

Suicide-Related Research in Canada: A Descriptive Overview

**A background paper prepared for the
Workshop on Suicide-Related Research**

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A bibliography of Canadian suicide research references has been appended to this document. Further, an updated bibliography, developed by the Centre for Suicide Prevention and the Centre for Research and Intervention on Suicide and Euthanasia, has been developed for Health Canada, and appears as a separate document. Together, the two bibliographies provide a gateway to research on suicide in Canada published during the period 1985 through 2003.

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Introduction

The purpose of this paper was to review and describe the range of suicide-related research currently being undertaken in Canada. It was originally prepared as a background document for the Workshop on Suicide-Related Research held in Montréal in February, 2003. This workshop was organized to enable researchers, suicide prevention experts, and other key interest groups and organizational representatives to discuss the creation of a national suicide prevention research agenda. This national agenda will contribute to the development of a clear and empirically sound evidence base as a foundation for the everyday practice of suicide prevention, including policy development, program planning, education, community development, and clinical interventions.

Many provinces and communities across Canada are actively involved in advancing the suicide prevention agenda, typically through some combination of education, skill development, advocacy, crisis response, prevention programs, bereavement support, and clinical services. In addition, many individual researchers and research teams are contributing to the existing knowledge base in suicide prevention in important ways.

However, apart from the efforts of the Canadian Association of Suicide Prevention (CASP), which exists to advocate for the prevention of suicide at the national level, there is currently no coordinated, national effort in place to link various local and provincial work, nor is there any formal national mechanism to enable researchers in this area to communicate effectively with front-line practitioners, policy-makers, medical staff, or community leaders. At the same time, recognition has been growing over the past few decades among many industrialized countries that the prevention of suicide and suicidal behaviour, and the minimization of suffering experienced by those who are bereaved by suicide, is an important national endeavour (Ramsay and Tanney, 1996).

Parameters

The objectives of this paper are:

- to provide a descriptive overview of the range of suicide-related research currently being undertaken in Canada
- to set the stage for further dialogue regarding the development of a national research agenda.

Questions addressed in this paper include: What is the overall scope of suicide-related research being done in Canada? Who is conducting it? From which locations are these research endeavours being pursued? What are the potential links that exist across research projects? What are the implications of this work for policy and practice?

For the purposes of this paper, the review of “suicide-related research” refers to systematic and scholarly inquiries that pertain to suicide and suicidal behaviours, across academic disciplines and spanning a range of research traditions, with two specific exceptions:

- First, studies examining euthanasia and assisted suicide are not included, even though it is recognized that many significant contributions to this particular literature have been made by Canadian researchers (Mishara, 1999).
- Second, studies that explicitly address self-mutilatory behaviours are excluded, with the exception of those studies that examine self-mutilation as a risk factor for suicide.

While important strides in Canadian suicide research have continued beyond 2003, this document reflects efforts from 1985-2003. Current research efforts or those that have been published after 2003 are not captured in the current document.

A. Published Canadian Literature: 1985 - 2003

This part of the paper describes suicide-related research undertaken in Canada and/or about Canada over the period 1985 to 2003. The literature described crosses a range of disciplines including health, social sciences, and education. This paper provides an update to some earlier commentaries (Tanney, 1995) and related work. For example, Ramsay and Bagley (1985) undertook a similar process almost twenty years ago when they assessed the state of suicide research in Canada. While every effort has been made to include studies published in both official languages, some articles may have been missed.

Methodology

Database searches of abstracts were conducted using Medline, PsychInfo, Educational Resources Information Center (ERIC), Humanities and Social Sciences Index, Sociological Abstracts, and the Centre for Suicide Prevention's Suicide Information and Education Collection (SIEC). Primary search terms included: suicide, research and Canada. Where possible, searches were also conducted using authors' last names, based on a list of researchers known to be studying the phenomenon of suicide in Canada. Because this paper was commissioned by the Mental Health Promotion Unit, a secondary set of search terms was used to generate a list of studies that explicitly reflected a prevention/health promotion focus with relevance for suicide prevention. Terms used were prevention, mental health promotion, determinants of health, and resiliency.

Studies have not been inspected for the quality of their research designs nor have they been judged on the rigour of their methodologies, as this was considered beyond the scope of this particular project. Unlike other "evidence-based reviews," no systematic procedures have been employed to appraise the validity of the claims being advanced and no summary judgments will be offered regarding the overall strength and trustworthiness of the empirical evidence.

Given the volume of published research articles, unpublished doctoral dissertations are not included. As mentioned previously, the following terms were excluded: euthanasia, assisted suicide, and self-mutilation.

At the conclusion of the Workshop on Suicide-Related Research, Canadian suicide researchers were provided an opportunity to review and revise this document to ensure its completeness.

Descriptive Overview

The range and volume of suicide-related research undertaken in (or about) Canada has steadily increased over the past twenty years. Over 250 research articles across a number of disciplines have been published on the topic of suicide during this period, revealing a rich and varied array of research traditions, methodological approaches and theoretical perspectives.

Research Categories

For the purposes of this paper, Canadian research is organized into the following six categories:

1. Biomedical (including genetic and biological investigations)
2. Clinical (including studies of clinical populations and therapeutic interventions designed to assist those at risk)
3. Health services and systems
4. Health of populations/sociocultural determinants (including studies of specific vulnerable populations as well as investigations that examine the role of the broader social determinants of health)¹
5. Health information/epidemiology
6. Knowledge development and policy research.

The structure of the first four categories is from the Canadian Institutes of Health Research (CIHR), a major funding source for health-related research in Canada. CIHR categorizes health research according to these four “pillars”. The fourth and fifth categories are common cross-cutting themes in discussions among researchers as well as in workshops on Canadian research priorities. It is understood that there is considerable overlap between research categories (e.g., health of populations and epidemiology), and that some studies could easily be affiliated with one or more categories. For ease of description and analysis, each published work has been placed in one of these six categories.

¹ See Appendix #1 for the Determinants of Health.

1. *Biomedical Research*

Research investigating the biological and genetic risk factors for suicide has proliferated in recent years and Canadian researchers have been at the forefront in advancing this knowledge base. Approximately thirty Canadian studies were published in this area over the period 1985-2003.

Hrdina has made a significant contribution to our understanding of the possible biological bases of suicidality based on a series of post-mortem studies (Hrdina, 1996; Hrdina and Du, 2001). For example, Hrdina and colleagues (1993) reported an increase in 5-HT₂ receptors in the post-mortem brains of suicide victims and depressed patients who died of natural causes. Their findings provided support for the view that an abnormality in the brain serotonergic system is associated with depression and suicidal behaviour. More recent studies (Alda and Hrdina, 2000) have examined the frequency distribution of platelet 5-HT_{2A} receptor densities. Results from this investigation support the notion that high 5-HT_{2A} receptor density is a marker of suicidality, and is possibly determined genetically.

In an effort to elucidate the genetic component of the serotonergic abnormalities found in suicide victims, Turecki and his colleagues at the McGill Group for Suicide Studies (1999) investigated the variance observed in brain serotonin receptor 2A (5-HTR_{2A}) binding in patients who died by suicide. By comparing brain tissue samples of subjects who died by suicide with those who had not, these researchers were able to confirm previous findings, i.e., greater 5-HTR_{2A} binding in subjects who died by suicide. More importantly, this study also provided preliminary support for the hypothesis that the number of 5-HTR_{2A} receptors is genetically mediated. In a study on patients with major depression, Du et al (2000) investigated variance at the 102T/C polymorphism on this locus and found a significant association between this variant and higher level of suicidal ideation as measured by the HAM-D item on suicidal ideation.

Other serotonergic receptors have also been the target of genetic studies carried out by Canadian researchers. For instance, the study of a polymorphism located in the promoter region of the 5-HT_{1A} autoreceptor revealed that the minor allele in this locus has a negative feedback on the repressor activity of a transcriptional factor acting on this autoreceptor in raphe cells. These findings suggested that genetic variation on this locus leads to a reduction of serotonergic neurotransmission and, consequently, to a predisposition to depression and suicide (Lemonde, et al., 2003). The possible role of genetic variation at genes coding for other serotonergic receptors has also been investigated. Turecki and colleagues (2003) investigated variation at seven serotonin receptor genes (5-HTR_{1B}, 5-HTR_{1D α} , 5-HTR_{1E}, 5-HTR_{1F}, 5-HTR_{2C}, 5-HTR_{5A}, and 5-HTR₆) in suicide completers. They were unable to find evidence supporting a major role for these loci in the predisposition to suicide.

Canadian researchers (Du, et al., 1999; Du, Faludi, Palkovits, Bakish, and Hrding, 2000; Turecki, 2001; Fitch, et al. 2001, Anguelova, Benkelfat, and Turecki, 2003) have also examined the role of the serotonin transporter gene. Current findings suggest that variation at this gene, particularly at a 44bp insertion/deletion locus on the promoter region of this gene, a variant thought to be functional, may play an important role in the predisposition to suicide and suicidal behaviours. Using a different design and methodology, Filteau and colleagues (1993) reported data that indirectly supports the role of the serotonin transporter in suicidality. They found a significant decrease of suicidal ideation among depressed patients treated with specific serotonin reuptake inhibitors (SSRIs) compared to norepinephrine reuptake inhibitors, mixed norepinephrine serotonin uptake inhibitors and serotonin-2 antagonists.

Other genes coding for components of the serotonergic pathways have been investigated by Canadian biomedical researchers. In particular, the genes that code for tryptophan hydroxylase (TPH) was thought to play a prominent role in suicidality (Du et al., 2000, Turecki et al., 2001; Lalovic and Turecki, 2002); however, more recent data suggest that this particular gene does not code for an isoform of TPH that is expressed in brain tissue. An homologous gene, referred to as TPH2, codes for such a variant. This is consistent with results of a meta-analysis of TPH1 studies carried out by Lalovic and Turecki (2002).

Du and colleagues (2002) studied a possible contribution of the monoamine oxidase (MAO-A) gene in depressed suicides. Interestingly, they found an association between a high activity-related allele and depressed suicide in males. This finding indicated that the MAO-A gene may be also involved in confers susceptibility to suicide in depressed males.

Turecki (2001) suggests that part of the vulnerability to suicide may be explained through the presence of genetic tendencies toward impulsive and impulsive-aggressive behaviours. The same group of researchers (Sequeira et al., 2003) reported an association of a genetic variant of the Wolfram Syndrome gene (WFS1) with suicide and higher measures of impulsivity. Their preliminary findings indicated a role for this gene in the pathophysiology of impulsive suicide. Investigating the relationship between suicide and impulsive-aggressive behaviours using a different approach, Arato and colleagues (1991) suggested that the hemispheric asymmetry of serotonergic mechanisms found in suicides could be associated to violence and aggression.

