

ONTARIO REGIONAL INJURY DATA REPORT

Central East

Central West

Eastern

Northern

South West

Toronto

produced by



Ontario Injured Prevention
Resource Centre

housed at



The Ontario Injury Prevention Resource Centre
housed at
Parachute
with the assistance of
Public Health Ontario
a funding partner of the Ontario Injury Prevention Resource Centre
is pleased to present the

Ontario Regional Injury Data Report

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The OIPRC, housed at Parachute, is a resource centre of Public Health Ontario in the Health Promotion, Chronic Disease and Injury Prevention Department.

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The views expressed within this Report are those of the authors and do not necessarily reflect those of the Government of Ontario or the Ministry of Health and Long-Term Care.

¹ Ontario Injury Prevention Resource Centre (2012). *Ontario Injury Data Report*. SMARTRISK: Toronto, ON.

Format of the Ontario Regional Injury Data Report

Due to the amount of data, the Ontario Regional Injury Data Report is not one document, but has been divided into six separate documents corresponding to each region: Northern Ontario (NIPPPN), Eastern Ontario (ERIN), Central East, Toronto, Central West (CWIPPN), and South West (SWIPN). Each regional report is available through the Ontario Injury Prevention Resource Centre's website at www.oninjuryresources.ca.

This summary section provides an overview of the project and important information on methodology and interpretation. At the end of this summary section, readers can find the tables corresponding to this report's region. Additionally, there are Appendices, which include Evidence-Informed Practice Recommendations, based upon the top contributors to injury outcomes in this region. Please note that the regional tables as well as a document containing all Evidence-Informed Practice Recommendations are available for separate download from the OIPRC's website.

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Ontario Regional Injury Data Report summary

Introduction

The Ontario Injury Prevention Resource Centre and Parachute are pleased to present the *Ontario Regional Injury Data Report*.

Injury is the leading cause of death for Canadians 1 to 44 years of age and is the second leading cause of potential years of life lost before the age of 70.² There are also major financial implications of injury in our society. According to the *Economic Burden of Injury in Canada* report released by SMARTRISK in 2009, injuries cost the Ontario economy \$6.8 billion. In addition, there were more than 18,000 deaths in Ontario between the years 2001-2005 due to injury, causing those affected to experience great personal loss.³ This loss of life is tragic and unnecessary; it is commonly held that more than 90% of injuries are preventable.

Injuries have been described as the “invisible epidemic” or as the “neglected disease”, as they occur in great numbers and there is a widespread misconception in society that they are *accidents* which are a part of everyday life.⁴ Accidents have been defined as unavoidable acts of fate. But injuries, even unintentional injuries, are not *accidents*; research shows that injuries are causally related to specific events and risk factors (e.g., gender, social-economic status, age, risk-taking behaviour) and thus, they are predictable and preventable.

Injury can be defined as the physical damage that results when a human body is suddenly or briefly subjected to intolerable levels of energy. The time between exposure to the energy and the appearance of an injury is short. Forms of energy that cause injuries include: thermal energy (e.g., scalds or burns); mechanical energy (e.g., collisions, falls or gashes); electrical energy (e.g., electrical shocks); chemical energy (e.g., poisonings); or the absence of heat or oxygen (e.g., hypothermia or suffocation). External causes of injuries can be classified as intentional (self-harm or assault) or unintentional (motor vehicle collisions, falls, drowning and poisoning when there is no intent to harm). This report includes both intentional and unintentional injury counts and rates. Evidence has indicated that both categories of injury have their own unique risk factors and are receptive to interventions.

The Ontario Injury Data Report

In March of 2012, SMARTRISK (now part of Parachute) released the Ontario Injury Data Report. This report presented the counts and rates of injury-related emergency department visits, hospitalizations and deaths by cause of injury in Ontario as a whole as well as separately for each

2 Statistics Canada (1998).

3 Ontario Injury Resource Centre. (2012). *Ontario Injury Data Report*. SMARTRISK: Toronto, ON.

4 Sattin, R. W., & Corso, P. (2007). *The epidemiology and costs of unintentional and violent injuries*. In L. S. Doll, S. E. Bonzo, J. A. Mercy & D. A. Sleet (Eds.), *Handbook of injury and violence prevention* (pp. 3-20). Atlanta, USA: Springer.

health unit. By providing these counts and rates, communities throughout the province could begin to better understand the most common injury causes throughout the various health units in our province and work to develop and implement evidence-informed strategies tailored to their specific needs. Such initiatives may aid in reducing the occurrence of injury and injury-related deaths in our province.

Purpose of Ontario Regional Injury Data Report

After receiving input from various stakeholders working in the field of injury prevention throughout the province, the OIPRC created the Ontario Regional Injury Data Report. In this report, data originally used in the creation of the Ontario Injury Data Report has been re-worked and presented by region: Northern Ontario (NIPPPN), Eastern Ontario (ERIN), Central East, Toronto, Central West (CWIPPN), and South West (SWIPN)). This will provide consistency to data across regions. It will also allow for the use of common language between regions and promote relationship building among individual health units in each region.

These data identify subgroups within the population who are more vulnerable to or at a higher risk for a particular cause of injury. Consequently, these data will aid injury prevention practitioners in the development and implementation of appropriate health promotion programming and prevention strategies targeting specific injury causes and specific age groups in each region.

In addition to providing data for each of Ontario's regions, this report also includes evidence-informed practice recommendations, which have been included as appendices to this methodology section and are available for individual download. These recommendations have been created based upon the major injury issues within each region and outline the associated evidence-informed practices for each of these top injuries. As such, readers can utilize the provided tables to identify major injury issues within their region and refer to the associated recommendation sections to investigate potential programming initiatives that could be applied. In order to highlight the top injury issues within each region, the next sections of this report provide tables summarizing the top five injuries resulting in emergency room visits, hospitalizations and deaths for each region. It is important to note that the evidence-informed practice recommendations are not exhaustive lists of all potential programming initiatives, but do provide in-depth overviews of potential practices which have been reviewed by experts in the field. Readers may utilize these sections as initial supports for programming development, but are also encouraged to do further research based upon the the information presented.

Overall, this report will assist health units to identify and set priorities by region, and will assist them in meeting the fundamental standards and accountability agreements for injury prevention. With access to information on injury in other areas of Ontario, regional networks can better connect within their own region and between regions, to share knowledge and promote effective strategies together aimed at reducing the burden of injury in our society.

Findings - Central East Region

The report illustrates that in the Central East Region the top five injuries resulting in emergency room visits, hospitalizations and deaths were as follows:

Table CE-1

Top five mechanisms of injury resulting in the largest proportion of injury related **emergency room visits**,
Central East Region, fiscal year 2007-2009

Cause of Injury	Visits
Falls	188,315
Inanimate	175,829
Sports and Recreation	83,519
Animate	40,135
On Road	37,851

Table CE-2

Top five mechanisms of injury resulting in the largest proportion of injury related **hospitalizations**,
Central East Region, fiscal year 2007-2009

Cause of Injury	Hospitalizations
Falls	15,811
On Road	2,070
Self-Harm/Suicide	2,047
Inanimate	1,931
Sports and Recreation	1,354

Table CE-3

Top five mechanisms of injury resulting in the largest proportion of injury related **deaths**,
Central East Region, calendar year 2001-2005

Cause of Injury	Deaths
Falls	1,036
Self-Harm/Suicide	1,022
On Road	832
Poisoning	312
Interpersonal	166

The numbers above identify the most common injuries within the Central East Region and highlight potential areas in which public health practitioners, policy makers and researchers can focus their attention and efforts. Considering emergency room visits, hospitalizations and deaths, the most common types of injuries in this region are related to: falls, sports and recreation, on-road vehicles, self-harm/suicide, poisoning and interpersonal violence. Evidence-informed practice recommendations related to each type of injury can be found in the appendix.

Findings - Central West Region

The report illustrates that in the Central West Region the top five injuries resulting in emergency room visits, hospitalizations and deaths were as follows:

Table CWIPPN-1

Top five mechanisms of injury resulting in the largest proportion of injury related **emergency room visits**, Central West Region, fiscal year 2007-2009

Cause of Injury	Visits
Falls	149,693
Inanimate	145,478
Sports and Recreation	65,266
Animate	37,035
On Road	26,691

Table CWIPPN-2

Top five mechanisms of injury resulting in the largest proportion of injury related **hospitalizations**, Central West Region, fiscal year 2007-2009

Cause of Injury	Hospitalizations
Falls	15,444
Inanimate	1,949
On Road	1,894
Self-Harm/Suicide	1,859
Sports and Recreation	1,194

Table CWIPPN-3

Top five mechanisms of injury resulting in the largest proportion of injury related **deaths**,
 Central West Region, calendar year 2001-2005

Cause of Injury	Deaths
Falls	1,028
Self-Harm/Suicide	939
On Road	634
Poisoning	313
Suffocation	115

The numbers above identify the most common injuries within the Central West Region and highlight potential areas in which public health practitioners, policy makers and researchers can focus their attention and efforts. Considering emergency room visits, hospitalizations and deaths, the most common types of injuries in this region are related to: falls, sports and recreation, on-road vehicles, self-harm/suicide, poisoning and suffocation. Evidence-informed practice recommendations related to each type of injury can be found in the appendix.

Findings - Eastern Ontario Region

The report illustrates that in the Eastern Region the top five injuries resulting in emergency room visits, hospitalizations and deaths were as follows:

Table ERIN-1

Top five mechanisms of injury resulting in the largest proportion of injury related **emergency room visits**, Eastern Ontario Region, fiscal year 2007-2009

Cause of Injury	Visits
Falls	109,997
Inanimate	100,218
Sports and Recreation	53,087
Animate	27,552
On Road	17,241

Table ERIN-2

Top five mechanisms of injury resulting in the largest proportion of injury related **hospitalizations**, Eastern Ontario Region, fiscal year 2007-2009

Cause of Injury	Hospitalizations
Falls	10,286
Self-Harm/Suicide	1,176
On Road	1,115
Inanimate	1,092
Sports and Recreation	888

Table ERIN-3

Top five mechanisms of injury resulting in the largest proportion of injury related **deaths**,
Eastern Ontario Region, calendar year 2001-2005

Cause of Injury	Deaths
Self-Harm/Suicide	699
Falls	569
On Road	447
Poisoning	213
Suffocation	94

The numbers above identify the most common injuries within the Eastern Ontario region and highlight potential areas in which public health practitioners, policy makers and researchers can focus their attention and efforts. Considering emergency room visits, hospitalizations and deaths, the most common types of injuries in this region are related to: falls, sports and recreation, on-road vehicles, self-harm/suicide, poisoning and suffocation. Evidence-informed practice recommendations related to each type of injury can be found in the appendix.

Findings - Northern Region

The report illustrates that in the Northern Region the top five injuries resulting in emergency room visits, hospitalizations and deaths were as follows:

Table NIPPN-1

Top five mechanisms of injury resulting in the largest proportion of injury related **emergency room visits**, Northern Region, fiscal year 2007-2009

Cause of Injury	Visits
Inanimate	71,755
Falls	67,852
Sports and Recreation	32,245
Animate	15,854
On Road	11,497

Table NIPPN-2

Top five mechanisms of injury resulting in the largest proportion of injury related **hospitalizations**, Northern Region, fiscal year 2007-2009

Cause of Injury	Hospitalizations
Falls	6,524
Self-Harm/Suicide	1,493
Inanimate	1,079
On Road	730
Poisoning	713

Table NIPPN-3

Top five mechanisms of injury resulting in the largest proportion of injury related **deaths**,
Northern Region, calendar year 2001-2005

Cause of Injury	Deaths
Self-Harm/Suicide	590
On-Road	344
Falls	337
Poisoning	174
Off-Road	109

The numbers above identify the most common injuries within the Northern Region and highlight potential areas in which public health practitioners, policy makers and researchers can focus their attention and efforts. Considering emergency room visits, hospitalizations and deaths, the most common types of injuries in this region are related to: falls, sports and recreation, on-road vehicles, self-harm/suicide, poisoning and off-road vehicles. Evidence-informed practice recommendations related to each type of injury can be found in the appendix.

Findings - South West Region

The report illustrates that in the South West Region the top five injuries resulting in emergency room visits, hospitalizations and deaths were as follows:

Table SWIPN-1

Top five mechanisms of injury resulting in the largest proportion of injury related **emergency room visits**, South West Region, fiscal year 2007-2009

Cause of Injury	Visits
Inanimate	116,141
Falls	111,699
Sports and Recreation	50,386
Animate	30,780
On Road	18,993

Table SWIPN-2

Top five mechanisms of injury resulting in the largest proportion of injury related **hospitalizations**, South West Region, fiscal year 2007-2009

Cause of Injury	Hospitalizations
Falls	10,291
Inanimate	1,397
On Road	1,397
Self-Harm/Suicide	1,068
Poisoning	762

Table SWIPN-3

Top five mechanisms of injury resulting in the largest proportion of injury related **deaths**,
 South West Region, calendar year 2001-2005

Cause of Injury	Deaths
On Road	704
Self-Harm/Suicide	693
Falls	645
Poisoning	196
Pedestrian	95

The numbers above identify the most common injuries within the South West Region and highlight potential areas in which public health practitioners, policy makers and researchers can focus their attention and efforts. Considering emergency room visits, hospitalizations and deaths, the most common types of injuries in this region are related to: falls, sports and recreation, on-road vehicles, self-harm/suicide, poisoning and pedestrian incidents. Evidence-informed practice recommendations related to each type of injury can be found in the appendix.

Findings - Toronto Region

The report illustrates that in the Toronto region the top five injuries resulting in emergency room visits, hospitalizations and deaths were as follows:

Table TOR-1

Top five mechanisms of injury resulting in the largest proportion of injury related **emergency room visits**,
Toronto, fiscal year 2007-2009

Cause of Injury	Visits
Falls	127,770
Inanimate	100,112
Sports and Recreation	39,530
Animate	19,507
On Road	18,950

Table TOR-2

Top five mechanisms of injury resulting in the largest proportion of injury related **hospitalizations**,
Toronto, fiscal year 2007-2009

Cause of Injury	Hospitalizations
Falls	13,779
Inanimate	1,538
Self-Harm/Suicide	1,254
Interpersonal	950
On Road	920

Table TOR-3

Top five mechanisms of injury resulting in the largest proportion of injury related **deaths**,
 Toronto, calendar year 2001-2005

Cause of Injury	Deaths
Self-Harm/Suicide	1,080
Falls	1,045
Poisoning	371
On Road	324
Interpersonal	277

The numbers above identify the most common injuries within the Toronto region and highlight potential areas in which public health practitioners, policy makers and researchers can focus their attention and efforts. Considering emergency room visits, hospitalizations and deaths, the most common types of injuries in this region are related to: falls, sports and recreation, on-road vehicles, self-harm/suicide, poisoning and interpersonal violence. Evidence-informed practice recommendations related to each type of injury can be found in the appendix.

Information about the OIPRC

The Ontario Injury Prevention Resource Centre (OIPRC), housed at Parachute, is a resource centre of Public Health Ontario in the Health Promotion, Chronic Disease and Injury Prevention Department.

The OIPRC has several objectives:

- To increase the knowledge, skill and confidence of injury prevention practitioners in the planning, implementation and evaluation of injury prevention initiatives in Ontario.
- To provide relevant and timely training for practitioners equitably across the province, to meet the needs of the priority populations identified.
- To provide communication, information and knowledge exchange services.
- To provide customized data information and assistance, using the most current information available.
- To engage key stakeholders to advance injury prevention and increase clients' awareness, understanding and access to appropriate injury prevention services and resources.

This report aims to provide Ontario regions with data that increases knowledge of injury rates, and facilitates communication and collaboration between practitioners. In addition, it provides information on evidence-informed practices related to specific injury topics. Best practice information is also available through the OIPRC's website. For more information about the OIPRC, please see our website at www.oninjuryresources.ca.

Reading the Ontario Regional Injury Data Report

Various definitions, timeframes and abbreviations have been used when developing this report, which are outlined below. Please note that these definitions have not changed since the release of the original Ontario Injury Data Report.

Definitions

Three injury outcomes have been isolated within this report:

Hospitalizations

These cases represent the total number of hospital separations from selected causes of injury.

Emergency Room Visits (ER)

These cases represent the total number of Emergency Department visits from selected causes of injury.

Deaths

These cases represent the total number of deaths each from selected causes of injury.

Data years reported

The data presented in the report were extracted from the most recent years for hospitalizations, emergency room visits, and deaths available from IntelliHEALTH at the time of extraction.

Hospitalizations and emergency room visits

All data for hospitalizations and emergency room visits cover fiscal years 2007/2008 and 2008/2009 and therefore represent two fiscal years, from the period of April 1, 2007 to March 31, 2009. In the tables, this is represented as FY 2007-2009.

Deaths

All data for deaths cover calendar years 2001-2005 and therefore represent five calendar years. In the tables, this is represented as CY 2001-2005.

Reading the tables

Please note that when tables contain blanks, this indicates that there were no injuries for this category. Blanks have been used to ensure easy readability of the tables.

All rates are rounded to one decimal place. Any rates below .05 are reported as "<.1".

The instances where injury counts that were less than five have been suppressed in order to avoid residual disclosure and thus comply with IntelliHEALTH release guidelines, are represented by "<5". Any rates associated with these suppressed cell counts are represented by "/".

It should be noted that for some regions tables contain very little data. In these instances we have not removed the tables and have left it up to the individual users to decide the utility of the tables.

Regional network breakdown

In the tables, abbreviations have been used to refer to regions in Ontario. Below we have included a list of the individual health units that make up each region.

