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Niagara Region Public Health Report on Preventable Injuries

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Injury

"All the ways an individual can be physically hurt, impaired, or killed, involving intentional or unintentional damage to the body."

~ Ontario Ministry of Health Promotion[1]

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Executive Summary

Niagara families grieve over a death due to injury. Other families endure the daily challenges of caring for a loved one with an acquired disability. Lives are changed because a child, sibling, grandparent, or parent was injured. The purpose of the *Niagara Region Public Health Report on Preventable Injuries* is to help policy makers and practitioners understand how these injuries impact the community and establish a foundation for moving towards comprehensive injury prevention in Niagara.

In Canada, unintentional injuries are the leading cause of death between 1 and 34 years old.[2] Suicide is in the top four leading causes of death between 15 and 54 years old. In Niagara, because of an injury, every ten minutes someone seeks emergency medical assistance and every three days someone dies. These injuries result from a series of events and not a single "accident." By reducing or eliminating these events, the risk for injury is decreased.

The Ontario Public Health Standards 2008[3] (OPHS) direct Niagara Region Public Health's (NRPH) injury prevention efforts (Appendix A). The OPHS outlines the NRPH role to address road safety and falls-prevention. The OPHS also stipulates that NRPH may address "other" injuries based on local public health importance. But, NRPH's ability to address all types of injuries is limited by finite human and financial resources. In order to identify which "other" injury issues are of local importance, NRPH applied the OPHS foundational principles of need, impact, capacity, and collaboration to a priority setting framework.

The Niagara Region Public Health Priority Setting Framework has two components: quantitative and qualitative. The quantitative component included injury related statistics for deaths, potential years of life lost, emergency room (ER) visits, hospitalizations, and length of stay in hospital. The qualitative component involved task groups rating six statements based on information from literature reviews, theories, and a community inventory. The quantitative and qualitative data were ranked to allow comparisons between 15 different types of injury across five age groups. This resulted in the following priorities:

Age	Priority One	Priority Two
0-4	Falls	Intentional Violence
5-14	Falls	Off Road Vehicle
15-19	Road Motor Vehicle	Intentional Self-Harm
20-59	Road Motor Vehicle	Falls
60 +	Falls	Road Motor Vehicle

By identifying these leading injury priorities, NRPH can allocate resources to these areas in a focused effort to reduce the impact injuries have on Niagara. This can be achieved by collaborating with community organizations to implement comprehensive injury prevention strategies that address risk factors and enhance protective factors through education, environmental supports, and enforcement.

Background: Injuries Impact Communities

Injuries are all the ways someone can be hurt, impaired, disabled, or killed, by intentional or unintentional damage to the body[4]. Intentional injuries occur when someone chooses to physically hurt someone or him/herself. Unintentional injuries result when a series of events leads to an injury without being planned.

Unintentional injuries are the leading cause of death among Canadians between the ages of 1 and 34. These injuries also rank in the top ten leading causes of death for those less than one year of age and those over the age of 35.[5] **Suicide is the second leading cause of death among Canadians between the ages of 15 and 34**, as well as the third and fourth leading cause of death among 10- to 14- year-olds and those aged 35 to 54, respectively. Unintentional injuries are also within the top ten leading causes of hospitalization for every age group[6].

Types of Injuries

Unintentional:

Cycling

Drowning

Exposure to Animate Objects (e.g., dog bites, raccoon scratch)

Exposure to Inanimate Objects (e.g., cut by knife, walked into door)

Falls

Off Road Vehicles

Pedestrian

Playground

Poisoning

Road Motor Vehicles

Scalds and Burns

Sports and Recreation

Suffocation

Intentional:

Self-harm

Violence

Injuries affect tax dollars in terms of overnight hospitalization, ER visits, operating room services, urgent care centres, and emergency medical services. Rehabilitation services may be used by those suffering the longer term effects of an injury. Injury sufferers and their families may experience grief, caregiver strain, and time lost from work or school. They may need counselling, special child care or education, special accommodation at work, or become dependent upon the Canada Pension Plan Disability Benefits. **Injuries cost Canadians $19.8 billion dollars annually[7] in direct and indirect costs**, but historically are not seen as a priority health issue.

Despite this, injuries continue to be overlooked. This may due to the belief that injuries are “accidents”, a single act of fate over which we have no control. However, Haddon’s[8] research in the 1960s showed that **injuries are predictable and preventable, not accidental**. Injuries are not the result of a single event but the result of a series of events. When the series of events is changed, the injury may not occur, or at a minimum the injury may not be as severe.

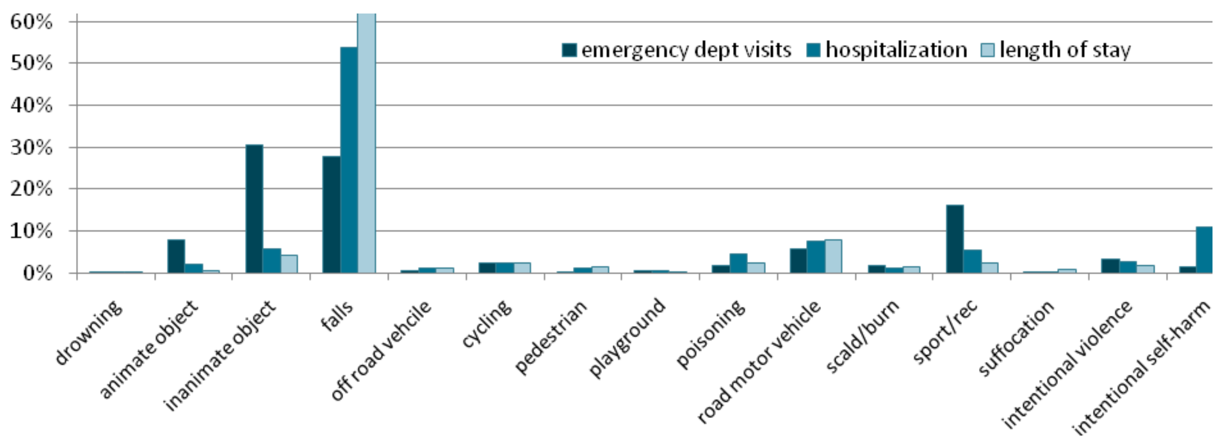
In response to this knowledge, the OPHS directs public health units across Ontario to conduct active surveillance of local injury issues. Furthermore, public health must use evidence-informed strategies in collaboration with the community to decrease the risk and/or incidence of injuries.

