

**Suicide-Related Behaviour in Later Life: Examining Risk and Protective Factors among Older Adults Receiving Home Care Services in Ontario, Canada**

by

**Eva Louise Neufeld**

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## **Author's Declaration**

I hereby declare that I am the sole author of this thesis. This is a true copy of the thesis, including any required final revisions, as accepted by my examiners.

I understand that my thesis may be made electronically available to the public.

## **Abstract**

Suicide in later life is a growing public health concern that is expected to increase as the baby boom generation reach late adulthood. In the general population, older adults have rates of suicide that are higher than any other age group. The rate of suicide is particularly higher for older men. In Canada, older men between 80 and 84 years have rates of suicide approximately six times greater than older women the same age. Older adults living in the community are a sub-set of the population that are at high risk for suicide yet are not typically a focus of suicide research. As a result they remain hidden from the view of mental health promotion and suicide prevention programs until a decline in mental status brings them to the attention of formal mental health care services. Improving our understanding of suicide in later life particularly among community-residing older men can inform suicide prevention strategies. To improve this understanding, the goals of this research were three-fold: to comprehensively describe the sociodemographic and clinical characteristics of community residing older adults who have experienced suicide-related behaviour; to describe the rates, risk and protective factors, and predictors of suicide-related behaviour among this population; and to compare these findings to a subpopulation of community-residing older adults with neurological conditions. To achieve these aims, this research utilized a secondary data analysis approach using health information from multiple linked datasets. The Canadian Institute of Health Information (CIHI) performed record linkages between Ontario hospital administrative data (Discharge Abstract Database, National Ambulatory Care Reporting System, and Ontario Mental Health Reporting System) and Ontario home care data (Home Care Reporting System). Home care data are sourced from the Resident Assessment Instrument–Home Care (RAI-HC) Assessment Instrument, the provincially mandated assessment tool used to identify the strengths, preferences and needs of all long-stay home care clients. The RAI-HC contains over 350 items across a wide range of

domains including health, functional status and resource use. Linkages of these data records between home care and hospital sectors enabled the prospective examination of community-residing older adults with recent suicide-related behaviour. This is one of the first national and international studies to use the RAI-HC to examine older home care clients with experiences of suicide-related behaviour.

The study samples consisted of Ontario home care clients aged 60 years or older assessed with the RAI-HC between April 2007 and September 2010. Clients' initial RAI-HC assessment was examined followed by corresponding hospital records for suicide-related behaviour (N = 222,149). The prevalence of suicide-related behaviour for the sample was 1.01% ( $n=2,077$ ) with higher rates for older men than women. Rates were examined across geographic regions of Ontario. Descriptive analyses demonstrated that older adults with suicide-related behaviour had more indicators of psychiatric distress (including cognitive impairment) and psychosocial dysfunction than the general home care population. Multivariate analyses showed significant effects for age and gender in the prediction of suicide-related behaviour after adjusting for risk and protective covariates. Tangible areas for intervention were revealed that may reduce future suicide risk such as managing alcohol use and dependence, managing pain, increasing positive social relationships, and reducing social isolation. Time-to-event analysis supported the multivariate regression findings. Analyses of two subpopulations of older adults with neurological conditions (dementia and Parkinson's disease) demonstrated marked differences in suicide risk and protective factors compared to the general home care population. Findings suggest that a one-size-fits-all approach to suicide prevention and intervention is not appropriate for persons with these conditions, as their specific risk and protective factors need to be taken into consideration.

This study based on provincial data covering the home care sector in Ontario defined high risk groups of older adults and provided evidence for risk and protective factors associated with suicide-related behaviour. Findings point to several areas that should be assessed by home care

professionals to reduce risk in the older home care client population. This multi-dimensional profile of high risk older adults will assist in initiating a policy dialogue regarding the need for targeted suicide prevention strategies in Ontario's home care sector.

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## **Dedication**

For my Family.

*“In the depths of winter, I finally learned that within me there lay an invincible summer”*

-Albert Camus

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## **1. INTRODUCTION AND OVERVIEW**

Suicide in later life is a growing public health concern that is expected to increase as adults of the baby boom generation reach late adulthood. In the general population, older adults have the highest rate of death by suicide across all age groups (Canadian Coalition for Seniors Mental Health [CCSMH], 2006; World Health Organization [WHO], 2005). In spite of these high rates, relatively little attention is paid to suicides in the older population given that public health promotion and media attention regarding suicides generally focus on younger age groups (O'Connell, Chin, Cunningham, & Lawlor, 2004). The rate of suicide in later life is particularly higher for older men. In Canada, older men between 80 and 84 years have rates of suicide approximately six times greater than older women the same age (i.e., 23.5 per 100,000 vs. 3.8 per 100,000; Statistics Canada, 2010). It has also been noted that the baby boom cohort holds higher suicide rates when compared to younger and subsequent cohorts (Phillips, Robin, Nugent, & Idler, 2010). This suggests that as the baby boom generation moves into late adulthood, suicide rates might increase if current trends remain unchanged. Therefore, improving our understanding of suicide in later life, particularly the factors that place older men at higher risk, will in turn inform strategies for suicide reduction and prevention in later life.

The overall goal of this research is to improve our understanding of suicide in later life by exploring the characteristics of a sample of community-residing older adults that have experienced suicide-related behaviour and are in receipt of home care services from Ontario's Community Care Access Centre's (CCACs). Older adults living in the community are a sub-set of the population that is at high risk for suicide, yet they are not typically a focus of suicide research. As a result they remain hidden from the view of mental health promotion and suicide prevention programs until a decline in mental status brings them to the attention of formal mental health care services. The estimated prevalence of suicidal thoughts (e.g., suicide ideation) among Canadian community-residing older adults has ranged between 2%-6%, which is similar to rates found in other countries. However, it is

difficult to determine the true prevalence given that older adults are less likely to report or volunteer suicidal thoughts or seek out mental health services. Through the linkage of multiple data sets between the Ontario home care sector and hospital administrative data sets in Ontario, this research attempts to address this uncertainty by examining a sample of older adults not only at risk of suicide, but who have engaged in suicidal behaviour with a hospitalization to record their injuries.

In Canada, approximately 1 million people are receiving home care services and the majority is over 65 years old. In Ontario, approximately 2.4% of the population is receiving home care services and half are over 65 years old. The demand on home care services in Ontario and nationwide is expected to increase as the population ages and seniors wish to remain independent in their homes for as long as possible. As the expected demand for home care services increases and the rates of suicide are also expected to increase as the baby boom generation reaches late adulthood, strategies to assess and prevent suicide risk in the home care sector will become critical. Older adults in Ontario's home care population with recent experiences of suicide-related behaviour are an unexplored area of research. Understanding the characteristics of this population will aid in the development of mental health initiatives and suicide prevention strategies for the Ontario home care sector.

This research is the first to link Ontario home care data to hospital data for the purposes of examining suicide risk in later life. The Resident Assessment Instrument-Home Care (RAI-HC) is the provincially mandated home care assessment instrument which comprehensively evaluates the needs, abilities and preferences of persons expected to be on home care service for 60 days or more (i.e., long-stay). This research utilizes the information from the RAI-HC to form the basis for understanding the characteristics of older adults at risk of suicide-related behaviour. This research aims to develop suicide risk profiles in the Ontario home care population upon which evidence for practice and the development of a standardized suicide assessment approach can be based. As a



provincially mandated home care instrument, this approach with the RAI-HC can facilitate the advancement of a comprehensive suicide prevention strategy at the provincial level.

## **1.1 Search Strategy**

An exploratory review of the literature was conducted by searching the electronic databases of PubMed (Medline), PsycINFO, and Scopus. Additional materials were retrieved from guidelines and textbooks in the psychiatry, social work and gerontology fields. The following MeSH terms and keywords were used in the literature search, or a combination thereof: “suicide”, “suicidal ideation”, “suicid\*”, “elderly”, “aging”, “older adults”, “risk factors”, “protective factors”, “resilience”, “home care”, “screening”, “predictors”, and “theory”. Reference lists of relevant articles were also reviewed to broaden the search and new keyword searches were performed as the topics expanded (e.g., “ICD-10-CA”, “hospitalization”). Studies in languages other than English were not included in this review. The location limiter feature in Scopus was occasionally set to “Canada” to find studies using Canadian populations or Canadian authors. If this did not generate enough results, the location limiter was removed. In order to examine recent research articles, an initial limiter on the date of publication was set to 2008 or later, followed by the year 2000 or later. If the search terms did not generate enough relevant articles during these years, the year of publication limiter was removed.

## **2. LITERATURE REVIEW**

Prinstein (2008) noted that while studies identifying broad risk factors for suicide-related ideation will continue to make important contributions to the literature, studies addressing risk factors specific to suicide-related behaviours are critical and sorely needed. A conservative level of empirical research on late life suicide is in part a reflection of the difficulty common to the study of suicide, namely performing research of adequate quality to investigate a socially and culturally stigmatized subject like suicide (Bauer et al., 1997). Some of the major methodological challenges in the study of suicide are that suicide is primarily examined retrospectively, that accurate definitions and conceptualizations of suicide continue to be under debate, and that suicides tend to be somewhat rare (Bauer et al., 1997). Van Orden and colleagues (2010) offer another explanation for the relatively low number of empirical advances in suicide research; which is the absence of a well-formulated theory to comprehensively identify prospective suicide risk. In some cases, suicide research is limited merely by the contradiction and confusion on what constitutes suicide versus self-harming behaviour (Silverman, Berman, Sanddal, O'Carroll, and Joiner, 2007a). This literature review begins therefore with clarification of the term 'suicide', followed by a review of the evidence on risk factors for suicide in the older adult population.

### **2.1 Defining Suicide**

The concept of suicide in this thesis is consistent with the revised nomenclature of Silverman, Berman, Sanddal, O'Carroll, and Joiner (2007a, 2007b). Suicide-related behaviour (previously referred to as suicidality) includes ideation (i.e., thoughts), behaviours (i.e., suicide attempts, self-harm, suicide) and communications (i.e., suicidal threats, plans). Suicide-related ideation is defined as thoughts of ending one's life or a wish to be dead (Yip et al., 2003). A suicide attempt is a form of

self-injury whereby the attempt is to end one's life. It is this intent to end life that distinguishes suicide attempts from other forms of self-harm (e.g., deliberate injury to one's body tissue without suicidal intent; Prinstein, 2008, Silverman et al., 2007b).

A distinction is also drawn between active and passive methods of suicide (Glass & Reed, 1993). Active methods of suicide tend to be swift, effective and allow little opportunity for interruption or time to reconsider (e.g., hangings, shootings, jumping). Comparatively, passive suicide methods are less overtly violent which may allow for intervention or time to reconsider (e.g., overdoses, carbon-dioxide poisoning). Passive suicide methods are also accomplished, for example, by ceasing to follow a medication regime, or intentional malnutrition. Conwell, Pearson and DeRenzo (1996) refer to passive suicides as indirect self-destructive behaviours (ISDBs). ISDB is defined as "an act of omission or commission that causes self-harm leading indirectly, over time, to the patient's death" (Conwell et al., 1996, p. 153). ISDBs are more common among older adults and are difficult to distinguish relative to overt, active methods of suicide-related behaviour. ISDBs encompass a range of behaviours including refusing to eat or drink, failing to take medications, or treatment non-compliance which often conceals the person's suicidal intent (Brown, Bongar, & Cleary, 2004). Some of these behaviours are more common in older adults residing in care facilities where access to lethal means of suicide (e.g., use of a firearm) is more restricted than community-dwelling older adults (Conwell et al., 1996; Scocco, Fantoni, Rapattoni, de Girolamo, & Pavan, 2009).

The International Statistical Classification of Diseases and Related Health Problems, 10<sup>th</sup> Revision (ICD-10) (WHO, 2010) refers to suicide-related behaviour as 'intentional self-harm'. ICD codes are recognized globally for the classification of morbidity and mortality, including injuries or death by suicide. In Ontario hospitals and emergency departments, version 10 ICD codes, with the Canadian enhancement (i.e., ICD-10-CA) are used to classify intentional self-harm. It should be noted that when using ICD codes to represent suicide-related behaviour, it is assumed that all occurrences

of self-harm were with the intent to die, which may not always be the case. As this dissertation utilizes ICD-10-CA codes from Ontario hospitals to determine whether suicide-related behaviour occurred, the term intentional self-harm is adopted (and used interchangeably) to refer to these occurrences.

### ***2.1.1 ICD-10-CA Codes for Intentional Self-Harm***

ICD-10-CA uses codes ‘X60’ through to ‘X84’ for variations of intentional self-harm. These codes capture, for example, self-poisoning, self-inflicted injury by cutting and piercing instruments, or self-inflicted injury by jumping from a high place (Table 1.1). Previous research on suicide-related behaviour using ICD-10 codes in Canada and the US demonstrate that this approach is effective in standardizing the way in which suicide-related behaviour is defined (Martens et al., 2010; Patrick et al., 2010). It is also possible to identify individuals with suicide-related behaviour through ICD-10 codes other than those that fall between X60 and X84. Some research has identified suicidal individuals through ICD-10 codes X40-X42, X46, and X47 in addition to the X60-X84 codes (Fransoo et al., 2009; Martens et al., 2010). Codes X40 through X42 include poisoning by analgesics and antipyretics (i.e., Tylenol), anti-rheumatics, and sedatives (hypnotics, narcotics). Codes X46 through X47 include poisoning by inhalation of solvents and vapours and other gasses. As cases of intentional self-harm can be under-reported from unwanted stigma, hospital administrative data under-estimate the number of poisonings that are indeed intentional poisonings and not accidental (Fransoo et al., 2009; Martens et al., 2010; Rhodes et al., 2002). Patrick and colleagues (2010) further noted certain types of injuries more frequently recorded among hospitalizations for suicide-related behaviour, including poisoning by psychotropic agents (e.g., T43), poisoning by other drugs (e.g., T50.9), and open wounds to wrists, arms, and elbows (e.g., S61.7). Asphyxiation (e.g., T71) was an uncommon occurrence; however, 84.5% of asphyxiation events were a result of intentional self-harm.

In some cases, the intention of the injury was determined by coupling the event with a diagnosis of depression, personality disorder, mania, adjustment reaction, or unspecified non-psychotic mental disorder; however, this approach does not fully guarantee that the injury was self-inflicted.

The use of ICD-10-CA codes to identify hospitalizations for suicide-related behaviour particularly among older adult populations has received criticism in the literature. Rhodes and colleagues (2002) examined whether Canadian hospital data consistently reflected the prevalence of suicide-related behaviours, specifically deliberate self-poisoning. Latent class analyses demonstrated that the prevalence of suicide-related behaviours was 63% higher than what the hospital administrative data reflected (e.g., ICD codes) with the greatest discrepancy presenting among the older age groups. These results suggest underreporting or misclassification of suicide-related behaviours and raise questions about the utility and sensitivity of hospital administrative data. For the current research, the ICD-10-CA codes for intentional self-harm (X60-X84) and accidental poisoning (X40-X42, X46, X47) will be examined as performed by Fransoo et al., (2009) and Martens et al., (2010) to acknowledge the potential of misclassification of suicide-related behaviours (Rhodes et al., 2002). A record of any of these events in the hospital administrative data will be interchangeably referred to as suicide-related behaviour or intentional self-harm.