Central East Region (CE)

Peel Public Health
York Region Public Health
Durham Region Public Health
Peterborough County-City Health Unit
Simcoe Muskoka District Health Unit
Haliburton, Kawartha, Pine Ridge District Health Unit

Central West Region (CWIPPN)

Haldimand-Norfolk Health Unit
Brant County Health Unit

Niagara Region Public Health
Wellington-Dufferin-Guelph Public Health
Hamilton Public Health
Waterloo Public Health
Halton Region Public Health

Eastern Region (ERIN)

Renfrew County and District Health Unit
Hastings and Prince Edward Counties Health Unit
Kingston, Frontenac and Lennox & Addington Public Health
Leeds, Grenville and Lanark District Health Unit
Eastern Ontario Health Unit
Ottawa Public Health

Northern (NIPPN)

Northwestern Health Unit
Thunder Bay District Health Unit
Porcupine Health Unit
Sudbury District Health Unit
Timiskaming Health Unit
Algoma Public Health
North Bay Parry Sound District Health Unit

South West (SWIPN)

Windsor-Essex County Health Unit
Chatham-Kent Public Health Unit
Elgin St. Thomas Public Health
Lambton Community Health
Middlesex-London Health Unit
Oxford County Public Health
Huron County Health Unit
Grey Bruce Health Unit
Perth District Health Unit

Toronto (TOR)

Toronto Public Health

Reading the Evidence Informed Practice Recommendations

Please note that the Evidence-Informed Practice Recommendations that accompany this report are only a list of the practices corresponding to the top injury issues within the region of focus. A document containing all recommendations compiled for the *Ontario Regional Injury Data Report*, is available separately for download on the OIPRC's website. Readers are encouraged to obtain the sections that are most relevant to their work, beyond the practices that correspond to the top injury issues within their region.

Please note these recommendations are not meant to be exhaustive lists of all potential programming initiatives for the associated injury categories. Instead, they represent initial research and overviews of practices that may prove useful for public health practitioners and have been supported by evidence. These recommendations have been reviewed by experts within the associated injury fields, but readers are still encouraged to conduct further research and environmental scans in order to ensure that the practices they implement represent the most relevant initiatives for their regions and communities.

Methodology

The data used in the preparation of this report is the same data that was used to produce the Ontario Injury Data Report, released in March 2012 by SMARTRISK. Therefore, the methodology has not changed and is described below, or also on pages 6 through 12 of the Ontario Injury Data Report which is available through the OIPRC’s website.

Data processing for regional report

As previously mentioned, data for the regional report were prepared by re-working the original data report and presenting it according to region, as opposed to individual health unit. Information on these data extraction processes can be found in the original methodology section from the Ontario Injury Data Report, which is available on the OIPRC’s website. In order to combine the data into regional tables, the original tables from the Ontario Injury Data Report were exported to Excel and combined using functions available in that program, after which the combined tables were transitioned into the format that they appear in this report.

Population, estimate data

To calculate injury rates, single year of age population, at the municipal and county level (Statistics Canada, IntelliHEALTH ONTARIO) were used to provide regional and PHU denominators. As there is no provision to extract fiscal year population projection, calendar year population projection data was extracted and used to calculate rates. Following extraction, the population counts were grouped according to the required age groups for each table.

The following formula was used to calculate rates:

$$\frac{\text{total number of ER visits / hospitalizations / deaths in an age group over the reported period}}{\text{total population in that age group over the reported period}} \times 100,000$$

Please note that using this formula the report provides age-specific annual rates per 100,000.

Data processing

As required to minimize processing time, the data were extracted either in complete ICD10 code group and year, or were requested in smaller parcels either by ICD10 codes or by year. Those files were transferred to an Excel file, manually reviewed to ensure there was no truncation of the records at the end and later transferred to SPSS. If files needed to be merged it was done at this stage using SPSS script. Output of the SPSS scripts were transferred to Excel and were then input into the final tables.

ICD10 codes used

Drowning:	W65-W74, V90.0-V90.9, V92.0-V92.9
Animate Object:	W50-W64, X20-X29
Inanimate Object:	W20, W22-W49, W85-W99, X33
Falls:	W00-W19 (LC – 58 was used for death)
Off Road Vehicle :	V81.0 – V81.9, V86.0 – V86.7, V86.9, V90-V94, V95.0 – V95.3, V95.8 – V96.2, V96.8 – V97.3, V97.8
On Road Vehicle:	V20-V29, V30-V39, V40-V49, V50-V59, V60-V69, V70 – V79, V83-V85.9, V87-V89.9
Pedal Cyclist:	V10- V10.5, V10.9-V11.5, V11.9-V12.5, V12.9-V13.5, V13.9-V14.5, V14.9-V15.5, V15.9-V16.5, V16.9-V17.5, V17.9-V18.5, V18.9 - V19.6, V19.8 - V19.9
Pedestrians:	V01.0-V01.1, V01.9-V02.1, V02.9-V03.1, V03.9-V04.1, V04.9-V05.1, V05.9-V06.1, V06.9, V09.0-V09.3, V09.9
Playground:	W09
Poisoning:	X40-X49
Scalding/Burning:	W92, X00-X09, X10-X19, X30, X32
Sports/recreation:	W02, W16, W21, X50, X51
Suffocation:	W75-W84
Interpersonal (intentional):	X85-Y09
Self-harm (Intentional):	X60-X84

Falls

Fall on same level from slipping, tripping and stumbling:	W01
Fall on same level involving ice and snow:	W00
Fall involving playground equipment:	W09
Fall on and from stairs and steps:	W10
Fall involving bed:	W06
Fall involving chair:	W07
Fall involving other furniture:	W08
Fall from tree:	W14
Fall from, out of or through building or structure:	W13
Fall involving ice-skates, skis, roller-skates or skateboards:	W02
Fall while being carried or supported by other persons:	W04

Other fall

(Please note that in the report these are specified as “other/unspecified” in tables 3 and 4)

Other fall on same level due to collision with, or pushing by, another person:	W03
Fall involving wheelchair:	W05
Fall on and from ladder:	W11
Fall on and from scaffolding:	W12
Fall from cliff:	W15
Diving or jumping into water causing injury other than drowning or submersion:	W16
Other fall from one level to another:	W17
Other fall on same level:	W18
Unspecified fall:	W19

Falls location of injury

Head:	S00-S09
Neck:	S10-S19
Thorax:	S20-S29
Abdomen, lower back, lumber spine and pelvis:	S30-S39
Shoulder and upper arm:	S40-S49
Elbow and forearm:	S50-S59
Wrist and hand:	S60-S69
Hip and thigh:	S70-S79
Knee and lower leg:	S80-S89
Ankle and foot:	S90-S99

Motor Vehicle Collisions (On Road)

Motorcycle:	V20-V29
Car:	V40-V49
Pickup truck/ van:	V50-V59
Heavy transport:	V60-V69
Bus:	V70-V79
Motor Vehicle Collision on Road Other:	V30-V39, V830-V859, V870-V899

Motor Vehicle Collisions (Off Road)

Rail:	V81
ATV:	V86
Water:	V90-V94
Air/space:	V95-V97

Sports and recreation

Fall involving ice-skates, skis, roller-skates or skateboards:	W02
Diving or jumping into water causing injury other than drowning or submersion:	W16
Striking against or struck by sports equipment:	W21
Over exertion:	X50
Travel and motion:	X51

Intentional injury

Firearm:	X93, X94, X95
Sharp or blunt object:	X99, Y00
Bodily force (unarmed):	Y04
Sexual assault by bodily force:	Y05
Drugs medicaments:	X85
Hanging, strangulation and suffocation:	X91

Intentional injury other

(Please note that in the report these are specified as "other" in tables 12 and 13)

Assault by corrosive substance	X86
Assault by pesticides	X87
Assault by gases and vapors	X88
Assault by other specified chemicals and noxious substances	X89
Assault by unspecified chemical or noxious substance	X90
Assault by drowning and submersion	X92
Assault by explosive material	X96
Assault by smoke, fire and flames	X97
Assault by steam, hot vapors and hot objects	X98
Assault by pushing from high place	Y01

Assault by pushing or placing victim before moving object	Y02
Assault by crashing of motor vehicle	Y03
Neglect and abandonment	Y06
Other maltreatment	Y07
Assault by other specified means	Y08
Assault by unspecified means	Y09

Intentional self-harm

Poisoning:	X60- X69
Firearm:	X72, X73, X74
Hanging, Strangulation, and Suffocation:	X70
Sharp or blunt object:	X78, X79
Jumping or lying before moving object:	X80, X81

Intentional self-harm other

(Please note that in the report these are specified as “other” in table 14 and 15)

Intentional self-harm by drowning and submersion	X71
Intentional self-harm by explosive material	X75
Intentional self-harm by smoke, fire and flames	X76
Intentional self-harm by steam, hot vapors and hot objects	X77
Intentional self-harm by crashing of motor vehicle	X82
Intentional self-harm by other specified means	X83
Intentional self-harm by unspecified means	X84

Quality assurance

A robust checking process was implemented to ensure that accurate data have been presented in each table. This process included manual entry of each value and then systematic checking to compare the inputted value with the original value. Finally, random checks were performed on each of the tables.

Provincial totals vs. regional totals

In the injury data available some cases were not assigned to a particular health unit, but were instead indicated as having an “unknown” geographic location. These cases were included in the Ontario tables, but do not appear in any individual health unit table. These cases may therefore cause discrepancies between the regional table totals and provincial table totals.

Residual disclosure

Residual disclosure occurs when previously unknown information about an individual can be deduced based on a combination of information sources. To avoid residual disclosure of personal health information, the IntelliHEALTH release guidelines require that in a data table all cells of injury counts less than five should be suppressed. Thus, in keeping with common Canadian practices and in compliance with these release guidelines, in the report tables all cell counts less than five (but greater than zero) have been replaced with “<5”, and their associated rates with “/”.

Points for clarification

The authors of this report would like to clarify the following:

1. Rates presented within tables are not age standardized frequencies.
2. These data represent patient discharge data.

ONTARIO REGIONAL INJURY DATA REPORT

South West data tables

This section of the *Ontario Regional Injury Data Report* provides data on a single provincial region. Consult the Summary section for information on the methodology used to generate the reported data, as well as guidance on interpretation and publication details. Sections for other regions can be obtained at www.oninjuryresources.ca.

For table cells where injury counts were less than 5, the actual count value has been replaced with “<5”, and the rate with “/”, to mitigate issues of residual disclosure.

* Please note that sport related falls are included in both the fall related injuries and sport related injuries categories. Additionally, the injury category “diving or jumping into water” (ICD-10 code W16) has been also been included in both the fall related injuries and sport related injuries categories. Also, playground injuries have been included as an isolated category as well as in the fall related injuries category. To avoid double counting, the column totals and table totals in tables 1 and 2 reflect including these counts and rates only once. Any discrepancies in these totals are due to this.

SWIPPN 1 - INJURIES: ER Visits and Hospital Visits by Cause and Age Group (FY 2007-2009)

Number and Age-Specific Rate per 100,000

AGE GROUP

INJURY	OUTCOME	0-4	5-9	10-14	15-19	20-24	25-34	35-44	45-54	55-59	60-64	65-69	70-74	75-79	80+	TOTAL
Drowning	ER	21 4.8	9 1.8	16 2.9	7 1.3	12 2.2	11 1.1	13 1.1	11 1.0	<5 /	8 2.3	5 1.7	<5 /	<5 /	<5 /	124 1.6
	Hosp	8 1.8	<5 /	5 .9	<5 /	<5 /	<5 /	<5 /	<5 /	<5 /	<5 /	<5 /	<5 /	<5 /	<5 /	<5 /
Animate	ER	2,195 505.7	2,471 494.1	4,738 867.8	5,390 962.4	2,378 443.8	3,453 343.6	2,975 243.4	2,913 259.8	1,142 254.1	958 269.7	696 231.4	545 197.8	451 193.7	475 165.5	30,780 393.3
	Hosp	13 3.0	23 4.6	45 8.2	90 16.1	33 6.2	56 5.6	43 3.5	42 3.8	19 4.2	16 4.5	12 4.0	7 2.5	6 2.6	14 4.9	419 5.4
Inanimate	ER	6,918 1593.7	5,970 1193.8	8,380 1534.9	12,956 2313.3	12,484 2329.8	18,858 1876.5	17,205 1407.9	15,673 1397.8	5,536 1231.6	4,022 1132.2	2,639 877.3	1,929 700.1	1,587 681.5	1,984 691.3	116,141 1484.2
	Hosp	77 17.7	54 10.8	79 14.5	108 19.3	99 18.5	172 17.1	184 15.1	191 17.0	63 14.0	78 22.0	63 20.9	48 17.4	65 27.9	116 40.4	1,397 17.9
Falls	ER	10,178 2344.7	7,751 1549.9	10,246 1876.7	7,661 1367.9	5,864 1094.3	8,982 893.8	9,883 808.7	12,073 1076.8	5,704 1269.0	5,106 1437.3	4,362 1450.0	4,498 1632.5	5,209 2237.0	14,182 4941.9	111,699 1427.4
	Hosp	205 47.2	244 48.8	162 29.7	154 27.5	154 28.7	291 29.0	409 33.5	729 65.0	505 112.4	578 162.7	630 209.4	807 292.9	1,125 483.1	4,298 1497.7	10,291 131.5
Off-Road	ER	32 7.4	164 32.8	438 80.2	742 132.5	557 104.0	610 60.7	551 45.1	356 31.8	77 17.1	61 17.2	28 9.3	20 7.3	20 8.6	16 5.6	3,672 46.9
	Hosp	<5 /	9 1.8	31 5.7	72 12.9	47 8.8	56 5.6	46 3.8	48 4.3	13 2.9	<5 /	<5 /	<5 /	5 2.2	<5 /	343 4.4
Pedal Cyclist	ER	217 50.0	992 198.4	1,910 349.8	1,301 232.3	657 122.6	659 65.6	694 56.8	709 63.2	249 55.4	137 38.6	111 36.9	56 20.3	57 24.5	42 14.6	7,791 99.6
	Hosp	6 1.4	34 6.8	60 11.0	37 6.6	17 3.2	30 3.0	37 3.0	58 5.2	28 6.2	10 2.8	19 6.3	8 2.9	10 4.3	9 3.1	363 4.6
Pedestrian	ER	50 11.5	64 12.8	114 20.9	249 44.5	191 35.6	193 19.2	163 13.3	193 17.2	62 13.8	61 17.2	50 16.6	36 13.1	35 15.0	50 17.4	1,511 19.3
	Hosp	5 1.2	5 1.0	14 2.6	28 5.0	11 2.1	22 2.2	16 1.3	22 2.0	14 3.1	10 2.8	6 2.0	7 2.5	9 3.9	16 5.6	185 2.4
Playground	ER	666 153.4	1,397 279.3	613 112.3	101 18.0	30 5.6	35 3.5	21 1.7	7 .6	7 1.6	<5 /	<5 /	<5 /	<5 /	<5 /	2,887 36.9
	Hosp	32 7.4	89 17.8	19 3.5	6 1.1	<5 /	<5 /	<5 /	<5 /	<5 /	<5 /	<5 /	<5 /	<5 /	<5 /	150 1.9
Poisoning	ER	912 210.1	149 29.8	215 39.4	585 104.5	553 103.2	912 90.8	889 72.8	825 73.6	308 68.5	197 55.5	148 49.2	139 50.5	122 52.4	184 64.1	6,138 78.4
	Hosp	48 11.1	5 1.0	12 2.2	42 7.5	32 6.0	72 7.2	80 6.6	120 10.7	60 13.4	55 15.5	54 18.0	50 18.2	47 20.2	85 29.6	762 9.7
Road MV	ER	249 57.4	393 78.6	613 112.3	2,438 435.3	2,577 480.9	3,371 335.4	3,043 249.0	2,850 254.2	1,047 232.9	675 190.0	508 168.9	405 147.0	342 146.9	482 168.0	18,993 242.7
	Hosp	14 3.2	17 3.4	35 6.4	151 27.0	155 28.9	187 18.6	203 16.6	232 20.7	91 20.2	58 16.3	52 17.3	45 16.3	70 30.1	87 30.3	1,397 17.9
Scald/ burn	ER	782 180.2	241 48.2	302 55.3	786 140.3	684 127.7	979 97.4	847 69.3	861 76.8	301 67.0	169 47.6	150 49.9	95 34.5	76 32.6	118 41.1	6,391 81.7
	Hosp	28 6.5	6 1.2	5 .9	5 .9	17 3.2	10 1.0	15 1.2	34 3.0	11 2.5	9 2.5	9 3.0	17 6.2	6 2.6	9 3.1	181 2.3
Sports	ER	1,138 262.2	2,266 453.1	7,945 1455.2	7,552 1348.4	5,215 973.2	8,110 807.0	7,337 600.4	5,750 512.8	1,729 384.7	1,164 327.7	706 234.7	526 190.9	416 178.7	532 185.4	50,386 643.9
	Hosp	7 1.6	31 6.2	85 15.6	92 16.4	51 9.5	86 8.6	96 7.9	85 7.6	41 9.1	29 8.2	27 9.0	24 8.7	40 17.2	37 12.9	731 9.3
Suffocation	ER	29 6.7	9 1.8	11 2.0	5 .9	<5 /	13 1.3	13 1.1	14 1.3	12 2.7	9 2.5	17 5.7	9 3.3	10 4.3	26 9.1	181 2.3
	Hosp	10 2.3	<5 /	<5 /	<5 /	<5 /	<5 /	5 .4	7 .6	7 1.6	11 3.1	10 3.3	12 4.4	20 8.6	39 13.6	129 1.7
Inter-personal	ER	53 12.2	101 20.2	572 104.8	2,504 447.1	2,522 470.7	2,367 235.5	1,594 130.4	995 88.7	174 38.7	69 19.4	39 13.0	28 10.2	19 8.2	28 9.8	11,065 141.4
	Hosp	28 6.5	<5 /	14 2.6	87 15.5	127 23.7	113 11.2	98 8.0	70 6.2	14 3.1	6 1.7	5 1.7	6 2.2	<5 /	<5 /	576 7.4
Self-Harm	ER	<5 /	<5 /	114 20.9	634 113.2	489 91.3	659 65.6	696 57.0	599 53.4	154 34.3	72 20.3	40 13.3	21 7.6	12 5.2	21 7.3	3,516 44.9
	Hosp	<5 /	<5 /	26 4.8	163 29.1	89 16.6	167 16.6	224 18.3	230 20.5	69 15.4	36 10.1	22 7.3	17 6.2	9 3.9	15 5.2	1,068 13.7
TOTAL	ER	22,682 5225.3	19,940 3987.2	33,568 6148.4	41,348 7382.7	33,500 6251.7	48,615 4837.4	45,496 3722.9	43,518 3881.2	16,400 3648.5	12,634 3556.5	9,454 3142.7	8,287 3007.6	8,347 3584.5	18,128 6316.9	361,917 4625.0
	Hosp	412 94.9	523 104.6	594 108.8	1,035 184.8	838 156.4	1,267 126.1	1,460 119.5	1,869 166.7	936 208.2	900 253.4	913 303.5	1,052 381.8	1,419 609.4	4,730 1648.2	18,020 230.3

