

# Fall Prevention Across the Lifespan

## Compendium

January 2017



Region of Waterloo  
PUBLIC HEALTH

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## 1.0 About the Compendium

### 1.1 Background and Purpose

In December 2016, a Fall Prevention Across the Lifespan Development Framework ([Development Framework](#)) was created to enhance the Region of Waterloo Public Health and Emergency Services' (ROWPHE) capacity to prevent falls and fall-related injuries in Waterloo Region. Addressing falls across the lifespan is a requirement of the Ontario Public Health Standards and a priority outlined in the 2015 Injury and Substance Misuse Prevention Program Review.<sup>1-3</sup> The Development Framework is a comprehensive model to address the many risk factors of falls and fall-related injuries that affect individuals across all stages of the lifespan. Using a public health approach, it proposes that fall prevention interventions should target modifiable risk factors (i.e., risk factors that can be changed) through strategies related to education, safe and supportive environments, and healthy public policy.

Though broad-level strategies can be planned and implemented to prevent falls across the lifespan, the Development Framework suggests it is essential to also consider some of the unique fall-related issues that individuals may face as they transition through each stage of the lifespan. As such, this compendium serves as a supplementary document to the Development Framework, exploring some of those unique fall-related issues.

### 1.2 How to Use the Compendium

This document examines the unique issues, risk factors, and implications of falls that are characteristic of the different stages of the lifespan. It also discusses some evidence-informed fall prevention interventions, using strategies related to education, safe and supportive environments, and healthy public policy. Finally, the compendium shares some links to fall prevention resources for each of the life stages. Similar to the new aged-based structure of the Healthy Living Division (HLV), the life stages in this document are categorized into the following groups:

- Fall Prevention for Ages 0-5
- Fall Prevention for Ages 6-12
- Fall Prevention for Ages 13-24
- Fall Prevention for Ages 25 to 54
- Fall Prevention for Ages 55+

Overall, the compendium can be used in conjunction with the Development Framework to inform fall prevention cluster discussion, along with program development at ROWPHE. The new structure of the HLV will help to facilitate this work by focusing on a greater understanding of the populations we serve and building collective capacity, internally and in the community, to prevent falls in Waterloo Region.

**Together, we can PREVENT FALLS FOR ALL!**

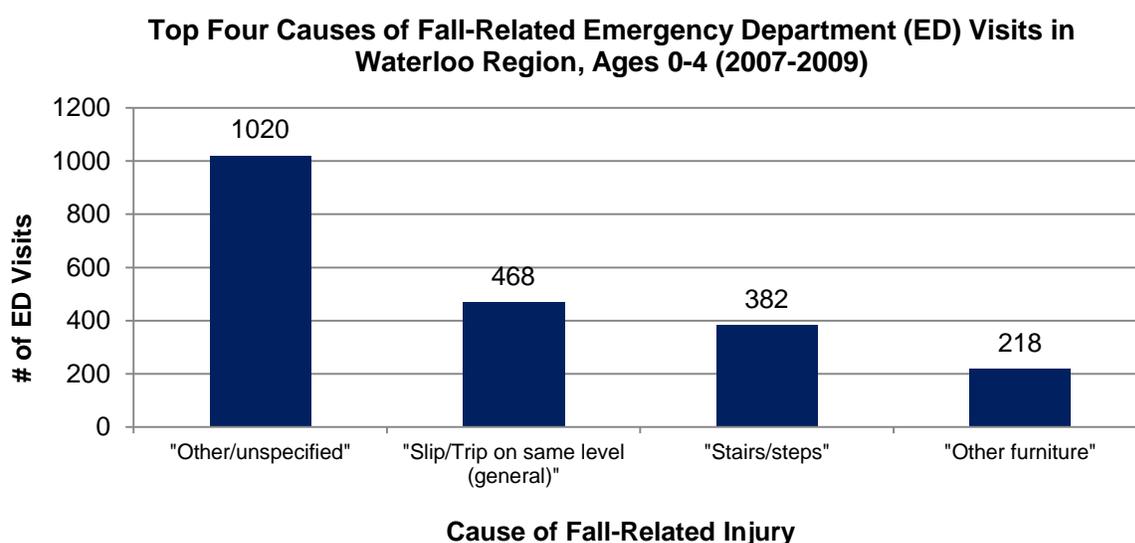
## 2.0 Fall Prevention for Ages 0-5

### 2.1 Issue

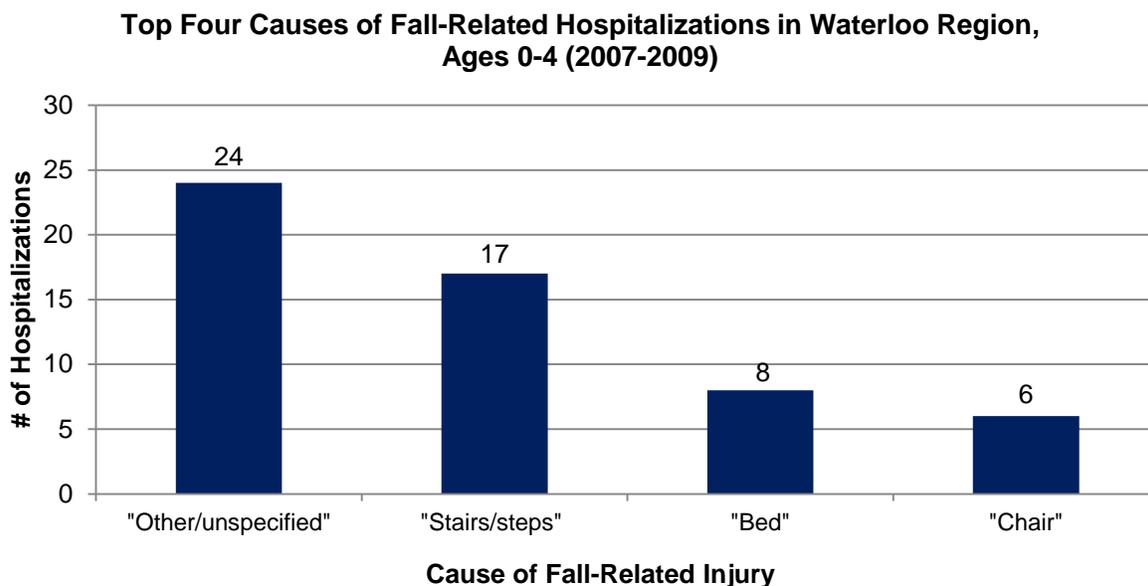
The majority of childhood falls occur under the age of five years.<sup>1</sup> In both Ontario and Waterloo Region, falls are the leading mechanism for injury-related emergency department visits and hospitalizations among children under the age of five.<sup>8, 9</sup> Between 2007 and 2009 in Waterloo Region, falls in this age group were responsible for approximately 50 per cent of emergency department visits and 41 per cent of hospitalizations due injury.<sup>9</sup> Between 2007 and 2009 in Waterloo Region, it is estimated that almost four infants and toddlers were sent to the emergency department each day (2,731 infants and toddlers total) and three were hospitalized each month (76 infants and toddlers in total) because of a fall.<sup>9</sup> More recent local data (2008-2012) reveals that falls continue to be the top cause of injury-related emergency department visits and hospitalizations among this age group in Waterloo Region.<sup>23</sup>

Aside from those fall-related incidents deemed as “other/unspecified”, the leading cause of fall-related emergency department visits and hospitalizations among infants under the age of five, as depicted in *Figure 1* and *Figure 2*, were “slips/trips on the same level” and falls on “stairs/steps”.<sup>9</sup> The most common fall-related injuries incurred were injuries of the head, followed by limb injuries.<sup>9</sup> In fact, between 2007 and 2009 in Waterloo Region, 1,974 infants were sent to the emergency department and 35 were hospitalized for fall-related head injuries.<sup>9</sup> Overall, the available data suggests that the majority of falls among this age group occur in the home, particularly around stairs and furniture. This is consistent in the literature, which suggests that infants and toddlers spend most of their time in a home setting during their first few years of life.<sup>1, 5, 6, 22, 24, 25</sup> The literature also suggests that the playground becomes a common place of injury for those children five years of age and older.<sup>1,5</sup>

*Figure 1: Top Four Causes of Fall-Related Emergency Department Visits in Waterloo Region, Ages 0-4 (2007-2009)*



Source: Ontario Injury Prevention Resource Centre. Ontario Injury Data Report. Toronto, ON: SMARTRISK; 2012.  
Figure 2: Top Four Causes of Fall-Related Hospitalizations in Waterloo Region, Ages 0-4 (2007-2009)



Source: Ontario Injury Prevention Resource Centre. Ontario Injury Data Report. Toronto, ON: SMARTRISK; 2012.

## 2.2 Risk Factors

Unique risk factors for falls and fall-related injuries that are characteristic of this stage in the lifespan include those relating to developmental characteristics, parenting styles, and the home environment.<sup>1, 5, 6, 22, 24</sup> These risk factors are summarized in *Table 1*.

*Table 1: Fall Risk Factors for Infants and Toddlers*

Biological/Medical	Behavioural
<ul style="list-style-type: none"> <li>• Innate curiosity about exploring the environment<sup>1, 4, 22</sup></li> <li>• Delayed cognitive ability to assess and understand risks in the environment<sup>1, 4, 22</sup></li> <li>• Deficits in postural control and muscle strength<sup>17</sup></li> <li>• Higher head to body ratio, impacting balance and increasing likelihood of the child landing on their head during a fall<sup>4, 22</sup></li> <li>• Being male<sup>1, 4, 22</sup></li> </ul>	<ul style="list-style-type: none"> <li>• Poor parental supervision and being supervised by another sibling<sup>1, 22</sup></li> <li>• Both overly permissive and overly restrictive parenting styles<sup>4, 22</sup></li> <li>• Limiting healthy risk-taking and risky play opportunities<sup>1, 26</sup></li> <li>• Poor nutrition<sup>1, 4, 6, 7, 14</sup></li> </ul>

Social/Economic	Environmental
<ul style="list-style-type: none"> <li>• Young maternal age, low level maternal education, and stress and mental health problems in caregivers<sup>1, 24, 25</sup></li> <li>• Socioeconomic factors, such as:               <ul style="list-style-type: none"> <li>○ Overcrowded housing;</li> <li>○ Hazardous environments;</li> <li>○ Single-parent upbringing;</li> <li>○ Living in poverty; and</li> <li>○ Lack of access to health care<sup>1, 4-7, 14, 22, 24, 25</sup></li> </ul> </li> <li>• Ethnicity<sup>1, 24</sup></li> <li>• Aboriginal status<sup>1</sup></li> </ul>	<ul style="list-style-type: none"> <li>• Fall hazards in the home, particularly stairs, furniture, windows, and dangerous nursery products (e.g., walkers)<sup>1, 4, 5, 22, 25, 26</sup></li> <li>• Playing on equipment that is too tall or improperly maintained<sup>1, 5</sup></li> <li>• Living in high-rise buildings<sup>1, 14</sup></li> <li>• Living in rural areas<sup>1, 4, 14</sup></li> </ul>

## 2.3 Implications

Overall, the burden of falls and fall-related injury for persons in this age group are a significant concern. For Canadian children younger than five years of age, treatment costs are an estimated \$447 million annually, or approximately \$238 per child per year.<sup>1</sup> Given head injury is the leading cause of fall-related emergency department visits and hospitalizations among this age group, consideration should be given to the long-term implications.<sup>1,27</sup> Head injuries, such as concussions, can affect the developing child across the lifespan, potentially causing neurologic and functional deficits later in life, such as delays in expressive vocabulary and problems with motor coordination and balance.<sup>1,27</sup> Young children also take longer to recover from concussions when compared to adults.<sup>1</sup> This can jeopardize the child's quality of life in the future.<sup>1</sup> Finally, the literature suggests that fall-related injury among infants and toddlers can impact other family members, such as siblings and parents who can be subject to a great deal of stress from changes in family behaviour and structure due to the increased care needs of the injured child.<sup>1</sup>