**Table 1.1: ICD-10-CA Codes to Define Suicide-Related Behaviour**

<b>ICD-10-CA Code</b>	<b>Brief Description</b>
X40-X42, X46, X47	Accidental poisoning
X60-X69	Intentional self-poisoning
X70	Intentional self-harm by hanging, strangulation and suffocation
X71	Intentional self-harm by drowning and submersion
X72-X75	Intentional self-harm by firearms and explosives
X76-X77	Intentional self-harm by smoke, fire, flames, steam, hot vapours, hot objects
X78-X79	Intentional self-harm by sharp and blunt objects
X80	Intentional self-harm by jumping from a high place
X81	Intentional self-harm by jumping or lying before moving object
X82	Intentional self-harm by crashing of motor vehicle
X83-X84	Intentional self-harm by other and unspecified means

## **2.2 Prevalence of Suicide-Related Behaviour among Community-Residing Older Adults**

Canada has seen a general decline in suicide rates from 12.7 per 100,000 between 1989 and 1992, down to 11.5 per 100,000 in 2009 (Health Canada, 1994, Navaneelan, 2012). The age-standardized mortality rate for deaths by suicide in Canada was 10.7 per 100,000 in 2009 (Statistics Canada, 2012) and suicide was the eighth leading cause of death for adults between the ages of 55 to 64 years (13.0 per 100,000; Public Health Agency of Canada, 2005). Required reporting of cause of death to the Canadian Vital Statistics Death Database is an effective mechanism for the surveillance of deaths by suicide in Canada. For suicide attempts that do not result in death or suicide-related ideation (i.e., suicidal thoughts), epidemiologic data must be derived from population-based research. Sirey and colleagues (2008) noted that community-residing older adults are a ‘sub-pocket’ of the population that are at significantly high risk for suicide and are typically not reached in suicide research. Community-residing older adults represent a population that may be hidden from view of mental health promotion and suicide prevention programs until a decline in mental status brings them to the attention of formal mental health care.

Canadian studies show that suicidal thoughts among community-residing older adults has ranged between 2% and 6% (Corna, Cairney, & Streiner, 2010; Lapierre et al., 2012; Vasiliadis, Gagné, & Prévile, 2012). These rates are similar to population-based studies found in other countries such as the US (Li & Conwell, 2010), Australia (Almeida et al., 2012), Italy (Scocco & De Leo, 2002), and Japan (Suzuki et al., 2011). It is difficult to determine the true prevalence however, given that older adults are less likely to report or volunteer suicidal thoughts (Barnow & Linden, 2000; Waern, Beskow, Runeson, & Skoog, 1999). Furthermore, variations in methodologies for measuring suicidal thoughts and a lack of standardized definitions increase the difficulty in comparing rates and drawing firm conclusions (Conwell & Thompson, 2008).

While it is important to examine suicidal thoughts given its high association with future suicide-related behaviour, it cannot be assumed that suicidal ideation among older adults is always a close proxy for suicide (Conwell, Rotenberg, & Caine, 1990). The current research is unique in that it examines older adults who have engaged in suicidal behaviour with a hospitalization to record their injuries. Relative to younger adults, rates of hospitalization for intentional self-harm among older adults are low (CDC, 2007; Health Canada, 2002). Patrick and colleagues (2010) sampled hospitalizations for intentional self-harm from British Columbia, Canada data and USA Nationwide inpatient data. Adults aged 65 and older had the lowest rates of hospitalizations for intentional self-harm (0.8% for Canadian hospitalizations and 0.7% for USA hospitalizations). In a Canada, adults aged 65 years and older accounted for 4% of hospitalizations for intentional self-harm (CIHI, 2004). These low rates of hospitalization may be explained in part by the high lethality of older adults' acts of self-harm (Heisel & Duberstein, 2005), the increased likelihood of succumbing to self-inflicted injuries (Draper, 1996) and less chance of discovery and emergency response for older adults living alone in the community (Conwell, Duberstein, Cox, Herrmann, Forbes, & Caine, 1998; Glass & Reed, 1993).

## **2.3 Demographic Factors**

### **2.3.1 Age**

In general, the male to female ratio of suicide increases with age, from approximately 3:1 among younger people to 12:1 among those over 85 years of age (De Leo & Spathonis, 2004). Older men (i.e., over 84 years) have the highest rate of suicide across all age groups (Canadian Coalition for Seniors Mental Health [CCSMH], 2006) at a rate of 7.3 times greater than rates of suicide among older women (CDC, 2007). Women of all ages attempt suicide approximately three times as often as men (Krug, Dahlberg, Mercy, Zwi, & Lozano, 2002). Research confirms that older men are more likely to use active methods of suicide, that is, violent, lethal methods such as firearms or hanging (CDC, 2007; Glass & Reed, 1993; Osgood, 1992). Women are known to choose less violent and disfiguring methods, such as an intentional medication overdose or ingesting a toxic substance (Biermann, Sperling, Bleich, Kornhuber, & Reulbach, 2008; CDC, 2007; Glass & Reed, 1993). The gender differences in methods used may account, in part, for the gender differences observed in the ratio of suicide attempts to fatalities.

### **2.3.2 Sex**

Predictors of suicide-related behaviour in later life have also been shown to differ by sex. For example, Coren and Hewitt (1999) identified gender differences in elderly suicide rates using data from the National Center for Health Statistics in the U.S. They discovered that factors associated with financial and social status were the strongest predictors of suicide for older men (namely, the loss of this status). For older women, the predictors were features of social and environmental stability and stress. Biermann and colleagues (2008), however, contradict the above assertion as their research



found no gender differences in a population-based study on the predictors of late-life suicide. Segal and Needham (2007) also found no significant gender differences in older adults' motives for suicide.

### ***2.3.3 Marital Status***

The relationship between marital status and suicide is somewhat ambiguous in the research literature. Positive correlations have been found between divorce rates and suicide in both western and eastern populations (Inoue, 2009; Leenaars, 1999). Roskar and colleagues (2011) found more suicide victims with a marital status change in the five years before death compared to matched controls. The first five years after a change in marital status was critical for elevated suicide risk, especially for older adults; however, all types of marital status changes (e.g., becoming widowed, getting divorced and getting married) proved to be risk factors for suicide related behaviour in this study (Roskar et al., 2011). Married people have tended to have the lowest rates of suicide (Luoma & Pearson, 2002). The protective effects of marriage from suicide were also reviewed by Rendall and colleagues (2011), who maintained that married men and women had a consistent survival advantage over unmarried men and women (Rendall, Weden, Favreault, & Waldron, 2011). Research also suggests that it is not the person's marital status *per se* but the connection and social support between two people. Haight (1995) found that marital status, family members and social support were not significant indicators of suicide risk; however, older adults who lacked a confidante thought about suicide significantly more than older adults with a significant other in their life. Interestingly, the significant other was not always a family member or spouse. This finding suggests that a lack of confidante, regardless of marital status, may be a more useful indicator in the context of suicide risk.

With regard to widowhood, there is a high risk for suicide particularly if the death of the spouse occurred in the first half of life (e.g., young widows/widowers) with young Caucasian widowers at highest risk (Kreitman, 1988; Luoma & Pearson, 2002; Martin Matthews, 1991). A

temporal effect also exists, whereby suicide rates are higher during the first week after the death of a spouse (Ajdacic-Gross et al., 2008) and decreases after the first year of widowhood (Erlangsen, Jeune, Bille-Brahe, & Vaupel, 2004). Among older adults, Ajdacic-Gross and colleagues (2008) found low rates of suicide among older widowed women (e.g.,  $\geq 60$  years). Similar findings were reported by Luoma and Pearson (2002) regarding older widowed Caucasian and African American women; which raises the question of why older women appear to be “protected” from suicide in the context of widowhood (p.1520). From a life course perspective, being widowed as a young person is less common, is unexpected, and has a difficult personal and social readjustment process following the death. Compared to later life, widowhood is more common, is expected to occur, and has a relatively easier personal and social readjustment following the death as there is typically access to female peers who are already widowed themselves (Martin Matthews, 1991).

Comparatively, the literature on older men and widowhood appear to consistently support the finding that older widowed men have more difficulty adjusting than older widowed women (Bennett, Smith, & Hughes, 2005; Byrne & Raphael, 1999; Lee, & DeMaris, 2007; Lee, DeMaris, Bavin, & Sullivan, 2001; Liew, 2011; Mechakra-Tahiri, Zunzunegui, Prévaille, & Dubé, 2010; Stimpson, Kuo, Ray, Rahi, & Peek, 2007; Van Grootheest, Beekman, Broese Van Groenou, & Deeg, 1999). Increased risks for depression, alcohol misuse and in some cases, death are outcomes of widowhood that are more common among older men than women. Gubrium (1974) uses the desolation hypothesis to account for these negative effects of widowhood on older adults. The marital disruption and loss of long-term intimate attachment that occurs following the death of a spouse is a major correlate of loneliness and its subsequent negative outcomes, including suicide ideation. This change or discontinuity in previous levels of social engagement (i.e., marriage) is referred to as desolation. The gender and marital role literature further supports that men have more to lose than women following spousal bereavement such as social relations and instrumental support (e.g., housekeeping, cooking)

that tend to be fulfilled by women (Van Grootheest et al., 1999). Suicidal ideation is also more likely to develop in older widowed men than women, both in the short- and long-term following bereavement (Bennett, Smith, & Hughes, 2005; Byrne & Raphael, 1999) such that routine inquiry about suicide or the development of a 'wish to die' is a recommended component in the assessment of widowed older men.

### ***2.3.4 Culture***

Approximately 3,800 Canadians died by suicide in 2009 (Statistics Canada, 2012). Asian countries account for approximately 60% of all suicides in the world, with high rates found in Japan, South Korea and Sri Lanka (Leach, 2006; WHO, 2008). While older age has typically been a risk factor for suicide, this finding is not consistent across all cultures. For example, death by suicide tends to increase across the life span for men of European descent. Native Americans and Hispanics however, have very high rates of suicide among their youth and very low rates after the age of 40. African American women have the lowest rates of death by suicide across the lifespan compared to other ethnic groups (Leach, 2006); with the exception of China. China is the only country in which the suicide rate is higher among women than men (Yip & Liu, 2006) although it is ranked third behind Korea and Sri Lanka whose women have the highest rates of suicide on a global scale (WHO, 2012). In the United States there are compelling differences in rates of suicide among older adults across age, gender, race and ethnicity. In 2002, Caucasian adults 65 years or older had higher suicide rates (per 100,000) than African Americans, Native Americans, Hispanic, and Asian older adults (Heisel & Duberstein, 2005). The WHO (2012) produces global suicide rates per 100,000 for the world's countries with Lithuania holding the highest rates as of 2011 (Appendix A). Cultural and ethnic variations account for some (but not all) of the disparity in a nations' suicide rate. For example, the practice for recently married women to move into the husband's home with his extended family is

related to female suicides in countries such as India, Sri Lanka, Pakistan and China (Sharma, Sharma & Bano, 2009). Other causes are related to a country's economic status (e.g., Japan; Inoue, Fukunaga & Okazaki, 2012), unemployment rate (e.g., India; Parry, 2012), and health spending per capita (Milner, McClure & De Leo, 2012).

Culture is an important component in the understanding of suicide across the lifespan particularly in terms of prevention and intervention. Sharma and colleagues (2009), for example, note that suicides among young women of the Hindu faith are often related to clashes within generations regarding values and expectations. Ozawa-De Silva (2010) tied the high suicide rates in Japan to the cultural preoccupation with how one is socially perceived (i.e., the importance of what others think), and Traphagan (2010) to the interpersonal conflict in Japanese multi-generational home environments. These examples highlight how culture can uniquely influence the risks that promote or protect against suicide.

## **2.4 Risk Factors for Suicide in Later Life**

There are a number of factors that distinguish suicide in later life. Compared to adolescents, suicide by older adults is infrequently an attempt to garner attention, a call for help, or an attempt to manipulate family or friends (Glass & Reed, 1993). Older adults who end their lives are rarely motivated by anger or revenge. Content analyses of suicide notes showed that suicide in later life rarely appears to be a function of ambivalence or redirected aggression (Leenaars, 1994). Older adults are less conflicted, more direct, and more aware of the reasons for ending their lives. This may in part be reflected by the lower ratio of attempted to completed suicides in later life. The ratio of suicide attempts to fatalities in later life has been estimated at 4:1 in adults over 65 years versus 200:1 for younger adults (CDC, 2007; McIntosh, Santos, & Hubbard, 1994). The lower ratio of suicide attempts to completions is explained in part by the number of older adults that succumb to their self-

inflicted injuries. A young healthy adult that self-injures is more likely to recover from their wounds and is also more likely to have family or friends around them (e.g., either in school setting or home). For older adults living alone in the community or those that are socially isolated, there is less chance of discovery or rescue following self-inflicted injuries (Draper, 1996; Glass & Reed, 1993) and they are more likely to die from the suicide attempt. It should also be noted that many instances of suicide among older adults go underreported, in part, due to the stigma of suicide and other social pressures that may lead family members and health professionals to avoid labeling these as intentional deaths (Duckworth & McBride, 1996).

Another finding of note is older adults' reticence to seek mental health services (Byers, Areal, & Yaffe, 2012; Pearson, Conwell, Lindsay, Takahashi, & Caine, 1997). Compared to younger persons, older adults with suicide-related ideation are much less likely to turn to suicide prevention centres, crisis telephone lines, or other kinds of mental health services (Glass & Reed, 1993). Those who see a physician prior to their suicide tend to report somatic symptoms or despair, and generally do not volunteer thoughts of self-harm unless directly questioned. Waern, Beskow, Runeson, and Skoog (1999) reported that three quarters of older adults who had died by suicide had told relatives or friends of their wish to die or their suicide-related ideation in the year preceding their suicide. However, 38% had discussed these thoughts with a healthcare professional.

It is common for the majority of older adults who die by suicide to have visited their primary care physician within a month prior to their suicide (Pearson et al., 1997). Tadros and Salib (2007) retrospectively examined the timing and nature of complaints to general practitioners (GPs) among a sample of elderly suicide deaths. One quarter of the sample contacted their GP in the last six weeks of life, while 19% did so in the last month, and 9.9% within one week of dying by suicide. In comparing the nature of complaints during the last GP consultation by age categories, younger adults complained more commonly of depression, while depression and pain were equally common among older adults.

Falls were an exclusive complaint for older adults, while alcohol related problems was a complaint exclusive to younger adults. Suicidal thoughts were not presented during the GP visit by any of the elderly suicide victims. As this study utilized coroner's records as the only source of data, there was no control group from which to compare older adults who died of other causes, or who visited their GP and did not die by suicide. Deisenhammer, Huber, Kemmler, Weiss and Hinterhuber (2007) found that half of their sample of deaths by suicide had no contact with a doctor during the months before death, while nearly 22% had no contact during the entire preceding year. Therefore not all older adults consistently present to a physician prior to their suicide where intervention could potentially occur.

