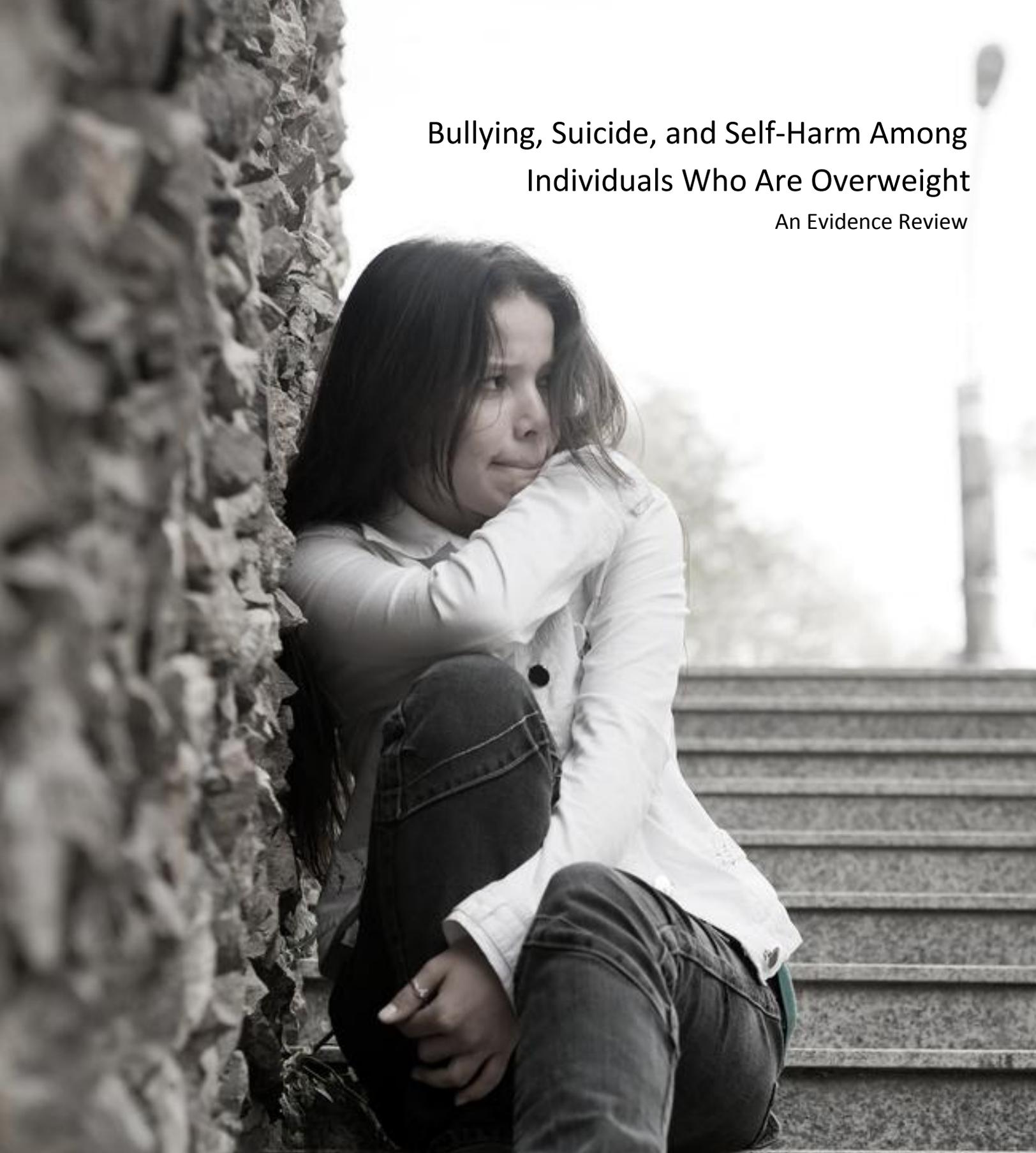


# Bullying, Suicide, and Self-Harm Among Individuals Who Are Overweight

An Evidence Review



**BC INJURY** research and prevention unit



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March, 2013

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Suggested citation:

Girardi A, Babul S, Rajabali F, & Pike I. (2013). *Bullying, Suicide, and Self-Harm Among Individuals Who Are Overweight: An Evidence Review*. A report prepared by the BC Injury Research and Prevention Unit for the Provincial Health Services Authority. Vancouver, BC.

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## Executive Summary

The purpose of this report is to summarize and synthesize recent research evidence on the association between body weight and three indices of psychosocial functioning: bullying, suicide, and self-harm. The guiding research question was whether overweight or obese individuals are more likely to experience injury as a result of these difficulties compared with individuals who are of healthy weight.

A person is bullied when he or she is repeatedly exposed to the intentional negative actions of another person (Solberg & Olweus, 2003). Researchers have conceptualized a number of different forms of bullying. *Physical aggression* refers to acts involving physical contact with the victim (e.g., hitting, pushing), *relational aggression* refers to “harming others through purposeful manipulation and damage of their peer relationships” (Crick & Grotpeter, 1995). *Suicide ideation* is defined as “any thinking about, considering, or planning for suicide,” *attempted suicide* is defined as “a non-fatal self-directed potentially injurious behaviour with any intent to die as a result of the behavior,” and *completed suicide* is defined as “death caused by self-directed injurious behaviour with any intent to die as a result of the behaviour.” *Self-harm* or *self-injury* is defined as “the intentional destruction of body tissue without suicidal intent and for purposes not socially sanctioned” (Klonsky, 2007).

### Method

Specific criteria were developed to clearly define the type of research that would be considered relevant to the review. Five electronic databases were searched for evidence (CINAHL, EMBASE, ERIC, Medline, PsycINFO). The search strategy required that the title or the abstract of the report contained both 1) terms related to body weight (e.g., BMI) and 2) terms related to bullying, suicide, or self-harm (e.g., aggression, victim). The search identified 5,744 unique citations that were screened for relevance using a pre-determined set of questions. Data from relevant studies was extracted and summarized in a series of tables. The search identified 33 unique, relevant studies related to bullying, 39 studies related to suicide, and 4 studies related to self-harm. Interviews were conducted with key informants to supplement the information gleaned from the database search.

### Results

The largest proportion of bullying studies were conducted in the United States (45%), followed by Canada (12%) and the United Kingdom (12%). The number of participants in each study ranged from  $n = 148$  to  $n = 12,439$ ; mean ages of the participants ranged from 8.5 years to 46.8 years. The largest number of studies (39%) included both children and adolescents, 30% of studies included adolescents only, 24% included children only, and 2 studies (6%) included adults. Nine reports (27%) clearly indicated that a procedure was used to recruit a *random* sample of participants from the population of interest, ten studies (30%) did not use a random sample of participants, and insufficient information was provided to determine whether a random sample was selected in the remaining 14 studies (42%). Considerable variability was observed in the methods used to assess bullying; in many of the studies (45%) bullying was assessed using 1-3 individual questions, and few reports included sufficient information about the reliability and validity of the measures. Twenty-three of the studies (70%)

contained results on relational aggression, 7 of which also contained results on physical aggression. Weight-related teasing was the most common form of relational aggression addressed. None of the studies focused solely on physical aggression. The remaining 10 studies (30%) described results related to bullying, but did not specify whether the aggression was physical or relational.

Three studies conducted in North America found that overweight/obese youth were not at an increased risk of being physically victimized compared with normal weight peers; however, three studies conducted in Europe and Asia found that overweight and/or obese youth were at significantly increased risk of experiencing physical aggression. In all age groups, individuals who were overweight or obese were significantly more likely to experience verbal aggression (i.e., teasing) compared with individuals who were not overweight. Conflicting results were observed as to whether overweight/ obese participants were significantly more likely than healthy-weight peers to experience other forms of relational aggression (i.e., social exclusion).

Three recent reviews were identified during the database search in which the authors summarized recent research regarding the association between weight/obesity and suicide. Of the 39 relevant studies identified in our search, 28 had been included in one or more of the previous reviews. The characteristics of the included studies are described in detail in the reviews.

Results of studies on suicide ideation were inconsistent. Some studies found an increased risk of suicide ideation among overweight or obese individuals, and others found no association between weight and suicide ideation. There was a relatively consistent pattern of results suggesting that overweight/obese females were at a significantly increased risk of suicide *attempts* compared with healthy weight peers, whereas overweight/obese males were less likely to report suicide attempts than healthy weight males. The results of the previous reviews concurred that the prevalence of death by suicide is *lower* among overweight/obese individuals compared with healthy weight individuals

Very little recent research has examined the association between weight and self-harm. Of the 4 studies identified, only one included an analysis of the association between actual body weight and self-harm using participants from a community-based sample (Kinoshita et al., 2012). The results indicated that overweight participants were not at an increased risk of self-harm compared with healthy-weight participants; however, the study was conducted in Japan so the results may or may not be applicable to North American populations. No conclusions can therefore be drawn, based on the currently available evidence, as to whether overweight and/or obese individuals are at an increased risk of self-harm.

## **Discussion**

Methodological weaknesses of the studies limit our ability to interpret and generalize the results. A major limitation of the bullying literature relates to the methods that were used to measure bullying. Most studies used a different measure to assess bullying, did not report reliability or validity of the measures, and many studies did not differentiate between physical and relational aggression. Limitations of the suicide literature identified by the authors of previous reviews include self-reporting of participants' height and weight, lack of longitudinal data to establish causal associations, lack of

control for confounding factors, potential reporting bias from interview assessments, and inconsistencies in the way in which coroners record suicide deaths. The most important limitation of the evidence on the association between weight and self-harm is the dearth of empirical research on this topic. Many of the same limitations identified for the literature on bullying and suicide also apply to the research on self-harm (e.g., lack of data on validity of measures and participant characteristics).

Several questions remain as to whether there is a clear association between weight and injury consequential to bullying, suicide, and self-harm. Specifically, very little recent research has examined the association between weight and physical aggression, particularly among children under the age of 12 years, and conflicting results were obtained among studies as to whether overweight individuals are at an increased risk of being physically victimized. Given that children who are bullied are more likely to carry weapons, an important area for future research may be to investigate the injuries associated with weapon carrying. There may be additional factors and contexts that influence the associations among weight, bullying, and self-harm that should be considered in future research (e.g., body dissatisfaction, culture, sex), and there is a need for longitudinal research that could help establish the direction of causal associations among the variables. Additional research using strong research designs is needed to evaluate whether existing bullying interventions reduce weight-related bullying.

Many researchers agree that there is a need to implement interventions to reduce weight-related bullying. Only one study was found that described an intervention to reduce weight-related teasing, but the results indicated that the intervention was not successful at reducing weight teasing. However, the key informants provided several examples of evidence-based bullying interventions that do not focus specifically on weight-related bullying. Schools have been identified as an appropriate setting for anti-bullying interventions, and it may be important to consider the specific settings in which weight-related bullying is most likely to occur. Some have suggested that interventions could be implemented with those who have been victimized so as to reduce the negative psychological outcomes of bullying.

Reviews of suicide prevention strategies indicate that successful approaches include cognitive-behavioural therapy, gatekeeper training, providing education to physicians about depression, and restricting access to lethal means of suicide such as firearms and prescription medications. The results of this review suggest that it may be important that suicide prevention strategies target overweight females in particular. Parents, teachers, health practitioners, and other professionals need to be made aware of the links among weight, bullying, and suicide to help them to identify those at risk who may benefit from intervention, and there may be a need to educate teachers and school staff about appropriate strategies for intervening when they observe bullying among students.

A productive national or provincial strategy would be to provide targeted funding to researchers to encourage the development and evaluation of new programs to target weight-related bullying, as well as the evaluation of existing anti-bullying programs to determine whether they are effective at reducing weight-related bullying. Collaborations among university-based researchers and community-based practitioners should be encouraged. Furthermore, it may be productive to provide funding and resources for schools to implement evidence-based anti-bullying programs, suicide prevention programs, and education programs for parents, teachers and other school staff.

## Introduction

The purpose of this report is to summarize and synthesize recent research evidence on the association between body weight and injury resulting from three indices of psychosocial functioning: bullying, suicide, and self-harm. The guiding research question was whether overweight or obese individuals are more likely to experience injury as a result of these difficulties compared with individuals who are of healthy weight.

