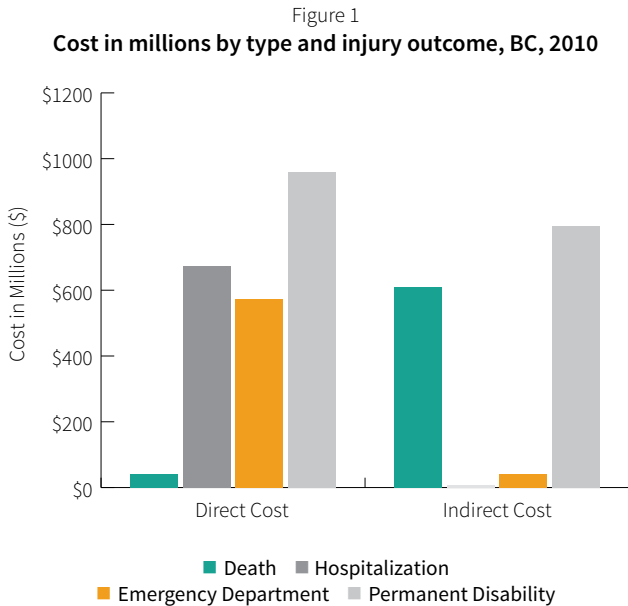
Intent	Total Costs	Direct Costs	Indirect Costs
Unintentional	\$3,062	\$2,018	\$1,044
Intentional	\$581	\$239	\$343
Undetermined Intent/Other	\$57	\$32	\$25
Total	\$3,701	\$2,289	\$1,412

Note: Numbers are rounded, therefore totals may not sum exactly.

^a BC Statistics Population Estimates <http://www.bcstats.gov.bc.ca/StatisticsBySubject/Demography/PopulationEstimates.aspx>

^b Retrieved from VISTA, BC Vital Statistics Agency in May, 2015. Total PYLL based on external causes of death in 2010 for those under 75 years.

^c Potential Years of Life Lost denotes the total number of years of life lost from an established life expectancy (75 years).



Permanent disabilities were the greatest cause for both direct and indirect costs of injuries in 2010 (Figure 1). Injuries resulting in hospitalization and other forms of treatment made up the remainder of the direct costs. Deaths, on the other hand, were a second major source of indirect costs.

Injury by Cause

The greatest number of injury deaths in BC in 2010 was from (Table 4):

- Falls: 27% (n=552)
- Suicide/self-harm: 25% (n=504)
- Transport incidents: 18% (n=352)
- Unintentional poisoning: 17% (n=351)

Hospitalizations due to injury were also most often due to (Table 4):

- Falls: 54% (n=19,021)
- Transport incidents: 14% (n=4,869)
- Other unintentional injuries: 13% (n=4,522)
- Suicide/self-harm: 8% (n=2,876)

The most frequent defined causes of emergency room visits were from (Table 4):

- Other unintentional injuries: 53% (n=240,615)
- Falls: 30% (n=135,993)
- Transport incidents: 8% (n=38,153)

The most common cause of permanent disability was from (Table 4):

- Falls: 41% (n=3,225) permanent partial disability and 43% (n=275) permanent total disability
- Other unintentional injuries: 26% (n=2,027) permanent partial disability and 23% (n=144) permanent total disability
- Transport incidents: 15% (n=1,178) permanent partial disability and 19% (n=117) permanent total disability



Falls accounted for the highest total costs (\$1.2 billion), generating the greatest per capita cost at \$274 and the greatest health care cost per capita at \$215 (Table 5).

The second highest total cost, per capita total cost and health care cost per capita among the major causes of injury was for transport incidents at \$658 million, \$147 and \$83, respectively.

The highest death costs for leading causes of deaths were for suicide and self harm from other causes at \$162 million, followed by unintentional poisoning (\$155 million) and transport incidents (\$153 million) (Table 6). For hospitalized treatment, the highest treatment costs for major causes of injury were for falls at \$415 million, followed by transport (\$109 million). One of the highest total costs for major causes of emergency room treatment and permanent disability were for falls at \$193 million and \$577 million respectively.

The highest cost per death in 2010 was for violence-related deaths at \$463,804, followed by unintentional poisoning at \$440,268 (Table 7). Hospitalized treatment cost was highest for each transport incident (\$22,393) and fall (\$21,807). The highest cost per emergency room treatment was for transport incidents (\$1,798) and suicide and self-harm by other means (\$1,683). The cost per permanent disability was highest for each self-harm by other means (\$306,442), violence-related case (\$299,034) and suicide/self-harm by poisoning (\$272,780).

Costs of Injury by Cause

The majority of the total costs of injuries in BC in 2010 were due to falls at \$1.2 billion or 33% of total costs, other unintentional injuries at \$839 million or 23%, and transport incidents at \$658 million or 18% (Table 8). Other causes of total costs of injury included suicide and self-harm (\$424 million or 11%), unintentional poisoning (\$245 million or 7%), violence (\$157 million or 4%), undetermined intent (\$57 million or 2%), and fire and burns (\$48 million or 1%).

Table 4: Number of injuries by cause and injury outcome, BC, 2010

Description	Deaths	Hospitalized Treatment	Emergency Room Visits	Permanent Partial Disability	Permanent Total Disability
Transport Incidents	352	4,869	38,153	1,178	117
Pedestrian	60	561	2,331	128	15
Pedal cycle	8	933	7,743	242	23
Motor vehicle	251	2,461	21,370	572	59
ATV, snowmobile	11	501	2,751	126	11
Other ^Δ	22	413	3,957	109	9
Falls	552	19,021	135,993	3,225	275
On the same level	20	5,868	43,737	1,019	75
From skates, skis, boards, blades	5	646	8,297	202	16
From furniture	51	1,163	7,869	148	13
In playgrounds	0	267	2,925	85	6
On stairs	34	1,626	17,206	386	37
From ladders/scaffolding	9	683	3,092	182	16
Diving	*	26	406	7	*
Other**	431	8,742	52,460	1,196	111
Drowning	51	45	161	6	*
Fire/Burns	34	280	5,670	129	7
Unintentional Poisoning	351	1,359	7,051	281	17
Struck by/against Sports Equipment	0	102	8,789	70	5
Other Unintentional Injuries***	76	4,522	240,615	2,027	144
Suicide/Self-Harm	504	2,876	4,539	602	29
Suicide/Self-Harm–Poisoning	129	2,538	3,506	547	24
Suicide/Self-Harm–Other	375	338	1,033	55	5
Violence	57	1,310	12,732	297	32
Undetermined Intent/Other	32	614	2,686	133	8
Total	2,009	34,998	456,390	7,948	634

^ΔOther includes: animal-rider or occupant of animal-drawn vehicle; occupant of railway train or railway vehicle; occupant of streetcar; occupant of special vehicle mainly used on industrial premises; occupant of special vehicle mainly used in agriculture; occupant of special construction vehicle; watercraft-related incidents, excluding drowning and submersion; air and space transport incidents; unknown mode of transport; and unspecified mode of transport.

*Less than 5 numbers suppressed due to small counts.

**Other falls includes: other fall on same level due to collision with or pushing by other person; fall while being carried or supported by other persons; fall involving wheelchair and other walking devices; fall from out or through building or structure; fall from tree; fall from cliff; fall from one level to another (fall from or into cavity, dock, hole etc.); and other fall on same level (bumping against object, fall from or off toilet) and unspecified falls.

***Other unintentional injuries includes: struck by object (excluding sports equipment); exposure to animate mechanical forces; other accidental threats to breathing; exposure to electric current/radiation/extreme air temperature and pressure; contact with venomous animals and plants; exposure to forces of nature; overexertion and strenuous/repetitive movements; and accidental exposure to other and unspecified factors.

Table 5: Number of injury deaths, death rates, total costs and costs per capita by cause, BC, 2010

Cause	Deaths	Death Rate (per 100,000)	Total Costs (\$ millions)	Total Cost Per Capita	Health Care Cost Per Capita
Falls	552	12.36	\$1,222	\$274	\$215
Transport incidents	352	7.88	\$658	\$147	\$83
Unintentional Poisoning	351	7.86	\$245	\$55	\$15
Suicide/Self-Harm–Poisoning	129	2.89	\$236	\$53	\$29
Suicide/Self-Harm–Other	375	8.40	\$188	\$42	\$5
Violence	57	1.28	\$157	\$35	\$19
Other Injuries	193	4.32	\$994	\$223	\$146
Total	2,009	44.99	\$3,701	\$829	\$512

Note: Health care cost per capita calculated using direct costs only. Other injuries include drowning, fire/burns, struck by/against sport equipment, other unintentional injuries and undetermined intent/other.

Table 6: Total cost by cause and injury outcome, BC, 2010 (\$ millions)

Cause	Cost of Injury Deaths	Cost of Hospitalized Treatment	Cost of Emergency Room Visits	Cost of Permanent Disability	Total Costs
Falls	\$38	\$415	\$193	\$577	\$1,222
Transport Incidents	\$153	\$109	\$69	\$327	\$658
Unintentional Poisoning	\$155	\$17	\$8	\$66	\$245
Suicide/Self-Harm–Poisoning	\$47	\$29	\$4	\$156	\$236
Suicide/Self-Harm–Other	\$162	\$7	\$2	\$18	\$188
Violence	\$26	\$18	\$14	\$98	\$157
Other Injuries	\$68	\$87	\$326	\$513	\$994
Total	\$649	\$682	\$615	\$1,756	\$3,701

Note: Numbers are rounded, therefore totals may not sum exactly. For other injuries see Table 5.

Table 7: Cost per injury outcome and cause, BC, 2010

Cause	Cost per Death	Cost per Hospitalized Treatment	Cost per Emergency Room Visit	Cost per Permanent Disability
Transport Incidents	\$434,714	\$22,393	\$1,798	\$252,569
Falls	\$68,233	\$21,807	\$1,417	\$164,860
Unintentional Poisoning	\$440,268	\$12,624	\$1,088	\$221,808
Suicide/Self-Harm–Poisoning	\$367,912	\$11,381	\$1,019	\$272,780
Suicide/Self-Harm–Other	\$431,054	\$19,494	\$1,683	\$306,442
Violence	\$463,804	\$13,804	\$1,129	\$299,034
Other Injuries	\$351,332	\$15,714	\$1,264	\$202,782
Total	\$322,831	\$19,485	\$1,347	\$204,566

Note: Numbers are rounded, therefore totals may not sum exactly. For other injuries see Table 5.

Falls made up \$960 million or 42% of the direct costs of injuries in BC in 2010, followed by other unintentional injuries at \$578 million or 25%, and transport incidents at \$370 million or 16% (Table 8). Other causes of direct costs of injury included suicide and self-harm (\$155 million or 7%), violence (\$84 million or 4%), unintentional poisoning (\$68 million or 3%), undetermined intent (\$32 million or 1%), fire and burns (\$25 million or 1%), and struck by or against sports equipment (\$14 million or 1%).

Transport incidents accounted for the greatest proportion of indirect costs at \$288 million or 20% of indirect costs, followed by suicide and self-harm at \$269 million or 19%, falls at \$262 million or 19%, and other unintentional injuries at \$261 million or 19% (Table 8). Other causes of indirect costs were unintentional poisoning (\$177 million or 13%), violence (\$73 million or 5%), undetermined intent (\$25 million or 2%), fire and burns (\$23 million or 2%), drowning (\$22 million or 2%), and struck by or against sports equipment (\$11 million or 1%).

Transport-Related Injuries by Cause and Associated Costs

Among transport-related injuries, the most common cause of injury deaths in BC in 2010 was (Table 9):

- Motor vehicle incidents: 71% (n=251)
- Pedestrian events: 17% (n=60)
- Other transport incidents: 6% (n=22)

Hospitalizations due to transport-related injuries were also most often due to (Table 9):

- Motor vehicle incidents: 51% (n=2,461)
- Cycling events: 19% (n=933)
- Pedestrian events: 12% (n=561)

The most frequent defined causes of transport-related emergency room visits were from (Table 9):

- Motor vehicle incidents: 56% (n=21,370)
- Cycling events: 20% (n=7,743)
- Other transport incidents: 10% (n=3,957)

Table 8: Total, direct and indirect costs of injury by cause, BC, 2010 (\$ millions)

Description	Total Costs	Direct Costs	Indirect Costs
Falls	\$1,222	\$960	\$262
On the same level	\$329	\$272	\$57
On stairs	\$120	\$90	\$30
From skates, skis, boards, blades	\$79	\$47	\$32
From furniture	\$71	\$60	\$11
From ladders/scaffolding	\$50	\$37	\$13
In playgrounds	\$36	\$22	\$14
Diving	\$4	\$2	\$2
Other**	\$533	\$429	\$104
Other Unintentional Injuries ***	\$839	\$578	\$261
Transport Incidents	\$658	\$370	\$288
Motor vehicle	\$376	\$203	\$174
Pedal cycle	\$99	\$63	\$36
Pedestrian	\$78	\$44	\$34
ATV, snowmobile	\$55	\$33	\$23
Other ^Δ	\$49	\$27	\$22
Suicide/Self-Harm	\$424	\$155	\$269
Suicide/Self-Harm-Poisoning	\$236	\$131	\$105
Suicide/Self-Harm-Other	\$188	\$24	\$164
Unintentional Poisoning	\$245	\$68	\$177
Violence	\$157	\$84	\$73
Undetermined Intent/Other	\$57	\$32	\$25
Fire/Burns	\$48	\$25	\$23
Struck by/against Sports Equipment	\$25	\$14	\$11
Drowning	\$25	\$3	\$22
Total	\$3,701	\$2,289	\$1,412

Note: Numbers are rounded, therefore totals may not sum exactly.

^Δ, **, *** See description on page 15.

The most common cause of transport-related permanent disability was from (Table 9):

- Motor vehicle incidents: 49% (n=572) permanent partial disability and 51% (n=59) permanent total disability
- Cycling events: 21% (n=242) permanent partial disability and 20% (n=23) permanent total disability
- Pedestrian events: 11% (n=128) permanent partial disability and 13% (n=15) permanent total disability

Motor vehicle incidents accounted for the highest proportion of the costs associated with transport-related injuries, making up over half of the total transport-related costs (57%) and over half of the transport-related costs when divided into direct (55%) and indirect (60%) (Table 10). Cycling was also a significant source of transport-related injury costs accounting for 15% of total costs, 17% of direct costs, and 13% of indirect costs. Other causes included pedestrian incidents (12% of all total, direct and indirect costs), ATV and snowmobile (8% of total, 9% of direct and 8% of indirect costs) and other (7% of all total and direct costs and 8% of indirect costs).

Table 10: Transport-related costs by injury outcome, BC, 2010 (\$ millions)

Description	Total Costs		Direct Costs		Indirect Costs	
	\$	%	\$	%	\$	%
Transport Incidents						
Motor vehicle	376	57.2	203	54.8	174	60.3
Pedal cycle	99	15.1	63	17.1	36	12.5
Pedestrian	78	11.9	44	12.0	34	11.8
ATV, snowmobile	55	8.4	33	8.8	23	7.9
Other ^Δ	49	7.4	27	7.3	22	7.5
Total	658	100.0	370	100.0	288	100.0

Note: Numbers are rounded, therefore totals may not sum exactly.

^Δ See description on page 15.

Table 9: Transport-related injuries by injury outcome, BC, 2010

Description	Deaths		Hospitalized Treatment		Emergency Room Visit		Permanent Partial Disability		Permanent Total Disability	
	N	%	N	%	N	%	N	%	N	%
Transport Incidents										
Pedestrian	60	17.0	561	11.5	2,331	6.1	128	10.9	15	12.8
Pedal cycle	8	2.3	933	19.2	7,743	20.3	242	20.5	23	19.5
Motor vehicle	251	71.3	2,461	50.5	21,370	56.0	572	48.6	59	50.6
ATV, snowmobile	11	3.1	501	10.3	2,751	7.2	126	10.7	11	9.2
Other ^Δ	22	6.3	413	8.5	3,957	10.4	109	9.3	9	7.9
Total	352	100.0	4,869	100.0	38,153	100.0	1,178	100.0	117	100.0

^Δ See description on page 15.

Table 11: Fall-related injuries by injury outcome, BC, 2010

Falls	Deaths		Hospitalized Treatment		Emergency Room Visits		Permanent Partial Disability		Permanent Total Disability	
	N	%	N	%	N	%	N	%	N	%
On the same level	20	3.6	5,868	30.9	43,737	32.2	1,019	31.6	75	27.2
From skates, skis, boards, blades	5	0.9	646	3.4	8,297	6.1	202	6.3	16	5.7
From furniture	51	9.2	1,163	6.1	7,869	5.8	148	4.6	13	4.6
In playgrounds	0	0.0	267	1.4	2,925	2.2	85	2.6	6	2.1
On stairs	34	6.2	1,626	8.5	17,206	12.7	386	12.0	37	13.5
From ladders/scaffolding	9	1.6	683	3.6	3,092	2.3	182	5.6	16	5.9
Diving	*	0.4	26	0.1	406	0.3	7	0.2	*	0.5
Other**	431	78.1	8,742	46.0	52,460	38.6	1,196	37.1	111	40.4
Total	552	100.0	19,021	100.0	135,993	100.0	3,225	100.0	275	100.0

*Less than 5 numbers suppressed due to small counts.

**Other falls includes: other fall on same level due to collision with or pushing by other person; fall while being carried or supported by other persons; fall involving wheelchair and other walking devices; fall from out or through building or structure; fall from tree; fall from cliff; fall from one level to another (fall from or into cavity, dock, hole etc.); and other fall on same level (bumping against object, fall from or off toilet) and unspecified falls.

Fall-Related Injuries by Cause and Associated Costs

Among fall-related injuries, the most common cause of injury deaths in BC in 2010 was (Table 11):

- Other causes of falls (see glossary for definition): 78% (n=431)
- Falls from furniture: 9% (n=51)
- Falls on stairs: 6% (n=34)

Hospitalizations due to fall-related injuries were also most often due to (Table 11):

- Other causes of falls (see glossary for definition): 46% (n=8,742)
- Falls on same level: 31% (n=5,868)
- Falls on stairs: 9% (n=1,626)

The most frequent defined causes of fall-related emergency room visits were from (Table 11):

- Other causes of falls (see glossary for definition): 39% (n=52,460)
- Falls on same level: 32% (n=43,737)
- Falls on stairs: 13% (n=17,206)

The most common cause of fall-related permanent disability was from (Table 11):

- Other causes of falls (see glossary for definition): 37% (n=1,196) permanent partial disability and 40% (n=111) permanent total disability
- Falls on same level: 32% (n=1,019) permanent partial disability and 27% (n=75) permanent total disability
- Falls on stairs: 12% (n=386) permanent partial disability and 14% (n=37) permanent total disability

Similarly, a large proportion of the costs from fall-related injuries were from other causes at 44% of total costs, 45% of direct costs, and 40% of indirect costs (Table 12). Same level falls made up the largest proportion of specified causes of fall-related costs at 27% of total costs, 28% of direct costs and 22% of indirect costs, followed by falls on stairs (10% of total costs, 9% of direct costs, and 11% of indirect costs),

Table 12: Fall-related injuries by injury outcome, BC, 2010 (\$ millions)

Description	Total Costs		Direct Costs		Indirect Costs	
	\$	%	\$	%	\$	%
Falls						
Other**	\$533	43.6	\$429	44.7	\$104	39.5
On the same level	\$329	26.9	\$272	28.4	\$57	21.6
On stairs	\$120	9.8	\$90	9.3	\$30	11.4
From skates, skis, boards, blades	\$79	6.4	\$47	4.9	\$32	12.0
From furniture	\$71	5.8	\$60	6.3	\$11	4.3
From ladders/scaffolding	\$50	4.1	\$37	3.9	\$13	5.0
In playgrounds	\$36	2.9	\$22	2.3	\$14	5.2
Diving	\$4	0.4	\$2	0.2	\$2	0.9
Total	\$1,222	100.0	\$960	100.0	\$262	100.0

Note: Numbers are rounded, therefore totals may not sum exactly.

** See description on page 15.

Table 13: Intentional injuries by injury outcome, BC, 2010

Intentional Injuries	Deaths		Hospitalized Treatment		Emergency Room Visits		Permanent Partial Disability		Permanent Total Disability	
	N	%	N	%	N	%	N	%	N	%
Suicide/Self-Harm-Poisoning	129	23.0	2,538	60.6	3,506	20.3	547	60.8	24	39.6
Suicide/Self-Harm-Other	375	66.8	338	8.1	1,033	6.0	55	6.2	5	8.1
Violence	57	10.2	1,310	31.3	12,732	73.7	297	33.0	32	52.3
Total	561	100.0	4,186	100.0	17,272	100.0	900	100.0	61	100.0

falls involving skates, skis, snowboards, or blades (6% of total costs, 5% of direct costs, and 12% of indirect costs), falls from furniture (6% of total costs, 6% of direct costs, and 4% of indirect costs), falls from ladders (4% of total costs, 4% of direct costs, and 5% of indirect costs), and falls from playground equipment (3% of total costs, 2% of direct costs, and 5% of indirect costs) (Table 12).

Table 14: Intentional injury costs by injury outcome, BC, 2010 (\$ millions)

Description	Total Costs		Direct Costs		Indirect Costs	
	\$	%	\$	%	\$	%
Intentional Injuries						
Suicide/self-harm-Poisoning	\$236	40.5	\$131	54.7	\$105	30.7
Suicide/self-harm-Other	\$188	32.4	\$24	10.1	\$164	47.9
Violence	\$157	27.0	\$84	35.2	\$73	21.4
Total	\$581	100.0	\$239	100.0	\$343	100.0

Note: Numbers are rounded, therefore totals may not sum exactly.

Intentional Injuries by Cause and Associated Costs

Among intentional injuries, the cause of injury deaths in BC in 2010 were (Table 13):

- Suicide/self-harm other than by poisoning: 67% (n=375)
- Suicide/self-harm by poisoning: 23% (n=129)
- Violence: 10% (n=57)

Intentional injury hospitalizations were also due to (Table 13):

- Suicide/self-harm by poisoning: 61% (n=2,538)
- Violence: 31% (n=1,310)
- Suicide/self-harm other than by poisoning: 8% (n=338)

The defined causes of intentional injury emergency room visits were from (Table 13):

- Violence: 74% (n=12,732)
- Suicide/self-harm by poisoning: 20% (n=3,506)
- Suicide/self-harm other than by poisoning: 6% (n=1,033)

The cause of permanent disability from intentional injury were from (Table 13):

- Suicide/self-harm by poisoning: 61% (n=547) permanent partial disability and 40% (n=24) permanent total disability
- Violence: 33% (n=297) permanent partial disability and 52% (n=32) permanent total disability
- Suicide/self-harm other than by poisoning: 6% (n=55) permanent partial disability and 8% (n=5) permanent total disability

Table 15: Injury outcome by health authority, BC, 2010

Health Authority	Deaths	Hospitalized Treatment	Emergency Room Visits	Permanent Partial Disability	Permanent Total Disability
Interior	465	7,149	89,043	1,619	129
Fraser	621	11,620	153,953	2,622	210
Vancouver Coastal	353	6,471	79,907	1,428	114
Island	399	6,516	84,991	1,443	114
Northern	171	2,775	43,082	719	57
Unspecified	0	467	5,415	118	10
BC Total	2,009	34,998	456,390	7,948	634

*Less than 5 numbers suppressed due to small counts.



Photo: Dubova/Shutterstock

Suicide by poisoning was responsible for the largest proportion of intentional injury-related costs in 2010 at 41%, followed by other forms of suicide and self-harm (32%) and violence (27%) (Table 14). Broken down by type of cost, suicide and self-harm by poisoning is shown to account for 55% of intentional injury-related direct costs, followed by violence (35%) and other forms of suicide and self-harm (10%). Suicide and self-harm by causes other than by poisoning accounted for almost half of the indirect costs of intentional injuries at 48%, which is higher than the proportions of indirect costs for suicide and self-harm accounted for by poisoning (31%) or by violence (21%) (Table 14).

Costs of Injury by Health Authority

Table 15 presents a summary of the injury numbers by health authority (HA) and are explained in greater detail for each HA in the following sections.

Table 16 presents the summary of the direct and indirect costs by health authority and are also explained in greater detail in the later sections.

Table 16: Total, direct and indirect costs of injury by health authority, BC, 2010 (\$ millions)

Health Authority	Total Costs	Direct Costs	Indirect Costs
Interior	\$736	\$437	\$299
Fraser	\$1,225	\$767	\$457
Vancouver Coastal	\$664	\$423	\$241
Island	\$676	\$428	\$248
Northern	\$354	\$201	\$153
Unspecified	\$47	\$32	\$14
BC Total	\$3,701	\$2,289	\$1,412

Note: Numbers are rounded, therefore totals may not sum exactly.

