

# ONTARIO REGIONAL INJURY DATA REPORT

Central East

Central West

Eastern

Northern

South West

**Toronto**

produced by



Ontario Injury 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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This report can be downloaded at

[www.oninjuryresources.ca](http://www.oninjuryresources.ca)

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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.

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<sup>1</sup> 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](http://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.<sup>2</sup> 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.<sup>3</sup> 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.<sup>4</sup> 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

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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](http://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

## Toronto 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](http://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.

# TOR 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	12 1.7	9 1.2	10 1.4	7 .9	8 .9	16 .7	18 .8	15 .9	<5 /	<5 /	<5 /	<5 /	<5 /	<5 /	107 .8
	Hosp	9 1.2	<5 /	<5 /		<5 /	<5 /	<5 /	<5 /	<5 /	<5 /	<5 /		<5 /	<5 /	32 .3
Animate	ER	1,183 163.4	1,460 197.2	2,372 327.0	2,515 332.1	1,875 205.8	2,951 334.7	2,400 207.2	2,053 116.5	724 108.0	559 106.0	414 87.1	359 81.4	300 80.8	342 77.3	19,507 150.3
	Hosp	16 2.2	17 2.3	28 3.9	47 6.2	36 4.0	69 3.2	47 2.1	33 1.9	9 1.3	9 1.7		<5 /	8 1.8	11 3.0	22 5.0
Inanimate	ER	7,706 1064.4	5,443 735.3	6,074 837.3	8,102 1069.9	10,022 1100.0	18,540 846.0	16,279 727.3	13,453 763.6	4,470 666.7	3,135 594.7	1,944 409.1	1,555 352.5	1,321 355.9	2,068 467.4	100,112 771.5
	Hosp	123 17.0	61 8.2	73 10.1	121 16.0	149 16.4	195 8.9	205 9.2	218 12.4	84 12.5	42 8.0	50 10.5	42 9.5	59 15.9	116 26.2	1,538 11.9
Falls	ER	12,724 1757.5	8,552 1155.4	9,022 1243.6	5,529 730.1	5,468 600.1	10,766 491.3	11,607 518.6	14,033 796.5	6,703 999.8	6,093 1155.7	5,134 1080.3	5,921 1342.1	7,101 1913.0	19,117 4321.1	127,770 984.6
	Hosp	251 34.7	308 41.6	207 28.5	183 24.2	187 20.5	509 23.2	712 31.8	1,096 62.2	591 88.2	688 130.5	752 158.2	987 223.7	1,571 423.2	5,737 1296.8	13,779 106.2
Off-Road	ER	6 .8	18 2.4	67 9.2	94 12.4	94 10.3	160 7.3	96 4.3	131 7.4	32 4.8	21 4.0	24 5.1	15 3.4	5 1.4	13 2.9	776 6.0
	Hosp			<5 /	7 .9	9 1.0	14 .6	6 .3	11 .6	5 .8	5 1.0	<5 /	<5 /		<5 /	66 .5
Pedal Cyclist	ER	195 26.9	775 104.7	1,134 156.3	767 101.3	768 84.3	1,552 70.8	1,390 62.1	1,206 68.5	355 53.0	235 44.6	107 22.5	73 16.6	59 15.9	38 8.6	8,654 66.7
	Hosp	5 .7	32 4.3	36 5.0	28 3.7	28 3.1	66 3.0	96 4.3	101 5.7	37 5.5	23 4.4	16 3.4	8 1.8	12 3.2	6 1.4	494 3.8
Pedestrian	ER	76 10.5	131 17.7	232 32.0	330 43.6	391 42.9	527 24.1	514 23.0	506 28.7	179 26.7	180 34.1	136 28.6	141 32.0	119 32.1	158 35.7	3,620 27.9
	Hosp	12 1.7	14 1.9	25 3.5	30 4.0	39 4.3	50 2.3	67 3.0	65 3.7	38 5.7	35 6.6	36 7.6	36 8.2	37 10.0	51 11.5	535 4.1
Playground	ER	431 59.5	1,196 161.6	300 41.4	28 3.7	11 1.2	11 .5	9 .4	8 .5		<5 /	<5 /	<5 /			1,999 15.4
	Hosp	35 4.8	125 16.9	24 3.3	<5 /	<5 /	<5 /		<5 /							192 1.5
Poisoning	ER	868 119.9	177 23.9	164 22.6	511 67.5	728 79.9	1,313 59.9	1,176 52.5	1,019 57.8	352 52.5	255 48.4	177 37.2	144 32.6	149 40.1	235 53.1	7,268 56.0
	Hosp	74 10.2	16 2.2	15 2.1	33 4.4	39 4.3	76 3.5	95 4.2	144 8.2	53 7.9	44 8.4	35 7.4	40 9.1	51 13.7	90 20.3	805 6.2
Road MV	ER	275 38.0	324 43.8	369 50.9	1,097 144.9	2,318 254.4	4,019 183.4	3,513 157.0	3,137 178.1	1,106 165.0	806 152.9	556 117.0	489 110.8	428 115.3	513 116.0	18,950 146.0
	Hosp	9 1.2	8 1.1	7 1.0	42 5.6	102 11.2	157 7.2	123 5.5	145 8.2	55 8.2	54 10.2	37 7.8	42 9.5	53 14.3	86 19.4	920 7.1
Scald/ burn	ER	771 106.5	187 25.3	178 24.5	328 43.3	506 55.5	850 38.8	775 34.6	700 39.7	243 36.2	179 34.0	125 26.3	73 16.6	99 26.7	129 29.2	5,143 39.6
	Hosp	63 8.7	7 1.0	7 1.0	15 2.0	8 .9	25 1.1	32 1.4	43 2.4	15 2.2	10 1.9	18 3.8	5 1.1	10 2.7	27 6.1	285 2.2
Sports	ER	1,490 205.8	2,013 272.0	5,979 824.2	4,715 622.6	3,947 433.2	7,084 323.3	5,394 241.0	4,372 248.2	1,385 206.6	988 187.4	653 137.4	518 117.4	461 124.2	531 120.0	39,530 304.6
	Hosp	<5 /	14 1.9	83 11.4	71 9.4	68 7.5	154 7.0	140 6.3	109 6.2	33 4.9	28 5.3	26 5.5	26 5.9	17 4.6	45 10.2	818 6.3
Suffocation	ER	49 6.8	7 1.0	5 .7	7 .9	18 2.0	19 .9	25 1.1	27 1.5	12 1.8	16 3.0	14 3.0	11 2.5	20 5.4	80 18.1	310 2.4
	Hosp	6 .8	<5 /			<5 /	7 .3	10 .5	15 .9	10 1.5	10 1.9	18 3.8	17 3.9	23 6.2	69 15.6	189 1.5
Inter-personal	ER	36 5.0	76 10.3	378 52.1	2,332 307.9	2,814 308.9	3,516 160.4	2,685 120.0	1,903 108.0	439 65.5	216 41.0	95 20.0	83 18.8	71 19.1	85 19.2	14,729 113.5
	Hosp	10 1.4	<5 /	18 2.5	165 21.8	177 19.4	211 9.6	176 7.9	127 7.2	23 3.4	10 1.9	6 1.3	6 1.4	5 1.4	13 2.9	950 7.3
Self-Harm	ER	7 1.0		80 11.0	562 74.2	618 67.8	977 44.6	834 37.3	691 39.2	173 25.8	110 20.9	44 9.3	43 9.8	32 8.6	58 13.1	4,229 32.6
	Hosp			27 3.7	174 23.0	163 17.9	240 11.0	231 10.3	212 12.0	61 9.1	52 9.9	26 5.5	18 4.1	18 4.9	32 7.2	1,254 9.7
TOTAL	ER	25,309 3495.8	18,616 2515.0	24,462 3371.9	25,973 3429.8	28,917 3173.8	51,324 2342.0	46,047 2057.3	42,765 2427.4	16,080 2398.4	12,710 2410.8	9,367 1971.0	9,380 2126.2	10,142 2732.2	23,331 5273.6	344,423 2654.1
	Hosp	530 73.2	609 82.3	553 76.2	918 121.2	1,011 111.0	1,778 81.1	1,944 86.9	2,323 131.9	1,014 151.2	1,011 191.8	1,030 216.7	1,237 280.4	1,869 503.5	6,298 1423.6	22,212 171.2