The Canadian body weight classification system provides a method for categorizing individuals into four main weight categories according to associated health risks: underweight, normal weight, overweight, and obese (Health Canada, 2003). Classification is based on body mass index (BMI), which is calculated by dividing an individual's weight in kilograms by his/her squared height in metres ( $BMI = \text{kg}/\text{m}^2$ ). The classification system for adults is provided in Figure 1. Children under the age of 19 years are classified using a different system due to variability in weight by age and sex. According to the U.S. Centers for Disease Control (CDC), children are classified as overweight if their weight is above the 85<sup>th</sup> percentile and as obese if their weight is above the 95<sup>th</sup> percentile (Ogden & Flegal, 2010).

Figure 1. BMI categories and associated health risk. Reproduced from Health Canada (2003).

BMI	Weight Category	Health Risk
< 18.5	Underweight	Increased risk
18.5 – 24.9	Normal weight	Least risk
25.0 – 29.9	Overweight	Increased risk
30 and over	Obese	
30.0 – 34.9	Obese Class I	High risk
35.0 – 39.9	Obese Class II	Very high risk
> 40.0	Obese Class III	Extremely high risk

The results of the Canadian Health Measures Survey indicated that approximately 21% of females and 19% of males between the ages of 20 and 39 years were obese; 23% of females and 37% of males in this age category were overweight. A higher prevalence of overweight and obesity was observed in adults between the ages of 40 and 69 years (Shields et al., 2010). Among children and adolescents aged 5 to 17 years, 19.8% were overweight and 11.7% were obese (Roberts et al., 2012).

## **Bullying**

A person is bullied when he or she is repeatedly exposed to the intentional negative actions of another person. Solberg and Olweus (2003) described three main elements of bullying: 1) an intention to harm the victim, 2) a difference in power between the victim and the perpetrator, and 3) a pattern of behaviour that is repeated over time.

Researchers have conceptualized a number of different forms of bullying. The current review will distinguish between two major forms of bullying: physical aggression and relational aggression. Whereas *physical aggression* refers to acts involving physical contact with the victim (e.g., hitting, pushing), *relational aggression* refers to “harming others through purposeful manipulation and damage of their peer relationships” (Crick & Grotpeter, 1995). Examples of relational aggression may include spreading rumours, or purposely excluding others from a group. Behaviours such as teasing or name-calling are often described as *verbal aggression*; this type of aggression will be described as a form of relational aggression for the purposes of this review. Due to differences across age, gender and type of bullying, it is difficult to provide a general estimate of the prevalence of bullying. Wang et al. (2009) reported that, among children and adolescents in grades 6 to 10 in the U.S., 13% had been physically bullied, 37% had been relationally bullied, and 41% had been verbally bullied at school in the previous 2 months.

Physical aggression poses a clear risk of injury to the victim. While verbal and relational forms of aggression do not directly cause physical injury, there is evidence to suggest that relational aggression may indirectly increase the risk of injury. For example, child and youth victims of relational aggression in Canada and the United States were more likely to report carrying weapons compared with those who were not bullied (Dukes et al., 2010; Kukaswadia et al., 2012). Furthermore, victims of relational aggression were at a significantly increased risk for both suicide and self-harm compared with those who were not victimized (Kim & Leventhal, 2008; Klomek et al., 2007; Fisher et al., 2012).

## **Suicide**

The term *suicide* can refer to a broad range of behaviour. Zhang et al. (in press) provided clear definitions of three different types of suicidal behaviour. *Suicide ideation* was defined as “any thinking about, considering, or planning for suicide,” *attempted suicide* was defined as “a non-fatal self-directed potentially injurious behaviour with any intent to die as a result of the behavior,” and *completed suicide* was defined as “death caused by self-directed injurious behaviour with any intent to die as a result of the behaviour.” In the remainder of this report, the latter form of suicidal behaviour will be referred to as *death by suicide*. The prevalence of suicide in general populations depends on the type of suicidal behaviour that is assessed.

According to Statistics Canada (2012), the overall rate of death by suicide in 2009 was 11.5 per 100,000 population (0.01%), and data from the Office of the Chief Coroner of British Columbia suggests that the suicide rate in BC (11.4 per 100,000) is similar to the national rate (Ministry of Public Safety and Solicitor General, 2011). In 2010, suicide was the second leading cause of death among BC youth aged 15 to 24 years (BC Vital Statistics Agency, 2010). In a large epidemiological survey of Canadians over the age of 15

years, 0.6% had attempted suicide in the previous year (Robertson Blackmore et al., 2008). A national survey in the U.S. found that 3.7% of adults reported suicidal thoughts in the previous year (CDC, 2011), and the prevalence of suicide ideation among Canadian youth aged 12 to 15 years in Cycle 5 of the National Longitudinal Study of Children and Youth (NLSCY) was 8% (Peter et al., 2008).

### ***Self-Harm***

*Self-harm* or *self-injury* is defined as “the intentional destruction of body tissue without suicidal intent and for purposes not socially sanctioned” (Klonsky, 2007). A number of different terms are used to describe self-harm including *non-suicidal self-injury*, *deliberate self-harm*, *self-mutilation*, and *self-injurious behavior*. Examples of self-harm include cutting, burning, scratching, and hitting oneself (Klonsky, 2007; Sansone et al., 2008). Self-harm usually *excludes* socially sanctioned behaviours that cause harm to bodily tissues (e.g., piercing, tattooing) as well as self-destructive behaviours for which injury is an unintended consequence (e.g., excessive laxative use intended to induce weight-loss among individuals with eating disorders). Klonsky (2011) reported a lifetime self-harm prevalence rate of 5.9% among adults in the United States; the average age at which individuals reported their first instance of self-harm was 16 years. In a survey of adolescents in Victoria, BC, 16.9% of participants reported that they had deliberately harmed themselves at least once, and self-harm behavior was more prevalent among females compared with males (Nixon et al., 2008).

## **2.0 Method**

Specific criteria were developed to clearly define the type of research that would be considered relevant to the review (Appendix A). Five electronic databases were searched for evidence (CINAHL, EMBASE, ERIC, Medline, PsycINFO). The search strategy required that the title or the abstract of the report contained both 1) terms related to body weight (e.g., BMI) *and* 2) terms related to bullying, suicide, or self-harm (e.g., aggression, victim). The complete search strategy is provided in Appendix B.

The title search produced 244 citations, and the abstract search produced 5,929 citations. Therefore, a total of 6,173 citations were uploaded into the reference management software, Endnote, at which time unique reference identification (refID) numbers were assigned to each citation. Endnote identified 429 duplicate citations that were deleted, resulting in 5,744 unique citations.

The 5,744 unique citations were uploaded to the online systematic review software (DistillerSR) where they were screened for relevance. First, the titles of the citations were screened in order to quickly exclude articles that were clearly irrelevant. During the title screen, 5,396 articles were excluded and 338 advanced to the following stage of the screening process. An additional 10 articles were excluded because they were conference presentations, the full-text articles were not accessible electronically through the UBC library network, or they were identified as duplicates. In the second stage of the screening process, the abstracts of each article were reviewed. During the abstract screen, 207 articles were excluded leaving 131 articles that were deemed to be potentially relevant to the review.

Articles were then organized according to whether they contained data regarding bullying, suicide, and/or self-harm. Variables to be extracted from the included studies (e.g., participant ages, sample size,

results) were identified, and clear definitions for each variable were developed. Data for each variable was extracted from each article, then organized and summarized in a series of tables.

Three recent reviews were identified during the database search in which the authors summarized research regarding the association between weight/obesity and suicide (Heneghan et al., 2012; Klinitzke et al., 2013; Zhang et al., in press). The results of these reviews were summarized, and the additional evidence identified by our search was reviewed and compared with the results of the previous reviews.

Interviews were conducted with key informants to supplement the information provided by the database search. Interview questions are provided in Appendix C.

### **3.0 Results**

Of the 131 articles that were identified, two articles were identified on the topic of self-harm, 48 articles were identified on the topic of suicide, 2 articles were identified that included data on both suicide and self-harm, and 79 articles were identified on the topic of bullying. Only one of these articles described an intervention to reduce weight-related bullying.

Of the 79 articles related to bullying, 38 did not include comparisons between overweight and healthy-weight participants, or included a measure of discrimination as the outcome measure (e.g., employment hiring discrimination). This type of discrimination does not clearly fit within the definition of bullying as a repeated pattern of behavior by an individual with a clear intention to harm the victim. Furthermore, the focus of this review was on the injury consequences of weight-related bullying, so those studies of discrimination were excluded. Studies of relational forms of aggression (e.g., teasing) were included because previous research established that this type of relational aggression was associated with a higher risk of suicide and self-harm. An additional 5 studies examined the association between BMI and bullying; however, because the authors did not report whether the samples contained participants who were overweight/obese, these studies were excluded.

The remaining 35 bullying-related studies included comparisons of participants who were of healthy weight to those who were overweight and/or obese. It was determined that 2 of these articles were based on samples of participants that were the same as one of the other relevant articles. In other words, two separate journal articles had been published using the same sample of participants. Therefore, the bullying-related evidence contained in this review is based on 33 unique samples of participants. The results of the single study that included the results of an intervention to reduce weight-related bullying are reported separately.

Of the 50 articles on the topic of suicide, 28 were included in one or more of the recently published reviews on the association between weight and suicide. An additional 22 studies were identified that contained information about the association between body weight and suicidal behaviour. However, five of these studies were conducted only with participants who were currently or formerly overweight, and did not compare the frequency of suicidal behaviours between those who were overweight and those who were not overweight. One other study was identified that included a comparison of the suicidal tendencies of a group of participants with weight problems to another group of participants

without weight problems. However, the group with weight problems included those who used diet pills and engaged in purging or excessive fasting, in addition to those who were overweight. Four studies included analyses of participants' perceptions of their weight status (i.e., body satisfaction), but did not assess the association between actual body weight and suicidal behaviour. Finally, one study compared the prevalence of suicidal behaviour of a group of participants diagnosed with Binge Eating Disorder (BED) to a group of participants without BED. Although the majority of participants in the BED group were overweight or obese, both groups contained participants who were overweight as well as participants who were not overweight. It was therefore not possible to evaluate the unique effects of body weight on suicidal behaviour separately from the BED diagnosis. For these reasons, 11 studies were excluded from the main analyses on the association between weight and suicide.

### **3.1 Bullying**

Data from 33 unique bullying-related studies were extracted from the reports and summarized in evidence tables. A detailed explanation of the evidence tables, along with definitions of all variables is provided in Appendix D. Separate tables were created for four groups of studies: those that included only samples of children aged 12 years and under (Appendix E), those that included samples of both children and adolescents up to age 18 years (Appendix F), those that included only samples of adolescents between the ages of 13 and 18 years (Appendix G), and those that included only samples of adults aged 19 years and older (Appendix H). The bullying-related results are reported for each age group separately. First, the general characteristics of the studies are described in order to provide a context for the results. In the following section, key characteristics of the studies are highlighted including the proportions of studies that included data on the variables of interest; however, note that all available information about these characteristics is provided in the evidence tables in the appendices.

#### **3.1.1 Bullying studies comparing overweight and healthy-weight participants**

##### **3.1.1.1 Key study characteristics**

The largest proportion of studies were conducted in the United States (45%), followed by Canada (12%) and the United Kingdom (12%). The remaining studies were conducted in Australia (6%), Germany (6%), Sweden (6%), China (3%), Denmark (3%), Norway (3%) and South Korea (3%).

Many of the studies (52%) identified a specific name for the study. The most common study (21%) was the Health Behaviour of School-Aged Children study (HBSC). The HBSC study is a cross-national initiative of the World Health Organization. Three studies reported data for different waves of Project-EAT (Eating and Activity in Teens and Young Adults), and each of the remaining studies had a different name or were not identified by a specific name.

Most of the studies (79%) included information about the strategy that was used to recruit participants into the study, but 7 studies contained no information about the recruitment strategy. Nine reports (27%) clearly indicated that a procedure was used to recruit a *random* sample of participants from the population of interest. Ten studies (30%) did not use a random sample of participants. For example, some researchers recruited convenience samples from elementary schools or high schools (e.g., Bang et

al., 2012; Goldfield et al., 2010). In the remaining 14 studies (42%) insufficient information was provided to determine whether a random sample was selected; however some of these reports indicated that representative samples were selected (e.g., Farhat et al., 2010).

