

# Suicide Prevention in Toronto

November 2014

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**Copies:**

Copies of this technical report can be downloaded at: <http://www.toronto.ca/health/>

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**About this Report:**

This report was prepared to address suicide prevention Toronto, including Toronto-specific data analysis.

Toronto Public Health (TPH) staff convened an external advisory group of researchers, clinicians and community experts, who provided strategic direction and advice.

In addition to this technical report, there is a TPH staff report that summarises this technical report and provides recommendations for suicide prevention interventions in Toronto.

Copies of both reports can be found at:

<http://www.toronto.ca/health/>

## EXECUTIVE SUMMARY

Suicide resulted in 243 deaths in Toronto in 2009, which is more than four times the number of people who died from homicide, and three times the number who died from motor vehicle crashes.<sup>1</sup> Suicide is just the tip of the iceberg in the continuum of suicide-related behaviours, including self-harm, suicidal ideation and suicide attempts, which contribute to the burden of suicide. Suicide not only results in a loss of life but also impacts survivors, family, friends and observers. Yet, despite agreement that suicide is a problem in our society, it has received comparably low levels of attention as a public health issue. Suicide remains one of the most important and least talked about population health problems.

The purpose of the report is to highlight suicide as an important public health problem in Toronto. The report creates a descriptive profile of suicide in Toronto, including prevalence, groups most affected, means of death, and risk and protective factors. Key findings include:

- Men experience higher rates of death from suicide,<sup>1</sup> whereas women experience higher rates of non-fatal suicidal behaviour;<sup>2</sup>
- Suicide mortality rates increase from youth to throughout middle age and are particularly high for elderly men;<sup>1</sup>
- The most common mechanisms of suicide in Toronto are hanging, strangulation, suffocation, jumping from a high place, self-poisoning from drugs and alcohol, and jumping or lying before a moving object (subway/train/car);<sup>3</sup>
- More than half of suicide deaths in Toronto occurred in the individual's home;<sup>3</sup>
- Approximately one in four persons who died from suicide in Toronto had attempted suicide previously;<sup>3</sup>
- The majority of people who died by suicide in Toronto had an identified history of mental illness;<sup>3</sup>
- The most frequently noted stressors present during the period prior to death from suicide in Toronto were interpersonal conflict, medical, employment and financial stressors;<sup>3</sup> and
- Suicide disproportionately affects certain groups, such as those who are exposed to multiple risk factors, including mental illness, substance misuse and abuse, socio-economic disadvantage, and social isolation.<sup>4</sup> Priority populations in Toronto include elderly men, LGBTQ youth, urban Aboriginals, homeless and incarcerated populations.

The report reviews the evidence on current, effective and promising suicide prevention interventions. There is strong evidence that restricting access to common means, such as to bridges, subway tracks and certain medications, are effective in preventing suicides.<sup>5</sup> Evidence supports a broad range of suicide prevention interventions, including: means restriction; media reporting guidelines; national suicide prevention programs; community-based and school-based prevention programs; gatekeeper training including peer education and primary healthcare provider training; and telephone-based services.<sup>5</sup>

Toronto's unique demographic characteristics, urban environment, and available services may provide specific opportunities for suicide prevention. The report provides a scan of the policy landscape and an environmental scan to review the current state of suicide prevention in Toronto, including existing initiatives such as the suicide bridge barrier on the Prince Edward Bridge and telephone crisis services on TTC subway platforms. It also describes suicide prevention strategies that have been developed in other jurisdictions. From the evidence, it is clear that many efforts need to be part of the solution; no specific intervention will be effective on its own to reduce the overall suicide rate.<sup>5</sup>

While this report takes a public health approach and concentrates on upstream and preventive approaches and interventions, an integral component of suicide prevention involves the healthcare sector. It is critical that healthcare services incorporate suicide prevention and access to mental health care as a core component of services, and ensure early identification, psychiatric emergency services, mobile crisis teams, efforts to encourage treatment adherence, and post-discharge support.

Comprehensive suicide prevention strategies are needed to reduce the burden of suicide in Toronto. A multi-sectoral approach, which involves communities, government and the healthcare sector, is required to address a range of prevention, treatment and maintenance interventions, as well as fight stigma, create situations that guard against suicide, and build resiliency and capacity in communities and in vulnerable individuals. Coordination and investment from provincial and federal governments is needed to ensure sustainable and adequate funding that will enable communities to undertake activities and strategies with goals, targets and evaluations.

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# 1. INTRODUCTION

## 1.1 Overview

Suicide is a serious public health problem and suicide attempts and death are sources of morbidity and mortality respectively. Suicide is ranked as the ninth leading cause of death, and results in more than 3,500 deaths each year in Canada.<sup>6,7</sup> When suicidal ideation and attempts are taken into account, suicide affects 1 in 13 Canadians. Yet despite agreement that suicide is a major problem in our society, it has received comparably low levels of attention as a population health issue. Suicide remains one of the most important and least talked about public health problems. Canada continues to be one of the few developed nations without a national suicide prevention strategy.<sup>8</sup>

Toronto Public Health (TPH) identifies suicide prevention as an area of priority. There were 243 deaths by suicide in Toronto in 2009.<sup>1</sup> Suicide deaths are just the tip of the iceberg, with health issues along the continuum of self-harm to suicide ideation to suicide attempt to suicide death. Furthermore, the impact of suicide can extend beyond individuals to have severe and long-lasting consequences on survivors, families, friends and observers.

The risk of suicide is distributed across the lifespan, affecting both young and old.<sup>1</sup> Suicide disproportionately affects certain groups, such as those that are exposed to multiple risk factors including mental illness, substance misuse and abuse, socio-economic disadvantage, and social isolation. Suicide is one of the leading causes of premature death and contributes an economic burden of costs to society.

## 1.2 Purpose & Scope

The purpose of this report is to highlight suicide as an important public health issue. It achieves this by presenting a description of what is understood to date about the problem of suicide in Toronto, including prevalence, groups most affected, mechanisms of injury and death, and risk and protective factors. The report also describes suicide prevention strategies from across Canada and worldwide, and reviews what is known about effective suicide prevention interventions. Finally, the report outlines the current situation of suicide prevention in Toronto and identifies areas for moving forward.

Within any discussion of suicide, it must be recognized that there is a wide spectrum of suicide-related behaviours. A comprehensive study of suicide includes the study of suicidal thoughts or ideation, suicidal attempts, and suicide deaths, all of which are included in the scope of this report. The scope excludes assisted suicide, euthanasia, and self-harm with no or undetermined suicidal intent. These outcomes are not addressed within this report, though it is important to acknowledge that making a distinction between suicidal and non-suicidal self-harm behaviour is problematic given that intent can be ambiguous even to the person performing the act and that self-harm in general may be a risk factor associated with attempted suicide and suicide death.

TPH's work on suicide follows the Canadian Association for Suicide Prevention's (CASP) guiding principles: that suicide is preventable, suicide prevention is everyone's responsibility, and that suicide prevention strategies should be inclusive, respectful, and informed.<sup>9</sup>

### 1.3 Definitions

There are many terms used in the literature about suicide, which may produce some conceptual ambiguity or uncertainty that is an obstacle to effective communication among researchers, policy-makers, health professionals, community organizations and other stakeholders. In order to ensure a consistent understanding it is necessary to define suicide and suicide-related behaviours. The following terms are defined for use in this report:<sup>10,11</sup>

**"Suicide"**: Death caused by self-inflicted, intentional injury (may be used interchangeably with suicide death).

**"Suicide attempt"**: Non-fatal, self-inflicted, potentially injurious behavior with any intent to die as a result of the behaviour. A suicide attempt may or may not result in injury.

**"Suicidal ideation"**: Thinking about, considering, or planning for suicide.

**"Suicide-related behaviour" or "suicidal behaviour"**: Encompasses serious thoughts of suicide or death, and attempts to die by suicide. Suicide-related behaviors may or may not result in injury or death.

**"Self-harm"**: Self-poisoning or self-injury, irrespective of the apparent purpose of the act.

### 1.4 Public Health Approach and Equity Considerations

Under the Ontario Public Health Standards (OPHS), public health units in Ontario are mandated by the Ontario government to protect and promote the health of the population.<sup>12</sup> Suicide prevention falls under the OPHS Injury Prevention Guidance Document, which recommends action on suicide prevention as an area of public health importance and provides direction for health promotion, policy development, and assessment and surveillance activities.

Suicide prevention is well-aligned with TPH work on mental health promotion and has been identified as a priority area for the organization. Preliminary community consultations on suicide prevention identified the need for a range of actions to address suicide prevention in the city, and saw a role for TPH in community-wide suicide prevention.

In this report, TPH has taken a public health approach to suicide prevention by moving upstream along the health-illness continuum. A public health approach to suicide prevention focuses on creating a larger context for prevention and health promotion that can best create situations that guard against suicide, intervene at the level of population health and modify some of the antecedent causes of suicide. This includes monitoring trends over time, policy and advocacy, and building resiliency and capacity in communities and in people including at-risk groups.

The field of public health gives important consideration to equity and health equity impacts. A public health problem such as suicide may disproportionately affect some individuals and groups in our society. It is critical that the approach to conceptualization, research and analysis, and interventions consider the different impacts, benefits, harms and costs across groups. In this report, we look at suicide both in the general population as well as in groups that are vulnerable to multiple and concurrent risk factors. Wherever possible throughout this report, particular attention is paid to address equity considerations such as gender, sexual orientation, race, ethnicity, language, culture, immigration status, religion, income, educational level, occupation or labour-market experiences, and social exclusion.

## 2. OVERVIEW OF SUICIDE RISK AND PROTECTIVE FACTORS

Suicide is a multi-factorial and complex phenomenon, influenced by interactions between biological, psychological, social and environmental risk and protective factors across a person's lifespan. This report reviews the literature on risk and protective factors to better understand how the interplay of various factors affects suicide and suicide-related behaviours.

Suicide risk factors are defined as factors that can lead to or are associated with suicide-related behaviours.<sup>13</sup> Risk factors are more likely to occur in combination than in isolation, and their impact differs for different individuals and communities at different times.<sup>4</sup> Risk can change with circumstance, and a risk factor identified at a population level may result in a true heightened risk for one person, but not for another.

For this report, a literature review was conducted to examine the published evidence on suicide risk. The starting point for this review was the Scottish Government Social Research report, a rigorous review of suicide risk and protective factors.<sup>4</sup> For a detailed outline of the literature review methodology, please see Appendix A.

The literature review addressed the following research questions:

- What factors are associated with risk/vulnerability to suicide and suicide-related behaviour?
- What population subgroups are at increased risk of suicide and suicide-related behaviour?

This report examines risk factors at multiple levels of influence: individual (psychological makeup, behaviours and physical health); social (family, relationships and community); and societal (structural/environmental) (Table 1). This approach provides a framework for understanding specific risk factors and their level of influence. While risk factors are reviewed as independent factors, there are additive effects of risk factors. For example, a risk factor such as mental illness can be exacerbated by co-morbid substance misuse, co-occurrence of self-harm and/or recent stressful life events. The additive effects of suicide risk factors will arise throughout this report.

The literature review found evidence to support risk factors at various levels of influence, including:

**Table 1: Risk Factors for Suicide**

LEVEL	RISK FACTORS
Individual (psychological make-up, behaviours & physical health)	<ul style="list-style-type: none"> <li>▪ Mental illness, including schizophrenia, mood disorders such as depression and bipolar disorder, attention deficit hyperactivity disorder (ADHD), and admission and discharge from healthcare institution</li> <li>▪ Self-harm (including suicide attempts)</li> <li>▪ Personality/cognitive factors: poor problem solving skills; neuroticism; impulsivity; hopelessness; etc.</li> <li>▪ Alcohol and drug misuse</li> <li>▪ Poor physical health/physical illness</li> <li>▪ LBGTQ sexual orientation</li> <li>▪ Aboriginal status</li> <li>▪ Homelessness, under-housed and incarceration</li> <li>▪ Job loss and unemployment</li> </ul>
Social (family, relationships and community)	<ul style="list-style-type: none"> <li>▪ Lack of social support and sense of isolation</li> <li>▪ Family environment</li> <li>▪ Violence and abuse</li> <li>▪ Relational or social loss</li> <li>▪ Bullying</li> </ul>
Societal (structural/environmental)	<ul style="list-style-type: none"> <li>▪ Socio-economic disadvantage (i.e. poverty, social inequities)</li> <li>▪ Oppression and discrimination</li> <li>▪ Access to lethal means</li> <li>▪ Local clusters of suicide that have a contagious influence</li> <li>▪ Exposure to, including through the media, and influence of others who have died by suicide</li> <li>▪ Stigma associated with help-seeking behavior</li> </ul>

## 2.1 Individual risk factors

### Mental illness

Suicide and mental health problems are deeply connected. It has been theorized that mental health factors make the strongest and most consistent contribution to suicide risk. The Mental Health Commission of Canada (2014) has estimated that 90 per cent of people who die by suicide were experiencing a mental health problem or illness.<sup>14</sup>

A comprehensive examination of systematic reviews on risk factors found that mental illness is a risk factor for suicide across all age and sex groups.<sup>4</sup> Further, comorbidity of mental disorders tends to be the rule, rather than the exception. In particular, it is well-established that one or more clinical diagnoses of mental illness including mood disorders, schizophrenia, personality disorders and conduct disorders, substance use disorders, and a history of psychiatric treatment,

are risk factors for death by suicide.<sup>15,16</sup> Recent studies with large national samples from Scandinavia provide further support for clinically diagnosed mental disorders as the major risk factors for suicide.<sup>17</sup> (Table 2). Some evidence suggests that suicide risk is elevated around the time of first diagnosis.<sup>4</sup>

**Table 2. Cumulative Incidence of Suicide by Mental Illness**

	<b>Cumulative Incidence, % (95% Confidence Interval)</b>	
	<b>Men</b>	<b>Women</b>
Biopolar disorder	7.77 (6.01-10.05)	4.78 (3.48-6.56)
Mood disorder	6.67 (5.72-7.78)	3.77 (3.05-4.66)
Schizophrenia	6.65 (5.85-7.34)	4.91 (4.03-5.98)
Any mental illness	4.33 (3.92-4.77)	2.10 (1.86-2.37)
No mental illness	0.72 (0.61-0.86)	0.26 (0.20-0.35)

Adapted from: Nordentoft, Mortensen & Pedersen (2011)

Population includes the 2.46 million people born in Denmark from January 1, 1955, through December 31, 1991, and followed up from 15 years of age to 2006. Cumulative incidence measures the percentage of persons in the population who had committed suicide within 30 years after onset of the disorder of interest, taking into account that people may migrate or die of other causes.

According to recent systematic reviews, risk factors associated with suicide and schizophrenia include being young and male, previous suicide attempts, a current or past diagnosis of depression, depressive symptoms (e.g. guilt, hopelessness), current psychotic symptoms such as hallucinations and delusions, family history of suicide and co-morbid substance misuse.<sup>15,16</sup> Evidence has shown that patients with schizophrenia are likely to die from suicide by violent means.<sup>15</sup> Treatment adherence decreases risk.

Risk of suicide is elevated for people with bipolar disorder, particularly for younger patients and during the early years after diagnosis.<sup>18</sup> Similar to schizophrenia, there are additive factors that increase the risk associated with bipolar disorder, including being male, history of suicide attempts, presence of mood disorders, psychiatric admissions, duration of psychiatric illness, adherence to treatment, recent discharge from a healthcare institution, and occupational and interpersonal problems.<sup>18</sup> There is also a substantial risk for suicidal ideation and suicide attempts associated with pediatric bipolar disorder.<sup>19</sup>

A recent review of the evidence on depression found a strong association between depression and suicide, and suicide risk increased with severity of depression.<sup>20</sup> Males with depression experienced the most significant risk for suicide. Additive factors include a family history of mental disorder, a history of suicide attempts or self-harm, the presence of current alcohol or drug misuse, and feelings of hopelessness and anxiety.

Pregnancy, and in particular, the post-partum period, has been identified as a period during which women may experience a high rate of mental health disorders including symptoms of suicidal ideation.<sup>4,21</sup>

Attention deficit hyperactivity disorder (ADHD) is a risk factor for death by suicide, particularly for young males, though it is also a concern for suicide in adults.<sup>4</sup> It has been found that ADHD

may contribute to increased severity of co-morbidities such as depression.<sup>4</sup> Research has also provided evidence that Autism Spectrum Disorder (ASD) is associated with suicide-related behaviour in youth, and is likely to occur in the context of other mental health problems, abuse and bullying.<sup>22</sup>

Suicide risk has been found to be associated with eating disorders.<sup>4</sup> Individuals with eating disorders have an overall higher risk of suicide than the general population, and this finding has been supported across a range of eating disorder severities and types. Eating disorders are often co-morbid with other mental illness such as depression, drug and alcohol misuse.

Inpatient suicide is a small but important fraction of suicides overall.<sup>23</sup> Suicide risk peaks immediately after admission and shortly after discharge from psychiatric hospitals.<sup>24</sup> Prevention of inpatient suicide requires safe hospital environments and patient supervision, systematic screening and evaluation of suicide risk at admission and discharge, and out-patient treatment and after-care.<sup>24</sup>

Most of the research on the association between mental illness and increased suicide incidence has focused on clinical populations, though there is a growing body of population studies that use health registry/hospital discharge data in Scandinavia. Large, rigorous prospective studies are needed to better understand mental health problems and suicide risk in the general population in Canada. Given the multi-faceted nature of risk, future research should also seek to better understand the constellation of mental health risk factors and how together they can contribute to or exacerbate other risks and stressors such as bullying, chronic illness, intimate partner violence, and marital breakdown/death of spouse.

### **Self-harm (including suicide attempts)**

Self-harm consists of non-fatal self-poisoning or self-injury. Self-harm is a public health issue in its own right, as well as being a risk factor for death from suicide. In a comprehensive review of the evidence, McLean et al. (2008) found that individuals who self-harm have a much greater risk of dying by suicide compared with those who do not engage in this behaviour.<sup>4</sup> This risk factor is of particular relevance to youth, with frequency of self-harm peaking in the late-teens.<sup>25</sup>

History of suicide attempts contributes to elevated risk of suicide.<sup>4</sup> Studies on psychological predictors among people who attempted suicide found that repeaters had a history of beginning younger, more severe problems, less lethal acts of self-harm and greater feelings of externally directed hostility and powerlessness.<sup>26,27</sup>

### **Personality/cognitive factors**

A large number of studies have examined specific personality/cognitive factors to better understand their contribution to suicide risk. The evidence in this area is heterogeneous, nevertheless, it has been suggested that suicide risk may be higher in individuals whose personality includes neuroticism, extroversion, impulsivity, aggression, anger, irritability, hostility, anxiety, hopelessness, and poor problem solving skills.<sup>4</sup> A recent review found that emotional/mood instability is a risk factor for suicide.<sup>28</sup> Mental disorders, such as depression, ADHD and anxiety disorders, can also affect and interact with cognitive styles such as

impulsivity, neuroticism, and hopelessness. Furthermore, evidence found that self-critical evaluative concerns or perfectionism is connected with suicide-related behaviour in a clinical sample, though more research is required to demonstrate generalizability to the general population.<sup>29</sup>

### **Alcohol and other substance misuse**

There is increased risk of suicide associated with substance misuse. Alcohol is a major contributor to risk of suicide attempts and death. Studies have found that death by suicide were 8.5 times higher in individuals misusing alcohol than the comparison group.<sup>4</sup> Furthermore, an examination of acute alcohol use showed a higher risk of suicide during or shortly after use of alcohol compared to alcohol free periods. Some studies found that the risk for suicide associated with alcohol was greater among women than men.<sup>4</sup>

Misuse of other substances, including recreational drug use, has also been found to increase risk of suicide. A review of studies on drug misuse found that the suicide risk associated with opioid use disorders and mixed intravenous drug use is even greater than that for alcohol misuse.<sup>30</sup> Indeed, opioids were the most common drugs found in lethal quantities in a recent study of self-poisoning suicide deaths in Toronto.<sup>31</sup> Sinyor et al. (2012), in examining substances used in suicides by overdose in Toronto, also found that psychotropic prescription medications, other prescription medications, and over-the-counter medications were substances most detected by toxicology reports.<sup>31</sup>

### **Poor physical health/physical illness**

There is a body of evidence examining the relationship between poor physical health/physical illness and suicide risk. Findings show that a range of chronic illnesses, including epilepsy,<sup>4</sup> multiple sclerosis,<sup>32</sup> chronic abdominal pain syndrome<sup>33</sup> and HIV<sup>34</sup> are associated with increased suicide risk. In some cases, suicide risk increased with severity of illness, disease course, or progressive disease subtype.<sup>4</sup> Research also suggests that other factors, such as depression, social isolation, age, income, and level of physical disability may also impact suicide risk among people with a chronic illness.<sup>32</sup>

In recent years, there has been research on whether obesity is a risk factor for suicide. A systematic review by Klinitzke (2013) found an inverse relationship between BMI and suicide death; obese people were less likely to die by suicide than people of low or normal weight.<sup>35</sup> An examination of suicide attempts, however, reported results that differed by sex. Obese females were more likely to attempt suicide, whereas obese males were less likely, compared to individuals with normal weight. Suicide risk is increased among those undergoing bariatric surgery (weight loss surgery).<sup>36</sup>

### **LGBTQ sexual orientation**

Risk of suicide is increased among members of the gay, lesbian, bisexual and transgendered (LGBT) community as well as people with gender questioning identities.<sup>13</sup> A systematic review by King (2008) reported that lesbian, gay and bisexual people are at a higher risk of suicidal ideation and behaviour than heterosexual people.<sup>37</sup> Lifetime risk of suicide attempts was especially high in gay and bisexual men. Much of the literature on LGBTQ sexual orientation

has concentrated on suicide risk among LGBTQ youth, particularly for suicidal ideation and attempts.<sup>38</sup> Research on trans people who live, work or receive health care in Ontario found that approximately three-quarters of trans people in Ontario have seriously considered suicide and 43% had attempted suicide at some point in their lives.<sup>39</sup> It has been theorized that heightened risk for LGBTQ groups may be explained by experiences of rejection, stereotyping and discrimination, lack of support from family and community, and lack of or difficulty finding appropriate resources and services.<sup>40</sup>

An analysis of CCHS data (2011/2012) on sexual orientation for Toronto found that 89.6% of the Toronto population identified as heterosexual, 3.9% identified as homosexual or bisexual, and 6.6% responded as don't know/refusal/no response. This question was based on a population between the ages of 18 and 59, and data was not available for youth or older adults. Data on LGBTQ suicide deaths in Toronto are unavailable, since sexual orientation is often unknown or unrecorded in data sources.

### **Aboriginal status**

Aboriginal people in Canada have much higher rates of suicide than the general population.<sup>41</sup> Suicide affects Aboriginal youth more than any other demographic, with rates five to six times that of non-Aboriginal youth in Canada.<sup>42</sup> However, there is much variation across and between communities, and between age groups.<sup>13</sup>

The literature on suicide supports the theory that suicide-related behaviours among Aboriginal people are rooted in legacies of trauma, deprivation and marginalization.<sup>13,43</sup> The risk of suicide associated with Aboriginal status may be grounded in psychosocial and environmental factors such as separation from one's home community, feelings of cultural isolation, lack of social support and family instability, discrimination and racism, and difficulty finding culturally appropriate services. Research specific to the Toronto context has found that Aboriginal families in Toronto are under significant stress as a result of poverty, inadequate access to affordable childcare and inadequate housing, as well as challenges related to intergenerational trauma including mental health problems, addictions and substance misuse, cultural loss and identity confusion. Aboriginal people in Toronto, especially men, are also greatly overrepresented in the urban homeless population and have high rates of incarceration.<sup>44</sup>

According to the 2006 census, 13,605 persons in the city of Toronto (0.5% of total population) are Aboriginal.<sup>45</sup> From 2001 to 2006, the number of Aboriginal people in Toronto increased by 2,235 persons (19.7%). Consultations by the City with various agencies serving the Aboriginal community indicate that they estimate that the number of Aboriginal people living in Toronto to be between 60,000 to 70,000. This is in sharp contrast to the number reported in the census.<sup>45</sup>

There are limitations in data sources on suicide among Toronto's Aboriginal population. The Canadian Community Health Survey (CCHS) was created to address a gap in data availability on health determinants at regional levels, and includes questions on suicide ideation and suicide attempts. However, the Aboriginal population sample in CCHS data is too small to allow reporting below a provincial level and tends to be unusable at a Toronto-level.<sup>46</sup> The CCHS therefore fails to meet its purpose as it relates to Aboriginal people. Given the prominence of the

issue of Aboriginal suicide, it is important to improve data sources that shed light on the health and wellbeing of the Aboriginal population in Toronto. Dr. Janet Smylie of the Centre for Research on Inner City Health, St. Michael's Hospital is currently leading a research study on Aboriginal health status, which involves collaboration with Toronto Public Health.

### **Homelessness, under-housed and incarceration**

The literature suggests an association between homelessness and suicide risk. Much of the suicide-related research on homelessness has concentrated on homeless youth as a vulnerable population. A study of 150 homeless and street-involved youth in Toronto examined the relative impact of a range of background, street-related, drug use, and mental health variables.<sup>47</sup> The results demonstrated the particular impact of depression and self-harm behaviours, as well as experiences of bullying and on-street discrimination on suicide risk. A study of 858 Montreal street-involved youth found associations between homelessness, suicidal ideation and accidental over-dose.<sup>48</sup>

Incarcerated persons are at heightened risk for death by suicide. A recent review by the Office of the Correctional Investigator reported that suicide accounts for approximately one in five deaths in custody each year.<sup>49</sup> The suicide rate of federal inmates is seven times higher than the general population. Incarceration was explained to increase suicide risk through loss of autonomy and personal control, deprivation, isolation, separation from loved ones, and feelings of hopelessness and despair.

### **Job loss and unemployment**

Unemployment is a major risk factor associated with suicide.<sup>4,50</sup> More evidence is needed to determine which aspects of unemployment have the greatest influence on suicide risk. Recent studies have examined job separation (i.e. layoffs) as well as the duration of unemployment, to try and separate the effect of job loss from the effect of unemployment.<sup>51</sup> Results suggest that unemployment duration may be the dominant force in the relationship between job loss and suicide.<sup>51,52</sup> Reviews have found that long-term unemployment is associated with greater incidence of suicide, which has been hypothesized to be linked to experiences of hopelessness, distress and mental ill health.<sup>52,53</sup>

A number of studies have examined the macroeconomic factors that affect suicide rates over time. Recent studies on the relationship between business cycles and suicide found that overall suicide rates rise during an economic recession and fall during expansion.<sup>53,54</sup> This effect was found in the recent global economic recession (2007 to 2009) in Europe and North America, including Canada.<sup>54</sup> Results showed that suicide rates rose for both men and women, but the increase was four times higher for working age men.<sup>54</sup> Another study, using data on housing loan interest rates, unemployment rates, days lost to industrial disputes, Consumer Price Index, gross domestic product, and the Consumer Sentiment Index, found a significant association with suicide and the pattern differed by sex: male suicide rates increased with economic adversity, while female suicide rates decreased.<sup>55</sup> A proposed explanation is that economic shocks may be particularly hard-hitting for men, who may be more likely to be in the labour force and subject to job loss, or who may see employment or providing for one's family as part of what it is to be

masculine.<sup>54</sup> More research is needed to understand how other aspects of employment, such as part-time or contract work, may impact suicide risk.

## **2.2 Social risk factors**

### **Lack of social support and sense of isolation**

Lack of social support and social isolation have been identified as important risk factors associated with suicide. Research on issue of social support, or lack thereof, has examined a number of indicators including living arrangement, degree of social connectedness, and frequency of social contact. Much of this research has examined older adults as the population of interest. A systematic review of suicide risk in older adults found that low social connectedness – that is, limited positive involvement with family, friends, and social groups – was associated with suicidal ideation, suicide attempts, and suicide in later life.<sup>56</sup> Suicide risk was particularly heightened in older men who had lost a spouse. In another study, it was reported that individuals who lived alone were more likely to die by suicide than those who lived with others.<sup>57</sup> More information is needed to better understand the impacts of social isolation and strategies for increasing social integration among different age and sex groups.

### **Family environment**

Family history of suicide has been found to be a risk factor for suicide. A recent review found that children exposed to parental suicide-related behaviour are at greater risk of suicide attempts themselves, regardless of the form (i.e. suicide or suicide attempt) or context (i.e. parental gender or age and sex of the offspring).<sup>58</sup> While it is difficult to understand all of the factors that influence this risk, a biopsychosocial approach would attribute it to a number of factors, ranging from neurobiological factors (e.g. dysfunction in serotonergic neurotransmission) to contextual factors and social learning.<sup>59</sup> Family history plays a role in suicide risk, independent of other mental illness.

Research on the mental health outcomes of children and adolescents in the child welfare system has examined suicide and suicide attempts in this population. Katz et al. (2011) found that children and adolescents in care were at greater risk of suicide attempts and death than those who were not in care.<sup>60</sup> They also reported that the rates of suicide attempts and hospital admissions were highest before entry into care and decreased thereafter.

### **Violence and abuse**

Negative and traumatic life events may be an important factor in suicide-related behaviour among people who are already vulnerable to suicide. There is robust evidence that physical abuse, emotional abuse and neglect predispose people to future suicide attempts and suicide.<sup>61</sup> This work concludes that all forms of child maltreatment, abuse and violence should be considered important risks to health.

Intimate partner violence has wide-ranging and often severe consequences, including physical injuries, disabilities, complications of pregnancy, alcohol and drug abuse, depression and poor mental health.<sup>62</sup> Intimate partner violence was found to be associated with increased suicide attempts for women.<sup>63</sup> There was no clear association for men. In some studies, results demonstrate a dose-response effect between the severity of abuse experienced and suicidality.<sup>62</sup>

### **Relational or social loss**

There is a body of literature reporting on the suicide risk associated with relational and social loss. Overall, the literature identifies relationship difficulties and loss, including breakups, separation, divorce and bereavement, as risk factors for non-fatal and fatal suicide.<sup>13</sup> A systematic review by Ide (2010) found that relationship difficulties are an important precipitating factor of suicide-related behaviour.<sup>64</sup> Divorce was associated with suicide in both genders, though some studies found that divorced males experienced greater risk of suicide than females, with the risk strongest amongst middle and older-aged males. The combined separated/divorced group were twice as likely to die from suicide compared to those who were married. There is a higher risk of suicide during the acute stage of separation.<sup>64</sup>

The risk associated with relational loss can have a larger influence on suicide risk for some groups, and can change with age. For example, it has been theorized that breakups may be more consequential at a younger age, versus older age, depending on an individual's life experience and their resultant coping strategies (Sinyor, M., personal communications, June 2, 2014). Nevertheless, the impact of relational or social loss may depend on other social supports in one's life and experiences of social exclusion or isolation.