Another line of biological investigation has examined the link between serum cholesterol levels and suicide risk. By linking data from the Nutrition Canada Survey with mortality records from the Canadian National Mortality Database, Canadian researchers (Ellison and Morrison, 2001) have found that low serum cholesterol levels are associated with an increased risk of suicide. Furthermore, the association persisted even after controlling for unemployment and receipt of treatment for depression

Canadian researchers have also investigated alterations in signal transduction. In 1999, Reiach and colleagues (1999) provided preliminary evidence consisting in a reduction of adenylyl cyclase (AC) type 4 immunolabeling and its activity in post-mortem temporal cortex of depressed suicide victims. These results suggested that this alteration accounts for the disturbances in the postreceptor cAMP signaling cascade in depression. Furthermore, Young and colleagues (2003) have contributed to the growing evidence supporting the fact that signal transduction abnormalities occur in patients with a mood disorder who died by suicide. Their data indicated that the transcription factor CREB might play an important role in the neurobiology of suicide and the antisuicidal effect of lithium. As part of this effort undertaken by Canadian researchers to investigate the molecular mechanisms involved in suicide, Honer and colleagues (2002) examined molecular components of neural connectivity in severe mental disorders and suicide.

Researchers in Canada have also approached several other aspects that might be involved in suicide. For instance, high catecholamine levels have been reported in depressed patients prior to suicide and in parasuicide (Dent, Ghadirian, Kusalic, and Young, 1986; Mancini and Brown, 1992). In addition, increased levels of ER stress proteins have been found in the temporal cortex of depressed suicides (Bown, Wang, MacQueen, and Young, 2000). The research work carried out by Merali and colleagues (2004) in the suicide brain led to the possibility that the observed changes of the corticotropin-releasing hormone (CRH) and GABA A receptor subunit,

or the dysregulation between these GABA A receptor subunits confer a risk to depression and/or suicide or are secondary to the psychopathology related with it.

Finally, more comprehensive biological studies using microarrays are starting to emerge. The McGill Group for Suicide Studies (Turecki, Sequeira, Gwadry, Canetti, Gingras, and French-Mullen, 2003) has recently begun conducting extensive brain expression studies investigating expression patterns in several cortical brain areas. These studies are promising and indicate a series of new candidate systems for future studies, representing new avenues for biomedical research in suicide.

In summary, there is a growing body of evidence confirming that neurobiological and genetic factors play a significant role in the etiology of suicide, and Canadian researchers have played an instrumental role in illuminating some of the molecular pathways and genetic processes that appear to contribute to an increased risk for suicide. Many more neurobiological and genetic studies are currently underway in Canada and build on previous studies by attempting to elucidate more precisely those genes implicated in suicide.

2. Clinical Research

Over 90 research articles examining the topic of suicide from a clinical or treatment perspective have been published in Canada since 1985. These include studies that have (a) examined specific personality characteristics (e.g., dependency, perfectionism) or other psychological dimensions of suicide risk in individuals, and (b) investigated risk for suicide in specific vulnerable or clinical populations (e.g., psychiatric in-patients, youth).

For ease of discussion, the category of clinical research has been divided into five sub-categories:

- a. treatment/intervention approaches
- b. family factors
- c. vulnerable clinical populations
- d. psychological dimensions, and
- e. survivors/bereavement.

Clinical and theoretical discussions which present models for clinical decision making (e.g., Kral and Sakinofsky, 1994; Truscott, Evans, and Knish, 1999) and reviews of the evidence (e.g., Lesage, 2002) are included here.

2a. Treatment/Intervention Approaches

Canadian studies investigating treatment approaches to suicide and suicidal behaviour have been few, with most studies being published in the last ten years. Investigations range from large, international, multi-site trials (Ahrens, Grof, Möller, Müller-Oerlinghausen, and Wolf, 1995) to smaller, in-depth qualitative studies (Hoover and Paulson, 1999) to single case-study designs (Malcolm and Janisse, 1994; Lum, Smith, and Ferris, 2002).

Suicide and treatment of mood disorders

While a large amount of clinical research has been devoted to determining the efficacy of specific treatments for patients suffering from mood disorders, only a few Canadian studies have specifically examined these interventions for their effect on suicidal behaviours. For example, Sharma (2001) investigated the effect of electroconvulsive therapy (ECT) on suicide risk among patients with mood disorders. He found that ECT has an acute but not long-term beneficial effect on suicidal behaviour. According to the author, the findings need to be interpreted with caution, given some of the study's specific limitations. In a large multi-centre trial, Ahrens and colleagues (1995) found that among those patients who received prophylactic lithium treatment for two years or longer, mortality due to suicide and cardiovascular disease was the same as, or only slightly higher than mortality in the general population.

Viewed from yet another perspective, the relationship between suicidality, adverse treatment-induced events (e.g., sedation, mania, decreased libido, psychosis) and pharmacological treatment for depression was explored (Tollefson, Rampey, Beasley, Enas, and Potvin, 1994). Results suggested no relationship between a treatment-emergent adverse event pattern and suicidality in this population.

Facilitation of healing

Hoover and Paulson (1999) used a phenomenological approach to identify themes of healing among those who were previously suicidal. Based on their in-depth analysis they were able to identify a series of processes that could have important implications for guiding future treatment decisions with suicidal individuals.

Strategies that facilitate healing among Aboriginal individuals have been described by McCormick (1996, 1997b) and Paproski (1997). They include: establishing a social connection and obtaining help/support from others; anchoring oneself in tradition; exercising and practicing self-care; involving oneself in challenging activities and setting goals; expressing oneself; establishing a spiritual connection and participating in ceremony; helping others; gaining an understanding of the problem; learning from a role model; and establishing a connection with nature (McCormick, 1997b).

Determination of risk

deMan and his colleagues in Québec have validated the psychometric properties of the Scale for Suicide Ideation (de Man and Leduc, 1995) and have adapted it for use with a French Canadian youth population (de Man, Leduc, and Labreche-Gauthier, 1993). Reynolds (1991) has also contributed to an understanding of the role of screening instruments and the assessment of suicide risk, particularly with children and adolescents. He has developed a series of useful screening tools, including the Suicide Ideation Questionnaire (SIQ) (Reynolds, 1988).

Meanwhile, in an effort to identify potential predictors of suicide, other Canadian researchers (Enns, Inayatulla, Cox, and Cheyne, 1997) examined the relationship among depressive symptoms, anxiety, hopelessness, and suicidal intent in a group of Aboriginal and non-Aboriginal adolescents who had been hospitalized after attempting suicide. Elsewhere, Wright and Adam (1986) found that even though many suicide attempters claimed that they wished to die at the time of hospital admission, all of the surviving patients expressed a desire to live at the time of discharge from hospital.

Holden and colleagues (1985, 1989) examined the relationship between suicidal intent and social desirability and found that “negative desirability responding” represented a distress set in the context of suicidal behaviour. Finally, Truant, O’Reilly and Donaldson (1991) have provided us with a glimpse into how psychiatrists weigh risk factors for suicide when making overall determinations about risk. They found that hopelessness was ranked as the most important risk factor, followed by suicidal ideation, previous attempts, level of mood and affect, quality of relationships, signs and symptoms of depression, and social integration.

Clinical case studies

Other suicide-related investigations with clinical implications have been undertaken in Canada in recent years. For example, Malcolm and Janisse (1994) provided a case-study investigation of a series of imitative suicides in a small, closed organization in British Columbia and found that scores of depression, anxiety and hostility, in combination with clinical interviews, were useful in identifying high-risk groups following the suicide deaths. Leenaars and Wenckstern (1998) presented a protocol analysis of Sylvia Plath’s last poems, showing specific differentiating risk factors in these narratives. More recently, Lum and colleagues (2002) relied on a case-study approach to demonstrate how to apply Satir’s therapeutic model to the treatment of a young male suicidal client. Leenaars (1997) presented a case, highlighting that even if one attempts to assess risk comprehensively, some patients will dissemble (or mask) their suicidal risk.

2b. Family Factors

Studies that explore the relationships among family dynamics, parenting relationships, attachment patterns, and risk for suicide constitute a small but important part of the Canadian treatment literature. One of the well-known researchers in this area is Ken Adam, who has investigated the role of early attachment patterns in the etiology of suicidal behaviour (Adam, 1985; 1986; Adam, Keller, West, Larose, and Goszer, 1994; Adam, Sheldon-Keller, and West, 1996). Many of his published works pre-date the scope of this review, but some recent studies, which build on his earlier lines of investigation, are highlighted briefly below.

From a different perspective, extensive family studies investigating familial aggregation of suicide and behavioural factors mediating suicide risk are currently being carried out at the McGill Group for Suicide Studies lead by Gustavo Turecki.

Attachment studies

In one study, adolescents who were referred to outpatient and/or residential services in three Canadian cities were assessed for lifetime suicidal ideation and attempts, and these findings were compared with their scores on the Parental Bonding Instrument (PBI) (Adam et al., 1994). Suicidal youth reported lower care and higher over-protection in relation to their mothers than their non-suicidal peers. In a later study (Adam et al., 1996), attachment patterns and history of suicidal behaviour among adolescents in psychiatric treatment were examined. Along these same lines, West and colleagues (1999) and Lessard and Morretti (1998) explored the relationship between perceived levels of attachment to caregivers (attachment-felt security) and suicidal ideation among clinical samples of adolescents.

Parent-child relationships

Approaching the exploration of family-based risk factors from a different perspective, de Man, Labrèche-Gauthier, and Leduc (1993) examined the relationship between parent-child relationships and suicide ideation in French Canadian youth. They found that suicide ideation in adolescent males and females were associated with a parenting style that was characterized by high control, in combination with a lack of sufficient maternal and paternal social support.

Tousignant and colleagues have also examined the role of the family in the context of suicide and suicidal behaviour (1986, 1993) by investigating the respective contributions of a father's and mother's care to determine its potential association with suicidal behaviour. Results showed poor care by the father to be highly associated with suicidal behaviour.

2c. Vulnerable Populations

Canadian researchers have undertaken several studies that highlight the clinical implications of working with particular high-risk populations. Because space limitations do not permit a review of each individual study, many of these works are discussed very briefly.

Individuals with mental disorders

Given the strong association between mental disorders and suicide (Tanney, 2000) it is not surprising that many studies have focused on trying to explicate this relationship with greater precision and across a number of different high-risk groups. For example, in an important case-control study of young men in Québec, which was the first psychological autopsy study to be carried out in Canada, Lesage and his colleagues (1994) found that among young men, suicide is linked to the following mental disorders: major depression, borderline personality disorder,

and substance abuse. Further studies in an extended sample indicated the important role of comorbidity in suicide risk (Kim et al., 2003).

In a series of studies that examined risks for suicide among patients diagnosed with borderline personality disorder, Canadian researchers found that the most significant predictors among this clinical population were previous attempts and higher education (Paris, 1987; 1990; Paris, Nowlis, and Brown, 1989).

Several Canadian studies have investigated the specific risks for suicide among psychiatric in-patients. In a Montréal-based study, findings indicated that in-patients suffering from an affective disorder or schizophrenia comprised the majority of the suicide death sample (Proulx, Lesage and Grunberg, 1997), while an Ontario study found that in-patients at greatest risk for suicide fit the following profile: previous suicidal behaviour, suffering from schizophrenia, admitted involuntarily, and living alone (Roy and Draper, 1995). A more recent study from Ontario found that in-patient suicide attempters were more likely to have had a family history of psychiatric problems, a history of previous suicide attempts, with the most common diagnosis being a mood disorder and not schizophrenia (Sharma, Persad, and Kueneman, 1998). Holley and her colleagues (1998) conducted a 13-year mortality review of a regional cohort of 876 suicide attempters who were admitted as inpatients between 1979 and 1981. Compared to the general population, study subjects were four times more likely to die of any cause, but 25 times more likely to die by suicide. Finally, in another Canadian study, Chandrasena and colleagues (1991) found that many of the foreign-born patients who had died by suicide were unemployed with poor social integration.