Approximately one-third of the studies (36%) included details regarding inclusion or exclusion criteria (i.e., characteristics of participants that deemed them eligible or ineligible to participate in the study). Inclusion criteria typically concerned the age of the participants and/or the ability of the participants to understand the language used in questionnaires. Some studies excluded participants who attended private schools or schools for students with special needs, and one study excluded participants with conditions or medications known to affect weight.

Considerable variability was observed in sample sizes. The number of participants in each study ranged from  $n = 148$  to  $n = 12,439$ . Almost 60% of the studies had sample sizes over 1000, and 18% had sample sizes over 5000.

All studies included information about the weight status of the participants. All studies included participants who were of healthy weight, all but one of the studies (97%) included participants who were overweight, and 82% included participants who were obese. One study compared participants who were obese to participants who were not obese; it is likely that overweight participants were included in the non-obese group, but this was not clearly indicated in the report. Five studies did not specify whether the overweight group also included participants who were obese. Forty-two per cent of the studies included participants who were underweight, 12% did not include underweight participants, and 46% of the reports did not specify whether underweight participants were included.

Most studies (88%) included data about the proportion of participants in at least one of four weight categories (i.e., underweight, healthy weight, overweight, obese); however, only 7 of the studies (21%) provided the proportion of participants in all four weight categories. In the only study to report the proportion of participants in all four weight categories from a randomly selected sample of participants, 4% of participants were underweight, 70% were healthy weight, 14% were overweight, and 13% were obese (Bauman, 2008). In the most recently published study including Canadian children and adolescents, 74% of participants were healthy weight, 19% were overweight, and 7% were obese (Kukaswadia et al., 2012). Among all studies, the proportion of underweight participants ranged from 0% to 25%, the proportion of healthy weight participants ranged from 54% to 80%, the proportion of overweight participants ranged from 7% to 43%, and the proportion of obese participants ranged from 1% to 23%. One key reason for the difference in proportions across studies may be related to differences in sampling procedures. For example, the authors of one study selected participants from schools that were known to have high proportions of students who were overweight (McCormack et al., 2011).

Specific data on the BMI of the participants were reported in 10 studies (30%). Among these studies, the mean BMI of the participants ranged from 17 to 26. Only two studies included specific data on the weight of the participants in kilograms.

The mean age of the participants was reported in 22 studies (67%). Mean ages ranged from 8.5 years to 46.8 years. In all studies, sufficient information was provided to determine whether the participants belonged to one or more of three age groups: childhood, adolescence, or adulthood. The largest number of studies (39%) included both children and adolescents, 30% of studies included adolescents only, 24% included children only, and 2 studies (6%) included adults.

All but one of the studies (97%) included information regarding the sex distribution of the participants. One study included all females. Of the remaining studies, the proportion of participants who were female ranged from 47% to 61%. Just over half of the studies (54%) included data on the ethnicity of the participants, and 36% included data on socio-economic status.

The methods used to assess bullying victimization were described in all but one of the studies (97%). In many of the studies (45%), bullying was assessed using 1-3 individual questions. For example, Brixval et al. (2011) used the following question: *"how often have you been bullied at school in the past month?"* In 14 studies (42%), multiple-item questionnaires were used that provided a total score based on the sum of the responses to the items. The Perceptions of Teasing Scale (Thompson et al., 1995) was used in 5 of these studies, and different questionnaires were used in each of the other 9 studies. One report indicated that the HBSC survey had been used, and two other reports indicated that several questions had been used but did not specify the number of items that were used.

Fewer than half of the reports (42%) contained information about the psychometric properties of the bullying assessment instruments. All of these 14 studies contained information about reliability, and 7 of the studies contained information about both reliability and validity. In many cases the authors did not provide specific psychometric data, but indicated simply that the scales or items had been validated.

The most common method of assessing bullying experiences was to ask the participants to complete a questionnaire (73%). Other methods included face-to-face interviews (6%), telephone interviews (6%), and online surveys (3%). In two studies (6%), the participants completed both questionnaires and interviews, but it was not clear if the bullying items were assessed by one or both of these methods. In one study (3%) participants completed either an online survey or a telephone interview, and in one study parents and teachers completed questionnaires and child participants were interviewed.

Most studies (91%) included a single respondent to the bullying questionnaire or interview, one study (3%) included two respondents, and one study (3%) included three respondents. In one study it was not clear how many respondents were included. In most studies (94%), participants provided a self-report of their bullying victimization experiences. In three studies (9%) parents responded to questions about their children's experiences with bullying, and one study (3%) included a teacher report.

Twenty-three of the studies (70%) contained results on relational aggression, 7 of which also contained results on physical aggression. Weight-related teasing was the most common form of relational aggression addressed. None of the studies focused solely on physical aggression. The remaining 10 studies (30%) described results related to bullying, but did not specify whether the aggression was physical or relational. In some cases, it was clear that the questionnaires included items related to both

physical and relational aggression, but the authors did not report results separately for each type of aggression.

The authors of 12 reports (36%) specified the perpetrators of the aggression, and the remaining reports contained no information about the identity of the bullies. Among the 12 studies with information about perpetrators, 4 assessed teasing by parents, 1 assessed teasing by siblings, 3 assessed teasing by friends, 1 assessed weight-based comments by significant others, 4 assessed teasing or weight-based comments by family members or relatives, and 9 assessed physical and/or relational aggression by peers. Seven of the studies included information about bullying by individuals in more than one of these categories.

Approximately one-quarter of the reports (27%) contained information about the location in which the bullying had taken place. All of these studies reported results of bullying that had taken place at school or on the way to, or from school.

### **3.1.1.2 Results of relevant bullying studies**

It was anticipated that there could be differences in the results according to the age of the participants; therefore, the results of the studies are described separately for each age group. One group of studies included only child participants up to the age of 12 years. The second group included both child and adolescent participants up to the age of 18 years. The third group included only adolescent participants between the ages of 13 and 18 years. Finally, the fourth age group included only adult participants over the age of 18 years. The results related to physical aggression, relational aggression, and unspecified (physical and/or relational) aggression will be discussed in separate sections.

#### ***Physical Aggression***

Among the studies that included child participants, only one included results on physical aggression. Frisen et al. (2009) did not report results on the association between BMI and physical aggression, but found that girls who perceived themselves as too fat experienced physical violence significantly more often than girls who did not perceive themselves as too fat.

Among studies that included child and adolescent participants, four studies included results on physical aggression. Two studies found that overweight or obese participants were not at an increased risk of physical bullying victimization compared to normal weight peers (Kukaswadia et al., 2012; Wang et al., 2010). However, Wang et al. (2010) found that underweight boys (not girls) were significantly more likely to be victims of physical aggression compared with healthy-weight peers. These two studies were conducted in Canada and the United States. Guo et al. (2010) found that significantly more obese and overweight participants experienced physical aggression than their normal weight peers; however rates of physical aggression were low. Less than 1% of normal weight children reported “often” being victims of physical aggression, whereas 1.8% of overweight participants and 1.6% of obese participants reported “often” being victims of physical aggression. Fox and Farrow (2009) found that overweight and obese participants had a significantly higher mean score on the physical aggression subscale of the questionnaire compared with non-overweight peers. These two studies were conducted in China and the United Kingdom, respectively.

Among studies that included samples of adolescents only, two included information about physical bullying. Kukaswadia et al. (2011) reported no significant differences between overweight/obese participants and healthy weight participants in Canada, after adjusting for potential confounding variables such as age and SES. Although obese boys were 2.07 times more likely to be victims of physical bullying than normal weight boys, the 95% confidence interval for the odds ratio included 1, so the difference between obese boys and normal weight boys was interpreted as not statistically significant. In Berg et al.'s (2005) Swedish sample of adolescents, significantly more obese adolescents (30%) reported being physically victimized than healthy weight adolescents (17%). However, overweight adolescents (22%) were not significantly more likely to report physical bullying compared with healthy weight peers.

Neither of the two studies that included only samples of adults reported results related to physical aggression.

### ***Relational Aggression - Child Samples***

Among the 8 studies that included child participants, 6 included results on relational aggression. In all of the studies in which weight- or appearance-related teasing was assessed, overweight and/or obese children were significantly more likely to be victimized compared with healthy weight peers on at least one form of teasing. For example, Bang et al. (2012) reported significantly higher scores on the POTS questionnaire, reflecting parental teasing, for overweight and obese Korean children compared with underweight or healthy-weight children. In a U.S. sample, McCormack et al., (2011) found that significantly more overweight/obese children than healthy-weight children reported being teased about weight in the past year, and being teased or made fun of by other kids and family members because of weight. On the other hand, there was no significant difference in the proportions of overweight/obese and healthy-weight children who reported being called names or being teased about looks. Griffiths et al. (2006) found that overweight and obese children were not at a significantly increased risk of relational aggression compared with average-weight peers.

In one study, the association between weight status and relational victimization appeared to depend on the source of the teasing (Kostanski et al., 2007). For example, 20% of overweight children reported weight teasing by friends, and 5% of healthy-weight children reported weight teasing by friends. On the other hand, 8% of overweight children reported weight teasing by their mothers, and 5% of healthy-weight children reported weight teasing by their mothers. In a regression analysis, BMI was a significant predictor of weight teasing by friends, but not of weight teasing by either parent.

The results of some studies suggested that sex may influence the association between weight and relational aggression among children. For example, Kostanski et al. (2007) found that both overweight and underweight boys were significantly more likely to be teased about weight than healthy-weight boys; however, only overweight (not underweight) girls were more likely to be teased about weight compared with healthy-weight girls. Similarly, Frisen et al. (2009) found that boys (but not girls) who perceived themselves as too skinny were teased more often than those who perceived their weight as

“just right.” On the other hand, McCormack et al., (2011) found that there was no effect of sex on weight-related teasing.

### ***Relational Aggression - Child and Adolescent Samples***

Of the 14 studies that included both children and adolescents, 8 included results regarding relational aggression. The results of all 8 studies suggested that either overweight or obese participants were significantly more likely to experience relational aggression compared with healthy-weight peers; however the associations varied somewhat by weight category and sex. Also, one exception was that Wang et al. (2010) found no association between weight and cyber-bullying. Lokesam et al., (2010) and Young-Hyman et al. (2006) reported significant positive correlations between BMI and measures of teasing. Several other studies found that both overweight and obese participants were significantly more likely to be relationally victimized than healthy-weight peers (Fox & Farrow, 2009; Guo et al., 2010; Hayden-Wade et al., 2005; Krukowski et al., 2008).

Kukaswadia et al. (2012) found that obese (not overweight) boys were significantly more likely to be victims of relational aggression compared with healthy-weight boys, and that overweight (not obese) girls were more likely to be victims of relational aggression compared with healthy-weight girls. Conversely, Wang et al. (2010) found that overweight (not obese) boys were significantly more likely to be victims of verbal aggression compared with healthy-weight boys, and that obese (not overweight) girls were significantly more likely to be victims of verbal aggression compared with healthy-weight girls. However, only underweight girls were significantly more likely to be relationally victimized compared with healthy-weight peers. There was no increased risk of relational victimization among overweight or obese boys or girls compared with healthy-weight peers. Differences in the results of these two studies may be related to the methods that were used to assess relational aggression. For example, Wang et al. (2010) used an 8-item questionnaire and differentiated between verbal aggression and other forms of relational aggression, whereas Kukaswadia et al. (2012) used a single, unspecified question to assess relational aggression.

Variability was observed among the other studies as to whether sex and age influenced the association between weight and relational aggression among child and adolescent samples. Fox and Farrow (2009) found no interaction between weight status and sex in predicting relational bullying victimization. Farhat et al. (2010) found that younger obese (not overweight) boys were significantly more likely to be victims of relational aggression compared with younger healthy-weight boys; however there was no increased risk of relational aggression for overweight/obese older boys or for obese/overweight girls in either age group.