SWIPPN 2 - INJURIES: Deaths by Cause and Age Group (CY 2001-2005)

Number and Age-Specific Rate per 100,000

AGE GROUP

INJURY	0-4	5-9	10-14	15-19	20-24	25-34	35-44	45-54	55-59	60-64	65-69	70-74	75-79	80+	TOTAL
Drowning	7 1.6	6 1.2	<5 /	<5 /	6 1.1	<5 /	14 1.2	10 .9	<5 /	<5 /	5 1.7	<5 /	<5 /	<5 /	71 .9
Animate		<5 /						<5 /	<5 /	<5 /		<5 /			5 .1
Inanimate		<5 /						<5 /	<5 /	<5 /		<5 /			5 .1
Falls				<5 /	6 1.1	<5 /	10 .8	19 1.7	19 4.2	21 5.9	27 9.0	36 13.1	98 42.1	404 140.8	645 8.2
Off-Road		<5 /	<5 /	<5 /	6 1.1	8 .8	13 1.1	14 1.3		<5 /	<5 /	<5 /		<5 /	53 .7
Pedal Cyclist			<5 /	<5 /	<5 /	<5 /	<5 /	<5 /	<5 /		<5 /		<5 /	<5 /	20 .3
Pedestrian	5 1.2	<5 /	<5 /	8 1.4	10 1.9	<5 /	13 1.1	7 .6	7 1.6	9 2.5	<5 /	5 1.8	6 2.6	12 4.2	95 1.2
Playground															
Poisoning			<5 /	<5 /	15 2.8	37 3.7	55 4.5	49 4.4	11 2.5	8 2.3	<5 /	<5 /	6 2.6	6 2.1	196 2.5
Road MV	<5 /	9 1.8	21 3.9	101 18.0	76 14.2	95 9.5	116 9.5	91 8.1	24 5.3	33 9.3	27 9.0	28 10.2	21 9.0	58 20.2	704 9.0
Scald/ burn	6 1.4	<5 /			<5 /	<5 /	7 .6	5 .5	<5 /	<5 /	<5 /	<5 /	6 2.6	5 1.7	50 .6
Sports				<5 /										<5 /	<5 /
Suffocation	<5 /	<5 /	<5 /	<5 /		<5 /	8 .7	<5 /	8 1.8	7 2.0	5 1.7	6 2.2	11 4.7	29 10.1	92 1.2
Inter-personal	8 1.8	<5 /	<5 /	6 1.1	9 1.7	15 1.5	20 1.6	12 1.1	<5 /	<5 /	<5 /	<5 /	<5 /	<5 /	87 1.1
Self-Harm			6 1.1	25 4.5	46 8.6	108 10.8	154 12.6	170 15.2	40 8.9	31 8.7	34 11.3	33 12.0	20 8.6	26 9.1	693 8.9
TOTAL	34 7.8	29 5.8	42 7.7	155 27.7	180 33.6	282 28.1	413 33.8	386 34.4	120 26.7	120 33.8	114 37.9	122 44.3	173 74.3	546 190.3	2,716 34.7

SWIPPN 3 - FALLS: ER Visits and Hospital Visits by Cause and Age Group (FY 2007-2009)

Number and Age-Specific Rate per 100,000

AGE GROUP

CAUSE	OUTCOME	0-4	5-9	10-14	15-19	20-24	25-34	35-44	45-54	55-59	60-64	65-69	70-74	75-79	80+	TOTAL
Slip/trip on same level (general)	ER	1,838 423.4	1,601 320.1	2,472 452.8	1,862 332.5	1,510 281.8	2,455 244.3	2,666 218.2	3,689 329.0	1,798 400.0	1,666 469.0	1,511 502.3	1,616 586.5	1,993 855.9	5,453 1900.2	32,130 410.6
	Hosp	23 5.3	30 6.0	21 3.9	23 4.1	25 4.7	55 5.5	71 5.8	197 17.6	141 31.4	169 47.6	212 70.5	244 88.6	422 181.2	1,531 533.5	3,164 40.4
Slip/trip on same level (ice/snow)	ER	45 10.4	346 69.2	683 125.1	474 84.6	517 96.5	884 88.0	1,190 97.4	1,509 134.6	721 160.4	671 188.9	503 167.2	442 160.4	370 158.9	454 158.2	8,809 112.6
	Hosp		<5 /	7 1.3	15 2.7	15 2.8	43 4.3	58 4.8	99 8.8	51 11.4	54 15.2	50 16.6	54 19.6	57 24.5	83 28.9	589 7.5
Fall from playground equipment	ER	666 153.4	1,397 279.3	613 112.3	101 18.0	30 5.6	35 3.5	21 1.7	7 .6	7 1.6	<5 /	<5 /	<5 /	<5 /	<5 /	2,887 36.9
	Hosp	32 7.4	89 17.8	19 3.5	6 1.1	<5 /	<5 /	<5 /	<5 /	<5 /	<5 /	<5 /	<5 /	<5 /	<5 /	150 1.9
Stairs/steps	ER	1,294 298.1	432 86.4	541 99.1	974 173.9	1,050 196.0	1,812 180.3	1,911 156.4	2,082 185.7	834 185.5	707 199.0	538 178.8	563 204.3	582 249.9	1,020 355.4	14,340 183.3
	Hosp	16 3.7	7 1.4	<5 /	11 2.0	19 3.6	39 3.9	57 4.7	114 10.2	67 14.9	93 26.2	68 22.6	98 35.6	108 46.4	230 80.2	931 11.9
Bed	ER	918 211.5	290 58.0	85 15.6	55 9.8	30 5.6	40 4.0	51 4.2	97 8.7	70 15.6	70 19.7	82 27.3	84 30.5	136 58.4	672 234.2	2,680 34.3
	Hosp	25 5.8	12 2.4	<5 /	<5 /	<5 /	<5 /	<5 /	10 .9	11 2.5	16 4.5	17 5.7	33 12.0	47 20.2	234 81.5	414 5.3
Chair	ER	769 177.2	185 37.0	83 15.2	50 8.9	42 7.8	81 8.1	121 9.9	143 12.8	110 24.5	81 22.8	75 24.9	94 34.1	125 53.7	303 105.6	2,262 28.9
	Hosp	9 2.1	7 1.4			<5 /	<5 /	8 .7	8 1.8	8 2.0	7 2.0	6 2.0	10 3.6	24 10.3	102 35.5	185 2.4
Other furniture	ER	889 204.8	183 36.6	55 10.1	27 4.8	33 6.2	41 4.1	36 3.0	68 6.1	24 5.3	25 7.0	24 8.0	30 10.9	29 12.5	75 26.1	1,539 19.7
	Hosp	23 5.3	6 1.2	<5 /	<5 /	<5 /	5 .5	<5 /	<5 /	<5 /	<5 /	7 2.3	5 1.8	9 3.9	12 4.2	74 1.0
Fall from tree	ER	15 3.5	146 29.2	106 19.4	26 4.6	21 3.9	37 3.7	30 2.5	21 1.9	12 2.7	7 2.0	5 1.7	<5 /	<5 /	<5 /	434 5.6
	Hosp	<5 /	12 2.4	7 1.3			<5 /	<5 /	<5 /	<5 /	<5 /	<5 /	<5 /	<5 /	<5 /	37 .5
From building or structure	ER	46 10.6	51 10.2	50 9.2	90 16.1	112 20.9	172 17.1	144 11.8	149 13.3	59 13.1	39 11.0	28 9.3	15 5.4	10 4.3	14 4.9	979 12.5
	Hosp	<5 /	<5 /	5 .9	<5 /	16 3.0	20 2.0	30 2.5	23 2.1	16 3.6	7 2.0	9 3.0	<5 /	<5 /	<5 /	145 1.9
Involving skates, skis, sport boards, rollerblades	ER	71 16.4	575 115.0	1,970 360.8	1,404 250.7	642 119.8	517 51.4	379 31.0	277 24.7	92 20.5	72 20.3	41 13.6	22 8.0	11 4.7	14 4.9	6,087 77.8
	Hosp	<5 /	16 3.2	44 8.1	40 7.1	14 2.6	23 2.3	23 1.9	13 1.2	9 2.0	7 2.0	<5 /	<5 /	<5 /	<5 /	202 2.6
Fall while being carried or supported by other persons	ER	270 62.2	24 4.8	28 5.1	17 3.0	11 2.1	11 1.1	5 .4	<5 /		<5 /	<5 /	<5 /	5 2.2	5 1.7	383 4.9
	Hosp	13 3.0		<5 /	<5 /	<5 /	<5 /	<5 /	<5 /				<5 /	<5 /	<5 /	23 .3
Other/unspecified	ER	3,380 778.7	2,537 507.3	3,577 655.2	2,591 462.6	1,873 349.5	2,907 289.3	3,351 274.2	4,057 361.8	1,982 440.9	1,784 502.2	1,558 517.9	1,629 591.2	1,952 838.3	6,183 2154.5	39,361 503.0
	Hosp	58 13.4	60 12.0	51 9.3	53 9.5	60 11.2	103 10.3	157 12.9	261 23.3	200 44.5	223 62.8	260 86.4	356 129.2	451 193.7	2,113 736.3	4,406 56.3
TOTAL	ER	10,201 2350.0	7,767 1553.1	10,263 1879.8	7,671 1369.7	5,871 1095.6	8,992 894.8	9,905 810.5	12,101 1079.3	5,709 1270.1	5,124 1442.4	4,369 1452.3	4,503 1634.3	5,216 2240.0	14,199 4947.8	111,891 1429.9
	Hosp	206 47.5	245 49.0	162 29.7	155 27.7	154 28.7	291 29.0	409 33.5	731 65.2	506 112.6	580 163.3	633 210.4	810 294.0	1,127 484.0	4,311 1502.2	10,320 131.9

SWIPPN 4 - FALLS: Deaths by Cause and Age Group (CY 2001-2005)

Number and Age-Specific Rate per 100,000

AGE GROUP

CAUSE	0-4	5-9	10-14	15-19	20-24	25-34	35-44	45-54	55-59	60-64	65-69	70-74	75-79	80+	TOTAL
Slip/trip on same level (general)											<5 /	10 4.3	29 10.1	40 .5	
Slip/trip on same level (ice/snow)										<5 /	<5 /		<5 /	<5 /	
Fall from playground equipment															
Stairs/steps						<5 /	<5 /	7 .6	8 1.8	7 2.0	8 2.7	11 4.0	27 11.6	29 10.1	102 1.3
Bed										<5 /		<5 /	<5 /	26 9.1	30 .4
Chair													<5 /	6 2.1	9 .1
Other furniture														7 2.4	7 .1
Fall from tree															
From building or structure				<5 /	<5 /		<5 /	<5 /	<5 /	<5 /	<5 /	<5 /		<5 /	16 .2
Involving skates, skis, sport boards, rollerblades															
Fall while being carried or supported by other persons															
Other/unspecified				<5 /	<5 /	<5 /	5 .4	11 1.0	9 2.0	9 2.5	15 5.0	21 7.6	57 24.5	305 106.3	438 5.6
TOTAL				<5 /	6 1.1	<5 /	10 .8	19 1.7	19 4.2	21 5.9	27 9.0	36 13.1	98 42.1	404 140.8	645 8.2

SWIPPN 5 - FALLS: ER Visits and Hospital Visits by Location of Injury and Age Group (FY 2007-2009)

Number and Age-Specific Rate per 100,000

AGE GROUP

INJURY LOCATION	OUTCOME	0-4	5-9	10-14	15-19	20-24	25-34	35-44	45-54	55-59	60-64	65-69	70-74	75-79	80+	TOTAL
Head	ER	6,799 1566.3	2,642 528.3	1,311 240.1	992 177.1	730 136.2	865 86.1	1,036 84.8	1,364 121.7	756 168.2	806 226.9	747 248.3	773 280.5	1,068 458.6	2,974 1036.3	22,863 292.2
	Hosp	63 14.5	16 3.2	17 3.1	25 4.5	22 4.1	25 2.5	42 3.4	61 5.4	42 9.3	48 13.5	73 24.3	67 24.3	92 39.5	325 113.3	918 11.7
Neck	ER	55 12.7	98 19.6	133 24.4	94 16.8	77 14.4	147 14.6	164 13.4	166 14.8	63 14.0	48 13.5	38 12.6	42 15.2	44 18.9	130 45.3	1,299 16.6
	Hosp	<5 /	<5 /	<5 /	<5 /	<5 /	5 .5	15 1.2	13 1.2	9 2.0	13 3.7	16 5.3	17 6.2	23 9.9	66 23.0	190 2.4
Thorax	ER	21 4.8	89 17.8	152 27.8	154 27.5	197 36.8	448 44.6	703 57.5	998 89.0	479 106.6	417 117.4	362 120.3	398 144.5	441 189.4	959 334.2	5,818 74.4
	Hosp			<5 /	<5 /	10 1.9	10 1.0	15 1.2	50 4.5	28 6.2	24 6.8	16 5.3	32 11.6	41 17.6	147 51.2	376 4.8
Abdomen, lower back, lumbar spine and pelvis	ER	108 24.9	200 40.0	260 47.6	258 46.1	358 66.8	725 72.1	752 61.5	732 65.3	286 63.6	223 62.8	198 65.8	233 84.6	307 131.8	1,077 375.3	5,717 73.1
	Hosp	<5 /	<5 /	7 1.3	12 2.1	9 1.7	21 2.1	21 1.7	32 2.9	28 6.2	29 8.2	43 14.3	57 20.7	100 42.9	457 159.3	823 10.5
Shoulder and upper arm	ER	604 139.1	728 145.6	773 141.6	621 110.9	479 89.4	664 66.1	773 63.3	1,127 100.5	576 128.1	527 148.4	466 154.9	495 179.7	518 222.5	1,127 392.7	9,478 121.1
	Hosp	72 16.6	132 26.4	21 3.9	17 3.0	9 1.7	14 1.4	22 1.8	50 4.5	52 11.6	59 16.6	61 20.3	80 29.0	86 36.9	214 74.6	889 11.4
Elbow and forearm	ER	902 207.8	1,612 322.3	2,132 390.5	893 159.4	508 94.8	748 74.4	828 67.8	1,235 110.2	659 146.6	635 178.8	505 167.9	472 171.3	495 212.6	1,168 407.0	12,792 163.5
	Hosp	16 3.7	57 11.4	53 9.7	20 3.6	19 3.6	24 2.4	35 2.9	71 6.3	39 8.7	40 11.3	35 11.6	28 10.2	34 14.6	76 26.5	547 7.0
Wrist and hand	ER	258 59.4	748 149.6	2,321 425.1	1,448 258.5	949 177.1	1,181 117.5	1,192 97.5	1,303 116.2	590 131.3	579 163.0	447 148.6	361 131.0	339 145.6	712 248.1	12,428 158.8
	Hosp		<5 /	<5 /	<5 /	<5 /		<5 /	<5 /	5 1.1	<5 /		<5 /	<5 /	12 4.2	44 .6
Hip and thigh	ER	88 20.3	76 15.2	100 18.3	118 21.1	84 15.7	148 14.7	208 17.0	321 28.6	227 50.5	244 68.7	281 93.4	408 148.1	655 281.3	2,883 1004.6	5,841 74.6
	Hosp	29 6.7	13 2.6	8 1.5	<5 /	<5 /	20 2.0	30 2.5	88 7.9	102 22.7	150 42.2	199 66.2	318 115.4	523 224.6	2,322 809.1	3,809 48.7
Knee and lower leg	ER	417 96.1	548 109.6	1,130 207.0	936 167.1	688 128.4	1,242 123.6	1,436 117.5	1,872 167.0	856 190.4	709 199.6	573 190.5	522 189.5	496 213.0	964 335.9	12,389 158.3
	Hosp	<5 /	6 1.2	43 7.9	55 9.8	66 12.3	135 13.4	185 15.1	256 22.8	150 33.4	150 42.2	110 36.6	96 34.8	114 49.0	226 78.8	1,595 20.4
Ankle and foot	ER	394 90.8	711 142.2	1,496 274.0	1,662 296.8	1,350 251.9	1,998 198.8	1,861 152.3	1,815 161.9	685 152.4	470 132.3	319 106.0	267 96.9	225 96.6	394 137.3	13,647 174.4
	Hosp		<5 /	<5 /	7 1.3	6 1.1	14 1.4	23 1.9	24 2.1	7 1.6	10 2.8	5 1.7	<5 /	7 3.0	22 7.7	132 1.7
TOTAL	ER	9,646 2222.2	7,452 1490.1	9,808 1796.5	7,176 1281.3	5,420 1011.5	8,166 812.6	8,953 732.6	10,933 975.1	5,177 1151.7	4,658 1311.2	3,936 1308.4	3,971 1441.2	4,588 1970.3	12,388 4316.7	102,272 1306.9
	Hosp	187 43.1	236 47.2	156 28.6	147 26.3	150 28.0	268 26.7	391 32.0	649 57.9	462 102.8	527 148.4	558 185.5	703 255.1	1,022 438.9	3,867 1347.5	9,323 119.1

SWIPPN 6 - MOTOR VEHICLE COLLISIONS – ON-ROAD: ER Visits and Hospital Visits by Cause and Age Group (FY 2007-2009)