OVERVIEW OF COSTS BY EACH HEALTH AUTHORITY

Interior Health Authority

Intentional and Unintentional Injury

Unintentional injuries made up the bulk of injuries in Interior Health (IH) in 2010: 73% (n=340) of injury deaths, 87% (n=6,212) of injury hospitalizations, 96% (n=85,406) of emergency room visits, 88% (n=1,418) of permanent partial disabilities arising from injury, and 90% (n=116) of permanent total disabilities arising from injury were unintentional (Table 17).

Intentional injuries made up 25% (n=118) of injury deaths, 11% (n=808) of hospitalized injuries, 3% (n=3,097) of emergency room visits, 11% (n=173) of permanent partial disabilities, and 9% (n=12) of permanent total disabilities. The remaining injuries were of undetermined intent (Table 17).

Unintentional injuries accounted for \$610 million or 83% of IH's total cost of injuries in 2010 (Table 18). They accounted for \$384 million or 88% of the direct costs, and \$226 million or 76% of the indirect costs.

Intentional injuries accounted for \$114 million or 15% of the total cost of injuries (Table 18). They made up \$46 million or 11% of the direct costs, and \$68 million or 23% of the indirect costs of injuries. Injuries of undetermined intent accounted for approximately \$13 million of total injury cost or less than 2% of injury costs across the three categories.

Injury by Cause

The greatest number of injury deaths in IH in 2010 was from (Table 19):

- Falls: 27% (n=124)
- Suicide/self-harm: 24% (n=113)
- Transport incidents: 22% (n=102)
- Unintentional poisoning: 14% (n=64)

Hospitalizations due to injury were also most often due to (Table 19):

- Falls: 53% (n=3,782)
- Transport incidents: 17% (n=1,189)
- Other unintentional injuries: 12% (n=872)
- Suicide/self-harm: 8% (n=568)

Table 18: Total, direct and indirect costs of injury by intent, Interior Health, 2010 (\$ millions)

Description	Total Costs	Direct Costs	Indirect Costs
Unintentional	\$610	\$384	\$226
Intentional	\$114	\$46	\$68
Undetermined Intent/Other	\$13	\$7	\$5
Total	\$736	\$437	\$299

Note: Numbers are rounded, therefore totals may not sum exactly.

The most frequent defined causes of emergency room visits were from (Table 19):

- Other unintentional injuries: 52% (n=45,849)
- Falls: 30% (n=26,319)
- Transport incidents: 10% (n=9,158)

The most common cause of permanent disability was from (Table 19):

- Falls: 40% (n=645) permanent partial disability and 42% (n=54) permanent total disability
- Other unintentional injuries: 24% (n=388) permanent partial disability and 21% (n=28) permanent total disability
- Transport incidents: 18% (n=286) permanent partial disability and 22% (n=28) permanent total disability

Falls accounted for the highest total costs (\$222 million), generating the greatest total cost per capita at \$309 and the greatest health care cost per capita at \$239 (Table 20). The second highest total cost, total cost per capita and health care cost per capita for major causes of injury was for transport incidents at \$171 million, \$238 and \$130, respectively.

Costs of Injury by Cause

The majority of the total costs of injuries in IH in 2010 were due to falls at \$222 million or 30% of total costs, transport incidents at \$171 million or 23%, and other unintentional injuries at \$148 million or 20% (Table 21). Other causes of total costs of injury included suicide and self-harm (\$87 million or 12%), unintentional poisoning (\$46 million or 6%), violence (\$26 million or 4%), undetermined intent (\$13 million or 2%), and fire and burns (\$10 million or 1%).

Table 17: Injury by intent and injury outcome, Interior Health, 2010

Description	Deaths	Hospitalized Treatment	Emergency Room Visit	Permanent Partial Disability	Permanent Total Disability
Unintentional	340	6,212	85,406	1,418	116
Intentional	118	808	3,097	173	12
Undetermined intent/Other	7	129	539	28	*
Total	465	7,149	89,043	1,619	129

*Less than 5 numbers suppressed due to small counts.

Table 19: Number of injuries by cause and injury outcome, Interior Health, 2010

Description	Deaths	Hospitalized Treatment	Emergency Room Visits	Permanent Partial Disability	Permanent Total Disability
Transport Incidents	102	1,189	9,158	286	28
Pedestrian	11	70	295	16	*
Pedal cycle	*	174	1,480	45	*
Motor vehicle	75	648	5,535	150	16
ATV, snowmobile	6	194	857	48	*
Other ^a	9	103	991	27	*
Falls	124	3,782	26,319	645	54
On the same level	6	1,363	9,590	230	17
From skates, skis, boards, blades	*	158	1,809	48	*
From furniture	17	207	1,306	25	*
In playgrounds	0	56	621	18	*
On stairs	7	284	2,995	68	7
From ladders/scaffolding	*	162	680	43	*
Diving	0	5	65	*	0
Other**	89	1,547	9,254	212	20
Drowning	22	7	28	*	0
Fire/Burns	5	69	1,211	29	*
Unintentional Poisoning	64	275	1,471	57	*
Struck by/against Sports Equipment	0	18	1,371	11	*
Other Unintentional Injuries***	23	872	45,849	388	28
Suicide/Self-Harm	113	568	890	119	6
Suicide/Self-Harm–Poisoning	31	499	694	108	5
Suicide/Self-Harm –Other	82	69	196	11	*
Violence	5	240	2,207	54	6
Undetermined Intent/Other	7	129	539	28	*
Total	465	7,149	89,043	1,619	129

^aOther includes: animal-rider or occupant of animal-drawn vehicle; occupant of railway train or railway vehicle; occupant of streetcar; occupant of special vehicle mainly used on industrial premises; occupant of special vehicle mainly used in agriculture; occupant of special construction vehicle; watercraft-related incidents, excluding drowning and submersion; air and space transport incidents; unknown mode of transport; and unspecified mode of transport.

*Less than 5 numbers suppressed due to small counts.

**Other falls includes: other fall on same level due to collision with or pushing by other person; fall while being carried or supported by other persons; fall involving wheelchair and other walking devices; fall from out or through building or structure; fall from tree; fall from cliff; fall from one level to another (fall from or into cavity, dock, hole etc.); and other fall on same level (bumping against object, fall from or off toilet).

***Other unintentional injuries includes: struck by object (excluding sports equipment); exposure to animate mechanical forces; other accidental threats to breathing; exposure to electric current/radiation/extreme air temperature and pressure; contact with venomous animals and plants; exposure to forces of nature; overexertion and strenuous/repetitive movements; and accidental exposure to other and unspecified factors.

Table 20: Injury deaths, death rates, total costs and costs per capita by cause, Interior Health, 2010

Cause	Deaths	Death Rate (per 100,000)	Total Costs (\$ millions)	Total Cost Per Capita	Health Care Cost Per Capita
Falls	124	17.26	\$222	\$309	\$239
Transport Incidents	102	14.20	\$171	\$238	\$130
Suicide/Self-Harm–Poisoning	31	4.32	\$48	\$67	\$36
Unintentional Poisoning	64	8.91	\$46	\$64	\$19
Suicide/Self-Harm–Other	82	11.42	\$39	\$54	\$7
Violence	5	0.70	\$26	\$37	\$22
Other Injuries	57	7.94	\$184	\$256	\$157
Total	465	64.74	\$736	\$1,025	\$609

Note: Health care cost per capita calculated using direct costs only. Other injuries include drowning, fire/burns, struck by/against sport equipment, other unintentional injuries and undetermined/other intent.

Table 21: Total, direct and indirect costs of injury by cause, Interior Health, 2010 (\$ millions)

Description	Total Costs	Direct Costs	Indirect Costs
Falls	\$222	\$172	\$50
Other**	\$83	\$66	\$17
On the same level	\$70	\$58	\$12
On stairs	\$21	\$15	\$6
From skates, skis, boards, blades	\$18	\$11	\$7
From ladders/scaffolding	\$12	\$9	\$3
From furniture	\$10	\$9	\$2
In playgrounds	\$7	\$5	\$3
Diving	\$1	\$0	\$0
Transport Incidents	\$171	\$93	\$78
Motor vehicle	\$105	\$57	\$48
ATV, snowmobile	\$21	\$12	\$9
Pedal cycle	\$19	\$12	\$6
Other ^a	\$13	\$6	\$7
Pedestrian	\$13	\$6	\$7
Other Unintentional Injuries***	\$148	\$96	\$51
Suicide/Self-Harm	\$87	\$31	\$57
Suicide/Self-Harm–Poisoning	\$48	\$26	\$23
Suicide/Self-Harm–Other	\$39	\$5	\$34
Unintentional Poisoning	\$46	\$14	\$33
Violence	\$26	\$16	\$11
Undetermined Intent/Other	\$13	\$7	\$5
Fire/Burns	\$10	\$6	\$4
Drowning	\$9	\$1	\$8
Struck by/against Sports Equipment	\$5	\$3	\$2
Total	\$736	\$437	\$299

Note: Numbers are rounded, therefore totals may not sum exactly.
^a, **, *** See description on page 22.



Photo: Christian Mueller/Shutterstock

Falls made up \$172 million or 39% of the direct costs of injuries in IH in 2010, followed by transport incidents and other unintentional injuries at \$93 million or 22% and \$96 million or 21%, respectively (Table 21). Other causes of direct costs of injury included suicide and self-harm (\$31 million or 7%), violence (\$16 million or 4%), unintentional poisoning (\$14 million or 3%), undetermined intent (\$7 million or 2%), fire and burns (\$6 million or 1%), and struck by or against sports equipment (\$3 million or 1%).

Transport incidents accounted for the greatest proportion of indirect costs at \$78 million or 26% of indirect costs, followed by suicide and self-harm at \$57 million or 19%, falls at \$50 million or 17%, and other unintentional injuries at \$51 million or 17% (Table 21). Other causes of indirect costs were unintentional poisoning (\$33 million or 11%), violence (\$11 million or 4%), drowning (\$8 million or 3%), undetermined intent (\$5 million or 2%), fire and burns (\$4 million or 1%), and struck by or against sports equipment (\$2 million or 1%).

Transport-Related Injuries by Cause and Associated Costs

Among transport-related injuries, the most common cause of injury deaths in IH in 2010 was (Table 22):

- Motor vehicle incidents: 74% (n=75)
- Pedestrian events: 11% (n=11)
- Other transport incidents: 9% (n=9)

Table 22: Transport-related injuries by injury outcome, Interior Health, 2010

Description	Deaths		Hospitalized Treatment		Emergency Room Visits		Permanent Partial Disability		Permanent Total Disability	
	N	(%)	N	(%)	N	(%)	N	(%)	N	(%)
Transport Incidents										
Pedestrian	11	10.8	70	5.9	295	3.2	16	5.5	*	6.5
Pedal cycle	*	1.0	174	14.6	1,480	16.2	45	15.8	*	15.2
Motor vehicle	75	73.5	648	54.5	5,535	60.4	150	52.4	16	55.5
ATV, snowmobile	6	5.9	194	16.3	857	9.4	48	16.8	*	14.7
Other ^a	9	8.8	103	8.7	991	10.8	27	9.5	*	8.2
Total	102	100.0	1,189	100.0	9,158	100.0	286	100.0	28	100.0

*Less than 5 numbers suppressed due to small counts. ^aSee description on page 22.

Table 23: Transport-related costs by injury outcome, Interior Health, 2010 (\$ millions)

Description	Total Costs		Direct Costs		Indirect Costs	
	\$	%	\$	%	\$	%
Transport Incidents						
Motor vehicle	\$105	61.7	\$57	61.4	\$48	62.1
ATV, snowmobile	\$21	12.2	\$12	12.6	\$9	11.8
Pedal cycle	\$19	10.9	\$12	13.1	\$6	8.2
Other ^Δ	\$13	7.6	\$6	6.6	\$7	8.8
Pedestrian	\$13	7.6	\$6	6.2	\$7	9.2
Total	\$171	100.0	\$93	100.0	\$78	100.0

Note: Numbers are rounded, therefore totals may not sum exactly.

^ΔSee description on page 22.

Hospitalizations due to transport-related injuries were also most often due to (Table 22):

- Motor vehicle incidents: 55% (n=648)
- ATV/Snowmobile incidents: 16% (194)
- Cycling events: 15% (n=174)

The most frequent defined causes of transport-related emergency room visits were from (Table 22):

- Motor vehicle incidents: 60% (n=5,535)
- Cycling events: 16% (n=1,480)
- Other transport incidents: 11% (n=991)

The most common cause of transport-related permanent disability was from (Table 22):

- Motor vehicle incidents: 52% (n=150) permanent partial disability and 56% (n=16) permanent total disability
- ATV/Snowmobile incidents: 17% (n=48) permanent partial disability and 15% (n=less than 5) permanent total disability
- Cycling events: 16% (n=45) permanent partial disability and 15% (n=less than 5) permanent total disability

Motor vehicle incidents accounted for the highest proportion of the costs associated with transport-related injuries, making up almost two-third of each cost type, total, direct and indirect transport-related costs (Table 23). ATV and snowmobile was also a significant source of transport-related injury costs accounting for over 12% of all costs, total, direct and indirect. Other causes included cycling (11% of total, 13% of direct costs and 8% of indirect costs), pedestrian incidents (8% of total, 6% of direct and 9% of indirect costs), and other (8% of total, 7% of direct and 9% of indirect costs).

Fall-Related Injuries by Cause and Associated Costs

Among fall-related injuries, the most common cause of injury deaths in IH in 2010 was (Table 24):

- Other causes of falls (see glossary for definition): 72% (n=89)
- Falls from furniture: 14% (n=17)
- Falls on stairs: 6% (n=7)

Hospitalizations due to fall-related injuries were also most often due to (Table 24):

- Other causes of falls (see glossary for definition): 41% (n=1,547)
- Falls on same level: 36% (n=1,363)
- Falls on stairs: 8% (n=284)

The most frequent defined causes of fall-related emergency room visits were from (Table 24):

- Falls on same level: 36% (n=9,590)
- Other causes of falls (see glossary for definition): 35% (n=9,254)
- Falls on stairs: 11% (n=2,995)

Table 24: Fall-related injuries by injury outcome, Interior Health, 2010

	Deaths		Hospitalized Treatment		Emergency Room Visits		Permanent Partial Disability		Permanent Total Disability	
	N	%	N	%	N	%	N	%	N	%
Falls										
On the same level	6	4.8	1,363	36.0	9,590	36.4	230	35.6	17	31.1
From skates, skis, boards, blades	*	0.8	158	4.2	1,809	6.9	48	7.4	*	6.8
From furniture	17	13.7	207	5.5	1,306	5.0	25	3.9	*	3.9
In playgrounds	0	0.0	56	1.5	621	2.4	18	2.8	*	2.2
On stairs	7	5.6	284	7.5	2,995	11.4	68	10.5	7	12.0
From ladders/scaffolding	*	3.2	162	4.3	680	2.6	43	6.7	*	7.3
Diving	0	0.0	5	0.1	65	0.2	*	0.2	0	0.6
Other**	89	71.8	1,547	40.9	9,254	35.2	212	32.9	20	36.1
Total	124	100.0	3,782	100.0	26,319	100.0	645	100.0	54	100.0

*Less than 5 numbers suppressed due to small counts. **See description on page 22.

The most common cause of fall-related permanent disability was from (Table 24):

- Other causes of falls (see glossary for definition): 33% (n=212) permanent partial disability and 36% (n=20) permanent total disability
- Falls on same level: 36% (n=230) permanent partial disability and 31% (n=17) permanent total disability
- Falls on stairs: 11% (n=68) permanent partial disability and 12% (n=7) permanent total disability

Similarly, a large proportion of the costs from fall-related injuries were coded as *other* at 38% of total costs, 38% of direct costs, and 34% of indirect costs (Table 25). Same level falls made up the largest proportion of specified causes of fall-related costs at 32% of total costs, 34% of direct costs and 24% of indirect costs, followed by falls on stairs (9% of total costs, 9% of direct costs, and 13% of indirect costs),

falls involving skates, skis, snowboards, or blades (8% of total costs, 6% of direct costs, and 14% of indirect costs), falls from furniture (5% of total costs, 5% of direct costs, and 3% of indirect costs), falls from ladders (5% of total costs, 5% of direct costs, and 6% of indirect costs), and falls from playground equipment (3% of total, 3% of direct, and 6% of indirect costs).

Intentional Injuries by Cause and Associated Costs

Among intentional injuries, the cause of injury deaths in IH in 2010 were (Table 26):

- Suicide/self-harm other than by poisoning: 70% (n=82)
- Suicide/self-harm by poisoning: 26% (n=31)
- Violence: 4% (n=5)

Intentional injury hospitalizations were also due to (Table 26):

- Suicide/self-harm by poisoning: 62% (n=499)
- Violence: 30% (n=240)
- Suicide/self-harm other than by poisoning: 9% (n=69)

The defined causes of intentional injury emergency room visits were from (Table 26):

- Violence: 71% (n=2,207)
- Suicide/self-harm by poisoning: 22% (n=694)
- Suicide/self-harm other than by poisoning: 6% (n=196)

The cause of permanent disability from intentional injury were from (Table 26):

- Suicide/self-harm by poisoning: 62% (n=108) permanent partial disability and 41% (n=5) permanent total disability
- Violence: 31% (n=54) permanent partial disability and 50% (n=6) permanent total disability
- Suicide/self-harm other than by poisoning: 6% (n=11) permanent partial disability and 9% (n=less than 5) permanent total disability

Suicide by poisoning was responsible for the largest proportion of intentional injury-related costs in 2010 at 43%, followed by other forms of suicide and self-harm (34%) and violence (23%) (Table 27).

Table 25: Fall-related costs by injury outcome, Interior Health, 2010 (\$ millions)

Description	Total Costs		Direct Costs		Indirect Costs	
	\$	%	\$	%	\$	%
Falls						
Other**	\$83	37.5	\$66	38.4	\$17	34.4
On the same level	\$70	31.5	\$58	33.8	\$12	23.6
On stairs	\$21	9.4	\$15	8.5	\$6	12.5
From skates, skis, boards, blades	\$18	8.0	\$11	6.3	\$7	13.8
From ladders/scaffolding	\$12	5.2	\$9	5.0	\$3	6.0
From furniture	\$10	4.7	\$9	5.1	\$2	3.4
In playgrounds	\$7	3.4	\$5	2.7	\$3	5.8
Diving	\$1	0.3	\$0	0.2	\$0	0.5
Total	\$222	100.0	\$172	100.0	\$50	100.0

Note: Numbers are rounded, therefore totals may not sum exactly.
**See description on page 22.

Table 26: Intentional injuries by injury outcome, Interior Health, 2010

	Deaths		Hospitalized Treatment		Emergency Room Visits		Permanent Partial Disability		Permanent Total Disability	
	N	%	N	%	N	%	N	%	N	%
Intentional Injuries										
Suicide/Self-Harm-Poisoning	31	26.3	499	61.8	694	22.4	108	62.4	5	41.3
Suicide/Self-Harm-Other	82	69.5	69	8.5	196	6.3	11	6.4	*	8.6
Violence	5	4.2	240	29.7	2,207	71.3	54	31.1	6	50.1
Total	118	100.0	808	100.0	3,097	100.0	173	100.0	12	100.0

*Less than 5 numbers suppressed due to small counts

Broken down by type of cost, suicide and self-harm by poisoning is shown to account for 56% of intentional injury-related direct costs, followed by violence (34%) and other forms of suicide and self-harm (11%) (Table 27). Suicide and self-harm by causes other than by poisoning accounted for half of the indirect costs of intentional injuries at 51%, which is higher than the proportions of indirect costs for suicide and self-harm accounted for by poisoning (34%) or by violence (16%).

Table 27: Intentional injury costs by injury outcome, BC, 2010 (\$ millions)

Description	Total Costs		Direct Costs		Indirect Costs	
	\$	%	\$	%	\$	%
Intentional Injuries						
Suicide/ Self-Harm- Poisoning	\$48	42.6	\$26	55.7	\$23	33.7
Suicide/Self- Harm - Other	\$39	34.3	\$5	10.5	\$34	50.5
Violence	\$26	23.1	\$16	33.8	\$11	15.8
Total	\$114	100.0	\$46	100.0	\$68	100.0

Note: Numbers are rounded, therefore totals may not sum exactly.

FRASER HEALTH AUTHORITY

Intentional and Unintentional Injury

Unintentional injuries made up the bulk of injuries in Fraser Health (FH) in 2010: 73% (n=453) of injury deaths, 87% (n=10,094) of injury hospitalizations, 96% (n=147,942) of emergency room visits, 87% (n=2,293) of permanent partial disabilities arising from injury, and 89% (n=188) of permanent total disabilities arising from injury were unintentional (Table 28).

Intentional injuries made up 25% (n=155) of injury deaths, 12% (n=1,376) of hospitalized injuries, 3% (n=5,294) of emergency room visits, 11% (n=296) of permanent partial disabilities, and 9% (n=19) of permanent total disabilities. The remaining injuries were of undetermined intent (Table 28).

Unintentional injuries accounted for \$1 billion or 84% of FH's total cost of injuries in 2010 (Table 29). They accounted for \$681 million or 89% of the direct costs, and \$348 million or 76% of the indirect costs.

Intentional injuries accounted for \$180 million or 15% of the total cost of injuries (Table 29). They made up \$78 million or 10% of the direct costs, and \$101 million or 22% of the indirect costs of injuries. Injuries of undetermined intent accounted for approximately \$16 million or 1% of all injury costs across the three categories.

Injury by Cause

The greatest number of injury deaths in FH in 2010 was from (Table 30):

- Falls: 27% (n=166)
- Unintentional poisoning: 22% (n=135)
- Suicide/self-harm: 20% (n=126)
- Transport incidents: 17% (n=104)

Hospitalizations due to injury were also most often due to (Table 30):

- Falls: 56% (n=6,509)
- Other unintentional injuries: 13% (n=1,557)
- Transport incidents: 13% (n=1,507)
- Suicide/self-harm: 8% (n=976)

Table 29: Total, direct and indirect costs of injury by intent, Fraser Health, 2010 (\$ millions)

Description	Total Costs	Direct Costs	Indirect Costs
Unintentional	\$1,029	\$681	\$348
Intentional	\$180	\$78	\$101
Undetermined Intent/Other	\$16	\$8	\$8
Total	\$1,225	\$767	\$457

Note: Numbers are rounded, therefore totals may not sum exactly.

The most frequent defined causes of emergency room visits were from (Table 30):

- Other unintentional injuries: 54% (n=82,820)
- Falls: 30% (n=46,259)
- Transport incidents: 8% (n=12,197)

The most common cause of permanent disability was from (Table 30):

- Falls: 42% (n=1,088) permanent partial disability and 44% (n=93) permanent total disability
- Other unintentional injuries: 27% (n=698) permanent partial disability and 24% (n=50) permanent total disability
- Transport incidents: 14% (n=364) permanent partial disability and 18% (n=37) permanent total disability

Falls accounted for the highest total costs (\$417 million), generating the greatest total cost per capita at \$258 and the greatest health care cost per capita at \$204 (Table 31). The second highest total cost, total cost per capita and health care cost per capita for major causes of injury was for transport incidents at \$200 million, \$124 and \$70, respectively.

Costs of Injury by Cause

The majority of the total costs of injuries in FH in 2010 were due to falls at \$417 million or 34% of total costs, other unintentional injuries at \$295 million or 24%, and transport incidents at \$200 million or 16% (Table 32). Other causes of total costs of injury included suicide and self-harm (\$123 million or 10%), unintentional poisoning (\$89 million or 7%), violence (\$56 million or 5%), undetermined intent (\$16 million or 1%), and fire and burns (\$13 million or 1%).

Table 28: Injury by intent and injury outcome, Fraser Health, 2010

Intent	Deaths	Hospitalized Treatment	Emergency Room Visits	Permanent Partial Disability	Permanent Total Disability
Unintentional	453	10,094	147,942	2,293	188
Intentional	155	1,376	5,294	296	19
Undetermined Intent/Other	13	150	717	33	*
Total	621	11,620	153,953	2,622	210

*Less than 5 numbers suppressed due to small counts.

Table 30: Number of injuries by cause and injury outcome, Fraser Health, 2010

Description	Deaths	Hospitalized Treatment	Emergency Room Visits	Permanent Partial Disability	Permanent Total Disability
Transport Incidents	104	1,507	12,197	364	37
Pedestrian	24	219	897	50	6
Pedal cycle	4	253	2,331	66	6
Motor vehicle	72	809	7,111	188	20
ATV, snowmobile	*	114	746	30	*
Other ^Δ	*	112	1,113	30	*
Falls	166	6,509	46,259	1,088	93
On the same level	6	1,823	13,826	318	23
From skates, skis, boards, blades	5	163	2,446	53	*
From furniture	5	412	3,146	56	5
In playgrounds	0	103	1,014	32	*
On stairs	*	565	5,962	135	13
From ladders/scaffolding	*	261	1,221	69	6
Diving	0	11	146	*	*
Other**	146	3,171	18,499	422	39
Drowning	12	11	51	*	0
Fire/Burns	10	59	1,408	31	*
Unintentional Poisoning	135	416	2,211	87	5
Struck by/against Sports Equipment	0	35	2,994	24	*
Other Unintentional Injuries***	26	1,557	82,820	698	50
Suicide/Self-Harm	126	976	1,503	205	9
Suicide/Self-Harm–Poisoning	27	880	1,218	190	8
Suicide/Self-Harm –Other	99	96	284	16	*
Violence	29	400	3,792	90	10
Undetermined Intent/Other	13	150	717	33	*
Total	621	11,620	153,953	2,622	210

^ΔOther includes: animal-rider or occupant of animal-drawn vehicle; occupant of railway train or railway vehicle; occupant of streetcar; occupant of special vehicle mainly used on industrial premises; occupant of special vehicle mainly used in agriculture; occupant of special construction vehicle; watercraft-related incidents, excluding drowning and submersion; air and space transport incidents; unknown mode of transport; and unspecified mode of transport.