### **Bullying**

Bullying is a public health problem with a major burden of illness on youth. Bullying behaviour and cyber bullying have been found to be associated with suicide.<sup>65,66</sup> Evidence shows increased risk for suicidal ideation and attempts amongst both bullies and victims of bullying. Furthermore, the risk is even greater among individuals with learning disorders, drug abuse, juvenile delinquency, or LGBTQ sexual orientation.<sup>66</sup>

## **2.3 Societal risk factors**

### **Socio-economic disadvantage/poverty**

There is a lot of interest in how the socio-economic characteristics of geographic areas (i.e. neighbourhood/community level) are associated with death by suicide. Despite an extensive literature, the evidence is mixed and inconclusive.<sup>4,67,68</sup> Some findings show a positive relationship (i.e. higher socio-economic areas have higher suicide rates), while other studies report an inverse association (i.e. lower socio-economic areas have higher suicide rates) or no association. The heterogeneity of results may be attributable to research design, where studies use different measures of socio-economic disadvantage, including measures of poverty, material deprivation, unemployment, income, educational achievement and occupation. Despite widely divergent findings, many studies have concluded that resources for suicide prevention should be targeted to high poverty/deprivation and high unemployment areas.<sup>68</sup>

### **Oppression and discrimination**

Many of the aforementioned individual and social risk factors, including sexual orientation, Aboriginal status and bullying, speak to the oppression faced by particular communities. Other groups may also experience marginalization, discrimination, victimization or violence including the mentally ill, people living in poverty, racialized groups, and incarcerated populations. Much more research is needed on how social and cultural oppression and discrimination relates to

suicide risk, particularly among vulnerable groups who experience multiple and concurrent barriers and problems.

In the context of Toronto, systematic and structural discrimination also needs to be better understood for how it can place newcomers to Toronto and Canada at risk for suicide. There is a body of evidence demonstrating the association between racial discrimination and negative physical and mental health outcomes.<sup>69</sup> An increase in understanding and awareness of the role of race/ethnicity, language, immigration status, migration experience, and settlement on suicide risk is needed. These analyses should include a gender-based, sex-based, race-based analysis to better understand the spectrum of issues facing groups at-risk for discrimination.

### **Access to lethal means**

Access to lethal means is a key risk factor in suicide. Evidence shows that availability of means can influence the risk of a person turning suicidal ideation into behaviour, and influences choice for suicide.<sup>70</sup> Moreover, the lethality of the available means increases the risk for suicide death. Some methods of injury have a higher risk of being fatal (e.g. firearms, jumping from a high place, dangerous chemical substances) and are more likely to result in death, whereas other means are less likely to be lethal (e.g. certain psychotropic agents).

Means restriction typically targets access to lethal means of suicide from self-poisoning (e.g. drug overdose), vehicle exhaust gas, use of firearms, jumping from high places (e.g. bridges), and access to railway/subway lines.<sup>71</sup> Evidence has shown means restriction to be effective in reducing risk for suicide.<sup>71</sup> (For more detailed information on the effectiveness of means restriction, please see Section 4 on Effective Interventions).

### **Local clusters of suicide that have a contagious influence**

In addition to individual risk factors for suicide, there is concern about imitation and modelling as environmental risk factors for suicide.<sup>72,73</sup> Often called "clustering" or "social contagion", this refers to a number of suicides occurring in close temporal, geographic and/or interpersonal proximity, based on a process by which one suicide facilitates the occurrence of a subsequent suicide.<sup>72</sup> Researchers have explained this phenomenon as a culturally learned idea and behaviour that is gained through exposure to other people.<sup>74</sup> Outbreaks of suicide clusters may be particularly problematic among teenagers and young adults.<sup>73</sup>

### **Exposure to, including through the media, and influence of others who have died by suicide**

Exposure to media portrayals of suicide is a modifiable risk factor for suicide.<sup>73</sup> In some cases, risk of suicide death has been found to increase proportional to the amount, duration and prominence of media coverage.<sup>72</sup> The risk has been found to be particularly strong for adolescents, though evidence has shown that there is risk across middle adulthood as well. Both print media and the Internet can contribute to risk. (See Section 4 on Effective Interventions for more detailed information on the effectiveness of media reporting guidelines.)

There may also be increased suicide risk for first-responders and those who work in emergency services, including paramedics, firefighters, police officers, dispatchers, correctional service officers and military personnel.<sup>75,76,77</sup> Encounters with stressful and traumatic situations may

contribute to poor mental health, including anxiety, depression, post-traumatic stress disorder, substance abuse and suicide risk. Since April 2014, there have been more than 17 first responder suicides in Ontario, including nine police officers.<sup>78,79</sup>

### **Stigma associated with help-seeking behavior**

Non-help-seeking was identified as a risk factor in need of more evidence.<sup>4</sup> More information is needed on the factors that influence an individual to either seek help or not seek help, including stigma associated with help-seeking, and the effect that it may have to increase risk among certain groups such as men.<sup>13</sup>

## **2.4 Protective factors**

A focus on protective factors is important for suicide prevention efforts, in that it brings an upstream, strengths-based approach to health promotion and prevention. Protective factors can be defined as "factors that enhance the likelihood of positive outcomes and lessen the likelihood of negative consequences from exposure to risk."<sup>80</sup> Protective factors are not just the opposite of risk factors, but conditions that encourage strength and resilience to make negative health behaviours less likely.<sup>81</sup>

Research on protective factors associated with suicide is extremely limited in comparison to research on risk factors. There are a number of different hypotheses for the dominance of risk over protective factors in existing research. Protective factors can be considered speculative in comparison to research on risk factors, as it can be difficult to link a certain behaviour or trait to a non-event.<sup>82</sup> Additionally, the protective factor research is often extrapolated from other research fields. Finally, there is a lack of consistency within the terms used when describing protective factors and protective behaviours for suicide.<sup>82</sup> Nevertheless, the identification of both risk and protective factors for suicide is seen as critical in suicide prevention, as the identification of both these factors helps to distinguish high-risk groups and the type of interventions that will be most effective.<sup>13</sup>

McLean et al. (2008) reviewed evidence on protective factors at various levels, including individual, social and structural factors, and identified protective factors that are supported in the literature as well as gaps in evidence.<sup>4</sup> Individual level protective factors included having problem solving/coping skills, reasons for living, good health, participation in physical activity and employment (especially full-time), though the level of protection conferred may differ by population group. Social level protective factors such as family connectedness (including marriage), positive school environment, and social support were found to be protective against risk for suicide. Societal level factors may also be protective against suicide, but there were limitations in the evidence. For example, social values were shown to be protective but the effect may differ by sex (e.g. traditional social values are protective among adolescent girls; individualistic values are protective among adolescent boys). Access to health treatment by a health professional was shown to be protective against repeat suicide attempts. McLean et al. (2008) also identified gaps in the evidence around what is known about self-help and help-seeking, neighbourhood quality, social capital, and older age as protective factors.<sup>4</sup>

For this report, a literature review was undertaken to synthesize recent available evidence on protective factors associated with suicide, to better understand how the determinants of health may protect against suicide risk. Using the search strategy of McLean et al. (2008), evidence on individual, social and societal level protective factors published since 2008 were identified and synthesized.

### **Social support**

Recent studies provided further evidence for social support as a protective factor against suicide for both youth and adults. In youth, parental connectedness and support, and caring and support from friends were strong protective factors against suicide.<sup>83,84,85,86,87</sup> Support from non-parental adults also acted as a protective factor.<sup>83,86</sup> For adults, research found that social support from family and friends and living in a household with other members worked to protect against suicide.<sup>85,88</sup> These findings have implications for the development and enhancement of interventions that enhance connectivity, strength and resilience. There is strong potential of neighbourhood-based interventions vis-à-vis community leaders, sports coaches and mentors. In addition, as parental and family support is an important area of influence, targeting parenting skills and attachment could help protect against suicide for both adults and children. There is a broad literature showing that poor attachment leads to negative health outcomes including mental illness.<sup>89,90</sup> Targeting programs and supports for new parents, particularly for those who themselves have mental illness, may be a useful preventive intervention.

To further advance the knowledge on social support as a protective factor, future research should work to outline the specific actions and behaviours that youth and adults find supportive of positive mental health and wellbeing. This type of knowledge could maximize the effectiveness of social support programs and community-based suicide prevention initiatives.

### **Positive school environment**

Similar to social support, recent literature provided support for the protective effect of a positive school environment against suicide. Research found an association between a number of school environment factors, including students reporting that they like school, feel safe at school and have fair teachers, with decreased suicide attempts.<sup>83,84,86,87</sup> A caveat of this research is that it does not provide information on the direction of the association. It is unclear if students who dislike school, feel unsafe and have bad teachers are at higher risk of suicide, or if students who are at higher risk of suicide are just more likely to dislike school, feel unsafe, and so forth. An understanding of this relationship is important, because if the former, there is strong evidence for school-based interventions. Developing programs in schools could present the opportunity to initiate strategies that combine and promote several different protective factors. For example, institutional support for Gay-Straight Alliances promotes the safety of all students, promotes the message that the school is LGBTQ-friendly, and encourages social support from teachers and student peers.

### **Religious participation**

There are several studies that focus on religion as a protective factor for suicide, though the evidence is mixed on whether religion has a protective effect against suicide. Half of the studies reviewed found that religious practice helped to protect against suicide.<sup>91,92</sup> Conversely, the other

half found that increased religious practice did not decrease an individual's risk of suicide.<sup>84,93</sup> This may be a result of the study populations selected, or the challenges of studying religiosity such as different indicators or measurement tools (i.e. measuring frequency of religious event attendance vs. degree of religious practice). The protectiveness of religion may also be influenced by other factors that may be promoted by religion, such as social support from family and friends, or by religion's ability to promote or prohibit co-morbid risk factors such as alcohol or drug use. It is therefore difficult to determine the degree and pathway by which religion may be a protective factor for suicide, however, more research is needed to better understand and account for how religion and religious participation affects suicide.

There remain significant gaps in the protective factors literature, particularly around social and societal level factors. Future research should go into greater depth to examine how the social determinants of health – such as employment, income, education, and neighbourhood quality – affect and protect against suicide-related behaviour. Future research should also consider the interplay between the person (including age, gender, race, ethnicity, culture, language, immigration status, sexual orientation, etc.) and their environment to address the interconnections between various strengths and vulnerabilities.

### **3. THE BURDEN OF ILLNESS OF SUICIDE IN TORONTO**

Data shows that suicide is a public health concern in Toronto. This section describes the extent of suicide and suicide-related behaviours in Toronto, to better understand how Toronto compares to the rest of Ontario and shed light on at-risk groups and potential interventions that can prevent or reduce suicide in Toronto.

The following data sources have been used: Canadian Community Health Survey (CCHS) data (cycles 2005 & 2007/08 combined), Vital Statistics (2000-2009), National Ambulatory Care Reporting System (2003-2011) and Office of the Chief Coroner for Ontario (1998-2011). (See Appendix B for detailed data analysis methods).

All data sources have limitations, which can result in under-estimates and under-reporting of suicide deaths. In Ontario, the Coroner classifies death as a suicide if the intention is clear, and may initially code a death as 'undetermined' until further information on the nature of death becomes available after investigation. Certain causes of death produce greater uncertainty as to whether it was intended as a suicide or not, such as self-poisoning or drowning which may be misclassified. In addition, reporting of suicides may be impacted by changes in the Coroner's weighting of evidence to classify a death as a suicide, or stigma about suicide that influences coding on the death certificate.

Data for self-harm and suicide attempts are very unreliable, including under-estimates of the burden of self-harm injuries. Self-harm behaviours are recorded for those that receive care from a hospital or community-based ambulatory service, thus, those who do not receive care from a hospital or community-based ambulatory service would not be captured in these data. Also, some self-harm attempts may be misclassified as "undetermined" if there is uncertainty of whether the

self-harm was intentional. The indicator cannot distinguish whether the self-injury was intended to result in death or in non-fatal self-harm.

Finally, self-reported data has a number of limitations. Populations do not always remember their behaviours, and may under-report or over-report certain behaviours or characteristics based on their perceived social desirability. In addition, surveys do not always provide a representative picture of the whole population. For example, CCHS data under-represents populations of low income, populations with low education, and new immigrants. The CCHS may also under-represent individuals with poor mental health and does not capture those who are homeless or institutionalized, who often have higher levels of poor mental health than the general public.

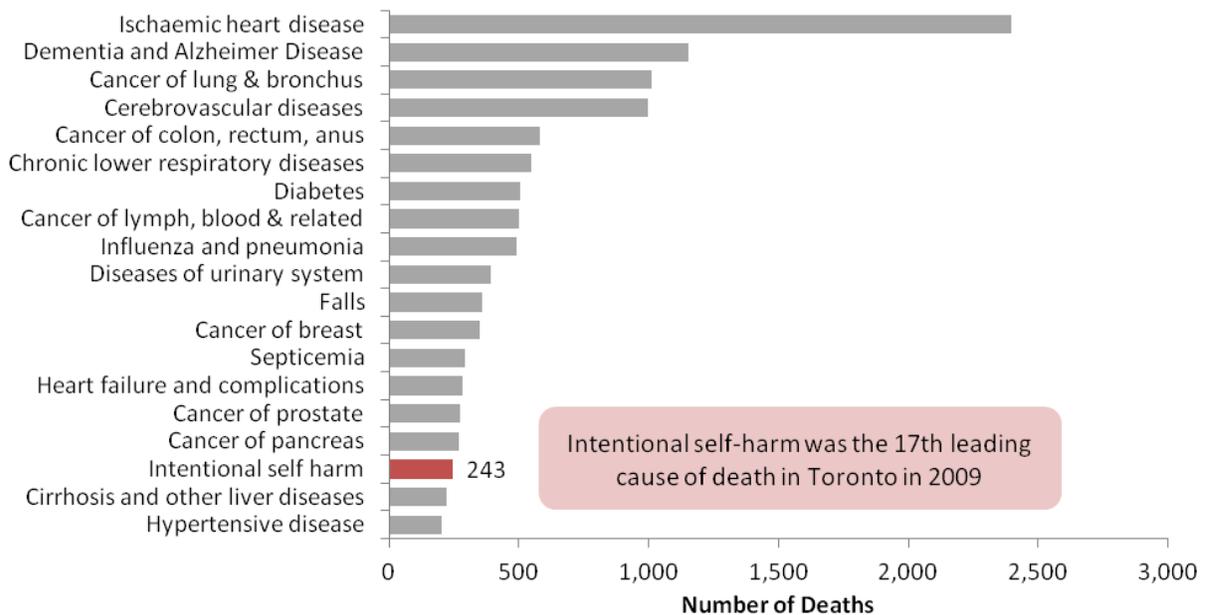
### 3.1 Context

#### *Leading causes of death*

Suicide is a leading and modifiable cause of death in Toronto. Suicide is among the top leading causes of death for youth, second only to unintentional injuries.<sup>1</sup> Suicide represents a relatively large percentage of all deaths for younger age groups because they do not generally die from chronic diseases.

In 2009, suicide resulted in more than four times the number of deaths than homicide, and three times the number from motor vehicle crashes.<sup>1</sup> Suicide was the 17<sup>th</sup> leading cause of death overall, comparable to cause of death by each of cancer of prostate, cancer of pancreas and cirrhosis and other liver diseases. See Figure 1 for leading causes of death in Toronto in 2009.

**Figure 1: Top 20 Leading Causes of Death, Toronto, 2009**



Notes: Leading causes of death were based on ICD-10 classification of primary cause of death, with modifications recommended by the Association of Public Health Epidemiologists in Ontario (APHEO).

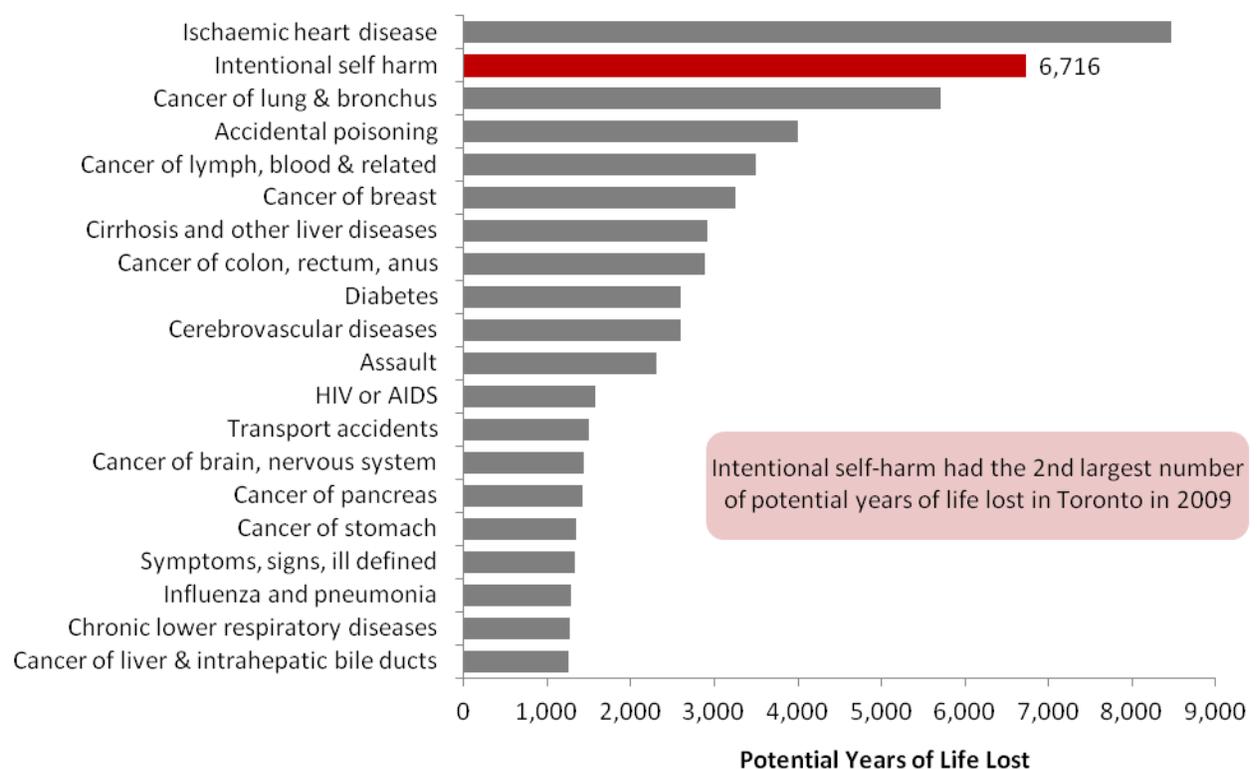
Data Source: Vital Statistics 2000-2009, Ontario Ministry of Health and Long-Term Care, IntelliHEALTH ONTARIO, Date Extracted: March 2013.

### Potential Years of Life Lost

Potential Years of Life Lost (PYLL) is a measure of premature mortality. PYLL represents the sum of the number of years not lived by individuals who died before the age of 75.<sup>94</sup> For example, a person who died at age 30 would contribute 45 potential years of life lost.

Suicide comprises a much larger number of PYLL than most other leading causes of death because it affects younger as well as older populations. In 2009, suicide comprised 6,716 potential years of life lost, the second largest number of PYLL among causes of death. Only ischemic heart disease (8,474 PYLL) had a greater number of PYLL. (Figure 2).

**Figure 2: Top 20 Causes of Premature Mortality, Using Potential Years of Life Lost (PYLL)**



Notes: PYLL were based on ICD-10 classification of primary cause of death, with modifications recommended by the Association of Public Health Epidemiologists in Ontario (APHEO).

Data Source: Vital Statistics 2000-2009, Ontario Ministry of Health and Long-Term Care, IntelliHEALTH ONTARIO, Date Extracted: March 2013.

The number of PYLL due to suicide in Toronto was more than double the PYLL due to diabetes (2,600 PYLL), more than four times the PYLL due to HIV (1,567 PYLL), and more than 27 times the PYLL due to dementia and Alzheimer disease (242 PYLL). Of the 6,716 potential years of life lost due to death from suicide in Toronto, 5,058 potential years of life were lost among males and 1,658 potential years of life were lost among females.

### ***Economic Burden***

In an examination of the economic impact of premature death associated with intentional self-harm, Smartrisk (2009) estimated the cost of suicide and suicide attempts in Ontario were \$842 million in 2004.<sup>95</sup> This estimate consisted of \$273 million in direct costs (e.g. healthcare costs) and \$568 million in indirect costs (e.g. costs associated with lost productivity from hospitalization, disability and premature death). The economic burden of suicide represented 76% of the costs associated with overall intentional injury in Ontario in 2004.

Recent data regarding economic burden is not available at a Toronto-level. An estimate of the economic burden of injuries in Toronto from 1999 estimated the cost of suicide was \$170 million.<sup>96</sup>

### ***Self-reported data***

The Canadian Community Health Survey (CCHS) analysis of self-reported data (cycles 2005 and 2007/08 combined) provides information on the prevalence of suicide ideation and attempts in Toronto. Six percent of people in Toronto reported that they have considered suicide in their lifetime. Among people who have considered suicide in their lifetime, one in four people (24%) reported contemplating suicide in the past 12 months. Among people who considered suicide in the past 12 months, one in four (24%<sup>1</sup>) had attempted suicide at some point in their lives.

CCHS data shows that people who have ever considered suicide are more likely than those who have never considered suicide to:

- Have gambled in the past 12 months: 7.6% of those who have gambled in the past 12 months have considered suicide, compared to 4.3% for those who have not gambled in the past 12 months;
- Have some level of problem gambling risk (classified as a low, moderate risk or problem gambler): 17.6% of those with problem gambling risk have considered suicide, compared to 7.6% of non-risk gamblers and 5.1% of non-gamblers<sup>1</sup>;
- Identify with a non-racialized group (e.g. White): 8.9% of persons from a non-racialized group have considered suicide, compared to 3.3% of persons from a racialized group;
- Be Canadian-born: 9.1% of Canadian-born persons have considered suicide, compared to 4.0% of those born outside of Canada.

Another survey, the Ontario Student Drug Use and Health Survey (OSDUHS), is a population survey of students in grades 7 through 12, conducted across Ontario every two years with the purpose of identifying trends in student drug use, mental health, physical health, and other risk behaviours.<sup>97</sup> In 2011, OSDUHS found that approximately one in ten (9.7%) students in Toronto report that they seriously considered suicide in the past year.<sup>98</sup> The data for the number of youth reporting suicide attempts in Toronto could not be released because of privacy concerns associated with the small numbers.

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<sup>1</sup> Caution: High sampling variability, interpret with caution

At the Ontario level, in 2011, 10.3% of students (103,800 students) report having suicidal thoughts in the past year, and 2.8% (28,000 students) report a suicide attempt in the past year.<sup>98</sup> Girls are more likely to consider suicide than boys (13.7 % vs. 7 %), and to report a suicide attempt (4% vs. 1.6%) in the past year. Suicidal ideation significantly differs by grade, ranging from 7.2% of 7th-graders to 14.0% of 11th-graders. However, suicide attempt does not significantly differ across grades.

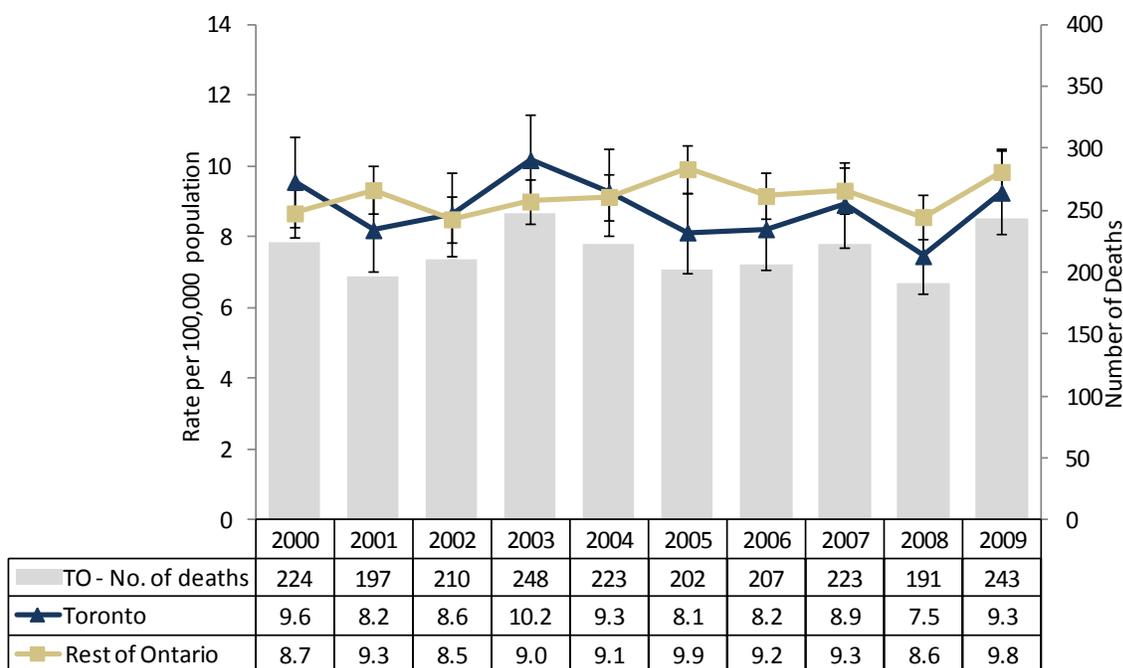
In 2011, OSDUHS found that 17.3% of Toronto students report bullying others at school, 21.6% report being bullied in school, and 17.2% report being cyber-bullied.<sup>98</sup>

### 3.2 Mortality, Hospitalization and Emergency Department Visit Rates

The purpose of this section is to describe the extent of suicide and suicide-related behaviours in Toronto, including mortality, hospitalizations and emergency department visits.

#### Mortality Rates

**Figure 3: Number of Deaths and Age-Standardized Mortality Rates from Suicide per 100,000 Population, Toronto and Rest of Ontario, 2000-2009**



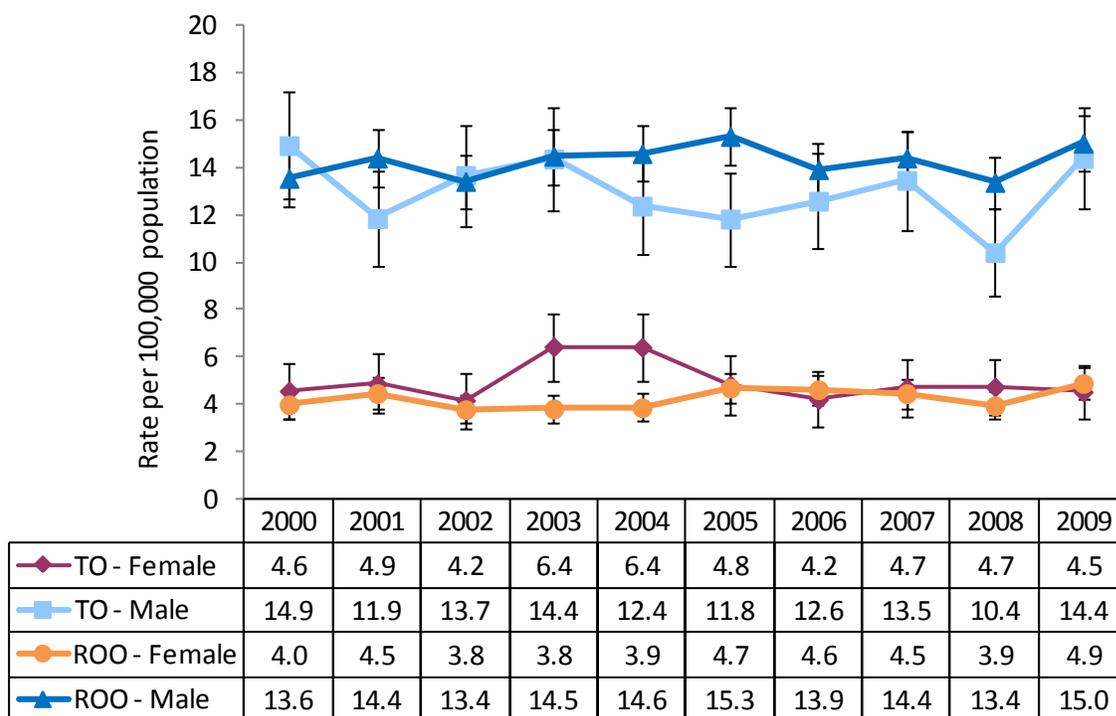
Notes: Data standardized to the 1991 Canadian population. Error bars (I) denote 95% confidence intervals. Data Source: Vital Statistics 2000-2009, Ontario Ministry of Health and Long-Term Care, IntelliHEALTH ONTARIO, Date Extracted: March 2013.

In 2009, intentional self-harm (suicide) was the cause of 243 deaths (9.3 deaths per 100,000 population) in Toronto. (Figure 3.) Age-standardized mortality rates from suicide in Toronto remained relatively stable from 2000 to 2009. The number of suicides ranged from a low of 191 in 2008 to a high of 248 in 2003.

Age-standardized mortality rates from suicide in Toronto are similar to the rest of Ontario (9.8 deaths per 100,000 population). The mortality rate from suicide in Toronto is slightly lower than in Canada (not shown). This may be explained by suicide rates that are highest among those living in rural and low-population areas,<sup>24</sup> and among specific groups (e.g. Aboriginal peoples living in Northern Canada) compared to the general population.<sup>99</sup>

An analysis of data available from 1986 to 2009 was conducted to examine trends over a longer time period (not shown). The data showed that the mortality rate in Toronto has been stable since 1991.

**Figure 4: Age-Standardized Mortality Rates from Suicide per 100,000 Population by Sex, Toronto and Rest of Ontario, 2000-2009**



Notes: Data standardized to the 1991 Canadian population. Error bars (I) denote 95% confidence intervals. TO: Toronto, ROO: Rest of Ontario.  
 Data Source: Vital Statistics 2000-2009, Ontario Ministry of Health and Long-Term Care, IntelliHEALTH ONTARIO, Date Extracted: March 2013.

Age-standardized mortality rates from suicides were higher among males compared to females, with males two to three times more likely to die from suicide in Toronto, and three to four times more likely to die from suicide in the rest of Ontario. (Figure 4).