Number and Age-Specific Rate per 100,000

AGE GROUP

CAUSE	OUTCOME	0-4	5-9	10-14	15-19	20-24	25-34	35-44	45-54	55-59	60-64	65-69	70-74	75-79	80+	TOTAL
Motorcycle	ER	<5 /	52 10.4	184 33.7	275 49.1	214 39.9	314 31.2	311 25.5	340 30.3	117 26.0	48 13.5	25 8.3	11 4.0	10 4.3	19 6.6	1,923 24.6
	Hosp		<5 /	13 2.4	25 4.5	20 3.7	40 4.0	60 4.9	71 6.3	23 5.1	6 1.7	<5 /	<5 /	<5 /	<5 /	272 3.5
Car	ER	165 38.0	237 47.4	276 50.6	1,672 298.5	1,891 352.9	2,364 235.2	1,983 162.3	1,792 159.8	686 152.6	470 132.3	357 118.7	303 110.0	268 115.1	382 133.1	12,846 164.2
	Hosp	9 2.1	7 1.4	14 2.6	103 18.4	114 21.3	119 11.8	107 8.8	120 10.7	51 11.4	41 11.5	40 13.3	34 12.3	58 24.9	75 26.1	892 11.4
Pickup truck/van	ER	34 7.8	38 7.6	41 7.5	183 32.7	162 30.2	223 22.2	243 19.9	254 22.7	83 18.5	51 14.4	37 12.3	19 6.9	26 11.2	18 6.3	1,412 18.0
	Hosp	<5 /		<5 /	12 2.1	12 2.2	12 1.2	13 1.1	12 1.1	7 1.6	<5 /	<5 /	<5 /	<5 /	<5 /	85 1.1
Heavy transport truck	ER	<5 /		<5 /	<5 /	20 3.7	52 5.2	90 7.4	75 6.7	35 7.8	20 5.6	5 1.7	<5 /	<5 /	<5 /	309 4.0
	Hosp						<5 /	<5 /	10 .9	<5 /	<5 /					19 .2
Bus	ER	8 1.8	23 4.6	28 5.1	48 8.6	16 3.0	21 2.1	38 3.1	49 4.4	19 4.2	15 4.2	11 3.7	12 4.4	6 2.6	15 5.2	309 4.0
	Hosp						<5 /			<5 /	<5 /	<5 /	<5 /		<5 /	8 .1
Other	ER	31 7.1	42 8.4	81 14.8	256 45.7	276 51.5	399 39.7	378 30.9	338 30.2	107 23.8	70 19.7	73 24.3	59 21.4	31 13.3	46 16.0	2,187 28.0
	Hosp	<5 /	6 1.2	6 1.1	11 2.0	9 1.7	14 1.4	19 1.6	19 1.7	7 1.6	<5 /	<5 /	5 1.8	9 3.9	<5 /	121 1.6
TOTAL	ER	244 56.2	392 78.4	612 112.1	2,438 435.3	2,579 481.3	3,373 335.6	3,043 249.0	2,848 254.0	1,047 232.9	674 189.7	508 168.9	405 147.0	342 146.9	481 167.6	18,986 242.6
	Hosp	14 3.2	17 3.4	35 6.4	151 27.0	155 28.9	187 18.6	203 16.6	232 20.7	91 20.2	58 16.3	52 17.3	45 16.3	70 30.1	87 30.3	1,397 17.9

**SWIPPN 7 - MOTOR VEHICLE COLLISIONS – ON-ROAD: Deaths by Cause and Age Group
(CY 2001-2005)**

Number and Age-Specific Rate per 100,000

AGE GROUP

CAUSE	0-4	5-9	10-14	15-19	20-24	25-34	35-44	45-54	55-59	60-64	65-69	70-74	75-79	80+	TOTAL
Motorcycle			<5 /	<5 /	6 1.1	9 .9	17 1.4	6 .5		<5 /		<5 /		<5 /	48 .6
Car	<5 /	<5 /	5 .9	24 4.3	25 4.7	17 1.7	22 1.8	20 1.8	6 1.3	10 2.8	<5 /	5 1.8	6 2.6	20 7.0	169 2.2
Pickup truck/ van		<5 /	<5 /	8 1.4	<5 /	8 .8	<5 /	<5 /		<5 /	<5 /	<5 /	<5 /	<5 /	36 .5
Heavy transport truck						<5 /	<5 /	<5 /	<5 /				<5 /		8 .1
Bus															
Other	<5 /	<5 /	13 2.4	65 11.6	41 7.7	58 5.8	74 6.1	59 5.3	17 3.8	19 5.4	22 7.3	20 7.3	13 5.6	36 12.5	443 5.7
TOTAL	<5 /	9 1.8	21 3.9	101 18.0	76 14.2	95 9.5	116 9.5	91 8.1	24 5.3	33 9.3	27 9.0	28 10.2	21 9.0	58 20.2	704 9.0

SWIPPN 8 - MOTOR VEHICLE COLLISIONS – OFF-ROAD: ER Visits and Hospital Visits by Cause and Age Group (FY 2007-2009)

Number and Age-Specific Rate per 100,000

AGE GROUP

CAUSE	OUTCOME	0-4	5-9	10-14	15-19	20-24	25-34	35-44	45-54	55-59	60-64	65-69	70-74	75-79	80+	TOTAL
Rail	ER				<5	<5	<5	5	<5	<5	<5				<5	19
	Hosp				/	/	/	.4	/	/	/					/
ATV	ER	29	159	414	700	497	532	473	304	59	37	19	13	14	12	3,262
	Hosp	6.7	31.8	75.8	125.0	92.8	52.9	38.7	27.1	13.1	10.4	6.3	4.7	6.0	4.2	41.7
Water	ER	<5	5	23	41	57	70	66	44	15	22	8	7	5	<5	368
	Hosp	/	1.0	4.2	7.3	10.6	7.0	5.4	3.9	3.3	6.2	2.7	2.5	2.2	/	4.7
Air/Space	ER			<5		<5	<5	7	<5	<5	<5	<5		<5	<5	23
	Hosp			/		/	/	.6	/	/	/	/		/	/	.3
TOTAL	ER	32	164	438	742	557	610	551	356	77	61	28	20	20	16	3,672
	Hosp	7.4	32.8	80.2	132.5	104.0	60.7	45.1	31.8	17.1	17.2	9.3	7.3	8.6	5.6	46.9
TOTAL	ER	<5	9	31	72	47	56	46	48	13	<5	<5	<5	5	<5	343
	Hosp	/	1.8	5.7	12.9	8.8	5.6	3.8	4.3	2.9	/	/	/	2.2	/	4.4

**SWIPPN 9 - MOTOR VEHICLE COLLISIONS – OFF-ROAD: Deaths by Cause and Age Group
(CY 2001-2005)**

**Number and Age-Specific Rate per 100,000
AGE GROUP**

CAUSE	0-4	5-9	10-14	15-19	20-24	25-34	35-44	45-54	55-59	60-64	65-69	70-74	75-79	80+	TOTAL
Rail															
ATV		<5 /	<5 /	<5 /	<5 /	5 .5	7 .6	<5 /		<5 /	<5 /				30 .4
Water					<5 /	<5 /	<5 /	<5 /				<5 /		<5 /	13 .2
Air/Space						<5 /	<5 /	7 .6							10 .1
TOTAL		<5 /	<5 /	<5 /	6 1.1	8 .8	13 1.1	14 1.3		<5 /	<5 /	<5 /		<5 /	53 .7

SWIPPN 10 - SPORTS AND RECREATION: ER Visits and Hospital Visits by Cause and Age Group (FY 2007-2009)

Number and Age-Specific Rate per 100,000

AGE GROUP

CAUSE	OUTCOME	0-4	5-9	10-14	15-19	20-24	25-34	35-44	45-54	55-59	60-64	65-69	70-74	75-79	80+	TOTAL
Fall involving ice skates, skis, rollerskates or skateboards	ER	71 16.4	575 115.0	1,970 360.8	1,404 250.7	642 119.8	517 51.4	379 31.0	277 24.7	92 20.5	72 20.3	41 13.6	22 8.0	11 4.7	14 4.9	6,087 77.8
	Hosp	<5 /	16 3.2	44 8.1	40 7.1	14 2.6	23 2.3	23 1.9	13 1.2	9 2.0	7 2.0	<5 /	<5 /	<5 /	<5 /	202 2.6
Diving or jumping into water causing injury other than drowning or submersion	ER	24 5.5	67 13.4	76 13.9	58 10.4	45 8.4	45 4.5	28 2.3	27 2.4	6 1.3	<5 /	<5 /	<5 /	<5 /	<5 /	384 4.9
	Hosp	<5 /	<5 /	<5 /	<5 /	<5 /	<5 /	<5 /	<5 /	<5 /	<5 /	<5 /	<5 /	<5 /	<5 /	12 .2
Striking against or struck by sports equipment	ER	126 29.0	712 142.4	2,447 448.2	1,723 307.6	903 168.5	1,363 135.6	923 75.5	463 41.3	99 22.0	57 16.1	34 11.3	19 6.9	6 2.6	<5 /	8,879 113.5
	Hosp	<5 /	9 1.8	16 2.9	14 2.5	10 1.9	12 1.2	10 .8	6 .5			<5 /		<5 /		81 1.0
Over exertion and strenuous or repetitive movements	ER	916 211.0	909 181.8	3,446 631.2	4,366 779.6	3,625 676.5	6,184 615.3	6,004 491.3	4,981 444.2	1,532 340.8	1,033 290.8	626 208.1	485 176.0	398 170.9	513 178.8	35,018 447.5
	Hosp	<5 /	5 1.0	24 4.4	36 6.4	26 4.9	48 4.8	62 5.1	64 5.7	31 6.9	22 6.2	21 7.0	22 8.0	36 15.5	35 12.2	435 5.6
Travel and motion	ER	<5 /	<5 /	6 1.1	<5 /		<5 /	<5 /	<5 /			<5 /				18 .2
	Hosp						<5 /									<5 /
TOTAL	ER	1,138 262.2	2,266 453.1	7,945 1455.2	7,552 1348.4	5,215 973.2	8,110 807.0	7,337 600.4	5,750 512.8	1,729 384.7	1,164 327.7	706 234.7	526 190.9	416 178.7	532 185.4	50,386 643.9
	Hosp	7 1.6	31 6.2	85 15.6	92 16.4	51 9.5	86 8.6	96 7.9	85 7.6	41 9.1	29 8.2	27 9.0	24 8.7	40 17.2	37 12.9	731 9.3

SWIPPN 11 - SPORTS AND RECREATION: Deaths by Cause and Age Group (CY 2001-2005)

Number and Age-Specific Rate per 100,000
AGE GROUP

CAUSE	0-4	5-9	10-14	15-19	20-24	25-34	35-44	45-54	55-59	60-64	65-69	70-74	75-79	80+	TOTAL
Fall involving ice skates, skis, rollerskates or skateboards															
Diving or jumping into water causing injury other than drowning or submersion				<5 /										<5 /	<5 /
Striking against or struck by sports equipment															
Over exertion and strenuous or repetitive movements															
Travel and motion															
TOTAL				<5 /										<5 /	<5 /

SWIPPN 12 - INTENTIONAL INJURY – INTERPERSONAL (ASSAULT): ER Visits and Hospital Visits by Cause and Age Group (FY 2007-2009)

Number and Age-Specific Rate per 100,000

AGE GROUP

CAUSE	OUTCOME	0-4	5-9	10-14	15-19	20-24	25-34	35-44	45-54	55-59	60-64	65-69	70-74	75-79	80+	TOTAL
Firearm	ER	<5 /	<5 /	<5 /	9 1.6	5 .9	6 .6	<5 /		<5 /		<5 /				29 .4
	Hosp			<5 /	<5 /	<5 /	<5 /	<5 /	<5 /			<5 /				10 .1
Sharp or blunt object	ER	<5 /	5 1.0	15 2.8	212 37.9	274 51.1	264 26.3	194 15.9	103 9.2	17 3.8	9 2.5	<5 /	<5 /	<5 /		1,103 14.1
	Hosp				23 4.1	19 3.6	22 2.2	33 2.7	15 1.3	<5 /	<5 /	<5 /	<5 /			120 1.5
Bodily force (unarmed)	ER	12 2.8	69 13.8	507 92.9	2,050 366.0	1,961 366.0	1,763 175.4	1,165 95.3	738 65.8	128 28.5	53 14.9	29 9.6	18 6.5	14 6.0	22 7.7	8,529 109.0
	Hosp	<5 /	<5 /	10 1.8	55 9.8	98 18.3	74 7.4	53 4.3	44 3.9	7 1.6	<5 /		<5 /	<5 /	<5 /	350 4.5
Sexual assault by bodily force	ER	<5 /	<5 /	17 3.1	55 9.8	54 10.1	41 4.1	22 1.8	13 1.2	<5 /	<5 /					210 2.7
	Hosp			<5 /							<5 /					<5 /
Drugs, medicaments	ER				<5 /	<5 /	7 .7	<5 /								10 .1
	Hosp						<5 /									<5 /
Hanging, strangulation and suffocation	ER				<5 /	<5 /	5 .5	<5 /	<5 /	<5 /	<5 /					20 .3
	Hosp						<5 /									<5 /
Other	ER	38 8.8	24 4.8	35 6.4	198 35.4	247 46.1	314 31.2	239 19.6	158 14.1	27 6.0	7 2.0	8 2.7	7 2.5	<5 /	7 2.4	1,312 16.8
	Hosp	27 6.2	<5 /	<5 /	8 1.4	9 1.7	14 1.4	11 .9	13 1.2	<5 /		<5 /	<5 /	<5 /	<5 /	98 1.3
TOTAL	ER	54 12.4	103 20.6	576 105.5	2,529 451.6	2,545 475.0	2,400 238.8	1,627 133.1	1,014 90.4	176 39.2	71 20.0	41 13.6	29 10.5	19 8.2	29 10.1	11,213 143.3
	Hosp	28 6.5	<5 /	14 2.6	88 15.7	128 23.9	113 11.2	99 8.1	73 6.5	14 3.1	6 1.7	5 1.7	6 2.2	<5 /	<5 /	582 7.4

SWIPPN 13 - INTENTIONAL INJURY – INTERPERSONAL (ASSAULT): Deaths by Cause and Age Group (CY 2001-2005)

Number and Age-Specific Rate per 100,000

AGE GROUP

CAUSE	0-4	5-9	10-14	15-19	20-24	25-34	35-44	45-54	55-59	60-64	65-69	70-74	75-79	80+	TOTAL
Firearm				<5	<5	7	<5	<5							16
				/	/	.7	/	/							.2
Sharp or blunt object		<5	<5	<5	6	<5	14	7	<5	<5	<5	<5			41
		/	/	/	1.1	/	1.2	.6	/	/	/	/			.5
Bodily force (unarmed)						<5					<5				<5
						/					/				/
Sexual assault by bodily force															
Drugs, medicaments											<5				<5
											/				/
Hanging, strangulation and suffocation		<5		<5			<5					<5			6
		/		/			/					/			.1
Other	8			<5	<5	<5	<5	<5	<5			<5	<5	<5	21
	1.8			/	/	/	/	/	/			/	/	/	.3
TOTAL	8	<5	<5	6	9	15	20	12	<5	<5	<5	<5	<5	<5	87
	1.8	/	/	1.1	1.7	1.5	1.6	1.1	/	/	/	/	/	/	1.1

SWIPPN 14 - INTENTIONAL INJURY – SELF-HARM: ER Visits and Hospital Visits by Cause and Age Group (FY 2007-2009)

Number and Age-Specific Rate per 100,000

CAUSE	OUTCOME	AGE GROUP														TOTAL
		0-4	5-9	10-14	15-19	20-24	25-34	35-44	45-54	55-59	60-64	65-69	70-74	75-79	80+	
Poisoning	ER	<5 /	<5 /	65 11.9	442 78.9	310 57.9	458 45.6	567 46.4	498 44.4	131 29.1	60 16.9	35 11.6	16 5.8	10 4.3	16 5.6	2,612 33.4
	Hosp			24 4.4	161 28.8	83 15.5	153 15.2	207 16.9	209 18.6	63 14.0	34 9.6	21 7.0	13 4.7	7 3.0	13 4.5	988 12.6
Firearm	ER				<5 /			<5 /	<5 /	<5 /				<5 /		6 .1
	Hosp									<5 /				<5 /		<5 /
Hanging, strangulation, and suffocation	ER			<5 /	13 2.3	<5 /	10 1.0	10 .8	6 .5	<5 /		<5 /	<5 /			47 .6
	Hosp			<5 /	<5 /	<5 /	<5 /	<5 /	<5 /							11 .1
Sharp or blunt object	ER			41 7.5	158 28.2	155 28.9	165 16.4	106 8.7	82 7.3	17 3.8	11 3.1	<5 /	<5 /	<5 /	5 1.7	749 9.6
	Hosp			<5 /	<5 /	<5 /	6 .6	12 1.0	10 .9	<5 /	<5 /	<5 /	<5 /	<5 /	<5 /	49 .6
Jumping or lying before moving object	ER						5 .5	<5 /	6 .5	<5 /		<5 /				15 .2
	Hosp		<5 /			<5 /	<5 /	<5 /	7 .6	<5 /						13 .2
Other	ER		<5 /	6 1.1	24 4.3	22 4.1	25 2.5	17 1.4	15 1.3	5 1.1	<5 /	<5 /				117 1.5
	Hosp						<5 /	<5 /	<5 /		<5 /	<5 /	<5 /			15 .2
TOTAL	ER	<5 /	<5 /	114 20.9	638 113.9	490 91.4	663 66.0	704 57.6	608 54.2	156 34.7	72 20.3	41 13.6	21 7.6	13 5.6	21 7.3	3,546 45.3
	Hosp		<5 /	26 4.8	165 29.5	89 16.6	168 16.7	226 18.5	233 20.8	69 15.4	36 10.1	23 7.7	17 6.2	10 4.3	15 5.2	1,078 13.8

SWIPPN 15 - INTENTIONAL INJURY – SELF-HARM: Deaths by Cause and Age Group (CY 2001-2005)

Number and Age-Specific Rate per 100,000

AGE GROUP

CAUSE	0-4	5-9	10-14	15-19	20-24	25-34	35-44	45-54	55-59	60-64	65-69	70-74	75-79	80+	TOTAL
Poisoning			<5	<5	<5	25	52	65	16	9	12	7	6	8	207
			/	/	/	2.5	4.3	5.8	3.6	2.5	4.0	2.5	2.6	2.8	2.7
Firearm			<5	<5	<5	11	23	28	5	13	6	7	<5	7	112
			/	/	/	1.1	1.9	2.5	1.1	3.7	2.0	2.5	/	2.4	1.4
Hanging, strangulation, and suffocation			<5	17	31	53	57	58	16	<5	10	13	6	11	279
			/	3.0	5.8	5.3	4.7	5.2	3.6	/	3.3	4.7	2.6	3.8	3.6
Sharp or blunt object							<5	8		<5	<5	<5	<5		20
							/	.7		/	/	/	/		.3
Jumping or lying before moving object				<5	6	8	11	6	<5	<5	<5	<5	<5		39
				/	1.1	.8	.9	.5	/	/	/	/	/		.5
Other				<5	<5	11	9	5	<5	<5	<5	<5			36
				/	/	1.1	.7	.5	/	/	/	/			.5
TOTAL			6	25	46	108	154	170	40	31	34	33	20	26	693
			1.1	4.5	8.6	10.8	12.6	15.2	8.9	8.7	11.3	12.0	8.6	9.1	8.9

ONTARIO REGIONAL INJURY DATA REPORT

Evidence Informed Practice Recommendations

As mentioned in the summary section of this document, the most common causes of injury in the South West region were related to falls, on-road vehicles, poisoning, pedestrians, sports and recreation, and self-harm/suicide. Evidence-informed practice recommendations for each type of injury have been included in the following section, in alphabetical order.