*Less than 5 numbers suppressed due to small counts.

**Other falls includes: other fall on same level due to collision with or pushing by other person; fall while being carried or supported by other persons; fall involving wheelchair and other walking devices; fall from out or through building or structure; fall from tree; fall from cliff; fall from one level to another (fall from or into cavity, dock, hole etc.); and other fall on same level (bumping against object, fall from or off toilet).

***Other unintentional injuries includes: struck by object (excluding sports equipment); exposure to animate mechanical forces; other accidental threats to breathing; exposure to electric current/radiation/extreme air temperature and pressure; contact with venomous animals and plants; exposure to forces of nature; overexertion and strenuous/repetitive movements; and accidental exposure to other and unspecified factors.

Table 31: Injury deaths, death rates, total costs and costs per capita by cause, Fraser Health, 2010

Cause	Deaths	Death Rate (per 100,000)	Total Costs (\$ millions)	Total Cost Per Capita	Health Care Cost Per Capita
Falls	166	10.26	\$417	\$258	\$204
Transport Incidents	104	6.43	\$200	\$124	\$70
Unintentional Poisoning	135	8.34	\$88	\$55	\$13
Suicide/Self-Harm–Poisoning	27	1.67	\$76	\$47	\$28
Violence	29	1.79	\$56	\$35	\$17
Suicide/Self-Harm–Other	99	6.12	\$47	\$29	\$4
Other Injuries	61	3.77	\$339	\$210	\$138
Total	621	38.38	\$1,225	\$757	\$474

Note: Health care cost per capita calculated using direct costs only. Other injuries include drowning, fire/burns, struck by/against sport equipment, other unintentional injuries and undetermined/other intent.

Table 32: Total, direct and indirect costs of injury by cause, Fraser Health, 2010 (\$ millions)

Description	Total Costs	Direct Costs	Indirect Costs
Falls	\$417	\$330	\$87
Other**	\$190	\$156	\$34
On the same level	\$104	\$85	\$19
On stairs	\$43	\$33	\$11
From furniture	\$27	\$22	\$5
From skates, skis, boards, blades	\$20	\$12	\$8
From ladders/scaffolding	\$18	\$13	\$5
In playgrounds	\$14	\$8	\$5
Diving	\$1	\$1	\$1
Other Unintentional Injuries***	\$295	\$204	\$91
Transport Incidents	\$200	\$114	\$87
Motor vehicle	\$117	\$63	\$54
Pedestrian	\$29	\$18	\$11
Pedal cycle	\$28	\$17	\$11
ATV, snowmobile	\$13	\$8	\$6
Other ^Δ	\$12	\$8	\$5
Suicide/Self-Harm	\$123	\$52	\$72
Suicide/Self-Harm-Poisoning	\$76	\$45	\$31
Suicide/Self-Harm-Other	\$47	\$6	\$41
Unintentional Poisoning	\$88	\$22	\$67
Violence	\$56	\$27	\$29
Undetermined Intent/Other	\$16	\$8	\$8
Fire/Burns	\$13	\$7	\$7
Struck by/against Sports Equipment	\$8	\$4	\$4
Drowning	\$7	\$1	\$6
Total	\$1,225	\$767	\$457

Note: Numbers are rounded, therefore totals may not sum exactly.
^Δ, **, *** See description on page 28.

Falls made up \$330 million or 43% of the direct costs of injuries in FH in 2010, followed by other unintentional injuries at \$204 million or 27%, and transport incidents at \$114 million or 15% (Table 32). Other causes of direct costs of injury included suicide and self-harm (\$52 million or 7%), violence (\$27 million or 3%), unintentional poisoning (\$22 million or 3%), undetermined intent (\$8 million or 1%), fire and burns (\$7 million or 1%), and struck by or against sports equipment (\$4 million or 1%).

Other unintentional injuries accounted for the greatest proportion of indirect costs at \$91 million or 20%, followed by transport incidents at \$87 million or 19%, falls at \$87 million or 19%, and suicide and self-harm at \$72 million or 16% (Table 32). Other causes of indirect costs were unintentional poisoning (\$67 million or 15%), violence (\$29 million or 6%), undetermined intent (\$8 million or 2%), fire and burns (\$7 million or 1%), drowning (\$6 million or 1%), and struck by or against sports equipment (\$4 million or 1%).

Transport-Related Injuries by Cause and Associated Costs

Among transport-related injuries, the most common cause of injury deaths in FH in 2010 was (Table 33):

- Motor vehicle incidents: 69% (n=72)
- Pedestrian events: 23% (n=24)
- Cycling events: 4% (n=less than 5)

Hospitalizations due to transport-related injuries were also most often due to (Table 33):

- Motor vehicle incidents: 54% (n=809)
- Cycling events: 17% (n=253)
- Pedestrian events: 15% (219)

The most frequent defined causes of transport-related emergency room visits were from (Table 33):

- Motor vehicle incidents: 58% (n=7,111)
- Cycling events: 19% (n=2,331)
- Pedestrian events: 7% (n=897)

Table 33: Transport-related injuries by injury outcome, Fraser Health, 2010

Description	Deaths		Hospitalized Treatment		Emergency Room Visit		Permanent Partial Disability		Permanent Total Disability	
	N	%	N	%	N	%	N	%	N	%
Transport Incidents										
Pedestrian	24	23.1	219	14.5	897	7.4	50	13.8	6	15.9
Pedal cycle	*	3.8	253	16.8	2,331	19.1	66	18.1	6	17.0
Motor vehicle	72	69.2	809	53.7	7,111	58.3	188	51.8	20	53.3
ATV, snowmobile	*	1.9	114	7.6	746	6.1	30	8.2	*	6.8
Other ^Δ	*	1.9	112	7.4	1,113	9.1	30	8.2	*	7.0
Total	104	100.0	1,507	100.0	12,197	100.0	364	100.0	37	100.0

* Less than 5 numbers suppressed due to small counts; ^Δsee description on page 28. Note: Numbers are rounded, therefore totals may not sum exactly.

The most common cause of transport-related permanent disability was from (Table 33):

- Motor vehicle incidents: 52% (n=188) permanent partial disability and 53% (n=20) permanent total disability
- Cycling events: 18% (n=66) permanent partial disability and 17% (n=6) permanent total disability
- Pedestrian events: 14% (n=50) permanent partial disability and 16% (n=6) permanent total disability

Motor vehicle incidents accounted for the highest proportion of the costs associated with transport-related injuries, making up over half of the total transport-related costs (59%) and over half of the transport-related costs when divided into direct (56%) and indirect (63%) (Table 34). Pedestrian events were also a significant source of transport-related injury costs accounting for 15% of total costs, 16% of direct costs, and 13% of indirect costs. Other causes included cycling incidents

(14% of total, 15% of direct and 13% indirect costs), ATV and snowmobile (7% of total, 7% of direct and 6% of indirect costs) and other (6% of total, 7% of direct and 5% of indirect costs).

Fall-Related Injuries by Cause and Associated Costs

Among fall-related injuries, the most common cause of injury deaths in FH in 2010 was (Table 35):

- Other causes of falls (see glossary for definition): 88% (n=146)
- Falls from furniture: 3% (n=5)
- Falls from skates, skis, boards, blades: 3% (n=5)

Hospitalizations due to fall-related injuries were also most often due to (Table 35):

- Other causes of falls (see glossary for definition): 49% (n=3,171)
- Falls on same level: 28% (n=1,823)
- Falls on stairs: 9% (n=565)

The most frequent defined causes of fall-related emergency room visits were from (Table 35):

- Other causes of falls (see glossary for definition): 40% (n=18,499)
- Falls on same level: 30% (n=13,826)
- Falls on stairs: 13% (n=5,962)

The most common cause of fall-related permanent disability was from (Table 35):

- Other causes of falls (see glossary for definition): 39% (n=422) permanent partial disability and 42% (n=39) permanent total disability
- Falls on same level: 29% (n=318) permanent partial disability and 25% (n=23) permanent total disability
- Falls on stairs: 12% (n=135) permanent partial disability and 13% (n=13) permanent total disability

Table 34: Transport-related costs by injury outcome, Fraser Health, 2010 (\$ millions)

Description	Total Costs		Direct Costs		Indirect Costs	
	\$	%	\$	%	\$	%
Transport Incidents						
Motor vehicle	\$117	58.5	\$63	55.4	\$54	62.5
Pedestrian	\$29	14.7	\$18	15.8	\$11	13.2
Pedal cycle	\$28	14.0	\$17	15.1	\$11	12.6
ATV, snowmobile	\$13	6.6	\$8	6.8	\$6	6.4
Other ^a	\$12	6.2	\$8	6.9	\$5	5.3
Total	\$200	100.0	\$114	100.0	\$87	100.0

Note: Numbers are rounded, therefore totals may not sum exactly.

^aSee description on page 28.

Table 35: Fall-related injuries by injury outcome, Fraser Health, 2010

Falls	Deaths		Hospitalized Treatment		Emergency Room Visits		Permanent Partial Disability		Permanent Total Disability	
	N	%	N	%	N	%	N	%	N	%
On the same level	6	3.6	1,823	28.0	13,826	29.9	318	29.3	23	25.0
From skates, skis, boards, blades	5	3.0	163	2.5	2,446	5.3	53	4.9	*	4.4
From furniture	5	3.0	412	6.3	3,146	6.8	56	5.1	5	5.1
In playgrounds	0	0.0	103	1.6	1,014	2.2	32	2.9	*	2.3
On stairs	*	1.8	565	8.7	5,962	12.9	135	12.4	13	13.8
From ladders/scaffolding	*	0.6	261	4.0	1,221	2.6	69	6.3	6	6.6
Diving	0	0.0	11	0.2	146	0.3	3	0.3	*	0.7
Other**	146	88.0	3,171	48.7	18,499	40.0	422	38.8	39	42.2
Total	166	100.0	6,509	100.0	46,259	100.0	1,088	100.0	93	100.0

*Less than 5 numbers suppressed due to small counts. ^aSee description on page 28. Note: Numbers are rounded, therefore totals may not sum exactly.

Similarly, a large proportion of the costs from fall-related injuries were coded as *other* at 46% of total costs, 47% of direct costs, and 39% of indirect costs (Table 36). Same level falls made up the largest proportion of specified causes of fall-related costs at 25% of total costs, 26% of direct costs and 21% of indirect costs, followed by falls on stairs (10% of total costs, 10% of direct costs, and 12% of indirect costs), falls from furniture (7% of total costs, 7% of direct costs and 6% of indirect costs), falls involving skates, skis, snowboards, or blades (5% of total costs, 4% of direct costs, and 9% of indirect costs), falls from ladders (4% of total costs, 4% of direct costs, and 6% of indirect costs), and falls from playground equipment (3% of total costs, 3% of direct costs, and 6% of indirect costs).

Table 36: Fall-related costs by injury outcome, Fraser Health, 2010 (\$ millions)

Description	Total Costs		Direct Costs		Indirect Costs	
	\$	%	\$	%	\$	%
Falls						
Other**	\$190	45.5	\$156	47.2	\$34	38.8
On the same level	\$104	24.8	\$85	25.8	\$19	21.3
On stairs	\$43	10.4	\$33	9.9	\$11	12.2
From furniture	\$27	6.5	\$22	6.6	\$5	6.2
From skates, skis, boards, blades	\$20	4.9	\$12	3.7	\$8	9.4
From ladders/scaffolding	\$18	4.3	\$13	4.0	\$5	5.6
In playgrounds	\$14	3.2	\$8	2.5	\$5	5.9
Diving	\$1	0.3	\$1	0.2	\$1	0.7
Total	\$417	100.0	\$330	100.0	\$87	100.0

**See description on page 28. Note: Numbers are rounded, therefore totals may not sum exactly.



Photo: Tom Wang/Shutterstock

Intentional Injuries by Cause and Associated Costs

Among intentional injuries, the cause of injury deaths in FH in 2010 were (Table 37):

- Suicide/self-harm other than by poisoning: 64% (n=99)
- Violence: 19% (n=29)
- Suicide/self-harm by poisoning: 17% (n=27)

Intentional injury hospitalizations were also due to (Table 37):

- Suicide/self-harm by poisoning: 64% (n=880)
- Violence: 29% (n=400)
- Suicide/self-harm other than by poisoning: 7% (n=96)

The defined causes of intentional injury emergency room visits were from (Table 37):

- Violence: 72% (n=3,792)
- Suicide/self-harm by poisoning: 23% (n=1,218)
- Suicide/self-harm other than by poisoning: 5% (n=284)

The cause of permanent disability from intentional injury were from (Table 37):

- Suicide/self-harm by poisoning: 64% (n=190) permanent partial disability and 43% (n=8) permanent total disability
- Violence: 31% (n=90) permanent partial disability and 50% (n=10) permanent total disability
- Suicide/self-harm other than by poisoning: 5% (n=16) permanent partial disability and 7% (n=less than 5) permanent total disability

Table 37: Intentional injuries by injury outcome, Fraser Health, 2010

	Deaths		Hospitalized Treatment		Emergency Room Visit		Permanent Partial Disability		Permanent Total Disability	
	N	%	N	%	N	%	N	%	N	%
Intentional Injuries										
Suicide/self-harm–Poisoning	27	17.4	880	64.0	1,218	23.0	190	64.1	8	42.8
Suicide/self-harm–Other	99	63.9	96	7.0	284	5.4	16	5.4	*	7.4
Violence	29	18.7	400	29.1	3,792	71.6	90	30.6	10	49.8
Total	155	100.0	1,376	100.0	5,294	100.0	296	100.0	19	100.0

*Less than 5 numbers suppressed due to small counts.

Suicide by poisoning was responsible for the largest proportion of intentional injury-related costs in 2010 at 42%, followed by violence (31%) and other forms of suicide and self-harm (26%) (Table 38). Broken down by type of cost, suicide and self-harm by poisoning is shown to account for 58% of intentional injury-related direct costs, followed by violence (34%) and other forms of suicide and self-harm (8%). Suicide and self-harm by causes other than by poisoning accounted for less than half of the indirect costs of intentional injuries at 41%, which is higher than the proportions of indirect costs for suicide and self-harm accounted for by poisoning (30%) or by violence (29%).

Table 38: Intentional injury costs by injury outcome, Fraser Health, 2010 (\$ millions)

Description	Total Costs		Direct Costs		Indirect Costs	
	\$	%	\$	%	\$	%
Intentional Injuries						
Suicide/self-harm–Poisoning	\$76	42.3	\$45	57.8	\$31	30.3
Violence	\$56	31.2	\$27	34.1	\$29	29.0
Suicide/self-harm–Other	\$47	26.4	\$6	8.1	\$41	40.7
Total	\$180	100.0	\$78	100.0	\$101	100.0

Note: Numbers are rounded, therefore totals may not sum exactly.

VANCOUVER COASTAL HEALTH AUTHORITY

Intentional and Unintentional Injury

Unintentional injuries made up the bulk of injuries in Vancouver Coastal Health (VCH) in 2010: 64% (n=224) of injury deaths, 88% (n=5,692) of injury hospitalizations, 96% (n=76,650) of emergency room visits, 88% (n=1,261) of permanent partial disabilities arising from injury, and 90% (n=103) of permanent total disabilities arising from injury were unintentional (Table 39).

Intentional injuries made up 34% (n=120) of injury deaths, 10% (n=663) of hospitalized injuries, 3% (n=2,725) of emergency room visits, 10% (n=141) of permanent partial disabilities, and 9% (n=10) of permanent total disabilities. The remaining injuries were of undetermined intent (Table 39).

Unintentional injuries accounted for \$545 million or 82% of VCH's total cost of injuries in 2010 (Table 40). They accounted for \$377 million or 89% of the direct costs, and \$168 million or 70% of the indirect costs.

Intentional injuries accounted for \$106 million or 16% of the total cost of injuries (Table 40). They made up \$39 million or 9% of the direct costs, and \$67 million or 28% of the indirect costs of injuries. Injuries of undetermined intent accounted for approximately \$13 million or about 2% of all injury costs across the three categories.

Injury by Cause

The greatest number of injury deaths in VCH in 2010 was from (Table 41):

- Suicide/self-harm: 32% (n=112)
- Falls: 30% (n=105)
- Unintentional poisoning: 18% (n=62)
- Transport incidents: 9% (n=33)

Hospitalizations due to injury were also most often due to (Table 41):

- Falls: 58% (n=3,768)
- Transport incidents: 13% (n=814)
- Other unintentional injuries: 12% (n=756)
- Suicide/self-harm: 7% (n=461)

Table 40: Total, direct and indirect costs of injury by intent, Vancouver Coastal Health, 2010 (\$ millions)

Description	Total Costs	Direct Costs	Indirect Costs
Unintentional	\$545	\$377	\$168
Intentional	\$106	\$39	\$67
Undetermined Intent/Other	\$13	\$7	\$6
Total	\$664	\$423	\$241

Note: Numbers are rounded, therefore totals may not sum exactly.

The most frequent defined causes of emergency room visits were from (Table 41):

- Other unintentional injuries: 49% (n=38,953)
- Falls: 33% (n=26,725)
- Transport incidents: 8% (n=6,394)

The most common cause of permanent disability was from (Table 41):

- Falls: 44% (n=632) permanent partial disability and 47% (n=54) permanent total disability
- Other unintentional injuries: 23% (n=331) permanent partial disability and 21% (n=24) permanent total disability
- Transport incidents: 14% (n=200) permanent partial disability and 18% (n=20) permanent total disability

Falls accounted for the highest total costs (\$252 million), generating the greatest total cost per capita at \$229 and the greatest health care cost per capita at \$181 (Table 42). The second highest total cost, total cost per capita and health care cost per capita for major causes of injury was for transport incidents at \$93 million, \$84 and \$53, respectively.

Costs of Injury by Cause

The majority of the total costs of injuries in VCH in 2010 were due to falls at \$252 million or 38% of total costs, other unintentional injuries at \$137 million or 21%, and transport incidents at \$93 million or 14% (Table 43). Other causes of total costs of injury included suicide and self-harm (\$84 million or 13%), unintentional poisoning (\$46 million or 7%), violence (\$22 million or 3%), undetermined intent (\$13 million or 2%), and fire and burns (\$9 million or 1%).

Table 39: Injury by intent and injury outcome, Vancouver Coastal Health, 2010

Description	Deaths	Hospitalized Treatment	Emergency Room Visit	Permanent Partial Disability	Permanent Total Disability
Unintentional	224	5,692	76,650	1,261	103
Intentional	120	663	2,725	141	10
Undetermined Intent/Other	9	116	532	25	*
Total	353	6,471	79,907	1,428	114

*Less than 5 numbers suppressed due to small counts. Note: Numbers are rounded, therefore totals may not sum exactly.

Table 41: Number of injuries by cause and injury outcome, Vancouver Coastal Health, 2010

Description	Deaths	Hospitalized Treatment	Emergency Room Visits	Permanent Partial Disability	Permanent Total Disability
Transport Incidents	33	814	6,394	200	20
Pedestrian	11	149	610	34	*
Pedal cycle	*	255	1,930	66	6
Motor vehicle	18	325	2,875	76	8
ATV, snowmobile	*	29	325	8	*
Other ^Δ	*	56	654	15	*
Falls	105	3,768	26,725	632	54
On the same level	*	1,225	8,758	206	15
From skates, skis, boards, blades	*	174	1,984	53	*
From furniture	8	227	1,413	28	*
In playgrounds	0	49	612	16	*
On stairs	9	325	3,528	76	7
From ladders/scaffolding	8	97	453	26	*
Diving	0	*	102	*	0
Other**	79	1,670	9,876	227	21
Drowning	5	8	33	1	0
Fire/Burns	10	50	1,126	25	*
Unintentional Poisoning	62	275	1,325	56	*
Struck by/against Sports Equipment	0	21	2,094	16	*
Other Unintentional Injuries***	9	756	38,953	331	24
Suicide/Self-Harm	112	461	752	96	5
Suicide/Self-Harm–Poisoning	31	395	553	85	*
Suicide/Self-Harm –Other	81	66	199	10	*
Violence	8	202	1,973	46	5
Undetermined Intent/Other	9	116	532	25	*
Total	353	6,471	79,907	1,428	114

^ΔOther includes: animal-rider or occupant of animal-drawn vehicle; occupant of railway train or railway vehicle; occupant of streetcar; occupant of special vehicle mainly used on industrial premises; occupant of special vehicle mainly used in agriculture; occupant of special construction vehicle; watercraft-related incidents, excluding drowning and submersion; air and space transport incidents; unknown mode of transport; and unspecified mode of transport.

*Less than 5 numbers suppressed due to small counts.

**Other falls includes: other fall on same level due to collision with or pushing by other person; fall while being carried or supported by other persons; fall involving wheelchair and other walking devices; fall from out or through building or structure; fall from tree; fall from cliff; fall from one level to another (fall from or into cavity, dock, hole etc.); and other fall on same level (bumping against object, fall from or off toilet).

***Other unintentional injuries includes: struck by object (excluding sports equipment); exposure to animate mechanical forces; other accidental threats to breathing; exposure to electric current/radiation/extreme air temperature and pressure; contact with venomous animals and plants; exposure to forces of nature; overexertion and strenuous/repetitive movements; and accidental exposure to other and unspecified factors.

Table 42: Injury deaths, death rates, total costs and costs per capita by cause, Vancouver Coastal Health, 2010

Cause	Deaths	Death Rate (per 100,000)	Total Costs (\$ millions)	Total Cost Per Capita	Health Care Cost Per Capita
Falls	105	9.52	\$252	\$229	\$181
Transport Incidents	33	2.99	\$93	\$84	\$53
Unintentional Poisoning	62	5.62	\$46	\$42	\$13
Suicide/Self-Harm–Poisoning	31	2.81	\$42	\$38	\$19
Suicide/Self-Harm–Other	81	7.34	\$42	\$38	\$5
Violence	8	0.63	\$22	\$20	\$12
Other Injuries	33	2.99	\$166	\$151	\$101
Total	353	31.91	\$664	\$602	\$384

Note: Health care cost per capita calculated using direct costs only. Other injuries include drowning, fire/burns, struck by/against sport equipment, other unintentional injuries and undetermined/other intent.

Table 43: Total, direct and indirect costs of injury by cause, Vancouver Coastal Health, 2010 (\$millions)

Description	Total Costs	Direct Costs	Indirect Costs
Falls	\$252	\$200	\$52
Other**	\$109	\$89	\$20
On the same level	\$69	\$58	\$11
On stairs	\$23	\$18	\$5
From skates, skis, boards, blades	\$22	\$13	\$9
From furniture	\$14	\$12	\$2
From ladders/scaffolding	\$7	\$5	\$2
In playgrounds	\$7	\$4	\$3
Diving	\$0	\$0	\$0
Other Unintentional Injuries***	\$137	\$97	\$40
Transport Incidents	\$93	\$58	\$35
Motor vehicle	\$40	\$25	\$16
Pedal cycle	\$26	\$17	\$9
Pedestrian	\$17	\$11	\$7
Other ^Δ	\$7	\$4	\$2
ATV, snowmobile	\$3	\$2	\$2
Suicide/Self-Harm	\$84	\$26	\$57
Suicide/self-harm-Poisoning	\$42	\$20	\$22
Suicide/self-harm-Other	\$42	\$6	\$36
Unintentional Poisoning	\$46	\$14	\$32
Violence	\$22	\$13	\$9
Undetermined Intent/Other	\$13	\$7	\$6
Fire/Burns	\$9	\$4	\$4
Struck by/against Sports Equipment	\$5	\$3	\$3
Drowning	\$2	\$1	\$2
Total	\$664	\$423	\$241

Note: Numbers are rounded, therefore totals may not sum exactly.
^Δ, **, ***See description on page 34.



Photo: Deymos.HR/Shutterstock

Falls made up \$200 million or 47% of the direct costs of injuries in VCH in 2010, followed by other unintentional injuries at \$97 million or 23%, and transport incidents at \$58 million or 14% (Table 43). Other causes of direct costs of injury included suicide and self-harm (\$26 million or 6%), violence (\$13 million or 3%), unintentional poisoning (\$14 million or 3%), undetermined intent (\$7 million or 2%), fire and burns (\$4 million or 1%), and struck by or against sports equipment (\$3 million or 1%).