Parasuicidal patients

Another group of studies with important clinical implications are those that investigate patients who repeatedly engage in self-harming and suicidal behaviour. Reynolds and Eaton (1986) compared multiple suicide attempters with single attempters and found that repeaters had higher levels of depression, hopelessness, and substance abuse as well as higher lethality ratings. Sakinofsky and Roberts (1990) examined why parasuicidal patients continued to engage in self-harming behaviour despite the apparent resolution of their problems. In an earlier study, Goldberg and Sakinofsky (1988) explored levels of "intropunitiveness" among parasuicidal patients across various interview modes. They found that highly intropunitive individuals who were in the cognitive interview group showed the most improvements on self-report measures of depressive symptoms. Leenaars, Lester, Wenckstern and their colleagues (1992), examining attempters and those who died by suicide, concluded that there may well be more similarities than differences in these groups. They may well be two overlapping groups.

Youth

Concern over increased rates of youth suicide in the past 30-40 years has prompted several Canadian researchers to try to better understand the specific risk factors for youth suicide and to highlight some possible implications for treatment and supportive interventions. For example, qualitative studies have been conducted which seek to illuminate some of the processes that led young people to contemplate suicide and the factors that helped them recover (Everall, 2000; McCormick, 1997a; Paulson and Everall, 2001). In Québec, de Man and colleagues surveyed a group of high school students (de Man and Leduc, 1995; de Man, 1999) in order to identify the correlates of suicide ideation. They found that depression was one of the most important factors, a finding which has clear clinical implications. Other groups of high-risk youth have also been studied, including youth in foster care (Charles and Matheson, 1991). Leenaars, De Wilde, Wenckstern and Kral (2001) showed that the suicide of teens may be highly related to cognitive

constriction and lack of understanding; suicidal teens may well be blind to many aspects of their own deaths.

Elderly

Continued high rates of elderly suicide have also fuelled a number of recent investigations by Canadian researchers. For example, writing from a nursing research paradigm, Delisle (1992) examined the questions: "What makes new pensioners vulnerable to suicide? Are their suicides preventable? What are the best nursing interventions?" Fortin and colleagues (2001) investigated the relationship between suicide ideation and self-determination among the institutionalized elderly and found that the suicidal elderly did not differ from nonsuicidal individuals on the dimension of self-determination.

Other, very specific, at-risk populations have also been investigated, including Chinese Canadian women patients (Lalinec-Michaud, 1988), patients who are using isotretinoin for the treatment of acne (Jick, Kremers, and Vasilakis-Scaramozza, 2000), and patients who present at emergency departments with chest pain, panic disorder and suicidal ideation (Fleet, Dupuis, Marchand, Burelle, Arsenault, and Beitman, 1996; Fleet, Dupuis, Kaczorowski, Marchand, and Beitman, 1997). Leenaars (1992) found that our understanding of suicide in the elderly may well be the poorest across the life span, requiring much greater attention.

2d. Psychological Dimensions

Antoon Leenaars has contributed substantially to the national and international knowledge base in suicide prevention through his empirical investigation of suicide notes as well as through other studies conducted in Canada and internationally.

Studies of suicide notes

Through the development of specific protocols for analyzing suicide notes, which have been applied across a number of different suicidal subjects (i.e., men, women, young, old, lethal methods, passive methods, attempters, those who died by suicide), Leenaars proposed a multi-dimensional model of suicide, examining both intrapsychic and interpersonal aspects that may assist us to better understand the suicidal individual (see Leenaars, 1996). He then went on to examine some very specific psychological characteristics related to suicide, including unbearable pain, cognitive constriction, indirect expressions, inability to adjust, ego, interpersonal relations, rejection-aggression, and identification-egression.

A recent study (Leenaars, De Wilde, Wenckstern, and Kral, 2001) provides a concise summary of some of the key findings emerging from the analysis of suicide notes. Suicide notes representing four developmental ages (adolescents, young adults, middle adults, old adults) were analyzed for specific protocols along the eight psychological multidimensional dimensions. Despite many commonalities across age groups, the results suggest that suicides of adolescents may be more highly related to cognitive constriction, indirect expressions, rejection-aggression, and identification-egression, than those of other age groups. Young adults too have their unique markers; they show the highest incidence of psychopathology (or inability to adjust).

It is important for progress in health that research findings in one nation be replicated in other nations so that their cross-cultural reliability can be ascertained. Leenaars and a number of international colleagues have applied Leenaars' multidimensional model to suicide notes not only from Canada, but the United States, Northern Ireland, Hungary, Russia and Australia (see Leenaars, Lester, Lopatin, Schustov & Wenckstern, 2002).

Personality characteristics

In addition to Leenaars, other Canadian researchers have examined specific personality traits or psychological characteristics related to suicide. For example, Bettridge and colleagues (1995) examined dependency needs and the perceived availability and adequacy of relationships among female adolescent attempters and non-attempters in Canada. Hewitt and others have studied the dimension of perfectionism and its relationship to suicidal behaviours across a number of different clinical populations including adolescent psychiatric patients and alcoholics (Hewitt, Flett, and Weber, 1994; Hewitt, Newton, Flett, and Callander, 1997; Hewitt, Norton, Flett, Callander, and Cowan, 1998). Finally, the McGill Group for Suicide Studies has been carrying out several studies investigating personality traits in those who died by suicide (see for instance Kim et al., 2003).

2e. Survivors/Bereavement

Very few published Canadian studies examine the issue of suicide bereavement. A brief review of this literature follows.

Grief after suicide

In comparison to parents who had lost a child to a motor-vehicle death, Séguin and colleagues (1995a) found that parents grieving a suicide death were more depressed (although this difference disappeared after nine months), experienced more shame and life events, and had a greater history of loss. In another level of investigation (Séguin, et al., 1995b), mother-survivors of a suicide death were interviewed about their experience of loss, and these findings were augmented with psychological autopsy findings. Subsequent analysis revealed the presence of significant transgenerational loss, separation, and inadequate child-rearing.

In a more recent study, Bailey, Kral, and Dunham (1999) compared grief experiences among university students across a range of different types of deaths. They found that suicide survivors, compared to the other groups, experienced more frequent feelings of rejection, responsibility, "unique" reactions, total grief reactions, increased shame and perceived stigmatization.

Bereavement groups

Hopmeyer and Werk (1994) looked at the structure and membership of various types of bereavement support groups offered in Montréal: those that served widows, those that served family survivors of suicide, and those that served family survivors of cancer deaths. All attendees reported strong satisfaction with their experiences, but the reasons for joining and the most valuable aspects of the group experience differed across settings. Finally, Rubey and McIntosh (1996) conducted a survey of suicide survivor groups in the United States and Canada in order to better understand their composition and character.

3. Health Services and Systems

Fewer Canadian studies have been conducted in this category as compared with the previous one on Clinical Research. Among the works that have been published – approximately 45 in total – a range of interests is apparent, including: reviews of crisis lines and suicide prevention centres; program evaluation studies; retrospective analyses of services following deaths by suicides; and professional development and training activities in suicide prevention and intervention. As mentioned earlier, several studies are included here which have relevance for suicide prevention, as well as broader applications for the health and well-being of the population as a whole, i.e., mental health promotion and prevention programs. Theoretical discussions and commentaries (e.g., Boyer and Loyer, 1996), presentations of models for organizing services (e.g., Boldt, 1985) and reviews of the relevant literature (e.g., Frankish, 1994; Rhodes and Links, 1998) are not included in this paper.

For ease of discussion, studies will be organized under the following sub-headings: suicide prevention centres, organization and evaluation of services, training and professional development, and mental health promotion/prevention programs.

3a. Suicide Prevention Centres

Canadian contributions to the international knowledge base regarding the effectiveness of crisis-based telephone hotlines and other suicide prevention centres have been significant. In one of the first of a series of studies that was done to explore the nature and effectiveness of suicide prevention centres, Mishara and Daigle (1992) investigated volunteer-based telephone crisis services at two different centres in Québec. By listening unobtrusively to a series of incoming calls and coding all responses, researchers were able to assess program effectiveness along the following three dimensions: changes in depression ratings, changes in urgency, and use of no-harm contracts or safety agreements. Later studies (Daigle and Mishara, 1995; Mishara and Daigle, 1997) examined the specific types of interventions provided by crisis-line volunteers and found that overall, a greater proportion of "Rogerian" or nondirective responses were related to decreases in depression ratings. Mishara and Giroux (1993) studied the role of stress in crisis-line volunteers at three different points in time: before the shift, during a call, and at the conclusion of a shift.

Other Canadian researchers have also examined the nature and impact of suicide prevention and crisis intervention centres in cities throughout Canada (Adamek and Kaplan, 1996; Leenaars and Lester, 1995). Adamek and Kaplan (1996) surveyed a number of different crisis lines in the United States and Canada to determine their readiness and capacity to respond to suicidal older adults. On the whole, they found that there was a lack of specific training in this area, poor awareness of recent suicide trends, and limited outreach to older adults.

On balance, the empirical evidence regarding the effectiveness of telephone-based hotlines at reducing suicide rates is scanty at best. Leenaars and Lester (1995) showed that suicide prevention centres had a positive impact on reducing suicide rates in Canada, but the impact did not reach statistical significance. Canadian researchers have been leaders in summarizing the findings to date as well as in articulating the methodological and ethical challenges inherent in conducting these types of investigation (Mishara and Daigle, 2000). Further evaluation studies of crisis centre services are currently being conducted by Canadian researchers and are described later in this paper.

3b. Organization and Evaluation of Services

Suicide prevention programs other than crisis hotlines have also been evaluated by Canadian researchers. For example, de Man and Labreche-Gauthier (1991) evaluated two different community-based suicide prevention programs in Québec by examining levels of self-esteem, stress, and suicide ideation among individuals who attended the programs. Meanwhile, in a study that has important implications for the way services to potentially suicidal youth are organized, Cappelli and others (1995) found that among youth attending an adolescent health clinic, depression and suicidal thoughts represented a significant portion of mental health problems. More recently, Breton and his colleagues (2002) conducted an in-depth review of suicide prevention programs being offered throughout Canada to describe their overall character and identify their underlying theoretical bases. These authors concluded that most of the suicide prevention programs being offered in Canada are not being formally evaluated and most program descriptions remain short on details, particularly in terms of their theoretical foundations

Reviews identifying “best practices” in youth suicide prevention (Gardiner, 2002; White and Jodoin, 1998) and other evidence-based reviews of the efficacy of youth suicide prevention programs (Guo and Harstall, 2002; Ploeg, et al., 1996) are not included here.