### ***Relational Aggression - Adolescent Samples***

Of the 9 studies that included samples of adolescents only, 7 included results on relational aggression. The results of these studies on the association between weight and relational aggression varied. Three of the studies reported a statistically significant association between weight and relational aggression. Wojtowicz et al. (2012) reported a significant positive correlation ( $r = .55$ ) between BMI and scores on

the POTS questionnaire weight teasing sub-scale. Goldfield et al. (2010) found that significantly more overweight and obese adolescents reported weight teasing by parents and peers than healthy-weight adolescents. Furthermore, overweight and obese girls reported more weight teasing by both parents and peers compared with overweight and obese boys. Jones et al. (2006) found that overweight girls had a significantly higher mean score on the appearance-teasing scale compared with healthy-weight girls, but not underweight girls. On the other hand, underweight boys had a significantly higher mean score on the appearance-teasing scale compared with healthy weight and overweight boys.

Two studies found that higher proportions of overweight and obese adolescents experienced weight-related teasing compared with healthy-weight adolescents, but did not report whether the differences were statistically significant (Haines et al., 2008; van den Berg et al., 2008). Finally, two studies found that the odds of experiencing relational aggression were not significantly higher for overweight or obese adolescents compared with healthy-weight peers (Berg et al., 2005; Kukaswadia et al., 2012).

Although sex differences were not tested statistically, van den Berg et al. (2008) reported a higher prevalence of weight teasing by healthy-weight, overweight, and obese girls than by healthy-weight, overweight, and obese boys, respectively. For example, 24% of healthy-weight girls reported weight teasing by family members, whereas 11% of healthy-weight boys reported weight teasing by family members; and 47% of obese girls reported weight teasing by family members, whereas 34% of obese boys reported weight teasing by family members. Haines et al. (2008) also reported a higher prevalence of weight teasing among girls than among boys, but only in some age groups. For example, among participants in mid-adolescence, 31% of overweight females and 20% of overweight males reported weight-related teasing. However, among participants in late adolescence, 28% of overweight females and 35% of overweight males reported weight-related teasing. These authors also reported significant changes in the prevalence of weight-related teasing over time. For example, among all females in the older cohort, the prevalence of teasing decreased significantly over time.

Only one study included an assessment of the potential differences among ethnic groups in the association between weight and relational aggression (van den Berg et al., 2008). They reported no significant differences among ethnic groups for healthy-weight and overweight participants. However, among obese adolescents, Asian males and females, black males, and females of a mixed or “other” ethnicity were significantly less likely to be teased than adolescents in other ethnic groups.

### ***Relational Aggression – Adult Samples***

The two studies that included adult samples included results related to relational aggression only. Both studies were conducted in the United States. Eisenberg et al. (2011) reported that overweight and obese males and females were significantly more likely to report hurtful weight-related comments by family members compared with participants who were not overweight. Overweight and obese females were significantly more likely to report hurtful weight-related comments by a significant other compared with participants who were not overweight. Among males, only obese (not overweight) participants were more likely to report hurtful weight-related comments by a significant other.

Carr et al. (2008) reported that obese participants with a BMI greater than 35 had significantly higher scores on the teasing/harassment subscale of the questionnaire compared to healthy-weight and overweight participants, and compared to obese participants with a BMI between 30 and 35.

### ***Unspecified Bullying - Child Samples***

Of the 8 studies that included child samples, 4 included unspecified bullying results. In these studies, either the authors did not specify whether the aggression was physical or relational, or the measures included both physical and relational aggression but the results were not reported separately for the two types of aggression.

In three studies that included both overweight and obese children, obese children were significantly more likely to be victims of bullying compared with healthy-weight children (Bell et al., 2011; Griffiths et al., 2006; Lumeng et al., 2010); however, only one of these studies found that overweight children were also more likely to be bullied compared with healthy-weight children (Bell et al., 2011). Frisen et al. (2009) reported that overweight girls, but not boys, were bullied at school significantly more often than those who were not overweight. These authors did not specify whether obese children were included in the overweight group.

### ***Unspecified Bullying – Child and Adolescent Samples***

Of the 14 studies that included both children and adolescents, 7 included results related to unspecified bullying. In one study conducted in Norway (Haraldstad, 2011), a small but statistically significant negative correlation ( $r = -.064$ ) was observed between BMI and bullying scores. Although all of the remaining studies found that overweight and/or obese participants were more likely to report bullying than comparison groups, each study reported results in different ways. Differences were related to the way in which participants were grouped by sex and weight category.

Brixval et al. (2011) found that both overweight and obese participants were more likely to report being bullied more than 2-3 times per month compared with healthy weight peers. Similar associations between weight and bullying were observed for boys and girls. However, after adjusting for grade and social class, only overweight (not obese) youth were significantly more likely to have been bullied compared with healthy-weight peers. Sweeting (2005) reported that obese participants were more likely to report bullying victimization than participants who were not obese; however, it is not clear whether the non-obese sample included participants who were overweight. In the study by Elgar et al. (2005), obese participants were more likely to report bullying compared with both healthy-weight and overweight participants. Mikolajczyk et al. (2008) found that overweight participants were more likely to be bullied than underweight participants, although there was some inconsistency in the data that were reported in the table compared with the in-text description of the results.

In a study conducted in the U.S., Farhat et al. (2010) found that obese participants were more likely to be victims of bullying compared with healthy-weight participants. Girls who were overweight were significantly more likely to be bullied than healthy-weight girls, however overweight boys were not more likely to be bullied than healthy-weight boys. In a study conducted in China, Guo et al. (2010) found that

overweight participants were more likely to be victims of bullying compared with those who were not overweight. Boys who were obese were more likely to be bullied than non-overweight boys, but obese girls were not more likely to be bullied than non-overweight girls.

### ***Unspecified Bullying – Adolescent Samples***

Of the 9 studies that included adolescent samples, 3 included results related to unspecified bullying. Berg et al. (2005) found that 26% of obese participants, 19% of overweight participants, and 14% of healthy-weight participants reported having been bullied in the previous school term. The difference in the proportion of healthy-weight and obese participants who reported bullying was statistically significant, but the difference between healthy-weight and overweight participants was not significant.

Bauman (2008) reported that the mean number of victimization experiences was significantly higher for underweight participants compared with healthy weight and overweight participants; however, the mean number of victimization experiences was not significantly different for underweight and obese adolescents.

Puhl et al. (2012) found that among participants who reported weight-based victimization, 65% were healthy weight, 18% were overweight, and 17% were obese. Among participants who did not report weight-based victimization, 84% were healthy-weight, 12% were overweight, and 4% were obese. Although the authors reported these results as the proportion of participants who experienced weight-based teasing, the questionnaire included items related to physical aggression, so it is not completely clear whether these proportions include those who were victims of weight-based physical aggression.

#### **3.1.2 Weight-related bullying interventions**

A single study on the effects of an intervention to reduce weight-related bullying was identified in the database search. Haines et al. (2006) implemented the Very Important Kids (V.I.K.) intervention with elementary school children in St. Paul, Minnesota. The intervention consisted of multiple components including an after-school program, a theatre production, a school no-teasing campaign and staff training, as well as family-based components. The purpose of the intervention was to promote the message that all forms of teasing were unacceptable and to reduce unhealthy weight-control behaviours.

The V.I.K. intervention was implemented at one elementary school over a full school year with students in fourth through sixth grades. All children in the class were invited to participate ( $n = 126$ ), and parents of 88 students provided consent for their children to participate in the study. Participation in each intervention component varied. For example, 62 of 88 participants attended the after-school program, and 18 students attended the theatre program. Children in a second school, matched for enrollment, ethnicity, SES, and academic achievement scores, participated as a control group. Teasing was measured using a 3-item questionnaire to assess the frequency of teasing in the previous month. Participants were asked how often they were called names, teased about appearance, and teased about weight.

Results indicated that the percentage of students who reported teasing decreased in the intervention school and increased in the control school. The odds of being frequently teased were significantly lower for students in the intervention school than in the control school, after controlling for demographic variables, BMI, and level of teasing at baseline. The odds of experiencing appearance-related teasing were significantly lower in the intervention school than the control school. Weight-related teasing decreased slightly in the intervention school; however the odds of being frequently teased because of weight was not significantly lower in the intervention school compared with the control school.

The authors examined the effect of several theoretical constructs that were thought to underlie the intervention effect. They reported that changes in weight-related peer norms significantly mediated the association between the intervention and teasing outcomes, and concluded that “changes in peer norms were critical to the intervention’s effect on teasing” (Haines et al., 2006, p. 893).

Although only one weight-related bullying intervention was identified in the database search, a review of studies evaluating “anti-fat prejudice” interventions was discovered serendipitously (Danielsdottir et al., 2010). Most of the studies included in the review were conducted with university students in the United States, and the interventions typically focused on improving participants’ knowledge about the causes of obesity or attitudes toward people with different body sizes. The authors of the review concluded that there was very little evidence supporting the effectiveness of interventions targeting beliefs about the causes of obesity or interventions intended to promote empathy and acceptance of obese individuals. Only one intervention focused on actual behaviour as an outcome, the V.I.K. intervention described above, and that intervention did not result in a reduction in weight-based teasing. The authors identified interventions focusing on social norms as the most promising.

### **3.2 Suicide**

Three recent reviews were identified during the database search in which the authors summarized research regarding the association between weight/obesity and suicide (Heneghan et al., 2012; Klinitzke et al., 2013; Zhang et al., in press). Of the 39 relevant studies that were identified on the topic of suicide, 28 were included in one or more of the previous reviews. The characteristics of the included studies (e.g., sample characteristics, measurement strategies) are described in these reviews. Interestingly, although all three reviews were published in the same year, and they all addressed very similar research questions, only 7 of 28 studies published in 2005 or later were described in all three reviews. This discrepancy in the included studies across reviews is related to the methods used to search for relevant evidence, as well as the inclusion/exclusion criteria applied.

The aim of the review by Zhang et al. (in press) was to review evidence on the association between BMI and suicidal behaviours. The authors searched only the PubMed database for articles that were published between 1980 and 2011. Search terms included those related to obesity (obesity, overweight, body mass index, BMI), as well as terms related to suicide (attempted suicide, completed suicide, suicide ideation, suicidal behaviors, suicide). Excluded studies included reviews, conference abstracts, commentaries, and those published in a language other than English.

Klinitzke et al. (2013) conducted a systematic review to synthesize evidence on the association between obesity and suicidal behaviours among adults. The authors searched the PubMed, Web of Science, and PsycInfo databases for articles that were published between the years 2000 and 2011. Search terms included those related to obesity as well as those related to suicide. Excluded studies included case studies, case series, those published in a language other than English, and those that included participants under the age of 18 years or who were undergoing medical treatments such as bariatric surgery.

The purpose of the review by Heneghan et al. (2012) was to examine the relationship between obesity and suicide. The authors searched the PubMed and Cochrane Library databases for relevant evidence that was published between 1950 and 2010. Search terms included those related to obesity (obesity, bariatric surgery) as well as suicide. Studies were included only if they reported data on suicidal behaviour among an obese population. Excluded studies included reviews, case reports, case series, and those published in a language other than English.

Heneghan et al. (2012) organized the relevant evidence according to whether or not the authors of the studies reported a significant association between obesity and suicide. They reported that “a positive association between obesity and suicide has been observed more frequently than a negative or absent association” (p. 98). In other words, they concluded that most studies found that obese participants were more likely to report suicidal behaviour compared with those who were not obese. A smaller number of studies found that obese participants were less likely to report suicidal behaviour compared with those who were not obese, or found no association between obesity and suicide. However, the authors of this review did not distinguish between different types of suicidal behaviour (e.g., suicidal ideation vs. death by suicide).

On the other hand, Zhang et al. (in press) and Klinitzke et al. (2013) organized the evidence according to the type of suicidal behaviour. Results were described separately for suicide ideation, suicide attempts, and death by suicide. Different associations between weight and suicide were identified depending on the type of suicidal behaviour, the sex of the participants, and the country in which the study was conducted. The results of the studies reviewed by Heneghan (2012) were consistent with those reported in the previous two reviews when the different types of suicidal behaviour were considered separately.

### ***Suicide Ideation***

A single study that was common to all three reviews was conducted by Carpenter et al. (2000) who examined suicidal behaviour among a large representative sample of adults in the United States. Each review included a slightly different description of the results of the study, so the original study was sought to provide a description here. When considering BMI as a continuous variable, women with a higher BMI were at an increased risk of suicide ideation compared with women with a lower BMI, and men with a lower BMI were at an increased risk of suicide ideation compared with men with a higher BMI. When comparing obese participants with average-weight participants, women who were obese were 1.2 times more likely to report suicide ideation, however this increased risk did not reach a level of statistical significance. Obese men were not more likely to report suicide ideation compared with

average-weight men. In this study, odds ratios for suicide ideation were adjusted for race, age, education, income, and disease history.