#### ***2.4.1 Previous Suicide Attempts***

Individuals at all ages who have previously attempted suicide are at higher risk for subsequent suicide attempts (Berman, 2009; O'Connell et al., 2004). Even one previous attempt indicates that the person has given him or herself permission to, and is capable of moving from, suicide-related ideation to suicide-related behaviour. Having a history of suicide-related behaviour is one of the strongest and reliable predictors of future suicide attempts and suicide-related ideation (Joiner, 2005; Van Orden et al., 2010) and remains a significant predictor over time (Suominen et al., 2004). Although the percentage is relatively small (e.g., approximately 10%), those who do die by suicide are more likely have attempted within the previous two years (Owens, Horrocks, & House, 2002; Ramsay, Tanney, Lang, Kinzel, & Turley, 1999). This is not always the case for suicide risk in later life; however, as Conwell, Rotenberg, and Caine (1990) found that 75% of older adults who died by suicide had never made a prior attempt.

### ***2.4.2 Hopelessness***

Hopelessness has been identified as significant predictor of suicide-related ideation and behaviour, of note, to a greater degree than severity of depressive symptomatology (Hill, Gallagher, Thompson & Ishida, 1988). This harbinger of self-harm entails not only a pervasive lack of perceived efficacy and helplessness but also the belief that one's future will be exclusively bleak (Cornette, Abramson, & Bardone, 2000). According to Shneidman (1996), hopelessness is the most common emotion experienced among persons with suicide-related ideation. Hopeless individuals systematically misconstrue their experiences such that their confidence in their ability to cope with problems is greatly diminished. Hopelessness leads one to believe that suicide is a viable, maybe the only, available strategy to deal with what are perceived as insoluble problems and a desolate future (Beck, Steer, Kovacs, & Garrison, 1985).

In a prospective study with 1,958 psychiatric outpatients, Beck, Brown, Berchick, Stewart and Steer (1990) reported that 16 of 17 patients (94.2%) who ended their lives initially provided responses suggestive of clinically significant hopelessness; however, not all who ended their lives initially presented within clinical range (Beck et al., 1990). In other words, hopelessness appears to be a highly sensitive but not an overly specific harbinger of suicide (i.e., considerably higher rates of false-positives than false-negatives). The relationship of hopelessness, depression and physical health to suicide-related ideation was examined in a study of 39 female nursing home residents. Meeks and Tennyson (2003) found positive correlations between depression and hopelessness with suicide-related ideation. In addition, the relationship between suicide-related ideation and hopelessness was not affected after controlling for physical health problems. In a similar study, social factors, hopelessness and other depression symptoms were examined in a group of older adults with depression to determine which factors placed depressed older adults at risk for suicide (Dennis,

Molloy, Andrews, & Friedman, 2005). Compared to controls, hopelessness and a poorly integrated social network were among the factors that differentiated the depressed older adults who engaged in suicide-related behaviour.

### ***2.4.3 Psychiatric Illness***

Psychiatric illness, namely major depression and other affective disorders, is one of the more significant risk factors for suicide in later life (Conwell, 1995; Fischer, Wei, Solberg, Rush, & Heinrich, 2003; Hansen, Wang, Stage, Kragh-Sorensen, 2003; Oquendo et al., 2004; Stolberg, Clark, & Bongar, 2002; Qin, 2011; Waern, Rubenowitz, & Wilhelmson, 2003; Yip et al., 2003). In a Canadian study of adults over 60 years who died by suicide, 42% had been diagnosed with major depression at the time of death. This number increased to 65% when cases of minor depression were included (Préville, Boyer, Hébert, Bravo, & Seguin, 2005). Beekman, Copeland and Prince (1999) report significant variation in prevalence rates of depression among community dwelling older adults (i.e., 0.4% to 35%). However, this prevalence discrepancy can, in part, be explained by varied sampling strategies, methodologies, and how depression was conceptualized. Major depressive disorders are less prevalent among older adults than among younger adults. A higher prevalence of depression among women than men is consistent across age groups (Blazer & Hybels, 2009; Jones, Marcantonio, & Rabinowitz, 2003; Newman, Bland, & Orn, 1998; Nolen-Hoeksema, 2002; Patten, 2000; Sivrioglu, Berlow & Ellison, 2004), with the exception of older widowed men who have shown higher rates of depression than women (Bennett et al., 2005; Lee et al., 2001; Mechakra-Tahiri et al., 2010; Van Grootheest et al., 1999).

A significant number of community dwelling elderly Canadians have a depressive illness (e.g., over 100,000), and an additional 400,000 live with depressive symptoms that may benefit from treatment (CCSMH, 2006). Rates of depression are shown to be even higher in long term care and



nursing homes. Jones, Marcantonio and Rabinowitz (2003) evaluated depression among U.S nursing home residents. The prevalence of identified depression was 20.3 cases per 100 residents, with women accounting for the majority of cases. Suicide in long term care settings is less common; however, it does not mean that persons in LTC settings do not experience distress, depression and suicide-related ideation (Conwell, Pearson, & DeRenzo, 1996). Wanting to die, feeling worthless or living without purpose are common observations made of some LTC residents (Adams-Fryatt, 2010). Major medical illnesses and the loss of personal relationships may also make the older adult wish that their life would end, but they may not be suicidal. LTC residents that engage in indirect self-destructive behaviours (e.g., refusing food, medication) may actually be attempting suicide or passively engaging in behaviours that do not immediately end their life, but will hasten their death (Adams-Fryatt, 2010; Conwell et al., 1996; Glass & Reed, 1993). Very little evidence exists that examines nursing home admission as a cause of suicide related behaviour. Loebel and colleagues (1991) examined records for 57 deaths by suicide for persons over 65 years in Washington state. Out of 18 older adults that gave reasons for their suicide, 44.4% gave specific indication that their suicide was motivated by anticipation of nursing home placement. This association was especially strong for married persons.

A history of psychiatric illness is a very strong risk factor for suicide in the general population (Hawgood & De Leo, 2008). However, suicide risk in relation to psychiatric illness differs depending on the type of illness (e.g., schizophrenia versus depression, versus substance use disorders; Qin & Nordentoft, 2005). In a review of psychological autopsy studies on suicides in later life, a large majority of older adults that died by suicide were found to have had a psychiatric illness at the time of death, from 76% to 89%. Major depressive disorder, but not bipolar disorder was the most commonly reported diagnosis followed by substance use disorders, and lastly personality disorders (Conwell & Brent, 1995). In a population-based study, Qin (2011) found that persons with

borderline personality disorder were at extremely high risk of suicide, although the effects were not significant for older adults. Among subjects over 60 years old, the psychiatric diagnoses most associated with death by suicide were recurrent depression, reaction to stress (adjustment disorders), other affective disorders and drug use disorders (Qin, 2011). Differences between older men and older women were noted across psychiatric diagnoses; however, reaction to stress showed the strongest risk for death by suicide for both sexes. Although many people with psychiatric illness neither attempt nor die by suicide, psychiatric illnesses are a well-defined risk factor for suicide that may require more research with older adult samples.

#### ***2.4.4 Physical Health and Functioning***

Physical illness and impairments in activities of daily living have a significant relationship with suicide-related ideation and behaviour. Some characteristics of physical illnesses that may predispose individuals to suicide include the nature of the illness (e.g., chronic vs. acute), whether or not the illness is debilitating (e.g., interfering with activities of daily living), and if the individual experiences pain (Goldblatt, 2000). Tadros and Salib (2007) found that 27.3% of older adults that died by suicide received a diagnosis of physical morbidity, such as pain, infection, fatigue and falling. Juurlink, Herrmann, Szalai, Kopp and Redelmeier (2004) examined the association between medical illnesses and suicide among older adults in Ontario. These researchers retrospectively identified 1,354 older adults who died by suicide over a 9-year period. As the number of acute and chronic illnesses increased, so did the cumulative risk of suicide. The specific conditions associated with suicide were congestive heart failure, chronic obstructive pulmonary disease, seizure disorders, urinary incontinence, anxiety disorders, depression, psychotic disorders, bipolar affective disorder, moderate and severe pain. Urinary incontinence was also identified as the single strongest predictor of suicide-related ideation in a community based Hong Kong sample of older adults (Yip et al., 2003). This may

suggest that for some individuals, the loss of pride or stigma associated with incontinence may be a significant risk factor than the actual decline in physical functioning.

Content analysis of suicide notes left behind by older adults showed that physical illness and the fear of impending physical illness was a significant reason for suicide compared to the content of suicide notes in younger age groups (Bauer et al., 1997). Using case control designs, several research studies also demonstrated a higher likelihood of suicide among older adults with physical illnesses compared to matched controls (Bergman, Barak, Sigler, & Aizenberg, 2011; Quan, Arboleda-Florez, Fick, Stuart, & Love, 2002; Waern, 2003; Waern et al., 2002). Even after controlling for psychiatric illness, physical illness remained an independent risk factor for suicide in Waern and colleagues' research. However, Conwell, Van Orden and Caine (2011) counter that since rates of physical illness and disability are naturally higher among older adults, their usefulness as independent risk factors to identify older adults at risk for suicide is weak.

#### ***2.4.5 Neurological Disorders***

Suicide risk in persons with neurological conditions (PNC) has been reported to be greater than the general population, yet the impact of neurological conditions (NC) on suicide risk in later life has not been adequately explored (Ayalon, Mackin, Arean, Chen, & McDonel-Herr, 2007; Stenager & Stenager, 1992). Studies that have examined the role of NC in suicide-related ideation and behaviour among older adults have focused on conditions such as dementia, Parkinson's disease and epilepsy which tend to be more common in later life, than traumatic brain injuries (TBI) or spinal cord injuries (SCI) (Ahoniemi, Pohjolainen, & Kautiainen, 2011; Reeves, & Laizer, 2012; Thietje, Pouw, Schulz, Kienast, & Hirschfeld, 2011). With the high rate of suicide in later life coupled with the prevalence of depression (CCSMH, 2006; CDC, 2007; De Leo & Spathonis, 2004; Magnil, Gunnarsson, Björkstедt, & Björkelund, 2008; Prévillе, Boyer, Hébert, Bravo, & Seguin, 2005), a

higher risk of suicide may be expected with a comorbid neurological condition. However, as NC are not uniform and wide margins exist in terms of experiences and adaptation, it cannot be assumed that all PNC are at risk for suicide. Nor can it be assumed that NC, in and of itself are the causal factor for suicide risk. As Förstl (2008) explains, even persons with dramatically progressive neurological diseases can have a positive attitude on life with no risk, or desire for, ending their life. This suggests that protective factors that mitigate suicide-related ideation may exist in the face of NC, yet additional research is needed to understand these factors among an older adult population. Although NC such as dementia and Parkinson's disease cause organic changes to the brain that can increase risk for suicide through impulsive behaviour and disinhibition (Mann, 2012), the review of the literature below focuses primarily on psychosocial risk and protective factors.

### *Dementia*

Suicide risk in persons with dementia is generally considered low (Bellini, De Ronchi, Forti et al., 1998; Draper, Moore & Brodaty, 1998; Lim, Rubin, Coats, & Morris, 2005); however, an increase in risk can be observed soon after a person is diagnosed (Haw, Harwood, & Hawton, 2009). Deficits in cognitive function, impaired insight and greater level of supervision may protect against suicide-related behaviour (Conwell, 1995); however, the awareness of cognitive limitations in the early stages of dementia is considered a risk factor for suicide (Margo & Finkel, 1990; Rubio et al., 2001; Seyfried, Kales, Ignacio, Conwell, & Valenstein, 2011; Qin, 2011), as are accompanying symptoms of depression (Enache, Winblad, & Aarsland, 2011). A large cross-sectional study by Ayalon and colleagues (2007) found that 12.4% of cognitively impaired older adults had passive suicide ideation while 18.9% had active suicide ideation. Barak and Aizenberg (2002) reported in a 10 year retrospective study of admissions to inpatient psychiatry that older adults who experienced suicide-related behaviour were in earlier stages of dementia compared with non-suicidal older adults.

Lim and colleagues (2005) noted that suicide can occur in the early stages of dementia particularly among individuals with a high-risk profile (e.g., dysthymia prior to the onset of cognitive decline, male gender, higher education). Individuals in the early stages of dementia have unique suicide risk factors compared to later stages of the disease such as the preservation of insight into ongoing and impending cognitive decline, cognitive deficits that limit adaptation (Lim et al., 2005), and comorbid depressive symptoms which often do not meet the criteria for major depression (Brommelhoff et al., 2009; Enache, Winblad, & Aarsland, 2011). Persons with dementia experience fluctuating moments of clarity and focus (Pratt, 2002), therefore it is conceivable that depressive symptoms and suicide risk increase with self-awareness of cognitive limitations. Diagnosis of dementia at a younger age also increases suicide risk (Haw, Harwood, & Hawton, 2009; Qin, 2011) as the prospect of progressively losing the ability to control and manage one's life is considered. Although considered a controversial topic, suicide and dementia are associated and persons in the early stages of the disease may be at higher risk than persons in later stages.

### *Parkinson's disease*

The severe physical limitations imposed by Parkinson's disease (PD) such as tremors, rigidity, bradykinesia, akathisia, and postural instability cause concern regarding the potential for depression and suicide ideation within this population (Baskak, Yolax-Yarpuz, Devrimci-Ozguven, & Atbasoglu, 2010; Kummer, Cardoso, & Teixeira, 2009; Myslobodsky, Lalonde & Hicks, 2001; Nazem et al., 2008). In a longitudinal study (8 years) of PD patients Kostic and colleagues (2010) found that the suicide-specific mortality rate was 5.3 times higher in persons with PD than age- and sex-matched controls. Conversely, Myslobodsky, Lalonde and Hicks (2001) examined 6 years of mortality data and found that the rate of suicide among persons with PD was 10 times lower than age-matched controls. In spite of these differences, both studies found that depressive symptoms were

significant predictors of suicide in multivariate regression models. This finding has been supported elsewhere that risk for suicide is better accounted for by depression symptoms, rather than symptoms of the disease itself (Kummer, Cardoso, & Teixeira, 2009; Nazem et al., 2008; Soulas et al., 2008).

Stenager, Wermuth, Stenager and Boldsen (1994) found that the earlier age of onset of PD increased risk for suicide ideation, suggesting that risk may be higher among individuals who have been coping with PD symptoms for longer periods of time. Most persons with PD are diagnosed over the age of 60; however, at least 10% have developed the symptoms before age 50 (NHCC, 2010). The average age of the above studies ranged between 51.6 years and 81.2 years.

#### **2.4.6 Pain**

There is strong evidence that persons with pain are at greater risk for completed suicide than persons without pain. Fishbain (1996) reviewed the literature and found increased risk for suicide among persons reporting pain stemming from various health conditions (e.g., back pain, cancer patients with inadequate pain management, HIV-infected patients, patients with multiple sclerosis, persons suffering from migraine headaches). Li and Conwell (2010) examined older adults receiving home care services in the US and found that the risk of suicide-related ideation increased with increases in pain severity. However, this finding was only significant for men. Men with severe and uncontrolled (i.e., un-medicated) pain were at especially high risk. A similar finding with respect to pain, gender and suicide-related behaviour was reported by Waern and colleagues (2002) and Juurlink and colleagues (2004). Hinkley and Jaremko (1994) explain that among chronic pain patients, the development of suicide-related ideation is time-dependent, in that the longer the pain duration, the greater the likelihood for the presence of suicide-related ideation.