Suicide and self-harm accounted for the greatest proportion of indirect costs at \$57 million or 24% of indirect costs, followed by falls at \$52 million or 22%, other unintentional injuries at \$40 million or 17% and transport incidents at \$35 million or 15% (Table 43). Other causes of indirect costs were unintentional poisoning (\$32 million or 13%), violence (\$9 million or 4%), undetermined intent (\$6 million or 3%), fire and burns (\$4 million or 2%), struck by or against sports equipment (\$3 million or 1%), and drowning (\$2 million or 1%).

Transport-Related Injuries by Cause and Associated Costs

Among transport-related injuries, the most common cause of injury deaths in VCH in 2010 was (Table 44):

- Motor vehicle incidents: 55% (n=18)
- Pedestrian events: 33% (n=11)

Table 44: Transport-related injuries by injury outcome, Vancouver Coastal Health, 2010

Description	Deaths		Hospitalized Treatment		Emergency Room Visit		Permanent Partial Disability		Permanent Total Disability	
	N	%	N	%	N	%	N	%	N	%
Transport Incidents	N	%	N	%	N	%	N	%	N	%
Pedestrian	11	33.3	149	18.3	610	9.5	34	17.1	*	20.1
Pedal cycle	*	3.0	255	31.3	1,930	30.2	66	33.1	6	31.3
Motor vehicle	18	54.5	325	39.9	2,875	45.0	76	37.9	8	38.7
ATV, snowmobile	*	3.0	29	3.6	325	5.1	8	4.2	*	3.5
Other ^Δ	*	6.1	56	6.9	654	10.2	15	7.7	*	6.4
Total	33	100.0	814	100.0	6,394	100.0	200	100.0	20	100.0

*Less than 5 numbers suppressed due to small counts. ^ΔSee description on page 34.

Hospitalizations due to transport-related injuries were also most often due to (Table 44):

- Motor vehicle incidents: 40% (n=325)
- Cycling events: 31% (n=255)
- Pedestrian events: 18% (149)

The most frequent defined causes of transport-related emergency room visits were from (Table 44):

- Motor vehicle incidents: 45% (n=2,875)
- Cycling events: 30% (n=1,930)
- Other transport events (see glossary for definition): 10% (n=654)

The most common cause of transport-related permanent disability was from (Table 44):

- Motor vehicle incidents: 38% (n=76) permanent partial disability and 39% (n=8) permanent total disability

- Cycling events: 33% (n=66) permanent partial disability and 31% (n=6) permanent total disability
- Pedestrian events: 17% (n=34) permanent partial disability and 20% (n=less than 5) permanent total disability

Motor vehicle incidents accounted for the highest proportion of the costs associated with transport-related injuries, making up almost half of the total transport-related costs (43%) and direct (42%) and indirect (45%) costs (Table 45). Cycling was also a significant source of transport-related injury costs accounting for 27% of total costs, 29% of direct costs, and 25% of indirect costs. Other causes included pedestrian incidents (19% of total, 18% of direct and 19% of indirect costs), other (7% of total, direct and indirect costs) and ATV and snowmobile (4% of total, 3% of direct and 4% of indirect costs).

Fall-Related Injuries by Cause and Associated Costs

Among fall-related injuries, the most common cause of injury deaths in VCH in 2010 was (Table 46):

- Other causes of falls (see glossary for definition): 75% (n=79)
- Falls on stairs: 9% (n=9)
- Falls from furniture: 8% (n=8)

Hospitalizations due to fall-related injuries were also most often due to (Table 46):

- Other causes of falls (see glossary for definition): 44% (n=1,670)
- Falls on same level: 33% (n=1,225)
- Falls on stairs: 9% (n=325)

Table 45: Transport-related costs by injury outcome, Vancouver Coastal Health, 2010 (\$ millions)

Description	Total Costs		Direct Costs		Indirect Costs	
	\$	%	\$	%	\$	%
Transport Incidents						
Motor vehicle	\$40	43.2	\$25	42.2	\$16	44.8
Pedal cycle	\$26	27.4	\$17	29.0	\$9	24.8
Pedestrian	\$17	18.7	\$11	18.4	\$7	19.2
ATV, snowmobile	\$7	7.0	\$4	7.1	\$2	6.8
Other ^Δ	\$3	3.7	\$2	3.3	\$2	4.4
Total	\$93	100.0	\$58	100.0	\$35	100.0

^ΔSee description on page 34.

Table 46: Fall-related injuries by injury outcome, Vancouver Coastal Health, 2010

	Deaths		Hospitalized Treatment		Emergency Room Visit		Permanent Partial Disability		Permanent Total Disability	
	N	%	N	%	N	%	N	%	N	%
Falls										
On the same level	*	3.8	1,225	32.5	8,758	32.8	206	32.6	15	28.3
From skates, skis, boards, blades	*	3.8	174	4.6	1,984	7.4	53	8.4	*	7.7
From furniture	8	7.6	227	6.0	1,413	5.3	28	4.4	*	4.5
In playgrounds	0	0.0	49	1.3	612	2.3	16	2.5	*	2.1
On stairs	9	8.6	325	8.6	3,528	13.2	76	12.0	7	13.7
From ladders/scaffolding	*	1.0	97	2.6	453	1.7	26	4.1	*	4.3
Diving	0	0.0	1	0.0	102	0.4	*	0.1	0	0.1
Other**	79	75.2	1,670	44.3	9,876	37.0	227	35.9	21	39.3
Total	105	100.0	3,768	100.0	26,725	100.0	632	100.0	54	100.0

**See description on page 34. *Less than 5 numbers suppressed due to small counts.

The most frequent defined causes of fall-related emergency room visits were from (Table 46):

- Other causes of falls (see glossary for definition): 37% (n=9,876)
- Falls on same level: 33% (n=8,758)
- Falls on stairs: 13% (n=3,528)

The most common cause of fall-related permanent disability was from (Table 46):

- Other causes of falls (see glossary for definition): 36% (n=227) permanent partial disability and 39% (n=21) permanent total disability
- Falls on same level: 33% (n=206) permanent partial disability and 28% (n=15) permanent total disability
- Falls on stairs: 12% (n=76) permanent partial disability and 14% (n=7) permanent total disability

Table 47: Fall-related costs by injury outcome, Vancouver Coastal Health, 2010 (\$ millions)

Description	Total Costs		Direct Costs		Indirect Costs	
	\$	%	\$	%	\$	%
Falls						
Other**	\$109	43.4	\$89	44.4	\$20	39.3
On the same level	\$69	27.4	\$58	29.1	\$11	20.7
On stairs	\$23	9.1	\$18	9.0	\$5	9.4
From skates, skis, boards, blades	\$22	8.8	\$13	6.4	\$9	17.9
From furniture	\$14	5.7	\$12	6.1	\$2	4.2
From ladders/scaffolding	\$7	2.8	\$5	2.6	\$2	3.3
In playgrounds	\$7	2.8	\$4	2.2	\$3	5.0
Diving	\$0	0.1	\$0	0.1	\$0	0.2
Total	\$252	100.0	\$200	100.0	\$52	100.0

Note: Numbers are rounded, therefore totals may not sum exactly.
**See description on page 34.

Similarly, a large proportion of the costs from fall-related injuries were coded as *other* at 43% of total costs, 44% of direct costs, and 39% of indirect costs (Table 47). Same level falls made up the largest proportion of specified causes of fall-related costs at 27% of total costs, 29% of direct costs and 21% of indirect costs, followed by falls on stairs (9% of total, direct and indirect costs), falls involving skates, skis, snowboards, or blades (9% of total costs, 6% of direct costs, and 18% of indirect costs), falls from furniture (6% of total costs, 6% of direct costs, and 4% of indirect costs), falls from ladders (3% of total direct and indirect costs), and falls from playground equipment (3% of total costs, 2% of direct costs, and 5% of indirect costs).

Intentional Injuries by Cause and Associated Costs

Among intentional injuries, the cause of injury deaths in VCH in 2010 were (Table 48):

- Suicide/self-harm other than by poisoning: 68% (n=81)
- Suicide/self-harm by poisoning: 26% (n=31)
- Violence: 6% (n=7)

Intentional injury hospitalizations were also due to (Table 48):

- Suicide/self-harm by poisoning: 60% (n=395)
- Violence: 31% (n=202)
- Suicide/self-harm other than by poisoning: 10% (n=66)

The defined causes of intentional injury emergency room visits were from (Table 48):

- Violence: 72% (n=1,973)
- Suicide/self-harm by poisoning: 20% (n=553)
- Suicide/self-harm other than by poisoning: 7% (n=199)

The cause of permanent disability from intentional injury were from (Table 48):

- Suicide/self-harm by poisoning: 60% (n=85) permanent partial disability and 39% (n=less than 5 cases) permanent total disability

Table 48: Intentional injuries by injury outcome, Vancouver Coastal Health, 2010

	Deaths		Hospitalized Treatment		Emergency Room Visit		Permanent Partial Disability		Permanent Total Disability	
	N	%	N	%	N	%	N	%	N	%
Intentional Injuries										
Suicide/Self-Harm-Poisoning	31	26.1	395	59.6	553	20.3	85	60.2	*	39.0
Suicide/Self-Harm-Other	81	68.1	66	10.0	199	7.3	10	7.3	*	9.6
Violence	7	5.9	202	30.5	1,973	72.4	46	32.4	5	51.4
Total	119	100.0	663	100.0	2,725	100.0	141	100.0	10	100.0

*Less than 5 numbers suppressed due to small counts.

- Violence: 32% (n=46) permanent partial disability and 51% (n=5) permanent total disability
- Suicide/self-harm other than by poisoning: 7% (n=10) permanent partial disability and 10% (n=less than 5) permanent total disability

Suicide by poisoning and other forms of suicide and self-harm were responsible for the largest proportion of intentional injury-related costs in 2010 at 40%, followed by violence (21%) (Table 49). Broken down by type of cost, suicide and self-harm by poisoning is shown to account for 52% of intentional injury-related direct costs, followed by violence (33%) and other forms of suicide and self-harm (15%).

Suicide and self-harm by causes other than by poisoning accounted for almost half of the indirect costs of intentional injuries at 53%, which is higher than the proportions of indirect costs for suicide and self-harm accounted for by poisoning (33%) or by violence (14%).

Table 49: Intentional injury costs by injury outcome, Vancouver Coastal Health, 2010 (\$ millions)

Description	Total Costs		Direct Costs		Indirect Costs	
	\$	%	\$	%	\$	%
Intentional Injuries						
Suicide/Self-Harm-Poisoning	\$42	39.8	\$20	52.3	\$22	32.5
Suicide/Self-Harm-Other	\$42	39.3	\$6	15.3	\$36	53.3
Violence	\$22	20.9	\$13	32.5	\$9	14.2
Total	\$106	100.0	\$39	100.0	\$67	100.0

Note: Numbers are rounded, therefore totals may not sum exactly.

ISLAND HEALTH AUTHORITY

Intentional and Unintentional Injury

Unintentional injuries made up the bulk of injuries in Island Health in 2010: 71% (n=284) of injury deaths, 88% (n=5,703) of injury hospitalizations, 96% (n=81,883) of emergency room visits, 88% (n=1,269) of permanent partial disabilities arising from injury, and 90% (n=103) of permanent total disabilities arising from injury were unintentional (Table 50).

Intentional injuries made up 28% (n=113) of injury deaths, 11% (n=736) of hospitalized injuries, 3% (n=2,772) of emergency room visits, 10% (n=157) of permanent partial disabilities, and 9% (n=10) of permanent total disabilities. The remaining injuries were of undetermined intent (Table 50).

Unintentional injuries accounted for \$566 million or 84% of Island Health’s total cost of injuries in 2010 (Table 51). They accounted for \$384 million or 90% of the direct costs, and \$181 million or 73% of the indirect costs.

Intentional injuries accounted for \$105 million or 16% of the total cost of injuries (Table 51). They made up \$40 million or 9% of the direct costs, and \$65 million or 26% of the indirect costs of injuries. Injuries of undetermined intent accounted for approximately \$6 million or 1% of all injury costs across the three categories.

Injury by Cause

The greatest number of injury deaths in Island Health in 2010 was from (Table 52):

- Falls: 34% (n=135)
- Suicide/self-harm: 27% (n=107)
- Transport incidents: 15% (n=58)
- Unintentional poisoning: 16% (n=64)

Hospitalizations due to injury were also most often due to (Table 52):

- Falls: 57% (n=3,736)
- Other unintentional injuries: 14% (n=880)
- Transport incidents: 11% (n=745)
- Suicide/self-harm: 8% (n=539)

Table 51: Total, direct and indirect costs of injury by intent, Island Health, 2010 (\$ millions)

Description	Total Costs	Direct Costs	Indirect Costs
Unintentional	\$566	\$384	\$181
Intentional	\$105	\$40	\$65
Undetermined Intent/Other	\$6	\$4	\$3
Total	\$676	\$428	\$248

Note: Numbers are rounded, therefore totals may not sum exactly.

The most frequent defined causes of emergency room visits were from (Table 52):

- Other unintentional injuries: 55% (n=46,446)
- Falls: 30% (n=25,553)
- Transport incidents: 7% (n=5,806)

The most common cause of permanent disability was from (Table 52):

- Falls: 42% (n=605) permanent partial disability and 45% (n=52) permanent total disability
- Other unintentional injuries: 27% (n=391) permanent partial disability and 24% (n=28) permanent total disability
- Transport incidents: 13% (n=180) permanent partial disability and 16% (n=18) permanent total disability

Falls accounted for the highest total costs (\$241 million), generating the greatest total cost per capita at \$323 and the greatest health care cost per capita at \$258 (Table 53). The second highest total cost, total cost per capita and health care cost per capita for major causes of injury was for transport incidents at \$104 million, \$140 and \$80, respectively.

Costs of Injury by Cause

The majority of the total costs of injuries in Island Health in 2010 were due to falls at \$241 million or 36% of total costs, other unintentional injuries at \$159 million or 23%, and transport incidents at \$104 million or 15% (Table 54). Other causes of total costs of injury included suicide and self-harm (\$83 million or 12%), unintentional poisoning (\$43 million or 6%), violence (\$22 million or 3%), fire and burns (\$10 million or 2%), and undetermined intent (\$6 million or 1%).

Table 50: Injury by intent and injury outcome, Island Health, 2010

Description	Deaths	Hospitalized Treatment	Emergency Room Visit	Permanent Partial Disability	Permanent Total Disability
Unintentional	284	5,703	81,883	1,269	103
Intentional	113	736	2,772	157	10
Undetermined Intent/Other	*	77	336	17	*
Total	399	6,516	84,991	1,443	114

**Less than 5 numbers suppressed due to small counts.*

Table 52: Number of injuries by cause and injury outcome, Island Health, 2010

Description	Deaths	Hospitalized Treatment	Emergency Room Visits	Permanent Partial Disability	Permanent Total Disability
Transport Incidents	58	745	5,806	180	18
Pedestrian	9	81	329	19	*
Pedal cycle	*	171	1,318	44	*
Motor vehicle	42	377	3,211	87	9
ATV, snowmobile	0	56	346	14	*
Other ^Δ	6	60	602	16	*
Falls	135	3,736	25,553	605	52
On the same level	*	1,046	7,655	179	13
From skates, skis, boards, blades	0	97	1,338	31	*
From furniture	19	236	1,294	26	*
In playgrounds	0	51	529	16	*
On stairs	12	321	3,328	75	7
From ladders/scaffolding	*	130	574	35	*
Diving	*	7	69	*	0
Other**	98	1,848	10,765	240	22
Drowning	9	11	33	*	0
Fire/Burns	8	59	1,218	27	*
Unintentional Poisoning	64	253	1,237	51	*
Struck by/against Sports Equipment	0	19	1,589	12	*
Other Unintentional Injuries***	10	880	46,446	391	28
Suicide/Self-Harm	107	539	828	113	5
Suicide/Self-Harm–Poisoning	33	478	639	102	*
Suicide/Self-Harm –Other	74	61	189	10	*
Violence	6	197	1,944	45	5
Undetermined Intent/Other	*	77	336	17	*
Total	399	6,516	84,991	1,443	114

^ΔOther includes: animal-rider or occupant of animal-drawn vehicle; occupant of railway train or railway vehicle; occupant of streetcar; occupant of special vehicle mainly used on industrial premises; occupant of special vehicle mainly used in agriculture; occupant of special construction vehicle; watercraft-related incidents, excluding drowning and submersion; air and space transport incidents; unknown mode of transport; and unspecified mode of transport.

*Less than 5 numbers suppressed due to small counts.

**Other falls includes: other fall on same level due to collision with or pushing by other person; fall while being carried or supported by other persons; fall involving wheelchair and other walking devices; fall from out or through building or structure; fall from tree; fall from cliff; fall from one level to another (fall from or into cavity, dock, hole etc.); and other fall on same level (bumping against object, fall from or off toilet).

***Other unintentional injuries includes: struck by object (excluding sports equipment); exposure to animate mechanical forces; other accidental threats to breathing; exposure to electric current/radiation/extreme air temperature and pressure; contact with venomous animals and plants; exposure to forces of nature; overexertion and strenuous/repetitive movements; and accidental exposure to other and unspecified factors.

Table 53: Injury deaths, death rates, total costs and costs per capita by cause, Island Health, 2010

Cause	Deaths	Death Rate (per 100,000)	Total Costs (\$ millions)	Total Cost Per Capita	Health Care Cost Per Capita
Falls	135	18.10	\$241	\$323	\$258
Transport Incidents	58	7.77	\$104	\$140	\$80
Suicide/Self-Harm–Poisoning	33	4.42	\$44	\$59	\$32
Unintentional Poisoning	64	8.58	\$43	\$57	\$17
Suicide/Self-Harm–Other	74	9.92	\$39	\$52	\$6
Violence	6	0.80	\$22	\$29	\$16
Other Injuries	29	3.89	\$184	\$247	\$165
Total	399	53.48	\$676	\$907	\$574

Note: Health care cost per capita calculated using direct costs only. Other injuries include drowning, fire/burns, struck by/against sport equipment, other unintentional injuries and undetermined/other intent.

Table 54: Total, direct and indirect costs of injury by cause, Island Health, 2010 (\$ millions)

Description	Total Costs	Direct Costs	Indirect Costs
Falls	\$241	\$193	\$48
Other**	\$112	\$92	\$20
On the same level	\$61	\$51	\$10
On stairs	\$23	\$17	\$6
From furniture	\$14	\$13	\$2
From skates, skis, boards, blades	\$12	\$7	\$5
From ladders/scaffolding	\$10	\$8	\$2
In playgrounds	\$7	\$4	\$3
Diving	\$1	\$1	\$1
Other Unintentional Injuries***	\$159	\$112	\$47
Transport Incidents	\$104	\$60	\$45
Motor vehicle	\$58	\$33	\$25
Pedal cycle	\$18	\$12	\$6
Pedestrian	\$12	\$6	\$6
Other ⁴	\$10	\$4	\$5
ATV, snowmobile	\$6	\$4	\$2
Suicide/Self-Harm	\$83	\$28	\$55
Suicide/Self-Harm-Poisoning	\$44	\$24	\$20
Suicide/Self-Harm-Other	\$39	\$4	\$34
Unintentional Poisoning	\$43	\$13	\$30
Violence	\$22	\$12	\$10
Fire/Burns	\$10	\$4	\$6
Undetermined Intent/Other	\$6	\$4	\$3
Struck by/against Sports Equipment	\$5	\$3	\$2
Drowning	\$4	\$1	\$4
Total	\$676	\$428	\$248

Note: Numbers are rounded, therefore totals may not sum exactly.
⁴, **, ***See description on page 40.



Photo: RONORMANJR/Shutterstock

Falls made up \$193 million or 45% of the direct costs of injuries in Island Health in 2010, followed by other unintentional injuries at \$112 million or 26%, and transport incidents at \$60 million or 14% (Table 54). Other causes of direct costs of injury included suicide and self-harm (\$28 million or 7%), unintentional poisoning (\$13 million or 3%), violence (\$12 million or 3%), fire and burns (\$4 million or 1%), undetermined intent (\$4 million or 1%), and struck by or against sports equipment (\$3 million or 1%).

Suicide and self-harm accounted for the greatest proportion of indirect costs at \$55 million or 22% of indirect costs, followed by falls at \$48 million or 20%, other unintentional injuries at \$47 million or 19%, and transport incidents \$45 million or 18% (Table 54). Other causes of indirect costs were unintentional poisoning (\$30 million or 12%), violence (\$10 million or 4%), fire and burns (\$6 million or 2%), drowning (\$4 million or 2%), undetermined intent (\$3 million or 1%) and struck by or against sports equipment (\$2 million or 1%).

Transport-Related Injuries by Cause and Associated Costs

Among transport-related injuries, the most common cause of injury deaths in Island Health in 2010 was (Table 55):

- Motor vehicle incidents: 72% (n=42)
- Pedestrian events: 16% (n=9)
- Other transport events (see glossary for definition): 10% (n=6)

Table 55: Transport-related injuries by injury outcome, Island Health, 2010

Description	Deaths		Hospitalized Treatment		Emergency Room Visit		Permanent Partial Disability		Permanent Total Disability	
	N	%	N	%	N	%	N	%	N	%
Transport Incidents										
Pedestrian	9	15.5	81	10.9	329	5.7	19	10.3	*	12.0
Pedal cycle	*	1.7	171	23.0	1,318	22.7	44	24.3	*	23.1
Motor vehicle	42	72.4	377	50.6	3,211	55.3	87	48.4	9	50.3
ATV, snowmobile	0	0.0	56	7.5	346	6.0	14	8.0	*	6.8
Other ⁴	6	10.3	60	8.1	602	10.4	16	9.0	*	7.7
Total	58	100.0	745	100.0	5,806	100.0	180	100.0	18	100.0

Note: Numbers are rounded, therefore totals may not sum exactly. *Less than 5 numbers suppressed due to small counts. ⁴See description on page 40.

Table 56: Transport-related costs by injury outcome, Island Health, 2010 (\$ millions)

Description	Total Costs		Direct Costs		Indirect Costs	
	\$	%	\$	%	\$	%
Transport Incidents						
Motor vehicle	\$58	55.8	\$33	55.5	\$25	56.3
Pedal cycle	\$18	17.7	\$12	20.4	\$6	14.0
Pedestrian	\$12	11.7	\$6	10.0	\$6	14.0
Other ^a	\$10	9.1	\$4	7.5	\$5	11.3
ATV, snowmobile	\$6	5.7	\$4	6.7	\$2	4.3
Total	\$104	100.0	\$60	100.0	\$45	100.0

Note: Numbers are rounded, therefore totals may not sum exactly.
^aSee description on page 40.

- Cycling events: 24% (n=44) permanent partial disability and 23% (n=less than 5) permanent total disability
- Pedestrian events: 10% (n=19) permanent partial disability and 12% (n=less than 5) permanent total disability

Motor vehicle incidents accounted for the highest proportion of the costs associated with transport-related injuries, making up over half of the total transport-related costs (56%) and over half of the transport-related costs when divided into direct and indirect (both at 56%) (Table 56).

Cycling was also a significant source of transport-related injury costs accounting for 18% of total costs, 20% of direct costs, and 14% of indirect costs. Other causes included pedestrian incidents (12% of total, 10% of direct and 14% of indirect costs), other (9% of total, 8% of direct and 11% of indirect costs), and ATV and snowmobile (6% of total, 7% of direct and 4% of indirect costs).

Fall-Related Injuries by Cause and Associated Costs

Among fall-related injuries, the most common cause of injury deaths in Island Health in 2010 was (Table 57):

- Other causes of falls (see glossary for definition): 73% (n=98)
- Falls from furniture: 14% (n=19)
- Falls on stairs: 9% (n=12)

Hospitalizations due to fall-related injuries were also most often due to (Table 57):

- Other causes of falls (see glossary for definition): 50% (n=1,848)
- Falls on same level: 28% (n=1,046)
- Falls on stairs: 9% (n=321)

Hospitalizations due to transport-related injuries were also most often due to (Table 55):

- Motor vehicle incidents: 51% (n=377)
- Cycling events: 23% (n=171)
- Pedestrian events: 11% (81)

The most frequent defined causes of transport-related emergency room visits were from (Table 55):

- Motor vehicle incidents: 55% (n=3,211)
- Cycling events: 23% (n=1,318)
- Other transport events (see glossary for definition): 10% (n=602)

The most common cause of transport-related permanent disability was from (Table 55):

- Motor vehicle incidents: 48% (n=87) permanent partial disability and 50% (n=9) permanent total disability

Table 57: Fall-related injuries by injury outcome, Island Health, 2010

Falls	Deaths		Hospitalized Treatment		Emergency Room Visit		Permanent Partial Disability		Permanent Total Disability	
	N	%	N	%	N	%	N	%	N	%
On the same level	*	3.0	1,046	28.0	7,655	30.0	179	29.7	13	25.3
From skates, skis, boards, blades	0	0.0	97	2.6	1,338	5.2	31	5.2	*	4.6
From furniture	19	14.1	236	6.3	1,294	5.1	26	4.4	*	4.2
In playgrounds	0	0.0	51	1.4	529	2.1	16	2.6	*	2.0
On stairs	12	8.9	321	8.6	3,328	13.0	75	12.5	7	14.2
From ladders/scaffolding	*	0.7	130	3.5	574	2.2	35	5.7	*	5.9
Diving	*	0.7	7	0.2	69	0.3	*	0.3	0	0.8
Other	98	72.6	1,848	49.5	10,765	42.1	240	39.7	22	42.9
Total	135	100.0	3,736	100.0	25,553	100.0	605	100.0	52	100.0

*Less than 5 numbers suppressed due to small counts.