The Reality of Injuries in Niagara

Injuries Impact Niagara's Health System

Injury statistics are limited to hospital data, since treatment at school, work, home, or a physician's office is not always reported. This means that injuries happen more often than what is shown below. **Between 2003 and 2007 in Niagara, 268,049 residents went to an ER seeking treatment for an injury** (Intellihealth, MOHLTC); 15,123 were hospitalized and spent 113,471 days in the hospital. Figure 1 below shows the percentage of hospital use per injury. **Fall-related injuries have the highest rate of hospitalization and length of stay in hospital.** Falls are also second to exposure to inanimate objects for highest ER usage.

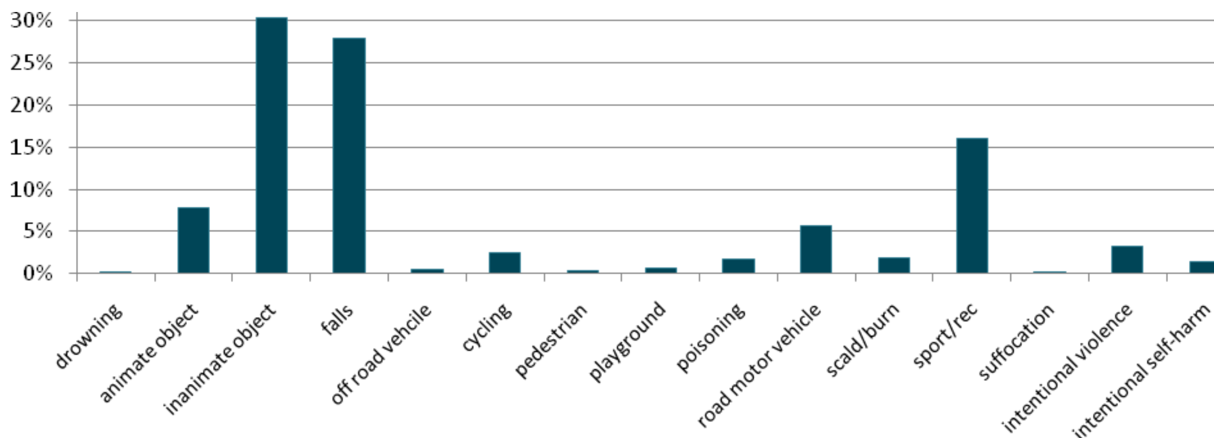
Figure 1: Percentage of Hospital Usage per Type of Injury in Niagara (all ages, 2003-2007)



Injuries Impact Niagara's Emergency Room Departments

ER staff treated one Niagara resident for an injury an estimated every 10 minutes. Of those injuries, exposure to an inanimate object, falls, as well as sports and recreational injuries accounted for 74%, of those ER visits (Figure 2). These statistics may be of significance and warrant further investigation in terms of the impact injuries have on Niagara's emergency health system. Investing in comprehensive injury prevention strategies may reduce ER usage, ER wait times, and Niagara Emergency Medical Services (NEMS) offload delays.

Figure 2: Percentage of ER visits by Type of Injury in Niagara (all ages, 2003-2007)



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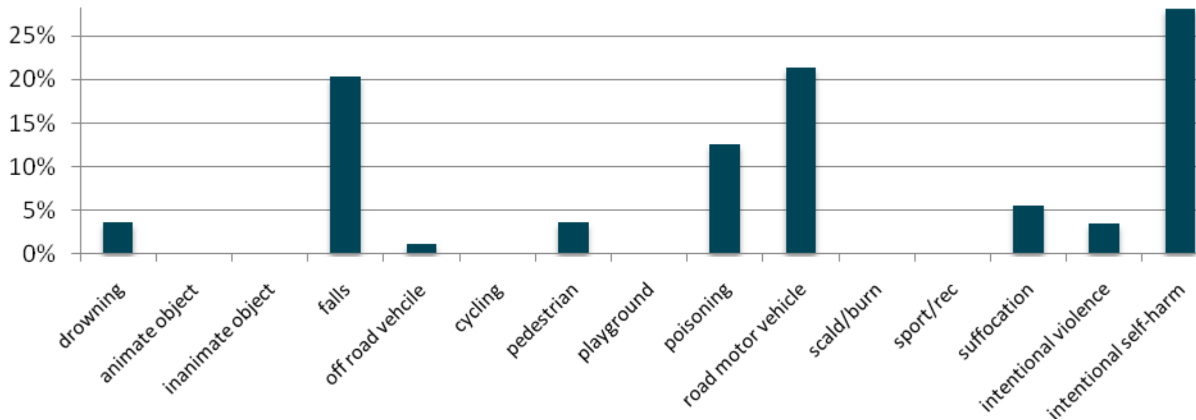
Deaths in Niagara Due to Injuries

Injuries impact the health system and can result in death. **Between 2000 and 2004, there** were 604 injury-related deaths in Niagara. That **is one injury-related death every three days.** Of these deaths, 69.9% are due to suicide, car crashes, and falls, as shown in Figure 3 below. It is also interesting to note that no deaths were the result of exposure to an inanimate object, despite the high number of ER visits.

Figure 3: Percentage of Deaths by Type of Injury in Niagara (all ages)

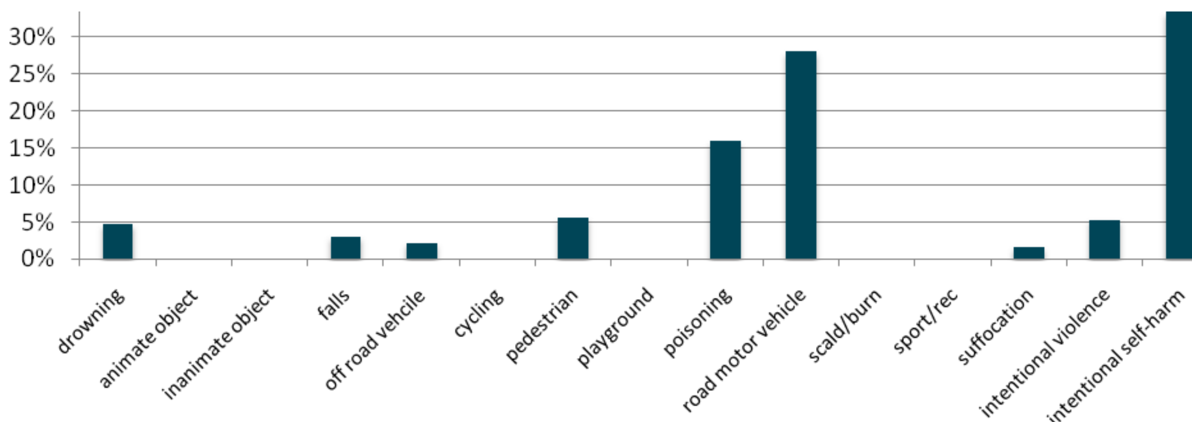


Potential Years of Life Lost in Niagara Due to Injuries

Potential years of life lost (PYLL), represents the number of years someone could still have lived until the age of 75 had they not died. For example, if someone in Niagara died at the age of 30, then there were 45 years of potential life lost for that person as an active and contributing member of the community. **Between 2000 and 2004, Niagara suffered 15,123 years of potential life lost due to injuries.**

Figure 4 below shows that younger residents die primarily from suicide, car crashes, and poisoning due to the higher PYLL value. Despite falls being a leading cause of death this factor has a lower PYLL value, suggesting that fall-related deaths occur more in older adults.