## 2.4 Fall Prevention Interventions

### 2.4.1 Education

Because parents and other caregivers are largely responsible for ensuring that infants and toddlers are not exposed to fall risks, fall prevention education efforts should target parents and child care facilities.<sup>1, 22</sup> Fall prevention key messaging should promote:

- Skill-building surrounding identifying and modifying fall dangers in the home;<sup>1, 4, 5, 22</sup>

- The importance of keeping one hand on a child while using a change table, properly securing stair gates, and setting car seats down on the floor when used as a carrier (never on top of furniture);<sup>4, 5</sup>
- The Canadian Standards Association (CSA) playground standards;<sup>4</sup>
- The importance of reinforcing early messages about safety practices;<sup>4</sup>
- The significance of early skill-building for safe play and socialization;<sup>1, 4</sup>
- The importance of encouraging engagement in age-appropriate risk-taking and risky play in hazard-free spaces;<sup>4, 17</sup>
- Proper nutrition, which includes regularly eating a variety of nutritious meals to maximize energy, strength, and endurance;<sup>1, 4, 6, 7, 14</sup>
- The benefits of vitamin D supplements for improving and maintaining bone health;<sup>28</sup> and
- Concussion prevention and management.<sup>27</sup>

In addition to social marketing campaigns and injury-related visits in primary and acute care settings, possible education channels for this life stage can include: child immunization and development assessment clinics, home visits (e.g., through collaborations with the Healthy Babies Healthy Children program), and child care facilities (e.g., through collaborations with owners/operators, staff, and public health inspectors)<sup>1, 4, 22</sup>

#### 2.4.2 Safe and Supportive Environments

Given that most fall-related injuries among infants and toddlers occur in the home and care settings—followed by at the playground—public health should continue to promote the use of home safety assessment tools in homes and child care facilities, as well as, advocate for safe, CSA-compliant play spaces.<sup>1, 4, 22, 25, 29, 30</sup> Modifications in the home and child care environment should focus on the use of stair gates as they have been shown to be effective in reducing the incidence of falls among infants and toddlers.<sup>1, 22, 25, 30</sup> Infants and toddlers can also easily fall from open windows and off balconies and, as such, use of window guards should be considered.<sup>1, 25, 30</sup> It is important to note, however, that the high cost of stair gates and the difficulty of properly installing them can be barriers to using such devices.<sup>1, 30</sup> As such, public health could work with community partners to improve access to free, low-cost, or discounted stair gates and installation programs.<sup>1, 30</sup>

The CSA standards are the only nationally recognized standards for children’s playgrounds and equipment and they provide information about materials, installation, strength of equipment, surfacing, inspection, maintenance, performance requirements, access to the playground, and play space layout and specifications for various types of playground equipment.<sup>1, 26</sup> While CSA standards are voluntary, evidence has found significant reductions in playground injuries after the replacement of equipment according to CSA standards and, as such, they should be advocated for.<sup>1, 26</sup> Public health should promote safe supervision in the playground, along with the use of wood chips, and especially sand, as cost-effective and safe playground surfaces for absorbing falls and preventing injury in playgrounds.<sup>1, 5</sup> Safe Kids Canada’s ‘five and five’ rule, which recommends that infants and toddlers under the age of five should not play on equipment taller than five feet, should also be advocated for as evidence suggests that having a maximum

height of about five feet for playground equipment can reduce pediatric emergency department visits by 45 per cent.<sup>5</sup>

### 2.4.3 Healthy Public Policy

Public health can play a role in supporting child care facilities in developing and implementing fall prevention policies.<sup>1</sup> Such policies could provide direction on fall prevention education training; safe supervision practices; the reduction of environmental hazards; use of safety aids, such as stair gates and window guards; and use of appropriate protective equipment, such as helmets, when engaging in relevant recreational activities.<sup>1, 22, 25, 30</sup> Public health can also support public operators/stakeholders involved with playground decision-making (e.g., child care facilities, schools, municipalities, engineers, et cetera) to adopt CSA standards, or incorporate them into their policies and guidelines.<sup>1, 26</sup> Included in the policies and guidelines could be direction on safe supervision practices and frequency of playground inspection and maintenance, as well as, an assessment checklist for fall-related hazards.<sup>1, 26</sup>

## 2.5 Fall Prevention Resources

- ✓ [New Parent Resource Guide](#)
- ✓ [Eating Well with Canada's Food Guide](#)
- ✓ [Eat Well and Be Active Educational Toolkit](#)
- ✓ [Fall Prevention Community of Practice](#)
- ✓ [Activity, Location, Timing, Environment, Resources \(ALTER\) for Child Safety Program](#)
- ✓ [Home Safety Checklist](#)
- ✓ [Injury Prevention Guidelines for PEI Early Childhood Centres](#)
- ✓ [YMCA Playground Policy](#)

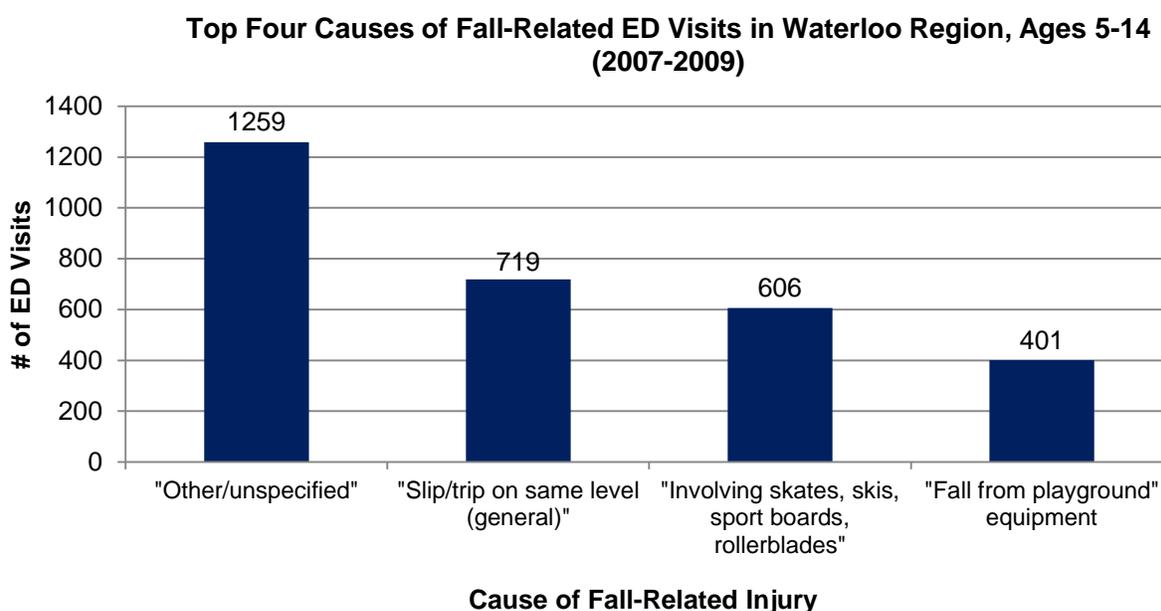
## 3.0 Fall Prevention for Ages 6-12

### 3.1 Issue

In both Ontario and Waterloo Region, falls are the leading mechanism for injury-related emergency department visits and hospitalizations among children aged five to 14.<sup>8, 9</sup> Between 2007 and 2009 in Waterloo Region, falls in this age group were responsible for over one-third (37 per cent) of emergency department visits and one-half (54 per cent) of hospitalizations due to injury.<sup>9</sup> During this time period, it is estimated that almost five children between the ages of five and 14 are sent to the emergency department each day (3,629 children in total between 2007 and 2009) in Waterloo Region because of a fall.<sup>9</sup> Further, approximately five children were hospitalized each month (130 children total between 2007 and 2009) because of a fall.<sup>9</sup>

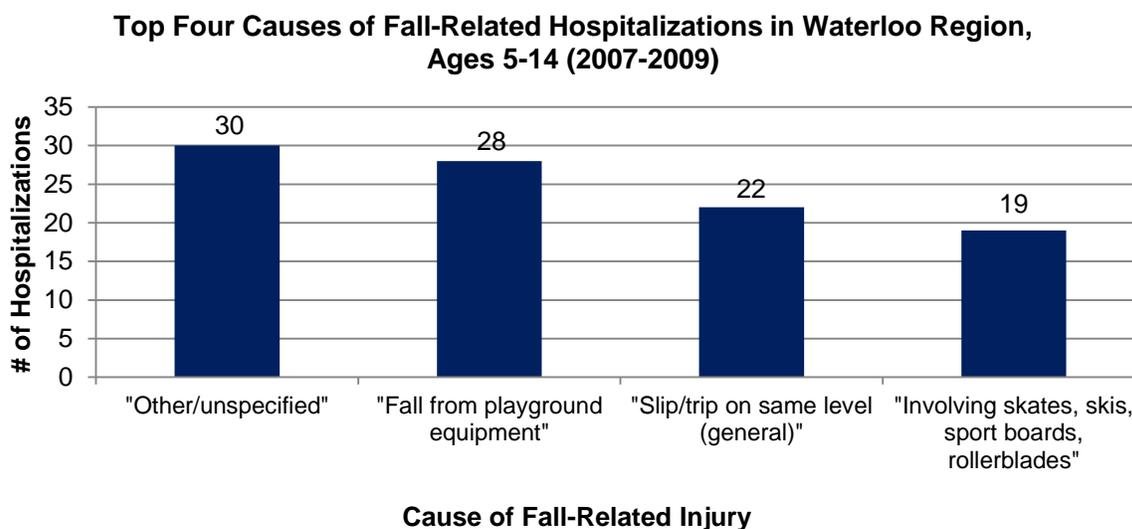
Aside from those fall-related incidents deemed as “other/unspecified”, the leading cause of fall-related emergency department visits and hospitalizations among children aged five to 14, as depicted in *Figure 3* and *Figure 4*, were “slips/trips on the same level” and “falls from playground equipment”.<sup>9</sup> The most common fall-related injuries incurred by children in Waterloo Region were injuries of the head, followed closely by limb injuries, particularly injuries of the elbow and forearm.<sup>9</sup> Head injuries were the top fall-related injuries seen in the emergency department for this age group, sending 927 children to the emergency department between 2007 and 2009.<sup>9</sup> Injuries of the elbow and forearm were the leading type of fall-related injury causing hospitalization in this age group, hospitalizing 41 children between 2007 and 2009.<sup>9</sup>

*Figure 3: Top Four Causes of Fall-Related Emergency Department Visits in Waterloo Region, Ages 5-14 (2007-2009)*



Source: Ontario Injury Prevention Resource Centre. Ontario Injury Data Report. Toronto, ON: SMARTRISK; 2012.

*Figure 4: Top Four Causes of Fall-Related Hospitalizations in Waterloo Region, Ages 5-14 (2007-2009)*



Source: Ontario Injury Prevention Resource Centre. Ontario Injury Data Report. Toronto, ON: SMARTRISK; 2012.

Overall, the available data suggests that the majority of falls among children in this age group are related to sport and recreational activity, including play on playground equipment.<sup>8, 9</sup> This is consistent with the literature, which suggests that children increasingly spend more time away from home, in playgrounds and other outdoor environments and involved in sport and recreational activity.<sup>1, 4, 22, 24, 26, 37</sup> Evidence suggests that falling from playground equipment accounts for approximately 75 per cent of all medically-attended to injuries among children.<sup>15</sup>

### 3.2 Risk Factors

Unique risk factors for falls and fall-related injuries that are characteristic of this stage in the lifespan include those relating to children's skill levels surrounding sport, parenting styles and attitudes towards healthy risk-taking and risky play, and the playground environment.<sup>1, 4, 5, 22, 25, 27, 33, 37</sup> These fall risk factors are summarized in *Table 2*.