Evidence-Informed Practices for Prevention of Falls

Overview

Falls are a major contributor to unintentional injury. In fact, fall-related injuries account for 31% of the total estimated cost of injuries in Canada, or \$6.2 billion (SMARTRISK, 2009). Injuries can happen at any age and fall prevention across the lifespan is an important goal for public health and injury prevention practitioners. Research indicates that children and older adults⁵ are at the greatest risk for falls (IMPACT, 2005). Among children, falls are responsible for more than 60% of hospitalizations and emergency room visits (Khambalia et al., 2006). Among adults aged 65 and over, falls account for 85% of injuries resulting in hospitalizations and are related to 40% of nursing home admissions (Scott, 2012). This report will present information on fall risk factors across the lifespan and evidence-informed practice recommendations for fall prevention. There is an emphasis on risk factors and recommendations for children and older adults, as these groups are most at risk for debilitating injury due to a fall.

Understanding Risk Factors

As we age, changes occur in individual behaviour and environmental-related risks. For this reason, it is important to describe risk factors according to life stage.

Fall Risk Factors by Age

Children

The following characteristics define the population of children at increased risk for falling (IMPACT, 2005; McKay et al., 2011):

- Boys (greater risk than girls)
- Younger children (age 0-6)
- Low socioeconomic status

The following factors apply to all children and increase fall risk:

- Natural curiosity that leads to environmental exploration
- Playing on equipment that is too tall or improperly maintained
- Playing near windows, stairs or furniture

⁵ As a number of sources were synthesized in preparing this document, the age range used to define children and older adults varied, thus, it has not been defined in our summary. Please refer to the original sources for information regarding the specific ages in each study or resource.

Teens

Risk factors for falling include (Ontario Injury Prevention Resource Centre, 2008):

- Increased risk taking behaviour combined with a sense of being ‘invincible’
- Alcohol and drug use
- Unsafe work conditions
- Participation in sport and recreational activities

Younger and Middle-aged Adults

Risk factors for falling in this age group are related to (Ontario Injury Prevention Resource Centre, 2008):

- Individual differences in risk-taking behaviour
- Alcohol and drug use
- Unsafe work conditions
- Environmental hazards such as snow, ice, uneven sidewalks, unsafe stairs

Older Adults

Fall risk factors in older adults tend to be described in four categories (Scott, 2012):

Biological

- Mobility impairment
- Chronic health conditions
- Visual impairments
- Acute illnesses

Behavioural

- History of falling
- Fear of falling
- Interaction of multiple medications
- Lack of exercise
- Poor nutrition

Social/Economic

- Living alone
- Lack of social support
- Lack of appropriate transportation

Environmental

- Building maintenance
- Home hazards (e.g., lack of grab bars)
- Presence of floor mats or uneven surfaces

Evidence-Informed Practice Recommendations

In order to address specific risk factors at different life stages, the most effective fall prevention strategies differ by age group. Resources for fall prevention research have been allotted according to the segments of the population that are at the highest risk and account for the greatest burden. Thus, evidence-informed recommendations are widely available for children and seniors. The research is less developed for younger and middle-aged adults. The best available research evidence is summarized in the following recommendations, according to life stage.

Children

Evidence-informed recommendations for fall prevention in children tend to relate to two main themes, home hazards and playgrounds.

Home Hazards

1. Parents are largely responsible for ensuring that children are not exposed to fall risks. Research indicates that educating parents about fall risks in their homes can help to prevent falls in children. This has been referred to as ‘anticipatory guidance.’ Paediatricians and family practice physicians can provide this guidance through their interactions with new parents. Other health professions can interact with parents through home visits or public education programs (IMPACT, 2005).
2. Windows and stairs are common locations for falls. Window guards, which prevent a window from being opened wide enough for a child to fit through, are an important fall prevention strategy (must comply with fire safety standards) (IMPACT, 2005; MacKay et al., 2011). Similarly, stair guards are also recommended. Pressure mounted stair gates (as opposed to wall mounted) should not be used at the top of stairs because they loosen over time. Research indicates that socioeconomic status and parental knowledge are barriers to the use of both window and stair guards. Community programs that provide and install window and stair guards help increase their use.
3. Other high-risk areas in the home include change tables, furniture placed near windows or balconies, and car seats set down on top of furniture (Parachute, 2013). Parents should be informed of these risks and the steps that can be taken to prevent falls, such as active supervision, keeping one hand on a child while using a change table, placing all furniture away from windows and balconies and setting car seats down on the floor (never on top of furniture).

Playground Hazards

1. Playground falls are related to the height of the equipment, the surfaces in place to absorb a fall, and the quality of adult supervision. The Canadian Standards Association (CSA) has compiled a list of guidelines for playground safety related to heights and surfaces. Evidence indicates that having a maximum height of 1.5 metres for play equipment can reduce pediatric emergency room visits by 45% (IMPACT, 2005; MacKay et al., 2011). Thus, the CSA recommends that structures not exceed 1.5 metres. Safe Kids Canada (now part of Parachute)

has recommended following the ‘five and five rule’; a child under the age of five should not play on equipment taller than five feet. In terms of surfacing, research shows that wood chips and sand are the most effective surfaces for absorbing falls and preventing injury (McKay et al., 2011). CSA recommendations specify depths and surface types depending on the height of the equipment.

2. In addition to a playground’s physical characteristics, active supervision is extremely important for fall prevention. Supervising at a close distance and ensuring play equipment is appropriate for children’s ages and abilities are fundamental to preventing injuries due to falls.

Teenagers

Fall risks for teenagers relate to developmental characteristics at this stage of life, and involvement in sport or recreational activities. Recommendations to reduce fall risk include:

1. Interventions that address risk-taking behaviour and promote developmental assets or “the building blocks of healthy development”(Search Institute), including risks involving alcohol and drug use.
2. Interventions that educate teens about proper use of equipment and fall risks during sports/ recreational activities (Ontario Injury Prevention Resource Centre, 2008).

Younger and Middle-Aged Adults

For younger and middle-aged adults, fall prevention recommendations include (Ontario Injury Prevention Resource Centre, 2008):

1. Interventions addressing risk-taking behaviour, especially related to alcohol and drug use.
2. Interventions addressing safety during sports and recreational activities (e.g., proper use of equipment).
3. Education about safety outdoors.
4. Education about the importance of life long participation in physical activity.

Older Adults

Fall prevention in older adults has been extensively researched. The overarching recommendation for fall prevention programming is that an older adult should be assessed for fall risk and prevention should be tailored to reducing or minimizing the impact of those risks (American Geriatric Society, 2010). There are many easily administered and validated assessments available to identify high-risk individuals (e.g., Five-step Test, Timed-up-and-go Test, Scott Fall Risk Screening Tool). More information on assessments can be found in the Canadian Fall Prevention Curriculum (Scott et al., 2007). After an assessment is conducted, the risk factors to target during an intervention can be determined. As mentioned, interventions should match the identified risks

of the individual. Interventions have been implemented in both community and residential settings.

Recommended strategies for a *community* level multifactorial intervention include: assessment and modification of the home environment for individuals with a high risk of falling, exercise programs that improve balance and gait training, appropriate use of assistive devices such as anti-slip shoes, proper medical attention for any foot problems, management of visual concerns, management of postural hypotension, and stopping or minimizing the use of psychoactive medication (American Geriatric Society, 2010). Similarly, components of a multifactorial intervention in a *residential* setting include: environment modification, creation of a multidisciplinary team, creation of individual fall prevention plans for those at high risk, assessment of appropriate use of assistive equipment, vitamin D supplementation where required, and exercise programming (American Geriatric Society, 2010).

Fall prevention strategies should form part of an overall plan for communities or facilities that reflects a comprehensive approach to fall prevention. Two of the most widely recognized evidence-informed plans for fall prevention include the BEEACH model, and the Stay on Your Feet program.

1. The **BEEACH model** (Scott, 2012) identifies seven factors that are necessary to bring about behaviour change and ultimately prevent falls in all settings.

Behaviour change is the common goal of fall prevention strategies. All individuals involved in the program (adults, staff, etc.) must buy in for this to happen. **Education** involves increasing awareness of the issue, increasing understanding that prevention is possible and promoting effective strategies. **Equipment** describes the importance of having access to and properly using assistive devices such as mobility aids or hip protectors. **Environment** refers to the assessment and modification of environmental hazards to reduce fall risk (e.g., remove tripping hazards such as floor mats). **Activity** describes the importance of participating in physical activity and social situations to maintain good physical and mental health. **Clothing and footwear** are important considerations because sometimes they can contribute to loss of balance (while dressing), tripping (pants too long) or slipping (slippery soles on shoes). Lastly, **Health Management** involves strategies such as: monitoring medications to minimize drowsiness; adopting good sleep habits; regular vision care and appropriate use of corrective lenses; and monitoring and maintaining good bone health.

2. **Stay on Your Feet** is an evidence-informed approach for community level fall prevention, which recommends creating a hub or ‘umbrella’ of all fall prevention programs and resources (Barnett et al., 2004). This would be accomplished by hiring a ‘stay on your feet’ community coordinator. The coordinator would oversee the following initiatives:
 1. Public information and awareness (e.g., distribute prevention materials to community)
 2. Community education and skill development (e.g., develop media campaigns about fall issues and workshops)
 3. Partnerships with health care professionals (e.g., provide resources and educational materials to physicians, nurse practitioners and community health nurses)

4. Community policy development (e.g., develop guidelines to assist local governments in taking fall prevention measures)
5. Home safety/hazard reduction (e.g., engage other local partners to conduct home safety assessments using a checklist)

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Evidence-Informed Practice Recommendations for the Prevention of On-Road Injuries

Overview

On-road incidents are a leading contributor to unintentional injuries and in turn this important public health issue has gained a great deal of attention both nationally and internationally (Government of Canada, 2011). In fact, 2011 was the Canadian Year of Road Safety (Government of Canada, 2011) and in May 2011 the World Health Organization (WHO) launched the Decade of Action, which is a global initiative aimed at preventing five million road traffic deaths by 2020 (World Health Organization, n.d.). It has been estimated that more than one million people die on roads globally every year and that 20 to 50 million people are injured (Government of Canada, 2011; WHO, 2011).

In 2009, Canadians suffered 2,209 fatalities on our nation's roads and 11,451 injuries required hospitalizations, which, although are declines from previous years, are still shocking numbers that deserve relevant and timely programming initiatives (Government of Canada, 2011). According to the Ontario Injury Data Report, on-road incidents led to more than 130,000 emergency room visits and 8,000 hospitalizations between fiscal years 2007/2008 and 2008/2009 and more than 3,000 deaths between 2001 and 2005 (Ontario Injury Prevention Resource Centre, 2012). The most recent Canadian Economic Burden of Injury report revealed that road related incidents (i.e., transport incidents) cost the Canadian economy roughly \$3.7 billion in 2004 (SMARTRISK, 2009).

Please note that depending on the document, on-road incidents are defined differently and include various injuries and ICD-10 codes. For example, some reports include pedestrian-related injuries and some do not. The ICD-10 codes used to define on-road for the Ontario Regional Injury Data Report (ORIDR) and Ontario Injury Data Report (OIDR) can be found in the associated summary documents.

Risk Factors

As almost everyone is a road user of some form, be it a driver, passenger, cyclist or pedestrian, numerous risk factors require consideration. Key risk factors, as related to Canadians and the injuries included in the OIDR and ORIDR on-road injury sections, are described below.

Factors influencing exposure to on-road incident risk

Various factors influence one's exposure to risk from road-related injuries. One important contributing factor is motorization (i.e., the amount of vehicles), as there is a positive correlation between number of vehicles on the road and number of injuries. Additionally, age plays a role in exposure to risk, with young Canadians being most at risk for exposure to road-related injuries. Planning is another risk factor that influences exposure. Specifically, when urban planning of roads is not thoroughly thought out ahead of time, the result can be a mixture of heavy traffic in highly populated areas, leading to increased risk of on-road injuries. Additional risk factors that

increase one's exposure to on-road risk include an increasing need for travel and use of less safe forms of travel. For more information, please see WHO, 2004.

Factors influencing involvement in an on-road incident

Various factors influence one's likelihood of being involved in a road-related incident. These include excessive speed, driver impairment, driver inexperience, driver fatigue, driver inattention, poor visibility (caused by environmental factors, vehicle factors and human factors), specific aspects of vehicles (e.g., maintenance and handling) and road design (e.g., maintenance and layout). Additionally, being younger in age and male is also a risk factor that increases one's likelihood of being involved in a incident, as the incidence rate among male drivers aged 16-20 years of age has been found to be roughly three times that of male drivers over the age of 25. Weather and time of day are also risk factors that influence incident involvement, with poor weather conditions and/or travelling at night/in darkness contributing to an increased likelihood. For more information, please see WHO, 2004.

Factors influencing on-road incident severity

Various factors influence the severity of on-road incidents and the resulting injuries. One major risk factor is the availability and use of in-car protection measures (i.e., whether for not a road user has and is appropriately using seatbelts and air bags). Other risk factors include excessive speed, vehicle type and roadside objects. Child specific risk factors in this category include the improper use of child car seats and booster seats. For more information, please see WHO, 2004.

Factors influencing post on-road incident severity and recovery

Finally, there are factors that influence the severity of injuries after incidents and recovery rates for injured individuals. One initial risk factor is the response time and quality of response to the on-road incident, with slower response times and lower quality response leading to increases in injury severity and mortality. Additionally, type of vehicle, size of vehicle, and materials involved (e.g., debris from road such as signage and loose materials in vehicle) in the on-road incident are important risk factors. Finally, there are care-related factors, including quality of care received at the incident and in hospitals/care centres, access to trained medical experts, access to equipment and general access to after care or rehabilitation. For more information, please see WHO, 2004.

Evidence-Informed Practice Recommendations

The need for prevention measures directed at on-road related injuries has been recognized on a global level, as indicated by the previously mentioned Decade of Action and Canadian Year of Road Safety. In turn, numerous prevention strategies have been developed and implemented, focusing on a variety of target issues. Given the multifaceted nature of on-road injuries and the related risk factors, there are strategies that apply differently to various segments of the population and examples of these will be outlined below. Many of these practice recommendations do not include specific campaign examples, but rather outline tools and strategies that have been found to be successful within road safety campaigns.

Population Level

According to the World Road Association, there are various types of road safety campaigns that can work to inform, persuade and motivate individuals to change their behaviours and beliefs around road safety (World Road Association, 2012). These various approaches can be implemented on a population level and also tailored to focus on specific groups of interest. These approaches include **communication campaigns, integrated campaigns, social marketing pieces and supporting activities** (World Road Association, 2012). Each campaign type presents unique ways to target and work with the population around road safety. The supporting activities are extremely important and should be included in all road safety strategies, as they have been proven to increase success. Supporting activities tend to focus on the 'three Es' of injury prevention; **enforcement, education and environment**, which when combined contribute to behaviour change. Overall, a well-planned campaign around road safety should be multifaceted in nature, in order to target the various risk factors associated with on-road injuries. For example, a campaign should include work involving legislation and the associated enforcement agencies, coupled with education around the issue and a promotion of environmental changes, which combined, may help to reduce on-road injuries among the population of interest. It is up to each community/practitioner to decide which aspects of each campaign type and supporting activities best target the road-related issues they are facing. For more information on any of the aforementioned campaign approaches, please see World Road Association, 2012.

Individual Level

As outlined above, there are various factors that contribute to on-road related injuries and many of these exist on an individual level. In turn, there are numerous individual-level practice recommendations, which will be outlined below. Please note that this is not an exhaustive list of individual-based practice recommendations. Practitioners should work to evaluate and understand the specific needs of their community when working to design road-safety campaigns.

Distraction / Inattention

Distracted driving and driver inattention have received considerable focus in recent years, mainly due to the role they have on road-related injuries and fatalities. The Canadian Council of Motor Transport Administrators (CCMTA) has developed a strategy focused on distracted driving, which highlights five key elements for managing distracted driving; **1) data collection, research and monitoring** (to effectively track and report on the issue), **2) public education and awareness, 3) legislation and regulations, 4) self-regulation and voluntary agreement, and 5) enforcement** (CCMTA, 2006). It is important to note that in order to fully target driver distraction, a campaign should work to include all of these elements and ensure that key partners have been included and assigned relevant roles. For more information on this strategy and for further examples, please see CCMTA, 2006.

Fatigue

Fatigue is often not thought of as a major road safety issue, but research demonstrates that roughly 20% of fatal collisions involve some form of driver fatigue (Government of Canada, 2011). As this issue has yet to receive a great deal of attention, the main goal of a campaign should be to increase driver awareness of this issue and provide practical steps and environmental supports for

drivers (e.g., signage reminding drivers to not drive fatigued and of rest stops) who may face fatigue. Educational materials should recommend that drivers always sleep well, share driving responsibilities where possible, stop or nap at rest areas, avoid heavy meals and stay hydrated while driving (Government of Canada, 2011). Some communities have implemented roadside signs that remind drivers of the dangers of driving while fatigued and draw attention to exits where tired drivers can stop (Government of Canada, 2011).

Aggressive driving

Aggressive driving encompasses various driver behaviours such as impatience, speeding, tailgating, quick and continuous lane changing, and failure to obey the common rules of the road. Speeding alone has been found to contribute to roughly 27% of fatalities and 19% of serious injuries (Government of Canada, 2011). Various practices have been found to be effective in reducing specific aggressive driving behaviours, including: speed enforcement on roads, speed cameras, legislation (e.g., driver sanctions and vehicle impoundment), and red light cameras (Government of Canada, 2011). Additionally, practitioners should continue to focus on raising the profile and awareness of the dangers of aggressive driving. Efforts should include various communications directed at the aggressive behaviours that are problems within their communities and practical tools (e.g., calming techniques and road side signage reminding drivers to stay calm or where rest stops are for them to take a break) to help drivers control their emotions when they are behind the wheel.