Interventions with suicidal individuals

Allard and others (1992) investigated whether specific follow-up interventions provided after a suicide attempt could decrease the risk of repeat attempts at two-year follow-up. Following their analysis, these authors concluded that intensive follow-up interventions did not reduce risks of repeated suicide attempts. Greenfield and his colleagues (1995) conducted a study to determine the impact of an outpatient psychiatric team on the hospitalization rates of youth in crisis, most of whom were suicidal adolescents. In a more recent investigation, Links (2002) determined that ongoing contact for two years following discharge was associated with greater survival among those patients who were at risk of post-crisis suicide.

Retrospective analyses and audits

Grunberg and his colleagues (1994) examined health service utilization issues based on a retrospective analysis of suicide deaths among young men in Québec. These authors found that almost half of the subjects who had died by suicide had consulted a mental health professional in the year before the suicide, compared to 5% in the control group. More recently, in a retrospective analysis of all suicides at one large psychiatric facility in Ontario, Martin (2002) described the most common patient characteristics and also identified potential deficiencies in care among those who died by suicide. According to the author, this study represents the first Canadian report of a cumulative series of suicides, including documented deficiencies in care, at a single psychiatric facility.

Cost analysis studies

At least three studies have assessed costs related to suicide and its prevention. These studies have relevance for the way services are conceptualized, justified, and delivered. In one of the first reports to calculate the costs of suicide mortality in a Canadian province, Clayton and Barcel (1999) discovered that in New Brunswick, the mean total cost estimate per suicide death in 1996 was (including indirect costs) \$849,877.80. Following a different line of investigation, Barnett and colleagues from the University of Alberta (1999) examined the specific costs associated with using flumazenil in cases of drug overdose. Based on a randomized, placebo-controlled study to assess cost-effectiveness, they found that the use of flumazenil in intentional drug overdose of unknown etiology is not cost effective. Finally, in calculating overall costs

related to gunshot wounds in Canada in 1991, Miller (1995) found that the estimated cost was \$6.6 billion. Suicides and attempted suicides accounted for the bulk of these costs at \$4.7 billion, including indirect costs.

3c. Training and Professional Development

Less than a handful of Canadian studies have been undertaken which specifically examine the effectiveness of training in suicide prevention and intervention² despite the fact that training and education activities constitute a major part of most local suicide prevention activities and efforts.

Davis (1991) describes the implementation of a curriculum that was used to train volunteers who were providing follow-up counselling to suicidal clients. Volunteers who evaluated the curriculum found it to be effective, although they were concerned about limited practice time. Both community professionals and trainees felt the project met its objectives.

Tierney (1994) used simulated role plays to evaluate the degree to which learners who had participated in a two-day suicide intervention gatekeeper training program had mastered various skills, knowledge and attitudes. Based on an assessment of immediate training effects, Tierney concluded that significant increases in suicide intervention skills had taken place.

Ross and colleagues (1998) were interested in determining the extent to which Canadian Schools of Nursing included violence-related content (including suicide prevention) in their curricula. Based on a survey with an 88% response rate, they learned that content regarding violence against children and women, and suicide as a response to abuse, formed part of the curriculum for all Schools of Nursing.

3d. Prevention/Mental Health Promotion

Primary prevention and mental health promotion programs typically target healthy populations who have not yet shown evidence of disease or disorder. Examples include the promotion of social competencies among youth, community renewal strategies, and family support programs. Several prevention and mental health promotion programs have been studied and evaluated by Canadian researchers in recent years, with most studies being published in the late 1990s. Not included in this document are studies which synthesize findings from the resiliency literature (e.g., Steinhauer, 2001), discussions of optimal prevention and clinical service delivery components in children's mental health (e.g., Offord et al., 1989), and guidelines for setting up effective Aboriginal mental health promotion programs (e.g., Kirmayer and Boothroyd, 1999).

Children, youth, and their environments

Bélanger and colleagues (1999) evaluated the impact of a program designed to promote social competence among kindergarten children in Montréal. Analysis revealed that there were significant gains in self-esteem and conflict resolution skills among children in the experimental group when compared with a control group.

Recognizing the impact of the social environment on child and youth well-being, another Canadian study examined system-level changes made by schools as a result of their

² Approaches taken to the development of training programs, i.e., Ramsay et al (1990) are included in a later category, Knowledge Development and Policy.

participation in an innovative, comprehensive mental health promotion program (Bond, Glover, Godfrey, Butler, and Patton, 2001). The Gatehouse project in Victoria, BC was designed as a “whole school” intervention which included the following elements: establishment and support of a school-based adolescent health team, identification of risk and protective factors in each school's social and learning environment from student surveys, and identification and implementation of effective strategies to address these issues.

In an earlier study, Peirson and Prillettensky (1994) also examined how school-level changes could contribute to a prevention climate at the secondary level. A grounded theory of successful school change was generated which included community ownership, attention to human factors, and proper implementation. Lastly, Collins and Angen (1997) highlighted the importance of youth participation in the development of health promotion and suicide prevention programs.

Conceptual models and approaches

In a study from Québec, researchers reviewed current practice in the area of child, youth and family interventions with a view to determining the conceptual underpinnings of various prevention models. Chamberland and colleagues (2000) analyzed a number of different prevention programs being implemented in Québec which were designed to serve individuals 18 and under and their families. Results indicated that intervention strategies were not aimed solely at modifying characteristics of children, youth and their families. Some projects also tried to change living environments, revealing the influence of ecological and social models in program development. Pancer and Cameron (1994) used the primary prevention initiative, “Better Beginnings, Better Futures” to assess the impact of citizen involvement in community-based prevention programs. Through a qualitative research methodology, these authors were able to assess the positive and negative outcomes that residents from seven Ontario communities derived from their involvement in this project.

Although many mental health promotion and prevention programs target children, youth and their families, two recently published Canadian studies have respectively targeted older adults and farming families/communities. Bouffard and others (1996) studied the development, implementation, and evaluation of a mental health promotion program for older adults that focused on assisting elderly women to establish and work towards personal goals. Using a case-study approach, Gerrard (2000) describes how a community psychology model was used to design and implement a farm stress program in Saskatchewan. Among other considerations, Gerrard emphasized the importance of conceptualizing mental health issues, like farm stress, from the perspective of “individuals-in-communities.”

4. Health of Populations and Sociocultural Determinants

A large number (approximately 85) of suicide-related research studies in Canada fall within this category. To make the review task manageable, studies have been further sub-divided under the following headings: social/cultural variables, specific at-risk populations, and determinants of health, i.e., healthy child development, income, employment, education, working conditions, social support, and environment.

4a. Social/Cultural Variables

This group of studies includes those that have examined rates of suicide at the population level based on a range of different social and cultural variables including age, sex, marital status, ethnicity, attitudes, and regional issues. Many of the studies included here reflect a distinctly Durkheimian orientation and arise out of the sociological tradition, with Frank Trovato from the University of Alberta furnishing the bulk of these studies. Space does not permit a review of each individual study conducted by Trovato, so they will be discussed briefly.

Social factors

Trovato's studies include an examination of the relationship between Canadian suicide rates and broad social factors such as ethnicity and immigration status (Trovato, 1986a; 1986b; 1992), sex and marital status (Trovato, 1986c; 1987; 1991), labour force participation (Trovato and Vos, 1992), regional and ecological variations (Trovato, 1992) and interprovincial migration (1986d). He has also examined suicide rates at the provincial level, specifically Québec (Krull and Trovato, 1994; Trovato, 1998). In a Durkheimian analysis of youth suicide in Canada, Trovato (1992) investigated the effects of three measures of social integration on youth suicide rates: family integration, religious integration, and unemployment. He found that religious detachment among the young was associated with an increased propensity towards suicide.

Other Canadian researchers have also examined rates of suicide by relying on Durkheim's concepts of social integration and anomie to better understand the social and economic correlates of suicide (Leenaars, Yang, and Lester, 1993; Leenaars and Lester, 1995; Leenaars and Lester, 1998; 1999). Theoretical frameworks describing alienation and specific risks for suicide are not included here.

Additional studies investigating broad-level social and demographic influences which are not necessarily located in the sociological tradition include: an examination of the "relative age effect" and its influence on youth suicide (Thompson, Barnsley, and Dyck, 1999); socioeconomic risk factors for elderly suicide (Agbayewa, Marion, and Wiggins, 1998); a demographic review of child and adolescent suicide (Thompson, 1987); an investigation of unemployment and labour force participation as risk factors for suicide (Cormier and Klerman, 1985); regional and ecological variations in suicide rates in provinces across Canada (Agbayewa, 1993; Sakinofsky and Roberts, 1987); investigations of immigrant suicide rates (Kliwer and Ward, 1988; Singh, 2002); and the psychosocial correlates of suicide among specific populations (Bagley and Ramsay, 1985; de Man, Labreche-Gauthier and Leduc, 1993; Hurteau and Bergeron, 1992).

Cultural factors

Canadian studies investigating the broad role of cultural influences (including gender, attitudes, and cross-cultural factors) on suicide are diverse. In a recent study, Pinhas and colleagues (2002) examined the role of gender in understanding suicidal behaviour among adolescents.

These authors found that gender-role conflict may be a potential contributing factor in the etiology of suicidal behaviour among female adolescents. Though illuminating, theoretical discussions about gender and suicide (e.g., Canetto and Sakinofsky, 2000) are not included here.

Bagley and Ramsay (1989) explored attitudes towards suicide, religious values, and suicidal behaviour through a community survey. Domino and Leenaars (1989) utilized the Suicide Opinion Questionnaire to compare Canadian and American college students' attitudes towards suicide. Canadian college students were significantly more likely than their American counterparts to view suicide as "a part of everyday life." Leenaars and Domino (1993) utilized the same questionnaire on a general population in Canada and the United States and noted differences in attitudes here too, but not as extreme as in the youth.

Studies that compare Canada with other nations as a way to further understand potential culture-bound risks for suicide have also been undertaken in recent years. In a series of cross-cultural investigations that compare Canada with the United States, Leenaars and others (Leenaars, 1992; Leenaars and Lester, 1994; Leenaars, 1995; Leenaars and Lester, 1995; Sakinofsky and Leenaars, 1997) have identified some clear differences in these two neighbouring countries, some of which may help to explain differences in suicide patterns. Other cross-cultural studies have compared college student suicide ideation in Canada and Japan (Heisel and Fuse, 1999). Cantor, Leenaars, Lester and their colleagues (1996) compared rates and patterns of suicide in Canada to that in seven other nations.

Lester and Leenaars (1998) examined the ecological relationship between suicides, homicides and accidental deaths from firearms in the Canadian provinces. They found a positive correlation for all these causes of death, interpreting this result as evidence for a regional subculture of firearm violence in Canada.

4b. Specific At-Risk Populations

In addition to the research examining specific clinical populations (summarized in the previous section), a number of other groups have been identified in the empirical literature as being at elevated risk for suicide including youth, elderly, Aboriginal Peoples, gay/lesbian populations, and those who are incarcerated. Each of these populations has been studied from a number of different perspectives in the hope of being able to identify specific risk or protective factors for suicide. Canadian studies investigating specific high-risk populations are summarized next. Reviews of the relevant literature (e.g., Kirmayer 1994; Clarke, Frankish, and Green, 1997) are not included here.