Heneghan et al. (2012) reported the results of four additional studies on the association between weight and suicide ideation. In two studies, obese adolescents and adults were at an increased risk for suicide ideation compared with normal weight participants. In one study involving U.S. adolescents there was no significant association between weight status and suicide ideation. In the fourth study, the odds ratio for suicide ideation among overweight participants compared with normal weight participants was 1.25, but Heneghan et al. (2012) did not report whether the increased risk was statistically significant.

Zhang et al. (in press) reviewed nine additional studies on the association between weight and suicide ideation. The results of these studies varied considerably, and the authors were unable to discern a consistent pattern. Among studies conducted in the United States and Canada, higher body weight was associated with an increased risk of suicidal ideation among females; however, this association was not found in studies conducted in other countries (Australia, Germany, and Korea). Two studies found a positive association between weight and suicide ideation among males, while two other studies found a decreased risk of suicide ideation among obese males.

Our search strategy identified an additional 9 studies on the association between weight and suicide ideation. Eight of these studies included samples of adolescents, and one study included adults. Three studies, conducted in the U.S., Finland, and Japan, found that overweight adolescents were not at an increased risk of suicide ideation compared with normal weight peers (Crow et al., 2008; Kinoshita et al., 2012; Riala et al., 2011). This pattern was consistent for boys and girls. Three studies conducted in the U.S. and one study conducted in China and the Philippines found an increased risk of suicide ideation among overweight or obese adolescents compared with healthy-weight peers (Dave & Rashad, 2009; Eaton et al., 2011; Latty et al., 2007; Page et al., 2011). However, Dave and Rashad (2009) found that the effect of weight on suicide ideation was only significant for females after controlling for a number of variables (e.g., age), and they noted that the level of body dissatisfaction was a much more important factor than actual body weight in the association with suicide ideation. Ratcliffe et al. (2011) found that extremely obese female adolescents were more likely to report suicide ideation compared with healthy-weight females (OR = 1.7). Extremely obese males were also more likely to report suicide ideation compared with healthy-weight males (OR = 1.6); however the odds ratio did not reach a level of statistical significance. Among adults in Australia, only participants in the highest BMI decile (BMI > 33) were at a significantly increased risk of suicide ideation compared with the average-weight reference group (Kelly et al., 2011).

### ***Suicide Attempts***

Results of studies on the association between weight and suicide attempts were somewhat consistent across the three reviews. Zhang et al. (in press) reported that almost all studies found an increased risk of suicide attempts among overweight or obese adolescent and adult females compared with healthy-weight females; whereas lower rates of suicide attempts were observed among overweight or obese males compared with healthy-weight males. One exception was that the pattern was not observed

among Korean adolescents. Three of the five studies reviewed by Klinitzke et al. (2013) found an increased risk of suicide attempts among obese adults, one study found a decreased risk of suicide attempts among obese men, and one study found an increased risk of suicide attempts among obese women and a decreased risk of suicide risk among obese men. Heneghan et al. (2012) did not report the statistical significance of differences between overweight/obese participants and healthy weight participants for most of the studies that were reviewed. However, an increased risk of suicide attempts was observed among obese or overweight participants compared with normal weight participants. One study conducted with adolescents in the Netherlands found an increased risk of suicide attempts among both obese boys and obese girls, compared with healthy-weight peers (van Wijnen et al., 2010).

Our search identified four additional studies that included results on the association between weight and suicide attempts. All of these studies were conducted with adolescents; three in the United States, and one in Finland. Dave and Rashad (2009) found that overweight and obesity were significant predictors of suicide attempts for females but not males, after controlling for potential confounding variables such as age and ethnicity. Eaton et al. (2011) reported that obese female Hispanic adolescents were more likely to report suicide attempts compared with those who were not obese (OR = 1.49), but obesity was not a statistically significant predictor of suicide attempts in a regression analysis. Ratcliffe et al. (2011) found that extremely obese male and female adolescents were not significantly more likely to make a suicide attempt compared with normal weight peers. Finally, Riala et al. (2011) reported that overweight adolescents were not at a significantly increased risk for suicide attempts compared with normal weight adolescents; although the results for females almost reached a level of statistical significance.

### ***Death by Suicide***

The results of studies on the association between weight and death by suicide were quite consistent across the three reviews. The results of the reviewed studies indicated an inverse association between body weight and death by suicide. In other words, overweight and obese participants were less likely to die from suicides compared with healthy-weight participants.

Our search strategy identified two additional studies that included results on the association between weight and death by suicide. The results of these two studies contrasted with those reported in the three previous reviews. Bridges and Tran (2008) found no association between BMI and suicide risk among males or females in the Caribbean Islands. Chang et al. (2012) conducted a large cohort study in Taiwan involving over 500,000 adults. They found that the risk of death by suicide was significantly greater for overweight adults compared with healthy-weight adults.

## **3.3 Self-harm**

### **3.3.1 Key study characteristics**

A total of four studies were identified in which the prevalence of self-harm behaviours among overweight or obese participants was investigated. Evidence tables are presented in Appendix I. Two studies included adolescents (Kinoshita et al., 2012; Riala et al., 2011), one included adults (Sansone et

al., 2008), and one included both adolescents and adults (Wan et al., 2011). The studies were conducted in four different countries: Japan, Finland, China, and the United States.

The authors of each study provided basic information about the methods by which individuals were recruited for participation. The studies that were conducted in Asia included large population-based samples, with close to 20,000 potential participants invited to participate; these participants were recruited through high schools. The other studies included smaller samples of fewer than 500 participants; one sample was recruited through a hospital psychiatry department, and the other sample was recruited from among patients undergoing consultations for gastric bypass surgery.

The two population-based surveys included equal numbers of male and female participants. The surveys of psychiatric and gastric bypass patients included a higher proportion of females than males. Only Sansone et al. (2008) provided information about the socioeconomic status and ethnicity of the participants. The majority of the participants (83%) were described as white, 14% were black, and 1-2% of participants were Native American, Asian, or Hispanic.

All four studies included information regarding the methods by which self-harm was measured. Riala et al. (2011) measured self-harm with the Schedule for Affective Disorder and Schizophrenia for School-Age Children Present and Lifetime (K-SADS-PL) that was administered by physicians in an interview format. Self-report questionnaires were used in the remaining three studies. Kinoshita et al. (2012) and Wan et al. (2011) used a single question to assess whether or not participants had engaged in self-harm behaviours, with follow-up questions to elicit more information about the type and frequency of such behaviours. Sansone et al. (2008) used the 22-item Self-Harm Inventory.

Only two of the four reports included any information about the psychometric properties of the instruments that were used to assess self-harm. Kinoshita et al. (2012) reported a form of inter-rater reliability for the classification of participants as having engaged in self-harm or not. Sansone et al. (2008) provided information about the validity of the Self-Harm Inventory (SHI) by describing a previous comparison between SHI scores and a diagnostic interview.

### **3.3.2 Results of relevant self-harm studies**

Because only four studies were identified on the topic of self-harm among overweight/obese participants, and because substantial variability existed across the studies in terms of participant characteristics and recruitment strategies, the results of the four studies are described separately.

Kinoshita et al. (2012) investigated the effects of both BMI and body weight perception (BWP) on the risk of self-harm among adolescents in Japan. Participants were divided into five weight categories based on BMI: underweight, slightly underweight, normal weight, slightly overweight, and overweight. Participants were also divided into groups based on their body weight perception. After adjusting for sex, age, drug use, scores on the General Health Questionnaire (GHQ), and body weight perception, only participants who were underweight, according to their BMI, had significantly higher rates of self-harm in the past year compared with normal weight participants. When looking at body weight perception, only

those who perceived themselves as overweight were at a significantly increased risk of self-harm after controlling for the other variables, including BMI.

Wan et al. (2011) assessed the effects of perceived body image on the risk of self-harm among adolescents and young adults in China. Participants were categorized into five groups according to their body image: too thin, thin, moderate, fat, or too fat. The authors reported that there was a significant difference in the percentage of participants in each category who reported deliberate self-harm in the past year, but did not report which groups were significantly different from each other. Whereas 12% of those who perceived their weight as moderate reported multiple incidents of self-harm over the past year 18% of those who perceived themselves as too thin and 21% of those who perceived themselves as too fat reported deliberate self-harm over the past year.

Riala et al. (2011) investigated the effects of weight on self-mutilative behaviour among adolescents who were admitted to a hospital psychiatry clinic in Finland. The authors calculated the percentage of participants who were overweight among those who reported self-harm in the past year, and among those who reported no self-harm or suicidal behaviours. Among girls, 36% of those who reported self-harm were overweight, whereas 20% of those who reported no self-harm/suicidal behaviours were overweight. Among boys, 39% of those who reported self-harm were overweight, and 41% of those who reported no self-harm/suicidal behaviours were overweight. Therefore, only overweight girls (not boys) were at a significantly increased risk of self-harm compared to non-overweight peers.

Sansone et al. (2008) examined lifetime prevalence of self-harm behaviours among U.S. adults who were undergoing consultations for gastric bypass surgery. All participants in this study were overweight or obese; the mean BMI was 47.2 (range 27.2 to 92.1). The authors reported the percentage of participants who had engaged in a number of different types of self-harming behaviour at any time in their lives. For example, 7.4% had banged their head on purpose, 6.6% had hit themselves, 5% had harmed themselves by abusing laxatives, and 3.3% had cut themselves. Among this group of overweight participants, there was no significant difference in BMI between those participants who engaged in each type of self-harm, and those who did not.

### **3.4 Results of key informant interviews**

Key informants included experts on the topics of bullying and suicide. They included academic researchers as well as prominent authorities within community organizations. The key informants were Dr. Wendy Craig (Professor, Queen's University), Dammy Damstrom-Albach (President, Canadian Association of Suicide Prevention), Leslie Dunning (Director General, Violence Abuse and Prevention, Canadian Red Cross), and Dr. Bonnie Leadbeater (Professor, University of Victoria),

The key informants agreed that there is a link between weight and bullying. This was the case both for those whose approach is research-based, as well as those who work directly with individuals in the community. A consistent message that came across from the interviews was that weight-based bullying is just one example of victimization that occurs among those whose physical characteristics are different from norms or ideals. Stated simply, people get bullied if they look different.

There was also agreement among the key informants that there is a link between bullying and suicide. In response to the question about this link, two of the key informants referred to cases that attracted a great deal of media attention, including Amanda Todd. Leslie Dunning spoke of the anecdotal evidence for this link from suicide notes. However, Dammy Damstrom-Albach stressed that there are a large number of factors that make people vulnerable to suicide, and that it is unlikely that obesity alone, or bullying alone, would lead to suicidal behaviour. Nevertheless, obesity and bullying maybe two predisposing factors, along with other factors such as difficulties with emotion regulation or coping skills, that are associated with suicide.

In response to the question about the injury consequences of bullying, the key informants stated that victims of physical aggression do sustain injuries, but were not aware of specific research studies on this topic. Leslie Dunning spoke of evidence from testimonials of victims of physical aggression regarding experiences of getting pushed around or beat up, and provided several examples of the types of injuries that have been sustained including broken bones, cuts and bruises, sprains, head injuries, cracked ribs, and injuries from weapons.

The key informants were not aware of any bullying interventions in which weight-related bullying was specifically targeted, or in which evaluations of general bullying interventions included measures of weight-related bullying. However, all provided examples of evidence-based or research-informed bullying interventions. These interventions are listed in Appendix J, along with brief descriptions of the programs and links to the program websites. All websites include sections describing program evaluation research. Wendy Craig drew attention to the Best Practices Portal of the Public Health Agency of Canada, which describes 17 interventions related to the topic of bullying, including information on intervention characteristics and evaluations (<http://66.240.150.14/index-eng.html>). One message that came across was that it may not be necessary to focus on specific victim groups and tailor interventions specific to weight-based bullying. It may be sufficient to create environments that promote inclusion, respect, and acceptance of diversity.

Several suggestions were provided by the key informants regarding directions for future research. These suggestions will be described along with other recommendations for future research in section 4.3.