The most frequent defined causes of fall-related emergency room visits were from (Table 57):

- Other causes of falls (see glossary for definition): 42% (n=10,765)
- Falls on same level: 30% (n=7,655)
- Falls on stairs: 13% (n=3,328)

The most common cause of fall-related permanent disability was from (Table 57):

- Other causes of falls (see glossary for definition): 40% (n=240) permanent partial disability and 43% (n=22) permanent total disability
- Falls on same level: 30% (n=179) permanent partial disability and 25% (n=13) permanent total disability
- Falls on stairs: 13% (n=75) permanent partial disability and 14% (n=7) permanent total disability

Table 58: Fall-related costs by injury outcome, Island Health, 2010 (\$ millions)

Description	Total Costs		Direct Costs		Indirect Costs	
	\$	%	\$	%	\$	%
Falls						
Other	\$112	46.7	\$92	47.8	\$20	42.1
On the same level	\$61	25.3	\$51	26.4	\$10	20.5
On stairs	\$23	9.7	\$17	9.0	\$6	12.5
From furniture	\$14	5.9	\$13	6.6	\$2	3.4
From skates, skis, boards, blades	\$12	4.9	\$7	3.7	\$5	9.8
From ladders/scaffolding	\$10	4.1	\$8	4.0	\$2	4.5
In playgrounds	\$7	2.8	\$4	2.1	\$3	5.4
Diving	\$1	0.6	\$1	0.3	\$1	1.9
Total	\$241	100.0	\$193	100.0	\$48	100.0

Note: Numbers are rounded, therefore totals may not sum exactly.

Similarly, a large proportion of the costs from fall-related injuries were coded as *other* at 47% of total costs, 48% of direct costs, and 42% of indirect costs (Table 58). Same level falls made up the largest proportion of specified causes of fall-related costs at 25% of total costs, 26% of direct costs and 21% of indirect costs, followed by falls on stairs (10% of total costs, 9% of direct costs, and 13% of indirect costs), falls from furniture (6% of total costs, 7% of direct costs, and 3% of indirect costs), falls involving skates, skis, snowboards, or blades (5% of total costs, 4% of direct costs, and 10% of indirect costs), falls from ladders (4% of total costs, 4% of direct costs, and 5% of indirect costs), and falls from playground equipment (3% of total costs, 2% of direct costs, and 5% of indirect costs).

Intentional Injuries by Cause and Associated Costs

Among intentional injuries, the cause of injury deaths in Island Health in 2010 were (Table 59):

- Suicide/self-harm other than by poisoning: 66% (n=74)
- Suicide/self-harm by poisoning: 29% (n=33)
- Violence: 5% (n=6)

Intentional injury hospitalizations were also due to (Table 59):

- Suicide/self-harm by poisoning: 65% (n=478)
- Violence: 27% (n=197)
- Suicide/self-harm other than by poisoning: 7% (n=61)

The defined causes of intentional injury emergency room visits were from (Table 59):

- Violence: 70% (n=1,944)
- Suicide/self-harm by poisoning: 23% (n=639)
- Suicide/self-harm other than by poisoning: 7% (n=189)

The cause of permanent disability from intentional injury were from (Table 59):

- Suicide/self-harm by poisoning: 65% (n=102) permanent partial disability and 44% (n=less than 5) permanent total disability

Table 59: Intentional injuries by injury outcome, Island Health, 2010

	Deaths		Hospitalized Treatment		Emergency Room Visit		Permanent Partial Disability		Permanent Total Disability	
	N	%	N	%	N	%	N	%	N	%
Intentional Injuries										
Suicide/Self-Harm-Poisoning	33	29.2	478	64.9	639	23.1	102	65.1	*	44.0
Suicide/Self-Harm-Other	74	65.5	61	8.3	189	6.8	10	6.4	*	8.8
Violence	6	5.3	197	26.8	1,944	70.1	45	28.4	5	47.2
Total	113	100.0	736	100.0	2,772	100.0	157	100.0	10	100.0

*Less than 5 numbers suppressed due to small counts.

- Violence: 28% (n=45) permanent partial disability and 47% (n=5) permanent total disability
- Suicide/self-harm other than poisoning: 6% (n=10) permanent partial disability and 9% (n=less than 5) permanent total disability

Suicide by poisoning was responsible for the largest proportion of intentional injury-related costs in 2010 (42%), followed by other forms of suicide and self-harm (37%) and violence (21%) (Table 60). Broken down by type of cost, suicide and self-harm by poisoning is shown to account for 59% of intentional injury-related direct costs, followed by violence (30%) and other forms of suicide and self-harm (11%). Suicide and self-harm by causes other than by poisoning accounted for more than half of the indirect costs of intentional injuries at 53%, which is higher than the proportions of indirect costs for suicide and self-harm accounted for by poisoning (32%) or by violence (15%).

Table 60: Intentional injury costs by injury outcome, Island Health, 2010 (\$ millions)

	Total Costs		Direct Costs		Indirect Costs	
	\$	%	\$	%	\$	%
Intentional Injuries						
Suicide/self-harm–Poisoning	\$44	42.2	\$24	59.2	\$20	31.6
Suicide/self-harm–Other	\$39	37.0	\$4	10.8	\$34	53.3
Violence	\$22	20.8	\$12	30.0	\$10	15.1
Total	\$105	100.0	\$40	100.0	\$65	100.0

Note: Numbers are rounded, therefore totals may not sum exactly.

NORTHERN HEALTH AUTHORITY

Intentional and Unintentional Injury

Unintentional injuries made up the bulk of injuries in Northern Health (NH) in 2010: 67% (n=115) of injury deaths, 80% (n=2,218) of injury hospitalizations, 93% (n=40,250) of emergency room visits, 83% (n=598) of permanent partial disabilities arising from injury, and 84% (n=48) of permanent total disabilities arising from injury were unintentional (Table 61).

Intentional injuries made up 32% (n=55) of injury deaths, 16% (n=440) of hospitalized injuries, 6% (n=2,377) of emergency room visits, 13% (n=96) of permanent partial disabilities, and 12% (n=7) of permanent total disabilities. The remaining injuries were of undetermined intent (Table 61).

Unintentional injuries accounted for \$282 million or 80% of NH's total cost of injuries in 2010 (Table 62). They accounted for \$170 million or 85% of the direct costs, and \$112 million or 73% of the indirect costs.

Intentional injuries accounted for \$63 million or 18% of the total cost of injuries (Table 62). They made up \$25 million or 12% of the direct costs, and \$37 million or 24% of the indirect costs of injuries. Injuries of undetermined intent accounted for approximately \$9 million or less than 3% of all injury costs for total and direct costs and 2% for indirect costs.

Injury by Cause

The greatest number of injury deaths in NH in 2010 was from (Table 63):

- Transport incidents: 32% (n=55)
- Suicide/Self Harm: 27% (n=46)
- Unintentional poisoning: 15% (n=26)
- Falls: 13% (n=22)

Hospitalizations due to injury were also most often due to (Table 63):

- Falls: 40% (n=1,116)
- Transport incidents: 19% (n=531)
- Other unintentional injuries: 15% (n=412)
- Suicide/Self Harm: 10% (n=263)

Table 62: Total, direct and indirect costs of injury by intent, Northern Health, 2010 (\$ millions)

Description	Total Costs	Direct Costs	Indirect Costs
Unintentional	\$282	\$170	\$112
Intentional	\$63	\$25	\$37
Undetermined Intent/Other	\$9	\$6	\$3
Total	\$354	\$201	\$153

Note: Numbers are rounded, therefore totals may not sum exactly.

The most frequent defined causes of emergency room visits were from (Table 63):

- Other unintentional injuries: 56% (n=23,988)
- Falls: 23% (n=10,097)
- Transport incidents: 10% (n=4,114)

The most common cause of permanent disability was from (Table 63):

- Falls: 32% (n=226) permanent partial disability and 34% (n=19) permanent total disability
- Other unintentional injuries: 28% (n=198) permanent partial disability and 25% (n=14) permanent total disability
- Transport incidents: 18% (n=128) permanent partial disability and 22% (n=12) permanent total disability

Transport incidents accounted for the highest total costs for major causes of injury (\$81 million), generating the greatest total cost per capita at \$287 and the second greatest health care cost per capita at \$140 (Table 64). The second highest total cost and total cost per capita for major causes of injury was for falls at \$79 million and \$282, respectively. The greatest health care cost per capita was for falls at \$203.

Costs of Injury by Cause

The majority of the total costs of injuries in NH in 2010 were due to other unintentional injuries at \$93 million or 26% followed by transport incidents at \$81 million or 23% and falls at \$79 million or 22% of total costs (Table 65). Other causes of total costs of injury included suicide and self-harm (\$42 million or 12%), violence (\$21 million or 6%), unintentional poisoning (\$20 million or 6%), undetermined intent (\$9 million or 3%), and fire and burns (\$5 million or 2%).

Table 61: Injury by intent and injury outcome, Northern Health, 2010

Description	Deaths	Hospitalized Treatment	Emergency Room Visit	Permanent Partial Disability	Permanent Total Disability
Unintentional	115	2,218	40,250	598	48
Intentional	55	440	2,377	96	7
Undetermined Intent/Other	*	117	455	25	*
Total	171	2,775	43,082	719	57

*Less than 5 numbers suppressed due to small counts.

Table 63: Number of injuries by cause and injury outcome, Northern Health, 2010

Description	Deaths	Hospitalized Treatment	Emergency Room Visits	Permanent Partial Disability	Permanent Total Disability
Transport Incidents	55	531	4,114	128	12
Pedestrian	5	23	125	5	*
Pedal cycle	*	51	502	14	*
Motor vehicle	44	275	2,455	65	7
ATV, snowmobile	*	104	459	25	*
Other ^Δ	*	78	574	20	*
Falls	22	1,116	10,097	226	19
On the same level	0	392	3,685	80	6
From skates, skis, boards, blades	0	32	531	11	*
From furniture	*	80	703	12	*
In playgrounds	0	7	141	*	0
On stairs	*	124	1,323	30	*
From ladders/scaffolding	0	31	155	9	*
Diving	0	*	24	0	0
Other**	19	449	3,535	81	8
Drowning	*	6	11	*	0
Fire/Burns	*	39	655	16	*
Unintentional Poisoning	26	106	643	23	*
Struck by/against Sports Equipment	0	8	741	6	0
Other Unintentional Injuries***	8	412	23,988	198	14
Suicide/Self-Harm	46	263	454	55	*
Suicide/Self-Harm–Poisoning	7	227	323	49	*
Suicide/Self-Harm –Other	39	36	131	6	*
Violence	9	177	1,922	41	*
Undetermined Intent/Other	*	117	455	25	*
Total	171	2,775	43,082	719	57

^ΔOther includes: animal-rider or occupant of animal-drawn vehicle; occupant of railway train or railway vehicle; occupant of streetcar; occupant of special vehicle mainly used on industrial premises; occupant of special vehicle mainly used in agriculture; occupant of special construction vehicle; watercraft-related incidents, excluding drowning and submersion; air and space transport incidents; unknown mode of transport; and unspecified mode of transport.

*Less than 5 numbers suppressed due to small counts.

**Other falls includes: other fall on same level due to collision with or pushing by other person; fall while being carried or supported by other persons; fall involving wheelchair and other walking devices; fall from out or through building or structure; fall from tree; fall from cliff; fall from one level to another (fall from or into cavity, dock, hole etc.); and other fall on same level (bumping against object, fall from or off toilet).

***Other unintentional injuries includes: struck by object (excluding sports equipment); exposure to animate mechanical forces; other accidental threats to breathing; exposure to electric current/radiation/extreme air temperature and pressure; contact with venomous animals and plants; exposure to forces of nature; overexertion and strenuous/repetitive movements; and accidental exposure to other and unspecified factors.

Table 64: Injury deaths, death rates, total costs and costs per capita by cause, Northern Health, 2010

Cause	Deaths	Death Rate (per 100,000)	Total Costs (\$M)	Total Cost Per Capita	Health Care Cost Per Capita
Transport Incidents	55	19.60	\$81	\$287	\$140
Falls	22	7.84	\$79	\$282	\$203
Suicide/Self-Harm–Poisoning	7	2.49	\$21	\$73	\$44
Suicide/Self-Harm–Other	39	13.89	\$21	\$74	\$8
Violence	9	3.21	\$21	\$76	\$39
Unintentional Poisoning	26	9.26	\$20	\$71	\$17
Other Injuries	13	4.63	\$111	\$395	\$264
Total	171	60.92	\$354	\$1,260	\$715

Note: Health care cost per capita calculated using direct costs only. Other injuries include drowning, fire/burns, struck by/against sport equipment, other unintentional injuries and undetermined/other intent.

Table 65: Total, direct and indirect costs of injury by cause, Northern Health, 2010 (\$ millions)

Description	Total Costs	Direct Costs	Indirect Costs
Other Unintentional Injuries***	\$93	\$64	\$29
Transport Incidents	\$81	\$39	\$41
Motor vehicle	\$52	\$23	\$30
ATV, snowmobile	\$11	\$7	\$4
Other ^a	\$7	\$4	\$3
Pedal cycle	\$6	\$3	\$3
Pedestrian	\$4	\$2	\$2
Falls	\$79	\$57	\$22
Other**	\$33	\$22	\$10
On the same level	\$24	\$18	\$5
On stairs	\$9	\$7	\$2
From furniture	\$6	\$5	\$1
From skates, skis, boards, blades	\$4	\$3	\$2
From ladders/scaffolding	\$3	\$2	\$1
In playgrounds	\$1	\$1	\$0
Diving	\$0	\$0	\$0
Suicide/Self-Harm	\$42	\$15	\$27
Suicide/Self-Harm-Other	\$21	\$2	\$19
Suicide/Self-Harm-Poisoning	\$21	\$12	\$8
Violence	\$21	\$11	\$11
Unintentional Poisoning	\$20	\$5	\$15
Undetermined Intent/Other	\$9	\$6	\$3
Fire/Burns	\$5	\$3	\$2
Drowning	\$2	\$0	\$2
Struck by/against Sports Equipment	\$2	\$1	\$1
Total	\$354	\$201	\$153

Note: Numbers are rounded, therefore totals may not sum exactly.

^a, **, *** See description on page 46.

Other unintentional injuries made up \$64 million or 32% of the direct costs of injuries in NH in 2010, followed by falls at \$57 million or 28% and transport incidents at \$39 million or 20% (Table 65). Other causes of direct costs of injury included suicide and self-harm (\$15 million or 7%), violence (\$11 million or 5%), undetermined intent (\$6 million or 3%), unintentional poisoning (\$5 million or 2%), fire and burns (\$3 million or 2%), and struck by or against sports equipment (\$1 million or 0.5%).

Transport incidents accounted for the greatest proportion of indirect costs at \$41 million or 27% of indirect costs,



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followed by other unintentional injuries at \$29 million or 19%, suicide and self-harm at \$27 million or 18%, and falls at \$22 million or 14% (Table 65). Other causes of indirect costs were unintentional poisoning (\$15 million or 10%), violence (\$11 million or 7%), undetermined intent (\$3 million or 2%), fire and burns (\$2 million or 1%), drowning (\$2 million or 1%), and struck by or against sports equipment (\$1 million or 0.6%).

Transport-Related Injuries by Cause and Associated Costs

Among transport-related injuries, the most common cause of injury deaths in NH in 2010 was (Table 66):

- Motor vehicle incidents: 80% (n=44)
- Pedestrian events: 9% (n=5)

Hospitalizations due to transport-related injuries were also most often due to (Table 66):

- Motor vehicle incidents: 52% (n=275)
- ATV/Snowmobile incidents: 20% (n=104)
- Other transport incidents (see glossary for definition): 15% (n=78)

The most frequent defined causes of transport-related emergency room visits were from (Table 66):

- Motor vehicle incidents: 60% (n=2,455)
- Other transport events (see glossary for definition): 14% (n=574)
- Cycling events: 12% (n=502)

The most common cause of transport-related permanent disability was from (Table 66):

- Motor vehicle incidents: 50% (n=65) permanent partial disability and 54% (n=7) permanent total disability
- ATV/Snowmobile incidents: 20% (n=25) permanent partial disability and 17% (n=less than 5) permanent total disability
- Other transport events (see glossary for definition): 15% (n=20) permanent partial disability and 14% (n=less than 5) permanent total disability

Table 66: Transport-related injuries by injury outcome, Northern Health, 2010

Description	Deaths		Hospitalized Treatment		Emergency Room Visit		Permanent Partial Disability		Permanent Total Disability	
	N	%	N	%	N	%	N	%	N	%
Transport Incidents										
Pedestrian	5	9.1	23	4.3	125	3.0	5	4.2	*	5.0
Pedal cycle	*	1.8	51	9.6	502	12.2	14	10.6	*	10.2
Motor vehicle	44	80.0	275	51.8	2,455	59.7	65	50.4	7	54.0
ATV, snowmobile	*	3.6	104	19.6	459	11.1	25	19.5	*	17.2
Other ^a	*	5.5	78	14.7	574	13.9	20	15.3	*	13.6
Total	55	100.0	531	100.0	4,114	100.0	128	100.0	12	100.0

*Less than 5 numbers suppressed due to small counts. ^aSee description on page 46.

Motor vehicle incidents accounted for the highest proportion of the costs associated with transport-related injuries, making up almost two-third of the total transport-related costs (65%), over half of the transport-related direct (58%) cost and almost three-quarter of indirect (71%) costs (Table 67). ATV and snowmobile incidents were a significant source of transport-related injury costs accounting for 14% of total, 18% of direct and 11% of indirect costs. Other causes included other causes of transport-related injury (9% of total, 11% of direct and 6% of indirect costs), cycling injuries (8% of total costs, 9% of direct costs, and 7% of indirect costs), and pedestrian incidents (about 5% of total, direct and indirect costs).

Fall-Related Injuries by Cause and Associated Costs

Among fall-related injuries, the most common cause of injury deaths in NH in 2010 was (Table 68):

- Other causes of falls (see glossary for definition): 86% (n=19)

Hospitalizations due to fall-related injuries were also most often due to (Table 68):

- Other causes of falls (see glossary for definition): 40% (n=449)

Table 67: Transport-related costs by injury outcome, Northern Health, 2010 (\$ millions)

Description	Total Costs		Direct Costs		Indirect Costs	
	\$	%	\$	%	\$	%
Transport Incidents						
Motor vehicle	\$52	64.7	\$23	57.7	\$30	71.4
ATV, snowmobile	\$11	14.1	\$7	17.5	\$4	10.8
Other ^a	\$7	8.7	\$4	11.1	\$3	6.4
Pedal cycle	\$6	7.7	\$3	8.6	\$3	6.9
Pedestrian	\$4	4.8	\$2	5.1	\$2	4.6
Total	\$81	100.0	\$39	100.0	\$41	100.0

Note: Numbers are rounded, therefore totals may not sum exactly.

^aSee description on page 46.

- Falls on same level: 35% (n=392)
- Falls on stairs: 11% (n=124)

The most frequent defined causes of fall-related emergency room visits were from (Table 68):

- Falls on same level: 37% (n=3,685)
- Other causes of falls (see glossary for definition): 35% (n=3,535)
- Falls on stairs: 13% (n=1,323)

The most common cause of fall-related permanent disability was from (Table 68):

- Other causes of falls (see glossary for definition): 36% (n=81) permanent partial disability and 39% (n=8) permanent total disability
- Falls on same level: 35% (n=80) permanent partial disability and 31% (n=6) permanent total disability
- Falls on stairs: 13% (n=30) permanent partial disability and 15% (n=less than 5) permanent total disability

Similarly, a large proportion of the costs from fall-related injuries were coded as *other* at 41% of total costs, 39% of direct costs, and 47% of indirect costs (Table 69). Same level falls made up the largest proportion of specified causes of fall-related costs at 30% of total costs, 32% of direct costs and 25% of indirect costs, followed by falls on stairs (12% of total and direct costs and 11% of indirect costs), falls involving skates, skis, snowboards, or blades (5% of total costs, 5% of direct costs, and 7% of indirect costs), falls from furniture (8% of total costs, 8% of direct costs, and 5% of indirect costs), falls from ladders (about 3% of total, direct and indirect costs), and falls from playground equipment (1% of total costs, 1% of direct costs, and 2% of indirect costs).

Intentional Injuries by Cause and Associated Costs

Among intentional injuries, the cause of injury deaths in NH in 2010 were (Table 70):

- Suicide/self-harm other than by poisoning: 71% (n=39)
- Violence: 16% (n=9)
- Suicide/self-harm by poisoning: 13% (n=7)

Table 68: Fall-related injuries by injury outcome, Northern Health, 2010

	Deaths		Hospitalized Treatment		Emergency Room Visits		Permanent Partial Disability		Permanent Total Disability	
	N	%	N	%	N	%	N	%	N	%
Falls										
On the same level	0	0.0	392	35.1	3,685	36.5	80	35.4	6	30.7
From skates, skis, boards, blades	0	0.0	32	2.9	531	5.3	11	4.8	*	4.3
From furniture	*	9.1	80	7.2	703	7.0	12	5.4	*	5.6
In playgrounds	0	0.0	7	0.6	141	1.4	*	1.2	0	0.9
On stairs	*	4.5	124	11.1	1,323	13.1	30	13.4	*	15.1
From ladders/scaffolding	0	0.0	31	2.8	155	1.5	9	3.8	*	3.8
Diving	0	0.0	*	0.1	24	0.2	0	0.2	0	0.1
Other	19	86.4	449	40.2	3,535	35.0	81	35.9	8	39.4
Total	22	100.0	1,116	100.0	10,097	100.0	226	100.0	19	100.0

*Less than 5 numbers suppressed due to small counts.

Table 69: Fall-related costs by injury outcome, Northern Health, 2010 (\$ millions)

Description	Total Costs		Direct Costs		Indirect Costs	
	\$	%	\$	%	\$	%
Falls						
Other**	\$33	41.1	\$22	38.6	\$10	47.3
On the same level	\$24	29.9	\$18	32.0	\$5	24.6
On stairs	\$9	11.5	\$7	11.7	\$2	10.9
From furniture	\$6	7.5	\$5	8.4	\$1	5.2
From skates, skis, boards, blades	\$4	5.3	\$3	4.5	\$2	7.4
From ladders/scaffolding	\$3	3.2	\$2	3.5	\$1	2.5
In playgrounds	\$1	1.4	\$1	1.1	\$0	2.0
Diving	\$0	0.2	\$0	0.2	\$0	0.2
Total	\$79	100.0	\$57	100.0	\$22	100.0

Note: Numbers are rounded, therefore totals may not sum exactly.

**See description on page 46.

Intentional injury hospitalizations were also due to (Table 70):

- Suicide/self-harm by poisoning: 52% (n=227)
- Violence: 40% (n=177)
- Suicide/self-harm other than by poisoning: 8% (n=36)

The defined causes of intentional injury emergency room visits were from (Table 70):

- Violence: 81% (n=1,922)
- Suicide/self-harm by poisoning: 14% (n=323)
- Suicide/self-harm other than by poisoning: 6% (n=131)

The cause of permanent disability from intentional injury were from (Table 70):

- Suicide/self-harm from poisoning: 51% (n=49) permanent partial disability and 31% (n=less than 5) permanent total disability
- Violence: 43% (n=41) permanent partial disability and 62% (n=less than 5) permanent total disability
- Suicide/self-harm other than poisoning: 7% (n=6) permanent partial disability and 7% (n=less than 5) permanent total disability

Table 70: Intentional injuries by injury outcome, Northern Health, 2010

Description	Deaths		Hospitalized Treatment		Emergency Room Visits		Permanent Partial Disability		Permanent Total Disability	
	N	%	N	%	N	%	N	%	N	%
Intentional Injuries										
Suicide/Self-Harm-Poisoning	7	12.7	227	51.6	323	13.6	49	51.0	*	31.0
Suicide/Self-Harm-Other	39	70.9	36	8.2	131	5.5	6	6.5	*	7.4
Violence	9	16.4	177	40.2	1,922	80.9	41	42.6	*	61.6
Total	55	100.0	440	100.0	2,377	100.0	96	100.0	7	100.0

*Less than 5 numbers suppressed due to small counts.