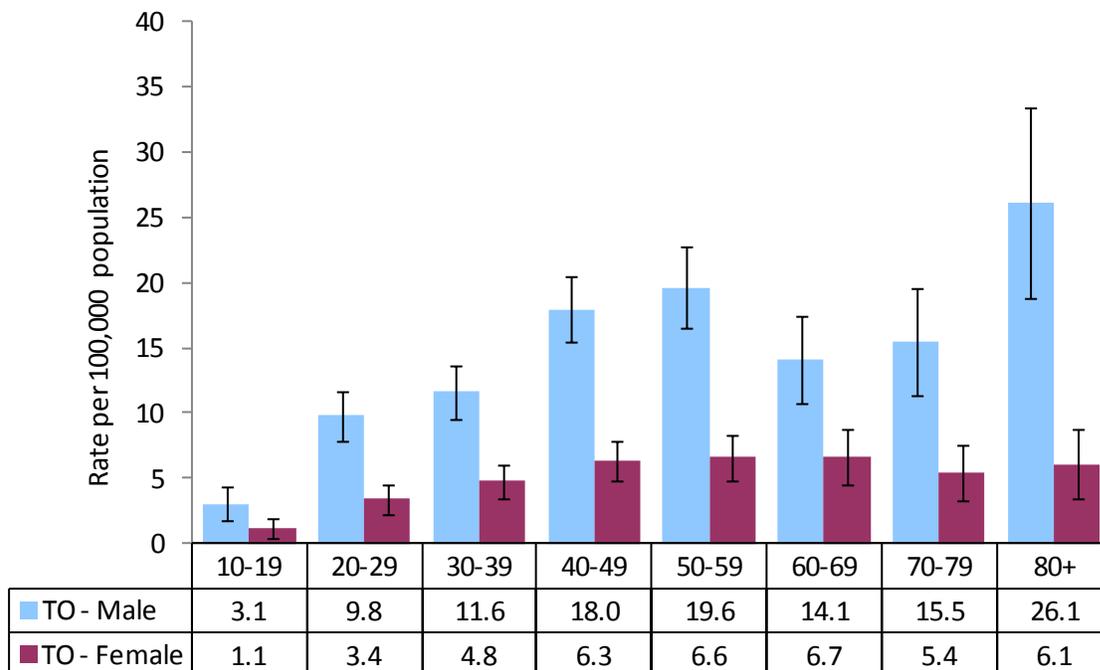
Age-standardized mortality rates from suicide among females in Toronto remained stable from 4.6 deaths per 100,000 population in 2000 to 4.5 deaths per 100,000 population in 2009, with the exception of 2003 and 2004, where mortality rates increased to 6.4 deaths per 100,000 in both years. Mortality rates from suicide among females in Toronto were similar to mortality rates

among females in the rest of Ontario, with the exception of 2003 and 2004, where mortality rates in Toronto exceeded rates for the rest of Ontario.

Age-standardized mortality rates among males in Toronto remained relatively stable at 14.9 deaths per 100,000 population in 2000 and 14.4 deaths per 100,000 population in 2009. Mortality rates among males were relatively similar between Toronto and the rest of Ontario; however, rates for Toronto males showed more fluctuation over time compared to the rest of Ontario.

Analysis of data available over a longer time period (1986 to 2009) showed that the mortality rate by suicide decreased slightly from 1986-1990 (not shown). Since 1991, rates of suicide mortality in Toronto have been relatively stable for both sexes.

**Figure 5: Age-Specific Mortality Rates from Suicide per 100,000 Population by Sex, Toronto, 2005-2009 (combined)**



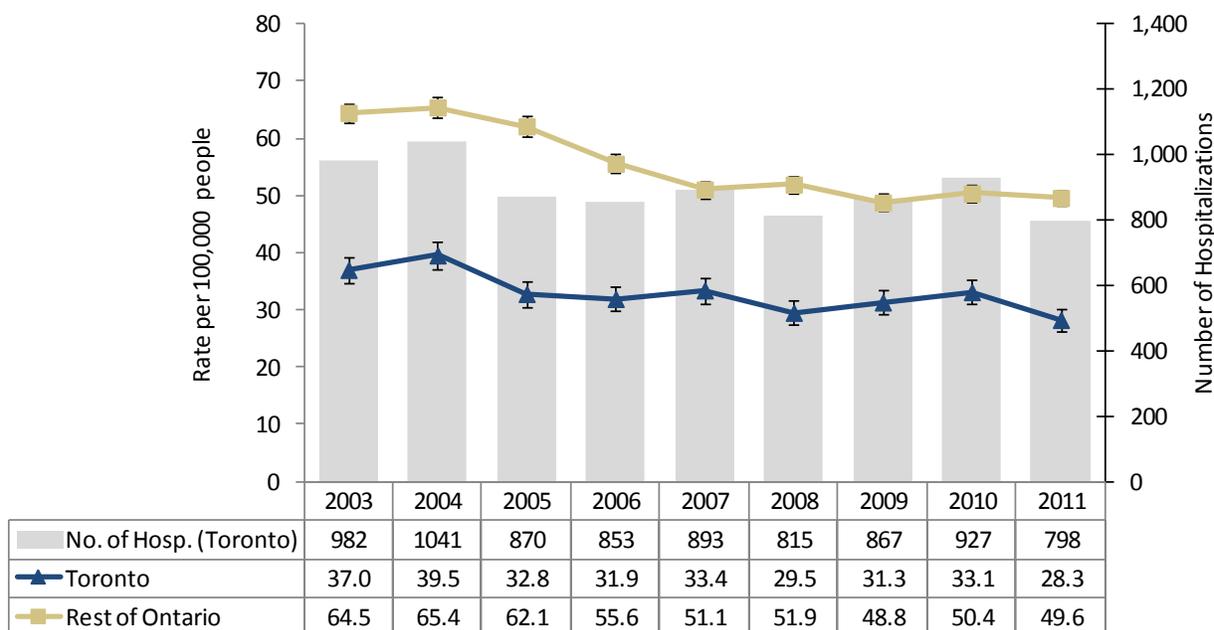
Notes: Error bars (I) denote 95% confidence intervals. TO: Toronto.

Data Source: Vital Statistics 2005-2009, Ontario Ministry of Health and Long-Term Care, IntelliHEALTH ONTARIO, Date Extracted: March 2013.

Age-specific mortality rates (2005-2009 combined) from suicide in Toronto were significantly higher among males compared to females across all age groups, with the exception of 10-19 years of age. (Figure 5). The most notable difference by sex was among the 80+ age group where the mortality rate among males was over four times the mortality rate among females (26.1 deaths vs. 6.1 deaths per 100,000 population, respectively). This may be a true difference or a possible explanation may be that elderly females who die by suicide are more likely than males to use low-lethality methods like self-poisoning and could be misidentified as dying from other causes.

## Hospitalization Rates

**Figure 6: Number of Hospitalizations and Age-Standardized Hospitalization Rates from Intentional Self-Harm per 100,000 Population, Toronto and Rest of Ontario, 2003-2011**



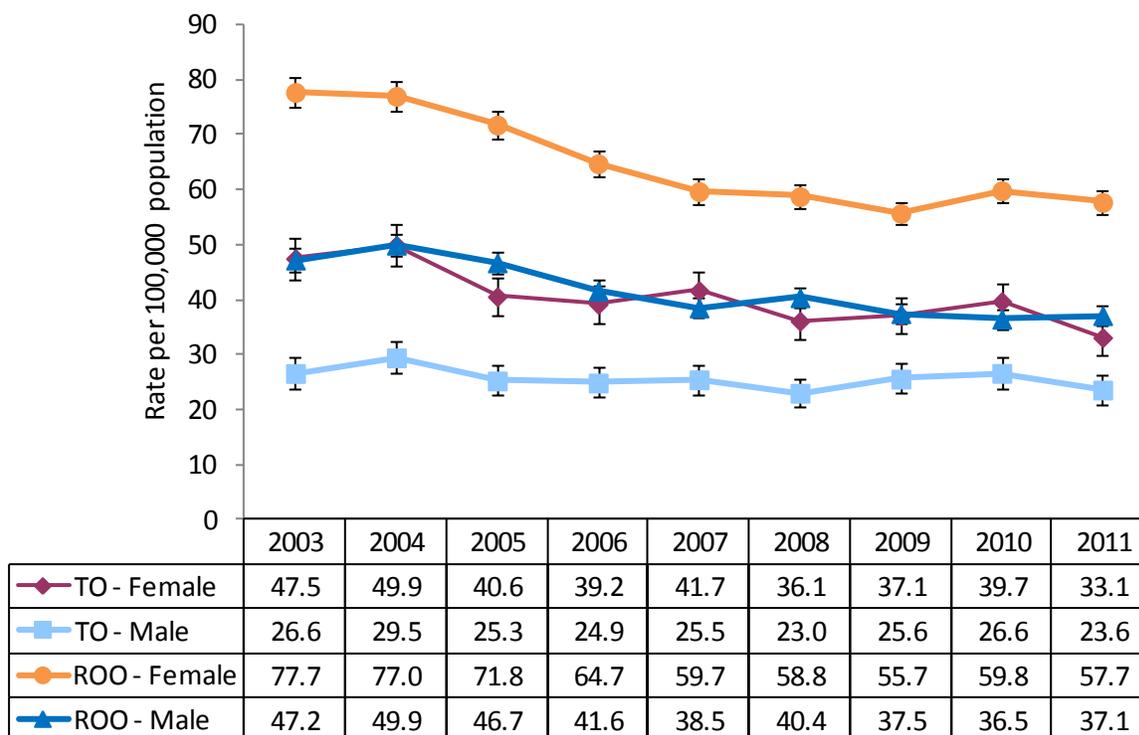
Notes: Data standardized to the 1991 Canadian population. Error bars (I) denoting 95% confidence intervals are hidden due to the scale of the graph and the precision of the estimates.

Data Source: National Ambulatory Care Reporting System 2003-2011, Ontario Ministry of Health and Long-Term Care, IntelliHEALTH ONTARIO, Date Extracted: March 2013.

The age-standardized hospitalization rate for intentional self-harm in Toronto has declined by 24% from 37.0 hospitalizations per 100,000 population in 2003 to 28.3 hospitalizations per 100,000 population in 2011. (Figure 6.) Age-standardized hospitalization rates in the rest of Ontario show a similar trend and declined by 23% over the same time period, from 64.5 hospitalizations per 100,000 population in 2003 to 49.6 hospitalizations per 100,000 population in 2011. The decline in hospitalization rates for intentional self-harm may reflect changes in the number or severity of presentations, admission criteria (i.e. pressure on existing scarce beds means threshold for admission is high), or attitudes towards self-harm (i.e. guidance provided to clinicians around the decision to admit).

Hospitalization rates remained significantly lower in Toronto compared to the rest of Ontario. In 2011, the hospitalization rate in the rest of Ontario was 1.8 times the Toronto rate. This may reflect differences in health care availability (i.e. more access to out-of-hospital or community supports in urban centres such as Toronto). Another possible explanation is that the burden of self-harm may be higher outside of Toronto, due to higher number of persons with known risk factors (e.g. Aboriginal status, substance abuse, exposure to violence).

**Figure 7: Age-Standardized Hospitalization Rates from Intentional Self-Harm per 100,000 Population by Sex, Toronto and Rest of Ontario, 2003-2011**



Notes: Data standardized to the 1991 Canadian population. Error bars (I) denote 95% confidence intervals. TO: Toronto, ROO: Rest of Ontario.

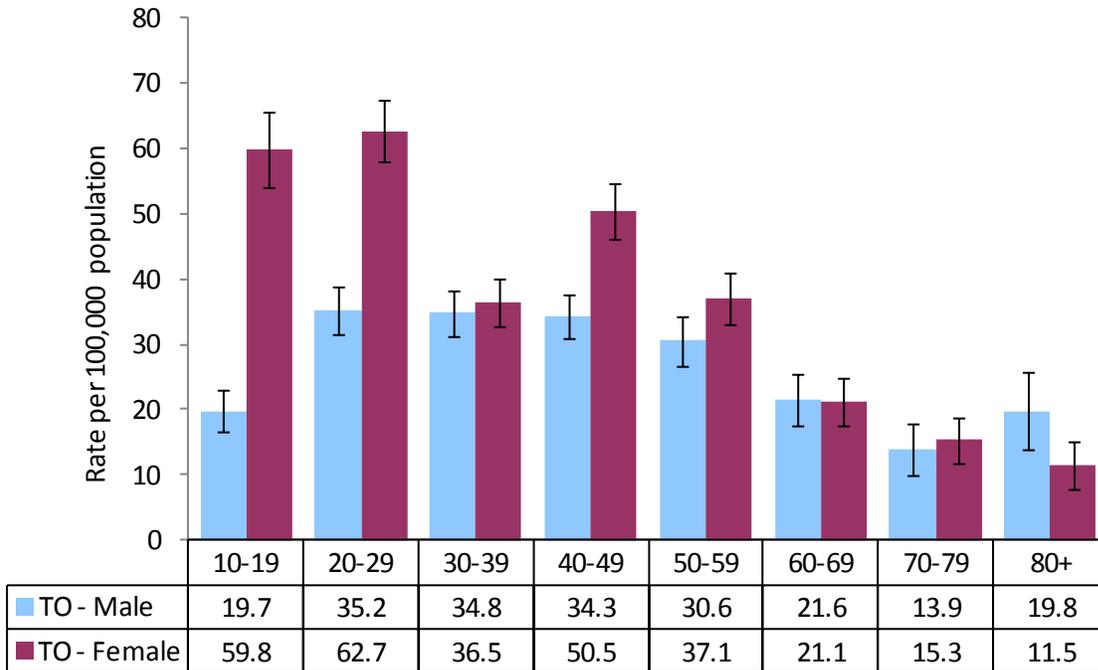
Data Source: National Ambulatory Care Reporting System 2003-2011, Ontario Ministry of Health and Long-Term Care, IntelliHEALTH ONTARIO, Date Extracted: March 2013.

Age-standardized hospitalization rates for males and females remained consistently lower in Toronto compared to the rest of Ontario. (Figure 7).

Hospitalization rates for females in Toronto and the rest of Ontario decreased at similar rates between 2003 and 2011, 30% and 26%, respectively. In 2011, the hospitalization rate for females in the rest of Ontario was 1.7 times that for females in Toronto. One possible explanation is that better management of depression in primary care settings may be associated with reductions in hospitalization rates in females.

The age-standardized hospitalization rates for males in Toronto decreased by 11% between 2003 and 2011, whereas hospitalization rates for males in the rest of Ontario decreased by 21% during the same time period. In 2011, the hospitalization rate for males in the rest of Ontario was 1.6 times that for males in Toronto.

**Figure 8: Age-Specific Hospitalization Rates from Intentional Self-Harm per 100,000 Population by Sex, Toronto, 2007-2011 (combined)**



Notes: Error bars (I) denote 95% confidence intervals. TO: Toronto.

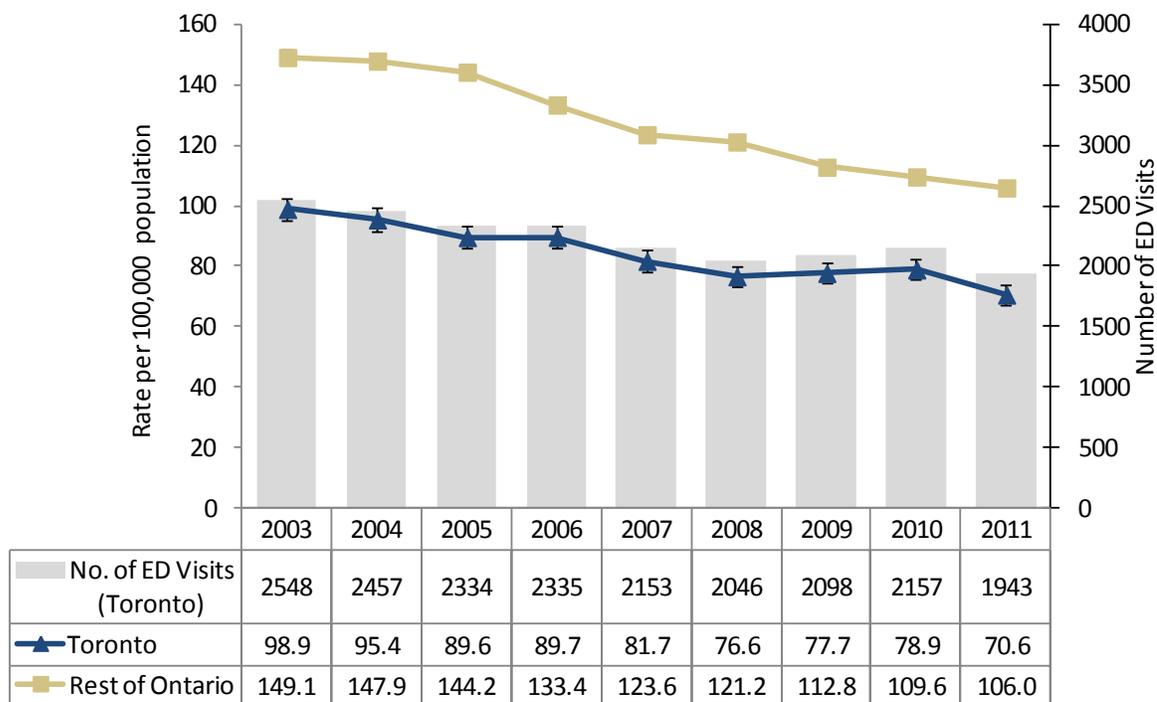
Data Source: National Ambulatory Care Reporting System 2007-2011, Ontario Ministry of Health and Long-Term Care, IntelliHEALTH ONTARIO, Date Extracted: March 2013.

Age-specific hospitalization rates (2007-2011 combined) from intentional self-harm in Toronto were significantly higher among females compared to males for the following age groups: 10-19 (59.8 vs. 19.7 hospitalizations per 100,000 population), 20-29 (62.7 vs. 35.2 hospitalizations per 100,000 population) and 40-49 (50.5 vs. 34.3 hospitalizations per 100,000 population). (Figure 8).

Possible explanations for differences in hospitalization rates by age and sex include different risk factors for segments of the population (e.g. alcohol use increasing for girls and decreasing for boys).<sup>100</sup>

## Emergency Department Visits

**Figure 9: Age-Standardized Emergency Department Visit Rates from Intentional Self-Harm per 100,000 Population, Toronto and Rest of Ontario, 2003-2011**



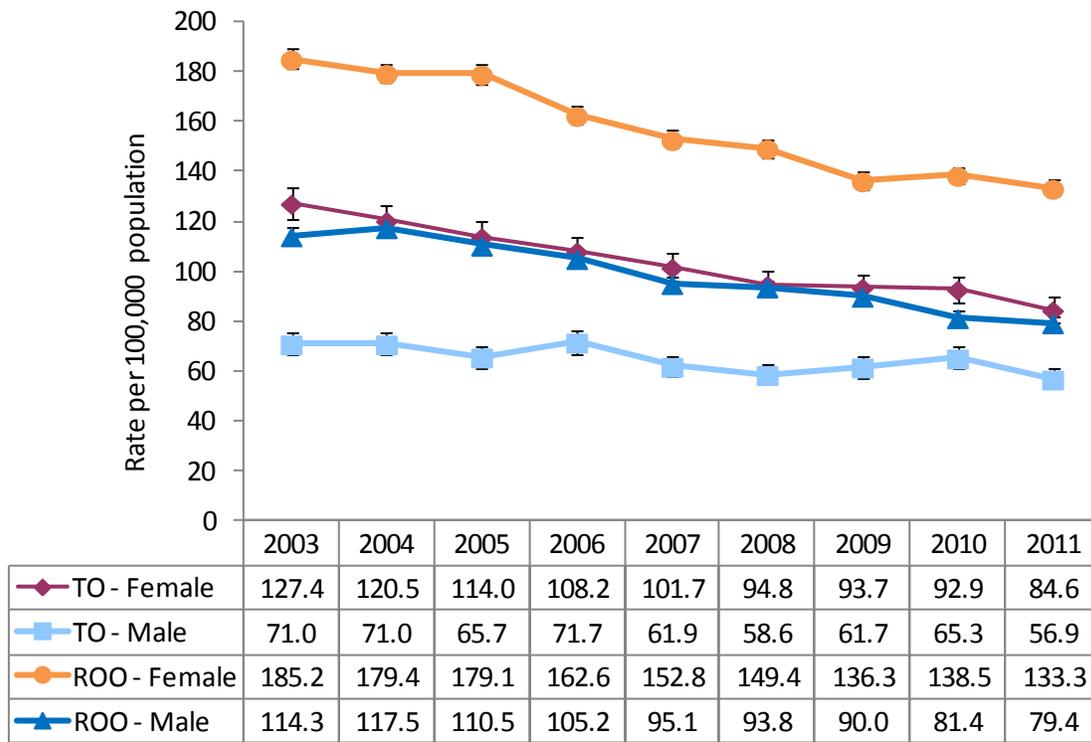
Notes: Data standardized to the 1991 Canadian population. Error bars (I) denoting 95% confidence intervals are hidden due to the scale of the graph and the precision of the estimates.

Data Source: National Ambulatory Care Reporting System 2003-2011, Ontario Ministry of Health and Long-Term Care, IntelliHEALTH ONTARIO, Date Extracted: March 2013.

Age-standardized emergency department (ED) visit rates from intentional self-harm in Toronto decreased by 28% from 98.9 visits per 100,000 population in 2003 to 70.6 visits per 100,000 population in 2011. (Figure 9). A similar decline in age-standardized ED visit rates occurred in the rest of Ontario, where rates declined by 29%, from 149.1 visits per 100,000 population in 2003 to 106.0 visits per 100,000 population in 2011. From 2003-2011, the ED visit rate in the rest of Ontario was significantly higher, around 1.5 times the rate of Toronto.

The data shows that hospitalizations and ED visits for intentional self-harm are both decreasing, suggesting that the proportion of admissions has remained relatively constant over time. One possible interpretation of these data is that fewer people are presenting to the ED. However, an important limitation of the self-harm data is that ICD-10 classifications do not separate self-harm for the purposes of self-injury, and self-harm for the purpose of suicide. Thus, although the data suggests that fewer people are presenting to the ED, it is unclear whether these trends differ for those with suicidal intentions, compared to those who do not.<sup>101</sup>

**Figure 10: Age-Standardized Emergency Department Visit Rates from Intentional Self-Harm per 100,000 Population by Sex, Toronto and Rest of Ontario, 2003-011**



Notes: Data standardized to the 1991 Canadian population. Error bars (I) denoting 95% confidence intervals are hidden due to the scale of the graph and the precision of the estimates.

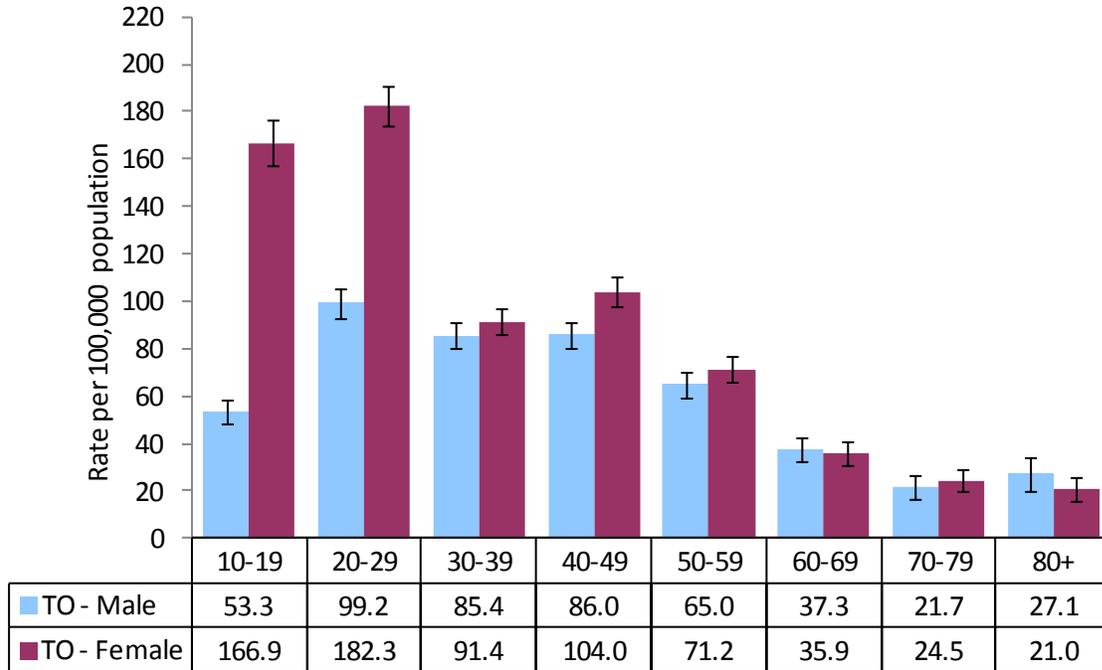
Data Source: National Ambulatory Care Reporting System 2003-2011, Ontario Ministry of Health and Long-Term Care, IntelliHEALTH ONTARIO, Date Extracted: March 2013

Age-standardized ED visit rates declined from 2003 to 2011 for females and males in both Toronto and the rest of Ontario. ED visit rates for females and males were significantly lower in Toronto compared to the rest of Ontario from 2003 to 2011. Females in the rest of Ontario had the highest ED visit rates. (Figure 10).

ED visit rates for females in Toronto declined by 34%, from 127.4 visits per 100,000 population in 2003 to 84.6 visits per 100,000 population in 2011, whereas ED visit rates for females in the rest of Ontario declined by 28%, from 185.2 visits per 100,000 population in 2003 to 133.3 visits per 100,000 population in 2011. In 2011, the ED visit rate for females in the rest of Ontario was 1.6 times that for females in Toronto.

ED visit rates for males in Toronto declined by 20% from 71.0 visits per 100,000 population in 2003 to 56.9 visits per 100,000 population in 2011, whereas ED visit rates declined by 31% among males in the rest of Ontario, from 114.3 visits per 100,000 population in 2003 to 79.4 visits per 100,000 population in 2011. In 2011, the ED visit rate for males in the rest of Ontario was 1.4 times that for males in Toronto.

**Figure 11: Age-Specific Emergency Department Rates from Intentional Self-Harm per 100,000 Population by Sex, Toronto, 2007-2011 (combined)**



Notes: Error bars (I) denote 95% confidence intervals.

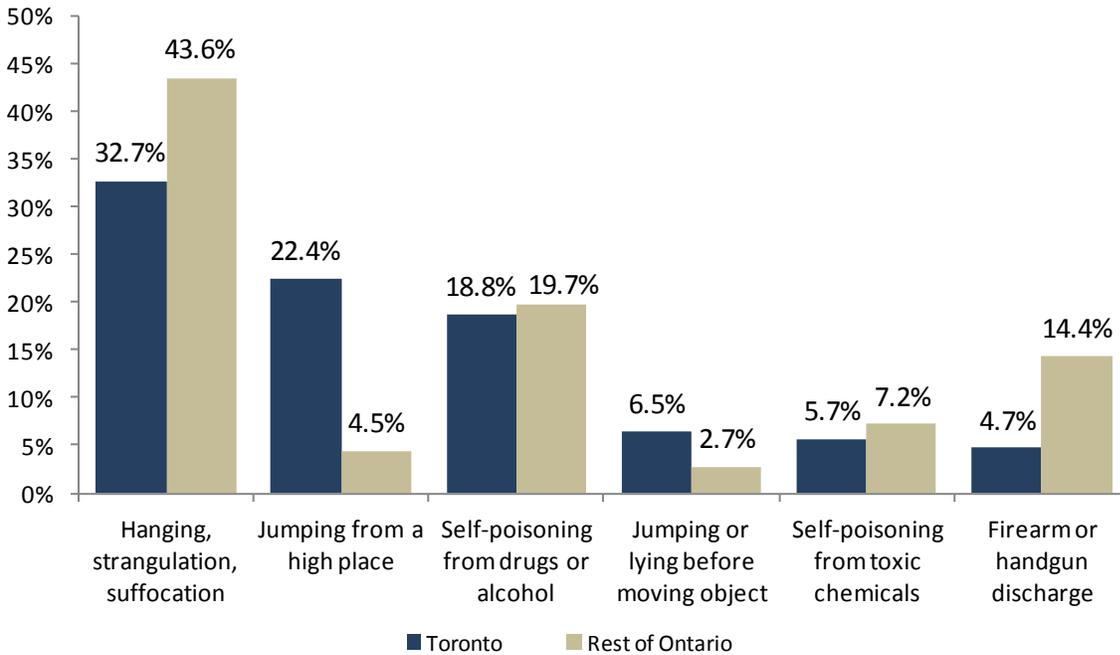
Data Source: National Ambulatory Care Reporting System 2007-2011, Ontario Ministry of Health and Long-Term Care, IntelliHEALTH ONTARIO, Date Extracted: March 2013.

In Toronto, females aged 10-19, 20-29 and 40-49 had significantly higher age-specific ED visit rates from intentional self-harm compared to males. (Figure 11). ED visits among females and males peak among 20-29 year olds, 182.3 and 99.2 visits per 100,000 population, respectively.