Youth

deMan and others (1992, 1993) examined risks for suicide among French-Canadian adolescents based on a range of variables including stress and social support. Bagley has made a sizable contribution to the suicide research literature in Canada. Of particular relevance here, Bagley has examined a range of factors associated with youth suicide (1989, 1992), including the role of sexual assault as a risk factor for suicidal behaviour (1995, 1997). McBride and Siegel (1997) found preliminary evidence to suggest an association between adolescent suicide and learning disabilities. Barber (2001) was guided by an "absolute misery hypothesis" as a way to account for suicidality among young people, and found that suicide risk among young males is increased when those around them are perceived to be more advantaged. Researchers in Ontario (Kidd, 2001; Kidd and Kral, 2002) investigated the meaning that suicide

held for street youth and young people engaged in prostitution. Key themes identified in participant narratives included feelings of worthlessness, loneliness, and hopelessness.

Elderly

At the other end of the age continuum, elderly suicide has also been studied fairly extensively by Canadian researchers. Duckworth and McBride (1996) examined coroners' records of elderly suicides in Ontario and determined, among other things, that elderly people who had died by suicide had rarely received psychiatric treatment prior to their deaths. Researchers in British Columbia examined the impact of weather and season on elderly suicide rates (Marion, Agbayewa, and Wiggins, 1999), while Alberta-based researchers (Quan and Arboleda-Florez, 1999) used coroners' records to describe the characteristics of suicide deaths among those over the age of 55, paying particular attention to gender differences. In a more recent study (Quan, Arboleda-Florez, Fick, Stuart, and Love, 2002), researchers examined the relationship between suicide and physical illness among the elderly. Examining the relationship between suicide ideation and a range of personal and social variables, researchers in Québec found that suicidal ideation among the elderly was associated with infrequent alcohol consumption, gender, depression, social isolation, and dissatisfaction with health and social support (Mireault and de Man, 1996).

Aboriginal

High rates of suicide among Canada's indigenous peoples have sparked a series of investigations in recent years. Many of these studies have attempted to understand Aboriginal suicide within a specific regional and cultural context. Starting in the West, several researchers have investigated Aboriginal suicides in British Columbia (Lester, 1996; Chandler and Lalonde, 1998; Cooper, Corrado, Karlberg, and Adams, 1992). Cooper and others (1992) examined the circumstances surrounding Aboriginal suicides in BC and found that rates of suicide among Aboriginal people living off-reserve more closely approximated the rates in the general population. In a later study of Aboriginal youth in BC, Chandler and Lalonde (1998) found that while the overall rate of youth suicide was higher among Aboriginal communities when compared with the general population, there were a number of First Nations that had low or non-existent rates of suicide. A strong association was found to exist between those communities with low rates of youth suicide and certain markers of "cultural continuity" including: making advances towards self-government and settling land claims, having control over community social services (i.e., police, education, and child welfare), and engaging in traditional cultural healing practices.

In Alberta, correlates of adolescent suicidality among Aboriginal youth were identified and compared with non-aboriginal youth (Gartrell, Jarvis and Derckson, 1985). After controlling for age, risk factors for Aboriginal suicide attempts included heavy alcohol use, absent fathers, sleeping difficulties, and poor psychological well-being. Bagley (1991) found that poverty and suicide were shown to have strong positive correlation in a study of young Aboriginal males living on reserves in Alberta.

In Manitoba, characteristics of suicides among Aboriginal individuals living on-reserve were compared with suicides among Aboriginal people living off-reserve (Malchy, Enns, Young, and Cox, 1997). Findings indicated that there were no significant differences in mean age, sex, blood alcohol level and previous psychiatric care among Aboriginal people who died by suicide living on and off reserve. A five-year review of all youth suicides was also conducted in Manitoba (Sigurdson, Staley, Matas, Hildahl, and Squair, 1994), as was a study of suicide and parasuicide in a remote northern Aboriginal community (Ross and Davis, 1986).

Suicides and psychological distress among Aboriginal communities in Ontario and Québec have also been studied. For example, Spaulding (1985) examined suicide rates among ten Ojibwa bands in northwestern Ontario. In Québec, Barss (1988) summarized the circumstances surrounding suicide deaths and suicide attempts among the Cree of James Bay, while Kirmayer and others (2000) have identified specific risk and protective factors associated with psychological distress among this population.

Suicide and suicidal behaviour among the Inuit have also been studied in recent years (Kirmayer, Malus, and Boothroyd, 1996; Kirmayer, Boothroyd, and Hodgins, 1998; Kral et al., 2000; Leenaars, 1995; Leenaars, Anawak, Brown, Hill-Keddie & Taparti, 1999). Factors associated with attempted suicide among Inuit youth include: substance use (solvents, cannabis, cocaine), recent alcohol abuse, psychiatric problems, and a greater number of stressful life events in the last year. Regular church attendance was negatively associated with attempted suicide (Kirmayer et al., 1998). Inuit elders' first-hand accounts of suicide, distress and healing in the eastern Arctic have also been captured through a series of narratives, adding a richness and dimension to our current knowledge base (Kral et al., 2000; Leenaars, 1995). Leenaars et al. (1999) have extended such study by capturing not only the narratives of some Inuit, but also from some Aborigine in Australia. These international comparisons show rich similarities to the malaise in both peoples, such as social and cultural turmoil created by the policies of colonialism in Canada and Australia.

Looking more broadly at the issue of Aboriginal suicide in Canada, Lester (1995a) found that there was no association between the proportion of Aboriginal people living in a particular region and the overall suicide rate.

Gays/lesbians

Canadian research exploring sexual orientation and suicide risk has primarily focused on gay men. For example, Bagley and Tremblay (1996) found that attempted suicide rates among young gay men in their sample ranged from 20% to 50%. Based on a survey conducted in Calgary, these authors found significantly higher rates of previous suicidal ideation and actions among homosexual males than among heterosexual males (Bagley and Tremblay, 1997). In a more recent Canadian study of gay and bisexual men, just under half of the subjects reported that they had considered suicide, while approximately 20% reported that they had attempted suicide at least once (Botnick et al., 2002).

Incarcerated populations

Several recent Canadian studies have examined suicide risk among prisoners. Bland, Newman, Dyck, and Orn (1990) looked at the prevalence of psychiatric disorders and suicide attempts among prisoners in Edmonton, while Lester (1995b) studied overall rates of suicide among Canadian prisoners. Green and colleagues (1993) summarized the most common characteristics of suicides among federally incarcerated prisoners and noted that suicides were not associated with age, offence, previous convictions or length of sentence. In a later study, risk factors for inmate suicide were identified following a review of suicide deaths in federal institutions: lengthy involvement in the criminal justice system, a greater likelihood of being incarcerated for robbery or murder, and involvement in institutional incidents of a serious nature (Laishes, 1997). More recently, Fruehwald and colleagues (2001) investigated the relevance of previous suicidal behaviour in understanding suicide among Canadian prisoners.

4c. Determinants of Health

Studies in this category are discussed below under the following headings: child development, social support, occupations and working conditions. Reviews of the literature concerning the determinants of health and suicide (i.e., Dyck, Mishara, and White, 1998) and evidence-based reviews of the association between unemployment and suicide (Jin, Shah, and Svoboda, 1996) are not included here.

Child development

In studies examining children's understanding of death and suicide, researchers in Québec found that among children in 1st, 3rd, and 5th grades who knew what suicide meant, the concept was related to age, the concept of death and personal experiences with death (Normand and Mishara, 1992). In a later study, Mishara (1999) found that by the 3rd grade, children have a fairly sophisticated understanding of suicide, learned by many from television and discussions with other children.

Social support

Hanigan and colleagues (1986) studied the relationship between young adults' suicidal behaviours and the level and quality of support received from their social environment following a critical life event. Later, Tousignant and Hanigan (1993) examined the role of social support among suicidal college students who had recently suffered the loss of a love relationship or the loss of a close friend. They found that suicidal students named fewer important persons in the kinship network and had more conflicts with this network than did nonsuicidal peers. Meanwhile, in a more recent study, Stravynski and Boyer (2001) examined the construct of loneliness and its relationship to suicide. They found strong associations among suicide ideation, parasuicide and subjective and objective experiences of being lonely and alone.

Occupations and working conditions

A series of studies have been conducted in Canada in recent years to determine if certain occupational groups are associated with elevated risks for suicide. For example, Loo (1986) examined risks for suicide in the RCMP and found that the average annual suicide rate was approximately half that of the comparable general population. Among those officers who did kill themselves, the most common method was service revolver.

Sakinofsky (1987) looked at suicide rates among physicians and compared their age-standardized mortality ratios with those of other occupational groups.

In a study that investigated the characteristics of suicides among Canadian farm operators, including the risks posed by exposure to specific hazards like pesticides, Pickett and colleagues (1993, 1998, 1999) found that provincial suicide rates among farm operators were generally lower than or equivalent to those of Canadian males generally. Furthermore, analyses revealed that there was no association between suicide and exposure to herbicides or insecticides.

In a study of suicide risk among electrical utility workers, Baris, Armstrong, Deadman, and Thériault (1996) did not find strong evidence for causal association between exposure to electric fields and suicide among this particular occupational group.

Finally, in a recent study that investigated risks for suicide among U.N. peacekeepers, Wong and colleagues (2001) found no overall increased risk of suicide in Canadian peacekeepers. The male rate of suicide in this military group was half that of a Canadian civilians comparison group. An apparent increased risk among a subgroup of air force personnel was not related to

military hazards but to personal problems such as relationship and financial issues, and also possibly to loneliness and isolation. Airforce personnel did not go through the careful pre-screening and training procedures that their army colleagues were subjected to, which also resulted in mutual bonding and support. These authors suggest that while peacekeeping per se does not increase overall suicide risk, military lifestyles may tax interpersonal relationships, promote alcohol abuse, and contribute to psychiatric illness in a minority of vulnerable individuals.

5. Health Information and Epidemiology

Many of the studies included in this category have considerable overlap with the studies presented in the previous section on the health of populations. For the most part however, studies included here arise out of the epidemiological tradition, i.e., studies of prevalence rates, distribution patterns of morbidity and mortality at the population level, and analyses of suicide rates and trends over time. There have been approximately 50 studies published in this category during the period under review. For discussion purposes, studies will be presented under the following sub-headings: national and regional analyses of mortality statistics, prevalence of suicidal behaviours, and studies of methods.

5a. National and Regional Analyses of Mortality Statistics

Starting with the study of suicide rates based on an analysis of birth cohorts (Lester, 1988; Reed, Camus, and Last, 1985), there has been a longstanding and consistent interest in studying suicide rates at the national level in Canada. Some researchers have examined overall trends in Canadian suicide rates (Beneteau, 1988; Chipeur and Von Eye, 1990; Lester, 2000) while others have looked at more specific contributions: age, gender, and geographical region (Dyck, Newman, and Thompson, 1988); country-of-origin (Strachan, Johansen, Nair, and Nargundkar, 1990); birth rates (Lester, 2000); sociodemographic factors (Hasselback, Lee, Mao, Nichol, and Wigle, 1991); age-period-cohort effects (Newman et al., 1988; Trovato, 1986); sex-specific trends (Hutchcroft and Tanney, 1988, 1990); and cohort size (Leenaars and Lester, 1996). Other national studies have relied on time-series designs (Lester, 1997) or broad epidemiological perspectives (Mao, Hasselback, Davies, Nichol, and Wigle, 1990) to study suicides in Canada, while others have turned their attention to the phenomenon of murder-suicides (Gillespie, Hearn, and Silverman, 1998).