Seatbelts

One of the most well known evidence-based practices for preventing on-road injuries is the use of seatbelts. In fact, when correctly worn they can reduce the risk of fatalities in an on-road incident by 47% and the risk of serious injury by 52% (Government of Canada, 2011). Ontario has legislation that requires all vehicle occupants to wear seatbelts, which provides a strong footing for evidence-based programming. Specifically, programming focused on seatbelt use should use legislation and enforcement to their advantage and design tools that remind the public of the legal requirements and the consequences of not buckling up. There are specific measures that practitioners can apply to increase the effectiveness of these campaigns, including: combining incentive programs with enforcement programs (e.g., rewarding good behaviour – this approach was taken in Quebec in the 1980s), feedback signs on the road (e.g., signs showing the actual use rate which are changed daily), employer support for seatbelt use, and education tools that incorporate important influencers, such as parents and siblings (Government of Canada, 2011). Additionally, *Selective Traffic Enforcement Programs (STEPs)*, (e.g., “seatbelt blitzes”) can use heightened enforcement measures during key times (e.g., holidays) to bring attention to the issue; practitioners should work with their local agencies to organize these within their area.

Alcohol and other drugs

Impairment while driving is all too common in today’s society. In fact, 2008 data demonstrated that roughly 40% of drivers who were fatally injured on the road had consumed alcohol before the incident (Government of Canada, 2011). Similarly, drugs are found in roughly one-third of fatally injured drivers (Government of Canada, 2011). The Criminal Code of Canada includes provisions that are designed to help law enforcement detect and charge for impaired driving. When attempting to implement evidence-based practices around this issue, practitioners should utilize these legalities within the enforcement, education and awareness-raising portions of their

campaigns. Education and awareness-raising is particularly important around drug use, as much of the public is unaware of the effect that drugs have on their driving abilities or the fact that police can detect someone who is under the influence of drugs and do not always apply the idea of drug-related impairment to prescription drugs that can also affect driving ability (Government of Canada, 2011). A practice that is becoming more common involves implementing a community system where concerned drivers can call 911 or a hotline when they suspect that another driver may be under the influence. Mothers Against Drunk Driving Canada and the DRIVE SOBER (previously known as Ontario Community Council on Impaired Driving) are working in Canada to implement these hotlines (Government of Canada, 2011).

New Drivers

One of the most common population-level practices to prevent on-road injuries is Graduated Driver Licensing (GDL). As this document is meant to supplement an Ontario report, only Ontario licensing systems will be discussed. According to the Ministry of Transportation of Ontario (MTO), driving should be considered a privilege, not a right (MTO, 2012) and all Ontarians are required to go through a licensing process that takes a minimum of 20 months to complete (MTO, 2012). During this process, applicants must progress through various levels of licensing and pass specific knowledge, application and physical tests in order to obtain a full licence. In each level, various restrictions are placed on new drivers, such as not being allowed to drive without a fully licensed passenger present and being required to have a zero blood alcohol concentration (BAC) at all times (MTO, 2012). Additionally, there are specific requirements for younger new drivers, such as limitations on the number of youth passengers they can have in the vehicle with them while driving (MTO, 2012). Evaluations have found that GDL programs can reduce collisions between 15-30% (Government of Canada, 2011). Practitioners focusing on injury prevention among new drivers should utilize the rules and regulations of the GDL system as support for their awareness and educational programming pieces.

Children

Children are part of a group of vulnerable road users, due in part to their physical make-up, but also due to the fact that they are passive road users who often do not have a choice of when, where and how they travel on roads. In order to help prevent injuries to children in vehicles, child car seats and booster seats have been designed and applied. It has been found that properly used child car seats and booster seats can reduce the chance of death by 71% and injuries by 67% (Government of Canada, 2011). However, research demonstrates that roughly only 90% of children under 12 months of age, 86% of toddlers (aged 1-3) and 40% of children (aged 4-8) are placed in the correct child car seats or booster seat while in vehicles (Government of Canada, 2011). Evidence-informed practices for increasing the proper use of child car seats and booster seats include educational campaigns for parents/guardians, child restraint clinics, booster seat fitting clinics, grants to subsidize child car seats and booster seats to parents/guardians and working with local physicians and retail stores to provide information to parents/guardians around proper usage (Government of Canada, 2011). More information on specific child car seat and booster seat tips can be found on www.parachutecanada.org.

Youth

Young Canadian drivers between 16 and 24 are overrepresented in on-road injury statistics, as they comprise only 13% of licensed drivers, yet they tend to account for 24% of fatalities and 26% of serious injuries (Government of Canada, 2011). One specific evidence-informed practice that injury prevention professionals can employ includes utilization of the GDL system to support their work and the inclusion of it within their educational and awareness-raising tools. Additionally, parents/guardians should be involved in any and all programming pieces targeted at youth drivers, as they often serve as key teachers for their children and control the time that youth spend in the driver's seat.

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Evidence-Informed Prevention Strategies for Pedestrian Injuries

Overview

As vulnerable road users, pedestrians are at a high risk of injury. Pedestrians are considered to be roadway users who are: not in a motorized or otherwise propelled vehicle, in a wheelchair, or pushing a bicycle or a wheelchair (Office of the Chief Coroner for Ontario, 2012). Pedestrian safety is an important public health concern. In Ontario, more than 2,000 pedestrians were killed between the years of 1988 – 2002 (Office of the Chief Coroner for Ontario, 2012). Pedestrian incidents caused 12,747 emergency room visits in Ontario between 2007 and 2009 (Ontario Injury Prevention Resource Centre, 2012). Children and older adults⁶ experience unique risk factors for being injured as pedestrians. Children lack sufficient knowledge and judgment around roadways to be safe without supervision. Safe Kids Canada, now part of Parachute (2008), reports that more than 30 children younger than age 14 are killed each year as pedestrians. Furthermore, older adults are at a high risk of being fatally injured; adults over the age of 75 accounted for more than 20% of pedestrian deaths between 1988 and 2002 (Office of the Chief Coroner for Ontario, 2012). Public health and injury prevention practitioners can play an important role in reducing injuries and improving road safety for pedestrians.

Risk Factors

There are a number of risk factors that apply to the population in general. For example: alcohol use (as a driver or a pedestrian), high speeds (due to a high speed limit, or due drivers exceeding the limit), urban areas with increased traffic, evening hours (e.g., between 2 and 10 pm), and disobeying crosswalk rules (pedestrians or drivers) are all factors that increase the risk of a pedestrian injury. Around the issue of speed, it has been shown in previous research that when a car travelling 30 km/hr hits a pedestrian the risk of death is 10%, but when the speed of the vehicle increases to 60 km/hr, the risk of death for a pedestrian increases to 100% (Corben & Oxley, 2006). This research is a powerful illustration of the danger created by speed. Other research around pedestrian risks shows that when more pedestrians are visible and present on the roadway, all pedestrians tend to be safer (Leden, 2002). Thus, there is value in promoting active forms of transportation.

There are also risk factors that apply to specific segments of the population. *Children* experience unique risk factors because of their developmental stage. Compared to teenagers and adults, children's peripheral vision is not fully developed, they lack a sense of vulnerability, are not as able to assess risky situations, understand the speed of oncoming vehicles in relation to their own speed, hear warning signals or move quickly out of a dangerous situation. As children get older, some of these developmental characteristics become less of a risk, but risk-taking behaviour increases, which is a risk factor in itself. Risk factors that emerge in the *teenage* years include: a

⁶ As a number of sources were synthesized in preparing this document, the age range used to define children and older adults varied, thus, it has not been defined in our summary. Please refer to the original sources for information regarding the specific ages in each study or resource.

further increase in risk taking behaviour, an invincible attitude and increased use of alcohol and other drugs. The Coroner's Review of Pedestrian Deaths in Ontario (2012) indicated that *older adults* accounted for 36% of all pedestrian-related fatalities. This is quite a disproportion, considering that older adults only represent 13% of the population, and suggests that older adults are at high risk of being seriously injured or killed as pedestrians. A number of reasons could contribute to this risk, such as mobility issues, a possible decrease in cognitive function, and an increasingly fragile physical condition.

The Ontario Coroner's Review (2012) also highlighted the five most common *situations* that lead to fatal injuries. These included: a pedestrian being hit at a mid-block location while crossing, pedestrian being hit on the sidewalk and/or shoulder of the road, a pedestrian crossing without the right of way, a vehicle turning left while the pedestrian was crossing with the right of way, and a vehicle turning right while the pedestrian was crossing with the right of way. These situations represent what appear to be the most dangerous for pedestrians, and the areas where the biggest difference in safety could be made. In sum, there are various risk factors that apply to all pedestrians. However, children and older adults experience unique risk factors, and specific pedestrian circumstances, such as those mentioned in the Coroner's report, seem to present a greater risk as well.

Evidence-informed Practice Recommendations

Coroner's Review of Pedestrian Deaths in Ontario

The Chief Coroner's Report (2012) outlined a number of recommendations to improve pedestrian safety in Ontario. The majority of these recommendations relate to adopting a '*complete streets approach*,' which is described in the report as follows:

"Viewing the road network holistically enables communities to reduce infrastructure costs by designing a transportation network that suits all users at the outset, rather than retrofitting to include pedestrian, cycling or transit amenities later. There are also safety and social benefits to be had by lowering traffic speeds, expanding mobility options, improving air quality, increasing opportunities for physical fitness, and designing more attractive communities." (Office of the Chief Coroner of Ontario, pp. 34, 2012)

In general terms, the complete streets approach involves building roadways that are safe for all road users; pedestrians, cyclists, transit users and motor vehicle drivers. Implementation of this approach will require time, resources and leadership at all levels of government, and cooperation of many sectors. However, the result would be significantly improved safety and long term sustainability.

The Chief Coroner's Report (2012) included the following recommendations for preventing pedestrian fatalities:

Leadership: Leadership at all levels of government will be needed to make the complete streets solution viable. The report outlines specific recommendations for the various ministries involved including: the Ministry of Transportation, Ministry of Municipal Affairs and Housing, Infrastructure Canada and Ontario.

Legislation: The data in the report clearly indicates that high speed leads to fatal pedestrian injuries. Thus, the report recommends legislation that reduces posted speed limits, requires environment modification to support these reduced limits, and enforcement of new limits.

Engineering: In addition to environmental modifications to reduce speed, engineering efforts that would improve pedestrian safety include leading pedestrian signal intervals, non-signalized pedestrian crossings for mid-block crossings, side guards on heavy trucks, and sufficient lighting on both sides of the street.

Education: It is recommended that a coalition between various injury prevention stakeholders work together to deliver pedestrian safety education in the province. A program targeted to older adults is recommended. Further, the Ministry of Transportation and the Ministry of Education are asked to include pedestrian safety education in the school curriculum and in driver training programs. Other research in this area supports this recommendation; a systematic review showed that safety education can improve safety knowledge and safe crossing behaviour in children (Duperrex, Roberts & Bunn, 2009).

Enforcement: The recommendations related to enforcement involve having strict enforcement of laws pertaining to drivers and to pedestrians. Specifically, enforcement of speed limits, yielding to pedestrians, running red lights, distracted driving, crossing while distracted, crossing at an undesignated location, or crossing against the traffic signal in pedestrians would be helpful.

The Coroner's Review (2012) is a comprehensive summary of evidence-informed strategies for preventing pedestrian injuries using the *complete streets* approach. As mentioned, this approach is a long-term solution and will require time and resources.

Strategies for Improving Pedestrian Safety

In addition to long-term solutions such as the complete streets approach, some short term strategies have also been shown to improve pedestrian safety. These strategies include:

Traffic Calming Measures

Research shows that traffic calming strategies can reduce traffic-related injuries and create a safer environment. Traffic calming is described as physical measures introduced into the environment to reduce the negative effects of traffic, alter driver behaviour and create a safer environment for pedestrians. Specific examples include speed bumps, roundabouts or reduced speed limits to *slow traffic*, improved lighting conditions or road surface treatments to *improve visibility*, and one-way streets or road blocking to *redistribute traffic* away from certain targeted areas (Bunn et al., 2003).

Signals at Intersections

At uncontrolled intersections with no signals or stop signs, having an unmarked crosswalk does not improve safety of pedestrians. In fact, research suggests that the risk of being injured actually increases if the road is multi-lane. At controlled intersections, a signal that allows pedestrians to cross with no cars moving in any direction improves safety (Campbell et al., 2004). There is also evidence that having a leading pedestrian interval (LPI) is effective in reducing injuries, which involves starting the pedestrian signal before the traffic signal so pedestrians have started crossing by the time traffic is signaled to move (Fayish & Gross, 2010).

Medians and Curbs

Research suggests that raised medians on multilane roads and curb medians can reduce pedestrian injuries (Campbell et al., 2004).

Bus Stops

Placing bus stops at the far side of an intersection in areas where visibility is high can reduce pedestrian injuries (Campbell et al., 2004; Retting et al., 2003).

Pedestrian Clothing

To improve visibility of pedestrians to drivers, pedestrians should wear clothing that makes them more noticeable. Research indicates that fluorescent colours during the day are best and reflective clothing, flashing lights and head-lamps can improve visibility at night (Campbell et al., 2004; Retting et al., 2003; Kwan & Mapstone, 2009).

Parking

The availability and type of street parking can impact pedestrian safety. Research shows that diagonal parking, rather than parallel parking, can reduce injury rates because pedestrians must look in the direction of oncoming traffic before entering the street. Another strategy is to eliminate street parking, which helps ensure that pedestrians are visible to drivers (Retting et al., 2003).

Urban Sprawl

Urban sprawl is associated with the development of roadways that are inherently dangerous for pedestrians. Roads leading to suburban areas tend to have higher speeds, infrequent intersections and lack sidewalks. Research indicates that sprawling areas have increased pedestrian injuries and fatalities (Frumpkin, 2002). Efforts to improve road conditions and prevent urban sprawl are important for preventing pedestrian injuries.

Mobile Phones

Mobile phones and other handheld distractions can be dangerous for pedestrians in the same way as they are dangerous for drivers. Recent research shows that pedestrians using a handheld device are more likely to make decisions that lead to unsafe crossings at intersections, compared to those not using such a device (Nasar, Hecht & Wever, 2009). It is important to raise awareness around this issue.

Preventing Pedestrian Injuries in Children

Given the developmental characteristics that increase the risk of children being injured as pedestrians, there are a number of prevention strategies that apply specifically to children. In their report on child pedestrian injuries, Safe Kids Canada (now part of Parachute) (2008) recommends three overall strategies to reduce these types of injuries. The first strategy is to *reduce driver speed*. This could be accomplished through legislation that lowers speed limits in residential areas, and through enforcement of this legislation (MacKay et al., 2011). The second strategy is to *encourage guided practice to teach child pedestrian safety*. This is best accomplished when parents are involved in education, when parents model good behavior as well as teach it, and when education includes practical roadside experience (McKay et al., 2011). The American Academy of Pediatrics (2009) also recommends teaching pedestrian safety to children, and highlights the role of paediatricians. Specifically, they should remind parents about the dangers of playing near the street or parked cars, to model the safe behaviour they are teaching, and the importance of active supervision (American Academy of Pediatrics, 2009). Lastly, the third recommendation outlined by Safe Kids Canada (2008) is to *make communities more walkable*. This encompasses many different strategies such as traffic calming measures, modifications to the front of a vehicle that take children into account, and modifications to the environment to make pedestrian areas safer. Many children live close enough to walk to and from school, and active transportation is something that has recently been encouraged. Because of this, many communities have adopted programs that highlight safe and active routes to school. A recent evaluation of this program in New York City shows that since the adoption of this program, pedestrian injuries in school-aged children during school hours have decreased by more than 40% (DiMaggio & Li, 2013).

Preventing Pedestrian Injuries in Older Adults

As mentioned, older adults experience unique risk factors for injury because of increasing fragility of the physical condition with age, decreasing cognitive ability and increasing mobility impairments. Preventing injuries in this population is related to education, vehicle design and the physical environment (Oxley et al., 2006).

Education should relate to:

- Teaching older adults about updated road regulations
- Age-related physical conditions that increase risk (e.g., balance, mobility, sensory) and high-risk behaviours (e.g., avoid stepping off curbs, slippery conditions, crossing at points that are not designated crosswalks)
- Maintaining good physical shape through exercise to maximize mobility

Vehicle design could relate to:

- Speed-alerting devices
- Hazard detecting devices

- The use of daytime running lights at all times
- Bull bars that are made of more forgiving material such as plastic, rather than metal

Environmental changes could relate to:

- Mechanisms to lower driving speeds
- Sidewalks that are well maintained (e.g., free of cracks and potholes) and that are separated from the roadway
- Crosswalk signals that incorporate the walking speed of older adults

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Evidence-Informed Practice Recommendations for Prevention of Poisoning

Overview

Poisoning is one of the leading causes of death from unintentional injury in Canada, and is an important public health issue. According to the Ontario Injury Data Report, poisoning caused more than 38,000 emergency room visits between 2007 and 2009 and a further 1,589 deaths between 2001 and 2005 (Ontario Injury Prevention Resource Centre, 2012). Poison centres across Canada receive 160,000 calls each year. The estimated economic burden of poisoning in 2004 was \$771 million (Safe Kids Canada, 2012). While poisoning can have serious consequences for a person at any age, children and older adults⁷ are at particularly high risk. There has been some controversy around the definition of poisoning because unintentional versus intentional poisoning incidents are difficult to differentiate without substantial evidence. Some research has suggested that injuries recorded as unintentional poisonings may actually be suicides, given the decrease in suicide rate and the corresponding increase of unintentional poisoning fatalities (Rockett et al., 2010). With this debate in mind, our summary of evidence will focus on the prevention of unintentional poisoning injuries and fatalities. More information on intentional injuries can be found in the violence or suicide sections of this report.

Risk Factors

Risk factors for poisoning can be described in terms of high risks groups. Children are at a high risk compared to other age groups because of their natural sense of curiosity and inexperience with harmful substances (Safe Kids Canada, 2012). Older adults also have a relatively high risk for unintentional poisoning for a variety of reasons, including decreased immune function, symptoms of dementia and/or taking multiple medications.

Evidence-Informed Practice Recommendations

There are a number of strategies that can help reduce the risk of poisoning. Many of these strategies are specific to children and older adults, given their unique risk factors, and others apply to the population as a whole. General strategies that apply at the population level will be described next, followed by strategies tailored to children and older adults.