*Table 2: Fall Risk Factors for Children*

Biological/Medical	Behavioural
<ul style="list-style-type: none"> <li>• Innate curiosity about exploring the environment<sup>1, 4, 22</sup></li> <li>• Delayed cognitive ability to assess, understand, and act on risks in the environment<sup>1, 4, 22</sup></li> <li>• Deficits in postural control and muscle strength<sup>1, 4, 17</sup></li> <li>• Bones, muscles, tendons, and ligaments are still growing, making children more prone to</li> </ul>	<ul style="list-style-type: none"> <li>• Low skill level surrounding sport and proper sport-specific playing techniques<sup>1, 4, 22, 27, 33</sup></li> <li>• Unsafe risk-taking and risky play<sup>1, 4, 22, 30</sup></li> <li>• Poor parental supervision and being supervised by another sibling<sup>1, 22</sup></li> <li>• Both overly permissive and overly restrictive parenting styles<sup>4, 22</sup></li> <li>• Limiting healthy risk-taking and risky play opportunities<sup>1, 26</sup></li> <li>• Negative parental perceptions about the urgency and</li> </ul>

<p>sport-related injury<sup>4</sup></p> <ul style="list-style-type: none"> <li>• Being male<sup>1, 4, 22</sup></li> </ul>	<p>importance of fall prevention<sup>1, 4, 22</sup></p> <ul style="list-style-type: none"> <li>• Low physical activity levels<sup>1, 4, 7, 14, 15, 35, 39, 40</sup></li> <li>• Poor nutrition<sup>1, 4, 6, 7, 14</sup></li> </ul>
Social/Economic	Environmental
<ul style="list-style-type: none"> <li>• Young maternal age, low level maternal education, and stress and mental health problems in caregivers<sup>1, 24, 25</sup></li> <li>• Socioeconomic factors, such as: <ul style="list-style-type: none"> <li>○ Single-parent upbringing;</li> <li>○ Living in poverty; and</li> <li>○ Lack of access to health care<sup>1, 4-7, 14, 22, 24, 25</sup></li> </ul> </li> <li>• Ethnicity<sup>1, 24</sup></li> <li>• Aboriginal status<sup>1</sup></li> </ul>	<ul style="list-style-type: none"> <li>• Fall hazards in the outdoor environment, particularly on playground equipment (especially climbers, swings, and slides) and in parks (especially those in low-income areas)<sup>1, 4, 7, 22, 24</sup></li> <li>• Playing on equipment that is too tall, has inadequate cushioning/fall-absorbing surfaces, or is improperly maintained<sup>1, 4, 5</sup></li> <li>• Fall hazards in the home, such particularly improperly secured hand rails and window guards<sup>1, 4, 22</sup></li> <li>• Living in high-rise buildings<sup>1, 14</sup></li> <li>• Living in rural areas<sup>1, 4, 14</sup></li> </ul>

### 3.3 Implications

The burden of falls and fall-related injury for children are a significant public health concern given that the percentage of hospitalizations due to fall-related injuries in this age group are the second highest across the lifespan, after older adults aged 55 and older.<sup>9</sup> Injury-related hospitalizations are costly to the healthcare system, costing on average \$5,162 per hospitalized Canadian versus \$1,305 in average medical costs per emergency department visit.<sup>13</sup> Injury-related hospitalizations can also be costly in terms of loss of productivity.<sup>1, 4, 13</sup> The literature suggests that fall-related injury can impact a child's attendance in school, negatively affecting their emotional wellbeing, peer relationships, and future academic performance.<sup>1, 4, 37</sup> Families of children who experience serious fall-related injury are often under large financial pressure with absences from work to care for children and the unexpected costs of hospitalization, therapy, and rehabilitation.<sup>1, 4</sup> Falls can also cause a great deal of stress among siblings who can be subject to changes in family behavior and structure because the care needs of the injured sibling have increased.<sup>1</sup>

Finally, since head injury is the leading cause of fall-related emergency department visits and hospitalizations among this age group, consideration should once again be given to the long-term implications.<sup>1, 27</sup> Head injuries, such as concussions, can cause neurologic and functional deficits later in life.<sup>1, 27</sup> Severe head injuries can also cause issues with impulsivity, inattention, restlessness, and other behavioural challenges, ultimately jeopardizing the child's quality of life in the future.<sup>1, 27</sup>

## 3.4 Fall Prevention Interventions

### 3.4.1 Education

Fall prevention efforts for this stage of the lifespan should target parents and child care facilities.<sup>1, 4, 5, 22, 24-26, 32</sup> They may also begin to target children and schools.<sup>1, 4, 5, 22</sup> Efforts should be made to raise awareness about:

- Ways in which children begin to interact with the environment and process danger;<sup>1, 4, 5</sup>
- Importance of safe supervision practices, especially when children are in playgrounds, involved in sport, and are interacting with possible hazards in the home;<sup>1, 4, 6, 7, 17</sup>
- Significance of early skill-building for safe play and socialization, including sport-specific skills (e.g., understanding the value of rules, proper playing techniques, and use of appropriate protective equipment);<sup>1, 4, 5</sup>
- How to identify and modify fall dangers in the indoor and outdoor environments;<sup>1, 4, 5, 14, 22,</sup>
- The CSA playground standards;<sup>4</sup>
- Importance of reinforcing early messages about safety practices;<sup>4</sup>
- Importance of encouraging engagement in age-appropriate physical activity and risky play in hazard-free spaces;<sup>1, 4-6, 22, 26, 30</sup>
- Proper nutrition, which includes regularly eating a variety of nutritious meals to maximize energy, strength, and endurance;<sup>1, 4, 6, 7, 14</sup>
- The benefits of vitamin D supplements for improving and maintaining bone health;<sup>28</sup>
- Regular physical activity, which incorporates a range of moderate- to vigorous-intensity aerobic and weight-bearing activities, to strengthen bones and muscles, as well as, improve posture and balance;<sup>1, 4-6, 15, 17, 24, 27, 26, 30, 33-36, 39, 40</sup> and
- Concussion prevention and management.<sup>27</sup>

In addition to social marketing campaigns and injury-related visits in primary and acute care settings, possible education channels for this life stage can include: school initiatives and curriculums (e.g., collaborating with principals, teachers, coaches, and other relevant stakeholders, including the Healthy Schools and the Active & Safe Routes to School committee), child immunization and development assessment clinics, home visits (e.g., through collaborations with the Healthy Babies Healthy Children program), and child care facilities (e.g., through collaborations with owners/operators, staff, and public health inspectors).<sup>1, 4, 5, 15, 22, 27</sup> For example, to promote physical activity, public health could encourage parents to integrate physical activity into their children's daily routine.<sup>1, 26</sup> Public health could also continue to promote active transportation to school through the Active & Safe Routes to School committee.<sup>1, 15, 22</sup> Intergenerational approaches to physical activity could also be considered for this age group as evidence suggest that exercise programs involving children and their grandparents can increase motivation and adherence to physical activity for both the children and grandparents.<sup>6, 17</sup>

### 3.4.2 Safe and Supportive Environments

The outdoor and play environments should be a focus for environmental fall prevention interventions targeting children, given falling off playground equipment and in other outdoor environments are among the most frequent reasons for childhood injury.<sup>1, 4, 22, 24, 26</sup> Again, public health could advocate for CSA-compliant playgrounds, supporting schools, child care facilities, municipalities, and other public operators to adopt CSA standards.<sup>1, 5, 6</sup> Public health could also advocate for built environments which are more supportive of physical activity.<sup>1, 4-6, 15, 17, 24, 27, 26, 30, 33-36</sup> This includes making communities that are more safe and pedestrian-centric versus car-centric.<sup>1, 15, 26, 35</sup> For example public health could continue to work with schools through the Active & Safe Routes to School committee to identify opportunities to create supportive environments that encourage active transportation to and from schools.<sup>1, 15, 26, 35</sup>

Since the home environment is also a fall risk factor for this age group, public health should continue to promote the use of safe and appropriate products and home safety assessment tools.<sup>1, 22, 25, 30, 33</sup> Once again, home modifications recommended in the literature for this age group includes proper installation of window guards and stair guards.<sup>1, 5, 22, 30</sup> Public health should work with community partners to improve access to free, low-cost, or discounted safety equipment and installation programs.<sup>1, 30</sup>

Finally, given fall-related injuries among children in this age group are often sport-/play-related, the use of appropriate protective gear while engaged in sport and recreational activities should be promoted.<sup>1, 4</sup> Protective gear should be specific to the sport or activity and can include helmets in particular, given the high incidence of fall-related head injuries in this age group, along with safety pads (especially for elbows and wrists) and mouth guards.<sup>1, 4, 5, 27 30</sup> Possible opportunities for public health to collaborate with community partners in order to increase access to protective equipment could be explored as cost can be a barrier to access.<sup>1, 5, 22, 24</sup>

### 3.4.3 Healthy Public Policy

Public health could provide support and consultation to child care facilities, schools, and sport organizations with regards to developing and implementing fall prevention policies.<sup>1, 4, 22, 25-27</sup> Such policies should provide direction on fall prevention education training, safe supervision practices, proper sport-specific playing technique training, the reduction of environmental hazards; and use and availability of safety aids and protective equipment.<sup>1, 4, 22, 25-27 30</sup>

Schools boards are already mandated by the Ministry of Education to develop and maintain concussion policies; as such, public health could work with school boards to integrate fall prevention information into their existing concussion policies.<sup>27</sup> Further public health could advocate for policy surrounding integrating fall prevention messaging into existing physical education curriculums, as well as, continue to advocate for policy that supports and promotes active transportation to and from schools, and the participation of daily physical activity among students.<sup>1, 4, 15, 22, 27</sup> Finally, public health can also support public operators/stakeholders involved with playground decision-making (e.g., child care facilities, schools, and municipalities) to adopt CSA standards, or incorporate them into their policies and guidelines.<sup>1, 26</sup> Included in

the policies and guidelines could be direction on safe supervision practices and frequency of playground inspection and maintenance, as well as, a checklist of fall-related hazards.<sup>1, 26</sup>

### 3.5 Fall Prevention Resources

- ✓ [Canadian Physical Activity Guidelines](#)
- ✓ [Eating Well with Canada's Food Guide](#)
- ✓ [Eat Well and Be Active Educational Toolkit](#)
- ✓ [Fall Prevention Community of Practice](#)
- ✓ [Safety Superheroes](#)
- ✓ [Activity, Location, Timing, Environment, Resources \(ALTER\) for Child Safety Program](#)
- ✓ [Home Safety Checklist](#)
- ✓ [The Ontario Curriculum Grades 1-8: Health and Physical Education](#)
- ✓ [Injury Prevention Guidelines for PEI Early Childhood Centres](#)
- ✓ [YMCA Playground Policy](#)