## TOR 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
<b>Drowning</b>	<5 /	7 1.0	<5 /	<5 /	8 .9	8 .4	9 .4	12 .7	<5 /	<5 /	<5 /	<5 /	6 1.6	13 2.9	<b>82</b> .6
<b>Animate</b>								<5 /				<5 /			<b>&lt;5</b> /
<b>Inanimate</b>								<5 /				<5 /			<b>&lt;5</b> /
<b>Falls</b>	<5 /	<5 /		<5 /	<5 /	10 .5	27 1.2	42 2.4	24 3.6	28 5.3	47 9.9	82 18.6	113 30.4	664 150.1	<b>1,045</b> 8.1
<b>Off-Road</b>			<5 /	<5 /	5 .6	<5 /	8 .4	7 .4	<5 /	<5 /	<5 /	<5 /	<5 /		<b>34</b> .3
<b>Pedal Cyclist</b>			<5 /	<5 /	<5 /	<5 /	<5 /	<5 /		<5 /	<5 /	<5 /			<b>14</b> .1
<b>Pedestrian</b>	<5 /	<5 /	5 .7	12 1.6	8 .9	17 .8	19 .9	31 1.8	6 .9	11 2.1	16 3.4	14 3.2	20 5.4	35 7.9	<b>198</b> 1.5
<b>Playground</b>															
<b>Poisoning</b>	<5 /	<5 /		<5 /	13 1.4	61 2.8	112 5.0	120 6.8	18 2.7	8 1.5	<5 /	7 1.6	6 1.6	16 3.6	<b>371</b> 2.9
<b>Road MV</b>	<5 /	<5 /	5 .7	27 3.6	46 5.1	59 2.7	50 2.2	30 1.7	24 3.6	10 1.9	10 2.1	16 3.6	13 3.5	29 6.6	<b>324</b> 2.5
<b>Scald/ burn</b>	5 .7	<5 /	<5 /	<5 /		7 .3	9 .4	11 .6	7 1.0	6 1.1	<5 /	9 2.0	12 3.2	6 1.4	<b>81</b> .6
<b>Sports</b>									<5 /						<b>&lt;5</b> /
<b>Suffocation</b>	<5 /		<5 /	<5 /		<5 /	7 .3	6 .3	7 1.0	<5 /	6 1.3	14 3.2	25 6.7	115 26.0	<b>191</b> 1.5
<b>Inter-personal</b>	10 1.4	<5 /	5 .7	32 4.2	57 6.3	73 3.3	40 1.8	27 1.5	10 1.5	7 1.3	<5 /	<5 /	5 1.4	<5 /	<b>277</b> 2.1
<b>Self-Harm</b>			5 .7	28 3.7	65 7.1	178 8.1	229 10.2	247 14.0	101 15.1	42 8.0	49 10.3	35 7.9	38 10.2	63 14.2	<b>1,080</b> 8.3
<b>TOTAL</b>	<b>30</b> 4.1	<b>21</b> 2.8	<b>27</b> 3.7	<b>112</b> 14.8	<b>204</b> 22.4	<b>421</b> 19.2	<b>512</b> 22.9	<b>536</b> 30.4	<b>201</b> 30.0	<b>121</b> 23.0	<b>144</b> 30.3	<b>190</b> 43.1	<b>239</b> 64.4	<b>945</b> 213.6	<b>3,703</b> 28.5