### 3.3 Mechanisms of Injury and Death

#### *Mechanism of Injury - Mortality*

**Figure 12: Mechanism of Injury – Deaths by Suicide, Toronto and Rest of Ontario, 2005-2009 (combined)**

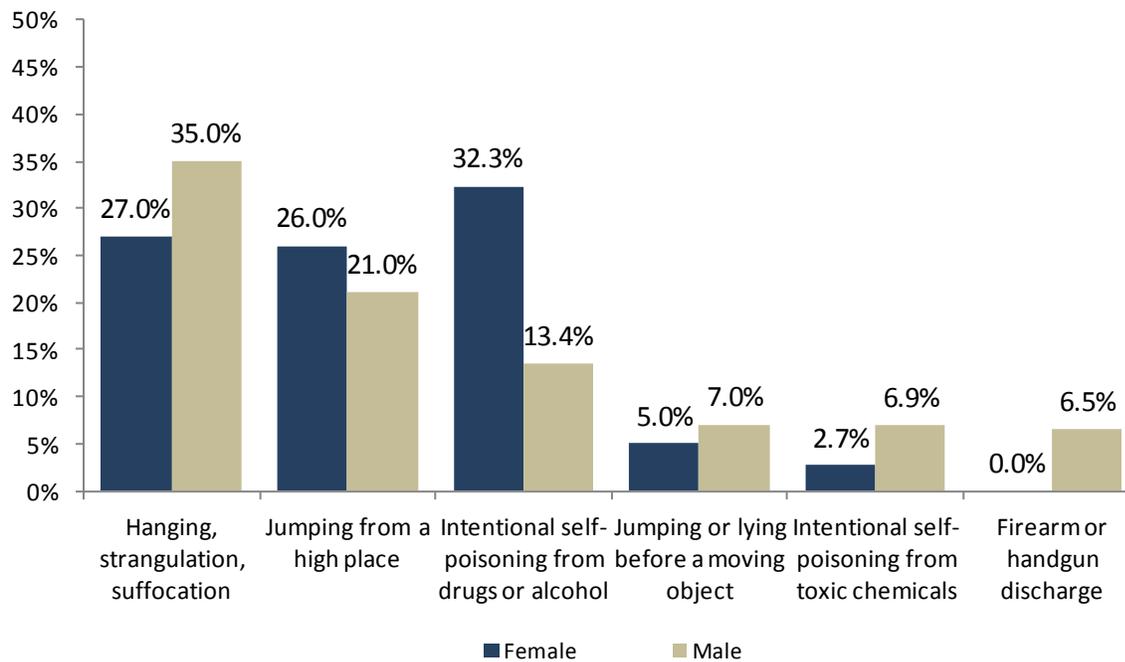


Data Source: Vital Statistics 2005-2009, Ontario Ministry of Health and Long-Term Care, IntelliHEALTH ONTARIO, Date Extracted: March 2013.

The most common mechanisms of suicide in Toronto from 2005-2009 were hanging, strangulation or suffocation (32.7%), jumping from a high place (22.4%) and self-poisoning from drugs or alcohol (18.8%). (Figure 12).

Mechanism of death appears to be related to access, as the pattern in the data for Toronto compared to the rest of Ontario substantiates differential access to means. Toronto residents were more likely than residents in the rest of Ontario to die by jumping from a high place (22.4% vs. 4.5%, respectively) or jumping or lying before a moving object (6.5% vs. 2.7%, respectively) and were less likely to die by hanging, strangulation or suffocation (32.7% vs. 43.6%, respectively) or by firearm or handgun discharge (4.7% vs. 14.4%, respectively).

**Figure 13: Mechanism of Injury – Deaths by Suicide by Sex, Toronto, 2005-2009 (combined)**



Data Source: Vital Statistics 2005-2009, Ontario Ministry of Health and Long-Term Care, IntelliHEALTH ONTARIO, Date Extracted: March 2013.

Females in Toronto were more likely than males to die by intentional self-poisoning from drugs or alcohol (32.3% vs. 13.4%) and jumping from a high place (26.0% vs. 21.0%) and were less likely than males to die by hanging, strangulation or suffocation (27.0% vs. 35.0%), intentional self-poisoning from toxic chemicals (2.7% vs. 6.9%) and firearm or handgun discharge (0% vs. 6.5%). (Figure 13).

***Mechanism of Injury – Hospitalization and Emergency Department Visits***

Unlike deaths, ED visits and hospitalizations from intentional self-harm are not assigned a primary cause of injury. Unless otherwise specified, we analyzed the unique number of ED visits and hospitalizations. This means there could be multiple diagnoses or classifications of injury for each visit or hospitalization. For example, a person could be admitted to the hospital with an injury from a sharp object and self-intentional poisoning from toxic chemicals. This would be recorded as one unique hospitalization with two diagnoses. Thus, percentages for the mechanisms of injury for hospitalizations and ED visits do not add up to 100%.

***Hospitalizations***

Intentional self-poisoning from drugs or alcohol was involved in the majority (94.7%) of intentional self-harm hospitalizations in Toronto from 2007-2011, followed by sharp or blunt object (12.2%) and intentional self-poisoning from toxic chemicals (5.0%).

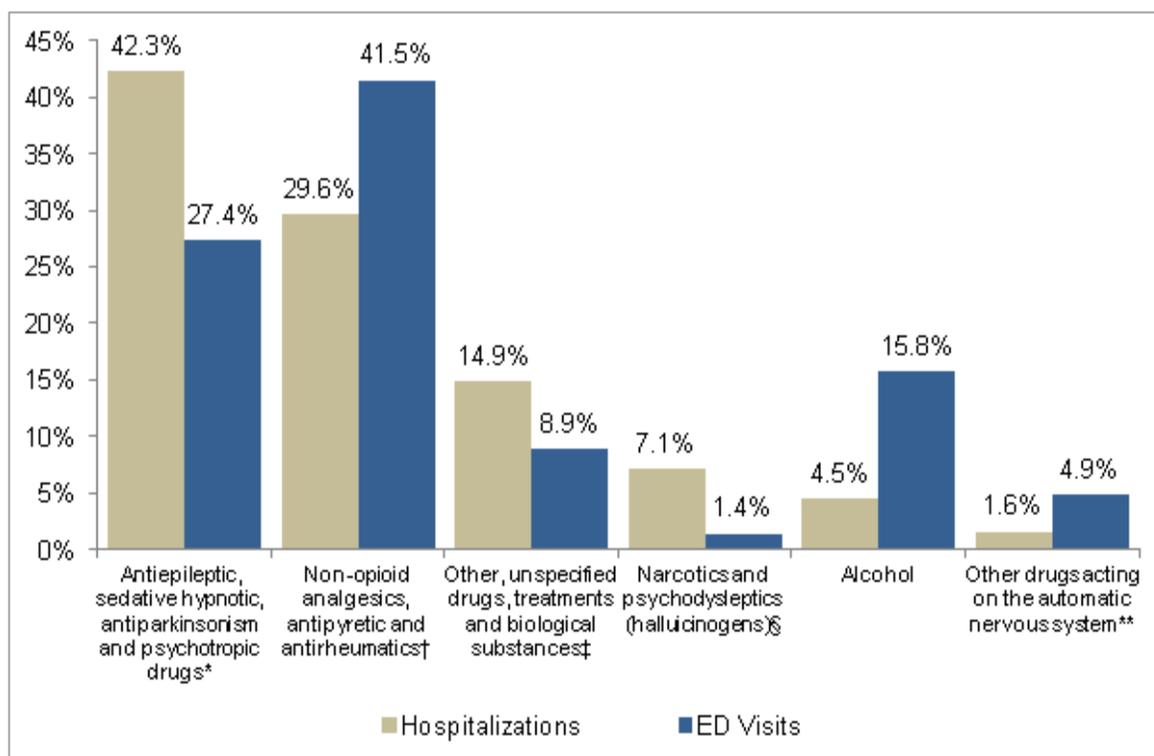
### Emergency Department Visits

The majority of ED visits for intentional self-harm in Toronto from 2007-2011 involved intentional self-poisoning from drugs or alcohol (85.3%), followed by injuries caused by a sharp or blunt object (17.3%) and intentional self-poisoning from toxic chemicals (5.1%).

Similar mechanisms were seen by sex and for the rest of Ontario for hospitalizations and ED visits from intentional self-harm.

Figure 14 provides a more detailed description of the non-fatal cases of intentional poisoning in Toronto. The majority of intentional poisoning diagnoses from ED visits and hospitalizations from 2007-2011 involved non-opioid analgesics, antipyretics and antirheumatics or antiepileptic, sedative hypnotic, anti-parkinsonism and psychotropic drugs.

**Figure 14: Emergency Department Visits and Hospitalizations for Self-Inflicted Poisoning, Toronto, 2007-2011 combined**



\*These include antidepressants and anti-anxiety medications, antipsychotics, amphetamines, and tranquilizers

†These include common painkillers (acetaminophen, ASA, Naproxin, Ibuprofen), and other nonsteroidal anti-inflammatory drugs

‡These include Diazepam (Valium), Benzodiazepine, blood pressure medications, Epinephrine, antibiotics, and many other unspecified drugs or substances

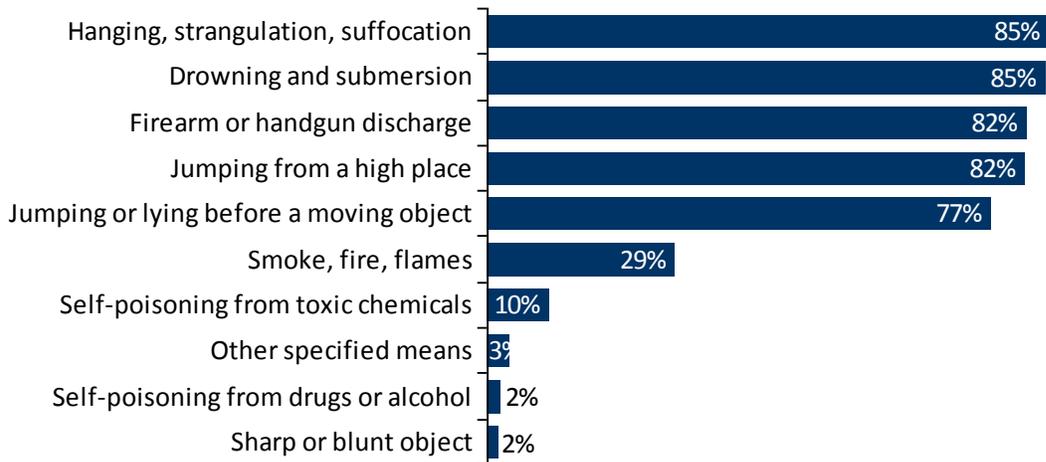
§These include codeine, heroin, LSD, methadone, morphine, opium and other street drugs

\*\*These include trazadone, beta blockers (e.g. atenolol, bisoprolol, metoprolol), Dextromethorphan, Dimenhydrinate (Gravol) and Diphenhydramine (Benadryl)

Data Source: National Ambulatory Care Reporting System 2007-2011, Ontario Ministry of Health and Long-Term Care, IntelliHEALTH ONTARIO, Date Extracted: March 2013.

### Case Fatality Rates

**Figure 15: Case Fatality Rates, Toronto, 2005 to 2009 combined**

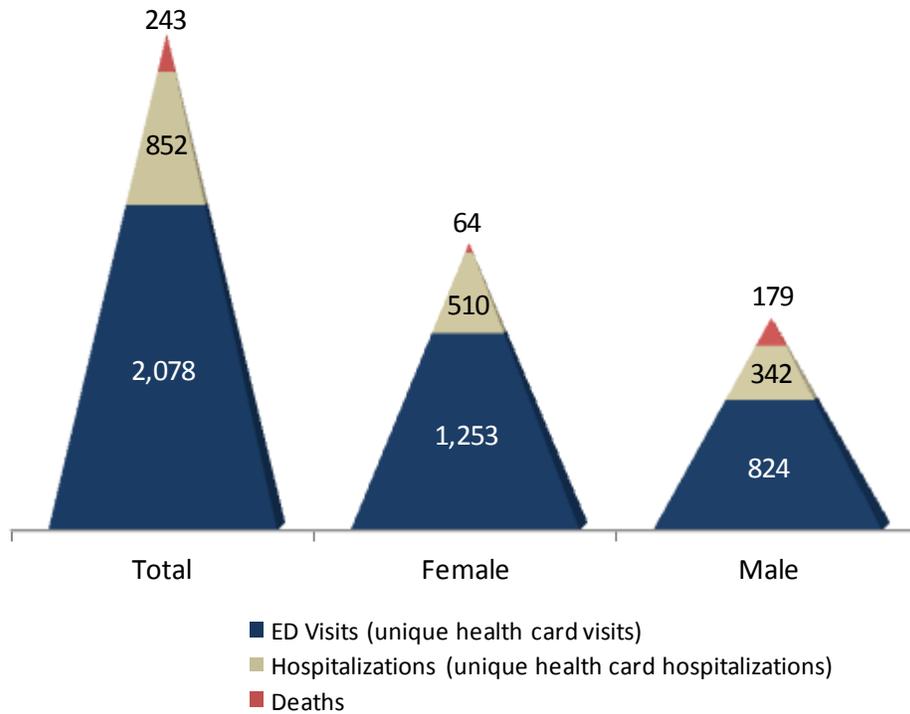


Data sources: Vital Statistics 2005-2009 and National Ambulatory Care Reporting System 2005-2009, Ontario Ministry of Health and Long-Term Care, IntelliHEALTH ONTARIO, Date Extracted: March 2013.

Case fatality rates are used to describe the lethality of each method of self-harm described above. (Figure 15). The calculations compare the number of persons who died using each self-harm method to the number of persons who presented to the ED with intentional injuries from the same self-harm method. A limitation of the case fatality rates shown above is that they do not include people who did not seek medical treatment for their injuries, and people who sought medical treatment in places other than hospitals in Toronto. Therefore, some of the case fatality rates shown above may be over-estimates.

### 3.4 Injury Pyramid

**Figure 16: Injury Pyramids by Sex, Toronto, 2009**



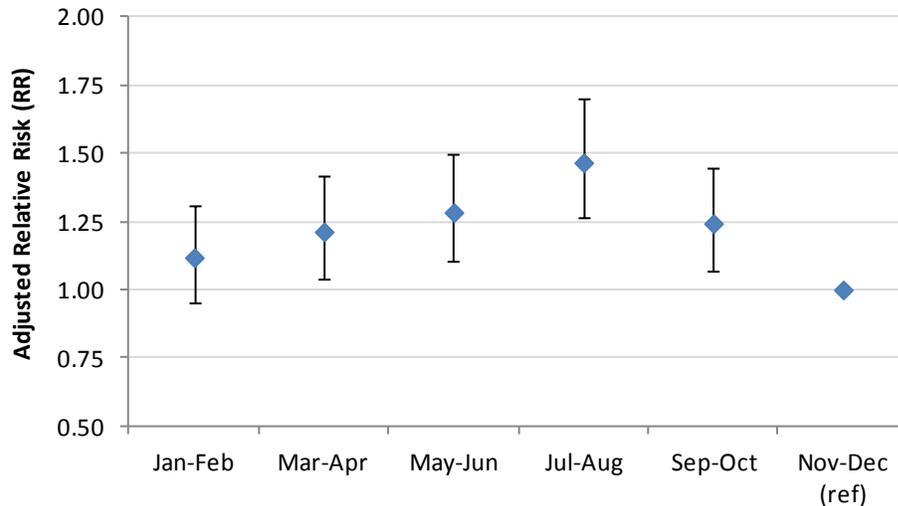
Data Sources: Deaths - Vital Statistics 2009, Hospitalizations and ED Visits – NACRS 2009, Ontario Ministry of Health and Long-Term Care, IntelliHEALTH ONTARIO. Date Extracted: July 2013.

The injury pyramid summarizes the number of ED visits by unique health card number, hospitalizations by unique health card number and deaths attributed to suicide or intentional self-harm in Toronto. As seen in the previous sections, ED visit and hospitalization rates from intentional self-harm were generally higher among females compared to males, whereas suicide mortality rates were higher among males compared to females. These findings result in a taller pyramid for females characterized by a larger base and second tier of non-fatal injury. The injury pyramid for males is shorter with a larger top tier of deaths. (Figure 16).

In Toronto, for every death by suicide, there are four people hospitalized and nine people visit an ED for intentional self-harm. Among females, for every death by suicide, eight people are hospitalized and 20 people visit an ED for intentional self-harm. Among males, for every death by suicide, two people are hospitalized and five people visit an ED for intentional self-harm.

### 3.5 Seasonality

Figure 17: Risk of Death by Suicide in Toronto, 2000-2009 combined



Notes: Adjusted for Nature of Suicide, Sex and Age group. Error bars (I) denote 95% confidence intervals.

There is a seasonal trend in suicide in Toronto. (Figure 17). The greatest risk of suicide occurred in July and August, with nearly 1.5 times the risk of suicide than in November and December. Relative risk compares the risk of a health event (disease, injury, risk factor, or death) among one group with the risk among another group. It does so by dividing the risk in group 1 by the risk in group 2.

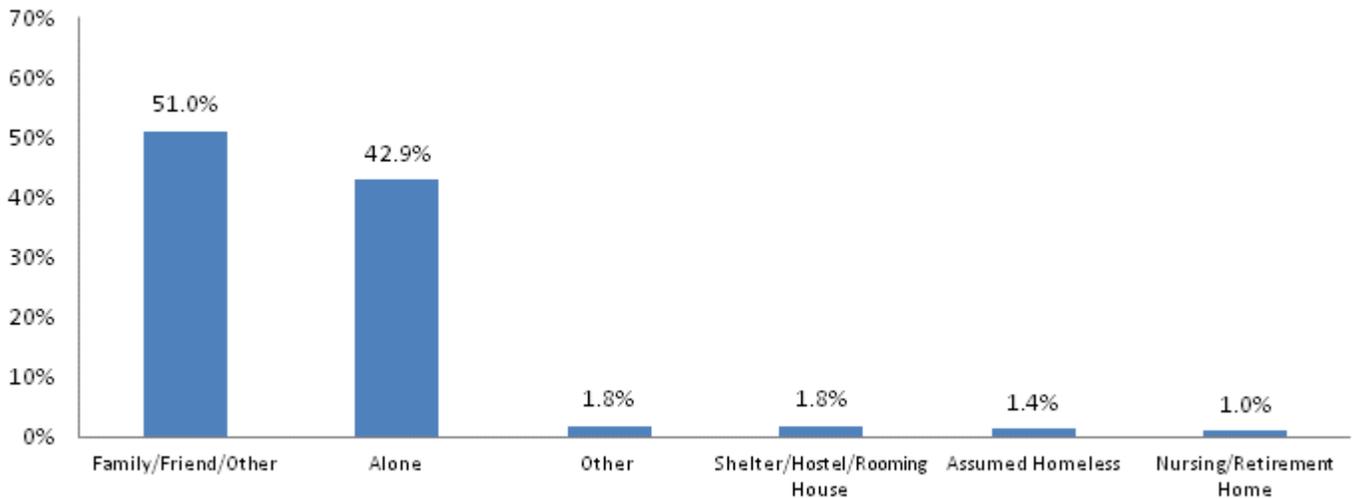
Seasonal trends in suicide in Toronto vary by sex, nature of suicide and age. There was greater variation in suicide risk according to age and sex when compared to variation by season.

There are several explanations for the seasonal trend in suicide.<sup>102,103</sup> Theories on the seasonal trend in suicide have suggested that there may be an activating potential associated with sunlight or temperature that may increase suicide risk. Other studies have explained the findings through the 'broken-promises effect', where things seem to be getting better for everyone in the summer and a sense of expectancy is elevated, so that when an individual is not feeling better, they may feel defeated and suicide is seen as an option.

### 3.6 Coroner's Data

Researchers at Sunnybrook Research Institute conducted analysis of suicides in Toronto through the Toronto Analysis of Suicide for Knowledge and Prevention (TASK-P) Study. They have extracted data from the Office of the Chief Coroner of Ontario records on all deaths by suicide in Toronto from 1998 to 2011.

**Figure 18: Living Situation at Time of Death for Suicide Deaths in Toronto, 1998-2011, All Cases**

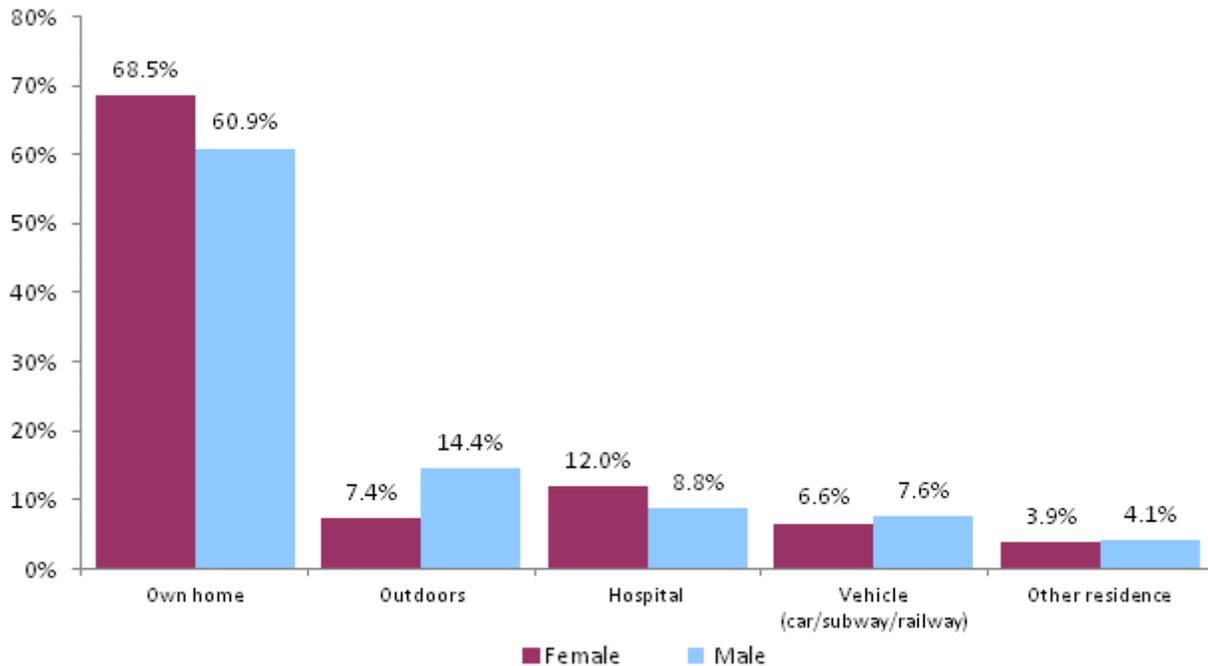


Notes: 0.2% of data missing or suppressed due to low cell counts; sex breakdown not provided due to low cell counts.  
Data source: Suicide Deaths 1998-2011, Office of the Chief Coroner for Ontario.

The most common living situation at time of death was living with a family, friend, or other person (51.0%), followed by living alone (42.9%). (Figure 18). This was consistent for all age groups and both sexes, with the exception of males between the ages of 45-64 and females 65+, who were more likely to live alone at the time of suicide. (Not shown - see Table 4 in Appendix C for a detailed breakdown of information by age and sex.)

Approximately 1.8% of individuals who died by suicide in Toronto were living in a shelter, hostel or rooming house and 1.4% of suicide cases were assumed homeless at the time of death. The number of homeless or under-housed individuals may be under-estimated due to the difficulty in ascertaining housing status from living situation (e.g. data does not provide information on 'hidden homelessness', such as the number of persons who may be under-housed but are temporarily staying at a friend or family member's house). Approximately 1.8% of suicide cases were in 'other' living situations at time of death, which included hotel(s), psychiatric ward/rehabilitation, correctional institution, group home/supportive housing/or other residence for people with mental illness.

**Figure 19: Most Common Location of Death for Suicide Deaths in Toronto, 1998-2011, by Sex, Ages 10-64 Years**

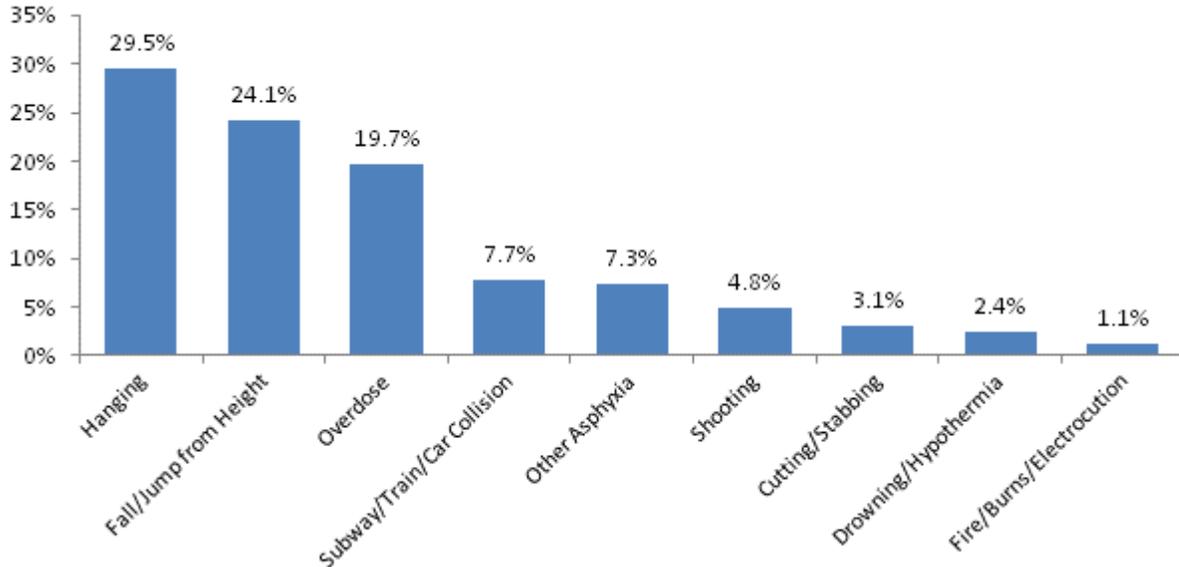


Notes: Ages 65+ not included due to low cell counts. Values less than 1% are not shown; these include "Work" and "Other". Location of death for 1.2% of female deaths and 3.0% of male deaths is missing or suppressed. †Values are slightly underestimated in the "Other residence" category as the sex breakdown for 10-24 was unavailable due to low cell counts  
 Data source: Suicide Deaths 1998-2011, Office of the Chief Coroner for Ontario.

A large majority of suicide deaths occurred at the individual's home; this was the most frequent location of death across all age groups and both sexes, but was slightly more common overall in females (68.5%) than males (60.9%). Males were more than twice as likely to die outdoors than females (14.4% of males compared to 7.4% of females). (Figure 19).

Vehicle (car, subway or railway) was a more common location of death in the 10-24 age group (13.0%) than any other age group. For persons 65+, hospital was the second most common location of death (14.5% of suicide deaths). (Not shown - see Table 4 in Appendix C for a detailed breakdown of information by age and sex.)

**Figure 20: Means of Death for Suicide Deaths in Toronto, 1998-2011, All Cases**



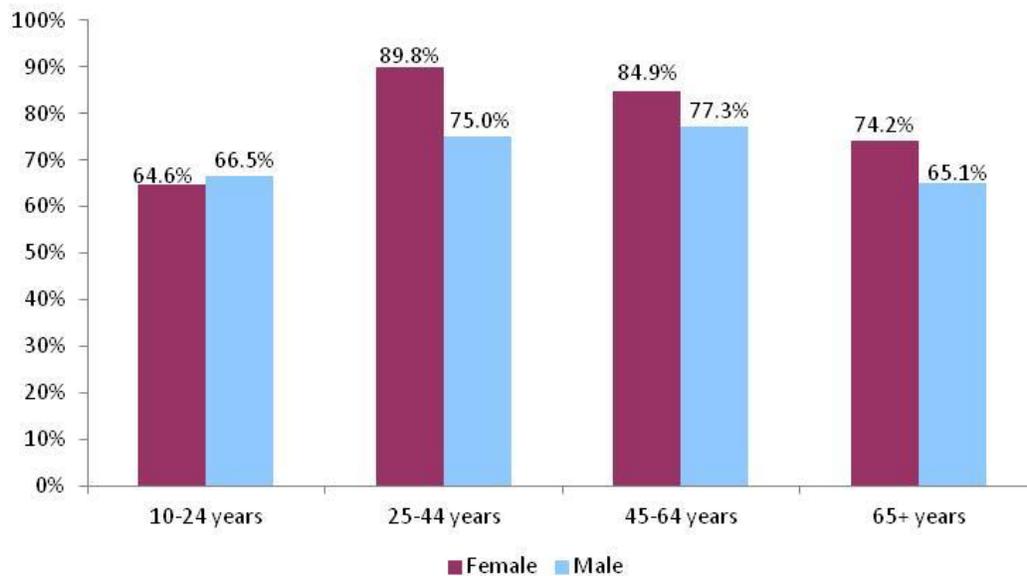
Notes: 0.4% of data missing or suppressed due to low cell counts; sex breakdown not provided due to low cell counts.  
Data source: Suicide Deaths 1998-2011, Office of the Chief Coroner for Ontario.

Coroner's data shows similar but slightly different results on mechanisms of injury and death compared to the Vital Statistics/Intellihealth data presented in Section 3.3. The datasets differ slightly because of classification methods used (i.e. Intellihealth data was classified according to ICD-10 codes, and the Coroner's data was classified using codes derived from a detailed review of Office of the Chief Coroner records.) The Coroner's data provides more detailed information on method used, while the Intellihealth data allows comparability of methods between Toronto and the rest of Ontario.

The five most common methods of death by suicide overall were hanging (29.5% of deaths), fall/jump from a high place (24.1% of deaths), self-poisoning from drugs or alcohol (19.7% of deaths), subway, train or car collision (7.7% of deaths) and other/non-hanging asphyxia (7.3% of deaths). (Figure 20). Non-hanging asphyxia includes airway obstruction, environmental/anoxic environment, and CO/vehicle exhaust/furnace fumes (i.e. helium, charcoal, etc).

The most common method of death by suicide for males was hanging, and for females was self-poisoning from drugs or alcohol. (Not shown - see Table 4 in Appendix C for a detailed breakdown of information by age and gender.) For both sexes, the second most common cause of death was fall or jump from a high place.

**Figure 21: Identified History of Mental Illness in Suicide Deaths in Toronto, 1998-2011, by Sex and Age Group**

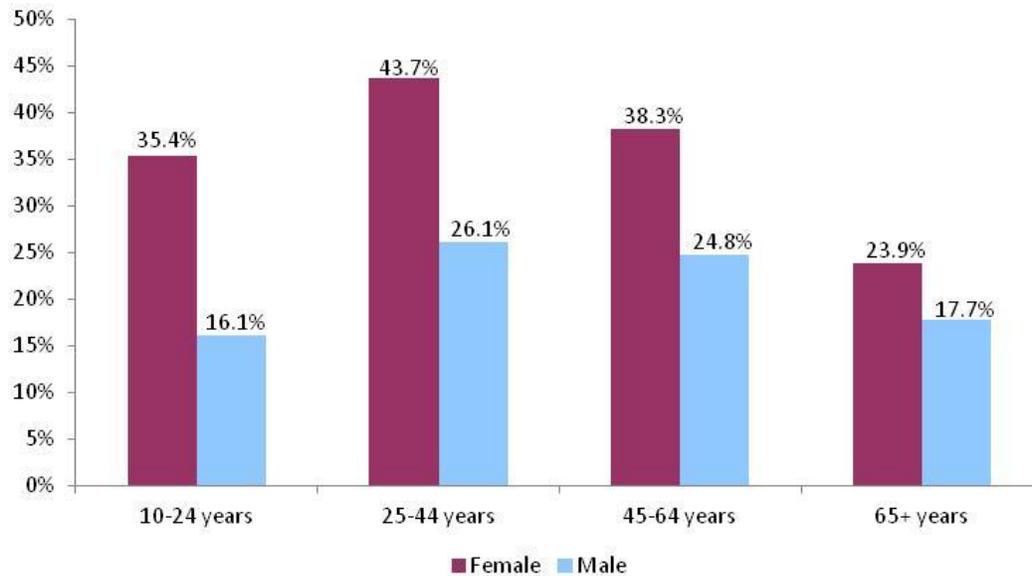


Notes: Data is based on available information from coroner's file and may be underestimated.  
Data source: Suicide Deaths 1998-2011, Office of the Chief Coroner for Ontario.