It is worth noting that not all pain experienced by older adults stem from physical illness. Somatic pain experienced by older adults with depression is as real and debilitating as pain associated

with common medical conditions (Callahan & Berrios, 2005). For example, emotional pain following bereavement (i.e., complicated grief; see Latham & Prigerson, 2004), and ‘psychache’ (i.e., extreme psychological pain; see Shneidman, 1998) are other forms of pain that have been linked to suicide risk. These findings suggest that pain may have a direct or mediating effect on suicide-related behaviour among older adults.

#### ***2.4.7 Social Support***

An association exists between suicide risk and persons with little or no social connections, people with no religious community involvement, the retired, unemployed, divorced and others who live alone (Heisel, 2006; Kennedy, Metz, & Lowinger, 1996; Rubenowitz, Waern, Wilhelmson, & Allbeck, 2001). Studies have shown that suicides in later life were more likely in people who lived alone in the community and did not participate in community activities (Conwell, Van Orden & Caine, 2011; Dennis, Wakefield, Molloy, Andrews, & Friedman, 2007). Additional social factors associated with suicide risk among older adults include the lack of a confidante, having few close friends and relatives (Bartels et al., 2002; Clarke et al., 2004), and a limited social network, including the perceived lack of social support (Awata et al., 2005; Rowe, Conwell, Schulberg, & Bruce, 2006; Yip et al., 2003). A common theme among these findings is the lack of social connectedness or social support from both subjective and objective perspectives. Experiencing loneliness is associated with suicide risk, functional decline, and mortality, yet it does not necessarily correlate with living alone (Loboprabhu & Milinari, 2012; Perissinotto, Stijacic Cenzer, & Covinsky, 2012; Rurup, Deeg, Poppelaars, Kerkhof, & Onwuteaka-Philipsen, 2011; Rurup et al., 2011; Wiktorsson, Runeson, Skoog, Ostling, & Waern, 2010). Loneliness has been described as an unwelcome feeling of lack or loss of companionship (Jones, Victor, & Vetter, 1985) and is independent from feelings of depression in later life (Perissinotto et al., 2012; Wiktorsson et al., 2010).

These aspects of social support are key factors in keeping older adults healthy, in their communities and delaying entry into institutional facilities. Forbes, Montague, Gibson, Hirdes and Clarke (2011) highlight research that demonstrates a positive relationship between social support and health, including self-rated mental health and good quality of life. However, an inverse relationship also exists whereby a deficiency in social support (e.g., decline in social activity, caregiver distress), leads to increased risk of poor health outcomes and hospital and nursing home admissions among older adults (Drame et al., 2012; Keefe, 2011). In light of this evidence on social support and risk of suicide, the appraisal of older adults' social support including loneliness and perceived levels of positive social relationships may be as important as assessing for physical health.

#### ***2.4.8 Assessing Suicide Risk in Older Adults***

The recognition of risk factors and warning signs of suicide among older adults can be challenging. While depression symptoms are notably associated with suicide in later life (Fischer et al., 2003; Hansen, Wang, Stage, & Kragh-Sorensen, 2003; Oquendo et al., 2004; Prévillé et al., 2005), the symptoms often initially manifest as somatic complaints in older adults (Callahan, 2001), or mimic symptoms of other illness (e.g., memory loss, pain; Callahan & Berrios, 2005). These overlapping complaints make it difficult for physicians and/or the people close to the older adult to discern between what is a physical complaint and a treatable psychological condition. Older adults are also often reluctant to discuss their mood and emotions with their family physician (Mellor, Davison, McCabe, & George, 2008) and physicians may avoid asking mental health-related questions out of fear of opening a "Pandora's box", which cannot be closed within short appointment times (Cole & Raju, 1996).

Suicide risk assessment with older adults should be done in a warm and empathetic environment in the context of a trusting and therapeutic relationship (Heisel et al., 2006; Perlman,



Neufeld, Martin, Goy, & Hirdes, 2011). As many older adults downplay or under-report risk factors or thoughts related to suicide (Pearson et al., 1997; Waern et al., 1999) it is crucial that risk assessment and intervention be performed early. The American Association of Suicidology (AAS) helps to differentiate between risk factors and warning signs (Rudd et al., 2006). Risk factors are considered distal and empirically derived (e.g., psychiatric diagnosis) whereas warning signs are more proximal and clinically derived (e.g., increased alcohol use). The motivation for the AAS was to highlight the short-term signs that indicate a person is at increased proximal risk of suicide versus the chronic, long-term risk factors that are useful for understanding a person's vulnerability to suicide. A list of warning signs was developed and consolidated into the mnemonic "IS PATH WARM" (i.e., Ideation, Substance abuse, Purposelessness, Anxiety, feeling Trapped, Hopelessness, Withdrawal, Anger, Recklessness, Mood changes) and adopted by the Canadian Coalition for Seniors' Mental Health in the assessment and prevention of suicide for older adults.

Undoubtedly, many risk factors are also important warning signs. In the context of suicide among older adults, they are less conflicted, more determined, and use methods that are more lethal and violent (Glass & Reed, 1993; Leenaars, 1994; Osgood, 1992). Therefore risk assessment that aides in the prevention of warning signs or the development of proximal suicidal states are especially critical for this age group. Interventions targeting more distal and intermediate risk factors, as identified in the preceding literature review, may also result in more lives saved (Conwell et al., 1998; Conwell et al., 2011).

#### ***2.4.9 Protective & Resilience Factors***

Research on protective factors and resiliency to late-life suicide has received less attention relative to the body of knowledge on suicide risk factors and assessment. Resilience factors and protective factors are terms that tend to be used interchangeably. Protective factors are individual

variables that lower the risk of suicide or act as a buffer to suicide-related ideation, e.g., strong ties to family/friends/community (Heisel, 2006; Nelson, Johnston, & Shrivastava, 2010; Sanchez, 2001). Resilience from a psychological perspective represents an individual's capacity to cope with stressful circumstances and adversity (Rutter, 2008). It is commonly understood as a process, and not a character trait of an individual. Conceivably therefore, older adults have a greater capacity for resilience to stressors than younger adults simply by way of greater life experiences. Canetto (1992) points out that gender differences in resiliency may account for women's low rate of suicide in later life relative to older men. The literature suggests that women have a greater capacity than men for coping with losses (such as widowhood), being flexible and seeking help, expressing emotions, and nurturing interpersonal relationships, which can boost resiliency to hardships in later-life (Allen-Burge, Storandt, Kinscherf, & Rubin, 1994; Bennett, Smith, & Hughes, 2005; McLaughlin, Vagenas, Pachana, Begum, & Dobson, 2010; Mechakra-Tahiri, Zunzunegui, Prévile, & Dubé, 2010).

Resiliency has also been conceptualized as feeling satisfied with life and as having meaning or purpose in life (Heisel & Flett, 2008). Life satisfaction and meaning in life can be influenced by a number of intrinsic and extrinsic factors and can be experienced differently between older men and women (Gaymu & Springer, 2010). Heisel and Flett (2008) investigated the effects of having meaning in life on risk factors for suicide-related ideation among a sample of older adults. Although gender was not a significant variable, the hierarchical regression analyses indicated that meaning in life factors explained significant variance in suicide-related ideation above and beyond the suicide risk factors alone. Linehan, Goodstein, Nielsen, and Chiles (1983) demonstrated that suicidal individuals strongly differed from non-suicidal individuals in the degree to which they attached importance to life-oriented beliefs and expectations. Linehan suggested that these beliefs or 'reasons for living' are an alternative approach to reducing the incidence of suicide when explored in a therapeutic milieu. Research also supports that reasons for living are different for different age groups

(Koven, Edelstein, & Charlton, 2001; Miller, Segal, & Coolidge, 2001) suggesting that assessing for reasons for living, meaning in life and other protective factors in the context of suicide risk should be appropriate to the beliefs and values of older people. These research trends suggest that it is worth exploring whether the presence of protective factors would mitigate suicide risk among older men and women, and how this may inform suicide prevention and interventions.

Resiliency and protective factors are as important as risk factors and warning signs in the assessment of suicide risk among older adults. The CCSMH (2006) describes several resiliency and protective factors such as religious (or spiritual) practice, sense of meaning and purpose in life, sense of hope or optimism, active social networks and support from family and friends, good health care practices, positive help-seeking behaviours and engagement in activities of personal interest. Although supported in research, these items are not an absolute approach for all older adults. For example, not all older adults are religious or spiritual; therefore attending spiritual service may not work as a buffer for suicide risk. The identification of protective factors that are meaningful for the person is warranted in suicide risk assessment with older adults.

## **2.5 Theoretical Models to Explain Suicide-Related Behaviour**

Theoretical models were developed to help understand why individuals die by suicide, or are at high risk of suicide-related behaviour. Many theories on suicide have developed over time and across disciplines (McIntosh, Santos, & Hubbard, 1994). Sociology for example, views suicide as a social phenomenon and examines social factors that are associated with high risk. Psychological theorists examine suicide from the individual perspective and focus on interpersonal characteristics or experiences associated with suicide. Biological theories link genes and early-life experiences to the neurobiology of suicide-related behaviour using twin and adoption studies. These theories have

shaped much of what is known regarding suicide risk. Suicidologists are also moving away from psychiatric diagnostic categories to explain suicide, in favour of integrated theories to expand the understanding of suicide given its complexity and multiple contributing factors (Leenaars, 2003; McIntosh et al., 1994; O'Connor, 2011). As many individuals who have suicide-related ideation do not go on to engage in suicide-related behaviour (Kessler, Borges & Walters, 1999), theories and models on suicide need to be both specific and sensitive to be useful.

Few suicidologists have developed theories specific to the experience of suicide among older adults. Leenaars' influential research on the study of suicide notes left behind by older adults provided crucial theoretical insights into the current understanding of late life suicide. Leenaars (2003) noted eight dynamic constructs to conceptualize geriatric suicide such as psychological pain, inability to adjust, and interpersonal conflict (Appendix B). The elements are dynamic (interactive) and have been evidenced in multiple research findings (Bauer et al., 1997; Goldblatt, 2000; Heisel, 2006; Quan et al., 2002; Waern et al., 2002; Yip et al., 2003). Suicide notes further reveal that with increasing age, there is a decrease in the wish to be killed (i.e., notes referring to themes of self-blame) and an increase in the wish to die (i.e., notes referring to themes of hopelessness, fear, fatigue, despair, and references to illness and pain; Leenaars, 1992). In an Australian study of 262 suicide notes, older suicides were more often seeking escape from pain and less often were they angry at others. They were also less likely to be suffering from love and romantic problems compared to suicide notes from younger age groups (Lester, Wood, Williams, & Haines, 2004).

While research exploring suicide notes provides unsolicited narratives from the suicidal person, most theories for understanding suicide-related behaviour are developed with living populations at high risk for death by suicide (with and without previous suicide attempts in their clinical history). Further, while the theories developed through research are of interest to health professionals, there is often a large gap between using theory in research and the translation of that

theory into a format for regular use by front line health professionals and/or the older adult at risk themselves (Grol & Grimshaw, 2003; Ketelaar; Russell & Gorter, 2008). Therefore, as noted above, theories and models on suicide need to be both specific and sensitive, and for older adults, tailored to the risk and resilience factors that are unique to their cohort. As the review of the literature above has suggested, suicide in later life is best understood as multidimensional in nature. Future models for research on suicide-related behaviour should adopt this approach.

## **2.6 The Interpersonal Theory of Suicide**

The Interpersonal Theory of Suicide (IPTS) was recently developed to assist in determining more sensitive and specific predictors of suicide risk and death (Joiner, 2005; Marty, Segal, Coolidge, & Klebe, 2012). A unique feature of IPTS is the theory's ability to address the difference between suicidal ideation and suicidal behaviour, which until this point was not addressed by previous suicide theorists. The IPTS proposes that an individual will engage in suicide-related behaviour if he or she has both: a) the desire to die; and b) the capability to act on that desire. Unlike other theories on suicide, the IPTS underscores the critical difference between suicide-related ideation (e.g., suicide desire) and suicide-related behaviour (e.g., suicide attempt). In other words, IPTS not only addresses who wants to die by suicide, but who can die by suicide (Ribeiro & Joiner, 2009). The Interpersonal Theory of Suicide is depicted graphically in Figure 2.1 (Van Orden et al., 2010).

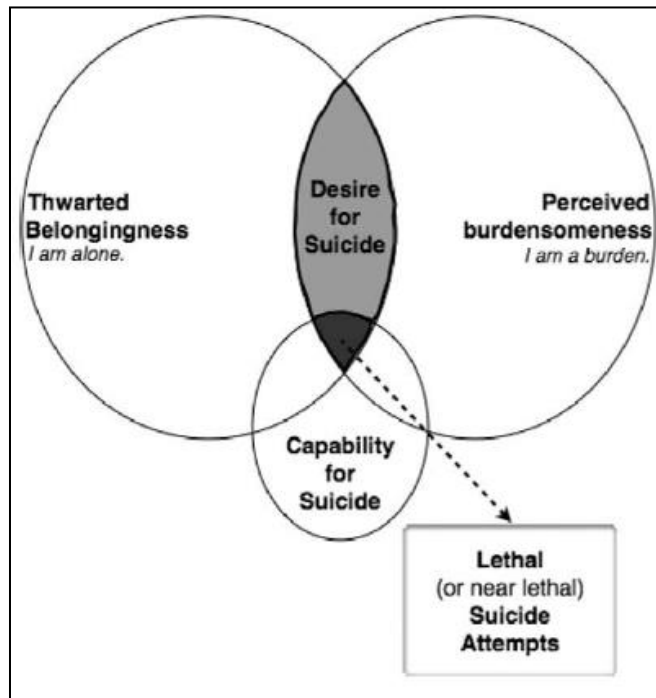


Figure 2.1. Assumptions of the Interpersonal Theory of Suicide

According to the theory, the desire to die, or suicide-related ideation results from the convergence of two interpersonal states; *perceived burdensomeness* (e.g., the feeling of being a burden on others) and *thwarted belongingness* (e.g., feeling alienated or socially isolated from friends, family or other valued social circles). The third variable, the capacity to carry out the act of suicide, refers to the *acquired capability* for self-harm. This includes habituation to pain and fearlessness about death that is learned over time (Marty et al., 2012; Van Orden et al., 2010). The IPTS appears well suited to understand suicide in later life given the increased likelihood for dependence on others due to functional impairment (e.g., burdensomeness) and the increased likelihood for diminished social networks (e.g., belongingness) among older adults. These constructs also align with Leenaars' theoretical conceptualizations of geriatric suicide. However, research has yet to ascertain how the IPTS constructs perform within a frail older adult population where the risk

of suicide is higher and objective (vs. subjective) levels of physical abilities and activities of daily living (ADLs) are reduced with advancing age. There is great potential from an investigative research perspective to explore IPTS constructs within an aging context, and further contribute to the theoretical understanding of suicide risk in later life. Within the current research, the two interpersonal states (i.e., perceived burdensomeness and thwarted belongingness) are empirically examined.