# TOR 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	2,411 333.0	1,939 262.0	2,298 316.8	1,260 166.4	1,293 141.9	2,659 121.3	2,968 132.6	3,952 224.3	2,091 311.9	1,934 366.8	1,685 354.6	1,946 441.1	2,337 629.6	5,985 1352.8	<b>34,758</b> 267.8
	Hosp	30 4.1	41 5.5	51 7.0	32 4.2	46 5.1	94 4.3	166 7.4	281 16.0	177 26.4	206 39.1	242 50.9	361 81.8	574 154.6	2,093 473.1	<b>4,394</b> 33.9
Slip/trip on same level (ice/snow)	ER	49 6.8	316 42.7	560 77.2	304 40.1	414 45.4	1,047 47.8	1,297 58.0	1,759 99.8	859 128.1	746 141.5	501 105.4	530 120.1	423 114.0	523 118.2	<b>9,328</b> 71.9
	Hosp	<5 /	5 .7	10 1.4	9 1.2	25 2.7	76 3.5	118 5.3	146 8.3	66 9.8	76 14.4	55 11.6	76 17.2	61 16.4	125 28.3	<b>849</b> 6.5
Fall from playground equipment	ER	431 59.5	1,196 161.6	300 41.4	28 3.7	11 1.2	11 .5	9 .4	8 .5		<5 /	<5 /	<5 /			<b>1,999</b> 15.4
	Hosp	35 4.8	125 16.9	24 3.3	<5 /	<5 /	<5 /		<5 /							<b>192</b> 1.5
Stairs/steps	ER	1,263 174.5	513 69.3	557 76.8	612 80.8	792 86.9	1,659 75.7	1,712 76.5	1,886 107.1	854 127.4	766 145.3	607 127.7	621 140.8	735 198.0	1,373 310.3	<b>13,950</b> 107.5
	Hosp	25 3.5	12 1.6	9 1.2	9 1.2	18 2.0	58 2.7	86 3.8	147 8.3	76 11.3	108 20.5	90 18.9	106 24.0	141 38.0	364 82.3	<b>1,249</b> 9.6
Bed	ER	1,741 240.5	300 40.5	78 10.8	42 5.6	37 4.1	68 3.1	90 4.0	110 6.2	53 7.9	55 10.4	90 18.9	153 34.7	210 56.6	930 210.2	<b>3,957</b> 30.5
	Hosp	37 5.1	16 2.2		<5 /		<5 /	7 .3	14 .8	8 1.2	10 1.9	22 4.6	29 6.6	63 17.0	291 65.8	<b>500</b> 3.9
Chair	ER	868 119.9	199 26.9	69 9.5	23 3.0	41 4.5	72 3.3	113 5.1	179 10.2	98 14.6	95 18.0	77 16.2	104 23.6	131 35.3	381 86.1	<b>2,450</b> 18.9
	Hosp	17 2.4	<5 /				<5 /	<5 /	14 .8	<5 /	8 1.5	13 2.7	16 3.6	32 8.6	115 26.0	<b>225</b> 1.7
Other furniture	ER	890 122.9	139 18.8	29 4.0	10 1.3	12 1.3	40 1.8	43 1.9	54 3.1	19 2.8	21 4.0	15 3.2	26 5.9	26 7.0	70 15.8	<b>1,394</b> 10.7
	Hosp	26 3.6	6 .8	<5 /				<5 /	6 .3	6 .9	<5 /	<5 /	<5 /	6 1.6	19 4.3	<b>80</b> .6
Fall from tree	ER	9 1.2	53 7.2	47 6.5	19 2.5	11 1.2	15 .7	17 .8	24 1.4	9 1.3	5 .0	6 1.3	6 1.4	<5 /	<5 /	<b>229</b> 1.8
	Hosp		<5 /	6 .8	<5 /	<5 /	<5 /	<5 /	5 .3		<5 /	<5 /	<5 /			<b>31</b> .2
From building or structure	ER	22 3.0	18 2.4	15 2.1	35 4.6	49 5.4	92 4.2	95 4.2	66 3.8	19 2.8	17 3.2	12 2.5	9 2.0	7 1.9	6 1.4	<b>462</b> 3.6
	Hosp	<5 /	<5 /	<5 /	5 .7	8 .9	25 1.1	30 1.3	30 1.7	5 .8	<5 /	5 1.1	<5 /	<5 /	<5 /	<b>124</b> 1.0
Involving skates, skis, sport boards, rollerblades	ER	81 11.2	523 70.7	1,564 215.6	900 118.9	638 70.0	936 42.7	640 28.6	462 26.2	92 13.7	83 15.7	58 12.2	45 10.2	24 6.5	36 8.1	<b>6,082</b> 46.9
	Hosp	<5 /	10 1.4	42 5.8	36 4.8	29 3.2	42 1.9	43 1.9	44 2.5	13 1.9	10 1.9	10 2.1	6 1.4	<5 /	<5 /	<b>292</b> 2.3
Fall while being carried or supported by other persons	ER	350 48.3	29 3.9	12 1.7	9 1.2	9 1.0	7 .3	<5 /	<5 /		<5 /	<5 /		8 2.2	19 4.3	<b>451</b> 3.5
	Hosp	17 2.4	<5 /								<5 /		<5 /	<5 /	<5 /	<b>26</b> .2
Other/unspecified	ER	4,657 643.3	3,332 450.2	3,499 482.3	2,288 302.1	2,165 237.6	4,168 190.2	4,634 207.0	5,543 314.6	2,614 389.9	2,375 450.5	2,085 438.7	2,486 563.5	3,200 862.1	9,806 2216.5	<b>52,852</b> 407.3
	Hosp	62 8.6	84 11.4	63 8.7	85 11.2	57 6.3	210 9.6	255 11.4	410 23.3	236 35.2	264 50.1	310 65.2	387 87.7	689 185.6	2,744 620.2	<b>5,856</b> 45.1
TOTAL	ER	12,772 1764.2	8,557 1156.0	9,028 1244.4	5,530 730.2	5,472 600.6	10,774 491.6	11,619 519.1	14,046 797.3	6,708 1000.5	6,101 1157.2	5,140 1081.6	5,927 1343.5	7,105 1914.0	19,133 4324.7	<b>127,912</b> 985.7
	Hosp	253 35.0	308 41.6	208 28.7	183 24.2	187 20.5	512 23.4	712 31.8	1,098 62.3	591 88.2	689 130.7	753 158.5	990 224.4	1,574 424.0	5,760 1302.0	<b>13,818</b> 106.5

## TOR 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		<5	<5	<5	<5	5	6	43	60
						/		/	/	/	/	1.1	1.6	9.7	.5
Slip/trip on same level (ice/snow)								<5		<5		<5	<5	<5	12
								/		/		/	/	/	.1
Fall from playground equipment															
Stairs/steps				<5		<5	5	12	7	18	13	22	20	81	181
			/		/	.2	.7	1.0	3.4	2.7	5.0	5.4	18.3		1.4
Bed									<5	<5	<5	<5	<5	36	47
									/	/	/	/	/	8.1	.4
Chair													<5	8	10
													/	1.8	.1
Other furniture									<5					<5	<5
									/					/	/
Fall from tree									<5		<5				<5
									/	/					/
From building or structure	<5	<5		<5		<5	8	5	<5			<5		<5	24
	/	/	/	/	/	.4	.3	/	/	/	/	/	/	/	.2
Involving skates, skis, sport boards, rollerblades									<5						<5
									/						/
Fall while being carried or supported by other persons															
Other/unspecified				<5	<5	5	14	22	11	7	30	48	77	488	704
			/	/	.2	.6	1.3	1.6	1.3	6.3	10.9	20.7	110.3		5.4
<b>TOTAL</b>	<5	<5		<5	<5	10	27	42	24	28	47	82	113	664	1,045
	/	/	/	/	.5	1.2	2.4	3.6	5.3	9.9	18.6	30.4	150.1		8.1