In total, 76.1% of individuals who died by suicide had an identified history of mental illness (83.0% of females and 73.3% of males). As shown in Figure 21, females were slightly more likely than males to have a history of mental illness in all age groups, with the exception of the 10-24 year age group, where the likelihood of history of mental illness is roughly equal. (See Table 5 in Appendix C.)

Given the robust literature showing that at least 90% of people who died from suicide suffered from a mental illness,<sup>14</sup> it is likely that many cases of mental illness went undetected.

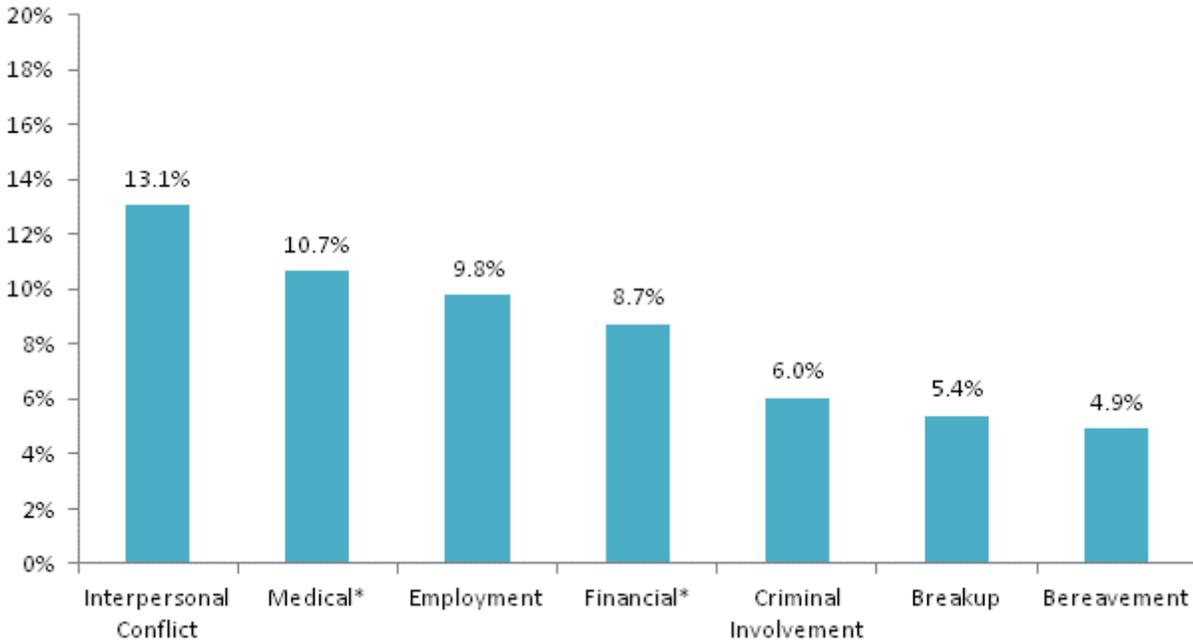
**Figure 22: Previous Suicide Attempt in Suicide Deaths in Toronto, 1998-2011, by Sex and Age Group**



Notes: Data is based on available information from coroner's file and may be underestimated.  
Data source: Suicide Deaths 1998-2011, Office of the Chief Coroner for Ontario.

Approximately one in four persons (27.4%) who died from suicide were identified as having attempted suicide previously. As shown in Figure 22, all age groups showed a greater proportion of females with a previous suicide attempt than males. In total, 37.5% of females and 23.2% percent of males who died from suicide had a previous suicide attempt. (See Table 5 in Appendix C.)

**Figure 23: Stressors Present in the One-Year Period Before Suicide Death in Toronto, 1998-2011, All Cases**



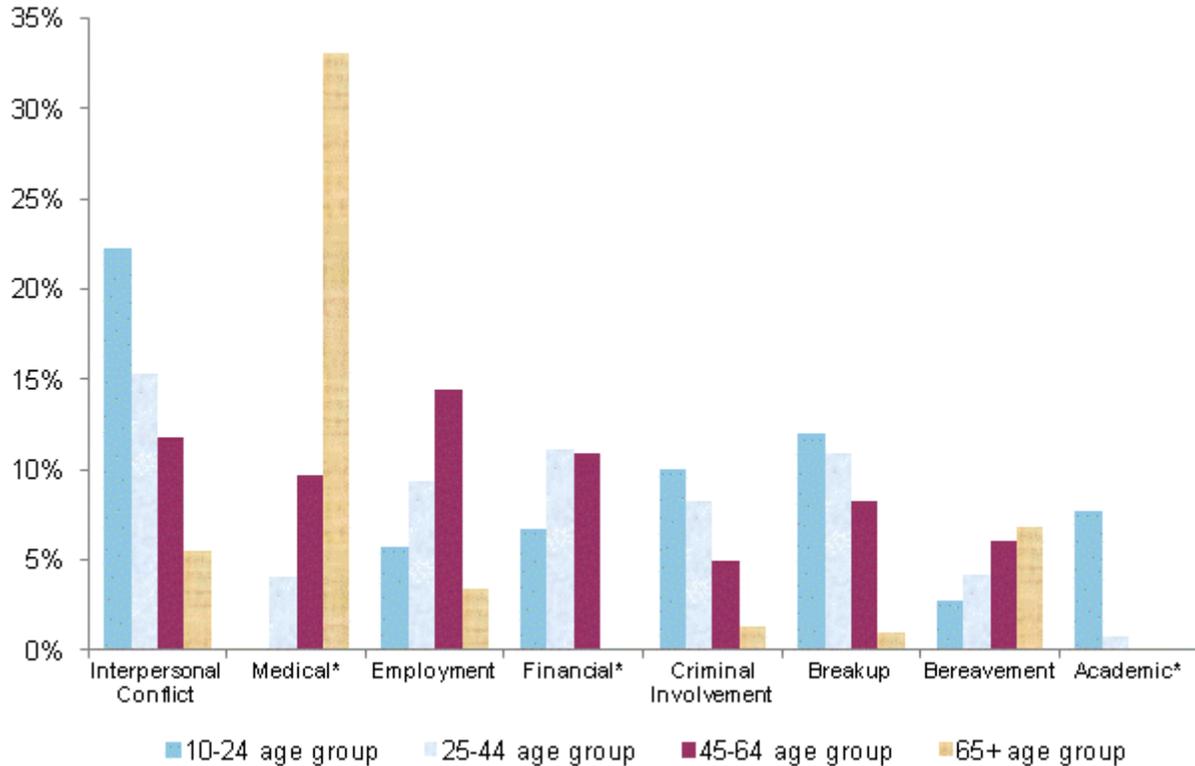
Notes: \*Totals are slight underestimates as some age groups were suppressed due to low cell counts. Sex breakdown not provided due to low cell counts.

Data is based on available information from coroner's file and may be underestimated.

Data source: Suicide Deaths 1998-2011, Office of the Chief Coroner for Ontario.

The top three most frequently noted stressors present in the one-year period before suicide death in Toronto were interpersonal conflict (13.1%), medical (10.7%), and employment (9.8%). (Figure 23). Interpersonal conflict consisted of perpetrator or victim of physical violence or sexual assault, threatening, custody involvement/dispute, separation from family member/family member leaving, or Children's Aid Society care/intervention; medical consisted of a recent medical health stressor; and employment consisted of recent job loss/unemployment or job issue/stress.

**Figure 24: Stressors Present in the One-Year Period Before Suicide Death in Toronto, 1998-2011, by Age Group**



Notes: \*Categories were suppressed for some age groups due to low cell counts. Sex breakdown not provided due to low cell counts.

Data is based on available information from coroner's file and may be underestimated.

Data source: Suicide Deaths 1998-2011, Office of the Chief Coroner for Ontario.

Stressors present in the one-year period before suicide death in Toronto varied considerably by age group. (Figure 24). In the 65+ year age group, medical issues were the most frequent stressor, noted in 33.1% of cases. In the 45-64 year age group, employment was the most frequently noted stressor (14.4%), but was more commonly mentioned for males (16.0%) than females (10.5%). In the 10-24 and 25-44 year age groups, interpersonal conflict was the most frequently noted stressor (noted in 22.3% and 15.3% of cases, respectively). Interpersonal conflict was more frequently noted in females than males in these age groups (28.0% of females and 20.2% of males in the 10-24 year age group, and 17.1% of females and 14.6% of males in the 25-44 year age group). See Table 6 in Appendix C for a detailed breakdown of information by age and sex.

### 3.7 Analysis of Suicide Clusters

A recent study by Sinyor, Schaffer and Streiner (2014) used a cluster analysis technique to identify patterns of death-specific characteristics in Coroner's data.<sup>104</sup> Sinyor et al. (2014) examined data from people who died by suicide in Toronto from 1998-2010 (n=2886 suicide deaths; mean 222 deaths/year) and classified them into distinct subgroups based on their constellation of risk factors. The hypothesis was that those who die by suicide are a heterogeneous group in terms of demographic, clinical and death-specific characteristics, and that identifying subgroups of suicides has implications for understanding different risk profiles and developing targeted suicide prevention interventions.

Sinyor et al. (2014) identified the following clusters and potential points of intervention:<sup>104</sup>

- Cluster 1 was the smallest cluster (n = 304) It is characterized the by highest proportion of females of any cluster (42.4%) and a 100% rate of past attempts as well as depression, and the highest proportion of deaths at home (82.2%) and by non-violent means (43.1%) including self-poisoning (30.9%) and non-hanging asphyxia (12.2%).
- Cluster 2 (n = 488) was characterized by being the oldest (mean age 55.6 years; 31.6% aged 65 years and older), all married (100%), with the largest proportion of people having experienced any stressor (61.9%), particularly interpersonal conflict (18.6%), employment and (or) financial (20.5%), medical (25.0%), and immigration (4.5%) stressors. Few had past attempts (4.5%), and this cluster involved the highest proportion of violent suicide methods (81.6%), including the most hanging (36.1%) and firearm deaths (7.0%) and the least from self-poisoning (11.7%).
- Cluster 3 (n = 561) was characterized by a 100% rate of substance misuse, which was often co-morbid with depression (63.5%). It is the cluster with the highest proportion of males (80.0%) and includes the smallest proportion of adolescents or the elderly (92.5% between the ages of 20 and 64). It has the largest proportion of divorced or separated people (22.1%), people with employment and (or) financial (24.4%) and criminal legal stressors (12.8%), as well as bereavement (7.3%) and intimate partner breakup (14.1%).
- Cluster 4 (n = 584) was the youngest cluster (mean age 42.9 years; 69.7% less than 50 years). People in this cluster were nearly all unmarried (95.7%), with the fewest experiencing a stressor in the past year (32.4%), the second highest proportion of past attempts (45.2%), and the highest proportion suffering from bipolar disorder (BD) (20.9%), schizophrenia (26.9%), and any mental illness apart from depression (66.4%). This group had the largest amount of recent contact with a hospital or psychiatry (14.1%), and had the highest proportion of deaths outside the home (32.7%), by jumping from height (32.2%), and by subway or train collision (10.3%).
- Cluster 5 is the largest cluster (n = 949). No one in this cluster was married, and 9.2% were widowed. They had no past attempts, the lowest rates of any mental illness, the least recent contact with a hospital or psychiatry (2.7%), and were the most likely to leave a suicide note (35.0%).

## 4. EFFECTIVE INTERVENTIONS

There is a large body of research evidence on suicide prevention interventions. Interventions can vary greatly in scope, comprehensiveness of the components covered, implementation and evaluation, and ongoing monitoring activities. This report draws upon the evidence presented by McMaster Health Forum in *Evidence Brief: Preventing Suicide in Canada*,<sup>13</sup> and the recently completed update review of the literature, *Rapid Synthesis: Identifying Suicide-prevention Interventions*.<sup>5</sup> The results from these two reports provide a comprehensive overview of the known effectiveness of interventions evidence to prevent suicide.

### 4.1 Overview of different levels of suicide interventions

The broad range of suicide prevention and reduction efforts can be seen as a continuum of suicide interventions, ranging from prevention, to treatment, to maintenance.<sup>13,105</sup>

- *Prevention* refers to a wide range of interventions that aim to reduce the occurrence of suicide and suicide-related behaviors in the community;
- *Treatment* refers to targeting those individuals who are currently suffering from a diagnosable mental health disorder and are intended to reduce the effect or symptoms of the disorder;
- *Maintenance* refers to supportive, educational and/or pharmacological interventions that are provided on a long-term basis to individuals who have serious and persistent mental illness or mental health problems.

Given the public health focus of this report, only interventions within the prevention category were reviewed and included in this report. While TPH recognizes the importance of treatment and maintenance within a comprehensive suicide prevention approach, the focus on upstream and prevention interventions aligns more strongly with the mandate set out within the OPHS (2008). For more information on treatment and maintenance interventions, please refer to the systematic reviews detailed in Appendix 1 of the McMaster Evidence Brief.<sup>13</sup>

### 4.2 Preventive interventions

A public health approach to suicide prevention includes both universal interventions in the whole population and interventions targeted to key risk groups. Rose's Theorem makes the case for prioritizing universal interventions because a large number of people at small risk may give rise to more cases of disease than a small number who are at high risk.<sup>106,107</sup>

A model for understanding prevention interventions is the Universal, Selective and Indicated (USI) model, which breaks the targeted interventions down into selective and indicated interventions.<sup>105</sup> The USI model is a comprehensive way of categorizing prevention efforts according to defined populations, and consists of:

- *Universal* interventions designed to reach the whole population, without regard to population target groups or risk factors;
- *Selective* interventions are designed to focus on groups who have been identified as at high

risk for suicide-related behaviours; and

- *Indicated* interventions are designed for individuals showing signs of suicide-related behaviour.

The 2014 Rapid Synthesis of suicide prevention interventions by McMaster Health Forum found 96 systematic reviews covering suicide prevention across the domains: **universal** interventions (n=16), interventions targeted at **selective** populations (n=31) and interventions **indicated** for high risk individuals (n=24); as well as **treatment** interventions to treat suicidal persons (n=51) and **maintenance** interventions to maintain reductions in suicidality (n=3).<sup>5</sup> Few reviews are of high quality (n=18) with most being either medium (n=43) or low quality (n=35). The majority of reviews have been done in the last 5 years (since 2010), which may suggest growing interest in the topic of suicide prevention.<sup>5</sup> (See Table 7 in Appendix D for a summary of the quality and recency of included systematic reviews.)

### ***Universal interventions***

McMaster Health Forum's review found 16 systematic reviews related to universal interventions, including media reporting guidelines (n=3), means restrictions (n=12), national suicide prevention programs (n=1), public messaging (n=1), and other interventions (n=1).<sup>5</sup> These universal interventions were analyzed for benefits, harms and costs. (See Table 8 in Appendix D for a summary of key findings for universal interventions.)

Among the studies reviewed, media reporting guidelines was found to be an effective universal intervention.<sup>5</sup> Implementation of media reporting guidelines was associated with a "decrease in headline mentions of suicide, glorification or sensationalized text and headlines, detailed descriptions of suicidal acts, use of graphics, and references to celebrity status of victims" (p.9). Several studies reported a sharp reduction in death by suicide, though this influence varied by age and gender. The implementation of media reporting guidelines or integrated media strategies may be challenging, however, requiring time and resources to work with reporters and media staff for awareness-raising and training. It has been suggested that the media industry is most supportive of collaborative approaches which promote a balance between responsible reporting with how to talk about and reduce stigma about suicide and mental illness.

Another related area is how to restrict exposure to suicide content on the Internet, which may contribute to elevated risk for socially isolated and susceptible individuals. The issue of suicide on the Internet is relevant across age populations but may be particularly pertinent for youth and young adults, who are most vulnerable to social contagion. There is promising evidence to suggest effectiveness of Internet interventions, including online screening to identify at-risk individuals, providing help through web interventions, positive messages on Internet forums that encourage at-risk individuals to seek assistance, and offering interventions in response to individual's posts on social media.<sup>108</sup> This is a recent area of research and more evidence is needed to better understand the feasibility and implementation as well as potential harms.<sup>5</sup>

Evidence shows that means restriction is widely effective in reducing deaths by suicide.<sup>5</sup> This includes a range of built environment interventions, such as barriers on bridges and subway

systems, as well restrictions on alcohol purchasing (including tax and price regulations), pharmaceutical access (both over-the-counter and prescription-only) and pharmaceutical dispensing (limits on volume, requiring blister packaging).<sup>5</sup> Means restriction targets the entire population and provides a way of reaching many at-risk individuals who are not in contact with health care and social services. The effectiveness has been explained by the ability to avert impulsive suicide attempts, prevent access to specific methods or sites, or force people to substitute less lethal methods.<sup>72</sup> Some limitations to means restriction have been reported, such as possible substitution effects, where decreasing means-specific suicides may increase suicide by other means.<sup>5</sup> Evidence suggests that males may be particularly likely to substitute for alternate means. The literature on means restriction is a good example of what is known about suicide prevention in general. That is, that many interventions may result in an incremental reduction in suicide deaths but that a suicide prevention strategy must be multi-pronged and no specific intervention will be as effective on its own.

Several studies show promising results around the effectiveness of national suicide prevention programs to reduce suicide.<sup>5</sup> However, most studies have looked at intermediate- or process-outcomes and much remains unknown about the impact on suicide rates. The potential harms and risks associated with national suicide prevention programs are that not all sub-populations are affected equally, that the effect may return to pre-intervention levels when the intervention is withdrawn, and that programs do not always account for the local socio-economic and cultural context.

### *Selective interventions*

McMaster Health Forum identified 31 systematic reviews that evaluated selective interventions.<sup>5</sup> This included suicide-prevention centres (n=1), community-based suicide-prevention programs (n=8), school-based suicide-prevention programs (n=19), programs for veterans and military personnel (n=4), and drug misuse programs (n=1). No reviews were identified for prison-based or workplace-based program interventions. (See Table 9 in Appendix D for table of summary of selective interventions).

There is some evidence to support the effectiveness of community-based suicide-prevention programs.<sup>5</sup> Studies report that case management Community Mental Health Teams (CMHT) have positive effects on promoting greater acceptance of treatment, reducing hospitalization and deaths, and that CMHTs are a cost-effective suicide prevention strategy. Other health education and screening programs may also be effective, especially among older adults. Prevention initiatives such as gatekeeper training or culturally-tailored educational programs specifically geared for indigenous communities have been found effective in reducing suicide-related behaviour and may increase protective factors.

Implementing selective interventions in specific settings may be an effective prevention strategy. Programs that target student populations have been well-studied and supported by high quality reviews, and have generally been found to have positive effects.<sup>5</sup> Benefits include improving outcomes and attitudes, identifying at-risk individuals, and reducing suicide attempts; however, evidence is limited in the effectiveness of reducing the overall suicide rate. Long-term 'whole-school approaches' were found to be more successful than programs of shorter duration, though

individual psychotherapy may also be a promising practice in school settings. A potential harm is that school-based curricula on suicide prevention for adolescents were reported to have negative effects among males. The need for educating adolescents about mental health and suicide must be balanced by concerns about social contagion and presenting suicide-related behaviour as normative. One option is for school programs to cover the topic of suicide but to spend more time emphasizing how to promote mental health and seek treatment for mental illness in general.

### ***Indicated interventions***

The review found 24 systematic reviews evaluating indicated interventions, including training and peer education (n=11), providing assistance to general practitioners (n=4), providing assistance to family and friends of high-risk individuals (n=3), postvention (n=7), telephone-based services (n=5), mobile device prevention services (n=1).<sup>5</sup> (See Table 10 in Appendix D for table of summary of indicated interventions).

Indicated interventions may work by focusing on high-risk individuals and those who come in contact with them, in order to help people better understand suicide, recognize warning signs, and know how to intervene. There are some promising indicated interventions associated with gatekeeper training and peer education, including providing assistance to family and friends of high-risk individuals.<sup>5</sup> Training and education may be especially effective when targeted at individuals identified as having primary contact with those at risk of suicide. One study found that person-to-person interventions delivered to parents and caregivers were effective at reducing adolescent risk behaviours and result in improvements in overall adolescent health. There are also positive effects of telephone-based suicide prevention services.

Psycho-educational programs were found not to generally increase help-seeking behaviour in youth, and there is a caution that suicide prevention programs could enhance knowledge about suicide that may disturb high-risk youth and make them more prone to suicide-related behaviour, especially if there is a lack of access to care.<sup>5</sup> However, it has been suggested that programs may be beneficial if incorporated as part of multimodal interventions such as screening.

Interventions aimed at clinicians are an effective practice. Education for physicians in depression recognition, knowledge of treatment guidelines, and restricting access to lethal means are associated with a reduction in suicide rates.<sup>5</sup> There is a debate about whether suicidal ideation should be universally screened at general physician visits, and whether there is a need for ongoing and universal surveillance of suicidal ideation even in people who appear at low risk.<sup>104</sup> Some suggest that the focus should instead be on identifying and intervening in the case of high risk for suicide. Regardless, there should be increased gatekeeper training and physician awareness, particularly for those who work with elderly populations or those experiencing significant stressors.

Finally, studies found inconsistent positive effects of postvention interventions.<sup>5</sup> Outreach to those who have previously attempted suicide has been suggested as an effective and low-cost intervention.<sup>104</sup> There is literature demonstrating that follow-up efforts such as phone calls and postcards may decrease future suicidal ideation and behaviour in groups of suicide attempters. There is also opportunity for follow-up through interaction with other public organizations, such

as the court system or employment services. It would be important for these organizations to be aware of the issue of suicide risk and to have routes for screening and treatment of depression and addictions. These strategies should be more widely considered and applied in Toronto.

## 5. POLICY ENVIRONMENT

### 5.1 National

#### *Federal Framework for Suicide Prevention Act*

Canada is one of the only developed countries without a national suicide prevention strategy in place.<sup>8</sup> On December 14, 2012, Bill C-300, the Federal Framework for Suicide Prevention Act, received Royal Assent.<sup>109</sup> The Federal Framework for Suicide Prevention has potential to address Canada's lack of national suicide prevention strategy.

The Act requires the Government of Canada to enter into consultations with other levels of government and non-governmental organizations to inform the development of a Federal Framework for Suicide Prevention. The federal framework will address six priority areas identified in the Act:

- Provide guidelines to improve public awareness and knowledge about suicide;
- Disseminate information about suicide, including information concerning its prevention;
- Make existing statistics about suicide and related risk factors publically available;
- Promote collaboration and knowledge exchange across domains, sectors, regions and jurisdictions;
- Define best practices for the prevention of suicide; and
- Promote the use of research and evidence-based practices for the prevention of suicide.

The designated authority for the Federal Framework for Suicide Prevention is the Public Health Agency of Canada (PHAC), which recognizes that suicide, in addition to being a mental health issue, is a public health issue and a health and safety priority. The release of the framework is expected in 2015. The Act requires the Government of Canada to report back to Parliament in 2016 and every two years thereafter, on progress and activities related to the Federal Framework for Suicide Prevention. It also requires provincial governments to support its direction.

#### *Canadian Association for Suicide Prevention*

The Canadian Association for Suicide Prevention (CASP) is one of the key players in suicide in Canada. CASP was established in 1985 with the purpose to "provide information and resources to communities to reduce the suicide rate and minimize the harmful consequences of suicide-related behavior."<sup>110</sup> Their overall mission is to reduce the suicide rate in Canada. In the absence of a national suicide strategy in Canada, CASP has been particularly important and valuable to facilitate information-sharing on suicide prevention interventions and research, advocate for policy development, and develop excellence in suicide-related research.

More recently, CASP developed the *Blueprint for a Canadian National Suicide Prevention Strategy*, a document that can be used to inform the national suicide policy agenda, and evidence-informed best practices and effective interventions.<sup>9</sup> The CASP Blueprint has been instrumental in guiding the development of many provincial, regional and local strategies in Canada. The goals of the CASP Blueprint include: increasing awareness and understanding of suicide and reduce stigma; providing more prevention, intervention, and postvention programs and services; promoting knowledge development and transfer, including improving surveillance systems; and increasing funding and access to services.

Within their Blueprint, CASP has taken an equity perspective and identified priority groups, who experience distinct needs that should be acknowledged and supported through the development of separate suicide prevention strategies. These groups include: Inuit, First Nations and Métis communities; people living with mental illness; and those who identify as LGBT.<sup>9</sup>

CASP continues to advocate for federal support of their Blueprint and to influence the development and implementation of the Federal Framework for Suicide Prevention currently in progress.

### ***Mental Health Strategy for Canada***

The Mental Health Commission of Canada (MHCC) was created in 2007 in response to the 2006 Senate Report on mental health. In 2009, the MHCC released a mental health framework, *Toward Recovery and Well-being*, which included a focus on suicide prevention.<sup>111</sup> The framework acknowledged the influence of the social determinants of health on mental health and the need to integrate mental health promotion and mental illness prevention not only into mental health policy but also more broadly into public health and social policy.

In 2012, the MHCC released the Mental Health Strategy for Canada.<sup>112</sup> This strategy outlines 26 priorities and 109 recommendations for action, including many that significantly advance suicide prevention in Canada.<sup>113</sup> Recommendations for suicide prevention include:

- Increasing the capacity of families, schools, workplaces and those involved with seniors to promote good mental health, reduce stigma, and prevent mental illness and suicide wherever possible; improving public awareness of how to recognize mental health problems and illnesses and seek help (mental health literacy); training front-line service providers in mental illness and suicide prevention (Strategic Direction 1);
- Supporting families to address their own needs, including grief and loss from suicide; drawing on direct knowledge of suicide, suicide attempts, and suicide risk by actively involving individuals and families in decision making (Strategic Direction 2);
- Improving access to mental health services, treatment and supports, including screening for mental health problems and suicide risk in primary health care (Strategic Direction 3);
- Addressing common underlying risk factors, such as poverty and trauma; strengthening the response to the mental health needs of population groups with high overall suicide

rates, such as older men, First Nations and Inuit youth, and lesbian, gay, bisexual, and transgendered youth (Strategic Directions 4 and 5);

- Establishing whole-of-government and pan-Canadian mechanisms to oversee mental health-related policies; strengthening data, research, knowledge exchange, standards and human resources related to mental health, mental illness and suicide prevention (Strategic Direction 6).

These recommendations are well-aligned with the 2009 CASP Blueprint for a Canadian National Suicide Prevention Strategy.

### ***2006 Senate Report***

In 2006, the report *Out of the Shadows at Last: Transforming Mental Health, Mental Illness and Addiction Services in Canada* was prepared for the Standing Senate Committee on Social Affairs, Science and Technology.<sup>114</sup> In addition to recommending the development of a Mental Health Commission of Canada, which was accomplished the following year, the 2006 Senate Report also recommended the following actions for the federal government to specifically support suicide prevention:

- Support the efforts of the Canadian Association for Suicide Prevention and other organizations working to develop a national suicide prevention strategy;
- Develop consistent standards and protocols for collecting suicide data;
- Increase the study of suicide warning signs, risk and protective factors; and
- Develop a national suicide research agenda.

### ***National Aboriginal Youth Suicide Prevention Strategy***

The National Aboriginal Youth Suicide Prevention Strategy was developed in 2006.<sup>115</sup> The goal of this strategy was to develop a national approach to Aboriginal youth suicide prevention that would increase protective (preventative) factors such as resiliency and reduce the risk factors associated with suicide. The impetus for this strategy was to address the high rate of Aboriginal youth suicide, which was considered to be among the highest in the world.<sup>115</sup> The scope was limited to First Nations living on reserve and Inuit living in Inuit communities, including developing and implementing locally-driven suicide prevention plans in First Nations and Inuit communities.

### ***National Guidelines for Seniors' Mental Health***

In 2006, the National Guidelines for Seniors' Mental Health: The Assessment of Suicide Risk and Prevention of Suicide was released as a practice guideline by the Canadian Coalition for Seniors' Mental Health (CCSMH), with federal funding from the Public Health Agency of Canada and the Canadian Institutes of Health Research.<sup>116</sup> The objective was to provide clinical practice recommendations for clinicians who encounter people 65 years of age and older who are at high risk for suicide. CCSMH also worked on the development of a late-life suicide knowledge translation toolkit for health and mental healthcare providers working with older adults and their families.

## 5.2 Provincial

Most Canadian provinces have some form of a provincial suicide prevention strategy. The Northwest Territories and the Yukon are the only jurisdictions in Canada lacking any kind of strategy.

Ontario has a number of strategies, guidelines and plans that support suicide prevention, both directly and indirectly. The key initiatives are highlighted below to help frame the broader policy context within which Toronto suicide prevention work is taking place.

### *Ontario Public Health Standards*

Suicide prevention is included in the Ontario Public Health Standards (OPHS) for Prevention of Injury and Substance Misuse, as an area of public health importance for health promotion and policy development and assessment and surveillance.<sup>12</sup> Specific activities are recommended to fulfil the Health Promotion & Policy Development Requirement, including:<sup>117</sup>

- Promoting suicide as a public health issue;
- Fostering collaborative partnerships with local, provincial and national community partners;
- Participating in developing, implementing and maintaining a local suicide prevention network;
- Advocating for a national, provincial, and local suicide prevention strategy;
- Using surveillance data to identify priority populations and addressing priority population specific policies;
- Identifying gaps in programs and services that enhance protective factors to promote resiliency against suicide-related behaviour;
- Working in collaboration with community partners and priority populations to support implementation of evidence-based policies, programs, and services, including:
  - Reducing the stigma of suicide within health settings and the community;
  - Increasing and improving early identification and intervention services through health professional and gatekeeper training;
  - Supporting the creation of legislation to limit over-the-counter acetaminophen sales to help decrease the incidence of overdose cases;
- Delivering communication strategies that promote mental health and mental health literacy and integrate mental health messages in all public health areas; and
- Support implementation of Safe School Committees as legislated within *Safe Schools Act* Bill 212.