Figure 4: Percentage of Potential Years of Life Lost by Type of Injury in Niagara



Injury Prevention

Injuries can happen to anyone and at any time. The risk of injury is influenced by many factors such as age, gender, education level, developmental level, perceptions of risk, income, availability of supports, access to safe equipment, and culture.

Another important factor is the use drugs, including alcohol. Being impaired by drugs increases the risk of an injury[9]. Some drugs, including alcohol, are depressants. These depressant drugs decrease a person's reaction time, coordination, vision, and fine motor control. Other drugs can cause hallucinations or hypersensitivity with changes to vision, balance, and motor control. Drugs can change the way someone controls their emotions and their perceptions of risk. Taking drugs that are prescribed, over the counter, or illegal, can increase one's risk for falls, car crashes, drowning, poisoning, engaging in violence, self-harm, etc. There is also an increased risk for injury when combining multiple drugs as the drug effects could be intensified or have unknown consequences[10].

The 3 E's of Injury Prevention

Understanding these factors is an important part of prevention. Injury prevention strategies involve enhancing protective factors and decreasing risk factors through education, enforcement, and creating changes in our community or environment.

Education

Education involves helping the community to learn more about injuries and how to prevent injuries. The community learns about the types of injuries, their risk factors, and how to develop skills that protect individuals and reduce their injury risk. Engaging the community to learn more can be complicated and involves several different ways of communication.

Enforcement

Ensuring compliance with regulations and laws protect Canadians from unsafe products or situations. For example, Health Canada enforces the Hazardous Products Act to ensure that cribs, carpets, paints, etc., meet regulations prior to manufacturing, importing, and distribution. There are also laws that, when enforced, reduce the risk for injury such as speed limits, bicycle helmets, pool fencing, and smoke detector use.

Environment

Where we live, learn, work, and play can impact our injury risk. Workplaces, schools, and public spaces frequently have policies that, when followed, are designed to decrease the risk of injury. Rules about violence, heavy lifting, alcohol use, supervision, etc., set a standard for safe activity. A safe indoor environment includes using handrails in stairways and bathtubs, keeping clutter-free floors, and labelling dangerous chemicals. A safe outdoor environment includes maintained roads and sidewalks, pedestrian signals, bicycle lanes, and safe parks.

Ontario Public Health Standards

Since 1997, NRPH has been mandated to address the issue of preventable injuries. With community partners, injury prevention staff have focused on various road safety issues, falls prevention among older adults, cycling safety, and early childhood injury prevention.

Given the broad spectrum of injures across 15 broad categories of injury, NRPH does not have the resource capacity to address all types of injury. Effectively addressing an injury issue means staff time to develop and implement comprehensive strategies with specifically targeted interventions, to maintain or enhance staff skill-sets, and to work in effective partnerships. Resources are also needed in terms of access to statistical data and research, as well as fiscal dollars for materials and evaluations.

The OPHS was released in 2008, redefining the NRPH scope of public health injury prevention practice. The OPHS emphasize using evidence-informed injury prevention efforts through education, enforcement, and environment. However, it also references the importance of applying the foundational principles of need, impact, capacity, and partnerships/collaboration.

The principle of **need** suggests that no two communities are alike and that NRPH must determine which injuries occur most in Niagara. It involves researching the facts and statistics about what makes Niagara unique.

Impact refers to whether there are injury prevention strategies that are proven to be safe, effective and within the scope of public health practice.

Capacity addresses the finite resources that are available to support injury prevention strategies. These include organizational structure, staffing, information management systems, partnerships, finances, and intervention development and maintenance.

Finally, **partnerships/collaboration** refers to the relationships NRPH has with local agencies and the community that can result in an integrated response to injury prevention. Successful collaboration aims to reduce redundancies and foster mutually benefitting relationships.

Also, the OPHS clearly specify that NRPH must apply a comprehensive prevention plan to promote road safety and decrease falls across the lifespan. It also outlines that NRPH may address “other” injury issues based on public health importance.[11] Identifying the “other” injury issues for Niagara involves examining all 15 categories of injury by way of these OPHS foundational principles.

Reassessing Niagara's Injury Prevention Priorities

Developing priorities is complicated. Setting priorities displays planning rigour and application of the OPHS foundational principles. It provides documentation to our Board of Health and the local taxpayer. It also explains our rationale for planning and implementing decision making regarding various strategies across multiple public health program areas.

Selecting a Priority Setting Framework

A framework that examines multiple factors was needed to determine local injury priorities. A nationally accepted framework developed by the Winnipeg Regional Health Authority[12] was selected for adaptation. This framework (Table 1, page 13) examines eight types of injury by assigning values to various criteria in order to compare different factors. In essence, it allows for one to compare apples to oranges. In this case, it provides a process for comparing different quantitative and qualitative factors that decision-makers feel to be of significance when determining injury priorities. Both quantitative and qualitative information are inputted into the framework and then ranked. No criterion is deemed to be of greater importance over another. However, this equal weighting may not be representative of true societal burden and is therefore a limitation of this framework.

Table 1

Winnipeg Regional Health Authority Priority Setting Tool								
Quantitative Criteria	**Violence**	**Suicide/ Self-Harm**	**Falls**	**Motor Vehicle**	**Poisoning**	**Drowning**	**Fire/Burn**	**Suffocation**
Death								
PYLL %								
Hospitalization								
Average LOS								
Sum Ranks								
Quantitative Ranking								
Qualitative Criteria								
Disproportionate burden								
Effective interventions								
Opportunity gaps exist								
Cost savings								
Worsening trends								
Within your mandate								
Ability to influence others								
Lack of readiness-other sectors								
Public readiness								
Political readiness								
Sum Ranks								
Qualitative Ranking								
Overall Priorities								

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To reflect Niagara's uniqueness and the OPHS foundational principles, NRPH adapted the Winnipeg Regional Health Authority Framework to produce the **Niagara Region Public Health Injury Prevention Priority Setting Framework** (Table 2, page 14). This adaptation included all 15 types of injury to provide a broader understanding of Niagara's injury burden and refined qualitative criteria to reflect the NRPH scope of practice. Also, this framework is applied to multiple age groups (0-4, 5-14, 15-19, 20-59, 60+) since the risk of injury varies across the lifespan and better reflects the NRPH operational structure. The ranking process remains consistent with the Winnipeg Regional Health Authority version.