## TOR 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	8,873 1225.6	3,150 425.6	1,412 194.6	1,016 134.2	1,012 111.1	1,753 80.0	1,824 81.5	2,336 132.6	1,161 173.2	1,139 216.1	985 207.3	1,305 295.8	1,667 449.1	5,169 1168.4	<b>32,802</b> 252.8
	Hosp	82 11.3	31 4.2	13 1.8	23 3.0	19 2.1	41 1.9	51 2.3	127 7.2	51 7.6	74 14.0	81 17.0	117 26.5	171 46.1	513 116.0	1,394 10.7
Neck	ER	37 5.1	61 8.2	76 10.5	60 7.9	51 5.6	105 4.8	145 6.5	151 8.6	59 8.8	48 9.1	44 9.3	37 8.4	73 19.7	138 31.2	<b>1,085</b> 8.4
	Hosp	<5 /	5 /	<5 .7	<5 /	<5 .7	7 .5	20 1.4	10 1.8	10 2.7	<5 2.9	17 3.6	14 3.2	31 8.4	62 14.0	180 1.4
Thorax	ER	16 2.2	61 8.2	90 12.4	76 10.0	136 14.9	388 17.7	587 26.2	844 47.9	385 57.4	344 65.3	313 65.9	357 80.9	434 116.9	1,033 233.5	<b>5,064</b> 39.0
	Hosp	<5 /	5 /	9 1.2	6 .8	7 .8	25 1.1	25 1.1	51 2.9	25 3.7	25 4.7	39 8.2	62 14.1	97 26.1	452 102.2	831 6.4
Abdomen, lower back, lumbar spine and pelvis	ER	90 12.4	181 24.5	202 27.8	156 20.6	238 26.1	544 24.8	593 26.5	665 37.8	256 38.2	248 47.0	206 43.4	257 58.3	333 89.7	1,181 267.0	<b>5,150</b> 39.7
	Hosp	<5 /	5 .7	9 1.2	6 .8	7 .8	25 1.1	25 1.1	51 2.9	25 3.7	25 4.7	39 8.2	62 14.1	97 26.1	452 102.2	831 6.4
Shoulder and upper arm	ER	719 99.3	795 107.4	617 85.1	415 54.8	465 51.0	813 37.1	933 41.7	1,125 63.9	586 87.4	537 101.9	547 115.1	610 138.3	669 180.2	1,443 326.2	<b>10,274</b> 79.2
	Hosp	80 11.1	145 19.6	32 4.4	9 1.2	15 1.7	24 1.1	52 2.3	58 3.3	36 5.4	51 9.7	45 9.5	63 14.3	68 18.3	190 43.0	868 6.7
Elbow and forearm	ER	1,173 162.0	1,955 264.1	2,186 301.3	708 93.5	506 55.5	1,147 52.3	1,229 54.9	1,635 92.8	921 137.4	891 169.0	706 148.6	740 167.7	730 196.7	1,437 324.8	<b>15,964</b> 123.0
	Hosp	14 1.9	85 11.5	70 9.7	38 5.0	22 2.4	73 3.3	88 3.9	125 7.1	64 9.6	75 14.2	53 11.2	64 14.5	59 15.9	127 28.7	957 7.4
Wrist and hand	ER	273 37.7	742 100.2	1,780 245.4	964 127.3	863 94.7	1,508 68.8	1,456 65.1	1,653 93.8	755 112.6	635 120.5	475 100.0	508 115.2	517 139.3	991 224.0	<b>13,120</b> 101.1
	Hosp	<5 /	<5 /	5 .7	10 1.3	9 1.0	13 .6	10 .5	12 .7	8 1.2	8 1.5	<5 /	7 1.6	<5 /	16 3.6	111 .9
Hip and thigh	ER	96 13.3	77 10.4	108 14.9	61 8.1	73 8.0	138 6.3	212 9.5	396 22.5	215 32.1	304 57.7	302 63.6	456 103.4	815 219.6	3,414 771.7	<b>6,667</b> 51.4
	Hosp	38 5.3	11 1.5	10 1.4	7 .9	6 .7	24 1.1	54 2.4	145 8.2	116 17.3	160 30.4	203 42.7	327 74.1	642 173.0	2,767 625.4	4,510 34.8
Knee and lower leg	ER	388 53.6	590 79.7	1,085 149.6	714 94.3	705 77.4	1,475 67.3	1,683 75.2	2,138 121.4	992 148.0	848 160.9	650 136.8	670 151.9	671 180.8	1,213 274.2	<b>13,822</b> 106.5
	Hosp	<5 /	8 1.1	52 7.2	65 8.6	80 8.8	234 10.7	303 13.5	375 21.3	164 24.5	169 32.1	134 28.2	129 29.2	134 36.1	221 50.0	2,072 16.0
Ankle and foot	ER	310 42.8	589 79.6	1,075 148.2	1,009 133.2	997 109.4	1,998 91.2	1,835 82.0	1,719 97.6	710 105.9	513 97.3	378 79.5	281 63.7	270 72.7	418 94.5	<b>12,102</b> 93.3
	Hosp	<5 /	<5 /	<5 /	5 .7	10 1.1	25 1.1	31 1.4	20 1.1	16 2.4	12 2.3	<5 /	<5 /	5 1.4	13 2.9	147 1.1
TOTAL	ER	11,975 1654.1	8,201 1107.9	8,631 1189.7	5,179 683.9	5,046 553.8	9,869 450.3	10,497 469.0	12,662 718.7	6,040 900.9	5,507 1044.6	4,606 969.2	5,221 1183.5	6,179 1664.6	16,437 3715.3	<b>116,050</b> 894.3
	Hosp	227 31.4	290 39.2	198 27.3	170 22.5	175 19.2	473 21.6	653 29.2	965 54.8	508 75.8	593 112.5	605 127.3	817 185.2	1,252 337.3	4,515 1020.5	11,441 88.2

## TOR 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 /	12 1.6	30 4.1	66 8.7	138 15.2	294 13.4	243 10.9	194 11.0	54 8.1	17 3.2	19 4.0	18 4.1	8 2.2	19 4.3	1,116 8.6
	Hosp			<5 /	<5 /	16 1.8	48 2.2	34 1.5	23 1.3	11 1.6	<5 /	7 1.5	<5 /	<5 /	<5 /	151 1.2
Car	ER	236 32.6	253 34.2	280 38.6	879 116.1	1,895 208.0	3,162 144.3	2,674 119.5	2,371 134.6	853 127.2	605 114.8	420 88.4	363 82.3	324 87.3	367 83.0	14,682 113.1
	Hosp	8 1.1	8 1.1	6 .8	37 4.9	80 8.8	94 4.3	67 3.0	82 4.7	36 5.4	34 6.5	20 4.2	33 7.5	44 11.9	69 15.6	618 4.8
Pickup truck/van	ER	10 1.4	17 2.3	14 1.9	22 2.9	51 5.6	73 3.3	119 5.3	125 7.1	20 3.0	25 4.7	25 5.3	14 3.2	11 3.0	9 2.0	535 4.1
	Hosp				<5 /	<5 /	<5 /	6 .3	10 .6		<5 /	<5 /	<5 /	<5 /	<5 /	29 .2
Heavy transport truck	ER			<5 /	<5 /	9 1.0	45 2.1	43 1.9	54 3.1	10 1.5	12 2.3	5 1.1	<5 /	<5 /	<5 /	192 1.5
	Hosp					<5 /	<5 /	5 .2	7 .4	<5 /	<5 /	<5 /				20 .2
Bus	ER	11 1.5	22 3.0	18 2.5	31 4.1	43 4.7	86 3.9	130 5.8	154 8.7	70 10.4	72 13.7	53 11.2	53 12.0	52 14.0	87 19.7	882 6.8
	Hosp				<5 /	<5 /	<5 /	<5 /	9 .5	<5 /	<5 /	<5 /	<5 /	<5 /	8 1.8	36 .3
Other	ER	14 1.9	21 2.8	27 3.7	100 13.2	185 20.3	366 16.7	306 13.7	241 13.7	100 14.9	76 14.4	34 7.2	39 8.8	30 8.1	28 6.3	1,567 12.1
	Hosp	<5 /			<5 /	<5 /	9 .4	10 .5	14 .8	5 .8	11 2.1	<5 /	<5 /	<5 /	6 1.4	66 .5
TOTAL	ER	275 38.0	325 43.9	371 51.1	1,102 145.5	2,321 254.7	4,026 183.7	3,515 157.1	3,139 178.2	1,107 165.1	807 153.1	556 117.0	489 110.8	428 115.3	513 116.0	18,974 146.2
	Hosp	9 1.2	8 1.1	7 1.0	42 5.6	102 11.2	157 7.2	123 5.5	145 8.2	55 8.2	54 10.2	37 7.8	42 9.5	53 14.3	86 19.4	920 7.1