### ***Ontario Mental Health Strategy***

In 2011, the Province released its provincial mental health and addictions strategy, *Open Minds, Healthy Minds*.<sup>118</sup> While the strategy does not specifically address suicide, it addresses protective factors in suicide prevention (e.g. resiliency-building, increasing access to mental health services). The strategy's focus for the first three years has been children and youth.

### ***Ontario Youth Suicide Prevention Plan***

The Ontario government launched the Ontario Youth Suicide Prevention Plan in October 2013, a three-year plan as part of Ontario's Comprehensive Mental Health and Addictions Strategy. Led by the Ministry of Children and Youth Services, the goal of the Ontario Youth Suicide Prevention Plan is to help communities to better respond to young people in crisis.<sup>119</sup> The four-point plan includes:

- Funding to support local initiatives
  - Eligible mental health agencies (funded by the Ministry of Children and Youth Services) can receive funding to support local initiatives to prevent youth suicide.
- Annual regional forums
  - Regional forums are being held across the province to provide education and training on youth suicide prevention. The forums bring together professionals and adults whom young people naturally confide in and go to for help. These include teachers, guidance counselors, mental health workers, school nurses and others who work with children and youth.
- Web-based, community mobilization guide
  - A web-based community mobilization guide will help communities to better respond to and support children and youth in crisis. The guide will provide knowledge and best practices on crisis intervention, youth suicide prevention, risk management and postvention in different community settings. It is being developed by the Ontario Centre of Excellence for Child and Youth Mental Health in consultation with youth suicide prevention experts.
- Targeted supports to Aboriginal children and youth
  - First Nations, Métis, Inuit and urban Aboriginal partners will be supported to develop and implement community-based, culturally-appropriate approaches to prevent youth suicide in their communities.

## **5.3 Municipal**

A jurisdictional review was conducted to examine local suicide prevention strategies in urban centres across Canada and worldwide, to provide information on current practices and developments that could inform suicide prevention in Toronto.<sup>120</sup> The jurisdictional review consisted of a document review and interviews with key informants who are working in the field of suicide prevention and who have direct experience in strategy development. The key highlights and effective approaches gleaned from other jurisdictions are outlined below, and analyzed for applicability to the Toronto context.

### ***Local suicide prevention strategies across Canada***

Many municipalities undertake suicide prevention initiatives, either within municipal or regional governments, or within the community as a coalition, council or committee. The local public health unit is typically a participating member in local suicide prevention efforts.

There are a limited number of local suicide prevention strategies in Canada, and many of these exist as regional strategies created by citizen-based coalitions. Within Ontario, there are five regional suicide prevention strategies: Halton, London-Middlesex, Niagara, Waterloo, and Sudbury-Manitoulin. These regional strategies tend to draw heavily on or adopt the CASP Blueprint to guide their strategy development and implementation. When narrowing the focus of the jurisdictional review to Canadian urban cities, even fewer strategies were found to examine. Three urban centres in Canada have developed municipal level suicide prevention strategies: Hamilton, Winnipeg, and Ottawa.

The Suicide Prevention Community Council of Hamilton guided the development and public release of the Hamilton strategy in 2010. The Council was strategic in nature and was comprised of members from stakeholder organizations, and was co-chaired by representatives from Hamilton Public Health and McMaster University. The Hamilton Suicide Prevention Strategy used the CASP Blueprint to develop their strategy, sought formal endorsement of the strategy from key individuals and organizations, and reports regularly to the community.

Winnipeg's suicide prevention strategy emerged from collaboration between the Winnipeg Health Authority and community partners and stakeholders. Early work consisted of a jurisdictional review of suicide prevention strategies and the publication of a discussion paper that advocated for the Winnipeg Regional Health Authority to take a leadership role in the development of a local suicide prevention strategy.<sup>121</sup> The result was the *Winnipeg Health Region Suicide Prevention 3-year Action Plan*, which was published in 2004.<sup>122</sup> The strategy included mental health promotion, awareness and understanding, prevention and intervention, and knowledge development and understanding, and each component was associated with an explicit goal, a list of objectives, status, target year, and indicators. Including evaluation in a suicide prevention strategy is a best practice that allows for the measurement and reporting of what is effective, however more work is needed to evaluate the effect on reducing the overall suicide rate.

The Ottawa Suicide Prevention Strategy was developed by a coalition in 2003, building upon a two-year process of conducting a needs assessment specific to the Ottawa context.<sup>123</sup> A representative from Ottawa Public Health co-chairs the Coalition. The Ottawa suicide prevention strategy plans and coordinates activities to prevent suicide, and is supported in part by funding from the City of Ottawa.<sup>124</sup> Ottawa has been a good example of positive media publicity on suicide; The Ottawa Citizen published a series featuring a personal story about suicide every day for one week as a way of raising awareness in a responsible manner.<sup>120</sup>

There are many similarities among suicide prevention strategies in Canadian cities. All have goals to reduce suicide and promote mental health, and include universal, selective, and indicated

interventions. In addition, all have direct involvement and leadership from the local public health unit or health authority. In the jurisdictional review, one key informant spoke to the potential benefits of having early involvement from government public health institutions, as they have an ability to influence city services.<sup>120</sup> But informants also reiterated the importance of having relevant stakeholders involved in writing a strategy so that it is both collaborative in nature and sufficiently clear about each of the stakeholder responsibilities.

A common challenge discussed by key informants involved in developing municipal strategies in Canada was the question of scope, broadly speaking.<sup>120</sup> It was revealed that suicide prevention strategies need to consider what the strategy will cover, its reach, how big it will be, what is feasible, and what can be successfully implemented given existing community resources. It was cautioned to avoid making strategies too general or inclusive at the expense of specifics, and to be realistic regarding what can be achieved, particularly if the strategy is originating from an under-resourced or volunteer group that will be limited in resources and capacity to influence change. In the Canadian context, many local suicide prevention strategies are funded from grants, which often are not sustainable or conducive to implementing long-term programs.

### ***Local suicide prevention strategies in international jurisdictions***

International cities with suicide prevention strategies were examined as part of the jurisdictional review, to draw upon the experience and expertise from around the world that may be applicable to the Toronto context. San Diego, Glasgow and Melbourne were the three cities/regions that best fit the criteria, with similar demographic profiles to Toronto including population size and ethnic diversity.

In 2011, San Diego County announced the *San Diego County Suicide Prevention Action Plan: Working Together to Prevent Suicide*, developed as a partnership between County of San Diego Health and Human Services Agency, Community Health Improvement Partners, Harder+Company Community Research, and the San Diego County Suicide Prevention Council.<sup>125</sup> The strategy is recognized for its focus on target populations including LGBT people, Native Americans, Latinos, Asian/Pacific Islanders, youth at transitional ages (18-24), and adults aged 65 and over. The San Diego County strategy underwent a professional external evaluation, which provided a social network analysis to gauge stakeholders' feelings of engagement and connectedness with other partners.

The Glasgow local strategy combined the national Scottish strategy with local action in Glasgow. Scotland's *Choose Life: A National Strategy and Action Plan to Prevent Suicide in Scotland* is well-recognized for its integration between the local and national suicide prevention strategies, including implementation of Choose Life coordinators for each local region of the country.<sup>126</sup> Despite this support, Glasgow is reported to experience funding challenges around local suicide prevention initiatives, including how to educate people and challenge the myths/stigma about suicide with few resources, lack of funding to implement training programs, and lack of ability and time to fully develop prevention work.<sup>120</sup>

The suicide prevention efforts of Victoria State (Melbourne) started with the Victoria Suicide Prevention Task Force in the 1990's. In 1997, the Task Force submitted a recommendation report

to the Victorian government, which led to the creation of the Victorian Suicide Prevention Strategy. Suicide prevention work, including evaluation, continued over time and was documented in the report *Next Steps: Victoria's Suicide Prevention Forward Action Plan 2006*.<sup>127</sup> Key aspects that stand out in the Victoria State (Melbourne) strategy include taking a whole-of-government approach overseen by a high-level cross departmental committee, and developing a long-term prevention plan and social inclusion meta-strategy. Another relevant document produced by the Victorian government includes the *Victorian Aboriginal Suicide Prevention and Response Action Plan 2010 – 2015*.<sup>128</sup>

Among the strategies, there was agreement that suicide is a serious public health concern and that, while often difficult to measure and evaluate, local strategies make an important contribution to systematic approaches to reducing suicides. Once again, the theme of collaboration emerged in the jurisdictional review, with informants speaking to the importance of working with those 'on the ground' during the planning process, to increase knowledge and awareness of emerging initiatives in the community and increase level of support. Internationally, it was also strongly recommended to engage local and regional governments, including Boards of Health, when initiating a suicide prevention strategy.

A common challenge cited by international key informants from the jurisdictional review was the difficulty of impact evaluation.<sup>120</sup> Several informants spoke to the need for assessing impact through a range of evaluation approaches, including identifying proxy measures for effectiveness (such as numbers of people trained, awareness of resources and access to support services) as well as looking at trends in suicide death rates over a minimum of three years. Another challenge is around intervention effectiveness, such as how to measure which intervention works best for whom, and "how to measure the suicides that didn't happen."

### ***Elements of an effective suicide prevention strategy***

Urban centres tend to have the resources to provide suicide prevention, intervention, and postvention services. There is a need for local suicide prevention initiatives, which can include municipal or community-wide suicide prevention strategies. Effective suicide prevention efforts need to be specific to the local population and must consider and address existing gaps in services. This can be best achieved by conducting a needs assessment or environmental scan, to understand the broader context of suicide prevention and mental health promotion activities in a particular place at that point in time.

Suicide prevention strategies in jurisdictions in Canada tend to use a public health framework, as suggested by the 1996 United Nations Guidelines and the CASP Blueprint. Most of the reviewed strategies rely heavily on the CASP Blueprint and principles for guidance, and this is seen as a best practice. While evidence on effectiveness of suicide prevention strategies is minimal, there is support for the following as elements of an effective suicide prevention strategy:

- Means restriction; media strategies; public education to increase awareness, mental health literacy and stigma reduction; social inclusion and cultural sensitivity;
- Gatekeeper training; teaching suicide prevention in health and social work curricula; and improving collaboration, communication, referral systems within the community; and

- Target populations including youth and older adults; and
- Discharge patients with a safety plan and schedule follow-ups within 48 hours; implement skills for safer-living support groups; and improve bereavement services.

Other elements of effectiveness of local suicide prevention strategies include creating sub-committees and working groups, engaging a variety of stakeholders while setting clear criteria for engagement, engaging public health institutions and the Board of Health, holding regular meetings and feedback sessions to update the community and maintain engagement, procure adequate funding to hire a full-time strategy coordinator and conduct thorough evaluations.<sup>120</sup>

## 6. SUICIDE PREVENTION IN TORONTO

### 6.1 Summary of Environmental Scan

This section provides an overview of the gaps and opportunities around suicide prevention in Toronto, to describe the current and emerging initiatives and services that can inform decision-making and policy development in the City of Toronto.

#### *Crisis services*

There are a number of crisis centres and hospitals that provide crisis intervention and emergency services to those at immediate risk of suicide in Toronto. Crisis services range from hospital-based to community-based services, and many are available 24 hours a day. Crisis services are integral to any suicide prevention strategy; they are an important point of access for suicide prevention, intervention and postvention. Please see Appendix E for a select list of services in Toronto.

#### *Bridge barriers*

The 'Luminous Veil' is a suicide barrier on Toronto's Prince Edward Bridge (Bloor Street Viaduct). The Luminous Veil was installed in 2003, with the goal to prevent suicides from occurring in a location that had been a 'hotspot' for suicide. This bridge barrier has been successful in its goal of preventing suicides at that site.<sup>129</sup>

Researchers examining the effectiveness of bridge barriers look at changes to the overall suicide rate and/or whether there is a reciprocal increase in suicides by jumping at other locations or by other means. One study examined the yearly rates of suicide in Toronto and found that the rate of suicide by jumping remained unchanged between the periods before and after the construction of the Luminous Veil, thus suggesting displacement to other bridges.<sup>130</sup> However, a critique of this study argued that the bridge barrier was not a "standalone" suicide prevention intervention and that while jumping from bridges increased elsewhere, overall suicide rates decreased.<sup>129</sup> Studies on bridge barriers from other cities, such as Montreal's barrier on the Jacques Cartier Bridge, have reported effectiveness with little or no displacement to other jumping sites.<sup>131</sup>

Suicide bridge barriers continue to be installed in cities across North America, including Edmonton and San Francisco. At the end of June 2014, San Francisco's Golden Gate Bridge Board of Directors unanimously approved \$76 million in funding to erect a suicide barrier on the Golden Gate Bridge.<sup>132</sup> The federal government will cover \$50 million of the cost; the rest will come from state and local sources.

### ***Transit barriers***

The Toronto Transit Commission (TTC) tracks suicide attempts and fatalities on the subway system. Suicide attempts and deaths on the subway system can have serious impacts not only in terms of morbidity and mortality, but also in the economic cost to transit system operations and psychological impacts on the driver, passengers and witnesses.

An average of 23 suicide-related incidents occurred each year on the Toronto Transit Commission (TTC) subway system between 1998 and 2014.<sup>133</sup> (Table 3.) Events where it has been determined that contact was made with a vehicle due to illness or accident are not included in the data summary.

**Table 3. TTC Suicide Fatalities and Attempts, 1998-2014**

Year	Attempt	Fatality	Total
1998	13	12	25
1999	4	22	26
2000	12	21	33
2001	17	12	29
2002	11	16	27
2003	9	17	26
2004	8	15	23
2005	6	14	20
2006	11	8	19
2007	9	13	22
2008	8	11	19
2009	4	14	18
2010	10	19	29
2011	8	8	16
2012	8	11	19
2013	9	8	17
2014 year-to-date*	13	8	21

Source: Toronto Transit Commission, 1998-2013

\*year-to-date, as of August 21, 2014

Engineering solutions to suicide prevention on transit systems are effective, available and called for. Environmental modifications (i.e. barriers) are the most effective strategy for suicide prevention used in transit systems. The installation of Platform Edge Door (PED) barriers has been implemented onto public transit networks in more than thirty-five major cities around the world, including Hong Kong, Singapore and Paris,<sup>134</sup> and has been shown to be effective in

preventing suicides without an associated increase at other stations or substitution to other means.<sup>135</sup> PEDs work by restricting access to the track level, which would eliminate suicides as well as provide passenger safety against other high risk incidents such as descending or unintentionally falling to track level. In addition to safety improvement, PEDs also offer service improvements through the ability to run more trains per hour with fewer service disruptions.

In 2010, the TTC Board approved the installation of PEDs on the Toronto subway system,<sup>136</sup> however, to date they remain unfunded. The case for PEDs on TTC becomes increasingly compelling when health-related savings are factored into the economic analysis on operational benefits. There is potential opportunity and a compelling argument for collaboration between transit and health mandates and officials to reduce lethal suicide attempts on TTC through the installation of PEDs.

Additional suicide prevention measures have been explored by the TTC, though none as promising as potential engineering solutions. In mid-2011, the TTC entered into a Memorandum of Understanding with the Distress Centres of Toronto to operate the Crisis Link Project. Crisis Link Project is designed to encourage customers in crisis to contact the Distress Centre on a pay telephone located near each Designated Waiting Area on every subway platform. The Distress Centre operates three direct telephone lines and staffed by qualified call responders.

A total of 218 calls were made on the Crisis Link lines between April 1, 2011 and March 31, 2013. A total of 26 calls (12%) were considered at imminent risk of suicide and required the involvement of the Toronto Police Service or necessitated Transit Control to invoke emergency procedures which included holding trains before they enter stations, slowing subway trains as they enter stations, and dispatching emergency personnel. An additional 40 calls (18%) were determined by the Distress Centres of Toronto to involve persons with suicidal ideation without imminent risk of suicide. Only one person who attempted suicide on the TTC subway system called Crisis Link before jumping to the tracks – most fatalities never called.

### ***Media reporting guidelines***

There has been concern and debate about how the news media should treat suicide, given that research has found that public presentation of suicide can influence other individuals to engage in suicide-related behaviour.<sup>73,137</sup>

The Canadian Association for Suicide Prevention (CASP), in partnership with the American Association of Suicidology (AAS), has outlined a number of media reporting guidelines to assist news media in presenting responsible information about suicide to the public.<sup>138</sup> The guidelines suggest that public accounts, in order to discourage imitative or copycat suicides, should avoid disclosing specific details pertaining to the method. Further, it is critical to avoid providing simplistic reasons for suicide, minimizing reports on romanticized reasons for the suicide, and limiting the description of suicide as being unexplainable. Print media can limit the imitative impact by not printing photos of the individual who died by suicide and by not including the word 'suicide' in the headline, and not printing the story on the first page of the publication. Other guidelines from CASP & AAS suggest that media ensure reporting does not make suicide appear as exiting, admirable, or an approved action. Media reporting should present resources for getting help (e.g. contact information for community resources, distress centres, or counselling

services), a list of warning signs to alert people to clues for suicide-related behaviors (e.g. depression, sudden changes in behaviour, or statements which reveal a desire to die) and what to do (e.g. call local crisis line, discuss it openly, and get professional help).

It is difficult to find information on the media reporting practices around suicide prevention that are exercised specifically in Toronto. In 2014, *Mindset: Reporting on Mental Health*, a guide for journalists, was released by the Canadian Journalism Forum on Violence and Trauma, in partnership with CBC News, with funding from the Mental Health Commission of Canada.<sup>139</sup> The guide and website are by journalists for journalists, journalism educators and students, and are intended to support how to report on suicide, mental health and stigma in Canadian media. The "do's and don'ts" reported in the guide suggest considering whether the particular death is considered newsworthy, whether it links to broader social issues, respecting the grieving and privacy of family or survivors, and including suggestions about where to get help. Additionally, many of the "don'ts" included in the guide overlap with those found in the CASP media guidelines, such as refraining from reporting on method, not romanticizing suicide, and avoiding simplistic explanations for suicide.

### ***Restriction of drugs and alcohol***

Suicide by self-poisoning from drugs and alcohol in Toronto involves the use of different classes of substances, including prescription and over-the-counter medications.<sup>30</sup> There are recent guidelines that advise and promote safer prescribing and dispensing practices. For example, recent Canadian guidelines on the prescription of opioids in non-cancer pain recommend that "physicians should assess their patients for depression and suicidal ideation, and opioids should be dispensed in small amounts for patients at risk."<sup>140,p.57</sup> There is potential to work with physicians and pharmacists to increase knowledge of the substances involved in suicides by overdose and to influence practices to prevent self-poisoning.

In Canada, there have been advocacy efforts to restrict over-the-counter drugs that are found in many intentional and unintentional overdoses, such as acetaminophen and diphenhydramine.<sup>141</sup> Countries around the world, including the United Kingdom, Germany and Australia, have implemented restrictions on acetaminophen (which can include limiting the number of pills consumers can buy at one time, where they can be bought, how many pills can be put in one package). Studies from the United Kingdom report that restricting access to acetaminophen is associated with a reduction in suicides by that substance.<sup>142</sup>

### ***Health provider practices and policies***

In 2009, the Registered Nurses Association of Ontario (RNAO) published a clinically-focused best practice guideline titled *Assessment and Care of Adults at Risk for Suicidal Ideation and Behaviour*.<sup>143</sup> These guidelines provide a series of recommendations including practice recommendations, educational recommendations, and organizational and policy recommendations. Organizations wishing to use the guideline may decide to do so in a number of ways, however, the guidelines are not binding on nurses or employers.

From an online search and speaking to practice consultants, none of the other professional bodies/colleges surveyed (College of Family Physicians – Ontario chapter; College of Family Physicians – National Office; Royal College of Physicians and Surgeons of Canada) appear to have, or are currently working on, any practice guidelines, policies or training specific to suicide prevention.

## **6.2 Toronto Public Health work on Suicide Prevention**

Given that suicide is noted as an area of public health importance in the Ontario Public Health Standards for Prevention of Injury and Substance Misuse, there is continued attention to addressing suicide prevention for the clients and communities served by TPH.<sup>12</sup>

A report passed by the Board of Health in 1999 endorsed TPH work around suicide prevention including addressing means restriction, developing a system of mental health services for Toronto, and preventing mental illness through the provision of specialized mental health nursing services and programs and policies related to the determinants of health.<sup>144</sup> TPH has continued to build on this work over the past 15 years through mental health promotion and suicide intervention work across multiple directorates.

### ***Mental health promotion***

TPH work around mental health promotion has identified recommendations to guide mental health promotion, including:

- Comprehensive, ecological approach that addresses predisposing, precipitating and contributing factors and protective factors (i.e., early identification, crisis intervention, and mental health promotion);
- Focus on high risk groups and high priority geographic areas;
- Addressing mental illness through early identification, referral, consultation, advocacy for services; and
- Media and educational campaigns to raise awareness and reduce stigma associated with suicide-related behaviour.

Recent work has framed suicide prevention as a key and complementary aspect of mental health promotion, highlighting goals such as promoting protective factors and resilient communities, reducing risk factors, inequities and stigma surrounding mental illness, and encouraging help-seeking behaviour. Further, the report suggests that known risk and protective factors for suicide broadly overlap with key determinants of mental health (social inclusion, freedom from violence and discrimination, and economic participation).

### ***Suicide prevention policies and interventions***

TPH has developed policies and procedures to support TPH staff and their clients, which provides direction for all TPH staff who encounter individuals with possible and/or imminent suicide-related behaviour. In addition to policies and procedures, the Mental Health Promotion Team is developing a suicide prevention workshop for TPH staff based on gate-keeping

principles.<sup>145</sup> The training will enhance the knowledge, attitudes, and skills of TPH staff to assess and refer individuals at risk for suicide, and increase knowledge of the amended TPH Suicide Prevention Policy. Additional online resources to support staff in understanding their role in suicide prevention have been developed and placed on the TPH internal website.

Currently, TPH is supporting suicide prevention in numerous ways. Mental health promotion is woven into a broad spectrum of programs (e.g. Healthy Babies Health Children home visiting program, Healthiest Babies Possible, Tuberculosis (TB) Clinic, Needle Exchange, and Vulnerable Adults) and help with early identification of individuals experiencing mental health issues and/or suicidal ideation. The Mental Health Promotion Team play a key role in supporting staff with clients experiencing mental health problems, suicidal thoughts and behaviour and providing educational sessions on suicide prevention. The team also provides crisis support to groups within organizations and the community who have been affected by the death by suicide of an individual.

Areas of TPH that work on Injury Prevention/Substance Abuse are implementing programs that promote resiliency in children and youth and address substance abuse prevention. The Healthy Schools Initiative supports activities to enhance physical, mental, social and spiritual well-being of the school community, strengthen the capacity of school communities to achieve optimal health, and to enhance resiliency in all school age children and youth in the City of Toronto.

TPH actively advocates for the promotion of the determinants of health which are associated with positive mental well-being and suicide prevention.

### ***City of Toronto Senior's Strategy***

The 2013 *Toronto Senior's Strategy: Towards an Age-Friendly City* was developed to present a framework and implementation goals for ensuring the diverse needs of City of Toronto's older residents are addressed.<sup>146</sup> Through a comprehensive consultation process and aligning with the World Health Organization's Age-friendly Cities and Communities Themes, *Toronto Senior's Strategy* identified 8 themes, including: respect & social inclusion; civic engagement, social participation; community support and health services; housing; transportation; outdoor spaces and buildings; and communications and information.

Within these eight thematic areas, twenty-five recommendations related to the needs of older adults were developed. One recommendation (Recommendation #13) called for the City of Toronto to address the specific needs of vulnerable older adults, and included the short-term action for "City of Toronto Agencies, Corporations, Divisions and Boards to collaborate on a suicide prevention initiative, including older adults as well as other priority populations."<sup>146,p.65</sup> TPH was named as the lead for this recommendation. Current initiatives, such as the TPH Suicide Prevention Policy and staff education initiatives, support TPH staff who work with vulnerable older clients who may be experiencing suicidal thoughts or ideation, however, further progress on this action item will be required.

## 7. KEY FINDINGS AND IMPLICATIONS

### 7.1 Who is affected by suicide in Toronto

Suicide resulted in 243 deaths in Toronto in 2009.<sup>1</sup> This is more than four times the number of people who died from homicide, and three times the number who died from motor vehicle crashes.<sup>1</sup> The continuum of suicide-related behaviours also includes self-harm, suicide ideation, and suicide attempts. According to self-reported data, 6% of people in Toronto, which is over 150,000 Torontonians, have considered suicide in their lifetime.<sup>147</sup>

Suicide is a leading and modifiable cause of death in Toronto. It is one of the leading causes of premature death, comprising a much larger number of potential years of life lost (PYLL) than most other leading causes of death because it affects younger as well as older populations. In 2009, suicide comprised 6,716 potential years of life lost, the second largest number of PYLL among causes of death.<sup>94</sup>

Overall mortality rates by suicide have remained stable over time in Toronto and Ontario.<sup>1</sup> Trends in subgroups were not possible to estimate. Toronto has lower rates of hospitalizations and ED visits for suicide-related behaviour than the rest of Ontario, and these rates have been declining in both Toronto and Ontario over time.<sup>2</sup> The differences between Toronto and Ontario may reflect differences in services delivery models, stricter admission criteria, socio-cultural attitudes, stigma around self-harm, barriers to health service access, or data reporting.

Suicide can affect population groups in many different ways. There are multiple risk factors for suicide, which are more likely to occur in combination than in isolation.<sup>4</sup> Risk can change with circumstance, and a risk factor identified at a population level may result in a true heightened risk for one person, but not for another. Some populations in Toronto face multiple and concurrent risk factors for suicide, which may place them at disproportionate risk for suicide.

Males experience higher rates of death from suicide,<sup>1</sup> whereas females experience higher rates of non-fatal suicidal behaviour.<sup>2</sup> Sex differences in suicidal behaviour have been theorized to be related to a number of factors, including lethality, differential rates of depression and alcohol misuse, and socialization.<sup>148</sup> Males tend to use more lethal means than females (e.g. hanging/strangulation/suffocation compared to self-poisoning from drugs and alcohol, respectively) and also have less interaction with the health care system. Help-seeking behaviour and social support, two protective factors associated with suicide, may be more prevalent among females.<sup>4</sup>

The risk of suicide is distributed across the lifespan, affecting both young and old. Suicide mortality rates increase from youth to throughout middle age and are particularly high for older men.<sup>1</sup> Among the elderly, being male as well as having a mental illness and physical illness are risk factors for suicide. However, suicide is relatively uncommon compared to deaths from other causes among the 80+ age group. Overall health needs may be particularly high among this group. There is evidence to support screening for risk factors at general practitioner visits, such as attention to a patient's social circumstance, expectations, quality of life and illness history, as well as treatment of depression, to reduce the risk of suicide in the elderly.<sup>149</sup>

Suicide is the second leading cause of death for young people in Toronto. In 2011, 1 in 10 students in Toronto reported that they seriously considered suicide in the past year.<sup>98</sup> In addition to mental illness, such as depression and substance abuse, the burden of youth suicide may be related to experiences of rejection and social exclusion, including bullying and victimization. This may be particularly pertinent for groups who face stigma, prejudice, discrimination and violence based on their identity (e.g. LGBTQ and Aboriginal youth). Young adults (18-24 year olds) also require attention as this group may feel too old to use children/youth services such as Kids Help Phone, yet may not identify with adult-oriented services.

Effective intervention targeted to youth may reduce the risk of suicide in adulthood. Mental disorders usually begin in youth, and illness and stressors may confer long term risk and likewise minimizing them may serve as protective factors. It can be important to ensure that protective measures are in place for those who are experiencing a first time diagnosis of a major mental illness.

Homeless and institutionalized populations face an elevated risk for suicide.<sup>3</sup> A small but significant proportion of suicides occurs in institutionalized settings, including hospitals, psychiatric facilities, correctional institutions, and long-term care homes. Suicide risk in these populations may be related to additive effects of mental illness, deprivation, isolation, separation from loved ones, and feelings of hopelessness and despair.

First responders and others who work in emergency services, including paramedics, firefighters, police officers, dispatchers, correctional service officers and military personnel, often face stressful and traumatic situations on the job, leaving them vulnerable to poor mental health, including anxiety, depression, post-traumatic stress disorder, substance abuse and suicide risk.<sup>75,76,77</sup> The adoption and implementation of mental health standards, processes and programs are needed, to build awareness of first responder mental health issues, reduce stigma around seeking help, and provide services and supports for suicide prevention.

More attention and resources are needed to better understand the relationship between socio-demographic variables (e.g. income, race, ethnicity, language, sexual orientation, occupation) and suicide risk. Certain groups may be vulnerable to poor mental health and suicide-related behaviour due to the cumulative effects of discrimination, racism, sexism and homophobia, as well as difficulties accessing the social determinants of health. There are limitations in the availability and comprehensiveness of Toronto-level data, including low-response rates of certain groups.

## **7.2 What is known about death by suicide in Toronto**

The most common mechanisms of suicide in Toronto were hanging/strangulation/suffocation, jumping from a high place, self-poisoning from drugs and alcohol, and jumping or lying before a moving object (subway/train/car).<sup>1</sup> Hanging is the most commonly used method of suicide worldwide.<sup>71</sup> While attempts have been made to restrict means for hanging in controlled environments such as hospitals, prisons, and police custody, more needs to be known about how

to prevent hanging in public or private places and what contributes to choice for hanging as method.

More than half (63%) of suicide deaths in Toronto occurred at the individual's home.<sup>3</sup> The most common living situation at time of death was living with a family, friend or other person (50.1%). Thus, the home is an important setting in which to address suicide prevention, including decreasing availability and accessibility of lethal means (e.g. firearms, drugs and alcohol, hanging, jumping) and building awareness of suicide risks and warning signs. The second most common living situation at time of death by suicide in Toronto was living alone (42.9%). A small proportion (1.8%) of people who died by suicide were recorded as living in a shelter, hostel or rooming house, and 1.4% were assumed homeless at time of death. The number of homeless or under-housed individuals may be under-estimated due to the difficulty in ascertaining housing status from living situation (e.g. hidden homelessness).

Approximately one in four persons who died from suicide in Toronto had attempted suicide previously.<sup>3</sup> There were a greater proportion of females (37.5%) with a previous suicide attempt than males (23.2%).