### ***2.6.1 Perceived Burdensomeness***

Perceived burdensomeness is the perception that one's existence is a burden to family, friends, and/or society (Joiner, 2009). This view is in fact a misperception, in that the person's death will make others "better off". Several studies show associations between the concepts of feeling like a burden to others and suicide-related behaviour. In a study on psychiatric patients at risk for suicide, a feeling of being a burden on others was among the ten strongest risk factors (Motto & Bostrom, 1990). Other research has shown similar conclusions, even after controlling for powerful predictors such as hopelessness (DeCatanzaro, 1995; O'Reilly, Truant & Donaldson, 1990; Van Orden, Lynam, Hollar, & Joiner, 2006).

In social gerontology, great attention has been paid to the caregiver burden and the negative feelings and stress that result from caring for an older adult with chronic conditions or cognitive impairment (Etters, Goodall, & Harrison, 2008; Faison, Faria & Frank, 1999; McConaghy & Caltabiano, 2005; O'Rourke, Haverkamp, Tuokko, Hayden, & Beattie, 1996; Stone & Clements, 2009). However, fewer studies have considered the perspective of the older adult receiving care and their experience of burdensomeness (Cousineau, McDowell, & Hotz, 2003). Perceived burdensomeness may be more likely to occur in later life as dependence on formal and informal supports is also likely to increase. There is a body of literature on suicide notes that directly supports

perceived burdensomeness as a precipitant to suicide among older adults. Suicide notes left behind by older adults show that they are more likely to make reference to physical illness, escaping pain, being tired and exhausted, and unable to cope with changes from the aging process compared to notes of younger adults (Bauer et al., 1997; Ho, Yip, Chiu, & Halliday, 1998; Leenars, 1992; Lester, Wood, Williams et al., 2004). Dreading the perceived and “unavoidable prospect of becoming dependent” was frequently voiced in older adults’ suicide notes (Bauer et al., 1997, p.105). So too was experiencing a diminished capacity to cope with life changes and being unable to tolerate a perceived loss of control over life. A psychological autopsy study on geriatric suicide in Norway also found that older adults who died by suicide had increasingly experienced their life as a burden in the time leading up to their death (Kjlseth, Ekeberg & Steihaug, 2010).

Cukrowicz, Cheavens, Van Orden, Tagain, and Cook (2011) tested the effects of perceived burdensomeness on suicide-related ideation in small sample of healthy, community residing older adults (N=57). Perceived burdensomeness was measured using the Interpersonal Needs Questionnaire (INQ; Van Orden et al., 2008); a 12-item scale with a separate subscale for perceived burdensomeness. After controlling for depressive symptoms, hopelessness and functional impairment, the results suggested that perceived burdensomeness accounted for significant variance in suicide-related ideation. Jahn, Cukrowicz, Linton and Prabhu (2011) also examined the mediating effect of perceived burdensomeness on the relationship between depressive symptoms and suicide-related ideation using a community sample of older adults (N=106). Perceived burdensomeness was measured using two items from the Suicide Cognition Scale, ‘I am a burden to my family’ and ‘the world would be better off without me’ (Rudd et al., 2010). Results of the study showed that perceived burdensomeness not only predicted suicide ideation among the sample, but it also mediated the relation between depressive symptoms and suicide ideation.



Important limitations to the above two studies are worth observing. Firstly, the samples recruited for the studies were generally healthy, educated, Caucasian older adults; many of whom had few perceptions of burdensomeness and few thoughts of suicide. Future research with a culturally diverse sample of older adults that endorse a wider range of suicide-related ideation, functional impairment and poorer mental health (e.g., depression symptoms) may provide greater insights into the effects of burdensomeness on suicide risk in the context of the IPTS. Secondly, the data were collected through self-reported questionnaires with low to moderate response rates. The authors of the study were unable to determine whether those who participated in the study differed in meaningful ways from those who did not participate. It is possible and likely that older adults with greater physical and psychological impairments declined to participate in the research studies, resulting in a sample with less elevation on variables of the IPTS constructs (e.g., burdensomeness) and suicide risk. Lastly, both studies excluded older adults if cognitive impairment was present (e.g., MMSE scores lower than 24) and if current substance abuse was reported; two factors that have shown association with increased risk of suicide-related behaviour (Conwell & Brent, 1995; Seyfried et al., 2011). In sum, ‘perceived burdensomeness’ is a newer term in the literature on late-life suicide, although evidence of this concept has been present throughout the literature on suicide notes. While the construct appears well suited to the experience of older adults at risk for suicide, additional research is required with clinical samples to fully elucidate this association. Specifically, future research would require a sample with greater diversity in terms of physical and psychological impairments to validate burdensomeness and suicide risk.

### ***2.6.2 Thwarted Belongingness***

When social connectedness and the need to belong are not met, a state of thwarted belongingness is said to ensue (Van Orden et al., 2010). The concept of thwarted belongingness is

composed of two dimensions: loneliness (e.g., feeling disconnected from others) and the absence of reciprocally caring relationships (e.g., feeling both cared about, and demonstrating care for another). As was noted above, suicide rates are higher among those with little or no social connections. This may include older adults who live alone, have no community involvement, and/or no ties to social engagement opportunities, such as through work place connections (Heisel, 2006; Kennedy, Metz, & Lowinger, 1996; Rubenowitz, Waern, Wilelmson, & Allbeck, 2001).

Thwarted belongingness in later life, including feeling lonely and lacking a reciprocally caring relationship, may arise following common late-life transitions that decrease the size of one's social support network (e.g., widowhood, relocation to care facilities, adult children moving away). Thwarted belongingness is said to be a dynamic state, rather than a stable trait; therefore it assumes that an individual's degree of feeling like they belong will vary over time, as does the magnitude of these feelings (Van Orden et al., 2010).

There have been few studies that directly test the construct of thwarted belongingness in the context of the IPTS; and no research to date that tests this construct with an older adult population. Van Orden, Witte, Gordon, Bender and Joiner (2008) recruited 309 undergraduate students (mean age of 19 years) to test the hypothesis that the joint presence of thwarted belongingness and perceived burdensomeness predicted suicide-related ideation. Thwarted belongingness was measured using the Interpersonal Needs Questionnaire (INQ; Van Orden et al., 2008); a 12-item scale with five items measuring belongingness (e.g., "these days other people care about me"). Responses are measured using a 7-point Likert scale indicating the degree to which each item is true. Using a step-wise hierarchical regression model controlling for age, gender and depression, the researchers found that thwarted belongingness, on its own, did not emerge as a significant predictor of suicide-related ideation. When thwarted belongingness was entered as a two-way interaction with perceived

burdensomeness in the third-step of the regression model, the interaction effect was significant, accounting for 30% of the variance explained.

Several questions emerge from the results of this study. These results appeared to indicate that among the sample, thwarted belongingness as its own construct was not an independent risk factor for suicide-related ideation, until evidence of perceived burdensomeness was also present. Although research literature supports associations between social isolation, loneliness and suicide, this was not the case for this particular study. Future tests of the theory may consider using an alternative approach to measuring thwarted belongingness (e.g., direct measures of loneliness or evidence of social support). Perhaps the age of the sample (e.g., mean age of 19 years) was also a factor as it can be assumed that many undergraduate students have an active social life and would not endorse the loneliness items on the INQ. These considerations suggest that testing the construct of thwarted belongingness among an older adult sample is worth exploring. As later-life is a time where one's social support network can decrease in size, testing the effects of thwarted belongingness on suicide-related ideation may produce different, yet meaningful results.

### ***2.6.3 Acquired Capability***

The third construct of the IPTS is acquired capability. As the words suggest, acquired capability is the ability to engage in suicide-related behaviour (self-injury) which is separate from the desire to engage in suicide-related behaviour. This construct involves a decreased fear of death and increased physical pain tolerance. It is the construct that moves an individual from thinking or wanting to die by suicide to acting on these intentions (Cukrowicz et al., 2011).

Acquired capability is a necessary precursor to serious suicide-related behaviour according to the theory. Joiner (2005) suggested that the ability to enact lethal self-injury is “acquired”, namely, through practice. In other words, to overcome the most basic instinct of self-preservation one must

also overcome the fear that accompanies suicide, sometimes through physically hurting oneself (e.g., cutting), practicing to load a gun, measuring a toxic overdose of a drug, practicing tying a noose, or standing on the edge of a bridge (Joiner, 2005). According to the theory, through this form of habituation to pain and self-injury, an individual works up the “courage” or capability to engage in suicide-related behaviour. The principles of the acquired capability construct are based on Solomon and Corbit’s (1974) Opponent-Process Theory, which suggests that with repeated exposure to a stimulus, the reaction to that stimulus changes over time such that it loses its ability to elicit the original response. Instead, the emotional effects of the opposite process become strengthened or amplified (Solomon, 1980). For example, bungee jumping is likely to elicit a fear response, yet with repeated exposure, the fear of jumping subsides and feelings of exhilaration becomes amplified (i.e., the opponent process). The IPTS applies Solomon’s theory to the acquired capability construct. With repeated exposure to what was originally a painful or fear-inducing experience (e.g., self-injury), the experience becomes less frightening and may be a source of emotional relief. It is hypothesized that this process renders an individual capable to engage in previously frightening and painful behaviours, which in turn results in fearlessness in the face of death. In addition, the acquired capability construct also states that individuals have an elevated tolerance to physical pain (Joiner et al., 2009; Van Orden et al., 2010) to proceed with suicide-related behaviour that would otherwise be agonizing to most. Orbach, Mikulincer, King, Cohen and Stein (1997) found that adolescents with recent suicide-related behaviour had a higher pain tolerance compared to non-suicidal psychiatric inpatients and individuals in the community. Berman and Walley (2003) noted similar results.

## **2.7 Summary of Current Literature**

Suicide among older adults is a phenomenon of growing concern as the Canadian population ages. Research shows that the prevalence of older adults with suicide ideation or hospitalizations for

intentional self-harm is generally low. This may be a misconception; however, as older adults are less likely to volunteer thoughts of suicide, less likely to request assistance for mental health concerns, more likely to use lethal methods and more likely to succumb to self-inflicted injuries than younger age groups. As such, the rates of older adults that present in hospital with intentional self-harm are probably an underestimation of the true rate of suicide-related behaviour in later life.

Community-residing older adults with a history of suicide-related behaviour are underrepresented in the research literature. While there is value in research on older adults' experiences of suicidal thoughts, variation exists in measures of suicide ideation, some of which are not developed for, or validated with, the older adult population. This creates difficulty drawing cross-comparisons and establishing conclusions upon which to base strategic interventions. Several studies have established pertinent risk factors for suicide, as well as protective factors among the older adult population which are useful in the assessment and recognition of at risk older adults. Whether these factors remain significant in samples of community-residing older adults versus clinical samples requires further exploration. Studies that have examined older adults with suicide-related behaviour also typically and understandably have smaller sample sizes which limit generalizability of the research findings. There are a limited number of Canadian studies that examine suicide-related behaviour among frail older adults.

Sampling older adults in receipt of home care services is an approach to assist in the understanding of late-life suicide among community residing older adults. While the body of research on risk and protective factors in later life has progressed, the concurrent assessment of these factors and the application of these findings to community-residing older adults is an important and logical direction for research. As the older adult population increases in proportion and relies on home care services to remain living independently in the community, the exploration of suicide risk within this population is of value for practice and policy.

### **3. STUDY CONTEXT AND RATIONALE**

#### **3.1 Data Sources and Linkages**

This research will be based on secondary data analysis of health information from multiple linked datasets. The primary data set is the Home Care Reporting System (HCRS), which is managed by the Canadian Institute of Health Information (CIHI). The HCRS contains demographic, clinical, functional, and resource utilization information on clients receiving services through publicly funded home care programs in Canada (CIHI, 2012). Information in the HCRS is obtained from the Resident Assessment Instrument–Home Care (RAI-HC), which is an assessment tool used to identify the strengths, preferences and needs of home care clients (Canadian Home Care Association, 2008; Morris et al., 2009). The RAI-HC contains over 350 items across a wide range of domains including health, functional status and resource use. The RAI-HC data are held on a secure server at the University of Waterloo and are free of personal identifiers that might identify an individual. Access to this database is strictly controlled through written contracts of confidentiality. The RAI-HC dataset is large with rich clinical content and has been in use with home care clients in Ontario since 2002. As a decade has passed since its inception, the HCRS dataset has expanded to over one million records. Over 150,000 assessments alone were performed in 2011-12 with the RAI-HC in Ontario (CIHI, 2012).

Using a common identifier, CIHI performed the data linkages for this research between assessment records in the RAI-HC to records in the Discharge Abstract Database (DAD), the National Ambulatory Care Reporting System (NACRS), and the Ontario Mental Health Reporting System (OMHRS) for the province of Ontario between 2007 and 2010. The DAD holds demographic, administrative and clinical information on hospital discharges across Canada. Since 2004-2005, all

DAD records have been reported using the International Statistical Classification of Diseases and Related Health Problems (ICD) codes, version 10, with the Canadian enhancement for morbidity classification (ICD-10-CA). NACRS contains information on presenting complaints, discharge diagnoses and interventions during emergency department visits. Like DAD, NACRS also uses ICD-10-CA codes. OMHRS contains data on individuals admitted to adult mental health beds in the province of Ontario and includes information on patients' mental and physical health as well as social supports and service use. These linkages allowed for the examination of RAI-HC assessment records that had corresponding hospitalization records for incidents of intentional self-harm (DAD and NACRS) and psychiatric inpatient mental health records where persons were assessed as a "danger or threat to themselves". The RAI-HC is psychometrically strong (Hirdes et al., 2008; Landi et al., 2000; Morris et al., 1997; Poss et al., 2008) and has several measures of psychiatric symptoms such as depression, cognition, and psychosis but it has no items on suicidal ideation or a history of previous suicide-related behaviour. Thus, through the linkages of records between the HCRS database and the DAD, NACRS and OMHRS, a prospective examination of community-residing older adults with recent suicide-related behaviour is possible. A flow diagram of the study sample can be found in Appendix C.

### **3.2 Defining Intentional Self-harm Events in Ontario Hospital Databases**

The primary dependent variable for this research is suicide-related behaviour. Data submissions to DAD and NACRS use diagnosis typing to indicate the relationship of a diagnosis to the patient's stay in the hospital. The purpose of diagnosis typing is to differentiate patients' length of stay and resource intensity during the hospital admission.

In the DAD, 'Type M' is the main reason for the patients' admission and accounts for the greatest portion of the length of stay or greatest use of resources. It is important to note that the ICD-

10-CA code that falls under the ‘Type M’ diagnosis type may not always be the main reason or condition for which the patient sought care. This creates a challenge to identifying events of intentional self-harm when only the Type M diagnosis is examined. For example, a person attempting suicide by ingesting a toxic amount of medication loses their balance, falls down a stairwell and breaks a number of bones. This person’s ICD-10-CA codes may reflect the broken bones as the Type M diagnosis, as it accounted for the largest amount of resources used and length of stay in a hospital bed. The self-inflicted poisoning may appear in later in a secondary diagnosis (i.e., a condition for which a patient may or may not receive treatment and is not a comorbidity); or it may appear under the ‘Type 1’ diagnosis type which are pre-admission comorbidities. For the purpose of this research, the ICD-10-CA codes for intentional self-harm were not restricted to only primary diagnostic types. This approach allowed for improved sensitivity of the dependent variable and increased the sample size of older adults with intentional self-harm records. This research utilizes ICD-10 codes X40-X42, X46-X47, X60-X84 in its definition of intentional self-harm (also referred to as suicide-related behaviour) as performed in previous studies (Fransoo et al., 2009; Martens et al., 2010).