## TOR 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
<b>Motorcycle</b>				<5 /	<5 /	11 .5	6 .3	5 .3	<5 /	<5 /	<5 /		<5 /	<5 /	<b>31</b> .2
<b>Car</b>		<5 /	<5 /	16 2.1	16 1.8	14 .6	12 .5	9 .5	6 .9	<5 /	<5 /	6 1.4	<5 /	12 2.7	<b>99</b> .8
<b>Pickup truck/ van</b>	<5 /		<5 /		<5 /		6 .3			<5 /					<b>11</b> .1
<b>Heavy transport truck</b>							<5 /	<5 /							<b>&lt;5</b> /
<b>Bus</b>								<5 /		<5 /				<5 /	<b>&lt;5</b> /
<b>Other</b>	<5 /	<5 /	<5 /	10 1.3	28 3.1	34 1.6	25 1.1	14 .8	15 2.2	<5 /	7 1.5	10 2.3	10 2.7	15 3.4	<b>178</b> 1.4
<b>TOTAL</b>	<5 /	<5 /	5 .7	27 3.6	46 5.1	59 2.7	50 2.2	30 1.7	24 3.6	10 1.9	10 2.1	16 3.6	13 3.5	29 6.6	<b>324</b> 2.5

## TOR 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 /	11 .6	5 .8	<5 /	<5 /	<5 /	<5 /	6 1.4	46 .4
	Hosp							<5 /	<5 /		<5 /	<5 /			<5 /	8 .1
ATV	ER	<5 /	14 1.9	31 4.3	45 5.9	49 5.4	87 4.0	54 2.4	59 3.4	14 2.1	6 1.1	10 2.1	<5 /	<5 /	<5 /	377 2.9
	Hosp				<5 /	6 .7	7 .3	5 .2	7 .4	<5 /	<5 /	<5 /	<5 /			36 .3
Water	ER	<5 /	<5 /	35 4.8	41 5.4	35 3.8	65 3.0	35 1.6	52 3.0	13 1.9	10 1.9	11 2.3	7 1.6		5 1.1	315 2.4
	Hosp			<5 /	<5 /		6 .3		<5 /	<5 /	<5 /	<5 /	<5 /			18 .1
Air/Space	ER	<5 /		<5 /	6 .8	7 .8	<5 /	5 .2	9 .5		<5 /	<5 /	<5 /			38 .3
	Hosp					<5 /	<5 /									<5 /
TOTAL	ER	6 .8	18 2.4	67 9.2	94 12.4	94 10.3	160 7.3	96 4.3	131 7.4	32 4.8	21 4.0	24 5.1	15 3.4	5 1.4	13 2.9	776 6.0
	Hosp			<5 /	7 .9	9 1.0	14 .6	6 .3	11 .6	5 .8	5 1.0	<5 /	<5 /		<5 /	66 .5

## TOR 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 <.1
Water			<5 /	<5 /	<5 /	<5 /	5 .2	7 .4		<5 /	<5 /	<5 /	<5 /		27 .2
Air/Space									<5 /			<5 /			<5 /
<b>TOTAL</b>			<5 /	<5 /	5 .6	<5 /	8 .4	7 .4	<5 /	<5 /	<5 /	<5 /	<5 /		34 .3



## TOR 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	81 11.2	523 70.7	1,564 215.6	900 118.9	638 70.0	936 42.7	640 28.6	462 26.2	92 13.7	83 15.7	58 12.2	45 10.2	24 6.5	36 8.1	<b>6,082</b> 46.9
	Hosp	<5 /	10 1.4	42 5.8	36 4.8	29 3.2	42 1.9	43 1.9	44 2.5	13 1.9	10 1.9	10 2.1	6 1.4	<5 /	<5 /	<b>292</b> 2.3
Diving or jumping into water causing injury other than drowning or submersion	ER	8 1.1	33 4.5	38 5.2	23 3.0	20 2.2	30 1.4	19 .9	19 1.1	<5 /	<5 /	<5 /	<5 /		<5 /	<b>200</b> 1.5
	Hosp		<5 /		<5 /		<5 /	<5 /	<5 /		<5 /					<b>9</b> .1
Striking against or struck by sports equipment	ER	73 10.1	554 74.8	1,756 242.1	940 124.1	597 65.5	1,033 47.1	611 27.3	346 19.6	82 12.2	33 6.3	33 6.9	15 3.4	8 2.2	6 1.4	<b>6,087</b> 46.9
	Hosp		<5 /	10 1.4	10 1.3	7 .8	13 .6	10 .5	8 .5		<5 /		<5 /			<b>62</b> .5
Over exertion and strenuous or repetitive movements	ER	1,326 183.2	902 121.9	2,621 361.3	2,848 376.1	2,683 294.5	5,070 231.4	4,105 183.4	3,535 200.7	1,208 180.2	865 164.1	561 118.0	456 103.4	429 115.6	487 110.1	<b>27,096</b> 208.8
	Hosp	<5 /	<5 /	31 4.3	23 3.0	32 3.5	98 4.5	84 3.8	56 3.2	20 3.0	15 2.9	16 3.4	19 4.3	14 3.8	42 9.5	<b>454</b> 3.5
Travel and motion	ER	<5 /	<5 /		<5 /	9 1.0	15 .7	19 .9	10 .6		<5 /		<5 /			<b>65</b> .5
	Hosp							<5 /								<b>&lt;5</b> /
<b>TOTAL</b>	ER	1,490 205.8	2,013 272.0	5,979 824.2	4,715 622.6	3,947 433.2	7,084 323.3	5,394 241.0	4,372 248.2	1,385 206.6	988 187.4	653 137.4	518 117.4	461 124.2	531 120.0	<b>39,530</b> 304.6
	Hosp	<5 /	14 1.9	83 11.4	71 9.4	68 7.5	154 7.0	140 6.3	109 6.2	33 4.9	28 5.3	26 5.5	26 5.9	17 4.6	45 10.2	<b>818</b> 6.3

# TOR 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									<5						<5
Diving or jumping into water causing injury other than drowning or submersion															
Striking against or struck by sports equipment															
Over exertion and strenuous or repetitive movements															
Travel and motion															
<b>TOTAL</b>									<5						<5