## 4.0 Fall Prevention for Ages 13-24

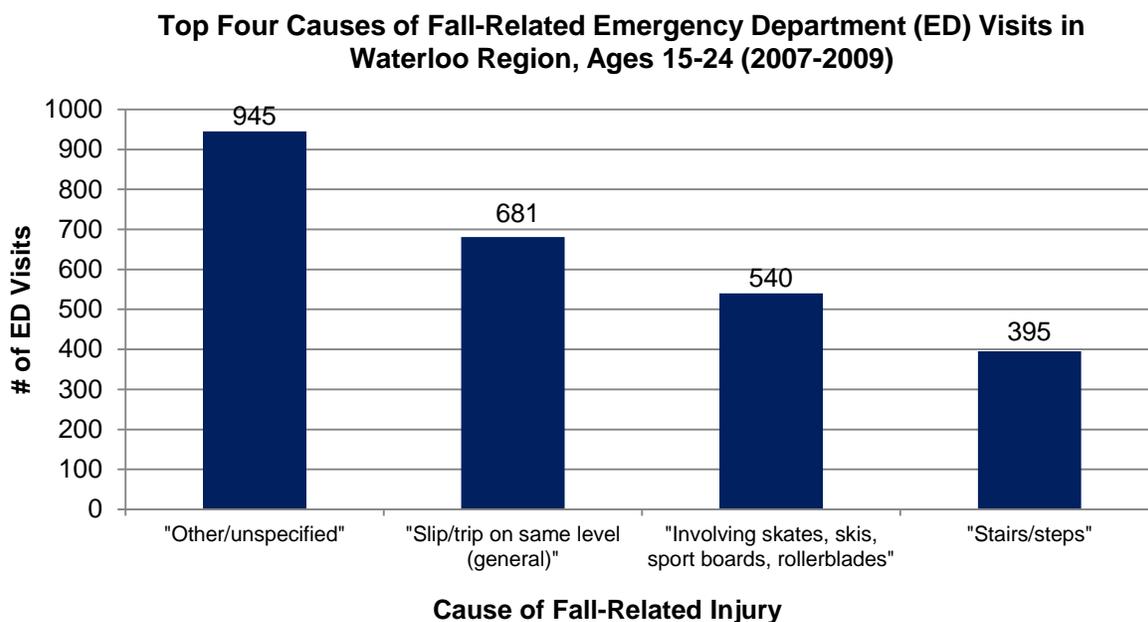
### 4.1 Issue

While falls are not the leading cause of injury-related emergency department visits and hospitalizations among youth in Ontario and Waterloo Region, they still represent a significant proportion of injury in this age group.<sup>8, 9</sup> Falls in youth aged 15 to 24 are the second leading cause of injury-related emergency department visits and hospitalizations, proceeding injuries due to contact with inanimate objects and self-harm.<sup>8, 9</sup> Between 2007 and 2009 in Waterloo Region, falls in this age group were responsible for approximately 18 per cent of emergency department visits and 19 per cent of hospitalizations due injury.<sup>9</sup> During this time period, it is estimated that almost four youth were sent to the emergency department each day (2,896 youth total between 2007 and 2009) in Waterloo Region because of a fall.<sup>9</sup> Further, approximately four were hospitalized each month (97 youth total between 2007 and 2009) because of a fall-related injury.<sup>9</sup>

Aside from those fall-related incidents deemed as “other/unspecified”, the leading cause of fall-related emergency department visits and hospitalizations among youth aged 15 to 24, as depicted in *Figure 5* and *Figure 6*, were “slips/trips on the same level” and falls “involving skates, skis, sport boards, and rollerblades”.<sup>9</sup> The leading fall-related injury incurred by youth in

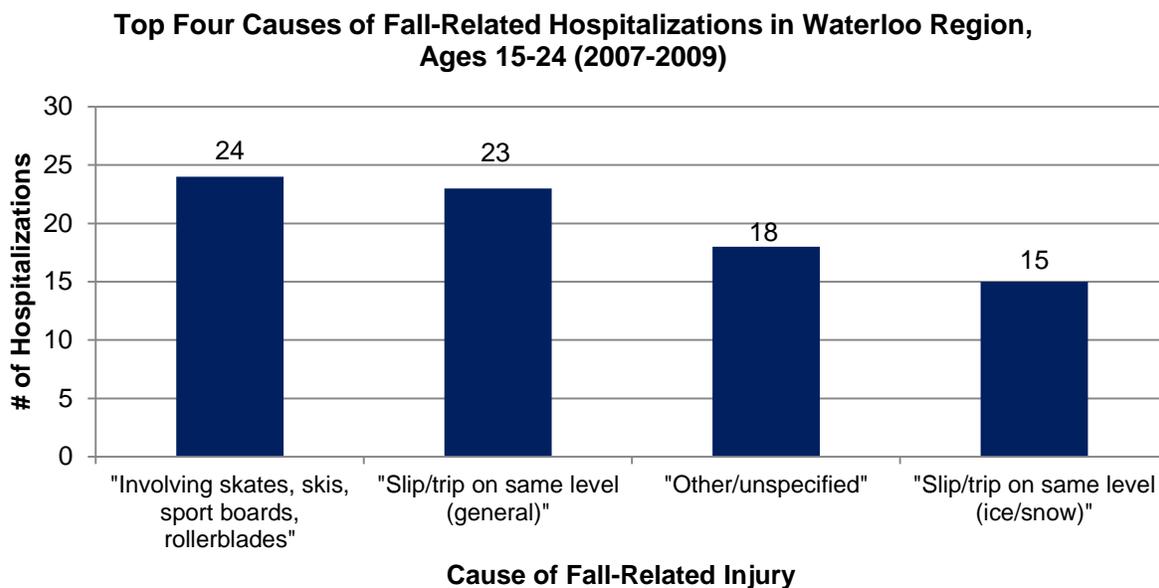
Waterloo Region were injuries of the head, followed by injuries of the knee and lower leg.<sup>9</sup> In fact, between 2007 and 2009 in Waterloo Region, head injuries due to falls sent 536 youth aged 15 to 24 to the emergency department; knee and lower leg injuries due to falls hospitalized 370 youth.<sup>9</sup>

Figure 5: Top Four Causes of Fall-Related Emergency Department Visits in Waterloo Region, Ages 15-24 (2007-2009)



Source: Ontario Injury Prevention Resource Centre. Ontario Injury Data Report. Toronto, ON: SMARTRISK; 2012.

Figure 6: Top Four Causes of Fall-Related Hospitalizations in Waterloo Region, Ages 15-24 (2007-2009)



Source: Ontario Injury Prevention Resource Centre. Ontario Injury Data Report. Toronto, ON: SMARTRISK; 2012.

Overall, the available data suggests that the majority of falls experienced among this age group occur because of external environmental factors, particularly while engaged in recreational activities.<sup>8, 9</sup> This is consistent in the literature which outlines that sport-related falls (i.e., falls from cycling, skiing, snowboarding, hockey, skateboarding, football, rugby, et cetera) are the leading cause of falls in youth, accounting for three in five falls.<sup>1, 4, 14, 34, 38</sup>

## 4.2 Risk Factors

Unique risk factors for falls and fall-related injuries that are characteristic of this stage in the lifespan include those relating to youth's knowledge and skill surrounding safe sport and recreational activity practices, maladaptive risky behaviours, peer influence, family relationships, and the home and workplace environment.<sup>1, 4, 14, 15, 34, 38, 39</sup> These fall risk factors are summarized in *Table 3*.

*Table 3: Fall Risk Factors for Youth*

Biological/Medical	Behavioural
<ul style="list-style-type: none"> <li>• Innate risk-taking disposition<sup>1, 4, 14</sup></li> <li>• Natural curiosity and impulsivity surrounding the search for independence<sup>1, 4, 14</sup></li> <li>• Rapid socio-emotional development, influencing youths' need to seek rewards such as peer acceptance even when risk is present<sup>1</sup></li> <li>• Delayed cognitive control, negatively influencing youths' ability to acknowledge and assess potential dangers<sup>1</sup></li> <li>• Bones, muscles, tendons, and ligaments are still growing, making youth more prone to sport-related injury<sup>1, 4, 6, 7, 14</sup></li> <li>• Being male<sup>1, 4, 22</sup></li> </ul>	<ul style="list-style-type: none"> <li>• Low skill level surrounding sport and proper sport-specific playing techniques<sup>1, 4, 22, 27, 33</sup></li> <li>• More easily influenced by peer pressure/approval and social norms rather than parental/family values, often impairing ability to estimate and manage risk and negatively impacting perceptions of positive health behaviours<sup>1, 4, 14</sup></li> <li>• Maladaptive risk-taking and risk-seeking<sup>1, 4, 22, 30</sup></li> <li>• Substance use, particularly use of alcohol<sup>1, 4, 14</sup></li> <li>• Low physical activity levels<sup>1, 4, 7, 14, 15, 35, 39, 40</sup></li> <li>• Poor nutrition<sup>1, 4, 6, 7, 14</sup></li> </ul>
Social/Economic	Environmental

- |  |   |
|--|---|
| <ul style="list-style-type: none"> <li>• Participation in sport and recreational activities<sup>1, 4</sup></li> <li>• Little parental support<sup>1, 4, 14</sup></li> <li>• Newly entering the workforce<sup>1, 4, 14</sup></li> <li>• Inability to establish positive connections in the school environment<sup>1</sup></li> <li>• Stress and mental health issues<sup>1, 24</sup></li> <li>• Ethnicity<sup>1, 24</sup></li> <li>• Aboriginal status<sup>1</sup></li> </ul> | <ul style="list-style-type: none"> <li>• Fall hazards in outdoor environments, especially those environments used for sport and recreational activity<sup>1, 4, 14, 35</sup></li> <li>• Fall hazards in indoor environments, especially those environments used for sport and recreational activity and workplaces<sup>1, 4, 14, 29</sup></li> <li>• Working in industrial settings—at heights and other balance control situations<sup>1, 4, 14</sup></li> </ul> |
|--|---|

### 4.3 Implications

While falls do not impact youth as widely as younger and older populations, the implications are still significant.<sup>8, 9, 12</sup> Data on falls in Canada suggest that almost one-third (26 per cent) of youth die each year because of fall-related injuries.<sup>12</sup> In addition, there are a number of negative health effects linked to experiencing falls in this stage of the lifespan that may not be fully recoverable and can be carried over in the an individual's older adult years, including improperly healed joints/bones; damaged tendons; the long-term and cumulative effects of head injuries, such a concussions; and other soft tissue, nerve, and blood vessel damage.<sup>1, 4, 6, 7, 14, 27</sup> Given head injury is the leading cause of fall-related emergency department visits among this age group in Waterloo Region, the long-term implications of head injuries should not be ignored.<sup>1, 9, 27</sup> Concussions experienced by young adults can negatively affect motor control, gait, and mental health, ultimately jeopardizing their quality of life in the future.<sup>1, 14, 27</sup> This is concerning, considering teens are less likely to use helmets and sport-specific protective equipment while engaged in sport and other recreational activities.<sup>1</sup> Further, fall-related injury can impact youths' attendance in school, negatively affecting their emotional wellbeing, peer relationships, and future academic performance.<sup>1, 4, 37</sup> Fall-related injuries can also pull youth and their parents away from work to attend therapy and rehabilitation and pay for other costs associated with hospitalizations, causing large financial pressure and mental distress.<sup>1, 4, 14</sup>

### 4.4 Fall Prevention Interventions

#### 4.4.1 Education

The target audience for fall prevention education campaigns and initiatives for this age group should include youth and their peers, as well as, schools/teachers and parents.<sup>1, 4, 5, 14</sup> Efforts should be made to raise awareness about:

- Physical and developmental characteristics of youth and the ways in which they interact with the environment, seek risk and independence, and are influenced by their peers;<sup>1, 4, 7, 14</sup>
- Significance building skills for safe play in sport (e.g., understanding the value of rules, proper playing techniques, and use of appropriate protective equipment);<sup>1, 4, 5</sup>
- The link between substance misuse, particularly use of alcohol, and falls (promoting Canada's Low-Risk Drinking Guidelines);<sup>1, 4, 14</sup>

- The importance of building developmental assets;<sup>4-7, 14</sup>
- The importance of parental support and role modeling of values and risk mitigation behaviours;<sup>1, 4</sup>
- Significance of fostering positive experiences and peer relationships in academic settings;<sup>1, 4, 14</sup>
- Importance of limiting maladaptive risk-taking and risk-seeking and supporting adaptive risk-taking and risk-seeking;<sup>1, 4, 22, 30</sup>
- Proper nutrition, which includes regularly eating a variety of nutritious meals to maximize energy, strength, and endurance;<sup>1, 4, 6, 7, 14</sup>
- The benefits of vitamin D supplements for improving and maintaining bone health;<sup>28</sup>
- Regular physical activity, which incorporates a range of moderate- to vigorous-intensity aerobic and weight-bearing activities, to strengthen bones and muscles, as well as, improve posture and balance;<sup>1, 4-6, 15, 17, 24, 27, 26, 30, 33-36, 39, 40</sup> and
- Concussion prevention and management.<sup>27</sup>