## **4.0 Discussion and Recommendations**

### **4.1 Critique of the Evidence**

A number of methodological weaknesses of the studies limit our ability to confidently interpret the results and our ability to determine whether the results are applicable across the entire population of BC and Canada. It is important to note that a minority of studies on bullying and suicide, and none of the studies on self-harm have been conducted with Canadian participants.

#### **4.1.1 Bullying**

A major limitation of the bullying literature relates to the methods that were used to measure bullying. First, a large degree of variability was observed across studies in the specific questions that were used to

assess bullying experiences. In almost half of the studies, bullying victimization was assessed using only 1-3 individual questions, which varied across studies. Among the 14 studies that used a scored multiple-item questionnaire, different questionnaires were used in each of them, except for the five studies that used the Perceptions of Teasing Scale (POTS). Many reports did not differentiate between physical and relational bullying, and few reports specified the perpetrators or location of the bullying. This variability greatly limits our ability to synthesize the evidence and compare results across studies.

Few reports included information about the reliability and validity of the measures that were used to assess bullying. Among studies that did include information about reliability and/or validity, some reports simply stated that the items were reliable (e.g., McCormack et al., 2011) or valid (e.g., Bang et al., 2012), but did not provide specific data. If the reliability of the measures is not established, we cannot be certain that participants would provide the same responses if they were asked the same questions again at a different time. If the validity of the measures is not established, we cannot be certain that the questions assess the characteristics that they are intended to assess. In summary, it was not always clear from the reports what “bullying” referred to.

An additional limitation of the bullying literature relates to the quality of the reporting of some important study characteristics. Most reports did not include information about the socioeconomic status or the ethnicity of the participants. In addition, most reports did not include information about whether any inclusion or exclusion criteria were applied to specify which individuals were eligible to participate in the study. Several reports did not specify whether a random sampling procedure was used to recruit participants for the study. If this important information is not provided, it is not possible to determine whether the results are generalizable and apply to all members of the population.

The variability in the use of weight categories is another critical limitation. Many reports did not specify whether participants who were underweight were included along with the group of participants who were of normal weight. This has important implications for the results as some studies found that underweight participants were more likely to be bullied compared with normal weight participants (e.g., Bauman, 2008; Wang et al., 2010). It may be that non-significant differences in bullying rates between overweight and non-overweight groups (e.g., Kukaswadia et al., 2011) could be due to the inclusion of underweight participants in the normal weight category. Furthermore, some reports did not differentiate between overweight and obese groups. This has important implications for the results as some studies reported differences in bullying rates between participants who were overweight and participants who were obese (e.g., Elgar et al., 2005).

#### **4.1.2 Suicide**

The authors of the three previous reviews on the association between body weight and suicide identified a number of limitations of the evidence (Heneghan et al. 2012; Klinitzke et al., 2013; Zhang et al., in press). These limitations are briefly discussed here, but detailed explanations are provided in each of the previous reviews, which are included as supplementary materials to this review.

The authors of all three reviews identified self-report of height and weight as a limitation of the included studies. This is important because individuals tend to overestimate their height and underestimate their weight. Elgar and Stewart (2008) compared self-reported height and weight with measured height and weight among adolescents and adults who participated in the Canadian Community Health Survey. They found that the prevalence of overweight and obesity was lower when based on self-reports than when based on actual measurements. Therefore, the results of the studies comparing suicide rates between overweight and non-overweight participants may have been inaccurate because participants were assigned to the wrong weight category. In particular, participants who were overweight may have been included in the normal weight group. This limitation also applies to the literature on the association between weight and bullying. Although data on BMI measurement procedures was not systematically assessed as part of our review, a quick scan of the studies revealed that several of them included the assessment of BMI by self-report (e.g., Wang et al., 2010).

Zhang et al. (in press) and Klinitzke et al. (2013) noted that the ability to generalize the results across cultures is limited, and that data on death by suicide may be inaccurate because there are inconsistencies in the way in which coroners record suicide deaths. Heneghan et al. (2012) noted that conclusions cannot be drawn regarding causal associations between obesity and suicide from cross-sectional studies, and suggested that there may be biases in reporting due to the fact that data were collected by face-to-face interviews, rather than questionnaires. Zhang et al. (in press) suggested that study authors did not always adequately control for confounding factors, and pointed out that few studies involved repeated measurements. Finally, Klinitzke et al. (2013) noted that potential differences across participants with different levels of obesity were not considered in many studies.

#### **4.1.3 Self-Harm**

The most important limitation of the evidence on the association between weight and self-harm is the dearth of empirical research on this topic. Many of the same limitations identified for the literature on bullying and suicide also apply to the research on self-harm (e.g., lack of data on validity of measures and participant characteristics, use of non-random samples). None of the studies were conducted in Canada, and only one of the four studies was conducted in North America, so the generalizability of the results to Canadian populations is questionable.

#### **4.2 Synthesis and Interpretation of the Results**

Most of the published research on the association between weight and bullying has been conducted with adolescents in the United States. Among the studies that included both children under the age of 12 years and adolescents aged 13 to 18 years, the samples typically included children who were over the age of 10 years. Few obvious differences were observed across age groups in study methodology or the quality of the reporting of study characteristics. One difference in methodology was that studies including child participants were more likely to use parental responses to the bullying measures compared with studies that included adolescents. Bullying assessments were also more frequently conducted in an interview format in studies with child samples compared with studies that included adolescents. The studies with children only were more likely to have smaller sample sizes, and were

more likely to include random samples of participants, compared with studies that included adolescents. In terms of the reporting quality, studies with children only were less likely to include data on socioeconomic status, but more likely to identify the perpetrators of aggression.

Very little research has been published since 2005 on the association between weight and physical aggression, particularly among adults and children aged 12 years and younger. Among studies that included adolescents (some of which included older children), the results varied depending on the country in which the study was conducted. The studies conducted in North America found that overweight/obese youth were not at an increased risk of being physically victimized compared with normal weight peers. However, the studies conducted in Europe and Asia found that overweight and/or obese youth were at a significantly increased risk of experiencing physical aggression.

In studies that included child samples only or adolescent samples only, overweight and obese participants were more likely to be teased about their weight compared with healthy-weight peers; however, overweight/obese participants were not more likely than healthy-weight peers to experience other forms of relational aggression (i.e., social exclusion). In most studies that included both children and adolescents, overweight and/or obese participants were more likely to experience both weight-related teasing and other forms of relational aggression compared with healthy-weight peers, but there was some variability in the results according to age and gender. In adult samples, overweight or obese participants were significantly more likely to experience teasing or hurtful weight-related comments compared with healthy-weight participants. *Therefore, in all age groups, individuals who were overweight or obese were more likely to be teased compared with individuals who were not overweight.* Regarding other forms of relational aggression, it is unclear why there is a discrepancy between studies that included both children and adolescents and studies that included only children or only adolescents. It may be due to the fact that each study used a different questionnaire to assess relational aggression.

Several reports were reviewed in which the authors did not discriminate between physical and relational aggression. Because of the ambiguity in the definition of bullying and the variability in the study methods, it is not possible to draw clear conclusions from the results.

Most of the published research on the association between weight and suicide was conducted with adolescents and adults in the United States, and only one study was identified that was conducted in Canada. The results of the previous reviews concurred that the prevalence of death by suicide is *lower* among overweight/obese individuals compared with healthy weight individuals. The results regarding suicide attempts were somewhat less consistent, but the pattern suggested a sex difference. Overweight/obese females were *more* likely to report suicide attempts than healthy-weight females, but overweight/obese males were *less* likely to report suicide attempts than healthy-weight males. No clear pattern emerged regarding the association between weight and suicide ideation.

Zhang et al. (in press) provided an extensive discussion about the consistent negative association between weight and death by suicide. For example, they point out that obese individuals may be less likely to die from self-poisoning suicide attempts, such as medication overdoses, because larger amounts of toxic substances are necessary to inflict lethal doses among those with a higher body

weight. Several authors have presented evidence that dissatisfaction with one's body size may be a critical factor in the link between weight and suicidal ideation and attempts (Dave & Rashad, 2009; Crow et al., 2008; Kinoshita et al., 2012). For example, Kinoshita et al. (2012) found that overweight adolescents were not at an increased risk of suicide ideation compared with healthy weight peers, but those who perceived themselves as overweight were more likely to report suicide ideation compared with healthy weight peers. It is important to note that a perception of being overweight may not be consistent with actual weight status.

Very little research has examined the association between weight and self-harm. Only one study included an analysis of the association between actual body weight and self-harm using participants from a community-based sample (Kinoshita et al., 2012). The results indicated that overweight participants were not at an increased risk of self-harm compared with healthy-weight participants; however, the study was conducted in Japan so the results may or may not be applicable to North American populations. The single study that was conducted in the United States included only overweight participants who were considering gastric bypass surgery, and no comparison was made to healthy-weight participants. The authors provided separate prevalence rates for each type of self-harm behaviour, and no overall rate was provided, so it is not possible to compare the self-harm prevalence rate in that study to those obtained from general population studies. Furthermore, those who choose to undergo gastric bypass surgery may not be representative of all overweight individuals. No conclusions can therefore be drawn, based on the currently available evidence, as to whether overweight and/or obese individuals are at an increased risk of self-harm.

#### ***4.3 Recommendations for Future Research***

Several questions remain as to whether there is a clear association between weight and injury consequential to bullying, suicide, and self-harm. Specifically, very little recent research has examined the association between weight and injury resulting from physical aggression, particularly among children under the age of 12 years, and conflicting results were obtained among studies as to whether overweight individuals are at an increased risk of being physically victimized. Although overweight youth are at an increased risk of being teased, it may be that they are not at an increased risk of being physically victimized because their larger size increases their ability to defend themselves and deters smaller children from instigating a physical interaction. Variability was also observed across studies as to whether there is an association between weight and suicide ideation. Furthermore, very few studies have examined the association between weight and self-harm. Consequently, future research should address these issues in order to firmly establish whether obesity is a risk factor for these negative outcomes. Dr. Bonnie Leadbeater suggested a possible collaboration with BCIRPU to examine the link between bullying and self-harm from available longitudinal survey data. Although this review focused on individuals who are overweight and obese, the experiences of underweight participants, including those with eating disorders, would be an important topic for a future review.

The discrepancies across study results suggest that there may be additional factors and contexts that might influence the associations among weight, bullying, and self-harm that should be considered in future research. This issue was identified as an important area for future research by one of the key

informants, Dr. Bonnie Leadbeater. Factors such as age, sex, culture, ethnicity, socioeconomic status, personality, and sexual orientation may affect an individual's vulnerability to weight-based bullying, suicide, and self-harm, as well as other associated psychological consequences (Carr et al., 2008; Eisenberg et al., 2011; Goldfield et al., 2010; Guo et al., 2010; Losekam et al., 2010; Krukowski et al., 2008; Puhl et al., 2012; van den Berge et al., 2008; Zhang et al., in press). For example, there may be cultural differences in what is considered an ideal body type, and van den Berg et al. (2008) suggested that the type or intensity of weight-based teasing may vary across individuals of different ethnic groups.

Several researchers suggested that there is a need for longitudinal research on the association between weight and bullying and the association between weight and suicide (Bang et al., 2012; Bauman, 2008; Brixval et al., 2011; Losekam et al., 2010; Heneghan et al., 2012; Zhang et al., in press). Such research could help to establish the direction of causal relationships among the variables (i.e., whether obesity precedes or follows bullying/suicide). Longitudinal designs would also facilitate a developmental approach to this area of study by allowing researchers to determine how the association between weight and bullying/suicide/self-harm changes with age (Griffiths et al., 2006; Haines et al., 2008; Krukowski et al., 2008). For example, given the importance of peer relationships in adolescence, it may be that peer teasing is more harmful than parental teasing among adolescents; whereas parental teasing may be more harmful during childhood.