## TOR 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 /	28 3.7	30 3.3	45 2.1	12 .5	12 .7	<5 /			<5 /		<5 /	<b>134</b> 1.0
	Hosp			<5 /	26 3.4	28 3.1	30 1.4	9 .4	<5 /							
Sharp or blunt object	ER		7 1.0	44 6.1	429 56.7	500 54.9	550 25.1	425 19.0	275 15.6	54 8.1	20 3.8	12 2.5	6 1.4	7 1.9	13 2.9	<b>2,342</b> 18.1
	Hosp		<5 /	7 1.0	90 11.9	65 7.1	76 3.5	70 3.1	38 2.2	9 1.3		<5 /	<5 /	<5 /	<5 /	
Bodily force (unarmed)	ER	12 1.7	53 7.2	287 39.6	1,428 188.6	1,694 185.9	2,085 95.1	1,637 73.1	1,184 67.2	275 41.0	139 26.4	58 12.2	51 11.6	47 12.7	49 11.1	<b>8,999</b> 69.3
	Hosp		<5 /	7 1.0	34 4.5	68 7.5	78 3.6	72 3.2	65 3.7	13 1.9	8 1.5	<5 /	<5 /	<5 /	5 1.1	<b>360</b> 2.8
Sexual assault by bodily force	ER		<5 /	7 1.0	94 12.4	98 10.8	144 6.6	64 2.9	39 2.2	10 1.5	<5 /	<5 /	<5 /		<5 /	<b>464</b> 3.6
	Hosp				5 .7	<5 /	<5 /	<5 /	<5 /							<b>12</b> .1
Drugs, medicaments	ER	<5 /		<5 /	<5 /	<5 /	6 .3	<5 /				<5 /				<b>22</b> .2
	Hosp	<5 /			<5 /								<5 /		<5 /	<b>&lt;5</b> /
Hanging, strangulation and suffocation	ER				<5 /	<5 /	<5 /		<5 /							<b>11</b> .1
	Hosp															
Other	ER	23 3.2	14 1.9	38 5.2	362 47.8	517 56.7	716 32.7	579 25.9	404 22.9	103 15.4	55 10.4	25 5.3	24 5.4	17 4.6	21 4.8	<b>2,898</b> 22.3
	Hosp	9 1.2	<5 /	<5 /	13 1.7	17 1.9	26 1.2	26 1.2	22 1.3	<5 /	<5 /	<5 /	<5 /	<5 /	7 1.6	<b>131</b> 1.0
<b>TOTAL</b>	ER	37 5.1	76 10.3	381 52.5	2,346 309.8	2,846 312.4	3,549 162.0	2,721 121.6	1,917 108.8	443 66.1	217 41.2	98 20.6	83 18.8	71 19.1	85 19.2	<b>14,870</b> 114.6
	Hosp	10 1.4	<5 /	18 2.5	169 22.3	180 19.8	213 9.7	178 8.0	129 7.3	23 3.4	10 1.9	6 1.3	6 1.4	6 1.6	14 3.2	<b>965</b> 7.4

**TOR 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				20	46	54	12	6	<5	<5			<5		141
				2.6	5.1	2.5	.5	.3	/	/			/		1.1
Sharp or blunt object	<5		<5	12	9	11	19	14	5	5	<5	<5	<5	<5	85
	/		/	1.6	1.0	.5	.9	.8	.8	1.0	/	/	/	/	.7
Bodily force (unarmed)					<5	<5	<5		<5						<5
					/	/	/		/						/
Sexual assault by bodily force															
Drugs, medicaments							<5								<5
							/								/
Hanging, strangulation and suffocation		<5	<5			<5	<5	<5	<5				<5	<5	17
		/	/			/	/	/	/				/	/	.1
Other	7	<5	<5		<5	<5	<5	5		<5	<5		<5	<5	29
	1.0	/	/		/	/	/	.3		/	/		/	/	.2
TOTAL	10	<5	5	32	57	73	40	27	10	7	<5	<5	5	<5	277
	1.4	/	.7	4.2	6.3	3.3	1.8	1.5	1.5	1.3	/	/	1.4	/	2.1

## TOR 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	6 .8		52 7.2	433 57.2	470 51.6	780 35.6	662 29.6	565 32.1	145 21.6	84 15.9	37 7.8	34 7.7	30 8.1	45 10.2	3,343 25.8
	Hosp			26 3.6	145 19.2	131 14.4	202 9.2	200 8.9	182 10.3	57 8.5	41 7.8	26 5.5	16 3.6	16 4.3	26 5.9	1,068 8.2
Firearm	ER				<5 /	<5 /			<5 /	<5 /	<5 /					6 .1
	Hosp				<5 /				<5 /		<5 /		<5 /			<5 /
Hanging, strangulation, and suffocation	ER			<5 /	8 1.1	<5 /	6 .3	7 .3	5 .3		<5 /	<5 /		<5 /	<5 /	37 .3
	Hosp				5 .7	<5 /	<5 /	5 .2	<5 /	<5 /	<5 /			<5 /	<5 /	26 .2
Sharp or blunt object	ER			23 3.2	101 13.3	122 13.4	167 7.6	132 5.9	109 6.2	25 3.7	17 3.2	<5 /	8 1.8	<5 /	8 1.8	717 5.5
	Hosp			<5 /	16 2.1	20 2.2	16 .7	19 .9	16 .9	5 .8	6 1.1	<5 /	<5 /	<5 /	<5 /	105 .8
Jumping or lying before moving object	ER				5 .7	<5 /	14 .6	6 .3	5 .3		<5 /				<5 /	37 .3
	Hosp				5 .7	<5 /	17 .8	7 .3	5 .3		<5 /				<5 /	41 .3
Other	ER	<5 /		<5 /	21 2.8	25 2.7	22 1.0	35 1.6	11 .6	<5 /	<5 /	<5 /	<5 /		<5 /	128 1.0
	Hosp				<5 /	8 .9	5 .2	<5 /	<5 /		<5 /				<5 /	27 .2
<b>TOTAL</b>	ER	7 1.0		80 11.0	569 75.1	623 68.4	989 45.1	842 37.6	697 39.6	174 26.0	110 20.9	44 9.3	43 9.8	32 8.6	58 13.1	4,268 32.9
	Hosp			27 3.7	176 23.2	165 18.1	243 11.1	235 10.5	212 12.0	63 9.4	54 10.2	27 5.7	19 4.3	18 4.9	32 7.2	1,271 9.8