For this stage of the lifespan, emphasis should be placed on promoting Developmental Assets.<sup>4-7, 14</sup> Developmental Assets are 40 evidence-informed, positive experiences and qualities that influence youths' development, helping to increase resiliency, build healthy skills for resisting peer pressure, foster positive peer and family relationships, support caring and encouraging school environments, prevent maladaptive risk-taking behaviours, and promote positive attitudes and behaviours.<sup>4, 5, 7, 14</sup> Categories of developmental assets include: support, empowerment, boundaries and expectations, constructive use of time, commitment to learning, positive values, social competencies, and positive identity.<sup>4, 5, 7, 14</sup> Public health can work with schools, parent groups, and other community partners to build Developmental Assets among youth in the community.<sup>4-7, 14</sup>

In addition to social marketing campaigns and injury-related visits in primary and acute care settings, possible education channels for this life stage can include: school initiatives and curriculums (e.g., collaborating with principals, teachers, coaches, and other relevant stakeholders, including the Healthy Schools and the Active & Safe Routes to School committee), workplaces that tend to employ youth (e.g., collaborating with employers to promote fall prevention key messaging and active transport to work), and local sport organizations (e.g., collaborating with coaches to educate youth skills related to safe play in sport).<sup>1, 4, 15, 22, 27</sup>

#### 4.4.2 Safe and Supportive Environments

Environments where participation in sport and recreational activity occurs should be a focus for environmental fall prevention interventions targeting youth, given most fall-related injuries in this age group are due to sport and recreational activity.<sup>1, 4, 14, 34, 38</sup> As such, public health could also advocate for safe built environments which are more supportive of physical and recreational activity.<sup>1, 4-6, 14, 17, 24, 27, 26, 30, 34, 38</sup> This can include promoting safe/clean parks and gymnasiums and keeping community centres open for extended hours to ensure youth in low income areas have a safe place to participate in sports and recreational activities.<sup>1, 4, 5, 27, 30, 34</sup> Enhancing access to protective equipment is particularly important considering cost can be a barrier to

access and affected youth are typically less likely to use protective equipment.<sup>1, 24, 34</sup> To promote physical activity among youth, public health could also continue to work with municipalities, engineers, and community groups (such as Active & Safe Routes to School and Waterloo Region Active Living Network) to advocate for environments which are more pedestrian-centric versus car-centric.<sup>1, 15, 26, 35</sup>

Other environments that should be targeted for youth fall prevention interventions include the home and workplace environment.<sup>1, 4, 14, 25, 29</sup> Public health should continue to promote the use of safe and appropriate products and home safety assessment tools.<sup>1, 22, 25, 30, 33</sup> Finally, public health could work with employers, through programs such as Project Health, to assess and modify fall hazards in the workplace.<sup>1, 4</sup>

#### 4.4.3 Healthy Public Policy

Public health can play a role in providing support and consultation to schools, sport organizations, and workplaces with regards to developing and implementing fall prevention policies and procedures.<sup>1, 4, 22</sup> Again, policies and procedures could provide direction on fall prevention education training; proper sport-specific playing technique training; the reduction of environmental hazards; and use and availability of appropriate protective equipment specific to the sport or recreational activity, particularly making available and enforcing the use of helmets when youth are engaged in relevant activities.<sup>1, 4, 22, 25-27 30</sup>

Public health could work with school boards to integrate fall prevention directions into their existing concussion policies.<sup>27</sup> Further, public health could advocate for policy surrounding integrating fall prevention messaging into existing physical education curriculums, as well as, continue to advocate for policy that supports and promotes active transportation to and from schools, and the participation in daily physical activity among students.<sup>1, 4, 15, 22, 27</sup> In terms of sport organizations, policies could also ensure the enforcement of proper safety certifications among sport coaches and mandatory use of protective equipment.<sup>1, 34</sup> Finally, in the workplace, policies could also include guidelines around safe equipment use—especially safe use of ladders.<sup>1, 4</sup>

In addition, it is suggested that for this age group, public health could continue to advocate for municipal policy around access to alcohol, which offers direction on the density of alcohol outlets and marketing of alcohol.<sup>1, 14</sup>

## 4.5 Fall Prevention Resources

- ✓ [Fall Prevention Community of Practice](#)
- ✓ [Canadian Physical Activity Guidelines](#)
- ✓ [Canada's Low-Risk Alcohol Drinking Guidelines](#)
- ✓ [Eating Well with Canada's Food Guide](#)
- ✓ [Eat Well and Be Active Educational Toolkit](#)

- ✓ [Developmental Assets](#)

## 5.0 Fall Prevention for Ages 25-54

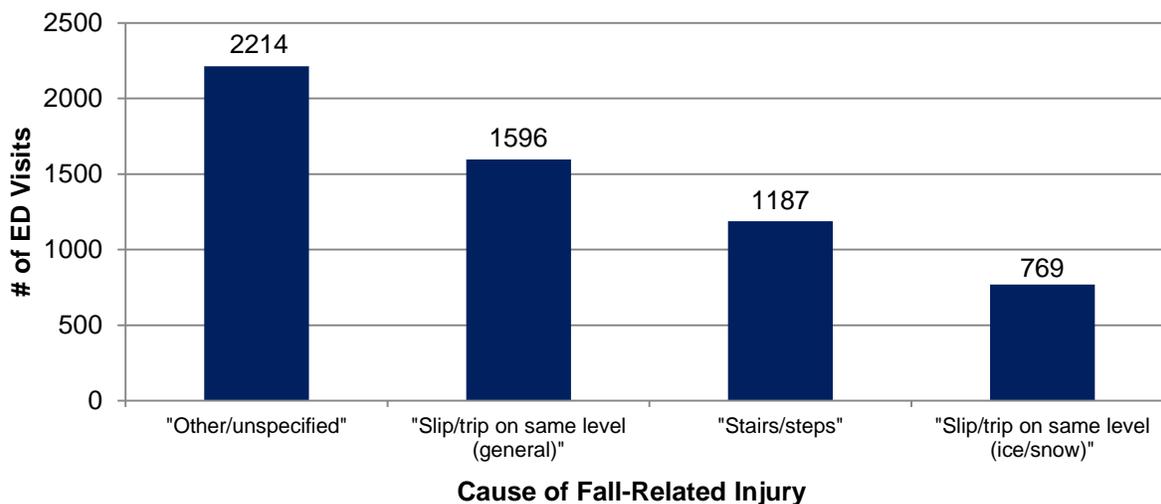
### 5.1 Issue

While falls are not the leading cause of injury-related emergency department visits among adults in Ontario and Waterloo Region, they still represent a significant proportion of injury in this age group.<sup>8, 9</sup> Data on falls in Canada suggests that in 2010, 35 per cent of mid-life adults were injured from falls.<sup>14</sup> Falls in adults aged 25 to 54 in Waterloo Region are the leading cause of injury-related hospitalizations and second leading cause of injury-related emergency department visits, proceeding injuries due to contact with inanimate objects.<sup>9</sup> Between 2007 and 2009 in Waterloo Region, falls in this age group were responsible for approximately 22 per cent of emergency department visits and 32 per cent of hospitalizations due to injury.<sup>9</sup> During this time period, it is estimated that almost 9 adults in this age group are sent to the emergency department each day (6,357 adults total between 2007 and 2009) in Waterloo Region because of a fall.<sup>9</sup> Further, approximately 16 were hospitalized each month (386 adults total between 2007 and 2009) because of a fall-related injury.<sup>9</sup>

Aside from those fall-related incidents deemed as “other/unspecified”, the leading cause of fall-related emergency department visits and hospitalizations among adults aged 15 to 24, as depicted in *Figure 7* and *Figure 8*, were “slips/trips on the same level”, followed by falls on “stairs/steps”.<sup>9</sup> The most frequently reported fall-related injury incurred by adults in Waterloo Region were injuries of the ankle and foot, followed by injuries of the knee and lower leg.<sup>9</sup> In fact, ankle and foot injuries due to falls sent 1,013 adults aged 25 to 54 to the emergency department between 2007 and 2009 in Waterloo Region; injuries of the knee and lower leg hospitalized 164 adults.<sup>9</sup>

*Figure 7: Top Four Causes of Fall-Related Emergency Department Visits in Waterloo Region, Ages 25-54 (2007-2009)*

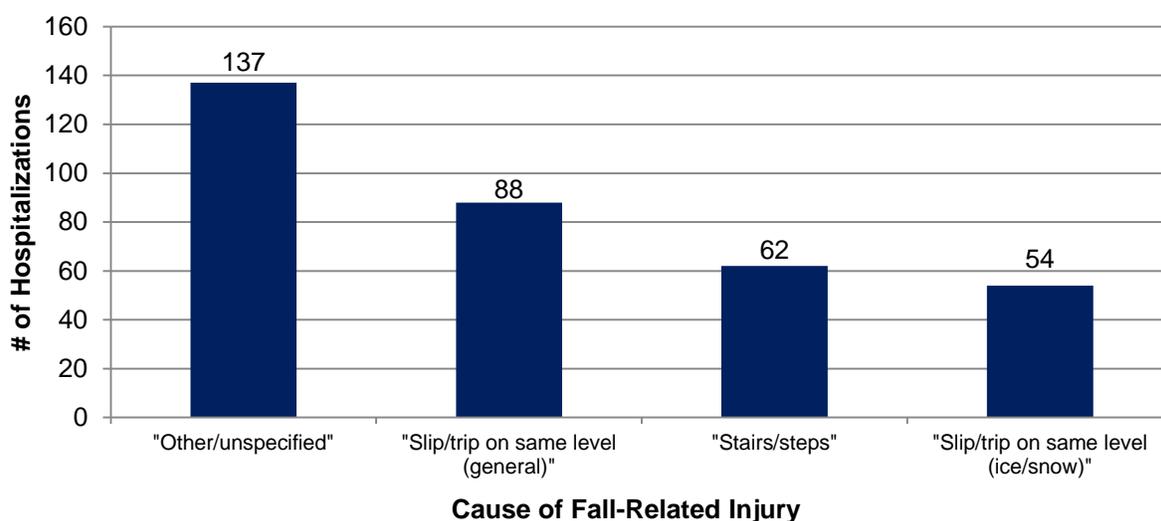
### Top Four Causes of Fall-Related Emergency Department (ED) Visits in Waterloo Region, Ages 25-54 (2007-2009)



Source: Ontario Injury Prevention Resource Centre. Ontario Injury Data Report. Toronto, ON: SMARTRISK; 2012.

Figure 8: Top Four Causes of Fall-Related Hospitalizations in Waterloo Region, Ages 25-54 (2007-2009)

### Top Four Causes of Fall-Related Hospitalizations in Waterloo Region, Ages 25-45 (2007-2009)



Source: Ontario Injury Prevention Resource Centre. Ontario Injury Data Report. Toronto, ON: SMARTRISK; 2012.

## 5.2 Risk Factors

Overall, the available data reveals that the majority of falls experienced among individuals in this life stage occur because of indoor and outdoor environmental factors.<sup>8, 9</sup> The literature expands on this suggesting that hazards in the home (especially when completing chores) and in the workplace environment are the primary factors for falls experienced in indoor environments among adults.<sup>1, 4, 14, 29</sup> In addition, weather- and sport-related hazards are the primary factors for falls in the outdoor environments among adults.<sup>1, 4, 14, 29</sup> According to the literature, pets also represent a unique fall risk factor in the environment for adults, resulting in annual fall related-injury rate of approximately 20 per cent per 100,000 population.<sup>1, 14</sup> These fall risk factors are summarized in *Table 4*.