Other suggestions for future research are related to the strategies used to measure the variables of interest. For example, researchers should differentiate among different types of bullying (e.g., physical vs. relational), and use assessment strategies that have been established as reliable and valid. Several researchers recommended that future research should consider different sources of information about bullying, such as peers, parents, and teachers, in addition to self-reports (Fox & Farrow, 2009; Lumeng et al., 2010; Kostanski et al., 2007; Krukowski et al., 2008). Others recommended the use of qualitative research methods (Fox & Farrow, 2009; Griffiths et al., 2006; Haines et al., 2008; Kostanski et al., 2007), and advocated for a more detailed examination of the frequency, nature, and intensity of bullying experiences and the associated consequences (Hayden-Wade et al., 2005; Kostanski et al., 2007; Krukowski et al., 2008). Researchers should also consider including measures of cyber-bullying, an emerging form of bullying that involves the use of mobile phones and social media. Only one of the studies included in this review reported results on cyber-bullying (Wang et al., 2010).

Research should be conducted to further our understanding of the potential injury consequences of both physical and relational aggression, including whether body weight influences injuries associated with bullying. Very little research has been conducted to investigate the nature of injuries that are sustained as a direct or indirect result of bullying. The reports in this review that described the association between weight and physical aggression did not include data regarding the types of injuries that were sustained by those who were victimized. Dukes et al. (2010) found that both physical and relational bullying were significant predictors of having been injured by someone. Laflamme et al. (2002) interviewed children who were treated at a hospital in Sweden due to injuries that occurred before or after school. Results revealed that 10% of the injured children were exposed to bullying in the previous 24 hours, and that 4% of the injured children were injured as a direct result of bullying victimization.

Given that children who are bullied are more likely to carry weapons (Kukaswadia et al., 2012), an important area for future research may be to investigate the injuries associated with weapon carrying.

Additional research using strong research designs (i.e., randomized controlled trials) is needed to evaluate interventions to reduce weight-related bullying. The need for such research was identified by the key informants, and was apparent from the lack of current research evidence regarding the effectiveness of bullying interventions at reducing weight-related bullying. Although few interventions have specifically targeted weight-related bullying, a number of school-based interventions to reduce bullying in general have been successfully developed and implemented. It may be that these existing interventions are effective at reducing weight-related bullying. Several reviews and meta-analysis of such interventions have been recently published (e.g., Leff et al., 2010; Merrell et al., 2008; Ttofi & Farrington, 2010), and indicate that the interventions are associated with reductions in both physical and relational aggression. Ttofi and Farrington (2010) identified specific characteristics of interventions that were associated with increased effectiveness including increased playground supervision, parental involvement, disciplinary measures for perpetrators of bullying, and greater intensity and duration of the program. Notably, intervention components involving peer-based activities were associated with an *increase* in victimization.

Two examples of interventions that have been implemented in B.C. schools include the W.I.T.S. program and Roots of Empathy. The W.I.T.S. program (Walk away, Ignore, Talk, and Seek help) was implemented with children in first grade, and was associated with significant reductions in relational aggression and physical aggression (Leadbeater et al., 2003). The Roots of Empathy program was implemented with children in 4<sup>th</sup> through 7<sup>th</sup> grades, and was associated with reductions in relational aggression (Schonert-Reichl et al., 2012). The key informants provided a number of other examples of evidence-based interventions (Appendix J). Future research is encouraged to investigate whether existing interventions are effective at reducing weight-related bullying specifically. Further research is necessary to identify which specific components of interventions are effective, and which may be ineffective or counter-productive.

There may be crucial links among the three psychosocial factors investigated in this review in their associations with body weight. The results of the current review suggest that overweight individuals are at an increased risk of experiencing weight-related teasing, as well as an increased risk of suicide attempts among females. Previous research has identified an association between bullying and suicide, and between bullying and self-harm (Fisher et al., 2012; Kim & Leventhal, 2008). Therefore, it may be that bullying is an important factor in the associations among weight, suicide, and self-harm. In other words, perhaps those who are overweight are at an increased risk of self-harm and suicide attempts due to the negative psychological consequences of bullying. This is an important question that could be addressed in future research. One of the key informants, Dr. Bonnie Leadbeater, suggested that investigating the pathways between weight and suicide would be an important area for future research.

Only three studies in the current review included data on both suicide and bullying (Bauman, 2008; Berg et al., 2005; Page et al., 2011), but these studies did not include analyses regarding whether bullying

mediated the association between weight and suicide. However, Bang et al. (2012) found that parental teasing was a significant mediator in the association between BMI and depression among children, and there is a well-established association between depression and suicide (Hawton et al., in press). Body dissatisfaction may also be a key component in the causal pathway between body weight, bullying, and suicide/self-harm. Those who have higher body weight are more likely to report body dissatisfaction (Berg et al., 2005; Wojtowicz & von Ranson, 2012) and Young-Hyman et al., (2006) found that dissatisfaction with body size was associated with depression.

#### ***4.4 Recommendations for Policy and Practice***

Many researchers agree that there is a need to implement interventions to reduce weight-related bullying (Haines, 2008; Hayden-Wade, 2005; Losekam, 2010; Lumeng, 2011; McCormack, 2011 ). Not only might victims of bullying be at risk of injury due to physical aggression and associated behaviors such as weapon carrying, but they may also be at increased risk for other negative outcomes. For example, youth who are teased about their weight are less likely to be motivated to participate in physical activity (Li & Rukavina, 2012), and more likely to perform poorly at school (Krukowski et al., 2003) and engage in unhealthy eating habits (Goldfield et al., 2010). A number of studies have found that bullying is associated with greater levels of body dissatisfaction (Fox & Farrow, 2009; Frisen et al., 2009; McCormack et al., 2011; Wojtowicz & von Ranson, 2012), and a greater risk for mental health disorders such as depression and anxiety (Eisenberg et al., 2006; Goldfield et al., 2010).

Schools have been identified as an appropriate setting for anti-bullying interventions (Kukaskwadia et al., 2011; McCormack et al., 2011), and it may be important to consider the specific settings (e.g., classroom, lunch room, locker room, gym) in which weight-related bullying is most likely to occur (Bauman, 2008; Puhl et al., 2012). Proposed strategies include education on weight bias and biological influences on body weight, as well as school-wide policies that promote inclusion, discourage teasing, and ensure adequate monitoring of locations in which teasing is most likely to occur (Bauman, 2008; Goldfield et al., 2010; Haines et al., 2007; 2008; Kukaskwadia et al., 2012; Puhl et al., 2012). Haines et al. (2008) suggested that interventions should be implemented with pre-adolescent populations.

Interventions have been developed to change attitudes and knowledge about obesity, but there is little evidence that existing interventions have a significant impact on actual bullying behaviours (Danielsdottir et al., 2010). The V.I.K. intervention was the only intervention identified in this review that was developed specifically to reduce weight-related bullying. This was also the only intervention identified by the authors of studies on the association between weight and bullying that were included in this review (e.g., Losekam et al., 2010). However, although the V.I.K. intervention was associated with a reduction in teasing overall, it did not result in a significant reduction in weight-based teasing. Therefore, it may be necessary to develop and evaluate new interventions that are effective at reducing bullying that are specific to those who are overweight.

Kukaswadia et al. (2011) suggested that it may be most effective to focus intervention efforts toward those who are most likely to be involved in bullying. However, others have expressed concerns that focusing attention specifically on overweight individuals may actually increase the likelihood that these

individuals will be victimized (Krukowski et al., 2008; Puhl & Luedicke, 2012; Wojtowicz & von Ranson, 2012). One group of researchers in the United States analyzed the prevalence of weight-related teasing over time to determine whether the implementation of state-wide obesity prevention policies would result in an escalation of weight-based teasing among overweight youth. The policies included the measurement of children's BMI, and the development of recommendations regarding physical activity and nutrition. Their results indicated that there was no change in rates of weight-based teasing after the policies were implemented (Krukowski et al., 2008).

Some have suggested that interventions could also be implemented with those who have been victimized so as to reduce the negative psychological outcomes associated with bullying; such interventions may involve improving body image and available social support (Farhat et al., 2010; Haines et al., 2007; 2008; Haraldstad et al., 2011; Kukaswadia et al., 2011; Losekam et al., 2011). One of the key informants, Dr. Bonnie Leadbeater, stressed the importance of having appropriate mental health support programs within schools. Given the increased prevalence of teasing among overweight individuals, another proposed strategy is to focus intervention efforts on programs promoting healthy weight through nutrition and physical activity (Sweeting et al., 2009; Wojtowicz et al., 2012). However, because causal associations between obesity and bullying have not yet been established, it is unclear whether reducing obesity will result in reduced bullying. On the other hand, providing education and opportunities for better nutrition and increased physical activity has the potential to benefit everyone, not just those who are overweight or obese, so programs promoting good nutrition and physical activity could be implemented *without emphasizing weight reduction as the goal*.

The authors of the previous suicide reviews provided few recommendations beyond those regarding further research on the association between weight and suicide. Heneghan et al. (2012) proposed that there is a need to routinely follow bariatric surgery patients post-operatively in order to ensure their psychological health. However, given that suicide is one of the leading causes of death among youth, there is clearly a need for interventions to prevent suicide among all youth. The results of the previous reviews on the association between weight and suicide indicated that overweight or obese females may be at an increased risk of suicide attempts compared with healthy-weight peers; therefore, it may be appropriate to focus suicide prevention efforts on overweight females. Reviews of suicide prevention strategies indicate that successful approaches include cognitive-behavioural therapy, gatekeeper training, providing education to physicians about depression, and restricting access to lethal means of suicide such as firearms and prescription medications (Joshi et al., 2009; Mann et al., 2005). One of the key informants, Dammy Damstrom-Albach, suggested that it could be useful to evaluate whether gatekeeper training can be incorporated into community-based weight control programs.

An additional recommendation is that parents, teachers, health practitioners, and other professionals need to be made aware of the links among weight, bullying, and suicide to help them to identify those at risk who may benefit from intervention (Bang et al., 2012; Bell et al., 2011; Fox & Farrow, 2009; Goldfield et al., 2010; Haines et al., 2008; Heneghan et al., 2012). This could be accomplished through workshops, newsletters, and/or presentations at school-related gatherings, such as parent advisory meetings or professional development events.

In addition to school-wide bullying interventions for students, there may be a need to educate teachers and school staff about appropriate strategies for intervening in individual cases of bullying. Through the use of focus groups, Haines et al. (2007) determined that school staff had directly observed weight-teasing among students, and Puhl et al. (2012) found that the classroom is one of the locations in which bullying most frequently occurs, particularly for girls. Li and Rukavina (2012) found that teachers often did not intervene appropriately when they observed weight-related teasing, for example by laughing or simply ignoring it. This issue was raised by one of the key informants, Leslie Dunning. Some of the anti-bullying programs listed in Appendix J include training for teachers and school staff on appropriate ways to intervene when they observe bullying.

Some studies included in this review found that parents and teachers were sources of weight-related teasing. For example, Hayden-Wade et al. (2005) found that 5% of overweight youth reported that a teacher had teased them about their appearance, and Goldfield et al. (2010) found that 25% of overweight/obese youth had been teased by their parents about their weight. Parents and teachers should be aware that this behavior is potentially harmful to children and youth. One of the key informants, Leslie Dunning, suggested that some people do not understand the harm they are causing when they tease others. It may be important to educate parents and teachers about the best ways to talk to children about weight (Bang et al., 2012; McCormack et al., 2011).

A productive national or provincial strategy would be to provide targeted funding to researchers to encourage the development and evaluation of new programs to target weight-related bullying, as well as the evaluation of existing anti-bullying programs to determine whether they are effective at reducing weight-related bullying. Collaborations among university-based researchers and community-based practitioners should be encouraged. Furthermore, it may be productive to provide funding and resources for schools to implement evidence-based anti-bullying programs, suicide prevention programs, and education programs for parents, teachers and other school staff.