## TOR 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	9	39	59	62	30	11	18	9	7	13	259	
				/	1.0	1.8	2.6	3.5	4.5	2.1	3.8	2.0	1.9	2.9	2.0	
Firearm				<5	<5	<5	8	6	8	<5	<5	<5	8	10	56	
				/	/	/	.4	.3	1.2	/	/	/	2.2	2.3	.4	
Hanging, strangulation, and suffocation				<5	12	20	51	80	76	35	15	12	6	13	343	
				/	1.6	2.2	2.3	3.6	4.3	5.2	2.9	2.5	1.4	3.5	2.6	
Sharp or blunt object					<5	5	6	16	<5		<5			<5	34	
					/	.2	.3	.9	/		/			/	.3	
Jumping or lying before moving object				<5	13	30	69	68	68	21	8	10	14	9	328	
				/	1.7	3.3	3.2	3.0	3.9	3.1	1.5	2.1	3.2	2.4	2.5	
Other				<5		<5	13	8	19	<5	5	<5	<5	<5	60	
				/		/	.6	.4	1.1	/	1.0	/	/	/	.5	
TOTAL				5	28	65	178	229	247	101	42	49	35	38	63	1,080
				.7	3.7	7.1	8.1	10.2	14.0	15.1	8.0	10.3	7.9	10.2	14.2	8.3

# 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 Toronto region were related to falls, on-road vehicles, poisoning, sports and recreation, self-harm/suicide and interpersonal violence. 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 adults<sup>5</sup> 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

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<sup>5</sup> 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 not as comprehensive 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 paediatric 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](http://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 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 adults<sup>6</sup> 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

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<sup>6</sup> 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](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 age<sup>7</sup> 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

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<sup>7</sup> 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 4<sup>th</sup> 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

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

# 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](http://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](http://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](http://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 (Hearse, 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:

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

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# Evidence-Informed Practice Recommendations for Preventing Violence

## Overview

Violence has been defined by the World Health Organization (WHO) as ‘the intentional use of physical force or power, threatened or actual, against oneself, another person or against a group or community, that either results in or has a high likelihood of resulting in injury, death, psychological harm, maldevelopment or deprivation (World Health Organization, 2002).’ In 2000, it was estimated that deaths due to violence amounted to 1.6 million worldwide (World Health Organization, 2002). In Ontario, the economic burden of violence was estimated at \$266 million (SMARTRISK, 2009). Violence exists in many different forms. It is usually divided into three types: self-directed (suicidal behaviour and self-harm), interpersonal (family and intimate partner violence and community violence) and collective (social and political violence such as organized hate crimes or war). For the purposes of this summary, the focus will be interpersonal violence, which includes child maltreatment, youth violence, elder abuse or intimate partner violence. In Ontario, there were more than 75,000 emergency room visits between 2005 and 2007 as a result of interpersonal violence (Ontario Injury Data Report, 2012). Public health and injury prevention practitioners can play an important role in preventing violence by encouraging multi-sector collaboration, identifying risk and protective factors and through implementing and evaluating promising practices.

## Risk Factors

Violence is a complex behaviour. It cannot be predicted by one simple risk factor; it is the result of many interacting influences. The Centres for Disease Control and Prevention (CDC) use the social ecological model (SEM) to frame their understanding of violence. According to the SEM, this behaviour is the result of interacting factors related to the *individual*, their *relationships*, the *community*, and *society* as a whole. It is important to recognize that most risk factors are not unique to each type, but can be considered shared risk factors for many types of violence (WHO, 2002). Some of the common risk factors for interpersonal violence include: maltreatment as a child, experiencing or witnessing violence as a child, low income, low self-esteem, high parental stress level, social isolation, alcohol use, social norms and availability of community supports. Evidently, the risk factors for violence have been examined in detail and a thorough explanation of these factors and how they relate to each other and to violence is beyond the scope of this report. Readers are encouraged to refer to the *World Report on Violence and Health* (WHO, 2002, pp. 12-15), *Preventing intimate partner and sexual violence against women: taking action and generating evidence* (WHO, 2010, pg. 21), and *Preventing child maltreatment: a guide to taking action and generating evidence* (WHO, 2006, pp. 13-16) for detailed descriptions of risk factors using the SEM.

# Evidence-Informed Violence Prevention Strategies

Violence is a complex issue with many contributing influences. The most effective efforts to prevent violence will be multifaceted and require collaboration between stakeholders at local, national and even international levels. As stated in the *World Report on Violence and Health* (2002), “the links between violence and the interaction between individual factors and the broader social, cultural and economic contexts suggest that addressing risk factors across the various levels of the ecological model may contribute to decreases in more than one type of violence (pp. 15).” The World Health Organization has produced a number of influential reports on violence prevention strategies, combining the extensive research in this area into practice recommendations and implementation strategies. In addition to *The World Report on Violence and Health* (2002), these reports are *Violence: the Evidence* (2010), and *Preventing Violence: A guide to implementing the recommendations of the world report on violence and health* (2004). The recommendations discussed in these three influential reports will be summarized; more detailed information can be found in the full reports, which are listed in the references.

In the report *Violence: the Evidence*, seven evidence-based prevention strategies are discussed in detail (WHO, 2010).

1. The first strategy is to **develop safe, stable and nurturing relationships between children and their parents and caregivers**. This can prevent child maltreatment, reduce childhood aggression, and help develop positive parenting skills. Examples of evidence-informed programs include the Positive Parenting Programme (Triple P) and the Nurse Family Partnership. Starting these positive parenting programs in the prenatal period is very important to maximize positive results.
2. The second strategy discussed by WHO is to **develop life skills in children and adolescents**. These programs have been shown to prevent youth violence, and improve children's' abilities to handle academic, emotional and social challenges. In addition, pre-school enrichment and social skills programs can improve academic performance and eventually improve job prospects. Youth engagement initiatives have also demonstrated positive results in terms of improving school performance, improving social skills and facilitating a productive use of free time.
3. The third strategy is to **reduce the availability and harmful use of alcohol**. Alcohol is strongly linked to many types of violence. Promising strategies to reduce alcohol use include reducing the hours and number of locations selling alcohol, increasing prices and having longer treatment available for problem drinkers.
4. Fourth, the report states that **reducing access to guns, knives and pesticides is effective in preventing violence**. Guns, knives and pesticides are three of the most common means used to inflict violence. Examples of programs that could limit access to firearms and sharp objects include licencing, enforcing a minimum buying age and requiring a background check. (Note: Pesticide availability is a risk factor for suicide, and not applicable to our summary of interpersonal violence. Refer to the section on suicide prevention for more information).

5. Fifth, there is evidence to suggest that **promoting gender equality** can help prevent violence against women. In Canada, the Youth Relationship project has shown promising results in reducing dating violence (Wolfe et al., 2003). This program targets adolescents, and is delivered in 18 group sessions that focus on building positive relationships, improving communication skills and improving real-life problem solving abilities.
6. There is also evidence that highlights the importance of **changing cultural and social norms** that support violence. Laws and policy changes help to send a message that violence in any form will not be tolerated, and many governments worldwide have started to initiate change in this area. Public education and awareness campaigns that challenge the cultural norms supporting violence are also valuable, but more rigorous research is needed to understand the specific effects of these programs.
7. Lastly, **victim identification, care and support programmes should be available**. Services such as trauma-focused cognitive behavioural therapy, protection orders, and advocacy support programs have been shown to reduce possible mental health issues related to violence, reduce repeat victimization and improve safety behaviours.