Population level

1. Safe Kids Canada (now part of Parachute), a leader in poison prevention, has recommended a **comprehensive approach** to poison prevention that combines the three E's of injury prevention – education, enforcement and engineering. For example, providing education to parents and community members about the safe storage of medications, enforcing the use of

⁷ As a number of sources were synthesized in preparing this document, the age range used to define children and older adults varied, thus, it has not been defined in our summary. Please refer to the original sources for information regarding the specific ages in each study or resource.

child-resistant closures on medications and locking medication away and out of reach would be a comprehensive strategy.

2. The use of **carbon monoxide detectors** is an important poison prevention strategy. Carbon monoxide is known as the ‘silent killer’ because it has no smell or colour, but can be deadly. Exposure at low concentrations can have negative cardiovascular and neurobehavioral effects, and at high concentrations it can be fatal (Raub et al., 2000). Common appliances found in the home (e.g., furnaces or clothes dryers) can produce carbon monoxide and should be inspected annually. Carbon monoxide detectors should be found on every level of each home and near all sleeping areas (MacKay et al., 2011; Safe Kids Canada, 2012).
3. **Poison control centres** are effective in reducing harm caused by poisoning and can also result in considerable cost savings in emergency room visits (MacKay et al., 2011,). It is important that parents and community members are made aware of their local poison control centre; the phone number should be widely distributed.
4. Since almost all poisonings occur in the home (Mack & Liller, 2010), an effective strategy for prevention is to provide **home safety education** (Kendrick et al., 2008). Research has shown that it can improve safe storage of medication and other harmful household products, and can increase awareness of the poison control centre.

Children

Because of their natural sense of curiosity and tendency to explore their environment, children are at high risk of poisoning from harmful substances found in the home.

1. One of the most important prevention strategies is the **safe storage of medication** (Safe Kids Canada, 2012; Safe Kids Worldwide, 2012). This involves a number of different tactics including:
 - Ensuring that medication has a child-resistant cap (CRC) when possible. One issue around this is that bulk medications are not required to have a CRC. Extra care should be taken when storing such medication.
 - Putting all medications in a locked compartment or cupboard and out of reach.
 - Keeping all medication in original containers, so that in the event of an accidental ingestion the dosage and proper name will be available when calling the poison centre.
 - Do not take medication in front of children (they will naturally want to imitate behaviour) or refer to it as candy.
 - Regularly collect and dispose of old medications following Health Canada’s guidelines (<http://www.hc-sc.gc.ca/hl-vs/iyh-vsv/med/disposal-defaire-eng.php>)
2. **Household products** can be dangerous in the same way as medications; children are unaware of the potential harm associated with these substances and will be naturally curious.

Therefore, many of the same strategies used for storage of medication can be used for household products such as cleaning products (e.g., products containing bleach), car-care products (e.g., windshield washer fluid), or personal hygiene related products (e.g., nail polish remover). These items should be kept in a locked cupboard and always in their original containers (Safe Kids Canada, 2012). This will ensure children do not mistake it for something they are allowed to have (e.g., water bottle) and ensure that the important information on the substance's label is available in incase of an emergency.

3. **Active parental supervision** is extremely important for poison prevention (MacKay et al., 2011). This applies at all times, but especially when visitors come by who may carry medications with them, or when bringing a child to a new environment that may not have potentially harmful products locked up.

Older Adults

It is particularly important to target older adults with poison prevention strategies because of the likelihood of being prescribed one or more medications. Also, older age can result in a natural decrease in immune system functioning, making this group more susceptible to injury.

1. **Safety related to medication** applies differently to older adults compared to children. It is important that older adults are attentive when taking medication; it should never be taken in the dark or in the absence of any corrective lenses that might be required to verify the medication and proper dose. It is also very important to keep medication in its original packaging, because some medications should not be taken with others and the proper dose can vary greatly between medications that may look similar (Centre for Research and Prevention of Injuries, 2013). For a detailed summary of good practices specific to older adults and medication, visit the following link: http://www.capic.org.uk/documents/FS_Poisoning.pdf.
2. **Safe food preparation** is always important to prevent food poisoning. However, because of the natural decrease in immune system functioning that happens with age, this is particularly important for older adults (Centre for Research and Prevention of Injuries, 2013).

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Evidence-Informed Practice Recommendations for Preventing Sports and Recreation Injuries

Overview

The benefits of leading an active lifestyle have been well documented. Being active is important to maintaining good health and participation should be encouraged, however, it is also necessary to recognize and understand the risk of injury associated with these activities. Between the years 2007 and 2009, there were 5,475 hospital admissions and more than 300,000 emergency room visits due to sport- or recreation-related injuries (Ontario Injury Prevention Resource Centre, 2012). By recognizing the risks, we are better able to reduce the rate of injury and maximize health benefits.

Risk Factors

Risk factors for sports- and recreation-related injuries are described as either intrinsic or extrinsic. Intrinsic risk factors are related to the biological or psychological characteristics of an individual, whereas extrinsic factors are related to an individual's surrounding environment (Caine, Maffulli & Caine, 2008). It is important to keep in mind that most previous research has focused on risk factors for specific sports or age groups; thus, not all of the factors discussed will apply to the whole population. This summary will provide an overview of common risk factors and explain the context in which they apply.

Examples of intrinsic risk factors include: previous occurrence of an injury, physical growth characteristics, changes in maturity, fitness level, muscle strength, balance and coordination (Frisch et al., 2009). Individuals who have been previously injured are more likely to re-experience an injury. Young people going through growth spurts are at an increased risk because of factors such as muscle-tendon tightness, vulnerable bones and decreased physical strength (Caine et al., 2008). Changes in maturity level can alter risk-taking behaviour and level of self-control, which may contribute to injury risk (Frisch et al., 2009). Fitness level is an important factor, and research has shown that improving cardiovascular fitness, muscle strength, range of motion and balance before a competitive season begins can decrease injury risk. (Frisch et al., 2009).

Extrinsic risk factors include protective equipment, amount of time spent participating in activities, rules, level of coaching and the culture of an activity/sport (Frisch et al., 2009). Protective equipment should be chosen in accordance with safety standards where they exist. Other considerations are proper fit and regular maintenance of equipment. Research indicates that in high school-aged students, more time spent playing sports increases injury risk (Emery & Tyreman, 2009). Rules and regulations around body contact and the mandatory use of safety equipment can also impact safety. Level of coaching has been associated with injury risk; more experienced coaches tend to have players and teams with fewer injuries compared to coaches with less experience (Caine et al., 2008). Lastly, culture can impact safety in sports or recreational activities as it influences behavioural norms and affects the expectations of players or participants (e.g., competitive level, sitting off while injured, interaction with opponents) (Schiff et al., 2010).

Evidence-Informed Practice Recommendations

The following recommendations are made according to the age⁸ of the participant or player. A section focused on concussion has also been included given the widespread occurrence and serious nature of this type of injury in sport and recreational pursuits. Research has also been dedicated to injury prevention in specific sports and recreational activities. As it is not realistic for public health efforts to focus on one sport only, this research is not examined in great detail. Instead, a table has been prepared that describes the key prevention strategies for each sport and references are provided for further reading.

Sports and Recreation Injuries among Children and Adolescents

In Canada, an estimated 43% of youth aged 12 – 15 participate in sport (Emery & Tyreman, 2009). As such, many injury prevention strategies for children and youth involve efforts to reduce injury in an organized sport setting. The following strategies are supported in the research literature.

1. **Physical training and conditioning** in the preseason has been shown to reduce injuries in youth sport. Balance and proprioceptive training (awareness of one's joint position), preseason conditioning including flexibility, cardiovascular training and strength training, and a structured warm up including strengthening, stretching, plyometrics and sport-specific balance training have shown promising results (Abernethy & Bleakley, 2007; Heidt et al., 2000; Schiff et al., 2010). These intrinsic interventions have been evaluated in isolation and together, in studies examining multiple strategies at once (Schiff et al., 2010). Both types of studies have shown positive results, however, interventions that combine multiple types of training appear to be superior (Abernethy & Blakely, 2007). More research is needed in this area to evaluate the generalizability of these strategies.
2. The use of **protective equipment** is an important injury prevention strategy. Various types of equipment have been evaluated and have shown generally positive results. These include ankle braces in basketball, knee pads in various high school sports, wrist protectors in snowboarding, face shields and protective eyewear in a variety of sports, helmet use in cycling, skiing and snowboarding, and mouthguards (Emery & Tyreman, 2009; Schiff et al., 2010). With regard to knee braces, studies have shown mixed results. Some indicate that knee braces were not effective for preventing knee injuries, and may actually increase the risk of ankle injuries (Abernathy & Bleakley, 2007). More research is required to understand the protective effects of equipment in a general sense, but results suggest that most protective equipment can be beneficial in preventing injury.
3. There is some evidence suggesting **rule changes** can prevent injury. Conclusive evidence exists for rule changes such as wearing a face shield in hockey, or eliminating "spearing" in football (Schiff et al., 2010). A recent study looking at various interventions to reduce injury in hockey showed that rule changes were the most effective, compared to education or cognitive-behavioural interventions (Cusimano, Nastis & Zuccaro, 2013). Mixed evidence exists for other strategies such as fair play initiatives in hockey (Macpherson et al., 2006). Lastly, it is important

⁸ Please note that various sources were used in the preparation of this document and age ranges varied. More information can be found by referring to the original studies.

to consider that rule changes can only be effective if they are enforced by referees/officials and consistently modeled and reinforced by coaches.

Sports and Recreation Injuries among Adults

There is a lack of research examining injury prevention specifically in an adult sport context. However, the strategies discussed above for youth sport should be considered valid for adults as well. Compared to children and youth, adults have fewer opportunities to participate in organized sport, so people tend to begin or remain active by individual type exercise, such as jogging, cycling, swimming and aerobics. Injury prevention during exercise involves the following strategies:

1. According to Canada's physical activity guidelines for adults, health benefits through exercise can be achieved by accumulating 150 minutes of moderate to vigorous physical activity in one week, with muscle and bone strengthening activities performed two days per week (see <http://www.csep.ca>). For those new to exercise, the key to preventing injury is to **start slowly and build gradually**. If a health condition exists that may interfere with a person's ability to exercise, a physician should be consulted before beginning any physical activity. The PAR-Q is a standardized test that assesses a person's health in accordance with starting an exercise program, and highlights any major risks that should be taken into account (Canadian Society for Exercise Physiology, 2002).
2. Another important consideration when beginning to exercise is using **proper equipment**. Appropriate footwear is especially important for preventing injury. Those beginning an exercise program for the first time should ensure they are oriented to new equipment and its correct use. For example, cardiovascular training equipment such as treadmills or stationary bikes are relatively easy to operate by the experienced exerciser, but can be intimidating to a new user. Without proper orientation, these types of machines can be hazardous. Weight machines and free weights also present a risk for injury to the new user if an orientation to its correct use is not provided.

Sports and Recreation Injuries among Older Adults

Exercise by older adults is very important to maintaining good health and mobility. Many older adults are nervous about exercising because they are afraid of falling; however, exercise is extremely important in fall prevention and injury prevention in general. The following guidelines describe the amount and types of exercise that are necessary to help reduce the risk of falling (Sherrington et al., 2011):

1. Exercise should be moderately or very challenging to balance, and should involve reducing the base of support, moving one's centre of gravity, and aim to decrease reliance on upper body support to balance while standing. A good example of such exercise is Tai Chi, which challenges balance through slow controlled movement.
2. In order to have an effect on fall risk, older adults should engage in at least two hours of exercise per week.
3. Exercise needs to be ongoing, as benefits can be rapidly lost.

4. All adults, whether they are at a high risk for falling or living independently in the community, should engage in exercise to prevent falls.
5. Exercise in a group setting or at home has been shown to reduce falls, and many studies have shown positive results when group exercise is supplemented with home exercise.
6. Walking is beneficial and can be included in an exercise program, but not at the expense of balance training. Additionally, adults at high risk for falls should avoid brisk walking, as it has been shown to increase falls among these individuals.
7. Similarly, strength training has many benefits for health and physical fitness. However, it should not be included at the expense of balance training, only in addition to exercises improving balance.
8. Those involved in administering exercise for older adults should be aware of other fall-related risk factors, and suggest a full risk assessment. Multifactorial interventions have been strongly linked to decreased fall risk and it is preferred to implement other appropriate strategies in addition to exercise.

Another reason older adults may avoid exercise is frail health. If an adult has a health problem that could interfere with performing physical activity, it is important to consult a physician before beginning a new program. Conditions such as a recent surgery, unexplained chest pain or breathing difficulties, osteoporosis, arthritis or high blood pressure should be discussed with a physician before exercising (National Institute on Aging, 2011). However, exercise can be adapted to accommodate almost any health condition and is highly recommended because of its ability to improve common health problems associated with advancing age.

Beyond ensuring medical conditions are assessed prior to beginning an activity or program, the same injury prevention principles apply to older adults as in the general population: a slow start, a gradual increase in difficulty and the proper use of equipment. Exercise classes specifically designed for older adults are increasingly available. More information is available through the Centre for Active Aging at Western University, <http://www.uwo.ca/actage/>.

Concussion

Concussion has been recognized as a significant risk related to participation in sport and recreation activities for all age groups. Research by the Centers for Disease Control and Prevention examining the epidemiology of concussion in the United States estimates that between 1.6 and 3.8 million concussions occur in sports and recreational activities each year (Daneshvar et al., 2011). The Canadian Institute for Health Information reported that between 2003 and 2004, head injuries sustained during sport or recreational activity were the third leading cause of traumatic head injury hospital admission in Canada (CIHI, 2006). One of the guiding documents in the field of concussion research is the *Consensus Statement on Concussion in Sport*, prepared by the world's leading experts on concussion at the 4th International Conference on Concussion in Sport, held in Zurich (McCroory et al., 2013). The most recent version was released March 12, 2013. The link to the full article is available on Parachute's website: <http://www.parachutecanada.org/injury-topics/item/consensus-statement-on-concussion-in-sport-with-new-resources>.

Risk factors for Concussion

Specific risk factors for concussion include: having previously had a concussion, the number and severity of previous concussions, sex, age, and the sport or recreation activity played (Harmon et al., 2013). As with other sports injuries, when someone has experienced a previous concussion, they are at increased risk of re-injury. With concussion, this is particularly problematic because repeat concussions can lead to slower recovery and more severe symptoms, which have been linked to chronic traumatic encephalopathy (CTE). When symptoms of a concussion are more severe, recovery is likely to take longer. Data suggests that females experience concussion more often than males, but this trend could exist simply because females may be more likely to report the injury. Because the brain is not fully developed, youth are more likely to experience severe symptoms and longer recovery times than adults. Lastly, contact between players is the most common cause of sport-related concussion; thus, contact sports present a greater risk (Harmon et al., 2013).

Prevention

It is not realistic to prevent all incidents of concussion due to the physical nature of many sports and recreational activities. However, efforts can certainly be made to reduce the number of concussions that occur, and to properly treat these injuries to minimize harmful effects.

1. According to a recent position statement released by the American Medical Society for Sports Medicine (Harmon et al., 2013), athletes should complete a **pre-participation exam** that asks about history of concussions or head injuries, and the presence of learning disabilities, mood disorders or migraines. Coaches and trainers can use this information to identify high-risk athletes.
2. When a concussion or head injury is suspected, the athlete should be assessed on the sidelines as soon as any required first aid is completed (McCrory et al., 2013). There are a number of tools that have been developed for assessment purposes. **The gold standard assessments** are: the Sport Concussion Assessment Tool 3 (SCAT3) and the SCAT3 for children, which were recently updated along with the concussion consensus statement in Zurich (McCrory et al., 2013). Another valuable tool is the concussion recognition tool (CRT). These assessments are accessible on Parachute's website: <http://www.parachutecanada.org/injury-topics/item/consensus-statement-on-concussion-in-sport-with-new-resources>
3. Following a concussion, athletes should be examined and **monitored carefully for symptoms** that may appear after the injury. Symptoms are not always apparent right away and may be delayed as long as two days following the injury. Drugs that alter one's mental state should be avoided if possible, to ensure possible symptoms are not overlooked (Harmon et al., 2013). Physical and cognitive rest is very important to recovery and should be strictly adhered to.
4. There have been guidelines developed for **returning to sport and physical activity** following a concussion (McCrory et al., 2013). These guidelines are from the updated Zurich consensus statement for concussion in sport, and are regarded as the gold standard (McCrory et al., 2013). The first stage is no activity, and the individual focus is on recovery. The next stage is light aerobic exercise, where a slight increase in heart rate is acceptable. Next, sport-specific exercise is recommended, where the movements associated with the activity are performed.

Then, non-contact training drills are completed, and only if the participant remains symptom free, is full contact practice introduced. Once all of these stages are completed and the participant remains symptom free, then a full return to their activity can occur. It is recommended that each stage take at least 24 hours, but it is important to emphasize that this is an *individual* process and if at any point symptoms are experienced, rest is needed before trying again to progress through the stages (McCroory et al., 2013).

5. **Education** can help improve the recognition, management and prevention of concussion (Tator, 2012). Education should target players/participants, coaches and trainers, parents, and other officials involved in organized sport and recreation activities such as referees, management and teachers. Further, health care professionals can benefit from education as to the risk factors, symptoms and guidelines for gradually returning participants to full activity. Educational strategies include concussion road shows, websites, cards (sport-specific cards containing symptoms and return to play guidelines), and mandatory concussion education. Mandatory education for players, parents and coaches of high school athletes has been implemented in many jurisdictions in the United States. Evaluation of these programs is needed, but they are designed to improve recognition and reporting of concussions, to prevent long-term damage and to ensure return-to-play protocols are followed. A similar strategy has been to hold pre-season or pre-activity meetings on concussion, or viewing of concussion videos (Tator, 2012).
6. **Legislative prevention strategies** addressing other injury-related issues have had previous success and show promise for preventing concussions (Tator, 2012). Previous examples include the introduction of new rules in football and hockey. In football, forms of tackling referred to as “spearing” and “clothes lining” are no longer allowed, and this has led to a reduction in the number of spinal and head injuries. In hockey, enforcing the rule of no body checking from behind has been important in preventing concussions (Harmon et al., 2013). It is important to note that rule changes are effective only if coaches consistently model these rules and officials consistently enforce them (Harmon et al., 2013).
7. Another prevention strategy is to **limit the number of contact practices** allowed in one week; this strategy has been adopted by some schools at the college level in the United States for football, lacrosse and soccer. In practice, it is also important to emphasize proper technique for high risk moves such as tackling, body checking or heading a ball in soccer (Harmon et al., 2013).