Suicide and self-harm and violence were almost equally responsible for intentional injury-related costs in 2010 (Table 71). Broken down by type of cost, suicide and self-harm by poisoning is shown to account for 49% of intentional injury-related direct costs, followed by violence (43%) and other forms of suicide and self-harm (9%). Suicide and self-harm by causes other than by poisoning accounted for almost half of the indirect costs of intentional injuries at 50%, which is higher than the proportions of indirect costs by violence (29%), or suicide and self-harm by poisoning (22%).

Table 71: Intentional injury costs by injury outcome, Northern Health, 2010 (\$ millions)

Description	Total Costs		Direct Costs		Indirect Costs	
	\$	%	\$	%	\$	%
Intentional Injuries						
Suicide/ Self-Harm – Poisoning	\$21	32.7	\$12	48.9	\$8	21.7
Suicide/Self- Harm–Other	\$21	33.1	\$2	8.5	\$19	49.8
Violence	\$21	34.2	\$11	42.6	\$11	28.4
Total	\$63	100.0	\$25	100.0	\$37	100.0

Note: Numbers are rounded, therefore totals may not sum exactly.

FURTHER ANALYSES OF BC COSTS

BC Costs of Injury by Age and Sex

In 2010, the cost of injuries for males was higher than for females, at \$2.2 billion versus \$1.5 billion (Table 72). Total injury cost per capita was \$994 for males and \$665 for females. Health care costs per capita for males was \$564 and \$461 for females. Total cost per capita was highest among youth aged 15-24 years at \$1,185, however health care cost per capita were highest among older adults aged 65+ years at \$965 followed by youth aged 15-24 at \$572. Among males, the highest total injury cost per capita was among ages 15-24 years at \$1,511. Among females, the highest total injury cost per capita was among ages 65 years and over at \$1,102.

BC Costs of Injury by Cause and Age

The highest costs for children 0-14 years were for (Table 73):

- Falls: 40% of total cost at \$153 million
 - » Other falls: 35% of fall-related costs at \$53 million
 - » Falls in playgrounds: 21% of fall-related costs at \$32 million
 - » Falls on the same level: 17% of fall-related costs at \$26 million
- Other unintentional injuries: 35% of total cost at \$132 million
- Transport incident: 13% of total cost at \$49 million
 - » Cycling events: 42% of transport-related costs at \$21 million
 - » Motor vehicle incidents: 25% of transport-related costs at \$12 million
 - » Pedestrian incidents: 14% of transport-related costs at \$7 million

The highest costs for youth 15-24 years were for (Table 73):

- Other unintentional injuries: 26% of total cost at \$178 million
- Transport incidents: 24% of total cost at \$165 million
 - » Motor vehicle incidents: 59% of transport-related costs at \$96 million
 - » Pedestrian incidents: 13% of transport-related costs at \$22 million
 - » Cycling events: 11% of transport-related costs at \$18 million
 - » ATV, snowmobile incidents: 11% of transport-related costs at \$18 million
- Falls: 17% of total cost at \$115 million
 - » Other falls: 39% of fall-related costs at \$46 million
 - » Falls from skates, skis, boards, blades: 26% of fall-related costs at \$30 million
 - » Falls on the same level: 17% of fall-related costs at \$20 million

The highest costs for adults 25-64 years were for (Table 73):

- Falls: 24% of total cost at \$469 million
 - » Other falls: 39% of fall-related costs at \$185 million
 - » Falls on the same level: 28% of fall-related costs at \$131 million
 - » Falls on stairs: 14% of fall-related costs at \$66 million
- Other unintentional injuries: 22% of total cost at \$445 million
- Transport incidents: 20% of total cost at \$399 million
 - » Motor vehicle incidents: 61% of transport-related costs at \$244 million

Table 72: Total, direct, indirect and per capita costs of injuries by age group and sex, BC, 2010

Sex/Age	Reference Population	Total Costs (\$M)	Direct Costs (\$M)	Indirect Costs (\$M)	Total Cost Per Capita	Health Care Cost Per Capita
Males, all ages	2,219,698	\$2,207	\$1,252	\$955	\$994	\$564
Females, all ages	2,246,226	\$1,494	\$1,036	\$457	\$665	\$461
Both 0-14 years	686,664	\$381	\$213	\$168	\$555	\$310
Both 15-24 years	585,221	\$694	\$335	\$359	\$1,185	\$572
Both 25-64 years	2,528,912	\$1,984	\$1,099	\$885	\$785	\$435
Both 65+ years	665,127	\$642	\$642	\$0	\$965	\$965
Males 0-14 years	354,742	\$226	\$126	\$100	\$637	\$355
Males 15-24 years	300,968	\$455	\$209	\$246	\$1,511	\$694
Males 25-64 years	1,257,430	\$1,280	\$670	\$609	\$1,018	\$533
Males 65+ years	306,558	\$247	\$247	\$0	\$805	\$805
Females 0-14 years	331,922	\$155	\$87	\$68	\$467	\$261
Females 15-24 years	284,253	\$239	\$126	\$113	\$840	\$443
Females 25-64 years	1,271,482	\$705	\$429	\$276	\$554	\$337
Females 65+ years	358,569	\$395	\$395	\$0	\$1,102	\$1,102

Note: Numbers are rounded, therefore totals may not sum exactly.

Table 73: Total, direct and indirect costs of injury by cause and age group, BC, 2010 (\$ millions)

Description	All			Children (0-14)			Youth (15-24)			Adult (25-64)			*65+
	Total	Direct	Indirect	Total	Direct	Indirect	Total	Direct	Indirect	Total	Direct	Indirect	Total
Falls	\$1,222	\$960	\$262	\$153	\$88	\$65	\$115	\$67	\$48	\$469	\$320	\$149	\$485
Other**	\$533	\$429	\$104	\$53	\$30	\$23	\$46	\$26	\$20	\$185	\$124	\$61	\$250
On the same level	\$329	\$272	\$57	\$26	\$14	\$11	\$20	\$11	\$9	\$131	\$95	\$37	\$153
On stairs	\$124	\$94	\$30	\$9	\$5	\$4	\$9	\$5	\$4	\$66	\$44	\$22	\$36
From skates, skis, boards, blades	\$79	\$47	\$32	\$15	\$8	\$7	\$30	\$17	\$13	\$31	\$19	\$12	\$3
From furniture	\$71	\$60	\$11	\$17	\$10	\$7	\$5	\$4	\$1	\$15	\$11	\$3	\$35
From ladders/scaffolding	\$50	\$37	\$13	\$1	\$0	\$0	\$3	\$2	\$1	\$37	\$25	\$12	\$10
In playgrounds	\$36	\$22	\$14	\$32	\$20	\$12	\$2	\$1	\$1	\$2	\$1	\$0	\$0
Diving	\$4	\$2	\$2	\$1	\$0	\$0	\$1	\$1	\$0	\$3	\$1	\$2	\$0
Other Unintentional Injuries***	\$839	\$578	\$261	\$132	\$77	\$55	\$178	\$106	\$72	\$445	\$311	\$134	\$85
Transport Incidents	\$658	\$370	\$288	\$49	\$25	\$24	\$165	\$74	\$91	\$399	\$226	\$173	\$45
Motor vehicle	\$376	\$203	\$174	\$12	\$5	\$7	\$96	\$40	\$57	\$244	\$134	\$110	\$23
Pedal cycle	\$99	\$63	\$36	\$21	\$11	\$10	\$18	\$10	\$7	\$57	\$38	\$19	\$4
Pedestrian	\$78	\$44	\$34	\$7	\$3	\$4	\$22	\$9	\$12	\$37	\$19	\$18	\$12
ATV, snowmobile	\$55	\$33	\$23	\$5	\$3	\$2	\$18	\$10	\$8	\$30	\$18	\$13	\$2
Other ⁴	\$49	\$27	\$22	\$4	\$3	\$2	\$10	\$4	\$6	\$30	\$17	\$14	\$3
Suicide/Self-Harm	\$424	\$155	\$269	\$11	\$4	\$7	\$109	\$37	\$71	\$297	\$106	\$192	\$8
Suicide/Self-Harm–Poisoning	\$236	\$131	\$105	\$6	\$4	\$3	\$53	\$32	\$22	\$171	\$90	\$81	\$5
Suicide/Self-Harm–Other	\$188	\$24	\$164	\$4	\$0	\$4	\$55	\$6	\$49	\$127	\$16	\$111	\$2
Unintentional Poisoning	\$245	\$68	\$177	\$11	\$7	\$4	\$38	\$10	\$28	\$186	\$41	\$145	\$10
Violence	\$157	\$84	\$73	\$4	\$2	\$1	\$55	\$28	\$27	\$96	\$51	\$45	\$2
Undetermined Intent/Other	\$57	\$32	\$25	\$2	\$1	\$1	\$11	\$5	\$5	\$42	\$23	\$19	\$3
Fire/Burns	\$48	\$25	\$23	\$10	\$5	\$6	\$9	\$3	\$6	\$26	\$14	\$12	\$3
Struck by/against Sports Equipment	\$25	\$14	\$11	\$8	\$4	\$4	\$7	\$3	\$3	\$10	\$6	\$4	\$0
Drowning	\$25	\$3	\$22	\$2	\$1	\$1	\$8	\$1	\$7	\$15	\$2	\$13	\$0
Total	\$3,701	\$2,289	\$1,412	\$381	\$213	\$168	\$694	\$335	\$359	\$1,984	\$1,099	\$885	\$642

Note: Numbers are rounded, therefore totals may not sum exactly.

^{*} Older Adults 65 years and over are assumed to be out of the workforce and therefore do not incur indirect costs.

⁴, ^{**}, ^{***} See description on page 46.

Table 74: Fall-related injury rates by age group, sex and injury outcomes per 100,000 population, BC, 2010

Sex/Age	Deaths	Hospitalized Treatment	Emergency Room Visits	Permanent Partial Disability	Permanent Total Disability
Males 0 - 14	*	142.9	4,754.3	61.4	4.7
Males 15 - 24	*	158.8	2,770.4	51.6	4.2
Males 25 - 64	3.7	205.7	1,930.3	57.5	5.4
Males 65+	68.8	1,274.8	4,534.8	140.7	16.1
Females 0 - 14	0.0	105.4	4,011.9	48.5	3.7
Females 15 - 24	*	68.2	2,190.0	27.5	2.1
Females 25 - 64	0.6	168.5	2,205.6	53.7	4.0
Females 65+	78.6	2,469.8	6,980.6	216.1	16.5

^{*}Less than 5 numbers suppressed due to small counts.

- » Cycling events: 14% of transport-related costs at \$57 million
- » Pedestrian incidents: 9% of transport-related costs at \$37 million

The highest costs for older adults 65+ years were for (Table 73):

- Falls: 76% of total cost at \$485 million
 - » Other falls: 51% of fall-related costs at \$250 million
 - » Falls on the same level: 31% of fall-related costs at \$153 million
 - » Falls on stairs: 7% of fall-related costs at \$36 million
 - » Falls from furniture: 7% of fall-related costs at \$35 million
- Other unintentional injuries: 13% of total cost at \$85 million
- Transport incidents: 7% of total cost at \$45 million
 - » Motor vehicle incidents: 52% of transport-related costs at \$23 million
 - » Pedestrian incidents: 28% of transport-related costs at \$12 million

BC Health Care Cost of Injury by Age and Major Causes

Falls were the single greatest cause of injury health care costs for children (ages 0-14 years), adults (ages 25-64 years), and older adults (ages 65+ years), and made up over a third of total injury costs in BC in 2010. (Figure 2).

Among youth (ages 15-24 years), the greatest injury health care costs were due to transport incidents at 22% of total health care costs, followed by falls (20%), suicide and self-harm (11%), violence (8%) and unintentional poisoning (3%). Among adults (25-64 years) and older adults (65+ years), the second greatest health care costs were for transport incidents. Furthermore, among adults (25-64 years), health care costs from suicide and self-harm and from unintentional poisoning injuries ranked third and fourth (Figure 2).

Fall-Related Costs by Age and Sex

Fall-related injury costs were higher for males than females in all age groups except for older adults (65+ years) where costs for females were twice the cost for males in that age group (Figure 3).

Among British Columbians aged 0-24 years, more males than females of the same age died, were hospitalized, visited the emergency room and sustained a disability from a fall in 2010 (Table 74). There were more females than males aged 65 years and over who died from a fall, with almost double the rate of hospitalizations, emergency room treatment, and permanent partial disability due to a fall.

The total cost per capita for falls in 2010 was highest for females aged 65 years and over compared to all other females as well as males in other age groups (Table 75). Similarly, the

Figure 2
Proportion of health care costs of injury (direct costs) by cause and age group, BC, 2010

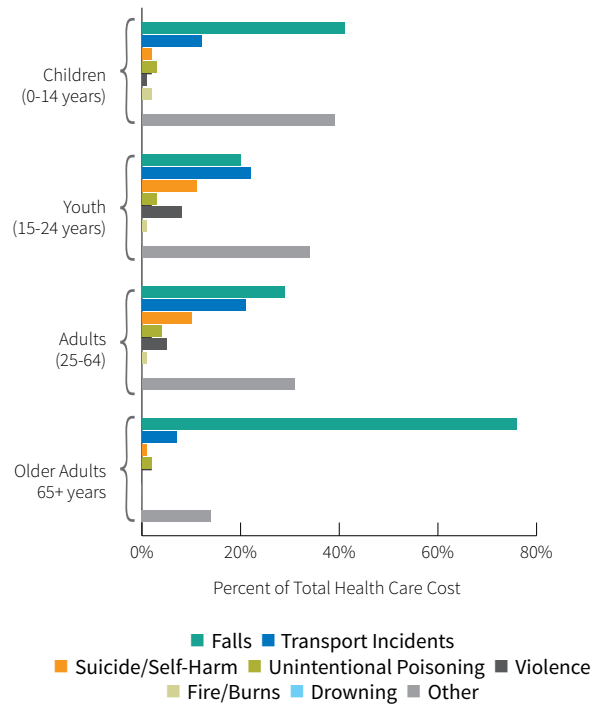
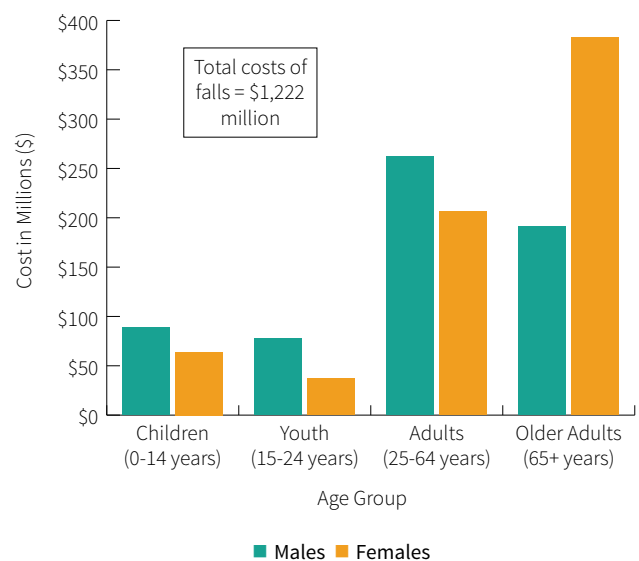


Figure 3
Total costs of falls by age group and sex, BC, 2010



health care cost per capita was highest for females aged 65 years and over when compared to females and males in the other age groups.

Table 75: Total, direct, indirect and per capita costs of falls by age group and sex, BC, 2010

Sex/Age	Reference Population	Total Costs (\$M)	Direct Costs (\$M)	Indirect Costs (\$M)	Total Cost Per Capita	Health Care Cost Per Capita
Males, all ages	2,219,698	\$598	\$435	\$163	\$269	\$196
Females, all ages	2,246,226	\$624	\$525	\$100	\$278	\$234
Both 0-14 years	686,664	\$153	\$88	\$65	\$223	\$128
Both 15-24 years	585,221	\$115	\$67	\$48	\$197	\$115
Both 25-64 years	2,528,912	\$469	\$320	\$149	\$185	\$127
Both 65+ years	665,127	\$485	\$485	\$0	\$729	\$729
Males 0-14 years	354,742	\$89	\$51	\$38	\$250	\$144
Males 15-24 years	300,968	\$78	\$45	\$33	\$260	\$150
Males 25-64 years	1,257,430	\$262	\$171	\$92	\$209	\$136
Males 65+ years	306,558	\$169	\$169	\$0	\$550	\$550
Females 0-14 years	331,922	\$64	\$37	\$27	\$193	\$111
Females 15-24 years	284,253	\$37	\$22	\$15	\$131	\$77
Females 25-64 years	1,271,482	\$206	\$149	\$57	\$162	\$118
Females 65+ years	358,569	\$317	\$317	\$0	\$883	\$883

Note: Health care cost per capita calculated using direct costs only.

Table 76: Transport-related injury rates by age group, sex and injury outcomes per 100,000 population, BC, 2010

Sex/Age	Deaths	Hospitalized Treatment	Emergency Room Visits	Permanent Partial Disability	Permanent Total Disability
Males 0-14	1.7	59.5	779.5	15.6	1.4
Males 15-24	13.6	181.7	1,645.3	45.1	4.5
Males 25-64	11.7	161.0	929.8	38.4	3.8
Males 65+	13.7	132.8	523.2	29.2	3.8
Females 0-14	1.5	31.3	481.1	8.6	*
Females 15-24	8.1	91.8	1,334.3	24.2	2.3
Females 25-64	4.6	71.0	797.6	18.7	1.7
Females 65+	8.1	114.9	449.0	26.3	2.6

*Less than 5 numbers suppressed due to small counts.

Transport-Related Costs by Age and Sex

At all ages, men accounted for more injury costs due to transport incidents than did women, with higher differences in cost between men and women observed in adults (25-64 years) (Figure 4).

Among British Columbians, there were more males than females of the same age who died, were hospitalized, visited the emergency room or sustained a disability from a transport-related incident in 2010 (Table 76).

The total cost per capita and health care cost per capita for transport-related incidents in 2010 was higher for males than females of all ages, with males aged 15-24 years having the highest cost per capita compared to males in all other age groups (Table 77).

Figure 4
Total costs of transport incidents by age group and sex, BC, 2010

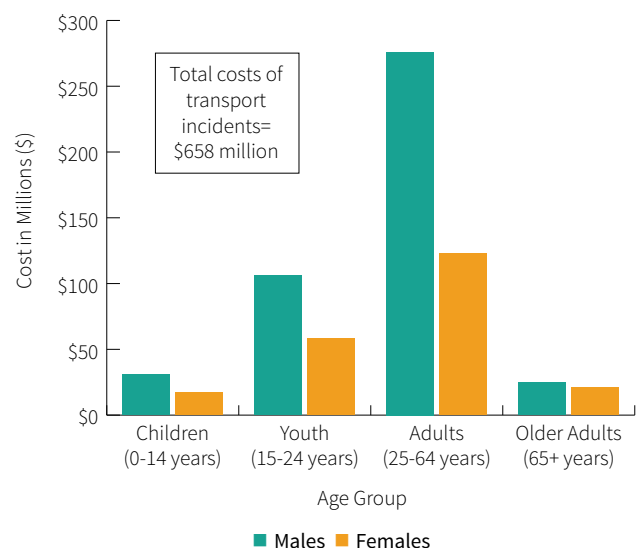


Table 77: Total, direct, indirect and per capita costs of transport incidents by age group and sex, BC, 2010

Sex/Age	Reference Population	Total Costs (\$M)	Direct Costs (\$M)	Indirect Costs (\$M)	Total Cost Per Capita	Health Care Cost Per Capita
Males, all ages	2,219,698	\$438	\$243	\$195	\$197	\$109
Females, all ages	2,246,226	\$220	\$127	\$93	\$98	\$57
Both 0–14 years	686,664	\$49	\$25	\$24	\$71	\$36
Both 15-24 years	585,221	\$165	\$74	\$91	\$282	\$126
Both 25-64 years	2,528,912	\$399	\$226	\$173	\$158	\$89
Both 65+ years	665,127	\$45	\$45	\$0	\$68	\$68
Males 0-14 years	354,742	\$31	\$16	\$15	\$87	\$45
Males 15-24 years	300,968	\$106	\$47	\$59	\$353	\$156
Males 25-64 years	1,257,430	\$276	\$155	\$121	\$219	\$123
Males 65+ years	306,558	\$25	\$25	\$0	\$80	\$80
Females 0-14 years	331,922	\$18	\$9	\$9	\$53	\$26
Females 15-24 years	284,253	\$58	\$27	\$32	\$205	\$94
Females 25-64 years	1,271,482	\$123	\$71	\$52	\$97	\$56
Females 65+ years	358,569	\$21	\$21	\$0	\$57	\$57

Note: Health care cost per capita calculated using direct costs only.

Table 78: Suicide-related injury rates by age group, sex and injury outcomes per 100,000 population, BC, 2010

Sex/Age	Deaths	Hospitalized Treatment	Emergency Room Visits	Permanent Partial Disability	Permanent Total Disability
Males 0-14	*	4.2	10.0	*	0.0
Males 15-24	16.9	75.4	153.7	14.0	*
Males 25-64	22.4	67.3	95.3	13.9	0.7
Males 65+	21.2	22.2	23.0	3.3	*
Females 0-14	*	17.5	33.7	3.1	0.0
Females 15-24	5.3	155.1	346.7	30.2	*
Females 25-64	5.3	88.9	124.9	20.0	1.0
Females 65+	5.0	25.4	24.1	6.5	*

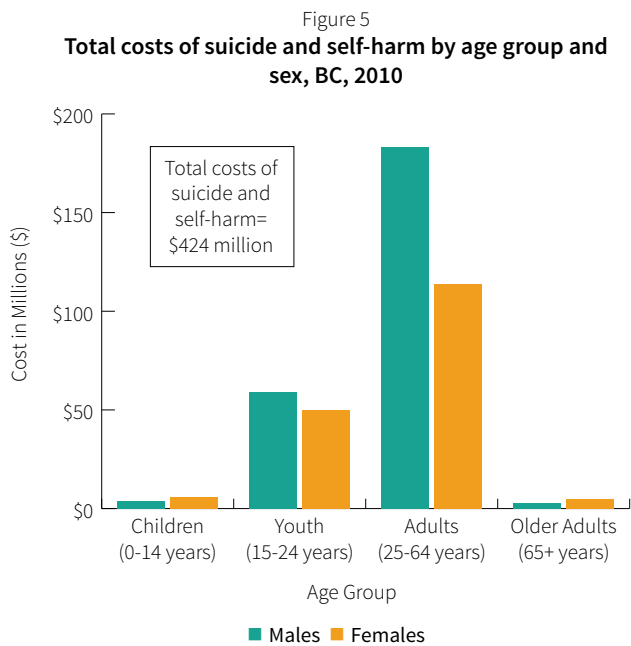
*Less than 5 numbers suppressed due to small counts.

Table 79: Total, direct, indirect and per capita costs of suicide and self-harm by age group and sex, BC, 2010

Sex/Age	Reference Population	Total Costs (\$M)	Direct Costs (\$M)	Indirect Costs (\$M)	Total Cost Per Capita	Health Care Cost Per Capita
Males, all ages	2,219,698	\$249	\$63	\$186	\$112	\$28
Females, all ages	2,246,226	\$175	\$92	\$83	\$78	\$41
Both 0–14 years	686,664	\$11	\$4	\$7	\$15	\$6
Both 15-24 years	585,221	\$109	\$37	\$71	\$186	\$64
Both 25-64 years	2,528,912	\$297	\$106	\$192	\$118	\$42
Both 65+ years	665,127	\$8	\$8	\$0	\$12	\$12
Males 0-14 years	354,742	\$4	\$1	\$3	\$12	\$3
Males 15-24 years	300,968	\$59	\$13	\$46	\$195	\$42
Males 25-64 years	1,257,430	\$183	\$46	\$137	\$145	\$37
Males 65+ years	306,558	\$3	\$3	\$0	\$10	\$10
Females 0-14 years	331,922	\$6	\$3	\$3	\$19	\$9
Females 15-24 years	284,253	\$50	\$25	\$25	\$176	\$87
Females 25-64 years	1,271,482	\$71	\$20	\$51	\$56	\$16
Females 65+ years	358,569	\$6	\$6	\$0	\$16	\$16

Suicide and Self-Harm-Related Costs by Age and Sex

Male youth and adults accounted for more of the total injury costs due to suicide and self-harm in BC in 2010 than did females (Figure 5). Children and older adults made up only a small fraction of the total costs.



Among British Columbians aged 15 to 65 years and over, death rates due to suicide in BC in 2010, for males were three to four times higher than death rates for females (Table 78). However, among females aged 15-24 years, rates for hospitalized treatment, emergency room visits and permanent disability resulting from self-harm were double the rate of males (Table 78).