Another influential report prepared by WHO, the *World Report on Violence and Health* (2002), offers recommendations to prevent specific types of violence. Prevention strategies are presented according to their corresponding level of the SEM, and are summarized below.

## Preventing Youth Violence

Strategies at the individual level are focused on increasing protective factors associated with youths' skills, attitudes and beliefs. Examples of these programs include preschool enrichment programs and social skills development programs. At the relationship level, prevention strategies focus on building positive relationships with the people youth interact with on a daily basis. Programs such as home visitation programs during infancy (to foster parenting skills), parenting programs (e.g., Triple P), mentoring programs within the community and therapeutic family interventions (e.g., multi-systemic family therapy) are good examples. At the community level, violence prevention focuses on making changes in the environment that lead to improved interactions between people. For example, policing programs, alcohol regulations and availability, extracurricular activity availability, and actions to limit gang activity are all community strategies. Lastly, prevention at the societal level addresses economic and social conditions that may contribute to violence. For example, poverty, gun activity, and health inequalities are all known to lead to violence in youth, and prevention would work to address these underlying issues.

## Preventing Violence toward Children

In their report, WHO points out that there are a number of programs for children who have experienced or witnessed violence, but programs focusing on primary prevention are lacking. Common strategies at the individual level include victim support programs and child protection services. Relationship level prevention strategies include parent training programs, home visitation programs and intensive family preservation programs. At the community level, violence prevention in children involves community support services and school based programs (e.g., teach children appropriate interactions and how to recognize violent situations). At the societal

level, national policies preventing child abuse and international regulations (e.g., Convention on the Rights of the Child) help to raise awareness and prevent violence.

## Preventing Intimate Partner Violence

Individual strategies to prevent intimate partner violence involve support services for victims (e.g., women's crisis centres, safe houses). These are important in preventing repeat victimization and addressing health needs. Community level strategies involve awareness and prevention campaigns, and coordinated community services between multiple sectors. Currently, the best evidence for preventing intimate partner violence is through school-based programs that prevent dating violence and focus on developing positive relationships during adolescence (in fact, these are the only programs considered to be effective) (WHO, 2010).

## Preventing Violence in the Elderly

Preventing violence in older adults can be challenging because of social isolation, which limits the people available to confide in, and because of lack of companionship, where older adults may not want to acknowledge violence if the perpetrator is a companion. Examples of prevention strategies include: national networks to support development of policies, services such as safe-houses and emergency shelters (community level), caregiver training programs, support through existing social services (community level), identification through those close to the elderly, such as family members or health care workers (relationship level) and education and awareness campaigns (community and society levels) (WHO, 2013).

The last report to be discussed in this summary is entitled *Preventing Violence: A guide to implementing the recommendations of the World Report on Violence and Health (WHO, 2004)*. As indicated by the title, this report outlines strategies and action steps for public health organizations to follow, which will ultimately reduce violence. The report is divided into six steps that are further broken down into detailed action items. For the purposes of this summary, the rationale behind each step will be described; the full report is a valuable and detailed resource that is highly recommended for practitioners interested in preventing violence using a public health approach.

1. **Increasing the capacity for collecting data on violence.** Data collection impacts the ability to quantifiably define a public health issue and thus create priorities. It also allows public health agencies to plan for the most effective geographic locations of various services, which improves prevention and also treatment. Finally, it provides a way to evaluate and improve prevention strategies.
2. **Researching violence – Causes, consequences and prevention.** High quality research leads to a better understanding of an issue. As stated in this report, if a problem is well understood, the response to the problem will be more effective. Similar to other population health issues, the best research methods are longitudinal or case control studies; these types of research tend to be expensive and work-intensive, but are very important to designing effective prevention efforts.



3. **Promoting the primary prevention of interpersonal violence.** As previously mentioned, support services for those who have been victims of violence are important, but primary prevention should continue to be a priority. Action at all levels of the social ecological model will be important, especially policy. Interventions that target early development, improve parenting skills in infancy, strengthening communities, changing cultural norms that lead to violence and reducing inequalities will be the most effective at preventing violence.
4. **Promoting social and gender equality and equity.** Social and gender inequalities and equity are risk factors at the societal and community levels. Further, these conditions worsen many other risk factors identified. It is important to focus on reducing these inequalities and inequities to ultimately prevent violence.
5. **Strengthening support and care services for victims.** Although primary prevention has been identified as an important focus, it is still important to provide appropriate and accessible services for those who are victims of violence. Violence, whether experienced first hand or witnessed, can lead to physical, mental and emotional health issues. If services are available for victims that meet these needs, further harm can be limited.
6. **National plan of action.** Countries need to work on developing nation-wide plans for preventing violence. Ministries of health can spearhead these efforts, but preventing violence will involve collaboration of many sectors. This collaborative effort needs to be organized through common goals (care of victims and primary prevention) and realistic timelines.

## Other Valuable Resources

- **Blueprints Database:** This resource centre began at the University of Colorado's Centre for the Study and Prevention of Violence. The aim is to collect, analyse and disseminate information about programs that have been shown to be effective in preventing youth violence and developing important life skills. This is an effective tool for finding suitable programs suited to community needs and resources. <http://www.blueprintsprograms.com/>
- **Canadian Best Practices Portal:** This service, provided through the Public Health Agency of Canada, features a searchable database of violence prevention programs that have been reviewed and deemed effective. <http://cbpp-pcpe.phac-aspc.gc.ca/>; <http://66.240.150.14/topic/br-rlac/6/page/1>
- **Centres for Disease Control and Prevention (CDC):** The CDC, based in the United States, has a branch dedicated to Injury, Violence and Safety. Extensive information on various high risk groups is available through the website: <http://www.cdc.gov/InjuryViolenceSafety/>.
- **Canadian Red Cross:** The Canadian Red Cross has a number of violence prevention education programs. More information is available on their website: <http://www.redcross.ca/article.asp?id=294&tid=030>
- **WHO – Violence prevention:** This website offers numerous resources and provides access to detailed information. [http://www.who.int/violence\\_injury\\_prevention/violence/en/](http://www.who.int/violence_injury_prevention/violence/en/)

- **WHO report on intersectoral action:** In their 2010 report, *Violence Prevention: An Invitation to Intersectoral Action*, WHO encourages collaboration between sectors in order to be successful in preventing violence. The full report is available here: [http://www.who.int/violenceprevention/about/intersectoral\\_action.pdf](http://www.who.int/violenceprevention/about/intersectoral_action.pdf).
- **PREVNet (Promoting Relationships and Eliminating Violence):** PREVNet is a Canadian network of professionals from many different sectors dedicated to the prevention of bullying and violence. Their website is an excellent resource: <http://prevnet.ca/>

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