The majority of people who died by suicide in Toronto had an identified history of mental illness (83.0% of females and 73.3% of males).<sup>3</sup> Given the robust literature showing that at least 90% of people who died from suicide suffered from a mental illness, it is likely that many cases of mental illness went undetected.<sup>14</sup>

The most frequently noted stressors present during the one-year period prior to death by suicide in Toronto were interpersonal conflict, medical, employment and financial stressors.<sup>3</sup> The stressors present in the one-period before suicide death in Toronto varied considerably by age group. In the 10-24 and 25-44 year age groups, interpersonal conflict was the most frequently noted stressor. In the 45-64 year age group, employment was the most frequently noted stressor, and more commonly mentioned for males than females. In the 65+ year age group, medical issues were the most frequent stressor.

While frequency data cannot speak to cause-and-effect, it may shed some light onto the circumstances of people's lives before their suicide, and as such, these findings suggest the importance of gaining a better understanding of how social level factors, such as recent crises, stressful life events and experiences of social isolation, relate to mental health. More detailed and timely data is needed on stressors and risk factors for suicide, including information that will help identify opportunities to prevent and intervene earlier and more effectively.

### **7.3 Effective suicide prevention interventions**

Suicides are preventable. Prevention is best developed at multiple levels to address a complex interplay of individual, interpersonal, community and societal factors. Both universal and targeted approaches are necessary to significantly reduce suicide and promote mental health. Evidence supports a broad range of prevention-level interventions.<sup>5</sup> Many efforts need to be part of the solution; no specific intervention will be effective on its own.

### ***Means restriction***

Means restriction strategies have been shown to be highly effective in reducing death by suicide. Some means restrictions interventions have already been implemented in Toronto, including the installation of the Prince Edward Bridge barrier ("Luminous Veil"), which achieved its primary goal.<sup>129</sup> Policies around suicide barriers, including design requirements and modifications and engineering solutions, could prevent some of the most common methods of suicide including jumping from a high place (e.g. bridges, rooftops or windows of apartment buildings or office towers) and perhaps hanging.

Engineering solutions have the potential to reduce or eliminate suicide on transit systems. An average of 23 suicide-related incidents occurred each year on the TTC subway system. TTC has identified the installation of Platform Edge Doors (PEDs) as a way to improve transit service efficiency as well as have benefits for passenger safety including suicide prevention. The case for PEDs on TTC becomes increasingly compelling when factoring in opportunities include PEDs in the original design of stations in future line extensions or new lines, and retrofit as a means to gain significant benefits from the completion of the automatic train control upgrade to the signal system.

Self-poisoning by alcohol and drugs has many potential points of intervention, including restricting availability of large quantities of lethal substances. Suicide by overdose in Toronto involves the use of different classes of substances, including prescription and over-the-counter medications.<sup>30</sup> Opioids were the most common drug found in lethal quantities in suicide deaths in Toronto.<sup>30</sup> Safer prescribing and dispensing practices, such as restricting access to large quantities of prescription opioids may help to prevent access to means for suicide by self-poisoning.

Restricting access to over-the-counter drugs found in many intentional and unintentional overdoses, such acetaminophen and diphenhydramine, is another means restriction intervention. Evidence shows that the implementation of restriction on acetaminophen has been associated with a reduction in suicides by that substance.<sup>142</sup>

Means restriction in institutions, such as hospitals, prisons and police custody, involves creating a safer environment through both the physical environment and operating policies. For example, attempts have been made to reduce suicide in controlled environments by restricting access to means for hanging such as ligatures and ligature points.<sup>71</sup> Research on reducing suicide in health care institutions reinforces the need for safety precautions, addressing unit design and environment and protective observation, in addition to assessment and treatment.<sup>22</sup> Other settings that can bear elements of risk, such as workplaces, employment centres, outplacement services, courts and long-term care homes, tend not to be designed for preventive interventions but should include more integration of suicide prevention interventions where possible.

### ***Public awareness and education***

Public awareness and education is critical to change attitudes towards the precursors of suicide and must work to reduce stigma. There is a need for greater public awareness and education

around the problem of suicide, to increase people's ability to identify suicide risk factors and warning signs and knowledge of how to intervene and help to prevent suicide-related behaviour.

Responsible reporting by the media is an effective practice to reduce suicide, particularly important in preventing social contagion among youth.<sup>5</sup> For examples, effective media strategies require coordination with a range of news media, including broadcast media (radio and television), print media (newspapers and magazines) and online media (web-based activities for print and broadcast media, and new media including blogs and social networking sites, e.g. Facebook, Twitter). New technologies and increasing access to Internet sites promoting suicide are relatively new areas for the suicide prevention field. More needs to be known about how to manage and prevent suicide risk vis-à-vis the Internet and social media that tend to be difficult to regulate.

### ***Community and school-based programs***

Community and school-based programs, such as education and skills building that increases problem-solving, coping skills and conflict resolution to promote overall good mental health and resiliency is an effective suicide prevention strategy.<sup>5</sup> Evidence supports taking a "whole-school approach" to create supportive school environments, build on what is known about protective factors, challenge social stigmas, and implement programs that reduce bullying, violence and social exclusion in schools and post-secondary institutions. In addition, targeted programs that address specific risk factors and target interventions to high risk groups has also been shown to be effective.<sup>5</sup>

Another promising community-based intervention is providing support initiatives that promote positive family life and positive parenting, as well as interventions that enhance parent/adolescent relationships.<sup>5</sup> Interventions in these areas may be particularly important given that today's children and youth are tomorrow's adults.

Targeted suicide prevention initiatives should be situated in settings such as workplaces and employment centres, given associations with stressors such as unemployment, job loss, financial stress and debt. More education and resources should be made available for groups, such as individuals receiving Ontario Works and federal Employment Insurance and implemented in settings and along with services already accessed.

### ***Gatekeeper training***

Training and education for people who come in contact with high-risk individuals can help with increased understanding of suicide, recognition of warning signs, and knowledge of how to intervene. This may be particularly effective when targeted to individuals identified as having primary contact with those at high risk of suicide, such as close friends and families, and caregivers.<sup>5</sup> There is also a need for training around cultural competency, to provide information on the background factors increase vulnerability to suicide, such as stigma and barriers that Aboriginal people face in access to care. This type of training and education is integral to increasing knowledge among both the general public and the healthcare sector.

Gatekeeper training for physicians and other healthcare providers can increase knowledge of risk factors and warning signs, depression recognition, and safer prescribing practices and guidelines. In particular, there should be increased awareness and training for those who work with elderly populations, including general practitioners, nurses and personal support workers.

#### **7.4 Working toward comprehensive solutions for suicide prevention**

While some prevention-level interventions have been shown to be effective and others show promising potential for suicide prevention and mental health promotion, a comprehensive approach must also address treatment and maintenance and include the broader healthcare system. There is a need for higher integration of mental health services and multiple service models, including community and institutional resources for supporting those with high needs such as vulnerable older adults and youth, and culturally appropriate resources for racialized and cultural groups. Action around suicide prevention should be informed by the broader community of suicide experts in and around Toronto, including individuals who have engaged in suicide-related behavior.

More work is needed to address gaps in knowledge regarding groups disproportionately impacted by suicide and modify some of the antecedent causes of suicide. A prioritized approach to suicide research would ensure that research funding and efforts focus on areas with the greatest likelihood of reducing deaths by suicide. There is also a need for ongoing standardized collection of data with improved content, commitment to consistent measuring and reporting over time including clear and measurable outcomes, and for data to be available and accessible to researchers and policy makers. Collaborative work with the Office of the Chief Coroner could identify ways to prevent suicides and/or intervene earlier and more effectively.

Existing initiatives and strategies at the municipal, provincial and federal levels provide opportunities to advance local suicide prevention efforts. There is potential to embed suicide prevention into current and existing City of Toronto strategies and programs that serve groups disproportionately impacted by suicide, such as youth, seniors, low-income groups, LGBTQ people, Aboriginal people, homeless and shelter residents, among others. Furthermore, a comprehensive approach to suicide prevention requires that the provincial and federal governments address the critical collaboration and investment required to fully develop and implement sustainable, multi-pronged strategies. Current initiatives such as the new Federal Framework for Suicide Prevention, soon to be released by the Public Health Agency of Canada, and the Youth Suicide Prevention Plan, by Ontario's Ministry of Children and Youth Services, are examples of potential opportunities to advance local suicide prevention efforts through collaboration and connectivity across orders of government.

## 8. CONCLUSIONS

This report provides an overview of suicide in Toronto, including data and evidence on suicide morbidity and mortality, mechanism of injury, risk and protective factors, and effective interventions. There remain many gaps in knowledge, which are affected by limited data sources and a lack of evaluation on interventions. Nonetheless, the problem of suicide in Toronto warrants public health attention. There is a range of suicide-related behaviours that have health, social and economic impacts on individuals as well as the communities they live in.

The report describes the complexities of suicide risk in Toronto, with a focus on the upstream and preventive interventions aligned with a public health mandate. A comprehensive approach to suicide considers the continuum of suicide-related behaviours, from self-harm to ideation to attempts to death, and the impacts and interplay between individual, community and societal levels. As outlined throughout the report, it is important to address the risk determinants that lead to social and health inequities and unfairly expose certain groups to elevated suicide risk, and identify mechanisms that reduce the exposure of individuals and communities to multiple risk factors.

This report reviews what is known about effective suicide prevention, and provides support for a range of preventive interventions, including means restriction, media reporting guidelines, public awareness and education, gatekeeper training, and place-based prevention interventions. While no specific intervention will be effective on its own, many interventions can work in concert to reduce the overall suicide rate. In addition to prevention-level interventions, maintenance and treatment are also essential components of comprehensive suicide prevention efforts.

Suicide prevention requires collaboration and coordination between multiple sectors, including community stakeholders, government, and the healthcare sector. Dedicated funding would be required to develop a comprehensive, multi-sectoral strategy that addresses universal and targeted prevention, as well as the critical components of healthcare needed to ensure early identification, mental health services, treatment and supports, and follow-up care, required to reduce the burden of suicide in Toronto.

# Appendices

## Appendix A: Methods for Literature Review

The review of risk and protective factors for this report builds on the literature base identified in the Scottish Government Social Research (2008) report, *Risk and Protective Factors for Suicide and Suicidal Behavior: A Literature Review*. The objective of the Scottish Government Research report was to "provide a high quality review of current knowledge regarding: the societal and cultural factors associated with increased incidence of suicide; and population subgroups that increased risk of suicidal behaviour" (p.13). The present review utilized this objective as a frame and followed the methodology used in the Scottish Government report to review more recent (2008-2014) literature on risk and protective factors for suicide.

### *Risk Factors*

Following the inclusion and exclusion criteria as noted in the Scottish Government report, this review included only high quality reviews (meta-analysis and/or systematic reviews) that investigated risk factors for suicidal behaviour with "clear suicidal intent" (p.18). This updated review of the literature excluded reviews that had the following foci:

- a. Assisted suicide/euthanasia
- b. Suicidal thoughts and ideation (when not linked with suicidal behaviour)
- c. Self-destructive behaviour (such as pathological gambling or dangerous driving when not linked with suicidal behaviour)
- d. Institutionalized populations (incarcerated, inpatient hospital)
- e. Clinical/psychopharmacological/neurobiological focus
- f. Military and veterans
- g. Rural and on-reserve populations

Primary studies and non-systematic reviews were excluded from this review.

The present review used a search strategy consistent with the strategy used in the Scottish Government report. Using the search terms 'Suicid\*' OR '(suicide AND self-harm\*)', NOT '(Assisted adj Suicide)' or '(euthanasia)', AND '(risk or (risk adj factor\*))' OR (relative adj risk) OR (attributable adj risk)), we searched for published meta-analysis and/or systematic reviews in the English language, published between January 2007 and January 2014 in the following electronic databases: EBSCO, PubMed and OVID. In accordance with the search strategy outlined in the Scottish Government report (2008), the present review did not search the Cochrane Library for literature, given that the focus of that database tends to be reviews and evaluations of interventions, as well as clinical trials.

One member of the research team conducted the database search and screened the titles and abstracts of the papers. A total of 33 systematic reviews and/or meta-analyses met the inclusion criteria. Two reviewers independently conducted the data extraction and quality assessment of all papers prior to conducting the data extraction and quality assessment, the reviewers evaluated the papers for the relevance of the topic and the applicability of the study to the Toronto context. Two studies were excluded at this stage as they were deemed not relevant to the topic based on the exclusion criteria. The data extraction form from the Scottish Government report was

adapted for the current report. Three reviewers tested the data extraction form by reviewing the same three studies and changes were made to the form after discussion between the reviewers. The quality assessment form used in the Scottish Government report was used in original form.

Articles that received an overall quality assessment of + or ++ were accepted, while those that received a quality assessment of – were excluded. Disagreements between the reviewers were resolved by consensus or by a third independent reviewer if consensus could not be reached. As an added quality assurance measure, the third reviewer also conducted a quality assessment of a random sample of papers to ensure consistency with the scoring of the two main reviewers. As there was high agreement between all three reviewers, no additional quality assessments were conducted by the third reviewer.

### ***Protective Factors***

A narrative review was conducted for protective factors literature. As acknowledged by McLean et al. (2008), there is an abundance of systematic reviews focusing on risk factors for suicide, but a very limited amount that exist that have a focus on protective factors. The review of evidence on protective factors associated with suicide included both systematic reviews/meta-analyses and primary studies.

Following the inclusion and exclusion criteria as noted in the Scottish Government report, this review included only studies that investigated protective factors for suicidal behaviour with "clear suicidal intent" (p.18). This updated review of the literature excluded reviews that had the following foci:

- a. Assisted suicide/euthanasia
- b. Suicidal thoughts and ideation (when not linked with suicidal behaviour)
- c. Self-destructive behaviour (such as pathological gambling or dangerous driving when not linked with suicidal behaviour)
- d. Institutionalized populations (incarcerated, inpatient hospital)
- e. Clinical/psychopharmacological/neurobiological focus
- f. Military and veterans
- g. Rural and on-reserve populations
- h. Countries distinctly different from North America and Western Europe (e.g. China, Korea, Turkey, etc.)

The present review used a search strategy consistent with the strategy used in the Scottish Government report. Original searches were conducted using terms such as “resilience” and “recovery” in addition to “protective factor”. Using the below list of search terms, we searched for 1) meta-analysis and/or systematic reviews, and 2) primary studies, in the English language, published between January 2007 and January 2014 in the following electronic databases: MEDLINE, EMBASE, PsychINFO, CINAHL, IBSS: International Bibliography of the Social Sciences, ASSIA: Applied Social Sciences Index and Abstracts, Social Services Abstracts and Sociological Abstracts. In accordance with the search strategy outlined in the Scottish Government report (2008), the present review did not search the Cochrane Library for literature, given that the focus of that database tends to be reviews and evaluations of interventions, as well as clinical trials.

**Systematic Review Search:**

1. suicid\*.mp. or Suicide/
2. (suicid\* and self-harm)
3. 1 or 2
4. (assisted adj suicide)
5. Euthanasia/ or euthanasia.
6. 4 or 5
7. 3 not 6
8. (resilienc\* or recovery or protect\* or cop\*)
9. meta analy\*.mp.
10. (systematic and review\*)
11. 9 or 10
12. case report.m\_titl.
13. editorial.pt.
14. letter.pt.
15. 12 or 13 or 14
16. 11 not 15
17. 7 and 8 and 16
18. limit 17 to (english language and yr="2007 -2014")

**Primary Study Search:**

1. Suicide, Attempted/ or suicid\*.mp. or Suicide/
2. (suicid\* and self-harm)
3. 1 or 2
4. (assisted adj suicide)
5. Euthanasia/ or euthanasia.mp.
6. 4 or 5
7. 3 not 6
8. meta analy\*.mp.
9. ((systematic adj1 review\*)
10. 8 or 9
11. case report.ti.
12. editorial.pt.
13. letter.pt.
14. 11 or 12 or 13 or 10
15. (protect\* adj factor\*)
16. (7 and 15) not 14
17. limit 16 to (english language and yr="2007 -2014")

Initial search results found 330 systematic reviews and 1266 primary studies. One researcher screened the titles of the papers. A total of 33 systematic reviews and/or meta-analyses and 115 primary studies met the inclusion criteria. Following the title review, an abstract review was conducted and studies that did not fit the scope of this literature review or were assessed to be poor quality or not relevant to the Toronto context were excluded. Two systematic reviews and 22 primary studies remained and were included in this review.

## Appendix B: Data Analysis Methods

### *Data Sources*

**Mortality:** Vital Statistics 1986-1999, Ontario Ministry of Health and Long-Term Care, IntelliHEALTH ONTARIO, Date Extracted: June 2014. Vital Statistics 2000-2009, Ontario Ministry of Health and Long-Term Care, IntelliHEALTH ONTARIO, Date Extracted: March 2013. Data age-standardized to the 1991 Canadian Population.

#### Vital Statistics

The Office of the Registrar General (ORG) collects information pertaining to births, deaths and stillbirths for all events occurring in Ontario, as mandated under the Vital Statistics Act. The data is sent to Statistics Canada on an annual basis where it is reviewed, edited and compiled into the Canadian Vital Statistics System. Upon ORG approval, the final dataset is sent to the MOHLTC, who distribute the data through the Provincial Health Planning Database using the IntelliHEALTH platform.

**Emergency Department Visits and Hospitalizations:** NACRS 2002-2011, Ontario Ministry of Health and Long-Term Care, IntelliHEALTH ONTARIO, Date Extracted: March 2013. Data age-standardized to the 1991 Canadian Population.

#### National Ambulatory Emergency External Cause (Chapter 20) (NACRS)

Information on all problem diagnoses including external cause for ambulatory care visits are collected through NACRS. NACRS data are distributed through the Provincial Health Planning Database using the IntelliHEALTH platform. Ambulatory visits include emergency visits as well as other hospital-based outpatient clinics (e.g., renal dialysis, day/night surgery).

Hospitalizations were identified through NACRS using Disposition status equal to 6 or 7 (transfers to inpatient care in the reporting hospital). NACRS also includes hospitalizations for patients who were admitted to an adult psychiatric bed.

Emergency Department Visits, Hospitalizations and Mortality denominator data: Population Estimate Summary, 1998 – 2009. Statistics Canada, Ontario Ministry Finance, Ontario Ministry of Health and Long-Term Care: IntelliHEALTH ONTARIO, Date Extracted: March 2013.

#### **Sunnybrook Health Sciences / Coroner's Data**

Data from the Office of the Chief Coroner (OCC for Ontario) was obtained from a database held by researchers at Sunnybrook Health Sciences Centre in Toronto, ON. The database contains information for all deaths occurring in the city of Toronto from 1998-2011, inclusive, that were ruled as suicides. The database excludes persons who are not residents of Toronto.

## *Definitions*

**Age-specific mortality rates:** the annual number of deaths in a given age group from suicide per 100,000 population in that age group during a given year.

**Age-standardized mortality rates (SRATEs):** the number of deaths from suicide per 100,000 population that would occur if the population had the same age distribution as the 1991 Canadian population.

**Age-specific hospitalization rates:** the total number of hospitalizations for intentional self-harm in a given age group per 100,000 population in that age group during a given year.

**The age-standardized hospitalization rate (SRATE):** the number of hospitalizations for intentional self-harm per 100,000 population that would occur in the population if it had the same age distribution as the 1991 Canadian population.

**Age-specific emergency department visits rates:** the total number of number of emergency department visits for selected causes of injury in a given age group per 100,000 population in that age group during a given year.

**Age-standardized emergency department visits rate (SRATE):** the number of emergency department visits for injury per 100,000 population that would occur in the population if it had the same age distribution as the 1991 Canadian population.

**Total potential years of life lost:** number of years NOT lived by an individual who died before age 75. (Intellihealth)

**Serious Suicide Consideration (CCHS):** determined by the question "Have you ever seriously considered committing suicide or taking your own life?" Respondents who answered the question affirmatively were then asked if they had seriously considered suicide in the past 12 months. Only respondents aged 15 and older are included in this population.

**Sex:** population based on their biological characteristics, whereas gender is a socially constructed concept. From a social determinants of health perspective, certain health conditions can be associated with gender, and from a biological perspective, health conditions can be associated with sex. Although reporting based on both concepts would be preferable, the data source used here only collects information on sex, and not gender.

**Income level:** based on the ratio of each survey respondent's annual household income to the low income cut-off corresponding to their household size, divided by the highest such ratio in Toronto. The lower level is the lowest 30% of income ratios, the middle level is the 31st to 70th percent, and the higher level is the top 30%.

**Recent immigrants:** arrived in Canada in the ten years prior to the data collection.

**Ethno-racial identity:** based on respondents identifying their cultural and/or racial background. The term racialized is used here to define groups that do not identify themselves as White, recognizing that 'races' or 'visible minorities' are socially constructed but have real consequences for individuals and communities.

### *Methods*

**Leading causes of death:** The 2009 Vital Statistics database provided information on the number of deaths in Toronto and the rest of Ontario, and the cause of death.

**Suicide mortality over time:** The Vital Statistics database provided information on the number of deaths due to intentional self-harm in Toronto and the rest of Ontario, by sex and 5 year age group, as well as the total population in Toronto and the rest of Ontario for all persons aged 10 and over for each year from 1986-2009.

Suicide mortality rates were obtained by dividing the number of suicide deaths in one year by the population in the same year, and then multiplying by 100,000 to calculate the number of deaths per 100,000 persons. The data were age-standardized to the 1991 Canadian population, meaning that for each year, the numbers of people in each age range was adjusted to reflect the breakdown of those age ranges in a single specified year (1991). This was done to ensure that any differences in suicide mortality were not due to changes in the age-structure of the Canadian population over time. Rates for Toronto and the rest of Ontario were calculated for both the whole population, and for each sex. 95% confidence intervals were also calculated; these are included to help understand whether any differences between the age groups are due to random chance, or are actual changes in mortality rates. 95% confidence intervals mean that we can be confident that the true value would be within that interval 95% of the time.

**Mortality by Age:** The Vital Statistics database provided information on the number of deaths in Toronto and the rest of Ontario, by sex and 10 year age group, as well as the total population in each age group for data year 2005-2009. 5 years of data were pooled together to increase the sample size in each age category, which provides a more precise estimate of the mortality rate. The proportion of suicide deaths was obtained by dividing the number of suicide deaths in each age stratum by the population in the same age stratum, and then multiplying by 100,000 to calculate the number of deaths per 100,000 persons. Rates for Toronto and the rest of Ontario were calculated for both the whole population, and for each sex. 95% confidence intervals were also calculated; these are included to help understand whether any differences between the age groups are due to chance, or are actual differences in mortality rates. 95% confidence intervals mean that we can be confident that the true value would be within that interval 95% of the time.

**Mechanism of Injury (MOI) – suicide mortality:** Data for mechanism of injury was provided by Vital Statistics for the years 2005-2009. The total number of suicide deaths was broken down by International Classification of Disease (ICD) 10 code for each mechanism of injury, and presented as a percentage of the total suicide deaths. The top six most common mechanisms of injury were reported for both the whole population, and each sex.

**Hospitalization and Emergency Department visits over time:** The National Ambulatory Care Reporting System (NACRS) database provided information on the number of hospitalizations and emergency department (ED) visits for intentional self-harm in Toronto and the rest of Ontario, by sex and 5 year age group for 2003-2011.

The proportion of hospitalizations for intentional self-harm was obtained by dividing the number of hospitalizations for intentional self-harm in one year by the population in the same year, and then multiplying by 100,000 to calculate the number of hospitalizations or ED visits per 100,000 persons. The data were age-standardized to the 1991 Canadian population, meaning that for each year, the numbers of people in each age range was adjusted to reflect the breakdown of those age ranges in a single specified year (1991). This was done to ensure that any differences in rates were not due to changes in the age-structure of the Canadian population over time. Rates for Toronto and the rest of Ontario were calculated for both the whole population, and for each sex. 95% confidence intervals were also calculated; these are included to help understand whether any differences between the age groups are due to random chance, or are actual changes in mortality rates. 95% confidence intervals mean that we can be confident that the true value would be within that interval 95% of the time.

**Hospitalization and emergency department visits by age:** The National Ambulatory Care Reporting System (NACRS) database provided information on the number of hospitalizations and emergency department (ED) visits for intentional self-harm in Toronto and the rest of Ontario, by sex and 10 year age group for 2007-2011.

Five years of data were pooled together to increase the sample size in each age category, which provides a more precise estimate of the hospitalization and ED visit rates. The proportion of suicide deaths was obtained by dividing the number of hospitalizations and emergency department visits in each age stratum by the population in the same age stratum, and then multiplying by 100,000 to calculate the number of deaths per 100,000 persons. Rates for Toronto and the rest of Ontario were calculated for both the whole population, and for each sex. 95% confidence intervals were also calculated; these are included to help understand whether any differences between the age groups are due to random chance, or are actual differences in mortality rates. 95% confidence intervals mean that we can be confident that the true value would be within that interval 95% of the time.

**Mechanism of Injury (MOI) – hospitalization and emergency department visits:** Data for mechanism of injury was provided by NACRS for the years 2007-2011. The number of hospitalizations and ED visits was broken down by International Classification of Disease (ICD) 10 code for each mechanism of injury. The most common mechanisms of injury were reported. Unlike deaths, ED visits and hospitalizations from self-harm are not assigned a primary cause of injury, meaning that one admission could encompass multiple diagnoses or classification of injury. Thus, the percentages for the mechanism of injury do not add up to 100%.

**Injury Pyramids by Sex:** The injury pyramids by sex use 2009 data from NACRS to summarize the total number of ED Visits and Hospitalizations by unique health card number in Toronto, and 2009 data from Vital Statistics to summarize the total number of deaths for suicide or intentional

self harm in Toronto. "Stacking" the total numbers in a pyramid allows a visualization of the number of ED visits, hospitalizations and deaths due to suicide in 2009.

**Canadian Community Health Survey Analysis:** Data from the Canadian Community Health Survey Cycles (CCHS) 2005 and 2007/08 was used to examine self-reported suicide ideation and attempts in Toronto. Data from 2005 and 2007/08 was combined in order to increase the sample size and provide a more precise estimate. Analyses were conducted using Stata statistical software 12.1 (StataCorp, 2011). Analyses were weighted to increase the representativeness of the sample using the svy prefix command for survey data analysis. Proportions of Toronto residents who have considered suicide in their lifetime and in the past 12 months were calculated as a total population, as well as by problem gambling status, racial group, and immigrant status.

Coefficients of variance were calculated to determine the reliability of each estimate, as per Statistics Canada's guidelines. Only estimates with a coefficient of variation that were in the "Acceptable" range (0.0-16.5) were reported. As a consequence, data on suicide attempts in Toronto could not be reported.

**Coroner's Data Analysis:** Data were abstracted from individual case files from the Office of the Chief Coroner (OCC) for Ontario. The analysis included pooled data from January 1998 – December 2011, among age groups 10-24, 25-44, 45-64, and 65+ years. These four age groups were chosen to examine contributing factors for suicide among specific populations (youth, young adults, middle aged, and older), with stratum that were large enough to ensure adequate sample sizes.

Data provided included age, sex, living situation at the time of death, location and cause of death, history of mental illness, past suicide attempt, and stressors. Data sources included the coroner's investigation report and pathology report, and, where available, police reports, letters from family members, copies of suicide notes, medical records, and interviews with family members, acquaintances, and physicians.

Descriptive statistics of both counts and percentages, stratified by age group and sex, were calculated for each contributing factor. Data was not provided for cells where there were less than five cases presented.

### *Limitations of data sources*

**Vital Statistics:** The Vital Statistics database may underestimate suicide deaths. Assessing whether the death was intentional may be difficult in some situations, and a coroner may initially code a death as "undetermined" until further information on the nature of death becomes available after investigation. This additional information does not appear in the mortality database. The stigma about suicide may also influence coding on the death certificate and lead to an underreporting of suicide deaths. Certain causes of death may produce greater uncertainty as to whether the death was intended as a suicide or not. This includes self-poisoning or drowning, which may be misclassified.

**National Ambulatory Care Reporting Services (NACRS):** NACRS captures self-harm behaviours of those that received care from a hospital or community based ambulatory service. Those who did not receive care for a self-harm behaviour from a hospital or community based ambulatory service would not be captured in the data. As well, capturing intention is difficult, and this indicator cannot distinguish whether the self injury was intended to result in death or in non-fatal self-harm. As noted above, there are certain codes for which it may be more difficult to assess intention. As a result, self-harm behaviours may be underestimated.

**Canadian Community Health Survey (CCHS):** The estimates for suicidal ideation and attempts are from self-reported data from the Canadian Community Health Survey (CCHS). Self-reported data has a number of limitations. People do not always remember their behaviours, and may under-report or over-report certain behaviours or characteristics based on their perceived social desirability. In addition, surveys do not always provide a representative picture of the whole population. The CCHS under-represents populations of low income, populations with low education, and new immigrants. The CCHS may also under-represent individuals with poor mental health and does not capture those who are homeless or institutionalized, who often have higher levels of poor mental health than the general public.

**Office of the Chief Coroner of Ontario (OCC):** While OCC reports in Ontario are thorough, data may underestimate suicide deaths, as a death can only be classified as a suicide if the intention is clear. Certain causes of death may be more likely to be misclassified than others, including self-poisoning or drowning. Additionally, some sources of information collected within a case file may be less reliable than other sources. This includes information collected from family members on psychiatric diagnoses and stressors. While the data is based on all available information, there are some case files that may be more complete than others, and thus some misclassification may have occurred for certain factors, including mental illness status and previous suicide attempt.

### ***Data Notes***

ICD-10 is the International Classification of Diseases, 10th Revision, an international standard for reporting clinical diagnoses developed by the World Health Organization. ICD-10 classifies diseases, injuries and causes of death, as well as external causes of injury and poisoning. It is used to monitor the incidence and prevalence of diseases and other health problems. ICD-10 diagnosis codes X60-X84 and Y87 were used to identify records associated with intentional self-harm.

Age-Standardization - Emergency Department Visits, Hospitalizations and Mortality estimates are age-standardized to the 1991 Canadian population. This allows for comparison of estimates over time and geography. However, because the standard population's distribution is younger than the current Toronto population, the age-standardized estimates are lower than the true rates.

Toronto is compared to Ontario without Toronto as opposed to the Ontario total because Toronto comprises such a large proportion of the Ontario population.

95% Confidence Interval is the range within which the true value lies, 19 times out of 20.