Table 2

Niagara Region Public Health Injury Prevention Priority Setting Framework															
	drowning	exposure to animate object	exposure to inanimate object	falls	off road vehicle	cycling	pedestrian	playground	poisoning	road motor vehicle	scalds and burns	sports and recreation	suffocation	intentional violence	intentional self-harm
death															
PYLL															
ER visits															
hospitalization															
LOS															
RANK SUMS															
Quantitative Ranking															
effective interventions opportunity gaps exist community readiness program standards resource availability collaboration															
RANK SUMS															
Qualitative Ranking															
TOTAL RANK SUMS															
OVERALL PRIORITY RANKING															

Applying a Priority Setting Framework in Niagara

In Niagara, the application of a priority setting framework requires three steps: a) identify local need by determining the actual number of injuries (statistics); b) identify our capacity to impact Niagara in collaboration with other agencies by building consensus through discussion; and c) combine these criteria together to generate priorities.

A) Need (Quantitative Data)

Local need is reflected by statistics, or the number of injuries. Hospital data was selected as the source for statistics as it was available for every age group and type of injury. The hospital injury data represents all Niagara residents that sought hospital care for their injuries regardless of which Ontario hospital they attended. Injuries treated outside of the hospital (e.g., walk-in clinic, school) were not included since that information is not consistently available.

Data was collected for 15 types of injury based on the 2007 International Classification of Diseases and Related Health Problems (ICD-10 XX codes) and were obtained from Intellihealth (MOHLTC database). To measure mortality from 2000-2004, the number of deaths and potential years of life lost (PYLL) were collected. To measure morbidity from 2003-2007, the number of ER visits, hospitalizations, and length of stay in hospital (LOS) were included.

These statistics were entered into the Niagara Region Public Health Injury Prevention Priority Setting Framework and then ranked. The higher the injury statistic, the greater the injury is considered a priority. As shown in Table 3 (page 15), the highest statistic receives a rank value of 1; the second highest, a rank value of 2, and so on. As shown below, falls ranked number 1 under ER visits as this factor had the highest statistic. When two or more values were the same, an average rank was assigned. Next, **rank sum** was calculated by adding up the rank scores for each injury. An overall **quantitative ranking** was then determined by ranking these sums from lowest to highest. The category with the smallest **quantitative ranking** is considered of greatest burden from a quantitative perspective, which in this example would be falls.

Table 3

Niagara Quantitative Data and Ranking: Ages 0 – 4

	drowning	exposure to animate object	exposure to inanimate object	falls	off road vehicle	cycling	pedestrian	playground	poisoning	road motor vehicle	scalds and burns	sports and recreation	suffocation	intentional violence	intentional self-harm
death	*	0	0	0	0	0	*	0	0	*	0	0	0	*	0
rank	2.5	10	10	10	10	10	2.5	10	10	2.5	10	10	10	2.5	10
PYLL	*	0	0	0	0	0	*	0	0	*	0	0	0	*	0
rank	2.5	10	10	10	10	10	2.5	10	10	2.5	10	10	10	2.5	10
ER visits	10	1,448	4,163	6,532	9	145	24	343	595	176	453	776	18	21	*
rank	13	3	2	1	14	9	10	7	5	8	6	4	12	11	15
hospitalization	*	27	41	157	0	*	*	23	84	5	28	*	6	14	0
rank	11.5	5	3	1	14.5	11.5	11.5	6	2	9	4	11.5	8	7	14.5
LOS	*	59	90	364	0	*	*	28	99	13	72	*	48	124	0
rank	11.5	6	4	1	14.5	11.5	11.5	8	3	9	5	11.5	7	2	14.5
RANK SUMS	**41**	**34**	**29**	**23**	**63**	**52**	**38**	**41**	**30**	**31**	**35**	**47**	**47**	**25**	**64**
Quantitative Ranking	**9.5**	**6**	**3**	**1**	**14**	**13**	**8**	**9.5**	**4**	**5**	**7**	**11.5**	**11.5**	**2**	**15**

* denotes frequency count less than 5 and is not reportable

B) Impact, Capacity, and Collaborative Opportunities (Qualitative Data)

To set priorities, it is also important to factor in the capacity to deliver comprehensive strategies that are evidence-informed in collaboration with community partners. To discuss these factors, tasks groups of local experts with knowledge and experience in injury prevention were formed. Tasks group members participated in sessions to discuss these statements:

1. There are effective interventions (best public health practices) to address this issue.
2. There is a unique public health role to address this issue that is not being addressed by the community.
3. The community is ready to actively participate in resolving this issue.
4. The issue is included in the Ontario Public Health Standards.
5. There are sufficient resources available to address this issue (e.g., staff, money, volunteers).
6. There are opportunities for public health to collaboratively address this issue with community stakeholders.

1	2	3
strongly disagree		strongly agree

Task groups discussed each statement for every type of injury and age group. Through consensus, the task groups assigned a group value for each statement using a three-point Likert Scale. This process involved 450 separate discussions where full consensus was reached 95% of the time. These values were entered into the Niagara Region Public Health Priority Setting Framework. To make informed decisions, group members relied on theories, literature reviews, and journals. A Niagara community inventory of 169 semi-structured phone interviews of 554 local injury prevention programs or services was reviewed to determine Niagara's capacity to address injuries, resource availability, and partnership opportunities.

For every injury, the statement values from the Likert Scale were added together to form a **sum** (Table 4, page 16)**.** The **sums** were then ranked across injuries to determine the **qualitative ranking**. The highest **sum** received a rank value of 1, the second highest sum got a rank of 2, and so on. In the case of equal values across one or more types of injury, an average rank was assigned. The category with the lowest **qualitative ranking** is considered of greatest burden from a qualitative perspective, which in this example is both falls and road motor vehicle.