*Table 4: Fall Risk Factors for Adults*

Biological/Medical	Behavioural
<ul style="list-style-type: none"> <li>• Depression<sup>1, 14, 35</sup></li> <li>• Low Body Mass Index (BMI) and significant weight loss in adulthood<sup>14</sup></li> <li>• Having a history of falling<sup>1, 4, 5, 14</sup></li> <li>• Being female (especially because females tend to be less physically active in this age group)<sup>1, 14</sup></li> </ul>	<ul style="list-style-type: none"> <li>• Cumulative past experiences which precipitate maladaptive risk-taking behaviours<sup>1, 5, 14</sup></li> <li>• Substance use, particularly use of alcohol<sup>1, 4, 14</sup></li> <li>• Negative attitudes and perceptions about the dangers of falling<sup>1, 4, 14</sup></li> <li>• Low physical activity levels<sup>1, 4, 7, 14, 15, 35, 39, 40</sup></li> <li>• Poor nutrition<sup>1, 4, 6, 7, 14</sup></li> </ul>
Social/Economic	Environmental
<ul style="list-style-type: none"> <li>• Socioeconomic factors, such as:             <ul style="list-style-type: none"> <li>○ Unemployment;</li> <li>○ Low income levels;</li> <li>○ Low education levels; and</li> <li>○ Lack of access to health care<sup>1, 4-7, 14, 22, 24, 25</sup></li> </ul> </li> <li>• Participation in sport and recreational activities<sup>1, 4</sup></li> <li>• Having a job that requires shift work<sup>1, 14</sup></li> <li>• Stress and mental health issues<sup>1, 24</sup></li> <li>• Social isolation<sup>1, 4, 6, 7</sup></li> <li>• Poor social support networks<sup>1, 4, 6, 7</sup></li> <li>• Ethnicity<sup>1, 24</sup></li> <li>• Aboriginal status<sup>1</sup></li> </ul>	<ul style="list-style-type: none"> <li>• Fall hazards in outdoor environments, especially weather-related hazards and those environments used for sport and recreational activity<sup>1, 4, 14, 35</sup></li> <li>• Fall hazards in indoor environments, especially the workplace and the home (particularly when doing chores and when pets are present)<sup>1, 4, 14, 29</sup></li> <li>• Working in industrial settings—at heights and other balance control situations<sup>1, 4, 14</sup></li> </ul>

### 5.3 Implications

While literature on falls and fall-related injuries among adults is very limited, the implications that falls can have on adults are still significant.<sup>8, 9, 14</sup> Injury data for Ontario and Waterloo show that the incidence of injury are highest among adults between the ages of 25 and 54 compared to all other age groups.<sup>8, 9</sup> Unintentional injury in adults represent a considerable burden to the health care system, as well as, a significant social burden, given the interference with work and family.<sup>14</sup> Moreover, falls in mid-life become significantly more likely to predispose individuals to a higher risk of falls in the future, having cumulative effects on functioning later in life.<sup>14</sup> Ultimately, fall-related injuries among adults can cause absences at work, affecting their livelihood, causing a great deal of mental distress, and jeopardizing quality of life.<sup>1, 4, 14</sup> Finally, fall-related injuries experienced by adults can begin to negatively influence attitude towards physical activity in the future, often causing adults to restrict their participation in physical activity and, thus, exacerbating their risk for falling again in the future.<sup>1, 4, 6, 7</sup>

### 5.4 Fall Prevention Interventions

#### 5.4.1 Education

The target audience for fall prevention education campaigns and initiatives for this age group should include adults and possibly employers.<sup>1, 4, 14, 29</sup> Efforts should be made to raise awareness about:

- Significance of building skills related to identifying, assessing, and modifying fall hazards in the environment (especially those related to chores, pets, the workplace, weather, and sport);<sup>1, 4, 14, 29</sup>
- The link between substance misuse, particularly use of alcohol, and falls;<sup>1, 4, 14</sup>
- The importance of limiting maladaptive risk-taking and risk-seeking behaviour and supporting adaptive risk-taking and risk-seeking behaviour.<sup>1, 5, 14</sup>
- Proper nutrition, which includes regularly eating a variety of nutritious meals to maximize energy, strength, and endurance;<sup>1, 4, 6, 7, 14</sup>
- The benefits of vitamin D supplements for improving and maintaining bone health;<sup>28</sup>
- Regular physical activity (especially for women in this age group), which incorporates a range of moderate- to vigorous-intensity aerobic and weight-bearing activities, to strengthen bones and muscles, as well as, improve posture and balance;<sup>1, 4-6, 15, 17, 24, 27, 26, 30, 33-36, 39, 40</sup> and
- Concussion prevention and management.<sup>27</sup>

The literature suggests that the focus of fall prevention education for this age group should be on identifying and removing hazards in the indoor and outdoor environments and maintaining healthy and active lifestyles.<sup>1, 4-6, 14, 27, 29, 35</sup> Broadly, messaging about the indoor and outdoor environment could include raising awareness about, and offering tips to minimize risks posed by pets, as well as, increasing knowledge about modifications that can be made to make environments safer and about how to identify and reduce occupational fall risks.<sup>1, 4, 14, 29, 35</sup>

Messaging about maintaining healthy and active lifestyles should involve raising awareness about the link between alcohol use and the severity of falls (promoting Canada's Low-Risk Drinking Guidelines), modifying attitudes towards car-centeredness, changing negative perceptions and attitudes about the dangers of falling, improving skill development in relation to physical activity and early initiation (especially for women), and promoting healthy eating.<sup>1, 4-6, 14, 15, 24, 27, 26, 36</sup> It is important to note that, though participation in sport and recreational activities is a risk factor falls and fall-related injuries, the benefits of physical and activity greatly outweigh the risks and, as such, physical activity promotion should incorporate messaging on safe sport-specific playing techniques.<sup>1, 4-6, 9, 14, 24, 27</sup>

In addition to social marketing campaigns and injury-related visits in primary and acute care settings, possible education channels for this life stage can include workplaces, collaborating with employers to promote fall prevention key messaging and active transport to work through Project Health.<sup>1, 14, 15</sup>

#### 5.4.2 Safe and Supportive Environments

Both indoor and outdoor environments should be targeted for adult fall prevention interventions given falls related to hazards in the home, workplace, and outdoor spaces are common in this age group.<sup>1, 4, 14, 29</sup> To address the indoor environments, public health could continue to promote the use of safe and appropriate products and home safety assessment tools.<sup>1, 22, 25, 30, 33</sup> Home safety assessment tools should include tips to remove hazards from the home, such as minimizing risk from pets; reducing clutter; securing loose cords, handrails, and area rugs; and ensuring rooms and stairs are well-lit.<sup>1, 25, 30</sup> Stairs start to become a particular concern in this age group and, as such, public health could advocate for the standardization of stair modification for residential, community, and home settings, engaging with municipal governments, local businesses, and landlord associations.<sup>1, 4, 8, 9</sup> Public health could also work with employers, through programs such as Project Health, to assess and modify fall hazards in the workplace.<sup>1, 4</sup> Collaborations could include integrating fall prevention messaging with existing hazard inspection and reporting practices.<sup>1, 4</sup>

To address the outdoor environments, public health should work with key stakeholders (e.g., municipalities, public works, engineers, local businesses, and landlord associations) to advocate for safe built environments which are free from fall-related hazards (especially weather-related hazards), and which are supportive of physical and recreational activity.<sup>1, 4-6, 14, 17, 24, 27, 26, 34 38</sup> To promote physical and recreational activity among adults, public health could also continue to work with municipalities, engineers, and community groups (such as Waterloo Region Active Living Network) to advocate for environments which are more pedestrian-centric versus car-centric.<sup>1, 15, 26, 35</sup>

#### 5.4.3 Healthy Public Policy

Public health could provide support and consultation to municipalities, employers/workplaces, local businesses, and landlord associations with regards to developing and implementing fall prevention policies and procedures.<sup>1, 4, 14, 22, 25-27</sup> Policies and procedures should provide

direction on fall prevention education training, strategies for regularly maintaining infrastructure and removing snow/ice and other fall hazards, and hazard reporting mechanisms.<sup>1, 4-6, 14, 17, 24, 27, 26, 34 38</sup> Particularly, public health should continue to advocate for policy that promotes built environments which are more pedestrian-centric and support physical activity and active transportation.<sup>1, 4, 15, 22, 27</sup> In addition, public health could continue to advocate for municipal policy around access to alcohol, which offers direction on the density of alcohol outlets and marketing of alcohol.<sup>1, 14</sup>

## 5.5 Fall Prevention Resources

- ✓ [Fall Prevention Community of Practice](#)
- ✓ [Canadian Physical Activity Guidelines](#)
- ✓ [Canada's Low-Risk Alcohol Drinking Guidelines](#)
- ✓ [Eating Well with Canada's Food Guide](#)
- ✓ [Eat Well and Be Active Educational Toolkit](#)

## 6.0 Fall Prevention for Ages 55+

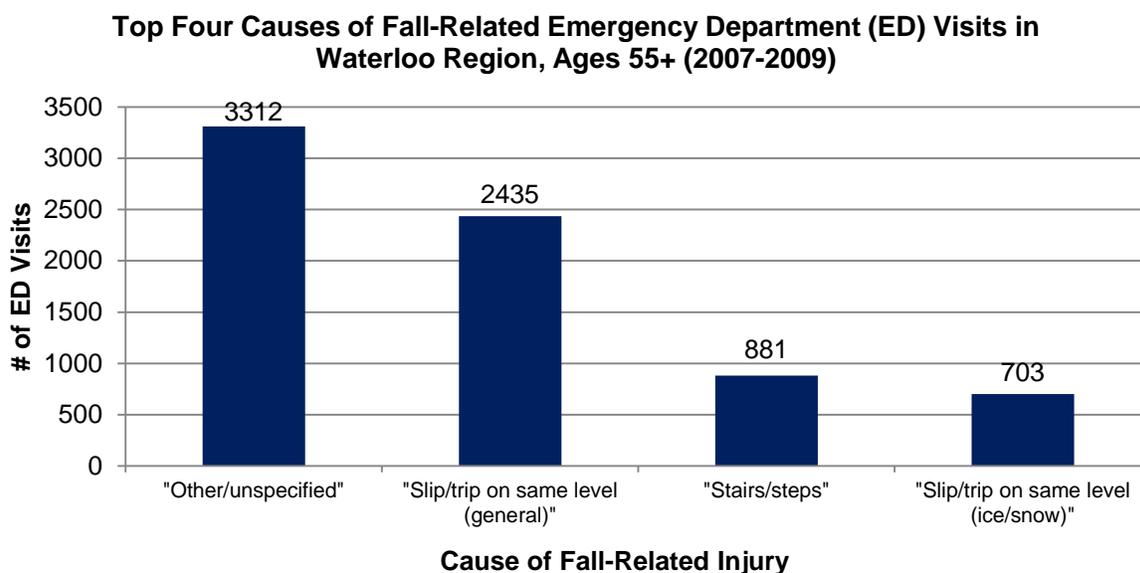
### 6.1 Issue

Across all other stages of the lifespan, older adults are the most at risk for fall-related emergency department visits and hospitalizations.<sup>1, 4, 6, 7-9, 14, 16, 31, 32, 36, 39-41</sup> In fact, the risk for falling is considered nine times greater for those over 65 years of age, compared to those younger.<sup>4</sup> One in three older adults over the age of 65, and one in two over the age of 80, fall at least once per year.<sup>1, 14</sup> In both Ontario and Waterloo Region, falls are the leading mechanism for injury-related emergency department visits and hospitalizations among older adults aged years old and older.<sup>8, 9</sup> Between 2007 and 2009 in Waterloo Region, falls in this age group were responsible for approximately 58 per cent of emergency department visits and 81 per cent of hospitalizations due to injury.<sup>9</sup> During this time period, it is estimated that almost 11 older adults in this age group are sent to the emergency department each day (7,850 older adults total between 2007 and 2009) in Waterloo Region because of a fall.<sup>9</sup> Further, approximately 75 were hospitalized each month (1,811 older adults total between 2007 and 2009) because of a fall-related injury.<sup>9</sup> More recent data in 2015 shows that falls are increasingly an issue for this age group in Waterloo Region, sending almost 14 older adults aged 55 and older to the emergency department (5,020 total) and hospitalizing just over three (1,214 total).<sup>41</sup>