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*Note: Citations identified by an asterisk (\*) are those that contain evidence directly relevant to the research question and that are included in the evidence tables in the appendices.*

## **Appendix A. Inclusion Criteria**

1. Any country
2. Any age group
3. English language only
4. Year of publication 2005 or later
5. Weight – The study must include overweight or obese participants and include a comparison between participants who are overweight/obese and those who are not.
6. Bullying – The study must include a measure of bullying or teasing (including aggression, harassment, abuse, violence, threat, discrimination, assault)

Or

Self-harm – The study must include a measure of self-harm, self-injury, or suicide

## **Appendix B. Search Strategy**

Search conducted December 4, 2012

### **Databases:**

CINAHL (Medline excluded)  
EMBASE  
ERIC  
Medline  
PsycINFO

### **Terms searched in document titles or abstracts:**

Obes\* or weight or overweight or "BMI" or "body mass index"

AND

Self-harm\* or self-injur\* or self-mutilat\* or suicid\* or bully\* or bullie\* or abus\* or harass\* or violen\* or teas\* or threat\* or aggress\* or victim\* or assault\* or discrimination

### **Limits applied:**

Publication date 2005 – 2012  
English language  
Human populations  
Journal Article

### **Title search:**

CINAHL, ERIC, Medline & PsycINFO search: 341 results (227 exported after duplicates removed)  
Embase (excluding Medline journals) search: 17 results

### **Abstract search:**

CINAHL, ERIC, Medline & PsycINFO search: 6388 results (5314 exported after duplicates removed)  
Embase (excluding Medline journals) search: 615 results

Total: 6173 references uploaded into Endnote  
Endnote identified 429 duplicates  
5744 unique references in Endnote

## Appendix C. Questions for Key Informant Interviews

Date:

Name of Interviewee:

Organization and position:

Contact information:

1. Please briefly describe your knowledge of the link between obesity and bullying.
2. Can you provide references for the most significant or influential studies that you know of on this association?
3. To your knowledge, is there any available data on the types of injuries that are sustained by victims of physical aggression?
4. To your knowledge, is there a link between bullying and suicide or self-harm?
5. Are there any bullying interventions that specifically target weight-related bullying or that have assessed weight-related bullying as part of the outcome?
6. What are the bullying interventions that have the strongest evidence behind them?
7. Do you have any suggestions for future research on the associations among weight, bullying, and suicide?
8. Do you have any other comments or suggestions?

## Appendix D. Description of Evidence Tables

Note the correspondence between the number & order of variables listed in the column header [separated by slashes (/)] & the number of bullets in the cells below.

If the study involves the comparison of 2 or more weight groups, the group are identified in bold followed by a colon and the characteristics of that group. (e.g., **OW**: 52% female; **OB**: 50% female). If no sub-groups are identified, the information refers to the entire sample or the authors did not specify to which group the participants belonged.

At all times we aim to use language that is consistent with the language used in the report (e.g., to describe different ethnic/religious groups, evaluation results). Furthermore, we only report data that can be retrieved from the main report/documentation, rather than data that are available only from other sources. When information is not reported in the main report, but seems very obvious, the data will be reported following the word “likely.”

Study Identification (first column in each table):

- Name of study [Reference Identification Number in brackets]
- Last name of first author, or acronym of organization, who wrote the first published report that describes the study (year of publication of the main report is in brackets)
- Country (or countries) in which the study was conducted

Abbreviations: **UW** = underweight, **HW** = healthy weight (normal or average weight), **OW** = overweight, **OB** = obese, BMI = body mass index, CT = can't tell; NR = not reported in the main report; n/a = not applicable; pt(s) = participant(s); grp(s) = group(s); yr(s) = year(s); mth(s) = month(s); wk(s) = week(s); hr(s) = hour(s); min(s) = minute(s); n = sample size; M = mean (average); SD = standard deviation; Med = median; r = correlation coefficient; S = statistically significant ( $p < .05$ , unless otherwise specified); NS = not statistically significant ( $p > .05$ , unless otherwise specified); info = information; diff(s) = difference(s); pop = population; SES = socio-economic status; pos = positive; neg = negative

Table 1: General Study Characteristics (Purpose of study, Topics, Weight status, Age group)

Table 2a: Participant Characteristics (Recruitment strategy, Inclusion or exclusion criteria, Sample size, Reasons for non-participation)

Table 2b: Participant Characteristics (Age, Grade, Gender, SES, Ethnicity, Weight)

Table 3: Bullying Measurement (Bullying instruments, Purpose of bullying instruments, Reliability, Validity, Format/Respondent)

Table 4a: Bullying Results (Physical aggression)

Table 4b: Bullying Results (Relational aggression)

Table 4c: Bullying Results (Unspecified physical and/or relational aggression)

Table 4d: Bullying Results (Perpetrators of aggression, Setting of aggression, Factors influencing weight-related aggression, Other relevant aggression-related results)

Table 5: Self-harm measurement

Table 6: Self-harm results

## Definitions of Variables in Evidence Tables

### EVIDENCE TABLE 1: General Study Characteristics

**Purpose of study:** Explicitly stated purpose or objective of the research described within the report.

**Topics:** Which relevant topics are included in the study (RA = relational aggression, PA = physical aggression, B = unspecified bullying/aggression or combined physical and relational aggression, WT = weight-related teasing, AT = appearance-related teasing)

**Weight status:** The weight category to which the participants belong. May include participants in more than one weight category. UW = underweight (BMI < 18.5), HW = healthy (BMI = 18.5 – 24.9), OW = overweight (BMI = 25-29.9), OB = obese (BMI > 30)

**Age group:** The age group to which participants belong. Specify early/middle/late when available. Childhood (0-12 years), adolescence (13-18 years), or adulthood (19+)

### EVIDENCE TABLE 2a: Participant Characteristics

**Recruitment strategy:** Methods used to recruit individuals to participate in the study.

**Inclusion criteria:** Characteristics of individuals that were required in order to be eligible to participate in the study.

**Exclusion criteria:** Characteristics of individuals that made them ineligible to participate in the study.

**Sample size: Approached:** The number of individuals who were approached or invited to participate in the physical activity intervention. Includes individuals who were approached and screened for eligibility, even if those individuals were found not to be eligible according to inclusion/exclusion criteria.

**Sample size: Completed:** The number of individuals who completed the intervention and associated assessments, and whose data are included in the statistical analyses.

**Reasons for non-participation:** Any available information about the reasons that participants who were approached or enrolled in the study did not complete their participation (e.g., refused participation, dropped out, missing data, failed to meet inclusion criteria). The precise numbers or percentages of participants are included when available.

### EVIDENCE TABLE 2b: Participant Characteristics

**Age:** Any available information about the age of the participants, including measures of central tendency (e.g., mean, median) and range.

**Grade:** Any available information about the school grade in which participants were enrolled.

**Gender:** Percentage of participants who were female.

**SES:** Any available information about the socio-economic status of the participants (e.g., education, income)

**Ethnicity:** Any available information about the ethnic distribution of participants (e.g., race)

**Weight:** Any available information about the weight or body composition of the participants (e.g., weight in lbs/kg, BMI, waist circumference, lean/fat mass)

### **EVIDENCE TABLE 3: Bullying measurement**

**Bullying Instrument:** The name of the measurement instrument(s) that was/were used to measure aggression/bullying.

**Purpose of Bullying Instrument:** Explicitly stated purpose of the instrument(s) that was/were used to measure aggression/bullying.

**Reliability: Current:** Whether or not the authors described any data related to the reliability of the bullying measurement instrument using the current sample (Y/N).

**Reliability: Previous:** Whether or not the authors described any data related to the reliability of the bullying measurement instrument from previously published studies (Y/N).

**Validity: Current:** Whether or not the authors described any data related to the validity of the bullying measurement instrument using the current sample (Y/N).

**Validity: Previous:** Whether or not the authors described any data related to the validity of the bullying measurement instrument from previously published studies (Y/N).

**Format:** The manner in which respondents provided responses on the measurement instruments (e.g., questionnaire, interview, online)

**Respondent:** Individual(s) who completed the measurement instruments (e.g., self-report, teachers, parents, nurses, clinicians).

### **EVIDENCE TABLE 4a: Bullying Results**

**Effects of Weight on Physical Aggression:** Results related to the experiences of physical aggression (e.g., hitting, kicking, pushing) regarding comparisons between individuals of different weight categories in their experiences of physical aggression. \* 95% confidence interval does not include 1

### **EVIDENCE TABLE 4b: Bullying Results**

**Effects of Weight on Relational Aggression:** Results related to the experiences of relational aggression (e.g., teasing, social exclusion) regarding comparisons between individuals of different weight categories in their experiences of relational aggression. \* 95% confidence interval does not include 1

### **EVIDENCE TABLE 4c: Bullying Results**

**Effects of Weight on Unspecified Aggression:** Results related to the experiences of bullying regarding comparisons between individuals of different weight categories in their experiences of bullying when the type of bullying was not specified by the authors or the authors combined measures of physical and relational aggression. \* 95% confidence interval does not include 1

#### **EVIDENCE TABLE 4d: Bullying Results**

**Perpetrators of Aggression:** The individuals who committed acts of physical and/or relational aggression.

**Setting of Aggression:** The physical location(s) in which the aggression took place.

**Factors Influencing Weight-Related Suicide:** Any factors found to moderate the association between weight and aggression (e.g., age, gender, ethnicity).

**Other Relevant Aggression-Related Results:** (e.g., effects of weight-related aggression on mental health, weight control behaviours, physical activity)

#### **EVIDENCE TABLE 5: Self-harm measurement**

**Self-Harm Instrument:** The name of the measurement instrument(s) that was/were used to measure self-harm

**Purpose of Self-Harm Instrument:** Explicitly stated purpose of the instrument(s) that was/were used to measure self-harm.

**Reliability: Current:** Whether or not the authors described any data related to the reliability of the self-harm measurement instrument using the current sample (Y/N).

**Reliability: Previous:** Whether or not the authors described any data related to the reliability of the self-harm measurement instrument from previously published studies (Y/N).

**Validity: Current:** Whether or not the authors described any data related to the validity of the self-harm measurement instrument using the current sample (Y/N).

**Validity: Previous:** Whether or not the authors described any data related to the validity of the self-harm measurement instrument from previously published studies (Y/N).

**Format:** The manner in which respondents provided responses on the measurement instruments (e.g., questionnaire, interview, online)

**Respondent:** Individual(s) who completed the measurement instruments (e.g., self-report, teachers, parents, nurses, clinicians).

#### **EVIDENCE TABLE 6: Self-Harm Results**

**Effects of Weight on Self-Harm:** Results related to the experiences of self-harm among overweight participants or comparisons between individuals of different weight categories in their experiences of self-harm.

**Factors Influencing Weight-Related Suicide:** Any factors found to moderate the association between weight and self-harm (e.g., age, gender, ethnicity).

**Appendices E to I Evidence Tables Available on Request**

BC Injury Research and Prevention Unit

[bcinjury1@cw.bc.ca](mailto:bcinjury1@cw.bc.ca)

(604) 875-3776

F508, 4480 Oak St.

Vancouver, BC V6H3V4

## Appendix J. Bullying Intervention Programs Identified by Key Informants

*Beyond the Hurt* <http://www.redcross.ca/article.asp?id=39953&tid=001>

Beyond the Hurt is a bullying program directed toward youth 11 years and older offered by the Canadian Red Cross as part of the broader RespectEd violence prevention approach. Information on training sessions for adults and youth facilitators is provided on the website.

*Fourth R* [www.youthrelationships.org](http://www.youthrelationships.org)

The Fourth R program is a school-based program for adolescents that focuses on different types of violence including bullying and dating violence. A variety of curriculum resources are available for purchase on the website, including those for different school contexts (e.g., physical education, English, after school programs) and populations (grades 7-12, aboriginal youth).

*Olweus Bullying Prevention Program* [www.violencepreventionworks.org](http://www.violencepreventionworks.org)

The Olweus program includes components to address bullying, dating violence, as well as youth suicide prevention. The bullying prevention program involves a school-wide approach including school-level, classroom-level, individual-level, and community-level components. The website includes a school readiness assessment, professional development resources, and information on free webinars on implementing the prevention program. For a fee, school staff can attend a two-day training program, and a school-wide guide, teacher guide, and bullying questionnaire are available for purchase.

*Steps to Respect* [www.cfchildren.org/steps-to-respect](http://www.cfchildren.org/steps-to-respect)

This school-based program involves training all adults in the school to recognize and intervene in bullying, classroom lessons for the students, and an evaluation component to track progress. Training manuals and intervention kits are available for purchase on the website.

*W.I.T.S.* (Walk Away, Ignore, Talk it out, Seek help) [www.witsprogram.ca](http://www.witsprogram.ca)

The W.I.T.S program addresses bullying prevention strategies for kids, teachers, families, and community leaders. The website includes free resources including a guide to program implementation in schools, an online training program for teachers and community leaders, a resource guide with lesson plans and ideas for activities, and a section to help parents to use the program with their children.