Table 4

Niagara Qualitative Data and Ranking: Ages 0 – 4

	drowning	exposure to animate object	exposure to inanimate object	falls	off road vehicle	cycling	pedestrian	playground	poisoning	road motor vehicle	scalds and burns	sports and recreation	suffocation	intentional violence	intentional self-harm
effective interventions	2	1	1	3	1	2	3	2	3	3	2	1	3	2	1
opportunity gaps exist	1	3	3	3	3	2	2	2	2	2	3	2	2	2	3
community readiness	2	2	2	2	1	2	2	1	2	2	2	1	2	2	1
program standards	1	1	1	3	3	1	1	1	1	3	1	1	1	1	1
resource availability	2	2	2	2	1	2	2	1	3	3	2	2	2	3	1
collaboration	3	2	2	3	2	2	3	2	2	3	2	2	2	3	2
SUM	11	11	11	16	11	11	13	9	13	16	12	9	12	13	9
Qualitative Ranking	10	10	10	1.5	10	10	4	14	4	1.5	6.5	14	6.5	4	14

C) Combining Quantitative and Qualitative Data

The final step involves combining the quantitative and qualitative rankings together to provide a **total rank sum** for each injury category. The lowest total rank sum was then given the highest **overall priority** ranking value of 1; the next lowest, an overall priority ranking of 2; and so on. As demonstrated in Table 5 (page 17), the falls category has an overall priority rank value of 1 and would be considered the greatest public health injury priority among children ages 0-4 in Niagara. Intentional self-harm, with an overall priority rank value of 15, would be considered the lowest priority.

Table 5

Niagara Cumulative Quantitative and Qualitative Ranking: Ages 0 – 4

	drowning	exposure to animate object	exposure to inanimate object	falls	off road vehicle	cycling	pedestrian	playground	poisoning	road motor vehicle	scalds and burns	sports and recreation	suffocation	intentional violence	intentional self-harm
Quantitative Ranking	9.5	6	3	1	14	13	8	9.5	4	5	7	11.5	11.5	2	15
Qualitative Ranking	10	10	10	1.5	10	10	4	14	4	1.5	6.5	14	6.5	4	14
TOTAL RANK SUMS	19.5	16	13	2.5	24	23	12	23.5	8	6.5	13.5	25.5	18	6	29
OVERALL PRIORITY	10	8	6	1	13	11	5	12	4	3	7	14	9	2	15

Niagara's Injury Prevention Priorities

The Niagara Region Public Health Injury Prevention Priority Setting Framework enables the examination of many quantitative and qualitative variables for five age groups across 15 types of injuries. As shown in Table 6 (Niagara Region Public Health Priority Setting: Ages 0 – 4, page 18), applying the priority ranking process resulted in falls being the leading injury priority for children up to four years of age. Intentional violence, road motor vehicles, and poisoning ranked second, third, and fourth, respectively.

Table 6

Niagara Region Public Health Priority Setting: Ages 0 – 4

	drowning	exposure to animate object	exposure to inanimate object	falls	off road vehicle	cycling	pedestrian	playground	poisoning	road motor vehicle	scalds and burns	sports and recreation	suffocation	intentional violence	intentional self-harm
death	*	0	0	0	0	0	*	0	0	*	0	0	0	*	0
rank	2.5	10	10	10	10	10	2.5	10	10	2.5	10	10	10	2.5	10
PYLL	*	0	0	0	0	0	*	0	0	*	0	0	0	*	0
rank	2.5	10	10	10	10	10	2.5	10	10	2.5	10	10	10	2.5	10
ER visits	10	1,448	4,163	6,532	9	145	24	343	595	176	453	776	18	21	*
rank	13	3	2	1	14	9	10	7	5	8	6	4	12	11	15
hospitalization	*	27	41	157	0	*	*	23	84	5	28	*	6	14	0
rank	11.5	5	3	1	14.5	11.5	11.5	6	2	9	4	11.5	8	7	14.5
LOS	*	59	90	364	0	*	*	28	99	13	72	*	48	124	0
rank	11.5	6	4	1	14.5	11.5	11.5	8	3	9	5	11.5	7	2	14.5
RANK SUMS	41	34	29	23	63	52	38	41	30	31	35	47	47	25	64
Quantitative Ranking	9.5	6	3	1	14	13	8	9.5	4	5	7	11.5	11.5	2	15
effective interventions	2	1	1	3	1	2	3	2	3	3	2	1	3	2	1
opportunity gaps exist	1	3	3	3	3	2	2	2	2	2	3	2	2	2	3
community readiness	2	2	2	2	1	2	2	1	2	2	2	1	2	2	1
program standards	1	1	1	3	3	1	1	1	1	3	1	1	1	1	1
resource availability	2	2	2	2	1	2	2	1	3	3	2	2	2	3	1
collaboration	3	2	2	3	2	2	3	2	2	3	2	2	2	3	2
RANK SUMS	11	11	11	16	11	11	13	9	13	16	12	9	12	13	9
Qualitative Ranking	10	10	10	1.5	10	10	4	14	4	1.5	6.5	14	6.5	4	14
TOTAL RANK SUMS	19.5	16	13	2.5	24	23	12	23.5	8	6.5	13.5	25.5	18	6	29
OVERALL PRIORITY	10	8	6	1	13	11	5	12	4	3	7	14	9	2	15

* denotes frequency count less than 5 and is not reportable

Comparatively, applying the priority setting process to the 5- to 14-year-old age group (Table 7, Niagara Region Public Health Priority Setting: Ages 5 – 14, page 19) shows that falls continue to be a leading childhood priority. Injuries resulting from off road vehicles, cycling, sports, recreation, road motor vehicle and intentional violence follow falls in terms of injury priority.

Table 7

Niagara Region Public Health Priority Setting: Ages 5 – 14

	drowning	exposure to animate object	exposure to inanimate object	falls	off road vehicle	cycling	pedestrian	playground	poisoning	road motor vehicle	scalds and burns	sports and recreation	suffocation	intentional violence	intentional self-harm
death	0	0	0	0	*	0	*	0	0	0	0	0	0	*	0
rank	9.5	9.5	9.5	9.5	2	9.5	2	9.5	9.5	9.5	9.5	9.5	9.5	2	9.5
PYLL	0	0	0	0	*	0	*	0	0	0	0	0	0	*	0
rank	9.5	9.5	9.5	9.5	2	9.5	2	9.5	9.5	9.5	9.5	9.5	9.5	2	9.5
ER visits	7	4,472	8,298	10,198	208	2,255	158	1,263	241	729	339	8,758	6	425	139
rank	14	4	3	1	10	5	12	6	11	7	9	2	15	8	13
hospitalization	*	61	65	244	30	108	19	73	30	42	7	131	*	*	58
rank	14	6	5	1	9.5	3	11	4	9.5	8	12	2	14	14	7
LOS	*	108	255	428	180	540	120	113	61	282	99	220	*	*	145
rank	14	10	4	2	6	1	8	9	12	3	11	5	14	14	7
RANK SUMS	61	39	31	23	29.5	28	35	38	51.5	37	51	28	62	40	46
Quantitative Ranking	14	9	5	1	4	2.5	6	8	13	7	12	2.5	15	10	11
effective interventions	1	1	1	2	2	2	3	1	1	2	1	2	1	2	1
opportunity gaps exist	1	3	1	3	3	1	1	2	3	1	1	2	2	3	3
community readiness	2	1	1	2	2	3	1	1	1	2	1	2	1	3	3
program standards	1	1	1	3	3	1	1	1	1	3	1	1	1	1	1
resource availability	3	1	1	2	2	3	3	1	2	3	3	3	1	3	1
collaboration	3	2	1	3	3	3	3	2	2	2	2	3	1	3	3
RANK SUMS	11	9	6	15	15	13	12	8	10	13	9	13	7	15	12
Qualitative Ranking	9	11.5	15	2	2	5	7.5	13	10	5	11.5	5	14	2	7.5
TOTAL RANK SUMS	23	20.5	20	3	6	7.5	13.5	21	23	12	23.5	7.5	29	12	18.5
OVERALL PRIORITY	11.5	9	8	1	2	3.5	6	10	11.5	5.5	13	3.5	14	5.5	7