Injury Prevention for Specific Sports and Activities

The table provided in the appendix summarizes Scanlan et al.’s (2001) detailed review of injury prevention strategies related specifically to baseball, basketball, bicycling, football, hockey, rugby and soccer. More detailed information can be found in the full article.

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Appendix

Table 1: Prevention strategies in various organized sports.

Sport	Prevention Strategies to Reduce Injury			References
	<i>Education</i>	<i>Equipment / Engineering</i>	<i>Enforcement</i>	
Baseball		The use of breakaway bases has been shown to reduce injuries among college athletes caused by sliding into base	Due to the high number of shoulder injuries reported by pitchers due to repetitive throwing action, it has been suggested that the number of innings young pitchers play per game be standardized	Scanlan, McKay, et al. 2001
Basketball	Preseason conditioning can help athletes be physically prepared and less likely to experience an injury	The use of high top shoes and ankle braces can be effective in reducing ankle injuries		Scanlan, McKay, et al. 2001
Bicycling	Education and safety training programs, such as CAN-BIKE, can improve safe riding behaviour	Helmet use is effective in preventing head injuries	Helmet legislation can improve rates of wearing helmets	Scanlan, McKay, et al. 2001

Football	<p>Preseason training and being in good physical shape is important</p> <p>Coaches should be educated on new injury prevention developments</p>	<p>Helmets should meet safety standards</p> <p>All equipment should be maintained, replaced if needed, and fit properly</p> <p>The use of protective knee braces has mixed results; these should be available for players who need them.</p> <p>Playing surfaces should be well maintained</p>	<p>Rule changes that eliminated spear tackling were very effective; future rule changes that reduce roughness could be considered based on this success</p>	Scanlan, McKay, et al. 2001
Ice Hockey	<p>Coaches should be skilled enough to teach players about high risk scenarios and how to avoid them</p>	<p>Helmets and face protection should be mandatory for all players</p> <p>Equipment should be evaluated and replaced when necessary</p>	<p>Rules such as no checking from behind, no high sticking and no fighting (certain leagues) need to be consistently enforced</p> <p>Rules of fair play could be developed and enforced, in addition to regular rules</p>	Scanlan, McKay, et al. 2001
Rugby	<p>Preseason conditioning is important</p>	<p>Players should wear mouthguards during practice and games</p>	<p>Coaches and officials should strictly enforce fair tackling rules</p>	Scanlan, McKay, et al. 2001
Soccer	<p>Some evidence exists to support proprioceptive training and strength training, but more research is needed</p>		<p>Guidelines to prevent heat exhaustion could be developed and enforced</p>	Scanlan, McKay, et al. 2001

<p>Skiing and Snowboarding</p>	<p>While rigorous research is not available to support the effect of ski lessons for beginners, they are still recommended as an injury prevention strategy</p>	<p>Proper fit and adjustment of ski bindings</p> <p>Helmet use decreases risk of head injury</p>		<p>Scanlan, McKay, et al. 2001</p>
<p>Snowmobiling</p>	<p>The majority of injuries occur among young adults who are male; educating this demographic about speed and following designated trails is important</p> <p>The Canadian Red Cross recommends that water should have 10 inches of ice before it is safe for snowmobiles</p>	<p>Clearly, wearing a helmet while snowmobiling is very important for injury prevention</p>	<p>ThinkFirst Canada (now part of Parachute) has recommended that graduated licensing be introduced for snowmobiling</p>	<p>Ontario Injury Compass, 2008</p> <p>ThinkFirst Canada, 2008</p>

Evidence-Informed Practice Recommendations for the Prevention of Suicide

Overview

Suicide, defined by the World Health Organization as the act of deliberately killing oneself, is an important public health issue. In Canada, it occurs at a rate of 11.5 per 100,000 people and is ranked as one of the ten most common causes of death (Statistics Canada, 2012). The total economic burden of suicide and self-harm has been estimated at approximately \$707 million (SMARTRISK, 2009). However, this economic data highlights the need to clarify the differences between suicide and self-harm.

Definitions

Unlike suicide, self-harm does not have one unanimously accepted definition. One way it has been conceptualized is “intentional self-poisoning or self-injury, irrespective of type of motive or the extent of suicidal intent (Hawton, Saunders & O’Connor, 2012).” It is important to understand the distinction between these concepts; suicidal intent does not have to exist for self-harm to occur. Research tells us that some acts of self-harm are accompanied with an intention to end one’s life, while in other situations, this intention is absent. These behaviours are commonly referred to as non-suicidal self-injury (NSSI) (Soomro, 2008). NSSI has been correlated with subsequent suicide attempts (Hamza, Stewart, Willoughby, 2012; Wilkinson & Goodyer, 2011), but still represents a unique behaviour and can require distinctive interpretation and interventions. One issue around this is that injury-related data does not always reflect the differences between these two self-harming behaviours and it can be difficult to differentiate the two when simply using data at face-value.

There are two main reasons for this difficulty in interpreting data around self-injury. First, hospitals report injury data in terms of emergency room visits, hospitalizations and deaths. Second, the ICD 10 codes often used to track data are related to self-harm (see ICD codes X60 – X84). Thus, if a death does *not* occur due to self-harm, it would be tracked as either an emergency room visit or a hospitalization, but there will be no distinction regarding intent of the self-harming behaviour. Therefore, the tracking of data does not allow for a proper distinction between the two concepts. Readers should recognize the limitations around data collection and avoid interpreting the data as a continuum of one issue.

For the purposes of this report, it is important for readers to understand the distinction between the concepts of self-harm and suicide. We will summarize evidence-informed practices that relate to suicide prevention. The prevention of self-harm, while also an important issue, will not be discussed here as it is beyond the scope of this summary to discuss both concepts.

A Complex Issue

The definition of suicide does not accurately convey the complexity of this issue. As stated in the book *Suicide Risk Management: A Manual for Health Professionals*, “understanding suicide is unachievable (Chehil & Kutcher, 2007, pp. vi).” Suicide is the end point of a complex process that involves many possible determinants including cultural, geographic, religious, social, family and individual factors (Chehil & Kutcher, 2012). Thus, finding a solution to this issue will not be easy. The most effective efforts will take a community approach and involve collaboration of multiple stakeholders. There are many challenges associated with this type of work, and community-based efforts help ensure everyone involved feels supported.

Risk and Protective Factors

Research devoted to understanding the risk factors for suicide has allowed us to gain a better understanding of this issue. However, before identifying these factors, it is critical to recognize that this research is correlational. That is, even if strong links are found between risk factors and suicide, no single factor can be said to cause this event. There may be times where a person exhibits many known risk factors and does not die by suicide, and also times where a person shows no warning signs at all, and does die by suicide. Moreover, research shows that the extent to which various risk factors correlate with suicide varies between factors. With this in mind, there is value in identifying risk factors because it can help professionals determine which segments of the population have the highest overall risk (Chehil & Kutcher, 2012).

In the general population, the most prominent risk factors for suicide include the *presence of a mental illness* (particularly mood disorders, such as major depression), and *having made a previous suicide attempt* (Schwartz et al., 2009). Other strongly correlated risk factors include: drug and alcohol abuse, hopelessness, family history of suicide, poor physical health, experiencing a sudden change or loss of loved one, and access to lethal means (Chehil & Kutcher, 2012; Miller & Eckert, 2009). Protective factors include positive family relationships, perceived social support, reduced access to lethal means, ease of access to mental health care services, and having strong religious beliefs (Schwartz et al., 2009). There is also evidence supporting the existence of gender and age-specific risk factors. Males are more likely to die by suicide, whereas attempted suicide occurs more often in females. Possible explanations offered for this trend include: men may be less likely to seek help for mental illness, men often act more impulsively than women, and men experiencing depression may have higher rates of alcohol and drug use compared to women (which can compound suicide risk). With regards to age, trends indicate that suicide rates increase as age increases. However, data shows that rates peak for adolescents/young adults and the elderly. The highest suicide rates are found among men over the age of 80 (Wilson & Gauvin, 2012).

Evidence-Informed Practices for Prevention

The need for suicide prevention has been recognized and prevention strategies have been developed and evaluated. It is important to note that evaluation of prevention strategies is difficult due to the relatively low base rate of suicide (e.g., a controlled study would require an unrealistically large sample) (Nordentoft, 2011). Much of the evidence pertaining to suicide

prevention comes from ecologically based research, which does not allow for potentially confounding environmental factors to be eliminated. There is also a reliance on proxy outcome measures such as suicidal thoughts, suicidal intent, or suicidal behaviour, and the rates of such indicators are much greater than the rate of death by suicide. The following suicide prevention strategies are based on the best available research findings. They have been categorized according to individual level, community level and school-based strategies.

Individual

1. **Improve treatment of mental illness.** One of the most important individual level strategies for suicide prevention is improving the identification and treatment of mental disorders through educating medical professionals. Research shows that the majority of people who die by suicide are likely to be experiencing mental health difficulties at the time of their death (Mann et al., 2005). In fact, many people have contact with a medical professional in the month before their death. Typically, primary care physicians do not receive specific training in recognizing mental illness and risk factors for suicide. Educating physicians to recognize these risk factors and intervene with patients in crisis has been shown to reduce suicide attempts and improve treatment of depression (Bruce et al., 2004). The American Association of Suicidology offers a one-hour, online training course that provides medical professionals with the knowledge required to integrate suicide assessment into routine visits. More information on this course is available here: <http://www.suicidology.org/education-and-training/recognizing-responding-suicide-risk-primary-care>
2. **Identify and support previous suicide attempters.** Another individual level strategy is the management of persons who have made a previous suicide attempt, since these individuals are known to be at high risk for attempting suicide again. This involves identifying individuals at risk, ensuring any necessary treatment for a mental illness is provided, removing lethal means, appropriate monitoring of the individual (e.g., take necessary steps to ensure safety through supervision, admission to inpatient unit, etc.) and maintenance of regular contact. A number of strategies for maintaining contact with a person after a suicide attempt have been evaluated and appear to be promising (Beautrais et al., 2007):
 - Provision of 'green cards' (encouraging help seeking and providing crisis centre contact information)
 - Regular receipt of a postcard containing a caring message
 - Regular telephone calls to individuals to monitor treatment

Community

1. **Reduce access to lethal means.** Some evidence indicates that reducing access to lethal means is effective in preventing suicide. Such strategies include restricting firearm sales and use, the availability of pesticides, barrier construction at jumping sites (e.g., bridges), changes to prescription drug policies (e.g., restriction of amounts available for pick up), and vehicle emissions of carbon monoxide (Beautrais et al., 2007). These efforts help reduce suicides in

which each particular method is used and can help reduce impulsive acts (Mann et al., 2005). The most effective strategies will sometimes depend on common methods in individual communities. For example, firearms are more accessible in the United States compared to Canada, so efforts to restrict firearms may be more effective in various States than in Canada, where more common methods include asphyxiation (Wilson & Guavin, 2012). It is important to note that some research suggests limiting access to lethal means may result in method substitution. That is to say, suicide may not actually be *prevented*; a person may end up choosing another method. However, reducing access to lethal means appears to be a promising strategy for preventing suicide.

2. **Gatekeeper training.** Another strategy that can be implemented within a community is gatekeeper training. A gatekeeper is someone who regularly interacts with members of the community. Typical gatekeepers include teachers, mental health professionals, police officers, paramedics, social workers and clergy. In gatekeeper training, these individuals learn to recognize signs of mental illness and risk factors for suicide, and they practise proper communication with individuals at risk, to ultimately increase help seeking and treatment. Evaluations of these programs show they are successful in increasing gatekeeper knowledge and awareness, and in some cases, lowering suicide rates (Knox et al., 2003). Programs offered locally include the Canadian-developed programs, safeTALK and ASIST. SafeTALK is a three hour training session for anyone aged 15 and over that teaches skills to recognize and respond to people who express suicidal thoughts or behaviours. ASIST is a two-day training session that helps prepare caregivers to identify risk factors and prevent suicide. More information on both of these programs can be found here: <http://www.livingworks.net/training/find>.

Another promising program is the *Community Helpers* program that has been implemented in Alberta. This program uses an anonymous community survey to identify adults in the community who youth seem to already turn to for support; these adults are called natural helpers. The *Community Helpers* program works to identify these community leaders and provide them with the knowledge and support required to link at-risk youth to community support services.

3. **Education and Awareness Campaigns.** Another community-based strategy is providing education and awareness programs. These programs are designed to improve mental health literacy, encourage help-seeking behaviour and reduce stigma associated with suicide and mental health. While these interventions are popular and intuitively seem important, the effects are difficult to evaluate and rigorous evidence to support their use is somewhat lacking. Research shows that public knowledge and awareness is typically improved, but changes in actual behaviour, such as help seeking, are not as common. Further, there is a lack of evidence that directly links these programs with reductions in suicide rates. Nevertheless, improving knowledge and awareness of mental illness and suicide at the community level is important for reducing stigma and encouraging treatment. Examples of these programs include: Mental Health Week (Canadian Mental Health Association), National Suicide Prevention Week (American Association of Suicidology), Mental Health First Aid training (Mental Health Commission - <http://www.mentalhealthfirstaid.ca>).
4. **Media Reporting Guidelines.** Research has shown that the way suicide is reported in the media can affect behaviour and either contribute to or reduce future suicide attempts

(Beautrais et al., 2007). This idea originated more than 200 years ago, when a German novelist's book was banned due to the large number of people who chose to end their lives in the same manner as the book's main character. This has been labeled the Werther Effect. In Austria, media guidelines were introduced and evaluated after a number of similar suicides involving the subway occurred within weeks of each other. When the media changed the way in which these stories were written, subway related suicides significantly declined. This effect is known as 'suicide contagion.' Evidence supporting the existence of this effect has led to the development of media guidelines to be used when reporting on suicide. In Canada, guidelines developed by the Canadian Psychiatric Association include the following recommendations:

- Reporters should **avoid**: using 'suicide' in the headline, using photos, describing the method, front page stories, romanticizing or glorifying the suicide in any way, giving the idea that suicide is unexplainable or a solution to problems
- Reporters should **include**: available treatment and community resources, warning signs for suicide, how to approach a suicidal person
- For more information on media guidelines in Canada -<http://publications.cpa-apc.org/media.php?mid=733&xwm=true>

However, there is some controversy around this topic due to the lack of direct evidence on suicide rates, and the emergence of social media adds another layer of complexity. We also have to differentiate between contagion and a clustering phenomenon. Sometimes there are groups of death by suicide that occur in a community without any direct link between them. This is a statistical anomaly and not contagion due to media

School-Based Programming

In addition to the aforementioned individual and community-based strategies, there have been many school-based programs developed around the issue of suicide prevention. These programs can be found through the National Registry of Evidence-Based Programs and Practices (NREPP), a U.S. based resource that lists various programs according to the level of research evidence available to support their use. While the following programs have strong evidence according to their inclusion in the NREPP database, there is mixed evidence supporting school-based programming. Some research has indicated that certain aspects of suicide prevention programs in schools can be harmful. Moreover, many of these programs are based on U.S. data. Therefore, any school-based initiative should be implemented according to the best available research evidence and must be evaluated on an ongoing basis to monitor the effects of the program. Examples of programs listed in NREPP are:

CARE (Care, Assess, Respond, Empower). This program targets high-risk youth and involves a suicide assessment and one brief counselling session. More information, as well as training for the program is available via the program developer, Reconnecting Youth, on their website www.reconnectingyouth.com.

CAST (Coping and Support Training). This program was designed to be delivered in a high school setting by trained teachers or school nurses. It has 12 sessions, each one hour in length,

and focuses on mood management, improved school performance and decreased use of drugs and alcohol. Training is available through the developer, Reconnecting Youth (www.reconnectingyouth.com).

LEADS (Linking Education and Awareness of Depression and Suicide). LEADS is a high school based curriculum involving three sessions, each one hour in length. It is delivered by teachers and designed to increase students' knowledge of depression, suicide and how to get help. Training is available. More information about this program can be found here: <http://www.save.org/leads>.

Lifelines. This program takes a school-wide approach in that it offers training for administration, teachers, parents and students. Activities include: developing administrative guidelines for dealing with students at risk, training for teachers, information for parents and a curriculum for students. It encourages the idea that suicide should be talked about and never kept a secret. Training is available for this program and more information can be found by contacting the developers: <http://www.hazelden.org/web/public/lifelines.page>

Reconnecting Youth. This program was developed for high-risk students that have a history of or are likely to drop out of school. It is one semester long and students receive a credit for taking it. Evaluations show significant reductions in drug use, drop out rates, depression symptoms and suicidal behaviour. Training is available for this program and more information can be found on the website, www.reconnectingyouth.com.

Postvention

Postvention refers to the activities and procedures that follow a death by suicide. Postvention efforts can play a critical role in suicide prevention, as the occurrence of a suicide can be a risk factor in itself for subsequent suicides, by increasing the likelihood of other people viewing suicide as an option (Headspace, 2012). This is especially true for young people. Therefore, a number of resources have been developed outlining evidence-informed postvention procedures for school communities. One resource developed for secondary schools in Australia is organized according to the events that should take place as an immediate response to a suicide, and in the following month and school year. The immediate response should be focused on ensuring the safety of students and staff at the school, finding out the facts to stop the spread of rumors, and providing immediate support to the students and staff affected. The first 24 hours involves setting up support networks for students and staff in the school, and verifying the facts of the crisis. Staff must be informed about the crisis and need to be directed to provide consistent messaging to students regarding what happened. This should be done in small groups, not via a school assembly, which has been shown to be harmful. The week following a suicide should be focused on maintaining a regular routine at school, providing support for students, liaising with the affected family members and documenting all of the school's activities related to the postvention program. During the months following a suicide, it is important to be proactive by planning for potentially traumatic events such as the release of the yearbook, anniversaries, and other significant events. Lastly, an incident report must be completed. More detailed information can be found in the following resources:

- Headspace: Suicide Postvention Toolkit 2012. www.headspace.org.au/schoolsupport.com
- Youth Suicide Prevention School-Based Guide. (2012). University of South Florida. <http://theguide.fmhi.usf.edu/>

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