Examining rates of suicide at the provincial and regional levels, researchers in Canada have been able to track important trends and highlight interprovincial differences. For example, researchers in Ontario examined suicide rates in that province from 1877 to 1976 (Barnes, Ennis, and Schrober, 1986), while another study investigated suicide rates in Québec from 1951-1986 (Lester, 1995b). Other researchers in Québec have looked at suicide rates in a particular region of the province from 1986 to 1991 (Caron, Grenier, and Béguin, 1995) or among specific age groups (Chiefetz, Posener, LaHaye, Zajdman, and Benierakis, 1987). Isaacs and others (1998) conducted a descriptive review of all suicides in the Northwest Territories and Aldridge and St. John (1991) looked at rates of child and adolescent suicide in Newfoundland and Labrador. Researchers in Québec have looked more closely at homicides which are followed by suicides (Buteau, Lesage, and Kiely, 1993; Bourget, Gagne, and Moamai, 2000), while the phenomenon of cluster suicides has been a subject of investigation among researchers in Alberta (Davies and Wilkes, 1993) and Manitoba (Wilkie, Macdonald, and Hildahl, 1998).

5b. Prevalence of Suicidal Behaviours

Several Canadian researchers have conducted large-scale epidemiological studies that seek to estimate the prevalence of suicidal behaviours in specific populations. Bland and his colleagues examined hospital attendance records to estimate the prevalence of parasuicidal behaviours in Edmonton, Alberta and found a rate of 466 per 100,000 per year among those 15 years and older (Bland, Newman, and Dyck, 1994). Newman and Bland (1988) also found that suicide risk varied across the spectrum of affective disorders. Other Alberta researchers (Ramsay and

Bagley, 1985) relied on a community survey to better understand the association between suicidal behaviours, attitudes, and experiences among an adult population in Calgary.

Using the data collected through the Ontario Child Health Study, Joffe and his colleagues (1988) found that between five and ten percent of young males, aged 12 to 16, reported engaging in suicidal behaviour within a six-month period. For young females of the same age, the percentage increased to 10 to 20 percent. In a study of adolescent suicide attempters, Grossi and Violato (1992) noted that the lack of an emotionally significant other differentiated suicidal youth from those who had never made an attempt. A number of researchers in Québec have also examined prevalence rates of suicide ideation and behaviours among young people in their province (Bouchard and Morval, 1988; Coté, Provonost, and Ross, 1990; Coté, Provonost, and Laroche, 1993; Pronovost, Coté, and Ross, 1990). Finally, a national profile of intentional and unintentional injuries among Aboriginal people in Canada has recently been published for the period 1990-1999 (Health Canada, 2001).

5c. Studies of Methods

In an effort to illuminate potential opportunities for prevention, several Canadian studies have analyzed the use of specific methods among those who died by suicide in Canada. For example, Avis (1993, 1994) has summarized the most common characteristics of suicide deaths by firearms and by drowning. In Québec, researchers retrospectively analyzed the circumstances surrounding suicide deaths at a particular bridge site (Prevost, Julien, and Brown, 1996), while Mishara (1999) reviewed a series of suicides on the Montréal subway system.

Examining more rare methods of suicide, Bullock and Diniz (2000) investigated self-suffocation by plastic bags in Ontario, Ross and Lester (1991) looked at suicide deaths at Niagara Falls and Shkrum and Johnston (1992) looked at self-immolation deaths over a three-year period.

Finally, Killias (1993) looked at the association between gun ownership and rates of suicide and homicide. Several other Canadian investigations have looked more specifically at the impact of gun control legislation on suicide and these studies will be reviewed in the next section.

6. Knowledge Development and Policy Research

This small but important category of research concerns itself with the practical matters of research methods and dissemination. Epistemological studies that interrogate both, “how we know,” as well as studies that raise questions about “what counts as knowledge,” are also included here. The few studies that have been published in this area have appeared in the last five years. Policy-related research, including an examination of specific legislative effects on rates of suicide in Canada, is also in this category. Two sub-headings will be used to review the 16 studies in this category: research issues and the development of knowledge, and policy research.

6a. Research Issues and the Development of Knowledge

Studies reviewed in this category are quite diverse and include those that address specific research issues as well as those that explore the philosophical and ethical underpinnings of certain research traditions and approaches to prevention.

At the most practical levels are studies that specifically address methodological considerations in studies of suicide. For example, Speechley and Stavraký (1991) have raised questions about the adequacy of suicide statistics for epidemiological research purposes. Despite some evidence of underreporting, these authors concluded that underreporting is not large enough to threaten the overall validity of officially reported suicide rates.

More recently, van Reekum and Links (1997) have highlighted some important research considerations in the study of impulsivity and suicide, while Breton and his colleagues (2002) have identified the importance of using “informant-specific correlates of suicidal behaviour” in the development of research and interventions targeting youth suicidal behaviour.

Another level of suicide-related research includes studies that investigate the knowledge development process itself. Included here is the study by Ramsay and colleagues (1990) that retrospectively examined the suicide prevention gatekeeper training model used in Alberta and developed by LivingWorks Education Inc., using Rothman's developmental research model. More recently, Breton (1999) reviewed a series of prevention and mental health promotion programs being delivered across Canada, and noted a distinct lack of conceptual coherence as well as a great deal of confusion about appropriate program aims. To correct some of these difficulties, Breton (1999) recommends that a new understanding of the emergence of mental health problems among children and youth may be required.

Building on this line of inquiry, Schrecker and colleagues (2001) recently published an article that raises some important questions about how current prevention research models and methods may direct our attention towards some specific dimensions of risk while potentially concealing other contributions to the emergence of overall vulnerability. More specifically, these authors suggest that biological and biomedical approaches tend to dominate the research agenda and have the effect of distracting attention away from public health. Furthermore, they believe that discussions of public health and mental illness should refer not only to prevention, but also to social risk reduction.

6b. Policy Research

Several Canadian studies have specifically examined the impact of Bill C-51 on firearm-related suicide deaths in Canada. This legislation was introduced in 1977 to restrict the use of firearms in Canada and many researchers hypothesized that it would have a favourable effect on reducing firearm suicides in Canada.

In one of the first studies, Rich and colleagues (1991) examined suicide rates and methods in Toronto and Ontario for five years before and five years after the enactment of gun control legislation. They found that the legislation led to an overall decrease in firearm-related suicide deaths among men, but the difference was apparently offset by an increase in suicide by jumping from a height, providing preliminary support for a substitution-of-method hypothesis.

Lester and Leenaars' (1993) analysis of Canadian data suggested that there was a decreasing trend in the overall firearm suicide rate and the percentage of suicides by firearms, following the introduction of Bill C-51. Carrington and Moyer (1994) reviewed the suicide mortality data for Ontario before and after the introduction of the gun control legislation and found an overall decreasing trend in firearm suicides with no concomitant evidence of substitution. Leenaars and Lester (1998) conducted a thorough review of the gun control legislation studies in Canada and concluded that while the legislation may have had some impact on suicide rates by firearm, more studies were warranted. Meanwhile, Carrington (1999) re-analyzed the earlier data summarized by Lester and Leenaars and challenged some of their original findings, but subsequent studies support the original Leenaars and Lester finding. Furthermore, more extensive international comparisons show great utility of controlling the environment to reduce suicide (Leenaars, et al., 2000). Public health approaches appear to be most effective in reducing suicide, not only in Canada, but also world wide.

In addition to examining the issue of gun availability in Canada and its effect on overall rates of suicide and homicide (Lester, 1994, 2000), Lester has also looked more broadly at the legislative effect of decriminalizing the act of suicide in Canada (1992).

Finally, there has been one other study in Canada that has examined the effects of provincial policy on the development of programs designed to prevent mental health problems (Nelson, Prilleltensky, Laurendeau, and Powell, 1996). These authors concluded that while the rhetoric of prevention permeated many of the provincial policy documents, there had not been a reallocation of funding in the health field from treatment and rehabilitation services to prevention programs, and funding for prevention remained minimal.

B. Related National Efforts and Key Milestones

Following is a brief summary of related national efforts and key milestones in the history of the suicide prevention movement in Canada.³

10th Congress of the International Association for Suicide Prevention, 1979

This Congress provided the catalyst for the formation of the Canadian Association for Suicide Prevention (CASP). At this meeting, a decision was made to establish a steering committee. This committee examined the viability of establishing a cooperative approach to promote and facilitate action in the area of suicide prevention. Tasks undertaken by the steering committee included a needs assessment that identified the following research priorities: evaluation of prevention programs, assessment of risk, psychology of suicide, and epidemiology. Respondents to the needs assessment also identified a mechanism for sharing research information as a key issue. (National Health and Welfare, 1987).

Canadian Task Force Reports on Suicide, 1987 and 1994

In 1979, Health and Welfare Canada established the National Task Force on Suicide in Canada. The Task Force met in 1980 and produced their first national report, *Suicide in Canada: Report of the National Task Force on Suicide in Canada 1987*. The comprehensive report provided an overview of the magnitude of the problem of suicide at the national level, reviewed the epidemiological and etiological knowledge base, presented findings on specific high-risk populations, and advanced a series of recommendations across the spectrum of prevention, intervention, and postvention activities. Nine recommendations focused on advancing the suicide research agenda, including: establishment of a broad national mortality data base, evaluation of current data collection procedures to standardize methods and increase efficiency, interdisciplinary investigation into the effectiveness of training efforts in suicide prevention, and multi-centre, multi-disciplinary research into youth suicide. While some of the recommendations listed in the original Task Force Report have sparked action (Tanney, 1995), for the most part, very little has been done in response to these recommendations over ten years later (Leenaars, et al., 1998). In 1994, an updated version of the Report was produced, and many of the original recommendations were restated and reinforced.

Canadian Association for Suicide Prevention

Efforts to establish a national association dedicated to the prevention of suicide and suicidal behaviour began in 1985 with the incorporation of the Canadian Association for Suicide Prevention (CASP). By 1988, the organization had elected its first president – Dr. Antoon Leenaars, and a Board of Directors, developed a formal set of by-laws and a five-year plan to guide the organization into the future. CASP's original vision was to "promote within Canada activities designed to reduce the incidence and/or effects of suicide."

Annual CASP conferences have been held in Canadian cities each year since 1990. Research and service recognition awards have been handed out since 1992. A series of specialized sub-committees have been in existence for several years including: research, youth/schools, survivors, crisis centres, and student committees. CASP's mandate has changed very little

³ For a more thorough review of Canadian efforts in suicide prevention, see Leenaars, A. (2000). "Suicide Prevention in Canada: A history of a community approach." *Canadian Journal of Community Mental Health*, 19(2), 57-73.

since its inception and the organization is still committed to advocating for and encouraging the development of suicide prevention, intervention and postvention activities on a national level, and to unite people across Canada's diverse cultures in an effort to understand suicide and reduce its impact.