### **3.3 The Resident Assessment Instrument Home Care (RAI-HC)**

The RAI-HC is a standardized and person-centered assessment tool that informs and guides care planning and services in community-based settings (Morris et al., 2009). It is structured into three main elements that work together: an assessment component to evaluate multiple domains of health, function, social support and service use; outcome scales that identify problems or areas of decline that could benefit from further evaluation; and Clinical Assessment Protocols (CAPs), which provide guidelines for further assessment and person-centered care planning (Morris et al., 1997). Several countries were involved in the pilot testing of the RAI-HC. The items in the RAI-HC have demonstrated excellent validity, inter-rater and test-retest reliability (Hirdes et al., 2008; Landi et al.,



2000; Morris et al., 1997; Poss et al., 2008). In Ontario, the RAI-HC is the provincially mandated common assessment for clients expected to be on service for more than 60 days and clients entering into long term care facilities (Canadian Home Care Association, 2008).

The RAI-HC was initially developed as an extension of the Minimum Data Set (MDS) 2.0 for use in nursing homes. The MDS 2.0 data represent a reliable and valid source of clinical information (Jones, Marcantonio & Rabinowitz, 2003; Poss et al., 2008). In the RAI-HC there is greater representation of domains that are more frequently encountered in community based settings, such as informal supports, environmental conditions, alcohol misuse, Instrumental Activities of Daily Living, and indicators of elder abuse (Morris et al., 1997). The RAI-HC, the MDS 2.0, and RAI Mental Health are part of an integrated system in which to monitor and assess older persons in community and institutional settings using common core items, consistent terminology and a common conceptual basis that emphasizes the identification of functional problems (Gray et al., 2009; Hirdes et al., 1999). This evidence-based integrated assessment system can be used for program evaluation, making regional comparisons of services and outcomes, and determining funding and resource allocation, in addition to its clinical utility (Collister et al., 2012; Hawes, Fries, James, & Guihan, 2007; Hirdes et al., 1999; Morris, Carpenter, Berg, & Jones, 2000; Poss, Hirdes, Fries, McKillop, & Chase, 2008; Sørbye et al., 2009).

The RAI-HC includes over 350 data elements measuring socio-demographic information, cognition, mood, behaviour, functional status, disease diagnoses, medication, social support, and service use (Morris et al., 1997). Assessments with the RAI-HC are completed by trained health professionals using a three-day observation period for most domains. Assessors are trained to consult multiple sources of information when completing the RAI-HC, such as direct observation of the client, consulting available medical records, communicating with the client, the client's family,

physician or other available health care professionals (Hawes, Fries, James, & Guihan, 2007; Morris et al., 2009; Morris, Carpenter, Berg, & Jones, 2000).

### ***3.3.1 Outcome Scales in the RAI-HC***

A number of summary scales representing different clinical and risk domains are embedded in the RAI-HC. The Cognitive Performance Scale (CPS) is based on five items and rates the cognitive status of home care clients. CPS scores range from 0 (intact cognition) to 6 (very severe impairment). It has been validated against the MMSE, the MoCA, and the Test for Severe Impairment demonstrating its appropriateness for measuring cognitive status among clients in home care, as well as in nursing homes, acute care and mental health settings (Büla & Wietlisbach, 2009; Gruber-Baldini, Zimmerman, Mortimore, & Magaziner, 2000; Hansebo, Kihlgren, Ljunggren, & Winblad, 1998; Hartmaier et al., 1995; Hartmaier, Sloane, Guess, & Koch, 1994; Jones, Perlman, Hirdes, & Scott, 2010; Landi et al., 2000; Morris et al., 1994; Paquay et al., 2007; Wellens et al., 2012). The Depression Rating Scale (DRS) is based on seven items and is used as a clinical indicator of depression. DRS scores range from 0 to 14. A score of three or greater is an indicator of major and minor depression symptoms in nursing home populations (Burrows et al., 2000). The DRS has been validated against the Hamilton Depression Rating Scale and the Cornell Scale for Depression (Burrows et al., 2000). Kohler and colleagues (2005) found that the DRS and the Geriatric Depression Scale (GDS) were both associated with depression diagnoses, but measured depression symptoms in different ways. The DRS has been used nationally and internationally to identify depression symptoms among home care clients (Dalby et al., 2008; Jónsson et al., 2003; Onder et al., 2007; Soldato et al., 2008; Szczerbinska, Hirdes, & Zyczkowska, 2012). The Activities of Daily Living (ADL) Hierarchy Scale measures four items of ADL performance and categorizes abilities into stages at which they can no longer be performed. Difficulty with performance is scored from 0

(independent) to 4 (total dependence). The ADL Hierarchy reliably assesses change in ADL impairment over time (Morris, Fries and Morris, 1999) and is a valid measure of functional status and disability in home care clients (Armstrong, Zhu, Hirdes, & Stolee, 2012; Carpenter et al., 2004; Cook et al., 2013; Landi et al., 2007; Landi et al., 2000; Sørbye et al., 2009). The Instrumental Activities of Daily Living (IADL) scale is based on seven items using performance based ratings. IADL scores range from 0 to 42 and are used to determine IADL ability and decline in home care clients (Armstrong, Zhu, Hirdes, & Stolee, 2012; Cook et al., 2013; Jónsson et al., 2003; June, Lee, & Yoon, 2009; Landi et al., 2000). The Changes in Health, End-stage disease and Signs and Symptoms (CHESS) scale is a measure of health stability (vs. instability) that has been used as a measure of frailty to predict mortality (Armstrong, Stolee, Hirdes, & Poss, 2010; Hirdes, Frijters & Teare, 2003). Scores on the CHESS range from 0 (no instability in health) to 5 (highly unstable health).

Many of the RAI-HC scales and indicators developed for use in community setting (e.g., alcohol misuse, indicators of elder abuse) demonstrated reasonable to excellent reliability (Morris et al., 1997). Validation of the core items in the RAI-HC (e.g., ADL performance, IADL performance, Cognitive performance) demonstrated excellent agreement with gold standard tools for geriatric assessment (Landi et al., 2000).

### **3.4 Study Population**

The sample consisted of Ontario long stay home care clients expected to be on service for 60 days or more, aged 60 years or older that were assessed with the RAI-HC between April 2007 and September 2010. Only clients' initial RAI-HC assessment was examined and subsequent follow-up assessments for the same client were excluded (N = 222,149). Corresponding emergency department visits, hospital admissions, and admissions to adult mental health beds where the diagnostic codes (NACRS) or problems (DAD) were coded for intentional self-harm (i.e., X40-X42, X46-X47, X60-

X84), or clients were assessed as a “danger/threat to themselves” (OMHRS) were then identified.

Assessment records of clients with impaired cognitive status or functional ability were not excluded from the dataset.

### **3.5 Proposed Research**

This research will attempt to contribute to current understanding of community-residing older adults that have experienced suicide-related behaviour and are at risk for future suicide attempts. In this endeavor, there will be three main research areas, each of which will be described in detail in its own chapter of the dissertation. This is one of the first Canadian and international studies to use the RAI-HC to examine older home care clients with experiences of intentional self-harm. The findings of the research may have important implications for the Ontario home care sector’s policies on the assessment of mental health and suicide risk. This research was approved by the Office of Research Ethics at the University of Waterloo (certificate #18655).

#### ***3.5.1 A Profile of Older Community-Residing Home Care Clients with Intentional Self-Harm in Ontario***

The first chapter is a starting point to understand community-residing older adults in Ontario that have experienced intentional self-harm. Comparisons are drawn across socio-demographic and clinical characteristics, as well as across genders. This chapter will create a comprehensive description of older adults with intentional self-harm in Ontario, and add to the current literature on suicide-related behaviour among community-residing older adults. It will be the first population-based study in Ontario to examine the health and functional status of community-residing older adults with intentional self-harm.

### ***3.5.2 Risk and Protective Factors Associated with Intentional Self-Harm among Older Community-Residing Home Care Clients in Ontario***

This second chapter will provide evidence for risk and protective factors associated with intentional self-harm. Unadjusted and adjusted regression models will describe a population of older adults receiving home care services in Ontario that are at high risk for intentional self-harm. Interactions between independent variables show risk and protective factors that significantly differed by sex, suggesting that certain approaches to suicide intervention and prevention need to be gender-specific. A time-to-event analysis will provide further support to the description of the high-risk population.

### ***3.5.3 Suicide-Related Behaviour among Older Adults with Dementia and Parkinson's Disease Receiving Home Care Services in Ontario***

This final chapter will provide evidence for risk and protective factors associated with intentional self-harm among older adults with dementia diagnoses (including Alzheimer's disease) and older adults with Parkinson's disease. Several sociodemographic and clinical characteristics will be examined for each neurological condition, as well as regression models to predict risk and protective factors associated with intentional self-harm. The results of this chapter suggest that the two neurological conditions share some similarities; however, they are also two heterogeneous populations in terms of what places them at risk for intentional self-harm. The evidence suggests that a one-size-fits-all approach to suicide prevention is not appropriate for these neurological conditions, as their specific risk and protective factors need to be taken into consideration.

### **3.6 Research Goals**

The proportion of older adults expected to receive home care services in Ontario is expected to increase as the population ages (CHCA, 2008). Further, the Mental Health Commission of Canada (MHCC) released the first mental health strategy for Canada in Spring 2012. Suicide prevention and early intervention for older adults were included among the strategic directions. The present research is timely and relevant in light of the MHCC's report and the expected increase in demand on the home care sector. This research will examine suicide-related behaviour in later-life among a sample of older home care clients in Ontario. As this is the first study to examine this topic, there is great potential for the development of evidence upon which to inform mental health strategies in the home care sector. Through the use of the linked home care and hospital administrative datasets, the research will not only examine older adults at risk of self-harm, but older adults who have engaged in suicide-related behaviour with a hospitalization to record the injury. The ability to examine this sub-population of older adults will make a contribution to the research literature and ideally inform suicide intervention and prevention strategies for the home care sector. It is hoped that the findings from this research will be widely disseminated through formal publications, conferences, and knowledge translation events.

## **4. A PROFILE OF OLDER COMMUNITY-RESIDING HOME CARE CLIENTS WITH INTENTIONAL SELF-HARM IN ONTARIO**

### **4.1 Introduction**

Suicide in later life is a growing public health concern that is expected to increase as adults of the baby boom generation reach late adulthood. In the general population, older adults have the highest rate of death by suicide across all age groups (Canadian Coalition for Seniors Mental Health [CCSMH], 2006; World Health Organization [WHO], 2005). In spite of these high rates, relatively little attention is paid to suicides in the older population given that public health promotion and media attention regarding suicides generally focus on younger age groups (O'Connell, Chin, Cunningham, & Lawlor, 2004). The rate of suicide in later life is particularly higher for older men. In Canada, older men between 80 and 84 years have rates of suicide approximately six times greater than older women the same age (i.e., 23.5 per 100,000 vs. 3.8 per 100,000; Statistics Canada, 2010). It has also been noted that the baby boom cohort holds higher suicide rates when compared to younger and subsequent cohorts (Phillips, Robin, Nugent, & Idler, 2010). This suggests that as the baby boom generation moves into late adulthood, suicide rates might increase if current trends remain unchanged. Therefore, improving our understanding of suicide in later life, particularly the factors that place older men at higher risk, can in turn inform strategies for suicide reduction and prevention in later life.

Sirey and colleagues (2008) noted that community-residing older adults are a sub-set of the population that are at high risk for suicide and are typically not reached in suicide research. Community-residing older adults represent a population that may be hidden from view of mental health promotion and suicide prevention programs until a decline in mental status brings them to the attention of formal mental health care. The estimated prevalence of suicidal thoughts among

Canadian community-residing older adults has ranged between 2%-6% (Corna, Cairney, & Streiner, 2010; Lapierre et al., 2012; Vasiliadis, Gagné, & Prévaille, 2012). These rates of suicidal thoughts are similar to those found in other countries (Almeida et al., 2012; Li & Conwell, 2010; Raue, Meyers, Rowe, Heo, & Bruce, 2006; Scocco & De Leo, 2002; Suzuki et al., 2011). However, it is difficult to determine the true prevalence given that older adults are less likely to report or volunteer suicidal thoughts (Barnow & Linden, 2000; Waern, Beskow, Runeson, & Skoog, 1999) or seek out mental health services (Byers, Arean, & Yaffe, 2012; Pearson, Conwell, Lindsay, Takahashi, & Caine, 1997). It cannot be assumed that suicidal ideation among older adults is always a close proxy for suicide as 75% of older adults who die by suicide have never made a prior attempt and have suicidal ideation much lower than younger adults (Conwell, Rotenberg, & Caine, 1990). Variations in methodologies for measuring suicidal thoughts and a lack of standardized definitions increase the difficulty in comparing rates and drawing firm conclusions (Conwell & Thompson, 2008). These and other unique factors that distinguish suicide among older adults from younger adults highlight the need for greater research that can improve opportunities for suicide prevention.

In the current study, community-residing older adults who have been admitted to the emergency department, hospital, or psychiatric hospital for reasons of intentional self-harm in the province of Ontario, Canada are examined. This research is unique in that it examines older adults not only at risk of suicide, but those who have engaged in suicidal behaviour with a hospitalization to record their injuries. Relative to younger adults, rates of hospitalization for intentional self-harm among older adults are low (CDC, 2007; Health Canada, 2002). Patrick and colleagues (2010) sampled hospitalizations for intentional self-harm from British Columbia, Canada data and US Nationwide inpatient data. Adults aged 65 and older had the lowest rates of hospitalizations for intentional self-harm (0.8% and 0.7% respectively). In a Canadian report, adults aged 65 years and older accounted for 4% of hospitalizations for intentional self-harm (CIHI, 2004). These low rates of



hospitalization may be explained in part by the high lethality of older adults' acts of self-harm (Heisel & Duberstein, 2005), the increased likelihood of succumbing to self-inflicted injuries (Draper, 1996) and less chance of discovery and emergency response for older adults living alone in the community (Conwell, Duberstein, Cox, Herrmann, Forbes, & Caine, 1998; Glass & Reed, 1993).

Based on these observations, the rates of hospitalizations for intentional self-harm among community-residing older adults in Ontario, Canada is anticipated to be low. However, the present study is the first to link hospital administrative data on intentional self-harm to person-level health information on older adults receiving home care services. The purpose was to compare older adults with intentional self-harm to those without such experiences across a number of socio-demographic and clinical characteristics to determine where suicide prevention initiatives may be targeted in the future.