* denotes frequency count less than 5 and is not reportable

The priorities for injury prevention shift as the age of Niagara's population increases. As shown in Table 8 (Niagara Region Public Health Priority Setting: Ages 15-19, page 20), road motor vehicles, or car crashes, is of greatest priority for 15- to 19-year-olds as a result of this priority setting process. Intentional injuries are also a priority, as intentional self-harm, including self-mutilation and suicide, and intentional violence are the second and third ranked priorities.

Table 8

Niagara Region Public Health Priority Setting: Ages 15 – 19

	drowning	exposure to animate object	exposure to inanimate object	falls	off road vehicle	cycling	pedestrian	playground	poisoning	road motor vehicle	scalds and burns	sports and recreation	suffocation	intentional violence	intentional self-harm
death	*	0	0	0	0	*	*	0	*	21	0	0	0	*	9
rank	5	11.5	11.5	11.5	11.5	5	5	11.5	5	1	11.5	11.5	11.5	5	2
PYLL	*	0	0	0	0	*	*	0	*	1207	0	0	0	*	519
rank	5	11.5	11.5	11.5	11.5	5	5	11.5	5	1	11.5	11.5	11.5	5	2
ER visits	5	3,217	7,576	4,299	244	1,038	140	56	438	1,885	562	6,812	6	1,874	672
rank	15	4	1	3	11	7	12	13	10	5	9	2	14	6	8
hospitalization	0	48	52	94	21	48	14	*	50	117	10	129	*	50	204
rank	15	8.5	5	4	10	8.5	11	13.5	6.5	3	12	2	13.5	6.5	1
LOS	0	121	133	270	143	369	118	*	93	804	105	322	*	109	776
rank	15	8	7	5	6	3	9	13.5	12	1	11	4	13.5	10	2
RANK SUMS	**55**	**43.5**	**36**	**35**	**50**	**28.5**	**42**	**63**	**38.5**	**11**	**55**	**31**	**64**	**32.5**	**15**
Quantitative Ranking	**12.5**	**10**	**7**	**6**	**11**	**3**	**9**	**14**	**8**	**1**	**12.5**	**4**	**15**	**5**	**2**
effective interventions	**2**	**1**	**1**	**1**	**2**	**2**	**2**	**1**	**3**	**3**	**1**	**2**	**1**	**2**	**1**
opportunity gaps exist	**1**	**3**	**1**	**3**	**1**	**3**	**3**	**1**	**2**	**3**	**3**	**3**	**3**	**2**	**3**
community readiness	**1**	**1**	**1**	**1**	**2**	**1**	**1**	**1**	**3**	**3**	**1**	**1**	**1**	**2**	**3**
program standards	**1**	**1**	**1**	**3**	**3**	**1**	**1**	**1**	**1**	**3**	**1**	**1**	**1**	**1**	**1**
resource availability	**3**	**1**	**1**	**1**	**2**	**1**	**1**	**1**	**3**	**3**	**1**	**1**	**1**	**3**	**2**
collaboration	**3**	**2**	**1**	**1**	**2**	**1**	**1**	**1**	**3**	**3**	**2**	**2**	**1**	**3**	**3**
RANK SUMS	**11**	**9**	**6**	**10**	**12**	**9**	**9**	**6**	**15**	**18**	**9**	**10**	**8**	**13**	**13**
Qualitative Ranking	**6**	**10.5**	**14.5**	**7.5**	**5**	**10.5**	**10.5**	**14.5**	**2**	**1**	**10.5**	**7.5**	**13**	**3.5**	**3.5**
TOTAL RANK SUMS	**18.5**	**20.5**	**21.5**	**13.5**	**16**	**13.5**	**19.5**	**28.5**	**10**	**2**	**23**	**11.5**	**28**	**8.5**	**5.5**
OVERALL PRIORITY	**9**	**11**	**12**	**6.5**	**8**	**6.5**	**10**	**15**	**4**	**1**	**13**	**5**	**14**	**3**	**2**

* denotes frequency count less than 5 and is not reportable

Applying the priority setting process as in Table 9 (Niagara Region Public Health Priority Setting: Ages 20 – 59, page 21) to Niagara's 20- to 59-year-olds shows that car crashes is the number one priority. This is consistent for the quantitative, qualitative, and combined rankings. Priorities were varied when criteria were examined individually; however, the priority setting process shows that falls and poisonings are the other priorities that may require preventative attention.