Aside from those fall-related incidents deemed as “other/unspecified”, the leading cause of fall-related emergency department visits and hospitalizations among older adults aged 55 years old and older, as depicted in *Figure 9* and *Figure 10*, were “slips/trips on the same level”, followed by falls on “stairs/steps”.<sup>9</sup> The leading fall-related injury incurred by older adults in Waterloo Region were injuries of the head, as well as, injuries of the hip and thigh.<sup>9</sup> In fact, head injuries

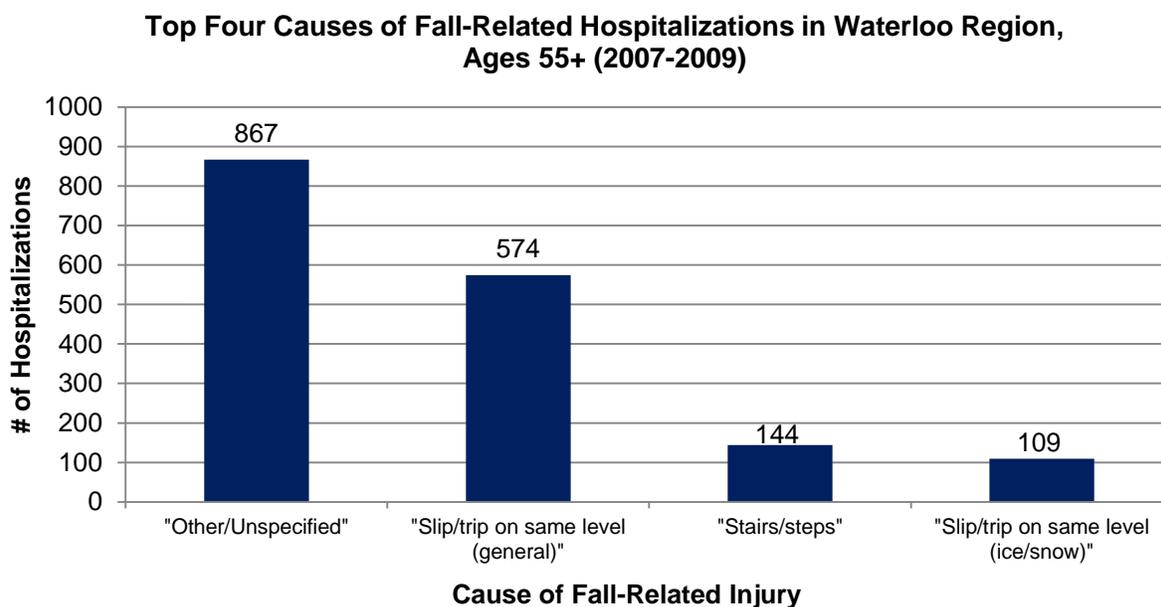
due to falls sent a total of 1,450 adults aged 55 and older (or almost two older adults each day) to the emergency department between 2007 and 2009 in Waterloo Region. During the same time period, fall-related injuries of the hip and thigh hospitalized a total of 725 older adults (or almost one older adult each day) in Waterloo Region.<sup>9</sup>

Figure 9: Top Four Causes of Fall-Related Emergency Department Visits in Waterloo Region, Ages 55+ (2007-2009)



Source: Ontario Injury Prevention Resource Centre. Ontario Injury Data Report. Toronto, ON: SMARTRISK; 2012.

Figure 10: Top Four Causes of Fall-Related Hospitalizations in Waterloo Region, Ages 25-54 (2007-2009)



Source: Ontario Injury Prevention Resource Centre. Ontario Injury Data Report. Toronto, ON: SMARTRISK; 2012.

Overall, the available data suggests the majority of falls experienced among individuals in this life stage occur because of indoor and outdoor environmental factors.<sup>8, 9</sup> Nonetheless, the literature consistently reveals that older adults represent a unique population in which a wide range of multiple other factors accumulate across the lifespan and interact with the population to significantly increase their risk for experiencing falls and fall-related injuries.<sup>1, 4, 14, 16, 21, 39-41, 42, 43</sup>

## 6.2 Risk Factors

Risk factors that are characteristic of individuals in this life stage are primarily age-related factors, such as chronic disease and comorbidities, multiple medication use (also known as polypharmacy), and mobility impairment.<sup>1, 4, 14, 16, 21, 31, 39-41, 42, 43</sup> Other risk factors include lack of access to appropriate services and hazards relating to clothing and indoor and outdoor environments.<sup>1, 4, 16, 31, 39-41, 42</sup> Unique to this age group is also that fall-related hazards in the indoor environments can span to various care settings, including hazards in hospitals, retirement homes, and long-term care facilities.<sup>1, 4, 16, 31, 39-41, 42</sup> A summary of the risk factors for falls and fall-related injuries among older adults are outlined in *Table 5*.

*Table 5: Fall Risk Factors for Older Adults*

Biological/Medical	Behavioural
<ul style="list-style-type: none"> <li>• Medications (especially when taking multiple medications and/or psychotropic medications)<sup>1, 4, 14, 16, 39, 41</sup></li> <li>• Chronic health conditions and comorbidities, such a stroke, dementia, diabetes, Parkinson’s disease, urinary incontinence, depression, arthritis, a heart disease<sup>1, 4, 14 16, 39-41, 42</sup></li> <li>• Mobility impairments, such as reduced bone density, decline in vision and depth perception, balance and gait deficits, muscle weakness/sarcopenia, hearing impairments, and foot problems (e.g., toe deformities and bunions)<sup>1, 4, 14, 16, 21, 31, 39-41, 42, 43</sup></li> <li>• History of falling<sup>1, 4, 5</sup></li> <li>• Low BMI<sup>14, 16</sup></li> <li>• Being female (especially because females tend to be less physically active in this age group)<sup>1, 14</sup></li> </ul>	<ul style="list-style-type: none"> <li>• Fear of falling (can also impact physical activity levels)<sup>1, 4, 7, 14, 16, 39, 41, 42</sup></li> <li>• Alcohol use (especially when used concurrently with medications)<sup>1, 4, 14, 16, 41</sup></li> <li>• Risk-taking due to failure to acknowledge or accept age-related limitations and risk of falling<sup>1, 4, 7, 14</sup></li> <li>• Negative perceptions and attitudes about the use of safety aids and assistive devices<sup>1, 4</sup></li> <li>• Poor/inadequate nutrition<sup>1, 4, 6, 7, 14, 16, 28, 42, 43</sup></li> <li>• Poor hydration/dehydration<sup>1, 4</sup></li> <li>• Inappropriate clothing and footwear</li> </ul>
Social/Economic	Environmental
<ul style="list-style-type: none"> <li>• Socioeconomic factors, such as:             <ul style="list-style-type: none"> <li>○ Low education levels; and</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• Outdoor hazards related to the built environment, especially weather-related</li> </ul>

<ul style="list-style-type: none"> <li>○ Lack of access to health care<sup>1, 4-7, 14, 22, 24, 25</sup></li> <li>• Changes related to retirement, including reduced income and social networks<sup>1, 4, 15, 41</sup></li> <li>• Social isolation/living alone (especially when due to loss of spouse)<sup>1, 4, 7, 41</sup></li> <li>• Poor social support networks<sup>1, 4, 6, 7</sup></li> <li>• Ethnicity<sup>1, 24</sup></li> <li>• Aboriginal status<sup>1</sup></li> </ul>	<ul style="list-style-type: none"> <li>hazards and poorly maintained infrastructure (particularly stairs)<sup>1, 4, 16, 31, 39-41, 42</sup></li> <li>• Fall hazards in indoor environments, especially those related to accessibility, such as stairs, low toilet seats, high beds, lack of grab bars and rest areas, absence of accessible light switches at room door ways, and items stored in high/out-of-reach places<sup>1, 4, 14, 16, 21, 25, 29, 39</sup></li> <li>• Being hospitalized<sup>1, 4, 16, 31, 39, 42, 44</sup></li> <li>• Living in long-term care<sup>1, 4, 16, 31, 39-41</sup></li> </ul>
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### 6.3 Implications

The personal, economic, and societal impact of falls and fall-related injuries among older adults represents one of the most significant public health concerns. Falls experienced by older adults cause more injury-related emergency department visits and hospitalizations than in any other age group.<sup>1, 4, 8, 9</sup> In 2010, the direct costs associated with falls experienced by older adults (aged 65 years and older) in Canada was estimated at over \$3 billion.<sup>1</sup> The injuries experienced from falls can be extremely damaging among this population and age-related changes, such as frailty, can increase the severity of injury and even influence the recovery process.<sup>1, 39</sup> Fall-related injuries can negatively impact an older adult's ability to engage in activities they enjoy, and even those activities that are essential for daily living (e.g., cleaning, toileting, preparing meals, et cetera).<sup>1, 4, 13-16, 41</sup>

Falls can also exacerbate existing health conditions, and even precipitate new ones.<sup>1, 4, 14, 16, 21, 31, 39-41, 42, 43, 44</sup> Because of this, falls often induce fear and mental distress, causing older adults to limit their physical activity and pull away from social activities.<sup>1, 4, 7, 14, 16, 39, 41, 42</sup> In 2013, 42.5 per cent of adults aged 55 and over in Waterloo Region reported worrying about falling and being injured in their daily activities.<sup>45</sup> In addition, many older adults who fall feel powerless and worry that they will be stigmatized as “old” or “incapable”.<sup>7</sup> This form of ageism further disengages older adults from social activity and can even trigger risky behaviours, causing them to ignore their age-related limitations and reject support when needed.<sup>1, 4, 7, 14</sup> Unfortunately, this can substantially increase their risk for falling again; in fact, older adults who have fallen once are two-to-three times more likely to fall again.<sup>1</sup>

Family members, such as spouses and adult children of the older adult who has fallen, often experience absences from work to provide informal care to their loved ones and transport them to and from appointments.<sup>1, 16, 42, 43</sup> Depending on the level of care needed and other dynamics within the family (e.g., sandwich generation effect, whereby adult children are caring for their own children in addition to caring for their aging parent), this can cause a significant amount of stress and financial pressure.<sup>1, 16, 42, 43</sup> Overall, as the older adult population continues to grow in

both Ontario and Waterloo Region, maintaining the quality of life and independence in older adults will be essential to minimize the impact that falls have on our communities and health care system.<sup>1</sup>

## 6.4 Fall Prevention Interventions

It is important to mention that, as part of the *Canadian Fall Prevention Curriculum*, a fall prevention model has been designed to address some of the unique risk factors that older adults face (see *Canadian Fall Prevention Curriculum* link in Section 6.5). This model is known as the “BEEACH Model”, which aims to prevent falls through behaviour change, education, equipment, the environment, activity, and health management.<sup>1, 21</sup> The model is congruent with the comprehensive Three E’s of Injury Prevention model and, thus, could be a helpful tool to explore along with the interventions discussed below.