## **4.2 Methods**

### ***4.2.1 Data sources***

Record linkages between Ontario hospital administrative data and Ontario home care data were employed to compare the socio-demographic and clinical characteristics of community-residing older adults who experienced intentional self-harm to those who did not. Ontario hospital administrative data were retrieved from the National Ambulatory Care Reporting System (NACRS) and the Discharge Abstract Database (DAD). Data on admissions to designated adult mental health beds in Ontario for patients that were assessed as a “danger or threat to themselves” were retrieved from the Ontario Mental Health Reporting System (OMHRS). These databases are managed by the Canadian Institute for Health Information (CIHI) and were made available through partnerships between CIHI and the University of Waterloo. NACRS contains information on presenting

complaints, discharge diagnoses and interventions during emergency department visits using ICD-10-CA diagnostic codes. The DAD holds demographic, administrative and clinical information on hospital discharges also using ICD-10-CA codes. OMHRS contains data on individuals admitted to adult mental health beds, specifically their mental and physical health, social supports and services used, as well as care planning and outcome measures. NACRS, DAD, and OMHRS data from the province of Ontario between 2007 and 2010 were used for the present study.

Ontario home care data were retrieved from the Home Care Reporting System (HCRS) database. The HCRS contains demographic, clinical, functional, and resource utilization information on clients receiving services through publicly funded home care programs in Canada (CIHI, 2012). Information in the HCRS is sourced from Resident Assessment Instrument–Home Care (RAI-HC), which is an assessment tool used to identify the strengths, preferences and needs of long-stay home care clients (Morris et al., 2009). The NACRS, DAD, OMHRS and HCRS datasets were linked together by CIHI using a common identifier. Personal identifiers and items that might identify an individual were removed to ensure confidentiality and anonymity of the data. The Office of Research at the University of Waterloo provided ethics approval for the analyses of the de-identified data in the current study (certificate #18655).

#### ***4.2.2 Sample***

The sample consisted of Ontario long stay home care clients expected to be on service for 60 days or more, aged 60 years or older that were assessed with the RAI-HC between April 2007 and September 2010 regardless of cognitive status or functional impairment (N = 222,149). Clients' initial assessment records in the HCRS dataset were used in the analysis. Corresponding emergency department visits, hospital admission records, and admissions to adult mental health beds where the diagnostic codes (NACRS) or problems (DAD) were coded for intentional self-harm (i.e., X40-X42,

X46-X47, X60-X84), or clients were assessed as a “danger/threat to themselves” (OMHRS) were then identified. The ICD-10-CA codes for intentional self-harm were not solely restricted to primary diagnostic types in order to allow for improved detection of self-harm events in a population with higher rates of multi-morbidity. In the linked data set, 81.3% (n=180,654) of those with NACRS records had a corresponding RAI-HC assessment, of which 1.1% (n=2,055) included an ICD-10 code for intentional self-harm. For those with DAD records, 58.6% (n=130,228) had a corresponding RAI-HC assessment, of which 1.3% (n=1,638) included an ICD-10 code for intentional self-harm. With regards to OMHRS records, 1.1% (n=2,521) had a corresponding RAI-HC assessment, of which 43.9% (n=1,106) included the “danger/threat to themselves” as the purpose for the psychiatric admission. Incidents of intentional self-harm that were recorded in multiple settings (e.g., emergency department and hospital admission) used the most recent record date and were counted as one event. The RAI-HC is psychometrically strong (Hirdes et al., 2008; Landi et al., 2000; Morris et al., 1997; Poss et al., 2008) and has several measures of psychiatric symptoms such as depression, cognition, and psychosis but it has no items on suicidal ideation or a history of previous suicide-related behaviour. Thus, through the linkages of records between the HCRS database and the DAD, NACRS and OMHRS, a prospective examination of community-residing older adults with recent suicide-related behaviour is possible (See Appendix C).

#### ***4.2.3 Measures***

The RAI-HC is a standardized and person-centered assessment tool that informs and guides care planning and services in community-based settings (Canadian Home Care Association, 2008; Morris et al., 2009). It is structured into three main elements that work together; an assessment component to evaluate multiple domains of health, function, social support and service use; outcome scales that identify problems or areas of decline that could benefit from further evaluation; and

Clinical Assessment Protocols (CAPs), which provide guidelines for further assessment and person-centered care planning (Morris et al., 1997; Morris et al., 2009). Several countries were involved in the pilot testing of the RAI-HC. The items in the RAI-HC have demonstrated excellent validity, inter-rater and test-retest reliability (Hirdes et al., 2008; Landi et al., 2000; Morris et al., 1997; Poss et al., 2008). In Ontario, the RAI-HC is the provincially mandated common assessment for clients expected to be on service for greater than 60 days and clients entering into long term care facilities (Canadian Home Care Association, 2008).

The RAI-HC includes over 350 data elements measuring socio-demographic information, cognition, mood, behaviour, functional status, disease diagnoses, medication, social support, and service use (Morris et al., 1997). RAI-HC assessments are completed by trained health professionals using a three-day observation period for most domains. Assessors are trained to consult multiple sources of information when completing the RAI-HC, such as direct observation of the client, consulting available medical records, communicating with the client, the client's family, physician or other available health care professionals (Hawes, Fries, James, & Guihan, 2007; Morris et al., 2009; Morris, Carpenter, Berg, & Jones, 2000).

A number of summary scales representing different clinical and risk domains are embedded in the RAI-HC. The Cognitive Performance Scale (CPS) is based on five items and rates the cognitive status of home care clients. CPS scores range from 0 (intact cognition) to 6 (very severe impairment). It has been validated against the MMSE, the MoCA, and the Test for Severe Impairment demonstrating its appropriateness for measuring cognitive status among clients in home care, as well as in nursing homes, acute care and mental health settings (Büla & Wietlisbach, 2009; Gruber-Baldini, Zimmerman, Mortimore, & Magaziner, 2000; Hansebo, Kihlgren, Ljunggren, & Winblad, 1998; Hartmaier et al., 1995; Hartmaier, Sloane, Guess, & Koch, 1994; Jones, Perlman, Hirdes, & Scott, 2010; Landi et al., 2000; Morris et al., 1994; Paquay et al., 2007; Wellens et al., 2012). The

Depression Rating Scale (DRS) is based on seven items and is used as a clinical indicator of depression. DRS scores range from 0 to 14. A score of three or greater is an indicator of major and minor depression symptoms in nursing home populations (Burrows et al., 2000). The DRS has been validated against the Hamilton Depression Rating Scale and the Cornell Scale for Depression (Burrows et al., 2000). Kohler and colleagues (2005) found that the DRS and the Geriatric Depression Scale (GDS) were both associated with depression diagnoses, but measured depression symptoms in different ways. The DRS has been used nationally and internationally to identify depression symptoms among home care clients (Dalby et al., 2008; Jónsson et al., 2003; Onder et al., 2007; Soldato et al., 2008; Szczerbinska, Hirdes, & Zyczkowska, 2012). The Activities of Daily Living (ADL) Hierarchy Scale measures four items of ADL performance and categorizes abilities into stages at which they can no longer be performed. Difficulty with performance is scored from 0 (independent) to 4 (total dependence). The ADL Hierarchy reliably assesses change in ADL impairment over time (Morris, Fries and Morris, 1999) and is a valid measure of functional status and disability in home care clients (Armstrong, Zhu, Hirdes, & Stolee, 2012; Carpenter et al., 2004; Cook et al., 2013; Landi et al., 2007; Landi et al., 2000; Sørbye et al., 2009). The Instrumental Activities of Daily Living (IADL) scale is based on seven items using performance based ratings. IADL scores range from 0 to 42 and are used to determine IADL ability and decline in home care clients (Armstrong, Zhu, Hirdes, & Stolee, 2012; Cook et al., 2013; Jónsson et al., 2003; June, Lee, & Yoon, 2009; Landi et al., 2000). The Changes in Health, End-stage disease and Signs and Symptoms (CHESS) scale is a measure of health stability (vs. instability) that has been used as a measure of frailty to predict mortality (Armstrong, Stolee, Hirdes, & Poss, 2010; Hirdes, Frijters & Teare, 2003). Scores on the CHESS range from 0 (no instability in health) to 5 (highly unstable health).

Many of the RAI-HC scales and indicators developed for use in community setting (e.g., alcohol misuse, indicators of elder abuse) demonstrated reasonable to excellent reliability (Hirdes et

al., 2008; Landi et al., 2000; Morris et al., 1997; Poss et al., 2008). Validation of the core items in the RAI-HC (e.g., ADL performance, IADL performance, cognitive performance) demonstrated excellent agreement with gold standard tools for geriatric assessment (Landi et al., 2000).

#### ***4.2.4 Analysis***

Data for persons with an age less than 60 years old were not included in the analyses. Based on a review of the literature, pertinent sociodemographic and clinical characteristics were identified to describe older adults with the experience of intentional self-harm. Categories were made for clients' demographic information (e.g., age grouping, marital status) and clinical information (e.g., number of medications, adherence) for ease of interpretation. Clients' living arrangements and the experience of caregiver distress were recoded into dichotomous variables. Caregiver distress was derived from endorsing two items in the RAI-HC: i) caregiver is unable to continue in caring activities – e.g., decline in health of caregiver makes it difficult to continue; and ii) primary caregiver expresses feelings of distress, anger or depression. Two items that measured alcohol consumption were combined into a single 'alcohol' variable; i) the older adult's alcohol consumption concerns others; and ii) the older adult needs a drink first thing in the morning (e.g., eye-opener). The receipt of any of four types of psychotropic medication (i.e., antipsychotic, anxiolytic, antidepressant, hypnotic) was combined into a single yes/no psychotropic medication variable. Summary scales from the RAI-HC (DRS, ADL, IADL, CPS, CHESS) were collapsed into three levels using cut-offs employed by Hirdes, Mitchell, Maxwell and White (2011). Study variables and corresponding RAI-HC codes are listed in Appendix D. Frequency tables were generated to examine the distribution of variables prior to recoding.

Intentional self-harm events that were retrieved from DAD and NACRS using ICD-10-CA codes X40-X42, X46-X47, X60-X84, and from OMHRS where clients were assessed as a

“danger/threat to themselves” were coded into event (=1) vs. no event (=0) to compare between older adults that experienced intentional self-harm to those without. Frequency tables were produced to describe the sociodemographic and clinical characteristics of the study sample. Differences in characteristics between groups were tested using Chi-square tests for categorical variables (alpha level  $p < .05$ ). Stratification by sex was performed to examine gender differences. All analyses were performed using SAS software.

### **4.3 Results**

There were 222,149 unique RAI-HC assessments performed with older adults between April 2007 and September 2010. Within this sample, 2,077 of home care clients (1.01%) experienced intentional self-harm (ISH) that was recorded on an emergency department visit, an admission to the hospital, or an admission to an adult mental health bed in the province of Ontario. Prevalence rates of ISH by age, sex, and region are displayed in Table 4.1 in descending order. A greater proportion of clients with ISH were younger and male. The proportion of clients with ISH was highest in the South West CCAC and the lowest in Central CCAC and Toronto Central CCAC. Table 4.2 shows that there were significant differences in age, sex, marital status and primary language between groups with and without ISH. Older adults in the ISH group were younger on average than the non-ISH group (mean age 75.3 years vs. 80.2 years, SD 8.7 and 8.5, respectively). The ISH group had a larger percentage of cases aged 60 to 74 years and fewer women. In addition, the ISH group contained more older adults that were never married, separated and or divorced, and they were more likely to identify English as their primary language compared to the non-ISH group. There was no significant group differences in whether the older adult lived alone, although the ISH group was slightly more likely to experience indicators of isolation (e.g., alone for long periods of time or alone all the time) than the non-ISH

group. Limited finances identified by having to make economic trade-offs were more common in the ISH group than the non-ISH group.



**Table 4.1: Prevalence Rates of Intentional Self Harm among Older Home Care Clients, Ontario**

		Rate (n) of ISH	95% CI
Age	60-74 years	1.89 (943)	1.8-2.0
	75-84 years	0.93 (800)	0.9-1.0
	85+ years	0.48 (334)	0.4-0.5
Sex	Male	1.14 (835)	1.1-1.2
	Female	0.95 (1,242)	0.9-1.0
Region	South West	1.63 (317)	1.5-1.8
	South East	1.19 (94)	1.0-1.4
	Champlain	1.31 (239)	1.0-1.5
	North West	1.30 (67)	1.0-1.6
	North East	1.18 (146)	1.0-1.4
	Waterloo Wellington	0.98 (120)	0.8-1.2
	Erie St. Clair	0.96 (117)	0.8-1.1
	HNHB	0.96 (318)	0.8-1.0
	North Simcoe Muskoka	0.93 (84)	0.7-1.1
	Mississauga Halton	0.90 (108)	0.7-1.1
	Central East	0.85 (174)	0.7-1.0
	Central West	0.78 (60)	0.6-1.0
	Central	0.67 (119)	0.6-0.8
	Toronto Central	0.67 (96)	0.5-0.8

*Note:* ISH=Intentional Self-Harm

**Table 4.2: A Comparison of Sociodemographic Characteristics between Older Home Care Clients with and without Intentional Self Harm, Ontario 2007-2010 (N=202,797)**

		ISH Sample N=2,077 % (n)	Non-ISH Sample N=202,720 % (n)	<i>p value</i>
Age	60-74 years	45.4 (943)	24.2 (48,995)	<.0001
	75-84 years	38.5 (800)	42.0 (85,156)	
	85+ years	16.1 (344)	33.8 (68,569)	
Sex	Female	59.8 (1,242)	64.2 (130,091)	<.0001
	Male	40.2 (835)	35.8 (72,629)	
Marital Status	Married	42.7 (874)	41.1 (83,236)	<.0001
	Never Married	6.5 (135)	4.6 (9,413)	
	Separated/Divorced	15.6 (323)	6.8 (13,647)	
	Widowed	34.5 (716)	46.6 (94,463)	
Primary Language	English	86.5 (1,797)	80.8 (163,860)	<.0001
	Other	13.5 (280)	19.2 (38,860)	
Living Alone		32.7 (543)	32.3 (51,034)	0.76
Isolated		49.9 (1,037)	47.2 (95,762)	0.01
Limited Finances		3.4 (70)	1.3 (2,577)	<.0001

*Note:* ISH=Intentional Self-Harm

Table 4.3 shows the average scores on the outcome scales in the RAI-HC. The average score on the Depression Rating Scale is significantly higher among older adults with ISH ( $t[204,795] = 33.1, p = <.0001$ ). Higher average scores were also found on the Cognitive Performance Scale; however, older adults with ISH had lower average scores on measures of ADL performance and measures of health instability (measured by the CHES scale).