Table 9

Niagara Region Public Health Priority Setting: Ages 20 – 59

	drowning	exposure to animate object	exposure to inanimate object	falls	off road vehicle	cycling	pedestrian	playground	poisoning	road motor vehicle	scalds and burns	sports and recreation	suffocation	intentional violence	intentional self-harm
death	14	0	0	13	6	*	9	0	66	76	0	0	8	17	130
rank	5	13	13	6	9	10	7	13	3	2	13	13	8	4	1
PYLL	551	0	0	339	263	*	383	0	2,274	2,850	0	0	222	602	4,362
rank	5	13	13	7	8	10	6	13	3	2	13	13	9	4	1
ER visits	56	9,772	50,694	29,471	917	2,660	559	50	2,745	10,488	3,015	23,978	52	6,057	2,694
rank	13	5	1	2	11	10	12	15	8	4	7	3	14	6	9
hospitalization	8	124	507	1,628	117	161	87	0	387	679	90	432	17	301	1,247
rank	14	9	4	1	10	8	12	15	6	3	11	5	13	7	2
LOS	42	336	2,376	9,043	954	1,471	832	0	1,445	5,729	775	1,177	173	1,562	6,451
rank	14	12	4	1	9	6	10	15	7	3	11	8	13	5	2
RANK SUMS	51	52	35	17	47	44	47	71	27	14	55	42	57	26	15
Quantitative Ranking	11	12	6	3	9.5	8	9.5	15	5	1	13	7	14	4	2
effective interventions	2	1	1	2	2	3	3	1	3	3	2	2	1	2	1
opportunity gaps exist	2	1	1	2	3	2	2	1	3	3	1	2	1	1	1
community readiness	2	1	1	1	2	1	1	1	1	3	1	1	1	2	2
program standards	1	1	1	3	3	1	1	1	1	3	1	1	1	1	1
resource availability	1	1	1	3	2	3	2	1	3	3	1	1	1	1	1
collaboration	3	2	1	3	3	2	2	1	3	3	3	2	1	3	2
RANK SUMS	11	7	6	14	15	12	11	6	14	18	9	9	6	10	8
Qualitative Ranking	6.5	12	14	3.5	2	5	6.5	14	3.5	1	9.5	9.5	14	8	11
TOTAL RANK SUMS	17.5	24	20	6.5	11.5	13	16	29	8.5	2	22.5	16.5	28	12	13
OVERALL PRIORITY	10	13	11	2	4	6.5	8	15	3	1	12	9	14	5	6.5

* denotes frequency count less than 5 and is not reportable

Using the priority setting process resulted in falls being the leading priority for injury prevention among those aged 60 years and over within Niagara as shown in Table 10 (Niagara Region Public Health Priority Setting: Ages 60+, page 22). Car crashes and poisoning rank second and third. These top three priorities are consistently demonstrated in the quantitative, qualitative, and combined rankings.

Table 10

Niagara Region Public Health Priority Setting: Ages 60 +

	drowning	exposure to animate object	exposure to inanimate object	falls	off road vehicle	cycling	pedestrian	playground	poisoning	road motor vehicle	scalds and burns	sports and recreation	suffocation	intentional violence	intentional self-harm
death	6	0	0	110	0	*	6	0	8	31	0	0	13	*	31
rank	6.5	12.5	12.5	1	12.5	8.5	6.5	12.5	5	2.5	12.5	12.5	4	8.5	2.5
PYLL	34	0	0	124	0	*	22	0	24	115	0	0	24	*	173
rank	4	12.5	12.5	2	12.5	8.5	7	12.5	5.5	3	12.5	12.5	5.5	8.5	1
ER visits	5	2,170	10,712	24,087	73	361	202	*	601	2,045	453	2,675	57	183	178
rank	14	4	2	1	12	8	9	15	6	5	7	3	13	10	11
hospitalization	0	40	207	6,003	10	49	50	*	161	319	47	143	36	26	132
rank	15	10	3	1	13	8	7	14	4	2	9	5	11	12	6
LOS	0	185	1,971	63,864	35	389	561	*	1,123	2,075	504	1,053	677	363	1,360
rank	15	12	3	1	13	10	8	14	5	2	9	6	7	11	4
RANK SUMS	54.5	51	33	6	63	43	37.5	68	25.5	14.5	50	39	40.5	50	24.5
Quantitative Ranking	13	12	5	1	14	9	6	15	3	2	10.5	7	8	10.5	4
effective interventions	1	1	1	3	2	3	3	1	3	3	2	1	1	1	1
opportunity gaps exist	1	1	1	2	2	2	2	1	2	2	2	1	1	1	1
community readiness	1	1	1	3	2	1	1	1	2	3	1	1	1	1	2
program standards	1	1	1	3	3	1	1	1	1	3	1	1	1	1	1
resource availability	1	1	1	3	2	3	1	1	2	3	3	1	1	2	1
collaboration	2	1	1	3	2	2	2	1	3	3	3	2	1	2	2
RANK SUMS	7	6	6	17	13	12	10	6	13	17	12	7	6	8	8
Qualitative Ranking	10.5	13.5	13.5	1.5	3.5	5.5	7	13.5	3.5	1.5	5.5	10.5	13.5	8.5	8.5
TOTAL RANK SUMS	23.5	25.5	18.5	2.5	17.5	14.5	13	28.5	6.5	3.5	16	17.5	21.5	19	12.5
OVERALL PRIORITY	13	14	10	1	8.5	6	5	15	3	2	7	8.5	12	11	4

* denotes frequency count less than 5 and is not reportable

Conclusion: Niagara's Injury Prevention Priorities

Every three days someone in Niagara dies as the result of an injury. In some cases, people are hospitalized. The health care system incurs the direct costs of these injuries. Society feels its impact in terms of time off work and school, in the form of partial and permanent disabilities, as well as experiencing grief and pain. These are the human costs that are incalculable.

Every 10 minutes, a Niagara resident visits the ER due to an injury.

Injuries are not discriminatory and can happen to anyone regardless of age, gender, education, or income. Whether at work, school, home, on the road, in a park, or in the community, there is a level of risk for injury. Fortunately, these injures are preventable, provided that environmental measures are equitably accessible, laws and regulations are enforced, and the Niagara community understands and applies the skills needed to reduce their risk.

The OPHS directs NRPH to address preventable injuries, specifically road safety, falls across the lifespan, and other injuries based on local community needs. However, with injuries being influenced by multiple risk factors and the limits imposed by finite resources, implementing comprehensive injury prevention strategies to multiple issues is a strategic challenge. Through the application of an adapted version of the Winnipeg Regional Health Authority's priority setting framework, the Niagara Region Public Health Injury Prevention Priority Setting Framework was implemented to determine evidence informed priorities. Applying this method identified the following injury priorities for Niagara:

Age	Priority One	Priority Two
0-4	Falls	Intentional Violence
5-14	Falls	Off Road Vehicle
15-19	Road Motor Vehicle	Intentional Self-Harm
20-59	Road Motor Vehicle	Falls
60 +	Falls	Road Motor Vehicle

These priorities guide the decision making process for resource allocation and present an overall perspective of the impact injuries have on Niagara for age-specific populations. As such, NRPH announced during the Health Story of Niagara[13] that falls and road motor vehicle (car crashes) were identified as the leading injury prevention priorities. NRPH is committed to collaborating with its partners for the next five years to create comprehensive injury prevention strategies in these areas. In addition, based on the capacity of NRPH, public health staff within the Chronic Disease and Injury Prevention Division, as well as the Family Health Division, are committed to addressing intentional violence among children aged 0-4 and intentional self-harm among Niagara's youth. The strategies used to address these issues will focus on reducing risk factors and promoting protective factors through education, environmental supports, and enforcement. In addition, other factors expressed in the Health Story of Niagara will be integrated into these strategies to ensure that we are meeting the needs of Niagara's diverse community.