The total cost per capita for suicide and self-harm in 2010 was higher for males than females in age groups 15-24 years and 25-64 years, with males and females aged 15-24 years having the highest total cost per capita compared to males and females in all other age groups (Table 79).

On the contrary, the health care cost per capita for suicide and self-harm in 2010 was higher for females than males aged 15-24 years (Table 79).

Unintentional Poisoning-Related Costs by Age and Sex

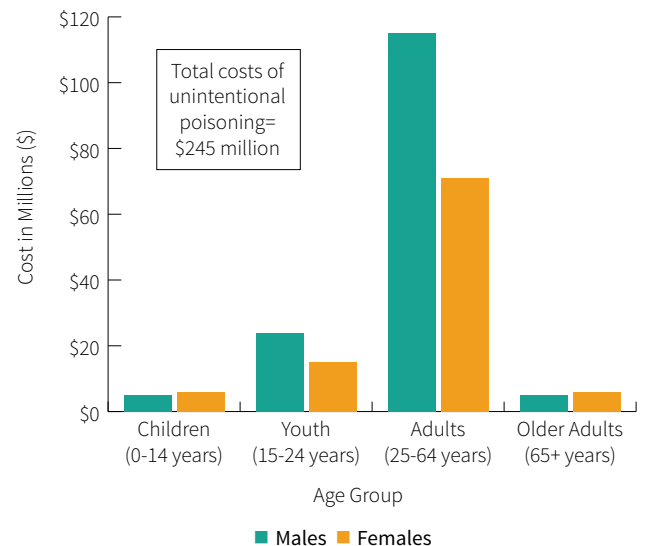
Adult males and females accounted for 76% of all unintentional poisoning costs, with males accounting for about 62% of the costs among adults (25-64 years) (Figure 6). Among British Columbians aged 15-25 years and 25-64 years, males had twice the death rate of females for unintentional poisoning (Table 80).



Photo: STILLFX/Shutterstock

The total cost per capita for unintentional poisoning in 2010 was higher for males than females in age groups 15-24 years and 25-64 years, with males aged 25-64 years having the highest total cost per capita compared to males in all other age groups (Table 81).

Figure 6
Total costs of unintentional poisoning by age group and sex, BC, 2010



Violence-Related Costs by Age and Sex

Violence-related costs were greatest among adults aged 25-64 years. Furthermore, within the same age group, males accounted for 83% of the violence-related costs (Figure 7).

Among British Columbians aged 15-24 years and 25-64 years, there were more males than females that died, were hospitalized, visited the emergency room or sustained a disability from violence-related incidents (Table 82).

With the exception of ages 0-14 years, the total cost per capita and health care cost per capita for violence in 2010 was higher among males than females of all ages, with males

Table 80: Injury rates due to unintentional poisoning by age group, sex and injury outcome per 100,000 population, BC, 2010

Sex/Age	Deaths	Hospitalized Treatment	Emergency Room Visits	Permanent Partial Disability	Permanent Total Disability
Males 0-14	0.0	12.1	207.2	3.7	*
Males 15-24	7.0	23.6	197.3	5.6	*
Males 25-64	16.2	32.8	149.1	6.6	0.4
Males 65+	2.9	44.4	111.4	7.5	*
Females 0-14	0.0	16.3	179.8	4.2	*
Females 15-24	2.8	27.8	217.5	6.3	*
Females 25-64	8.0	29.9	142.7	6.5	0.4
Females 65+	2.0	51.3	133.1	8.5	*

*Less than 5 numbers suppressed due to small counts.

Table 81: Total, direct, indirect and per capita costs of unintentional poisoning by age group and sex, BC, 2010

Sex/Age	Reference Population	Total Costs (\$M)	Direct Costs (\$M)	Indirect Costs (\$M)	Total Cost Per Capita	Health Care Cost Per Capita
Males, all ages	2,219,698	\$148	\$34	\$115	\$67	\$15
Females, all ages	2,246,226	\$97	\$35	\$62	\$43	\$15
Both 0-14 years	686,664	\$11	\$7	\$4	\$16	\$10
Both 15-24 years	585,221	\$38	\$10	\$28	\$65	\$17
Both 25-64 years	2,528,912	\$186	\$41	\$145	\$74	\$16
Both 65+ years	665,127	\$10	\$10	\$0	\$15	\$15
Males 0-14 years	354,742	\$5	\$3	\$2	\$14	\$8
Males 15-24 years	300,968	\$24	\$5	\$19	\$78	\$16
Males 25-64 years	1,257,430	\$115	\$21	\$94	\$92	\$17
Males 65+ years	306,558	\$4	\$4	\$0	\$14	\$14
Females 0-14 years	331,922	\$6	\$4	\$2	\$18	\$11
Females 15-24 years	284,253	\$15	\$5	\$9	\$51	\$19
Females 25-64 years	1,271,482	\$71	\$20	\$51	\$56	\$16
Females 65+ years	358,569	\$6	\$6	\$0	\$16	\$16

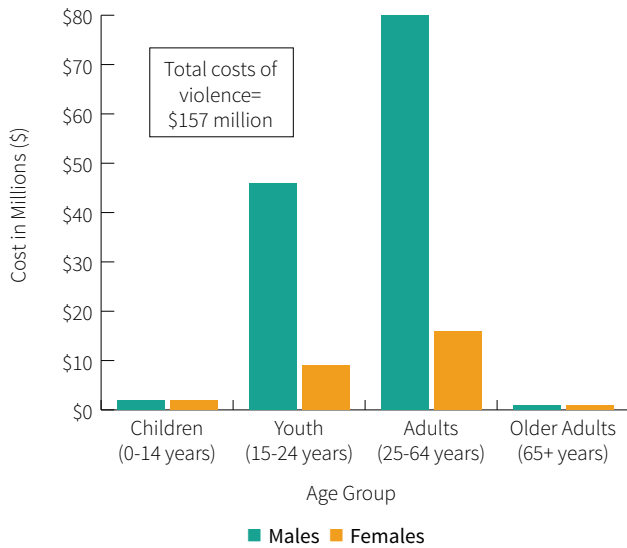
Table 82: Violence-related injury rates per 100,000 population by age group, sex and injury outcome, BC, 2010

Sex/Age	Deaths	Hospitalized Treatment	Emergency Room Visits	Permanent Partial Disability	Permanent Total Disability
Males 0-14	0.0	3.9	110.1	*	*
Males 15-24	2.0	117.3	1,321.9	28.7	2.8
Males 25-64	2.9	56.0	367.0	12.0	1.3
Males 65+	*	11.4	41.4	1.9	*
Females 0-14	0.0	3.9	53.6	*	0.0
Females 15-24	*	15.5	448.5	4.8	*
Females 25-64	0.6	9.8	163.2	2.4	0.2
Females 65+	*	6.4	26.0	*	*

*Less than 5 numbers suppressed due to small counts.

Figure 7

Total costs of violence by age group and sex, BC, 2010



aged 15-24 years having the highest cost per capita compared to males in all other age groups (Table 83).

Sensitivity Analysis

The calculation of indirect costs for this report was driven by economic factors including wage rates, workforce participation rates, unemployment rates, income loss due to disability, real wage growth rates and a discount rate. A discount rate is the rate at which society as a whole is willing to trade off present for future benefits, making current costs and benefits worth more than those occurring in the

future.[14] It is important to consider discounted rates in determining outcomes, particularly since a dollar received today is considered more valuable than one received in the future. Recently, using a discount rate has become controversial, especially for health benefits, since health, unlike wealth, cannot be invested to produce future gains. [15] However, it has been argued that failure to discount the future costs in economic evaluations can give misleading results.[14] The analysis in this report has used a discount rate of 3% so as to be consistent with previous methodologies of calculating economic burden of injuries and other health related economic evaluations.

The assumptions underpinning the economic burden of injuries presented in this report are subject to significant variations. In order to capture the effects of these assumptions, sensitivity analyses were used to illustrate the possible range of indirect cost estimates. Sensitivity analyses were conducted using variations in discount rate, unemployment rate and average weekly earnings (Table 84). It was assumed during the analysis of each of these parameters, that when the effect of varying one condition was changed, the other two variations were held constant.

The analysis varying the discount rate to 5% revealed high sensitivities to percent changes in total, direct and indirect costs of injuries (Table 84). The costs decreased by 15.8 % for total costs, 12.4% for direct costs and 21.3% for indirect costs. The analyses for unemployment rate and average weekly earnings showed minimal sensitivities to the total and direct costs.

Table 83: Total, direct, indirect and per capita costs of violence by age group and sex, BC, 2010

Sex/Age	Reference Population	Total Costs (\$M)	Direct Costs (\$M)	Indirect Costs (\$M)	Total Cost Per Capita	Health Care Cost Per Capita
Males, all ages	2,219,698	\$129	\$69	\$60	\$58	\$31
Females, all ages	2,246,226	\$28	\$15	\$13	\$12	\$7
Both 0-14 years	686,664	\$4	\$2	\$1	\$6	\$4
Both 15-24 years	585,221	\$55	\$28	\$27	\$94	\$48
Both 25-64 years	2,528,912	\$96	\$51	\$45	\$38	\$20
Both 65+ years	665,127	\$2	\$2	\$0	\$4	\$4
Males 0-14 years	354,742	\$2	\$1	\$1	\$6	\$3
Males 15-24 years	300,968	\$46	\$24	\$22	\$154	\$81
Males 25-64 years	1,257,430	\$80	\$42	\$37	\$63	\$34
Males 65+ years	306,558	\$1	\$1	\$0	\$5	\$5
Females 0-14 years	331,922	\$2	\$1	\$1	\$5	\$4
Females 15-24 years	284,253	\$9	\$4	\$5	\$31	\$13
Females 25-64 years	1,271,482	\$16	\$9	\$8	\$13	\$7
Females 65+ years	358,569	\$1	\$1	\$0	\$3	\$3

Table 84: Effects of changes in discount rate, unemployment rate and average weekly earnings on economic costs of injury, BC, 2010 (\$ millions)

Key Driver	Total Costs	Direct Costs	Indirect Costs
Discount Rate			
3% (Base Case)	\$3,700.92	\$2,288.72	\$1,412.20
5%	\$3,115.96	\$2,004.50	\$1,111.46
% Decrease	15.8%	12.4%	21.3%
Unemployment Rate			
7.6% (Base Case)	\$3,700.92	\$2,288.72	\$1,412.20
5%	\$3,740.66	\$2,288.72	\$1,451.94
% Increase	1.1%	0.0%	2.8%
Average Weekly Earnings			
\$798.92 (Base Case)	\$3,700.92	\$2,288.72	\$1,412.20
\$817.61	\$3,733.96	\$2,288.72	\$1,445.24
% Increase	0.9%	0.0%	2.3%

Comparisons with Earlier Studies

There is a series of national and provincial reports on the economic burden of injury released by SMARTRISK, now a founding member organization of Parachute Canada. Specific to BC, the first report on unintentional injuries was released in 2001,[2] followed by the second and third national reports released in 2009 and 2015 on both unintentional and intentional injuries.[3, 4] The focus of the 2001 report was the costs of unintentional injuries using 1998 data, providing information by injury type, age, sex and specific causes such as falls and motor vehicle crashes. The focus of the 2009 national report was the costs for both unintentional and intentional injuries using 2004 data with a chapter for BC providing cost information by age, sex, and cause of injury. The third national report released in June 2015, is based on 2010 data and is similar to the analysis conducted in this report. The current report by the BC Injury Research and Prevention Unit is specific to BC, using 2010 data to calculate unintentional and intentional injury costs by age, sex and cause of injury. Further costs are also calculated for

each cause of injury by age and sex. In order to identify a time trend for these costs, this report also provides an analysis, where available, using data from the previous reports. It is important to note that direct mortality costs are excluded when comparisons are made to data from earlier reports.

In order to compare the cost value of injuries across different periods of time, it is important to measure the costs at a point in time relative to a reference period.[16] The Consumer Price Index, a commonly used price index, was used to adjust the costs from previous years, 1998 and 2004, to 2010 cost value in order to compare across the years.[17]

Except for permanent disability, the numbers for injury deaths, hospitalized treatment and emergency room visits have increased from 2004 to 2010 (Table 85). The costs for all causes of injury deaths in BC have increased by 11.1% from 2004 to 2010 (Table 85), with a greater increase in intentional injury death costs than unintentional injury death costs (15.5% increase for intentional injuries and 7.4% increase for unintentional injuries) (Table 86). Costs of hospitalized treatment and emergency room visits for all causes have increased by 51.3% and 60.2% respectively, from 2004 to 2010 (Table 85).

Costs for all unintentional injury outcomes showed an increase from 2004 to 2010, with the highest increase in costs for emergency room visits (60.7%) (Table 86). The numbers for unintentional injury deaths, hospitalized treatment and emergency room visits have also increased from 2004 to 2010 (Table 86). Costs for unintentional injury deaths have decreased from 1998 to 2004 by 44.0% (Table 86). Costs for unintentional hospitalized treatment and emergency room visits have increased significantly from 1998 to 2004 by 60.4% and 129.1%, respectively (Table 86). Permanent disability costs have decreased by 10.2% from 1998 to 2004.

Costs for intentional injuries were not available for 1998. A comparison for the years 2004 and 2010 for intentional injuries showed an increase in costs for deaths (15.5%), hospitalized treatment (26.3%) and emergency room visits (51.7%).

Table 85: Change in injury cost by year and injury outcome, BC, 2004 and 2010 (\$ millions in 2010 dollars)

Year	Cost of Injury Deaths*		Cost of Hospitalized Treatment		Cost of Emergency Room Visits		Cost of Permanent Disability	
	\$	N		N		N		N
1998**								
2004	\$547.8	1,721	\$450.7	32,667	\$383.8	403,340	\$1,732.7	9,900
2010	\$608.5	2,009	\$681.9	34,998	\$614.8	456,390	\$1,755.6	8,582
% Cost Increase 2004-2010	▲ 11.1%		▲ 51.3%		▲ 60.2%		▲ 1.3%	

*Previous years do not include direct costs for deaths. For comparison purposes, direct costs for deaths are excluded for 2010.

**Costs for 1998 were calculated for unintentional injuries only and are therefore not included in this table.

Table 86: Change in cost of injury, by injury type, year, injury outcome, BC, 1998, 2004 and 2010 (millions in 2010 dollars)

Year	Cost of Injury Deaths*		Cost of Hospitalized Treatment		Cost of Emergency Room Visits		Cost of Permanent Disability	
	\$	N	\$	N	\$	N	\$	N
Unintentional Injuries								
1998*	\$616.3	1,556	\$251.0	26,687	\$160.8	395,688	\$1,586.7	9,739
2004	\$345.2	1,188	\$403.2	27,365	\$368.4	383,956	\$1,425.0	8,701
2010	\$370.7	1,416	\$619.8	30,198	\$591.8	436,433	\$1,444.5	7,480
% Cost Increase/Decrease 1998-2004	▼ 44.0%		▲ 60.4%		▲ 129.1%		▼ 10.2%	
% Cost Increase/Decrease 2004-2010	▲ 7.4%		▲ 53.7%		▲ 60.7%		▲ 1.4%	
Intentional Injuries								
1998**								
2004	\$196.3	517	\$42.4	4,770	\$13.0	16,383	\$279.1	1,072
2010	\$226.7	562	\$53.6	4,186	\$19.7	17,272	\$272.8	961
% Cost Increase/Decrease 2004-2010	▲ 15.5%		▲ 26.3%		▲ 51.7%		▼ 2.3%	

*Previous years do not include direct costs for deaths. For comparison purposes, direct costs for deaths are excluded for 2010.

**Costs for 1998 were calculated for unintentional injuries only.

Note: Numbers are rounded, therefore totals may not sum exactly.

Table 87: Change in total, direct and indirect costs of unintentional injuries and death rate, by year, BC, 1998, 2004 and 2010 (\$ millions in 2010 dollars)

Year	Total Costs	Direct Costs*	Indirect Costs	Death Rate**
1998	\$2,615.0	\$1,085.8	\$1,529.2	38.9
2004	\$2,541.8	\$1,503.8	\$1,038.0	28.3
2010	\$3,031.3	\$1,986.9	\$1,044.4	31.7
% Increase/Decrease 1998-2004	▼ 2.8%	▲ 38.5%	▼ 32.1%	▼ 27.3%
% Increase/Decrease 2004-2010	▲ 19.3%	▲ 32.1%	▼ 0.6%	▲ 12.0%

*Previous years do not include direct costs for deaths. For comparison purposes, direct costs for deaths are excluded for 2010.

**Death rate per 100,000.

Permanent disability costs decreased by 2.3% from 2004 to 2010 (Table 86).

Total costs for unintentional injuries have decreased from 1998 to 2004 by 2.8%, whereas, these costs have increased by 19.3% from 2004 to 2010. The increase in costs from 2004 to 2010 is mostly driven by the increase in direct costs by 32.1% (Table 87).

Although death rates for unintentional injuries seem to have increased from 2004 to 2010 by 12.0% (Table 87), overall, age standardized death and hospitalization rates for all external causes of injury, unintentional injury, and intentional injury each depict a significant declining trend (all with p values < 0.05) from 1998 to 2010 for deaths and 2001/02- 2010/11 for hospitalizations (Figure 8).

Figure 9 depicts the BC age standardized death and hospitalization rates per 100,000 population by year and cause of injury from 1998 to 2010 for deaths and 2001/02-

Table 88: Change in unintentional injury cost of deaths, by year and cause, BC, 1998, 2004 and 2010 (\$ millions in 2010 dollars)

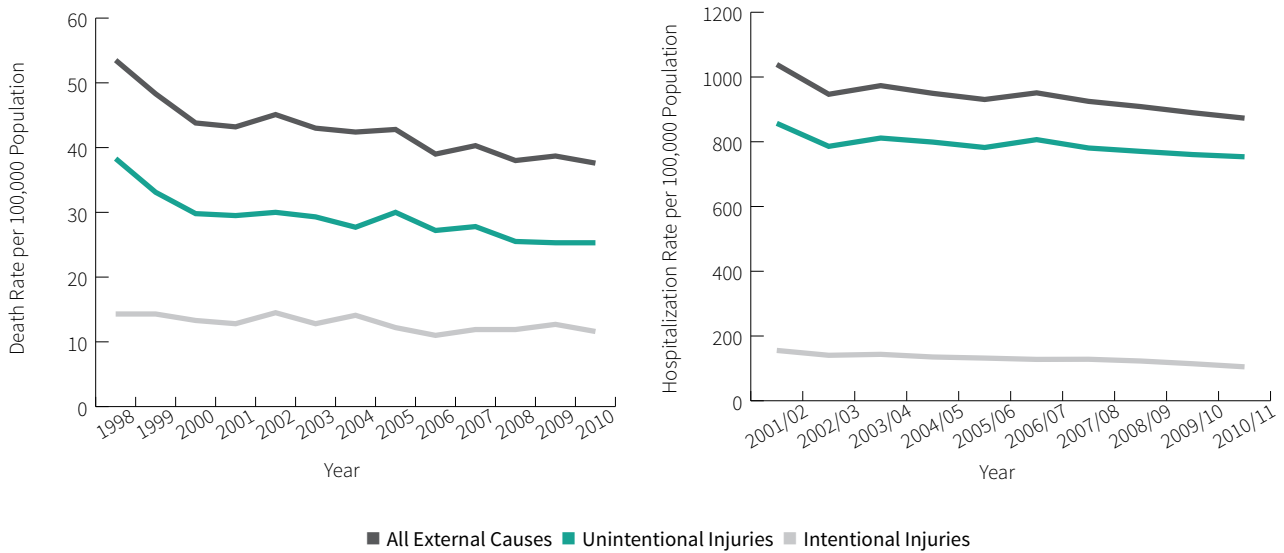
Cause of Injury	1998		2004		2010*		% Cost Increase/Decrease 1998-2004	% Cost Increase/Decrease 2004-2010
	Cost of Injury Deaths*		Cost of Injury Deaths*		Cost of Injury Deaths*			
	\$	N	\$	N	\$	N	Cost of Injury Deaths*	
Falls	\$22.6	358	\$21.2	333	\$26.8	552	▼ 6.2%	▲ 26.5%
Motor Vehicle	\$198.2	380	\$83.7	197	\$105.0	251	▼ 57.8%	▲ 25.5%
Poisoning	\$241.3	433	\$95.7	237	\$150.3	351	▼ 60.3%	▲ 57.1%
Drowning	\$63.1	207	\$16.8	40	\$20.6	51	▼ 73.4%	▲ 22.7%
Fires/Burns	\$18.6	33	\$6.3	26	\$9.2	34	▼ 66.1%	▲ 46.0%
Other	\$72.6	145	\$121.5	355	\$58.7	177	▲ 67.3%	▼ 51.7%
Total	\$616.3	1,556	\$345.2	1,188	\$370.7	1,416	▼ 44.0%	▲ 7.4%

*Previous years do not include direct costs for deaths. For comparison purposes, direct costs for deaths are excluded for 2010.

Other includes pedestrians, cyclists, ATV, snowmobiles, other transport, struck by/against sports equipment and other unintentional injuries.

Figure 8

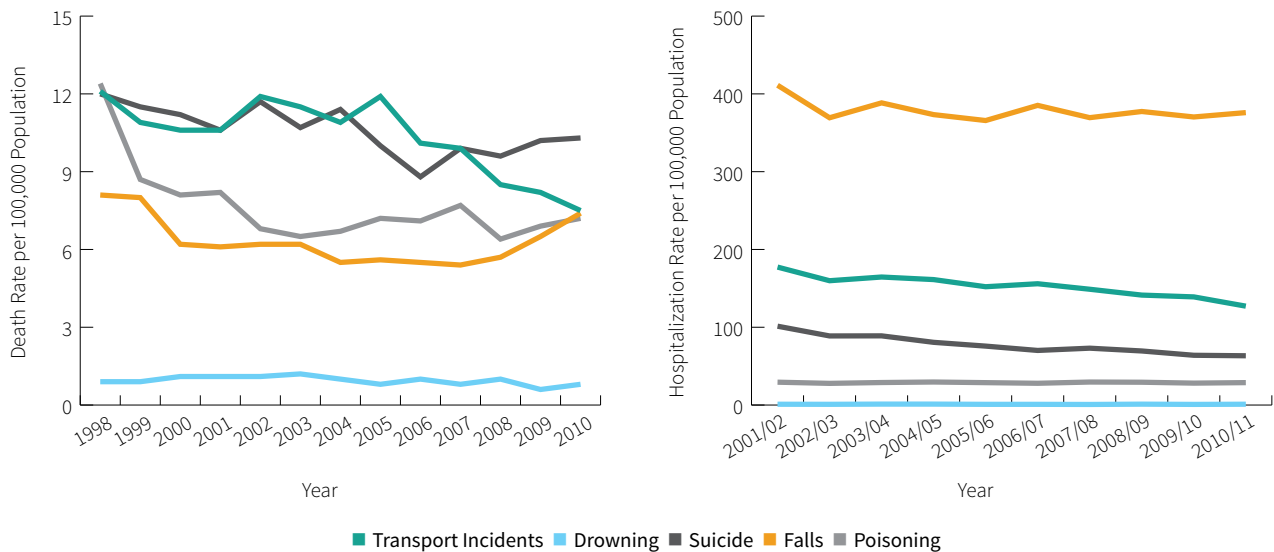
Age standardized death and hospitalization rates by year and injury intent, BC, 1998-2010 and 2001/02-2010/11



Source: Mortality data: BC Vital Statistics Agency, VISTA database, Accessed July 18, 2013. Hospitalization data: Discharge Abstract Database, BC Ministry of Health, Accessed June 30, 2014 from BCIRPU Injury Data Online Tool (iDOT).
 Note: Rates are based on all causes of injury, either unintentional or intentional. These rates differ from what was calculated for the economic burden of injuries in this report as some codes were excluded. Please refer to the appendix for a complete list of the inclusion codes. Please note that data coding procedures for death data changed in BC in 2000 from International Statistical Classification of Diseases and Related Health Problems 9th Version (ICD 9) to the 10th Version (ICD 10).

Figure 9

Age standardized death and hospitalization rates by year and cause of injury, BC, 1998-2010 and 2001/02-2010/11



Source: Mortality data: BC Vital Statistics Agency, VISTA database, Accessed July 18, 2013. Hospitalization data: Discharge Abstract Database, BC Ministry of Health, Accessed June 30, 2014 from BCIRPU Injury Data Online Tool (iDOT).
 Note: Rates are based on all causes of injury, either unintentional or intentional. These rates differ from what was calculated for the economic burden of injuries in this report as some codes were excluded. Please refer to the appendix for a complete list of the inclusion codes.