## Appendix C: Coroner's data tables

Table 4: Living Situation at Time of Death, Cause of Death, and Location of Death for Suicide Deaths in Toronto, 1998-2011

	10-24 age group (N=300)			25-44 (N=1157)			45-64 (N=1108)			65+ (N=526)			Totals																	
	Total		Female	Total		Female	Total **		Female	Total		Female	Total Males		Total Females	Total persons														
	n	%	(n=82)	n	%	(n=334)	n	%	(n=774)	(n=332)	n	%	(n=367)	(n=159)	(n=2182)	(N=907)	(N=3091)**													
<b>Living Situation at Time of Death</b>																														
Alone	63	21.0	48	22.0	15	18.3	485	41.9	359	43.6	126	37.7	548	49.5	390	50.4	158	47.6	230	43.7	146	39.8	84	52.8	943	43.2	383	42.2	1326	42.9
Family/Friend/Other	218	72.7	156	71.6	62	75.6	592	51.2	403	49.0	189	56.6	500	45.1	335	43.3	163	49.1	265	50.4	198	54.0	67	42.1	1092	50.0	481	53.0	1575	51.0
Nursing/Retirement Home*																														
Assumed Homeless	5	1.7					26	2.2	21	2.6	5	1.5	11	1.0																
Shelter/Hostel/Rooming House	6	2.0					30	2.6	23	2.8	7	2.1	19	1.7																
Other	8	2.7					23	2.0	16	1.9	7	2.1	25	2.3	18	2.3	7	2.1												
<b>Missing / Suppressed</b>	<b>0</b>	<b>0.0</b>	<b>14</b>	<b>6.4</b>	<b>5</b>	<b>6.1</b>	<b>1</b>	<b>0.1</b>	<b>1</b>	<b>0.1</b>	<b>0</b>	<b>0.0</b>	<b>0</b>	<b>0.0</b>	<b>31</b>	<b>4.0</b>	<b>4</b>	<b>1.2</b>	<b>6</b>	<b>1.1</b>	<b>4</b>	<b>1.0</b>	<b>2</b>	<b>1.3</b>	<b>50</b>	<b>2.3</b>	<b>11</b>	<b>1.2</b>	<b>7</b>	<b>0.2</b>
<b>Location of death</b>																														
Own home	165	55.0	118	54.1	47	57.3	688	59.5	472	57.4	216	64.7	733	66.2	485	62.7	247	74.4	365	69.4	254	69.2	111	69.8	1329	60.9	621	68.5	1951	63.1
Hospital	24	8.0	15	6.9	9	11.0	97	8.4	65	7.9	32	9.6	101	9.1	70	9.0	31	9.3	78	14.8	41	11.2	37	23.3	191	8.8	109	12.0	300	9.7
Other residence	24	8.0					68	5.9	50	6.1	18	5.4	56	5.1	39	5.0	17	5.1	8	1.5					89	4.1	35	3.9	156	5.0
Outdoors	45	15.0	35	16.1	10	12.2	182	15.7	147	17.9	35	10.5	117	10.6	99	12.8	17	5.1	39	7.4	34	9.3	5	3.1	315	14.4	67	7.4	383	12.4
Vehicle (car/subway/railway)	39	13.0	27	12.4	12	14.6	104	9.0	73	8.9	31	9.3	83	7.5	66	8.5	17	5.1	29	5.5					166	7.6	60	6.6	255	8.2
Work							11	1.0					11	1.0																
Other							7	0.1					7	0.1																
<b>Missing / Suppressed</b>	<b>3</b>	<b>1.0</b>	<b>23</b>	<b>10.5</b>	<b>4</b>	<b>4.9</b>	<b>0</b>	<b>0.0</b>	<b>16</b>	<b>1.8</b>	<b>2</b>	<b>0.5</b>	<b>0</b>	<b>0.0</b>	<b>15</b>	<b>2.0</b>	<b>3</b>	<b>1.0</b>	<b>7</b>	<b>1.4</b>	<b>38</b>	<b>10.3</b>	<b>6</b>	<b>3.8</b>	<b>92</b>	<b>4.2</b>	<b>15</b>	<b>1.7</b>	<b>10</b>	<b>0.3</b>
<b>Cause of death</b>																														
Hanging	103	34.3	70	32.1	33	40.2	350	30.3	283	34.4	67	20.1	316	28.5	244	31.5	72	21.7	143	27.2	109	29.7	34	21.4	706	32.4	206	22.7	912	29.5
Other Asphyxia	19	6.3	13	6.0	6	7.3	78	6.7	55	6.7	23	6.9	90	8.1	68	8.8	22	6.6	39	7.4	24	6.5	15	9.4	160	7.3	66	7.3	226	7.3
Fire/Burns/Electrocution*							10	0.9					19	1.7					5	1.0									34	1.1
Drowning/Hypothermia*							29	2.5	17	2.1	12	3.6	28	2.5	14	1.8	14	4.2	16	3.0	11	3.0	5	3.1	42	1.9	31	3.4	73	2.4
Overdose	19	6.3	9	4.1	10	12.2	196	16.9	106	12.9	90	26.9	283	25.5	148	19.1	134	40.4	111	21.1	47	12.8	64	40.3	310	14.2	298	32.9	609	19.7
Fall/Jump from Height	96	32.0	76	34.9	20	24.4	329	28.4	223	27.1	106	31.7	214	19.3	148	19.1	65	19.6	106	20.2	73	19.9	33	20.8	520	23.8	224	24.7	745	24.1
Shooting*	15	5.0					31	2.7					45	4.1					57	10.8									148	4.8
Cutting/Stabbing*							28	2.4					45	4.1					22	4.2									95	3.1
Subway/Train/Car Collision*	38	12.7	26	11.9	12	14.6	106	9.2	76	9.2	30	9.0	67	6.0	52	6.7	15	4.5	27	5.1					154	7.1	57	6.3	238	7.7
<b>Missing / Suppressed</b>	<b>10</b>	<b>3.3</b>	<b>24</b>	<b>11.0</b>	<b>1</b>	<b>1.3</b>	<b>0</b>	<b>0.0</b>	<b>63</b>	<b>7.6</b>	<b>6</b>	<b>1.8</b>	<b>1</b>	<b>0.0</b>	<b>100</b>	<b>13.0</b>	<b>10</b>	<b>3.0</b>	<b>0</b>	<b>0.0</b>	<b>103</b>	<b>28.1</b>	<b>8</b>	<b>5.0</b>	<b>290</b>	<b>13.3</b>	<b>25</b>	<b>2.8</b>	<b>11</b>	<b>0.4</b>

\* Empty cells contain n <5. \*\*n=2 with unknown sex

Data source: Suicide Deaths 1998-2011, Office of the Chief Coroner for Ontario.

**Table 5: Mental Illness and Previous Suicide Attempts for Suicide Deaths in Toronto, 1998-2011**

	10-24 N=300			25-44 N=1157			45-64 N=1108			65+ N=526			Totals N=3091		
	Total n (%)	Male n (%)	Female n (%)	Total n (%)	Male n (%)	Female n (%)	Total* n (%)	Male n (%)	Female n (%)	Total n (%)	Male n (%)	Female n (%)	All Males n=2182 (%)	All Females n=907 (%)	Total Persons n=3089* (%)
<b>Identified History of Mental Illness**</b>															
Yes	198 66	145 66.5	53 64.6	917 79.3	617 75	300 89.8	882 79.6	598 77.3	282 84.9	357 67.9	239 65.1	118 74.2	1599 73.3	753 83.0	2352 76.1
No	102 34	73 33.5	29 35.4	240 20.7	206 25	34 10.2	226 20.4	176 22.7	50 15.1	169 32.1	128 34.9	41 25.8	583 26.7	154 17.0	737 23.9
<b>Previous Suicide Attempt</b>															
Yes	64 21	35 16.1	29 35.4	361 31.2	215 26.1	146 43.7	319 28.8	192 24.8	127 38.3	103 19.6	65 17.7	38 23.9	507 23.2	340 37.5	847 27.4
No	236 79	183 83.9	53 64.6	796 68.8	608 73.9	188 56.3	789 71.2	582 75.2	205 61.7	423 80.4	302 82.3	121 76.1	1675 76.8	567 62.5	2242 72.6

\*n=2 where sex could not be determined

\*\*rates of identified mental illness and previous suicide attempt may be an underestimate due to limitations of data collection techniques

Data source: Suicide Deaths 1998-2011, Office of the Chief Coroner for Ontario.

**Table 6: Stressors Present in the One-Period Before Suicide Death in Toronto, 1998-2011, by Age Group**

**Total All age group:**

Type of stressor	Total		Male		Female	
	N=3091*	(%)	n=2182	(%)	n=907	(%)
Interpersonal conflict	404	13.1	275	12.6	129	14.2
Medical	330	10.7	227	10.4	103	11.4
Employment	303	9.8	212	9.7	56	6.2
Financial	270	8.7	202	9.3	47	5.2
Criminal involvement	187	6.0	152	7.0	28	3.1
Breakup	167	5.4	123	5.6	39	4.3
Bereavement	151	4.9	101	4.6	50	5.5
Perpetuating conflict	94	3.0	49	2.2	13	1.4
Housing	76	2.5	38	1.7	11	1.2
Immigration	47	1.5	20	0.9	7	0.8
Victimization	43	1.4	12	0.5	20	2.2
Academic	31	1.0	17	0.8	6	0.7
Civil legal stressor**	16	0.5				
CAS involvement**	14	0.5				

\* Includes 2 with no known sex

\*\* No sex breakdown as one or more of the sex-specific categories contains n <5.

Data source: Suicide Deaths 1998-2011, Office of the Chief Coroner for Ontario.

**10-24 age group:**

Type of stressor	Total		Male		Female	
	N=300	(%)	n=218	(%)	n=82	(%)
Interpersonal conflict	67	22.3	44	20.2	23	28.0
Breakup	36	12	28	12.8	8	9.8
Criminal involvement	30	10	23	10.6	7	8.5
Academic	23	7.7	17	7.8	6	7.3
Financial*	20	6.7				
Employment*	17	5.7				
Perpetuating conflict	15	5	9	4.1	6	7.3
Victimization*	11	3.7				
Immigration*	10	3.3				
Bereavement*	8	2.7				
CAS involvement*	6	2				

Note: Medical, Housing and Civil Legal stressors not included as they contained n <5.

\* No sex breakdown as one or more of the sex-specific categories contains n <5.

Data source: Suicide Deaths 1998-2011, Office of the Chief Coroner for Ontario.

**25-44 age group:**

Type of stressor	Total		Male		Female	
	N=1157	(%)	n=823	(%)	n=334	(%)
Interpersonal conflict	177	15.3	120	14.6	57	17.1
Financial	129	11.1	103	12.5	26	7.8
Breakup	126	10.9	95	11.5	31	9.3
Employment	109	9.4	88	10.7	21	6.3
Criminal involvement	96	8.3	80	9.7	16	4.8
Bereavement	49	4.2	35	4.3	14	4.2
Medical	48	4.1	29	3.5	19	5.7
Perpetuating conflict	47	4.1	40	4.9	7	2.1
Immigration	27	2.3	20	2.4	7	2.1
Victimization	21	1.8	7	0.9	14	4.2
Housing*	20	1.7				
Academic*	8	0.7				
CAS involvement*	8	0.7				
Civil legal stressor*	7	0.6				

\* No sex breakdown as one or more of the sex-specific categories contains n <5.

Data source: Suicide Deaths 1998-2011, Office of the Chief Coroner for Ontario.

**45-64 age group:**

Type of stressor	Total		Male		Female	
	N=1108	(%)	n=774	(%)	n=332	(%)
Employment	159	14.4	124	16	35	10.5
Interpersonal conflict	131	11.8	90	11.6	41	12.3
Financial	121	10.9	99	12.8	21	6.3
Medical	108	9.7	73	9.4	35	10.5
Breakup	92	8.3	69	8.9	23	6.9
Bereavement	66	6.0	41	5.3	25	7.5
Criminal involvement	54	4.9	49	6.3	5	1.5
Housing	49	4.4	38	4.9	11	3.3
Perpetuating conflict*	32	2.9				
Victimization	11	1.0	5	0.6	6	1.8
Immigration*	10	0.9				
Civil legal stressor*	9	0.8				

Note: CAS involvement and academic stressors not included as they contained n <5.

\* No sex breakdown as one or more of the sex-specific categories contains n <5.

Data source: Suicide Deaths 1998-2011, Office of the Chief Coroner for Ontario.

**65+ age group:**

	Total		Male		Female	
	n=526	(%)	n=367	(%)	n=159	(%)
Medical	174	33.1	125	34.1	49	30.8
Bereavement	36	6.8	25	6.8	11	6.9
Interpersonal conflict	29	5.5	21	5.7	8	5.0
Employment*	18	3.4				
Criminal involvement*	7	1.3				
Housing*	7	1.3				
Breakup*	5	1				

Note: Financial, perpetuating conflict, civil legal, immigration, academic, CAS involvement and victimization stressors were excluded as they contained n <5.

\* No sex breakdown as one or more of the sex-specific categories contains n <5.

Data source: Suicide Deaths 1998-2011, Office of the Chief Coroner for Ontario.

## Appendix D: Effective Interventions

**Table 7: Summary of the Quality\* and Recency of Included Systematic Reviews**

Last year the literature was searched	High quality (n=18)	Medium quality (n=43)	Low quality (n=35)
2011-2014	7	17	20
2008-2010	7	14	7
2005-2007	1	4	2
pre-2005	3	8	6

Source: Hirji et al. (2014)

\*Reviews were assessed for quality using the AMSTAR quality appraisal tool, which rates overall quality on a scale of 0 to 11 with 8-11 being high quality, 4-7 medium quality and 0-3 low quality.

**Table 8: Summary of Key Findings from Systematic Reviews Regarding Universal Interventions for Suicide Prevention**

Intervention	Key findings		
	Benefits	Harms	Costs
Media reporting restrictions	<ul style="list-style-type: none"> <li>Sharp reductions in death by suicide, as high as 75%, have been found after the introduction of media restrictions for reporting of suicides</li> <li>Media restrictions are associated with decreases in headline mentions of suicide; glorification or sensationalized text and headlines; detailed descriptions of suicidal acts; use of graphics; and references to celebrity status of victims</li> <li>The internet is often a high-risk factor for socially isolated and susceptible individuals who are difficult to reach in other ways; therefore, restricting their exposure to suicide may yield large benefits</li> </ul>	<ul style="list-style-type: none"> <li>Some studies have shown a paradoxical increase in stories about suicide</li> <li>Although some studies have found reductions to persist as long as five years after means restrictions are instituted, other studies have found a regression to pre-intervention levels</li> <li>In general, the influence of media on behaviour varies by age and gender, and so the effect of the media in provoking or deterring suicide are expected to vary by age and gender as well</li> </ul>	<ul style="list-style-type: none"> <li>Time and resources are required to manage reporters who are may not be supportive of guidelines</li> <li>Organizational training of media staff is needed to create awareness of restrictions and optimize usage</li> </ul>
Means access restrictions	<ul style="list-style-type: none"> <li>Means access retractions have been widely found to be effective</li> </ul>	<ul style="list-style-type: none"> <li>May decrease means-specific suicides but</li> </ul>	None reported

	<ul style="list-style-type: none"> <li>Restricting alcohol purchasing (including tax and price regulations), pharmaceutical access (both over-the-counter and prescription-only), pharmaceutical dispensing (limits on volume, requiring blister packs), and car exhaust (through requiring catalytic converters) decrease suicide attempts and deaths by those causes, though the causal link is disputed in some cases</li> <li>The effects of firearms restriction is unclear</li> <li>Means access restrictions are most effective at limiting suicide by very lethal means or by alcohol-related mortality</li> </ul>	<p>increase suicides by other means</p> <ul style="list-style-type: none"> <li>Restrictions on certain pharmaceuticals may shift use to other pharmaceuticals</li> <li>Are more effective in females than males as males are more likely to substitute for alternate means</li> </ul>	
National suicide prevention programs	<ul style="list-style-type: none"> <li>Several studies have shown positive effects, and many have promising results, however, some of these report on intermediate- or process-outcomes rather than on suicide rates</li> </ul>	<ul style="list-style-type: none"> <li>Not all subpopulations are affected equally</li> <li>Effects wane and return to pre-intervention levels when the intervention is withdrawn</li> <li>Studied programs do not always account for local socioeconomic and cultural contexts</li> </ul>	<ul style="list-style-type: none"> <li>Costs were low to low/medium on account of not needing direct physician involvement</li> </ul>
Public messaging	<ul style="list-style-type: none"> <li>One study found a reduction in perceived barriers to accessing help, and an increase in help-seeking, but other studies have not corroborated this finding.</li> </ul>	None reported	None reported
Other	<ul style="list-style-type: none"> <li>One review evaluated the effects of hosting the Olympic Games on rates of death by suicide and found no effect.</li> </ul>	None reported	None reported

Source: Hirji et al. (2014)

**Table 9: Summary of Key Findings from Systematic Reviews Regarding Selective Interventions for Suicide**

Intervention	Key findings		
	Benefits	Harms	Costs
Training and peer education	<ul style="list-style-type: none"> <li>Interventions identified as promising (but often having some mixed findings) included:               <ul style="list-style-type: none"> <li>psychosocial education interventions;</li> <li>training for several groups (students in need; individuals identified as having primary contact with those at risk of suicide, teachers and students, GPS and community facilitators, veterans, military officers service members,</li> <li>school-based prevention programs that include a training component, as well as programs and skills training targeted specifically to high-risk students;</li> </ul> </li> <li>Psychoeducational programs generally do not increase help-seeking behaviour in youth but combining it as part of multimodal interventions such as screening seems to have a possible effect on help seeking</li> <li>Education of physicians in depression recognition and treatment, and in restricting access to lethal means were able to reduce suicide rates</li> <li>In a review of suicide programs for Canadian youth ages 10-24 years, six out of nine school programs led to improvements in knowledge on suicide, one led to improvements in attitudes about suicide, and three to improvements in skills required to intervene in the suicidal process</li> <li>The same review found that one of the three suicide-prevention centre programs led to a reduction in suicidal urgency, while another of the three led to reduction in suicidal ideation</li> </ul>	<ul style="list-style-type: none"> <li>One review identified studies indicating that gatekeeper training either had no improvement or decreases in help-seeking behaviour by students, peers and parents</li> <li>One review found some evidence to suggest that programs to enhance knowledge about suicide and mental health issues may disturb high-risk youth and make them more prone to suicidal behaviour, especially if there is a lack of access to care</li> </ul>	<ul style="list-style-type: none"> <li>None reported</li> </ul>
Providing assistance to general practitioners or health service planners	<ul style="list-style-type: none"> <li>Training physicians to provide specific depression management led to a significant reduction in suicidal ideation among older adults, but was limited to those with major depression and effects were greater in women (78)</li> <li>Practice management guidelines were not effective nor were emergency department management strategies to provide psychosocial assessments</li> </ul>	<ul style="list-style-type: none"> <li>Psychometric screening tests were not seen as helpful for primary care practitioners in assessment of youth at risk of suicide</li> </ul>	<ul style="list-style-type: none"> <li>A systematic review found one study indicating that training GPs to respond to youth at risk of suicide decreased drug and hospital care costs</li> </ul>

Providing assistance to family/friends of high-risk individuals	<ul style="list-style-type: none"> <li>Person-to-person interventions delivered to parents and caregivers that are aimed at modifying adolescent risk and protective behaviours, are effective at reducing adolescent risk behaviours and yield improvements in overall adolescent health</li> </ul>	<ul style="list-style-type: none"> <li>None reported</li> </ul>	<ul style="list-style-type: none"> <li>None reported</li> </ul>
Postvention	<ul style="list-style-type: none"> <li>Inconsistent positive effects have been found across reviews evaluating approaches to postvention</li> </ul>	<ul style="list-style-type: none"> <li>Negative effects of school-based suicide postvention have been observed</li> </ul>	<ul style="list-style-type: none"> <li>None reported</li> </ul>
Telephone-based suicide prevention services	<ul style="list-style-type: none"> <li>One longitudinal study included in a review found significantly fewer suicides by telephone hotline and emergency service users</li> <li>One qualitative study found telephone-based suicide prevention services to be helpful for non-chronic suicidal callers</li> </ul>	<ul style="list-style-type: none"> <li>None reported</li> </ul>	<ul style="list-style-type: none"> <li>None reported</li> </ul>
Mobile device prevention services	<ul style="list-style-type: none"> <li>No reviews identified</li> </ul>	<ul style="list-style-type: none"> <li>No reviews identified</li> </ul>	<ul style="list-style-type: none"> <li>No reviews identified</li> </ul>
Drug misuse programs	<ul style="list-style-type: none"> <li>Three trials of interventions for problem drinking showed reductions in death by suicide after the intervention (brief physician intervention with follow-up telephone call, rehabilitation program, and motivational intervention) though these were small and not statistically significant</li> <li>One study evaluating a program for problem-drinking reported a reduction in suicide attempts following telephone aftercare contact</li> </ul>	<ul style="list-style-type: none"> <li>One trial found a small increase in suicide after a brief physician intervention</li> </ul>	<ul style="list-style-type: none"> <li>None reported</li> </ul>

Source: Hirji et al. (2014)

**Table 10: Summary of Key Findings from Systematic Reviews Evaluating Indicated Interventions**

Intervention	Key findings		
	Benefits	Harms	Costs
Training and peer education	<ul style="list-style-type: none"> <li>Interventions identified as promising (but often having some mixed findings) included:               <ul style="list-style-type: none"> <li>psychosocial education interventions;</li> <li>training for several groups (students in need; individuals identified as having primary contact with those at risk of suicide, teachers and students, GPS and community facilitators, veterans, military officers service members,</li> <li>school-based prevention programs that include a training component, as well as programs and skills training targeted specifically to high-risk students;</li> </ul> </li> <li>Psychoeducational programs generally do not increase help-seeking behaviour in youth but combining it as part of multimodal interventions such as screening seems to have a possible effect on help seeking</li> <li>Education of physicians in depression recognition and treatment, and in restricting access to lethal means were able to reduce suicide rates</li> <li>In a review of suicide programs for Canadian youth ages 10-24 years, six out of nine school programs led to improvements in knowledge on suicide, one led to improvements in attitudes about suicide, and three to improvements in skills required to intervene in the suicidal process</li> <li>The same review found that one of the three suicide-prevention centre programs led to a reduction in suicidal urgency, while another of the three led to reduction in suicidal ideation</li> </ul>	<ul style="list-style-type: none"> <li>One review identified studies indicating that gatekeeper training either had no improvement or decreases in help-seeking behaviour by students, peers and parents</li> <li>One review found some evidence to suggest that programs to enhance knowledge about suicide and mental health issues may disturb high-risk youth and make them more prone to suicidal behaviour, especially if there is a lack of access to care</li> </ul>	<ul style="list-style-type: none"> <li>None reported</li> </ul>
Providing assistance to general practitioners or health service planners	<ul style="list-style-type: none"> <li>Training physicians to provide specific depression management led to a significant reduction in suicidal ideation among older adults, but was limited to those with major depression and effects were greater in women</li> <li>Practice management guidelines were not effective nor were emergency department management strategies to provide psychosocial assessments</li> </ul>	<ul style="list-style-type: none"> <li>Psychometric screening tests were not seen as helpful for primary care practitioners in assessment of youth at risk of suicide</li> </ul>	<ul style="list-style-type: none"> <li>A systematic review found one study indicating that training GPs to respond to youth at risk of suicide decreased drug and hospital care costs</li> </ul>

Providing assistance to family/friends of high-risk individuals	<ul style="list-style-type: none"> <li>• Person-to-person interventions delivered to parents and caregivers that are aimed at modifying adolescent risk and protective behaviours, are effective at reducing adolescent risk behaviours and yield improvements in overall adolescent health</li> </ul>	<ul style="list-style-type: none"> <li>• None reported</li> </ul>	<ul style="list-style-type: none"> <li>• None reported</li> </ul>
Postvention	<ul style="list-style-type: none"> <li>• Inconsistent positive effects have been found across reviews evaluating approaches to postvention</li> </ul>	<ul style="list-style-type: none"> <li>• Negative effects of school-based suicide postvention have been observed</li> </ul>	<ul style="list-style-type: none"> <li>• None reported</li> </ul>
Telephone-based suicide prevention services	<ul style="list-style-type: none"> <li>• One longitudinal study included in a review found significantly fewer suicides by telephone hotline and emergency service users</li> <li>• One qualitative study found telephone-based suicide prevention services to be helpful for non-chronic suicidal callers</li> </ul>	<ul style="list-style-type: none"> <li>• None reported</li> </ul>	<ul style="list-style-type: none"> <li>• None reported</li> </ul>
Mobile device prevention services	<ul style="list-style-type: none"> <li>• No reviews identified</li> </ul>	<ul style="list-style-type: none"> <li>• No reviews identified</li> </ul>	<ul style="list-style-type: none"> <li>• No reviews identified</li> </ul>

*Source: Hirji et al. (2014)*

## Appendix E: Select crisis centres and resources in Toronto

- **Anishnawbe Health Mental Health Crisis Line:** 416-891-8606
  - For Aboriginal clients
- **Centre for Addiction and Mental Health (CAMH)**
  - **Dialectical Behaviour Therapy (DBT):** This is a one-year intensive outpatient psychotherapy program for adults (18-65) with Borderline Personality Disorder (BPD). It includes one hour of individual therapy weekly, and one two-hour skills group weekly. Anyone with BPD is eligible except those who also have a chronic psychotic or cognitive disorder. The treatment is designed for individuals who are not involved in other primary therapies.
  - **Twenty-Week Skills Group:** This is a 20-week group (two hours, once weekly) that offers DBT based skills training to people with BPD. Participants are required to have an outside primary therapist while attending the group.
  - **Psycho-Educational Support Group for Family and Friends of People with BPD:** This is an 8-week group designed to help friends and loved ones of those with BPD develop a better understanding of the disorder, learn skills to improve their relationships and manage stress.
- **Distress Centres of Toronto:** 416-408-HELP (4357)
  - The Distress Centre provides crisis response, intervention, and emotional support to those experiencing emotional distress or in need of crisis intervention and suicide prevention. The Centre serves as a point of access for suicide prevention, intervention and postvention. The Centre provides links to emergency services when necessary. Includes access to a confidential interpreter, offered in 151 languages.
- **Gerstein Crisis Centre:** 416-929-5200
  - The Gerstein Centre provides crisis intervention to adults, living in the City of Toronto, who experience mental health problems. The service has three aspects, telephone support, community visits and a ten-bed, short-stay residence. The Centre provides supportive counselling for immediate, crisis issues and referrals to other services for on-going, non-crisis issues. The service is a non-medical community mental health service. Crisis calls of a medical nature (severe self-harm or suicide attempts) are referred to a hospital.
- **Kids Help Phone:** 1-800-668-6868 or kidshelpphone.ca
  - Call or go online to reach a professional counsellor
  - Youth 20 and under
- **Mobile Crisis Intervention Team (MCIT)**
  - Collaborative partnership between Toronto hospitals and the Toronto Police Services. The program provides community crisis response from a police constable and a registered nurse, both trained in mental health to individuals who are experiencing a mental health crisis. The MCIT assesses the individual's needs, intervenes, de-escalates the situation and links the individual to appropriate services.

- **Mount Sinai Hospital Crisis Clinic:**
  - The Mount Sinai Hospital Crisis Service provides short-term crisis intervention to individuals who are experiencing difficulty in coping with recent stressors in their lives. The focus of the program is to manage and support patients through acute crisis. Patients in the clinic meet with a clinician for up to a maximum of 6 sessions.
- **North York General Hospital**
  - North York General Hospital offers crisis Intervention and Stabilization and partial hospitalization program that allows adults experiencing acute emotional distress to get treatment and still live at home if they have support. The partial hospitalization program is offered on weekdays from 9 a.m. to 3 p.m. and is a combination of group therapy and individual counseling, with other types of therapy available if needed.
- **St. Michael's Hospital**
  - Psychosocial/Psychoeducational Intervention for people with recurrent Suicide Attempts (PISA): The PISA Intervention has been in operation since February 1999. PISA is a group therapeutic intervention for people with recurrent suicide attempts and aims to decrease suicide-related behaviour, increase resilience and begin the person on a recovery path. The intervention is educational, supportive and skills-based, it teaches people how to stay safe, how to manage emotions and relationships and how to improve problem solving skills. In PISA, clients meet in small groups of 8-10 people once a week for 20 weeks.
  - Emergency Crisis Service: Available 24 hours/day for mental health emergencies. Services include:
    - Psychiatric and medical evaluations.
    - Crisis intervention, assessment and stabilization.
    - Referrals to the appropriate level of care which includes inpatient admission and referral to outpatient services and community resources.
  - Crisis Stabilization Unit (CSU): The crisis stabilization unit is a 24 hour-a-day, 3-bed unit located adjacent to the emergency department. The service provides extended observation, treatment and support up to 72 hours to mental health clients seen in the emergency department.
  - Mobile Crisis Intervention Team (MCIT): The MCIT is a partnership program between St. Michael's Hospital and Toronto Police Divisions 51 and 52. The program partners a mental health professional and a police officer who respond to 911 emergency and police dispatch calls involving emotionally disturbed persons, from 1 p.m. to 11 p.m. seven days a week. The service area includes Bloor to Lakeshore and Spadina to the Don Valley.
- **Scarborough Hospital**
  - The regional Crisis program at Scarborough Hospital offers a hospital crisis program to support individuals arriving at the hospital's Birchmount campus Emergency Department. Crisis workers are available on site 24/7 to provide assistance to individuals experiencing emotional or psychiatric crisis. The program's services are offered to all Scarborough residents from 11:30 p.m. to 7:30 a.m.
- **Scarborough Mobile Crisis: 416-495-2891**
  - For individuals 16+ living in Scarborough and East York

- **St. Elizabeth Health Centre Community Crisis Response:** 416-498-0043
  - For individuals 16+ living in Etobicoke and North York
- **Sunnybrook Health Sciences Centre**
  - Sunnybrook has a psychiatric emergency services program, and in-patient beds/outpatient follow up with an emphasis on mood and anxiety disorders, adolescent and geriatric populations.
- **Telehealth Ontario:** 1-866-797-0000
  - Provides medical information about symptoms and treatment
- **Toronto Western Hospital**
  - The Psychiatric Emergency Services (PES) at Toronto Western Hospital offers a 24-hour service and is physically located in the Emergency Department. The team provides rapid triage, assessment, management and disposition for the adult mental health patient who require these services while in the Emergency Department. PES is designed to provide a safe, secure, and integrated environment where assessments can take place.
- **Youthdale Crisis Support Team:** 416-363-9990
  - Mental health services and crisis response for children 6-18 and their families
- **211toronto.ca**
  - A searchable directory of community, social, health and government services including local suicide prevention supports.

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