Appendix A: Ontario Public Health Standards 2008 (pp 22-24)[14]
Prevention of Injury and Substance Misuse

Goal
To reduce the frequency, severity, and impact of preventable injury and of substance misuse.

Societal Outcomes
- Community partners have the capacity to create safe and supportive environments where people live, work, play, and learn.
- Members of the public have an increased capacity to prevent injury and substance misuse.
- There is change in the public's cultural norms towards viewing injuries as predictable and preventable.
- Sustained behaviour change by the public contributes to the prevention of injury and substance misuse.
- An increased proportion of the public lives in safe and supportive environments.
- There is reduced incidence and severity of injuries and injury-related hospitalizations, disabilities, and deaths.
- There is reduced incidence and severity of substance misuse and substance-related injuries, hospitalizations, disabilities, and deaths.

Board of Health Outcomes
- The board of health is aware of and uses epidemiology to influence the development of healthy public policy and its programs and services for the prevention of injury and substance misuse.
- There is an increased awareness of community partners about the factors associated with injury and substance misuse required to inform program planning and policy development, including the following:
  - Community health status;
  - Risk, protective, and resiliency factors; and
  - Impact.
- Policy-makers have the information required to enable them to amend current policies or develop new policies that would have an impact on the prevention of injury and substance misuse.
- Community partners are engaged in the prevention of injury and substance misuse.
- The public is aware that the majority of injuries are predictable and preventable.
- The public is aware of the risk, protective, and resiliency factors associated with injury and substance misuse.
- The public is aware of the impact associated with injury and substance misuse.
- Priority populations have the capacity to prevent injury, substance misuse, and associated harms.
- The public is aware of current legislation related to the prevention of injury and substance misuse.

Community partners may include but are not limited to non-governmental organizations; governmental bodies; school boards and/or staff, school councils, and students of elementary, secondary, and post-secondary educational settings; parents; employers and employees in workplace settings; and other stakeholders.

Appendix A cont'd

Assessment and Surveillance

Requirement

1. The board of health shall conduct epidemiological analysis of surveillance data, including monitoring trends over time, emerging trends, and priority populations, in accordance with the *Population Health Assessment and Surveillance Protocol, 2008* (or as current), in the areas of [11]:
   - Alcohol and other substances;
   - Falls across the lifespan;
   - Road and off-road safety; and
   - Other areas of public health importance[12] for the prevention of injuries.

Health Promotion and Policy Development

Requirements

2. The board of health shall work with community partners, using a comprehensive health promotion approach, to influence the development and implementation of healthy policies and programs, and the creation or enhancement of safe and supportive environments that address the following:
   - Alcohol and other substances;
   - Falls across the lifespan;
   - Road and off-road safety; and may include
   - Other areas of public health importance for the prevention of injuries as identified by local surveillance in accordance with *Population Health Assessment and Surveillance Protocol, 2008*

3. The board of health shall use a comprehensive health promotion approach to increase the capacity of priority populations to prevent injury and substance misuse by:
   a. Collaborating with and engaging community partners;
   b. Mobilizing and promoting access to community resources[13];
   c. Providing skill-building opportunities; and
   d. Sharing best practices and evidence for the prevention of injury and substance misuse.

4. The board of health shall increase public awareness of the prevention of injury and substance misuse in the following areas:
   - Alcohol and other substances;
   - Falls across the lifespan;
   - Road and off-road safety; and may include
   - Other areas of public health importance for the prevention of injuries, as identified by local surveillance in accordance with *Population Health Assessment and Surveillance Protocol, 2008*.

   These efforts shall include:
   a. Adapting/supplementing national and provincial health communications strategies; and/or
   b. Developing and implementing regional/local communications strategies.

[11] The broad topic areas include alcohol and other substances (i.e., including alcohol misuse, drinking and driving, illicit substance use), falls across the lifespan (i.e., including falls in children, youth, adults, and older adults), and road and off-road safety (i.e., including motorized vehicles, pedestrians, cyclists, drivers, and occupants).

[12] Other areas of public health importance related to prevention of injuries and substance misuse may include violence, suicide, burns, drowning, farm injuries, poisonings, scalds, suffocation, sport and recreation, and playground safety. The assessment, planning, delivery, and management for other areas of public health importance would be based on local epidemiology and evidence of effective interventions.

[13] Community resources may include, but are not limited to, volunteers, coalitions, stakeholders, and access to safety equipment.

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Appendix A cont'd

Health Protection

Requirement

5. The board of health shall use a comprehensive health promotion approach in collaboration with community partners, including enforcement agencies, to increase public awareness of and adoption of behaviours that are in accordance with current legislation[14] related to the prevention of injury and substance misuse in the following areas:
   - Alcohol and other substances;
   - Falls across the lifespan;
   - Road and off-road safety; and may include
   - Other areas of public health importance for the prevention of injuries as identified by local surveillance in accordance with *Population Health Assessment and Surveillance Protocol, 2008*

[14] Legislation includes municipal by-laws (e.g., community safety zones), provincial legislation (e.g., mandatory child car seats under the Highway Traffic Act), and federal legislation (e.g., ban on baby walkers under the Hazardous Products Act) that support prevention of injury and substance misuse.

Endnotes

[1] Ministry of Health Promotion (2007). Ontario's Injury Prevention Strategy: Working together for a safer, healthier Ontario. Toronto: Queen's Printer for Ontario; p. 2.

[2] Public Health Agency of Canada (2004). Leading causes of death in Canada. Retrieved on February 10, 2010 from www.phac-aspc.gc.ca/publicat/lcd-pcd97/table1-eng.php.

[3] Ministry of Health and Long Term Care (2008). Ontario Public Health Standards 2008. Toronto: Queens Printer for Ontario.

[4] Ministry of Health Promotion (2007). Ontario's Injury Prevention Strategy: Working together for a safer, healthier Ontario. Toronto: Queen's Printer for Ontario; p. 2.

[5] Public Health Agency of Canada (2004). Leading causes of death in Canada. Retrieved on February 10, 2010 from www.phac-aspc.gc.ca/publicat/lcd-pcd97/table1-eng.php.

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[9] Ministry of Health Promotion (2007). Ontario's Injury Prevention Strategy: Working together for a safer, healthier Ontario. Toronto: Queen's Printer for Ontario; p. 4.

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[14] Ministry of Health and Long Term Care (2008). Ontario Public Health Standards 2008. Toronto: Queens Printer for Ontario.