L'Association québécoise de suicidologie

The first meeting of L'Association québécoise de suicidologie (AQS) took place in 1987 in Montréal. At this meeting, documents outlining the philosophy, objectives and general regulations were adopted and the first Board of Directors was elected. AQS was formed as one way to bring together and coordinate the efforts of several suicide prevention centres, each of which had previously been working in isolation. Over the years, the organization has steadily grown to become a vibrant provincial organization dedicated to advancing the suicide prevention mandate in Québec. In 1992 the AQS amended its general regulations to make them more consistent with those of several other provincial alliances. At the same time, the first subsidy from the Ministry of Health and Social Services permitted the AQS to establish an office whose main function was to coordinate and support the organization's activities.

Crisis Line Network

One of the first volunteer-based crisis lines to operate in Canada was in Sudbury, Ontario, to be followed shortly by Toronto's Distress Centre, which opened its telephone lines in 1967 (Leenaars et al., 1998). Today 24-hour, telephone based crisis response services exist in most major cities across the country, and are at varying stages of development. Several centres across Canada have been accredited by the American Association of Suicidology and a movement is currently investigating the viability of establishing a national crisis line network in Canada (Ian Ross, personal communication).

United Nations Conference in Calgary, 1993

In 1993, an international meeting was convened on suicide prevention where an interregional expert group sponsored by the United Nations was invited to develop guidelines for the creation and implementation of national strategies for the prevention of suicide. This week-long meeting took place in Alberta, with representatives from 12 countries. The draft guidelines from this meeting were submitted to the United Nations and were later published as *Prevention of Suicide: Guidelines for the formulation and implementation of national strategies* (UN, 1996). The core elements of a national strategy were articulated in this document and included the following features: government policy, conceptual framework, general aims and goals, measurable objectives, implementation through community organizations, and monitoring and evaluation (Ramsay and Harrington, 2000). This document has provided an important blueprint for many countries in the development of their national strategies for suicide prevention.

Combined Meeting of the International Association for Suicide Prevention, The Canadian Association for Suicide Prevention, the Québec Association of Suicidology and Suicide-Action Montréal, 1993

A meeting of over 700 participants, this was an important opportunity for increased contact between (a) Canadian francophone and anglophone suicide Researchers, and (b) with the international research community.

Choosing Life: Special Report on Suicide Among Aboriginal People, 1995

A Royal Commission was established to investigate the problem of suicide among Canada's Aboriginal peoples. Based on 172 days of public hearings that took place in 96 communities across the country, the Royal Commission produced a final report summarizing the findings from the hearings. The report discusses rates of suicide among Aboriginal peoples and acknowledges many of the individual, cultural, social and historical factors that have contributed to the high rates of suicide among many Aboriginal communities. The report highlights several promising approaches being undertaken by Aboriginal communities in Canada to combat the problem of suicide, while also pointing out some of the potential barriers to action. It concludes with a series of recommendations, with a strong focus on community ownership and community development principles.

International Francophone Suicide Prevention Congress, 2000 and 2002

The First International Francophone Suicide Prevention Congress was held in Québec City in 2000, and had over 800 persons attending. The Congress was organized by the Québec Association for Suicidology and the Centre for Research and Intervention on Suicide and Euthanasia (CRISE) of the University of Québec at Montréal. A second international Francophone meeting was held in Liège, Belgium in 2002, with significant French Canadian participation. A third Francophone meeting is scheduled for France in 2004.

First International Conference on Innovative Practices in Suicide Prevention, 2004

CRISE is organizing, in collaboration with Suicide-Action Montréal and the International Association for Suicide Prevention, a First International Conference on Innovative Practices in Suicide Prevention (Pratiques novatrices pour la prévention du suicide) May 4-7, 2004 in Montréal.

France-Québec Collaboration

There has been ongoing collaboration between France and Québec in suicide prevention, which includes research components as part of the France-Québec Cooperation Project. This has included exchanges in areas such as Suicide in the Metro (Montréal and Paris), gun control and evaluation of training programs. The collaboration is expanding to include Belgium.

In the area of Public Health, there have been a number of activities as part of the French International Network on Injury Prevention (REFIF) which holds annual seminars, including research seminars and international conferences on suicide as part of the injury prevention content. The last meeting was in Montréal in 2002 and the next meeting will be held in Lebanon. The 6th World Conference on Injury Control and Prevention "Injuries, Suicide and

Violence" was held in Montréal in May 2002, with over 1,600 participants from around the world. This conference included many sessions on suicide research with simultaneous translation.

Survivors/Bereavement Groups

Survivors of suicide offer an invaluable perspective in advancing the knowledge base and improving the everyday practice of suicide prevention. CASP has had a Survivors' Committee in place for several years, which has enabled survivors of suicide to bring their particular interest and knowledge to the attention of the broader suicide prevention community. Annual CASP conferences have provided an important vehicle for survivors, mental health professionals, and researchers to communicate with one another. It is also probably fair to say that survivors' interests have often been quite narrowly understood, i.e., their needs have typically been constructed in terms of their use of bereavement services, and yet survivors of suicide also have a valuable role to play in advocating for suicide prevention programs and educating others about needed changes to the overall mental health system (Bonny Ball, personal communication).

Research Units

Several specialized research units devoted specifically to the study of suicide have been created in Canada in the last few years, including: the Centre for Research and Intervention on Suicide and Euthanasia (CRISE) at the University of Québec in Montréal, the Arthur Sommer Rotenberg Chair in Suicide Studies at St. Michael's Hospital in Toronto, the Laboratoire d'étude sur le suicide et le deuil at the Centre de recherche Fernand-Seguin at Louis-H. Lafontaine Hospital in Montréal, and the McGill Group for Suicide Studies at McGill University in Montreal. Each of these centres will be described very briefly below⁴.

The Center for Research and Intervention on Suicide and Euthanasia

The Center for Research and Intervention on Suicide and Euthanasia (CRISE) is a research unit affiliated with the Université du Québec à Montréal (Montréal, Québec, Canada) which includes researchers, practitioners and students from throughout the province. The centre is unique in that all projects involve collaborative efforts between suicide researchers and community organizations. The members of CRISE share a view of the suicidal phenomenon using the social ecological model developed by Uri Bronfenbrenner. According to this approach, the complex phenomenon of suicidal behaviour may be understood in terms of reciprocal exchanges among individuals and various social-environmental influences.

Arthur Sommer Rotenberg Chair, University of Toronto

The Arthur Sommer Rotenberg Chair in Suicide Studies is an academic program affiliated with the Department of Psychiatry at the University of Toronto. The Chair is housed at St. Michael's Hospital, an urban health care facility located in the inner-city of Toronto. The Arthur Sommer Rotenberg Chair in Suicide Studies has the mission of conducting research leading to a greater understanding of the various biological, psychological and sociological determinants of suicidal behaviour, and implementing societal and clinical healthcare advances to reduce the losses and suffering resulting from suicide and suicidal behaviour. The multi-professional team at the Arthur Sommer Rotenberg Chair in Suicide Studies is headed by Dr. Paul S. Links, Professor of Psychiatry at the University of Toronto, and includes research and healthcare professionals representing the fields of Epidemiology, Psychiatry, Psychology, Social Work, and Sociology.

⁴ Descriptions of these three centres are based on information provided from the programs' respective websites.

McGill Group for Suicide Studies

Affiliated with both McGill University and the World Health Organization, the McGill Group for Suicide Studies (MGSS) in Montréal is the only research unit of its kind in Canada, housing one of the world's largest collections of DNA from those who have died by suicide. Led by Dr. Gustavo Turecki, MGSS is composed of 5 independent investigators and more than 20 research associates from a wide variety of disciplines including histopathology, clinical psychology, psychiatric nursing, and laboratory technology. The role of MGSS is to study biological, behavioural, and clinical risk factors for suicide.

Fernand-Seguin Research Centre, Montréal

The Laboratory for the Study of Suicide and Bereavement is financed by the Québec Health Research Fund. It has been part of the Fernand-Seguin Research Centre since 1994. A key mission of the Centre is to carry out various research projects addressing suicide, violent death and bereavement. Suicide and accidents are major causes of death among adult males. It is thus essential to better define the risk factors associated with these deaths in order to be able to prevent them in the future. It is in this spirit that a group of researchers has undertaken a program of research to evaluate the neurobiological, psychosocial and genetic dimensions of this type of mortality.

Other relevant Canadian research centres include the Suicidology Research Group at the University of Windsor, the Centre for Addiction and Mental Health at the Clarke Institute in Toronto, the Culture and Mental Health Research Unit at McGill University in Montréal, and the Mental Health Evaluation and Community Consultation Unit (MHECCU) at UBC in Vancouver.

C. Author's Commentary

The views included in this next section are those of the author. By definition, the commentary that follows is partial and situated. It is recognized that individual readings of this work will inevitably lead to different interpretations and questions and that participants at the February Workshop will bring their own perspectives to the text. The comments that follow are offered in the spirit of a "conversation-opener."

Suicide Research in Canada

Many of the findings generated from suicide-related research conducted in or about Canada have made an important contribution to the national and international evidence base.

Furthermore, there are clear signs that a commitment to undertaking high-quality, collaborative, multi-disciplinary research about suicide is driving some important new research initiatives in many parts of this country.

Key questions to be considered include:

- Where are suicide researchers in Canada devoting most of their attention?
- Which research traditions and disciplines are making the largest contribution to the current knowledge base?
- How do Canada's research efforts relate to other international research endeavours?
- What are the strengths on which we can build, and where are the obvious gaps?
- What do Canadian research activities reveal about how the problem of suicide in Canada is being constructed and what are the potential consequences of this?

Canadian investigations have frequently focused on identifying specific risk factors, antecedent conditions, and potential pathways to suicide. Studies have commonly taken the form of large scale mortality reviews or psychological autopsy studies, whereby retrospective analyses of coroners' records and medical examiners' reports are analyzed for themes and patterns, and sometimes augmented with interviews with key informants. These studies have helped to identify statistical risk factors for suicide, and to corroborate international and regional studies. For example, empirically validated risk factors for completed suicide are well established and include: mental disorder, previous suicidal behaviour, family history of suicidal behaviour, impulsivity, and social isolation. Specific populations have also been determined to be at elevated risk for suicide including: individuals with mental disorders, males, youth, elderly, gays/lesbians, Aboriginal individuals, and incarcerated persons.

Interest in the problem of suicide from a clinical or treatment perspective has also been considerable during the period under review. Most of the published Canadian studies undertaken in this area have been devoted to describing the characteristics of clinical populations at risk for suicide rather than to evaluating the specific efficacy and effectiveness of various treatment approaches. Several studies currently underway at the Arthur Sommer Rotenberg Chair in Suicide Studies are specifically concerned with investigating the effects of various psycho-educational, therapeutic, and pharmacological interventions on emotional distress and suicidal behaviours within specific clinical populations, e.g., those diagnosed with borderline personality disorder.