Table 89: Change in unintentional injury cost of hospitalized treatment, by year and cause, BC, 1998, 2004 and 2010 (\$ millions in 2010 dollars)

Cause of Injury	1998	2004	2010*	% Increase/ Decrease 1998-2004	% Increase/ Decrease 2004-2010
	Cost of Hospitalized Treatment	Cost of Hospitalized Treatment	Cost of Hospitalized Treatment	Cost of Hospitalized Treatment	Cost of Hospitalized Treatment
Falls	\$161.8	\$260.8	\$414.8	▲ 61.2%	▲ 59.0%
Motor Vehicle	\$38.2	\$43.4	\$64.9	▲ 13.6%	▲ 49.5%
Poisoning	\$2.6	\$12.5	\$17.2	▲ 390.2%	▲ 37.3%
Drowning	\$0.3	\$0.5	\$0.7	▲ 40.6%	▲ 59.7%
Fires/Burns	\$1.4	\$4.8	\$6.9	▲ 238.0%	▲ 43.9%
Other	\$47.1	\$81.2	\$115.4	▲ 72.3%	▲ 42.1%
Total	\$250.9	\$403.2	\$619.8	▲ 60.4%	▲ 53.7%

*Previous years do not include direct costs for deaths. For comparison purposes, direct costs for deaths are excluded for 2010. Other includes pedestrians, cyclists, ATV, snowmobiles, other transport, struck by/against sports equipment and other unintentional injuries.

2010/11 for hospitalizations. Although there were small differences in rates from year to year, all death trends showed a significant downward trend ($p < 0.05$) except for falls and drowning. In addition, death trends for falls and poisoning have shown a slight increase in rates from 2008 to 2010, while rates have increased for suicide from 2007 to 2010 (Figure 9). The trend for falls from 2008 to 2010 was significant ($p < 0.05$).

For hospitalizations, trends for transport and suicide showed a significant decline ($p < 0.05$).

Unintentional injury death costs have declined by 44.0% from 1998 to 2004, with costs for falls, motor vehicle, poisoning, drowning and fire/burns all decreasing (Table 88). As for the period 2004 to 2010, the total unintentional death costs have increased by 7.4%, with costs for these same causes of injury increasing as listed above (Table 88). Similarly, the number of deaths for all major causes of injury have also increased from 2004 to 2010 (Table 88).

The total costs of hospitalized treatment for unintentional injuries have increased by more than half for both the time periods, with each of the costs for falls, motor vehicle, poisoning, drowning, fire/burns and other unintentional injuries observed to be increasing (Table 89).

SUMMARY

With this report, BCIRPU has quantified the annual burden that injury places on British Columbians and the health care system. A further analysis has been provided at a regional level to provide more detailed information to regional health authorities regarding the specific costs of injury in their jurisdictions. Detailed provincial breakdowns by age group and sex, as well as leading causes of injury, have also been provided. A comparison of previous economic analyses has been made to understand the change in injury costs over time. Though many attempts have been made to quantify the burden of injury, it is still a challenging task to quantify and attach economic costs to the greater burden of pain, diminished potential, and loss experienced by injured British Columbians and their families.

The analyses in this report showed that injuries resulted in 2,009 lives lost in 2010 costing British Columbians \$3.7 billion dollars. This is equivalent to one death from injury every 4.4 hours, and a total expenditure of \$422,479 per hour, 24 hours per day, seven days per week for all causes of injury. Permanent disabilities were the greatest cause of both direct and indirect costs of injuries in 2010, with injuries resulting in hospitalization and other forms of treatment making up the remainder of the direct costs. Deaths were the second major source of indirect costs.

Falls were the cause of the greatest number of injury deaths and hospitalizations in 2010, as well as the most common cause of permanent partial and total disability. Falls had the most severe impact on older adults over the age of 65 years. There were more females than males aged 65 years and over to die from a fall, with almost double the rates of hospitalization, emergency room treatment, and partial permanent disability. The majority of the total and direct costs of injuries in BC were due to falls, accounting for the highest costs for hospitalized treatment, emergency room visits and permanent disability. The highest proportion of fall-related costs was among individuals aged 65 years and over. In addition, falls generated the greatest per capita cost in BC in 2010, with the highest per capita cost being among females aged 65 years and over.

Transport incidents were the second-leading cause of hospitalizations due to injury after falls in 2010. British Columbian males aged 15-24 years had twice the rate of deaths, hospitalizations, and permanent partial disability as a result of a transport-related incident as compared to females. Transport incidents were the second-highest cause of injury costs and accounted for the greatest proportion of indirect costs. Transport incidents also accounted for the second highest costs per hospitalized and emergency room treatment after suicide and self-harm-related injuries. Among

youth aged 15-24 years, the highest proportion of total costs was from transport-related injuries. The per capita cost of transport-related incidents in 2010 was higher for males than females of all ages, with males aged 15-24 years having the highest cost per capita compared to males in all other age groups.

Suicide and self-harm were the second leading cause of death in BC in 2010, accounting for one quarter of all injury deaths and the majority of all deaths by intentional injury. Among British Columbians aged 15 years and over, death rates for males were three to four times higher than rates for females from suicide and self-harm. However, among females aged 15-24 years, rates for hospitalized treatment, emergency room visits and permanent disability resulting from suicide and self-harm were double the rate of males. Suicide and self-harm accounted for the second greatest proportion of indirect costs after transport and the highest proportion for total costs for deaths. Male youth and adults accounted for more of the total injury costs due to suicide and self-harm in BC in 2010 than did females. The total cost per capita for suicide and self-harm was higher for males than females among both youth and adults, with males and females aged 15-24 years having the highest total cost per capita compared to males and females in all other age groups. However, health care costs in the same age group were highest for females than males across all other age groups.

The breakdown of costs by injury outcomes for leading causes provides different economic perspectives. Although fall-related injuries and deaths accounted for the highest total costs, the weight of these costs was more from hospitalization, emergency room visits and permanent disability rather than from deaths, where the cost per death for falls was the lowest. Since most of the fall-related deaths were among individuals over the age of 65 years who were out of the workforce, indirect costs for these deaths were not calculated. Furthermore, most of the transport-related deaths were among those aged 15-64 years who are still in the workforce, therefore resulting in high costs for deaths, both direct and indirect. Similarly, death costs for unintentional poisoning and suicide by poisoning and by other means are also higher than costs for falls.

The costs for all causes of injury deaths have increased from 2004 to 2010, with a greater increase in intentional injury death costs than unintentional injury, possibly driving the increase in total injury death costs. Time trends for death rates depict that although suicide and self-harm-related death rates have generally decreased from 1998 to 2010, there has been an increase in the rates over the last four years. This increase in death rates for suicide and self-harm

may be reflected in the increase in the intentional injury death costs from 2004 to 2010.

Injury rates have shown a decreasing trend over the last decade due to various prevention initiatives and legislation changes. For example, motor vehicle death rates have declined markedly where the improvement may be attributed to increased use of occupant restraints and reduction in impaired driving, together with a continuation of longer-term influences such as improved highway design and safer vehicle designs. Despite all unintentional injury death rates showing downward trends, the rates for falls and poisoning have shown an increase over the last three years, possibly driving the unintentional injury death costs up.

Total costs for unintentional injuries have increased from 2004 to 2010. The increase in these costs is mostly driven by the increase in direct costs which includes costs for treatment, continuing and terminal care, and rehabilitation.

As previously mentioned, the majority of direct costs were due to falls, with the highest proportion of costs among ages 65 years and older. Although hospitalization rates for falls among all ages have shown a downward trend (not significant), the number and rates of fall-related hospitalizations among ages 65 years and older have significantly increased from 2001/02 to 2010/11^d ($p < 0.05$). This increase in fall-related hospitalization numbers among older adults possibly drives the direct costs for unintentional injuries and is attributed to the increasing number of older adults in BC. In addition, the older the individual, the longer they remain in the hospital for care after sustaining a fall-related injury,[18] therefore incurring higher direct costs.

There have been many successful programs and government initiatives geared towards reducing falls and fall-related injuries among older adults. In fact, BC is recognized nationally and internationally as a leader in fall prevention among older adults.[15] However, because the BC population is rapidly getting older – in 2010 older adults represented 15% of the total population, and it is anticipated that by 2031 this population will represent 23.5% of the total BC population [15] – there remains a challenge to build on existing initiatives and efforts to continue fall prevention in the province.

Indirect costs include costs for loss of productivity; time lost from work and lost earnings. These costs are assigned to people ages 15-64 years who are in the workforce. For children aged 0-14 years, indirect costs were calculated after the age of 14, when it is assumed that they would enter the workforce. Indirect costs were not calculated for people aged



Photo: Leonardo da/Shutterstock

65 years and older as they were assumed to have left the workforce. In BC, in 2010, indirect costs represented 37% of the total costs. These costs have shown a decline over time from 1998 to 2010, with a greater decline from 1998 to 2004.

Recently, there have been many prevention initiatives geared towards reducing injuries among individuals aged 25-55 years. For example, the Preventable Campaign, by the Community Against Preventable Injuries, has been extremely successful in creating a positive shift in attitudes and self-reported precautionary actions towards injury prevention.

CONCLUSION

Injury Prevention has been identified as an important priority within BC. The guiding framework document for public health in BC, *PROMOTE, PROTECT, PREVENT: Our Health Begins Here*, includes a specific goal and three objectives for injury prevention. The goal of, *a safer province that reduces the risk of preventable injuries*, will be achieved through:

1. Building a culture of safety at work, home and play by increasing awareness of injury risks, implementing prevention education and taking priority actions, such as designing and developing safe environments, systems and products.
2. Reduce the incidence of falls, fall-related injuries and fall-related risk factors among seniors in BC through surveillance, enhanced community capacity, public information and evidence-based prevention measures.
3. Reduce the incidence of injuries among children and youth in BC through physical and social environmental modifications and increased awareness of safety-promoting behaviours.

The key motivation in investment in injury prevention makes sense from an economic point of view. Research and experience have shown that the vast majority of injuries that occur are both predictable and preventable; hence increasing the level of prevention will produce savings.

^d Discharge Abstract Database, BC Ministry of Health, Accessed June 30, 2014 from BCIRPU Injury Data Online Tool (iDOT)

Data demonstrate who is at risk, and when and under what conditions the injuries occur, which all assist in making strategic decisions regarding injury prevention strategies and actions. There is a wide range of ongoing efforts in injury prevention in BC, particularly in road safety, fall prevention and intentional injury prevention. The development and evaluation of future injury prevention interventions requires a national and provincial commitment.

The evidence presented in this report demands further attention and action in reducing the burden of injuries in BC. Continued surveillance and research, together with the implementation of effective injury prevention education, engineering and enforcement strategies are necessary to stem the human and economic burden that injuries exact. Given that the vast majority of injuries are both predictable and preventable, support for injury prevention in BC represents a prudent investment.

There are different perspectives that can be adopted when looking at injury costs. For someone charged with the responsibility to mitigate health system costs, an investment in the prevention of falls among older adults, or transport-related injury among youth aged 15-24 years, and suicide – the main drivers of the health care costs related to injury – would be prudent. For someone focused at the population and economic growth level of the province, injury prevention may be most effective when targeting individuals aged 25-55 years, as this population contributes to productivity and the human capital costs which drive the indirect costs.

In order to achieve significant savings through injury prevention, it is worthwhile to focus on prevention efforts for reducing hospitalizations, emergency care and permanent disability for fall-related injuries among individuals aged 65 years and older, and transport-related deaths, hospitalizations, emergency care and permanent disability among ages 15-64 years.

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APPENDIX 1: METHODOLOGY

An incidence costing,^a[19] human capital approach was conducted where the population of BC residents in 2010 were costed over the lifetime of injured individuals. Both the direct and indirect costs were discounted to a present value in 2010 at 3% per annum. The indirect costs included only foregone earnings calculated as average earnings and adjusted by the 2010 BC participation and unemployment rates, over the working life of an individual (ages 15 to 64 years inclusive). A 1% per year real wage growth was assumed.

Indirect costs, under the human capital methodology, are societal productivity losses, accounting for the injured individual's inability to perform his or her regular activities and are captured through measuring foregone or lost income. This method produces a conservative estimate of indirect costs as costs are assigned to people 15 to 64 years of age inclusive, and costs are not assigned to those leaving the workforce to provide informal care to injured or ill family members. For children aged 0-14 years, indirect costs were calculated after the age of 14, when it is assumed that they would enter the workforce. Indirect costs were not calculated for people aged 65 years and older as they were assumed to have left the workforce.

In addition, there are no costs assigned for the lost productivity of those outside the workforce. Furthermore, certain intangible costs associated with injuries are difficult to quantify in economic terms and therefore are not calculated. Such factors include: pain and suffering, economic dependence, and social isolation which are difficult to quantify in economic terms are not calculated.

The Electronic Resource Allocation Tool (ERAT)

In order to capture the full episodic costs associated with the various types of injury, this report employed the approach developed by The SMARTRISK Foundation, now Parachute Canada, for The Economic Burden of Injury in Canada. The Electronic Resource Allocation Tool (ERAT) provided a framework based on existing provincial injury data and data available from the injury costing literature.[4] The resource tool has been designed to allow for constant updating of current injury and cost information.

Data Sources

The following sources of most recent provincial available data were used in this report:

- 2010 mortality data from BC Vital Statistics was used to estimate lost productivity due to premature deaths.
- The Discharge Abstract Database (DAD) from the BC Ministry of Health contained the required 2010 data on hospital episodes and length of stay related to injuries.

- Resource Intensity Weights (RIWs) derived from the DAD, were used to attach average costs to the hospital episodes.
- National Ambulatory Care Reporting System (NACRS) data for Ontario contained data that were used to estimate emergency room visit statistics for BC.
- Unemployment rates, labour force participation rates, and average wage rates obtained from Statistics Canada's CANSIM database were used to estimate the monetary value of the productivity losses resulting from morbidity and premature death.
- BC population data obtained from BC Statistics were used in the calculation of injury rates and per capita costs.
- Life expectancy year tables were obtained from Statistics Canada and were used in the calculation of indirect costs related to injuries.

The above data are not nearly sufficient to allow for a comprehensive documentation of all costs associated with injuries in BC. Proxy measures that would provide the complete picture were developed using the methodology from *Miller et al. Databook (1995) on Nonfatal Injury: Incidence, Costs and Consequences* [20] to calculate:

- Direct morbidity costs for out-of-hospital treatment related to injuries, using ratios of episodes and related costs of emergency room visits to hospitalized cases; and
- Incidence of both permanent partial and total disability using coefficients that relate these episodes and related costs (both direct and indirect) to the incidence of hospitalized and emergency room visit cases.

In the ERAT, mortality costs were restricted to indirect costs only. To derive the direct costs for mortality, specific average costs, as outlined in Table 1, were estimated on a complete episode of potential events due to an injury-

Table 1: Direct Costs of Injury Deaths in BC

Cost of Potential Events	Data Source for Cost Information
Coroner's Service	BC Coroner's Service
Ambulance Service (attendance and transportation, pharmaceuticals, medical supplies)	BC Ambulance Service
Emergency Room (physician care, pharmaceuticals, medical supplies)	Health Canada, Economic Burden of Illness in Canada
Hospital Care (physician care, pharmaceuticals, medical supplies)	BC Ministry of Health
Insurance Costs (survivors' benefits) from WorkSafe BC, ICBC	Insurance Corporation of BC and WorkSafe BC
Additional direct health care costs (other health spending, capital, public health, health research)	Health Canada, Economic Burden of Illness in Canada

^a Involves estimating new cases of a condition which have their onset in a given year and estimating the lifetime costs for them.

Appendix I continued...

related death and were summed with the ERAT direct costs to acquire the total direct costs. These events range from costs incurred as a result of deaths occurring at the scene, ambulance transportation costs, treatment occurring in the emergency rooms and hospitals prior to the death, health insurance administration costs and other direct health care costs. The data sources for the average costs for each of these components are outlined in Table 1.

Injury death data: Mortality data was obtained from BC Vital Statistics for 2010 calendar year and included injury death cases, with information on age group, sex and external cause of injury codes based on the International Classification of Diseases, 10th revision (ICD-10). Direct mortality costs were organized by specific costs estimated on a complete episode of events due to an injury-related death and summed to acquire the total direct costs. Indirect costs were related to earnings lost due to death, compared with what would have been the remaining working life of individuals had they lived.

Hospitalized injuries: Injury hospitalization data was obtained from the Discharge Abstract Database (DAD) at the Ministry of Health. Acute hospital separation data for all injury hospitalizations in BC by 2010 calendar year were extracted from this dataset. The case-level data included age, sex, Resource Intensity Weights (RIWs), Length of hospital Stay (LOS), ICD-10 external cause of injury codes, and health authority of residence for the 2010 calendar year. Injury deaths that occurred in the hospital were included as both a hospitalization and a death as these cases generated both direct hospitalization costs and indirect mortality costs. Hospital costs were estimated using the BC average inpatient cost per weighted case. Medical and rehabilitation costs were calculated using hospital costs and coefficients derived from the study of *Miller et al.*, (1995).[20] Indirect costs were limited to lost earnings during hospitalization.

Emergency room visits: Emergency room visits were determined directly from the Ontario NACRS data for 2010 and estimated to all of BC, by using Ontario incidence-to-population ratios on BC's population. In cases where treatment was initiated in an emergency department, with subsequent hospital admission, the case was included in both emergency room visit and hospitalized categories to capture treatment costs in both settings. Medical and rehabilitation costs were calculated using hospital costs and coefficients derived from the study of *Miller et al.*, (1995).[20]

Disability: Permanent partial and permanent total disabilities from injury were estimated using both hospitalized and emergency room visits and coefficients derived from the study of *Miller et al.*, (1995).[20] Long-term medical costs

were calculated using hospital costs in conjunction with coefficients derived from the same study, while the indirect cost associated with income loss was assumed to be 100% for total permanent disability, and 17% for partial permanent disability.

Population denominators: Estimates of populations by age and sex for BC in 2010 were obtained from BC Statistics.

Regional analysis: Regional death and hospitalization data were adjusted for each health authority using the above data sources. Average cost per case by health authority was not available and therefore the provincial average was applied to calculate the cost values.

Non-hospitalization and disability incidences were not available at a regional level. Cases for non-hospitalizations and disability were adjusted so that both the emergency room visit to hospitalized ratio of cases and the disability to hospitalized ratio of cases remained constant from province to region. This was achieved by applying the ratio of regional to provincial hospitalized incidence to the emergency room visit and disability incidences. In situations where there were no hospitalized cases, distribution of cases was calculated by applying the proportion of regional to provincial population to the provincial emergency room visit cases. Moreover, the provincial RIW average for the same group in the regions where there are no hospitalized cases was applied in order to obtain cost values for emergency room visit cases. In addition, for the emergency room visit cases, no data was available on ages or cost ratios and provincial values were applied.

Please note that the coefficients presented in the study of *Miller et al.*, (1995) are based upon injury data classified using International Classification of Disease, 9th Edition (ICD-9) groupings.[20] In addition, the coefficients derived from the same study are based upon non-fatal injuries in the United States in the mid-1990s. This report assumes that these coefficients are similar to those that would be obtained from a Canadian study.

Parachute Canada released the *Cost of Injury in Canada Report** in June 2015. The cost estimates for BC in the national report differ slightly from those presented in this report. Differences arise from subtleties in the timing of data extractions for each report, which results in small differences in the total number of injury deaths and hospitalizations, as well as differences in the ascribed cost of an average hospital case. Table 2 below provides details of these differences.

Appendix I continued on the next page...

Table 2: Differences in values for BC for Economic Burden Reports, 2010

Economic Burden of Injury – Report by Parachute*	Economic Burden of Injury – Report by BCIRPU
<p>1. <i>Mortality Data</i> Total Deaths: 2,070 Data Source: Statistics Canada for 2010 calendar year Only indirect costs for mortality were calculated.</p>	<p><i>Mortality Data</i> Total Deaths: 2,009 Data Source: BC Vital Statistics, Data received in January, 2013 for 2010 calendar year Both direct and indirect costs for mortality were calculated.</p>
<p>2. <i>Hospitalization Data</i> Total Hospitalizations: 35,816 Data Source : Hospital Morbidity Database (HMDB), Canadian Institute for Health Information (CIHI) for 2010/11 fiscal year Additional information acquired from this data relate to Length of Stay and Resource Intensity Weights that are all used in the calculation of hospitalization costs.</p>	<p><i>Hospitalization Data</i> Total Hospitalizations: 34,998 Data Source : Discharge Abstract Database (DAD), BC Ministry of Health, Data received in June, 2011 for 2010 calendar year Additional information acquired from this data relate to Length of Stay and Resource Intensity Weights that are all used in the calculation of hospitalization costs. Differences are observed for length of stay and resource intensity weights by age group, sex and cause of injury.</p>
<p>3. <i>Non-Hospitalization Data</i> Total Non-Hospitalizations : 456,390 Data Source: Ontario NACRS data extended for BC</p>	<p><i>Non-Hospitalization Data</i> Total Non-Hospitalizations : 456,390 Data Source: Ontario NACRS data extended for BC</p>
<p>4. <i>Disability Data</i> Total Disabilities : 8,708 Data for disabilities are estimated using hospitalization and non-hospitalization data.</p>	<p><i>Disability Data</i> Total Disabilities : 8,582 Data for disabilities are estimated using hospitalization and non-hospitalization data. The difference in the disability data is driven by the difference in the hospitalization numbers.</p>
<p>5. <i>Population Data</i> Total Population: 4,465,924 Data Source: Statistics Canada</p>	<p><i>Population Data</i> Total Population: 4,465,924 Data Source: BC Vital Statistics</p>
<p>6. <i>Average Hospital Case Cost</i> Cost Value : \$5,161.91 Data Source : Estimate based on 2004 value from CIHI</p>	<p><i>Average Hospital Case Cost</i> Cost Value : \$5,382.50 Data Source : Planning and Innovation Division, BC Ministry of Health. Data received in March, 2013.</p>
<p>7. <i>Total Costs</i> Total Cost Value: \$3,646 Million</p>	<p><i>Total Costs</i> Total Cost Value: \$3,701 Million Differences in total cost are obtained as a result of:</p> <ol style="list-style-type: none"> a. Differences in mortality numbers which will affect the indirect costs. b. Addition of the direct mortality costs that were excluded in the national report, affecting the total direct costs. c. Differences in hospitalization numbers, length of stay and resource intensity weights which will affect both direct and indirect costs. d. A higher average hospital case cost which will affect both the direct and indirect cost. e. Differences in hospital disability numbers that are a component of the estimated total disability numbers. These differences arise as a result of differences in hospitalization numbers. As a result, both direct and indirect costs are affected.

*Parachute (2015). *The Cost of Injury in Canada*. Parachute: Toronto, ON. Version 2.1 - 23 June 2015.

APPENDIX 2: ICD-10 CODE CLASSIFICATIONS BY CAUSE

Cause	ICD-1- Codes
Unintentional Injuries	
Transport Incidents - Pedestrian	V01 - V09
Transport Incidents - Pedal Cycle	V10 - V19
Transport Incidents - Motor Vehicle	V20 - V29, V40 - V79
Transport Incidents - ATV, Snowmobile	V30 - V39, V86
Transport Incidents - Other	V80 - V85, V87 - V89, V91, V93 - V99
Falls - On the same level	W00 - W01
Falls - From skates, skis, boards, blades	W02
Falls - From furniture	W06 - W08
Falls - In playgrounds	W09
Falls - On stairs	W10
Falls - From ladders/scaffolding	W11 - W12
Falls - Diving	W16
Falls - Other	W03 - W05, W13 - W15, W17 - W19
Drowning	V90, V92, W65 - W74
Fire/Burns	X00 - X19
Unintentional Poisoning	X40 - X49
Struck by/against Sports Equipment	W21
Other Unintentional Injuries	W20, W22 - W64, W75 - W99, X20 - X39, X50, X58, X59
Intentional Injuries	
Suicide/Self-Harm - Poisoning	X60 - X69
Suicide/Self-Harm - Other	X70 - X84
Violence	X85 - X99, Y00 - Y09
Undetermined Intent/Other	Y10 - Y36

Cause	ICD-1- Codes
Struck by thrown, projected, or falling object (e.g., falling tree branch)	W20
Other Exposure to inanimate mechanical forces (e.g., contact with broken glass)	W22-49
Exposure to animate mechanical forces (e.g., bitten or struck by dog)	W50-64
Other accidental threats to breathing (e.g., choking on food)	W75-84
Exposure to electric current, radiation and extreme ambient air temperature and pressure	W85-99
Contact with venomous animals and plants	X20-29
Exposure to forces of nature (e.g., lightning)	X30-39
Overexertion and strenuous or repetitive movements (e.g., lifting heavy objects)	X50
Accidental exposure to other and unspecified factors (e.g., unspecified cause of fracture)	X58 - X59

Data Limitations

The data sources used in this report are largely reliant on existing administrative data. The quality of the data is reliant on the expertise of professional data coders, who must interpret written descriptive information into ICD-10 codes. Some ICD-10 codes may be too broad and in some cases lack specific detail about the injury.

It should be noted that the time period of analysis for the data was selected as 2010 as this was the most recent available year for complete data at the time of analysis.