### 6.4.1 Education

The target audience for fall prevention education campaigns and initiatives for this age group should include older adults and their care providers.<sup>1, 4, 31, 39, 41, 42-44</sup> Care providers may include informal care providers, such as family members and friends, and especially formal care providers, such as primary care physicians, hospital staff, paramedics, long-term care staff, pharmacists, optometrists, audiologists, occupational therapists, and community support service staff.<sup>1, 4, 31, 39, 41, 42-44</sup> Education topics should include:

- Building skills related to assessing and re-assessing fall risk, using evidence-informed risk assessment tools;<sup>1, 4, 5, 7, 14, 29, 31, 41</sup>
- Building skills related to identifying, assessing, and modifying fall hazards in the environment, using evidence-informed home safety checklists (home and care environments should be a focus);<sup>1, 4, 14, 16, 21, 31, 39-41, 42, 43</sup>
- Building skill related to establishing healthy lifestyle habits, such as being physically active (especially for women in this age group), eating healthy, and staying hydrated<sup>1, 4-6, 14, 27, 29, 35, 39-41, 43, 44</sup>
- The importance of regular health management to combat age-related risks (e.g., foot care, medication review, vitamin D supplementation, assistive/safety device referral and fittings, vision and hearing check-ups, et cetera);<sup>1, 4, 14, 16, 21, 31, 39-41, 42</sup>
- The impact falls have on quality of life, autonomy, and dignity (with emphasis on limiting risky behaviours);<sup>1, 4, 5, 14, 16, 21</sup>
- The link between alcohol use, adverse medication reactions, and falls;<sup>1, 4, 14, 16, 41</sup>
- The link between clothing, footwear, and falls;<sup>1, 4, 5, 14, 16</sup> and
- Reducing stigma related to aging and falling.<sup>1, 4, 7, 14</sup>

Older adults are more receptive to fall prevention messages that are positive and focus on the benefits of an intervention.<sup>1, 4, 16, 39, 41</sup> This should be central when building skills surrounding healthy lifestyle choices, and can even be helpful in reducing stigma related to aging and falling.<sup>4</sup> An estimated 13 per cent of Canadians aged 60 to 79 years old are meeting the Canadian

Guidelines for Physical Activity.<sup>1</sup> To build skills related to being physically active, public health could promote exercise programs in the community, as well as, the Canadian Guidelines for Physical Activity—suggesting age-appropriate exercises to be integrated into daily routines (including exercises that target gait, balance, and strength).<sup>1, 4, 7, 14, 16, 39, 41, 42</sup> Public health could consider training older adult volunteers to lead fall prevention education groups, including instructing exercise classes.<sup>4</sup> In addition, intergenerational approaches to physical activity could also be considered for this age group as evidence suggests that exercise programs involving grandparents and children can increase motivation.<sup>6, 17</sup> Low-risk drinking guidelines that are more inclusive of the older adult population could be adapted and promoted to prevent fall risk related to concurrent medication and alcohol use.<sup>41</sup> Finally, best-practice guidelines on vitamin D supplementation, which recommend that adults over 50 should get 800-2000 IU of vitamin D daily, should be promoted.<sup>1, 28, 31</sup>

Partnering with formal care providers becomes really important to the prevention of falls in this age group as older adults begin to interact more with the health care environment.<sup>1, 4, 31, 39-41, 42</sup> Public health should seek opportunities to work with care providers to share knowledge and key messages about fall prevention so that they can be more widely translated to older adults.<sup>1, 4, 31, 39-41, 42</sup> For example, given that 77 per cent of older adults take at least one alcohol-interacting medication, and 55 per cent of older adults 65 years and older in Waterloo Region reported that they were regular drinkers (2011-2012), public health could work with pharmacists to train them to assess for alcohol use when dispensing medications, and to discuss ways to prevent adverse medication reactions.<sup>1, 41, 42, 46</sup> In general, older adults should also be encouraged to have annual check-ups with their health care providers (e.g., primary care physician, optometrist, and audiologist) and fall prevention should be incorporated into these check-ups.<sup>1, 4, 16, 42, 43</sup>

Last, because the home and care environments are a particular risk for this age group, public health could collaborate with and train key stakeholders (e.g., community support service organizations, occupational therapists, and paramedics) to conduct home inspections/use home safety checklists with older adults during home visits.<sup>1, 4, 14, 21, 39-41, 43</sup> Home safety educational tools and checklists should also be integrated into hospital discharge programs.<sup>1, 4, 31, 42</sup> Broadly, home safety checklists should include tips relating to proper footwear and clothing, use of safety aids, fire safety, and health management.<sup>1, 4, 14, 16, 21, 31, 39-41, 42, 43</sup> Fall assessment tools should also be developed and promoted through these channels.<sup>1, 4, 5, 7, 14, 29, 31, 41</sup> Older adults should be engaged in the assessment process as a way to increase awareness of possible fall risks.<sup>4,</sup>

#### 6.4.2 Safe and Supportive Environments

For older adults, fall risks are present in both the outdoor and indoor (home and care settings) environments.<sup>1, 4, 14, 16, 21, 31, 39-41, 42, 43</sup> To address the outdoor environment, public health should be involved in discussions with municipalities and relevant committees to make our communities more age-friendly.<sup>1, 6, 14, 35, 39, 40, 43</sup> Age-friendly communities incorporate policies, processes, and services to create physical and social environments that are more supportive of healthy and active aging.<sup>1, 14</sup> Age-friendly communities are those that have mechanisms in place to ensure infrastructure (especially stairs) are well maintained; affordable housing, designed with older adults' needs in mind, is available; public transportation is accessible; health and support

services are equitable; roads are pedestrian-centered and consider the mobility needs of older adults; and much more.<sup>1, 6, 14, 39, 40</sup> Finally, to address transportation-related issues that older adults can experience, along with health service inequities often found in rural areas, the literature proposes a mobile fall prevention clinic model of care as a possible solution.<sup>1</sup> Such clinics travel to areas where older adults frequent, allowing them the opportunity to meet with a variety of health care providers in one place to assess their fall risks and discuss possible interventions.<sup>1</sup>

It is suggested that one-half of all falls requiring hospitalization experienced by older adults take place in the home.<sup>1</sup> To address the home environment, public health could work with stakeholders in the community to advocate for free/low-cost home safety programs that involve home inspections by trained professionals, along with support in removing or modifying hazards.<sup>1, 4, 16, 25, 29</sup> Putting these supports in place were considered in the literature to be more effective than simply offering home safety checklists.<sup>25, 29</sup> Installing safety equipment, such as grab bars and toilet seat risers in the bathroom; improving lighting in the bedroom and stair ways; removing clutter; and securing loose cords, rugs, and carpets are all important home modification for older adults.<sup>1, 4, 14, 16, 21, 25, 29, 39</sup>

Finally, public health can offer consultation to health care organizations (e.g., hospitals, long-term care facilities, and retirement homes) to develop mechanisms to regularly assess and modify the environment to reduce fall risk.<sup>1, 16, 31, 44</sup> Examples of modifications in the care setting include: non-slip and no-glare flooring, padded bedside mats (to absorb impact of falls), proper lighting, window coverings, raised toilet seats, low-low beds, grab bars, and bed/chair exit alarms.<sup>1, 31</sup> In addition, ways to integrate exercise in the care environment, alternatives to physical and chemical restraints, and opportunities to offer protective equipment (e.g., hip protectors) should be explored.<sup>1, 16, 31, 44</sup>

### 6.4.3 Healthy Public Policy

Public health can play a role in providing support and consultation to key stakeholders (e.g., municipalities and relevant committees and organizations) to develop and implement policies which promote age-friendly communities in Waterloo Region.<sup>1, 6, 14, 35, 39, 40, 43</sup> For example, public health can work with municipalities to develop policies and procedures to ensure that infrastructure in public spaces (especially stairs) are well maintained and free of fall-related hazards (e.g., cracks, snow, ice, et cetera).<sup>1, 6, 14, 39, 40</sup> To promote active aging, public health can consult on policy related to public parks to ensure an adequate number of rest areas/benches are available in parks.<sup>4</sup> Finally, public health could work with low-income housing units to develop policy around the installation of safety devices, such as grab bars in bathrooms, in units intended for, or mainly occupied by older adults.<sup>1</sup>

In the care environment, public health could support health care organizations (e.g., hospitals, long-term care facilities, and retirement homes) to develop policies and procedures related to integrating fall prevention measures into routine practices.<sup>1, 16, 31, 41, 44</sup> Such policies could provide direction on regular fall prevention education training for staff; fall risk assessment, re-

assessment, and intervention referral mechanisms; modification and removal of environmental hazards; and use and availability of safety aids, such as hip protectors.<sup>1, 16, 31, 44</sup> For example, public health could collaborate with pharmacists to develop and implement screening algorithms and procedures into routine patient education processes, in order to identify and mitigate risks related concurrent medication and alcohol use.<sup>41</sup> In addition, Accreditation Canada has identified fall prevention as a required organizational practice among hospitals and long-term care; public health could play a consultative role in supporting these settings in ensuring existing policies are supportive of fall prevention, helping to develop new ones where necessary.<sup>1</sup>

## 6.5 Fall Prevention Resources

- ✓ [Fall Prevention Month Provincial Campaign](#)
- ✓ [Fall Risk Assessment](#)
- ✓ [Canadian Fall Prevention Curriculum](#)
- ✓ [Fall Prevention Community of Practice](#)
- ✓ [Canadian Physical Activity Guidelines](#)
- ✓ [Canada's Low-Risk Alcohol Drinking Guidelines](#)
- ✓ [Eat Well and Be Active Educational Toolkit](#)
- ✓ [Eating Well with Canada's Food Guide](#)
- ✓ [Strategies and Actions for Independent Living](#)
- ✓ [Home Safety Checklist](#)
- ✓ [Age-Friendly Communities](#)
- ✓ [Queensland Stay On Your Feet](#)
- ✓ [Steps to Safer Stairs: A Kit for Improving Stair Safety](#)

## 7.0 We All Have a Role to Play

As evident throughout this report, falls are a complex issue, impacting families, workplaces, and communities across all ages in Waterloo Region. Fortunately, most falls are predictable and preventable.<sup>1, 4</sup> To address the many risk factors associated with falls across the stages of the lifespan, a multi-factorial approach must be employed, integrating prevention measures related to education, safe and supportive environments, and healthy public policy.<sup>1, 4-7, 14, 21</sup>

Fundamentally, preventing falls is a shared responsibility and can only be achieved through continued cross-divisional, cross-departmental, and multisectoral collaboration.<sup>1</sup> Through many of the health promotion practices and principles carried out every day, public health can play a vital role in preventing falls for all. Thus, this compendium is intended to serve as a supplementary document to the [Development Framework](#) and can be used to initiate and guide fall prevention planning at ROWPHE.

## 8.0 Limitations and Notes

For consistency purposes, data extracted from IntelliHealth Ontario, using relevant International Classification of Disease (ICD) codes, and outlined in the 2012 *Ontario Injury Data Report*, were used in this document when describing the prevalence of fall-related injury in Waterloo Region.<sup>8, 9, 12</sup> Though the data presented in the report were extracted between 2001 and 2009, this is the most recent known and publicly available injury data aggregated according to injury type, injury cause, and age in Waterloo Region. As such, it is important to interpret this data with caution.

In addition, fall-related injuries may often be treated by primary care and community care providers, as well as, in the home by informal caregivers. Therefore, this data likely only captures more of the most serious fall-related injuries, representing an unknown proportion of the true burden of falls and fall-related injury in Waterloo Region. The true incidence of falls and fall-related injuries is undoubtedly much higher than those incidents depicted in the emergency department visit and hospitalization data.

Further, for the purpose of the compendium, the incidence of falls were explored in each of the life stages that the HLV division is organized into, however, this did not always neatly align with age breakdown of the data in the 2012 *Ontario Injury Report*. As such, the age breakdown was stated in each of the sections of the compendium to maintain data integrity.

Finally, fall prevention research and literature is quite limited for certain stages of the lifespan, including those in the adolescent and mid-aged adult years. In light of this, it will be important to continually monitor new fall prevention research, and possibly consider initiating an Evidence and Practice-Based Planning Framework related to the topic of fall prevention across the life stages, in order to ensure public health key messages and programming are reflective of the most up-to-date evidence.

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