Dominant Research Traditions and Disciplines

Suicide research is firmly rooted in the traditional scientific paradigm where a concern with prediction, control, and understanding is placed in the foreground. Research about suicide is commonly undertaken by researchers located within academic institutions, with the following disciplines furnishing the bulk of studies: psychiatry, psychology, public health, and sociology. Research designs are typically quantitative in nature; in keeping with contemporary trends to articulate and promote evidence-based approaches, the “strongest” studies are considered to be those that employ some form of randomized experimental design. Even though few studies investigating the problem of suicide are able to consistently employ randomized controlled trial designs (due to ethical constraints, the multi-causal nature of suicide, and the challenges associated with studying a low-base rate phenomenon), the RCT is still considered the “gold standard” for advancing knowledge claims.

Suicide is an individual outcome that takes place in a social context and as a result has given rise to two distinct approaches to studying the phenomenon. Individually-focused researchers, such as those conducting biomedical investigations and those examining specific psychological dimensions of suicide, are generally interested in specifying more precisely the *intrapersonal* and/or individual genetic contributions to suicide. These studies have fairly direct clinical implications for the way we work with suicidal individuals.

At the more macro-level, sociologists, community and social psychologists, and those who work in the area of cultural psychiatry are particularly concerned with the socially situated nature of suicide, and these researchers have turned their attention to the historically and culturally-embedded risks for suicide. These types of investigations raise important questions about the way we construct the problem of suicide, as well as the way in which we plan broad-based prevention programs.

Considerations

Canadian research has provided an important empirical foundation for designing prevention and intervention programs as they have helped to draw our attention to the groups at statistically highest risk to die by suicide. However, given the retrospective character of many of these large-scale mortality reviews, many of these studies have an inherent bias built into them, i.e., since the outcome of suicide is known from the outset, it may serve to over-sensitize researchers to the presence of mental health problems and psychopathology.

Many current investigations into suicide are part of an overall program of research, and several individual projects are being pursued within the context of a larger, specialized research unit, three of which are located in Québec. For example, studies emerging from the Arthur Sommer Rotenberg Chair in Suicide Studies have a distinctly clinical focus, as well as an emphasis on health services research. Meanwhile, researchers working as part of CRISE are bringing a pragmatic focus to their research by collaborating with existing service providers in both the design and execution of their studies. Their studies are explicitly grounded in an ecological tradition that recognizes the multiple, macro-level influences on suicide and suicidal behaviour. Studies like those being led by Gustavo Turecki at Douglas Hospital, McGill University are focused on understanding biomedical and genetic aspects of suicide. Finally, the scholarly work emerging from the Centre de recherche Fernand-Seguin, Hôpital Louis H –Lafontaine, brings together a focus on bereavement, health services, and clinical research.

Current Capacities and Gaps

The individual strengths and collective talents of Canadian researchers studying suicide are extraordinary and far too numerous to enumerate in detail. A few noteworthy contributions will be highlighted briefly below for the purposes of identifying some of the unique contributions being made by Canadian researchers to the overall suicide knowledge base.

Resources and Strengths

Canadian researchers are leaders in advancing our understanding of the genetic and biomedical contributions to suicide (Hrdina, 1996; Turecki et al., 1999; 2001). The work of Mishara and others (2000) has also been at the forefront of the field in terms of evaluating telephone-based crisis intervention services. Epidemiological studies on suicide and parasuicide undertaken by Bland and colleagues (Bland et al., 1994) have been widely quoted in the international literature. The contributions made by clinical researchers in Canada (e.g., Links, 2002; Paris, 1990; Sakinofsky et al., 1990) have also been substantial, particularly in terms of increasing our knowledge base about working with suicidal patients with borderline personality disorders and repeat attempters. Adam's scholarly contributions (Adam et al., 1996) regarding the role of attachment and suicidal behaviour have also received international attention. Leenaars' (1999) extensive series of empirical investigations of suicide notes has provided us with unique insights into the suicidal mind. The establishment of the Laboratory for the Study of Suicide and Bereavement in Montréal by Alain Lesage and Monique Séguin highlights the explicit emphasis that will be placed on studying the unique aspects of suicide bereavement, which will fill an important gap in the international literature on suicide. The work of Breton and others (2002) in promoting a more theoretically coherent approach to program evaluation in the suicide prevention field is both timely and important. Research investigating Aboriginal and Inuit suicide in Canada from a developmental, cultural anthropological, and social historical perspective is highly prized here in Canada and elsewhere (e.g., Chandler and Lalonde, 1998; Kirmayer, et al., 1998; and Kral, et al., 2000). The broad psychosocial risk factors and demographic influences on suicide at the population level have been well articulated by researchers in Alberta (e.g., Bagley, et al., 1995; Trovato, 1992), Ontario (e.g., Leenaars, 1995) and Québec (de Man, et al. 1993). Finally, for providing ongoing leadership to the suicide prevention community in Canada and for their role in enthusiastically nurturing the idea for a national research strategy in Canada, it is worth mentioning the special and important contributions of Ron Dyck, Richard Ramsay, and Bryan Tanney from Alberta, and Antoon Leenaars and Isaac Sakinofsky from Ontario.

Gaps

Community action research, participatory research, large-scale multi-site studies, longitudinal research, policy research, knowledge generation and dissemination research, and program evaluation studies rarely appear in Canadian published literature on suicide. Educational research and investigations about suicide from a nursing or social work perspective are also rare, despite the relevance of suicide prevention to these professions. Suicide bereavement and effective clinical responses for those bereaved by suicide has not received a lot of attention by Canadian researchers. Despite the call for more research into prevention programs almost 20 years ago (Health and Welfare Canada, 1987), knowledge in this area continues to be limited. Studies designed to evaluate the effects of specific treatment modalities for suicidal individuals, e.g., cognitive behavioural therapy or dialectical behavioural therapy, are less common in Canada than in other parts of the world.

Few of the published suicide-related studies in Canada are authored by women, racial minorities, or Aboriginal people.

To close this section, it is worth noting that there might be some additional ends that could be accomplished through conducting suicide-related research that could add an important dimension to the traditional focus on “prediction and control.” For example, writing from the perspective of health promotion research, Buchanan (2000) suggests that there are at least five other purposes that theory and research can serve, including: making assumptions explicit, understanding, sense-making, sensitization, and critique.

Research as Product and Process

Beyond providing a sound knowledge base upon which to make program planning and intervention decisions, formal research also serves an important agenda-setting function by selectively orienting our attention to key concepts and opportunities for action. In other words, where we focus often determines where we will go, and the focus of Canadian investigations about suicide has, at least to date, tended to place the following issues in the foreground:

- Identification of psychopathology among those who are suicidal
- Recognition of suicide trends at the provincial and national levels
- Determination of specific risk factors among particular high-risk groups (especially youth, elderly, Aboriginal, incarcerated, and individuals with mental disorders), and
- Highlighting of social and demographic influences on suicide.

Findings from these types of studies often get converted into “lists of risk factors for suicide,” ranging from broad social influences to individual traits, which are then offered up to clinicians and program planners as helpful guides to suicide prevention practice. While certainly helpful, these types of studies may also have the unintended effect of restricting the focus of practitioners and clinicians to risks, deficits, and psychopathology.

Increasing attention is being paid to protective factors and the creation of “competence-enhancing environments” (Weissberg, Caplan, and Harwood, 1991), as key ingredients in suicide prevention and it is encouraging to note that Canadian program planners and researchers alike (e.g., Greenfield; Manion) are helping to shift our attention toward the promotion of resilience and the building of capacities as important elements in the prevention of suicide.

Appendix #1: Determinants of Health⁵

KEY DETERMINANTS	UNDERLYING PREMISES
Income and Social Status	Health status improves at each step up the income and social hierarchy. High income determines living conditions such as safe housing and ability to buy sufficient good food. The healthiest populations are those in societies which are prosperous and have an equitable distribution of wealth.
Social Support Networks	Support from families, friends and communities is associated with better health. The importance of effective responses to stress and having the support of family and friends provides a caring and supportive relationship that seems to act as a buffer against health problems.
Education	Health status improves with level of education. Education increases opportunities for income and job security, and equips people with a sense of control over life circumstances - key factors that influence health.
Employment/ Working Conditions	Unemployment, underemployment and stressful work are associated with poorer health. People who have more control over their work circumstances and fewer stress related demands of the job are healthier and often live longer than those in more stressful or riskier work and activities.
Social Environments	The array of values and norms of a society influence in varying ways the health and well-being of individuals and populations. In addition, social stability, recognition of diversity, safety, good working relationships, and cohesive communities provide a supportive society that reduces or avoids many potential risks to good health. Studies have shown that low availability of emotional support and low social participation have a negative impact on health and well-being.
Physical Environments	Physical factors in the natural environment (e.g., air, water quality) are key influences on health. Factors in the human-built environment such as housing, workplace safety, and community and road design are also important influences.

⁵ Health Canada. *Towards a Common Understanding: Clarifying the Core Concepts of Population Health: A Discussion Paper*. Cat. No. H39-391/1996E. ISBN 0-662-25122-9

KEY DETERMINANTS	UNDERLYING PREMISES
Personal Health Practices and Coping Skills	<p>Social environments that enable and support healthy choices and lifestyles, as well as people's knowledge, intentions, behaviours and coping skills for dealing with life in healthy ways, are key influences on health.</p> <p>Through research in areas such as heart disease and disadvantaged childhood, there is more evidence that powerful biochemical and physiological pathways link the individual socio-economic experience to vascular conditions and other adverse health events.</p>
Healthy Child Development	<p>The effect of prenatal and early childhood experiences on subsequent health, well-being, coping skills and competence is very powerful. Children born in low-income families are more likely than those born to high-income families to have low birth weights, to eat less nutritious food and to have more difficulty in school.</p>
Biology and Genetic Endowment	<p>The basic biology and organic make-up of the human body are a fundamental determinant of health. Genetic endowment provides an inherited predisposition to a wide range of individual responses that affect health status. Although socio-economic and environmental factors are important determinants of overall health, in some circumstances genetic endowment appears to predispose certain individuals to particular diseases or health problems.</p>
Health Services	<p>Health services, particularly those designed to maintain and promote health, to prevent disease, and to restore health and function, contribute to population health.</p>
Gender	<p>Gender refers to the array of society-determined roles, personality traits, attitudes, behaviours, values, relative power and influence that society ascribes to the two sexes on a differential basis. "Gendered" norms influence the health system's practices and priorities. Many health issues are a function of gender-based social status or roles. Women, for example, are more vulnerable to gender-based sexual or physical violence, low income, lone parenthood, gender-based causes of exposure to health risks and threats (e.g., accidents, STDs, suicide, smoking, substance abuse, prescription drugs, physical inactivity). Measures to address gender inequality and gender bias within and beyond the health system will improve population health.</p>
Culture	<p>Some persons or groups may face additional health risks due to a socio-economic environment, which is largely determined by dominant cultural values that contribute to the perpetuation of conditions such as marginalization, stigmatization, loss or devaluation of language and culture and lack of access to culturally appropriate health care and services.</p>

APPENDIX 2: REFERENCES

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