**Table 4.3: Mean Scores on RAI-HC Outcome Scales among Older Home Care Clients with and without Intentional Self Harm, Ontario 2007-2010 (N=204,797)**

	ISH Sample N=2,077		Non-ISH Sample N=202,720	
	Mean (+ SD)	95% CI	Mean (+ SD)	95% CI
Depression Rating Scale (DRS)	1.84 (2.53)	1.73-1.95	0.95 (1.77)	0.94-0.96
ADL Hierarchy Scale	0.54 (1.03)	0.50-0.59	0.66 (1.21)	0.67-0.68
IADL Capacity Scale	3.69 (1.73)	3.61-3.76	3.75 (1.75)	3.75-3.76
Cognitive Performance Scale (CPS)	1.25 (1.25)	1.19-1.30	1.00 (1.23)	1.00-1.01
CHESS Scale	1.17 (1.02)	1.13-1.21	1.21 (1.05)	1.21-1.22

*Note:* ADL=Activities of Daily Living, IADL=Instrumental Activities of Daily Living, CHESS=Changes in Health, End-stage disease and Signs and Symptoms

Table 4.4 shows the clinical characteristics of older adults with ISH to those in the non-ISH group. Compared to the non-ISH group, older adults with ISH were more likely to have a psychiatric diagnosis, have indicators of alcohol use and dependence, express feelings of loneliness and anhedonia, have fewer positive social relationships and experience pain on a daily basis. Older adults in the ISH group were slightly less likely to have a caregiver that lives with them compared to older adults in the non-ISH group; however, the caregivers of the ISH group were more likely to endorse indicators of caregiver distress compared to caregivers in the non-ISH group. Older adults in the ISH group were more likely to report going out of the house on a daily basis (i.e., daily outings). There was no significant difference between groups regarding the expected improvement of their functional ability.

Compared to the non-ISH group, older adults with ISH were more likely to have depressive symptoms (as measured by the DRS) and cognitive impairment (as measured by the CPS). They were less likely to have impairments in ADL's or IADL's compared to older adults in the non-ISH group. There was no significant difference in health instability (as measured by the CHESS scale). Older adults in the ISH group used more medication and psychotropic medication, yet they were less likely

to adhere to a medication regime compared to older adults in the non-ISH group. In terms of neurological conditions, the groups showed significant differences in the areas of Alzheimer's and Parkinson's Disease which were more common in for the ISH group. Indicators that measure changes in the older adults' level of functioning were significantly more pronounced for the ISH group in all areas, except for vision and a general measure of overall decline which were not significantly different between groups.

**Table 4.4: A Comparison of Clinical Characteristics between Older Home Care Clients with and without Intentional Self-Harm, Ontario 2007-2010 (N=204,797)**

		ISH Sample N=2,077 % (n)	Non-ISH Sample N=202,720 % (n)	<i>p value</i>
<b>Clinical Characteristics</b>				
Any Psychiatric Diagnosis		34.4 (715)	11.1 (22,492)	<.0001
Alcohol Use & Dependence		4.0 (83)	1.3 (2,687)	<.0001
Loneliness		18.7 (389)	12.4 (25,220)	<.0001
Anhedonia		21.0 (436)	14.3 (28,931)	<.0001
Positive Social Relationships		77.2 (1,603)	86.5 (175,283)	<.0001
Daily Pain		56.7 (1,178)	51.6 (104,623)	<.0001
CG Lives with Client		50.0 (1,039)	52.0 (105,390)	<.0001
Caregiver Distress		20.9 (435)	16.2 (32,854)	<.0001
Daily Outings		64.1 (1,331)	55.9 (113,394)	<.0001
Optimism to Improve		21.8 (452)	22.5 (45,596)	.43
DRS score <sup>a</sup>	0	44.9 (932)	61.3 (130,432)	
	1-2	28.4 (590)	22.3 (45,214)	<.0001
	3+	26.7 (555)	13.4 (27,074)	
CPS score <sup>d</sup>	0-1	57.3 (1,191)	65.8 (133,339)	
	2-3	38.3 (795)	30.7 (62,324)	<.0001
	4+	4.4 (91)	3.5 (7,057)	
ADL Hierarchy Scale score <sup>b</sup>	0	72.7 (1,509)	69.1 (140,023)	
	1-2	20.8 (432)	21.9 (44,369)	<.0001
	3+	6.6 (136)	9.0 (18,328)	
IADL Capacity Scale score <sup>c</sup>	0	4.4 (92)	5.5 (22,205)	
	1-2	27.7 (575)	24.4 (49,389)	.0006
	3+	67.9 (1,410)	70.2 (142,226)	
CHESS Scale score <sup>e</sup>	0	30.5 (633)	29.6 (59,917)	
	1-2	58.7 (1,220)	58.1 (117,784)	.09
	3+	10.8 (224)	12.3 (25,019)	
Number of Medications	0	1.6 (34)	1.5 (2,984)	
	1-4	16.3 (338)	16.9 (34,256)	.0005
	5-8	30.9 (641)	34.7 (70,386)	
	9+	51.2 (1,064)	46.9 (95,094)	
Psychotropic Medications		66.6 (1,383)	39.9 (80,890)	<.0001
Medication Non-Adherence <sup>f</sup>		2.7 (55)	1.5 (2,943)	<.0001
<b>Neurological Conditions</b>				
Alzheimer's Disease & Dementia		21.5 (429)	16.1 (31,253)	<.0001
Stroke		16.4 (341)	17.3 (35,078)	.29
Head Trauma		1.2 (25)	0.9 (1,810)	.13
Multiple Sclerosis		0.6 (12)	0.6 (1,240)	.84
Parkinson's Disease		4.8 (99)	3.9 (7,990)	.05
<b>Decline in Areas of Function</b>				
Communication		9.9 (206)	7.4 (15,022)	<.0001
Vision		6.8 (142)	6.4 (12,947)	.40

Mood	21.8 (452)	12.1 (24,465)	<.0001
Behavioural Symptoms	10.5 (219)	4.9 (10,019)	<.0001
ADL	42.0 (872)	45.8 (92,749)	.0006
Social Activities	13.0 (270)	11.4 (23,081)	.02
Overall Deterioration	44.5 (925)	45.1 (91,372)	.62

*Note:* ISH = Intentional Self-Harm, CG = Caregiver, DRS = Depression Rating Scale, ADL = Activities of Daily Living, IADL = Instrumental Activities of Daily Living, CPS = Cognitive Performance Scale, CHESS = Changes in Health, End-stage disease and Signs and Symptoms

<sup>a</sup>0 = no indicators of depression; 1-2 = some indicators of depression; 3+ = indicators of probable depression

<sup>b</sup>0 = no impairment; 1-2 = some functional impairment; 3+ = severe functional impairment

<sup>c</sup>0 = no difficulty; 1-2 = some difficulty; 3+ = great difficulty

<sup>d</sup>0-1 = cognitively intact to borderline cognitive impairment; 2-3 = mild to moderate cognitive impairment; 4+ = cognitively impaired

<sup>e</sup>0 = no health instability; 1-2 = some health instability; 3+ = moderate to high health instability

<sup>f</sup>compliant less than 80% of time, including failure to purchase prescribed medications

Table 4.5 shows significant socio-demographic differences between older men and women that experienced intentional self-harm, but many of these differences paralleled to those observed in the non-ISH group. Older women in both groups were more likely to be widowed compared to older men, while older men in both groups were more likely to be married. Older women in both groups were more likely to live alone and experience indicators of isolation. No notable gender differences emerged for primary language or limited finances.

**Table 4.5: A Comparison of Sociodemographic Characteristics between Male and Female Older Home Care Clients with and without Intentional Self-Harm, Ontario 2007-2010 (N=204,797)**

		ISH Sample			Non-ISH Sample		
		Female (n=1,242)	Male (n=835)	<i>p value</i>	Female (n=130,091)	Male (n=72,629)	<i>p value</i>
		% (n)	% (n)		% (n)	% (n)	
Age	60-74 years	44.9 (558)	46.1 (385)	.33	21.6 (28,145)	28.7 (20,850)	<.0001
	75-84 years	38.0 (472)	39.3 (328)		41.5 (53,958)	43.0 (31,198)	
	85+ years	17.1 (212)	14.6 (122)		36.9 (47,988)	28.3 (20,581)	
Marital Status	Married	33.4 (410)	55.6 (464)	<.0001	28.7 (37,048)	64.3 (46,188)	<.0001
	Never Married	5.7 (70)	7.9 (65)		4.3 (5,560)	5.4 (3853)	
	Separated/Divorced	16.1 (198)	15.2 (125)		6.5 (8,403)	7.3 (5,244)	
	Widowed	44.8 (550)	20.2 (166)		60.5 (77,960)	23.0 (16,503)	
Primary Language	English	87.0 (1,081)	85.8 (716)	.40	80.9 (105,178)	80.8 (58,682)	.77
	Other	13.0 (161)	14.3 (119)		19.2 (24,913)	19.2 (13,947)	
Living Alone		40.2 (390)	22.1 (153)	<.0001	38.9 (38,316)	21.3 (12,718)	<.0001
Isolated		56.2 (698)	40.6 (339)	<.0001	54.2 (70,532)	34.7 (25,230)	<.0001
Limited Finances		3.5 (44)	3.1 (26)	.60	1.2 (1,543)	1.4 (1,034)	<.0001

*Note:* ISH=Intentional Self-Harm



Table 4.6 shows significant clinical differences between older men and women in the ISH and in the non-ISH groups. Many of the clinical characteristics (e.g., psychiatric diagnosis, alcohol use and dependence) were in higher proportion among the ISH group than the non-ISH group. Notable gender differences that were observed in both groups were for psychiatric diagnosis (higher proportion among women), alcohol use and dependence (higher proportion among men), loneliness (higher proportion among women), indications of probable depression (higher proportion among women), and being in receipt of psychotropic medication (higher proportion among women).

Older men with ISH were less likely to have a caregiver that lived with them than men in the non-ISH group; however, a greater proportion of caregiver distress was observed among the caregivers of both men and women in the ISH group. Few gender differences emerged for neurological conditions with the exception of Alzheimer's Disease and dementia diagnoses, which were significantly more pronounced for older men in the ISH group. In terms of indicators that measure changes in the older adults' level of functioning, a greater proportion of older men in the ISH group experienced a declining ability to communicate and a worsening of mood and behaviour symptoms than older women in the ISH group and both men and women in the non-ISH group.

**Table 4.6: A Comparison of Clinical Characteristics between Male and Female Older Home Care Clients with and without Intentional Self-Harm, Ontario 2007-2010 (N=204,797)**

	ISH Sample			Non-ISH Sample			
	Female	Male	<i>p value</i>	Female	Male	<i>p value</i>	
	(n=1,242)	(n=835)		(n=130,091)	(n=72,629)		
	% (n)	% (n)	% (n)	% (n)			
<b>Clinical Characteristics</b>							
Any Psychiatric Diagnosis	40.3 (500)	25.8 (215)	<.0001	12.4 (16,076)	8.8 (6,416)	<.0001	
Alcohol Use & Dependence	2.1 (26)	6.8 (57)	<.0001	0.8 (970)	2.4 (1,717)	<.0001	
Loneliness	20.6 (256)	15.9 (133)	.0073	14.1 (18,324)	9.5 (6,896)	<.0001	
Anhedonia	21.0 (261)	21.0 (175)	.98	14.1 (18,342)	14.6 (10,589)	.003	
Positive Social Relationships	79.3 (985)	74.0 (618)	.005	86.8 (112,964)	85.8 (62,319)	<.0001	
Daily Pain	62.6 (778)	47.9 (400)	<.0001	55.6 (72,294)	44.5 (32,329)	<.0001	
CG Lives with Client	44.1 (548)	58.8 (491)	<.0001	44.2 (57,435)	66.0 (47,955)	<.0001	
Caregiver Distress	18.4 (228)	24.8 (207)	.0004	13.7 (17,826)	20.7 (15,028)	<.0001	
Daily Outings	59.5 (739)	70.9 (592)	<.0001	52.4 (68,113)	62.4 (45,281)	<.0001	
Optimism to Improve	22.2 (276)	21.1 (176)	.53	22.4 (29,200)	22.6 (16,396)	.50	
DRS score <sup>a</sup>	0	44.6 (554)		63.6 (82,688)	65.7 (47,744)		
	1-2	26.3 (327)	31.5 (263)	.004	22.2 (28,874)	22.5 (16,340)	<.0001
	3+	29.1 (361)	23.2 (194)		14.2 (18,529)	11.8 (8,545)	
CPS score <sup>d</sup>	0-1	62.2 (773)	50.1 (418)		67.2 (87,415)	63.2 (45,924)	
	2-3	34.7 (431)	43.6 (364)	<.0001	29.6 (38,456)	32.9 (23,868)	<.0001
	4+	3.1 (38)	6.4 (53)		3.2 (4,220)	3.9 (2,837)	
ADL Hierarchy Scale score <sup>b</sup>	0	77.1 (957)	66.1 (552)		71.3 (92,805)	65.0 (47,218)	
	1-2	17.6 (218)	25.6 (214)	<.0001	20.3 (26,451)	24.7 (17,918)	<.0001
	3+	5.4 (67)	8.3 (69)		8.3 (10,835)	10.3 (7,493)	
IADL Capacity Scale score <sup>c</sup>	0	4.5 (56)	4.3 (36)		5.1 (6,619)	6.2 (4,486)	
	1-2	32.1 (399)	21.1 (176)	<.0001	26.9 (34,953)	19.9 (14,436)	<.0001
	3+	63.4 (787)	74.6 (623)		68.0 (88,519)	74.0 (53,707)	
CHESS Scale score <sup>e</sup>	0	29.5 (366)	32.0 (267)		29.7 (38,590)	29.4 (21,327)	
	1-2	59.4 (738)	57.7 (482)	.45	59.0 (76,721)	56.5 (41,063)	<.0001

	3+	11.1 (138)	10.3 (86)		11.4 (14,780)	14.1 (10,239)	
Number of Medications	0	1.5 (18)	1.9 (16)		1.3 (1,657)	1.8 (1,327)	
	1-4	12.9 (160)	21.3 (178)	<.0001	16.0 (20,777)	18.6 (13,479)	<.0001
	5-8	30.0 (373)	32.1 (268)		34.5 (44,883)	35.1 (25,503)	
	9+	55.6 (691)	44.7 (373)		48.3 (62,774)	44.5 (32,320)	
Psychotropic Medication		71.5 (888)	59.3 (495)	<.0001	42.3 (55,057)	35.6 (25,833)	<.0001
Medication Non-Adherence <sup>f</sup>		2.3 (12)	3.2 (15)	.17	1.4 (1,847)	1.5 (1,096)	.11
<b>Neurological Conditions</b>							
Alzheimer's Disease & Dementia		16.6 (199)	28.9 (230)	<.0001	15.7 (19,605)	16.8 (11,648)	<.0001
Stroke		15.6 (194)	17.6 (147)	.23	15.6 (20,230)	20.4 (14,848)	<.0001
Head Trauma		0.9 (11)	1.7 (14)	.11	0.8 (997)	1.1 (813)	<.0001
Multiple Sclerosis		0.9 (11)	0.1 (1)	.02	0.7 (851)	0.5 (389)	.001
Parkinson's Disease		4.2 (52)	5.6 (47)	.13	2.8 (3,625)	6.0 (4,365)	<.0001
<b>Decline in Areas of Function</b>							
Communication		7.4 (92)	13.7 (114)	<.0001	6.8 (8,903)	8.4 (6,119)	<.0001
Vision		7.0 (87)	6.6 (55)	.71	6.8 (8,902)	5.6 (4,045)	<.0001
Mood		21.3 (264)	22.5 (188)	.50	11.9 (15,463)	12.4 (9,002)	.0008
Behavioural Symptoms		9.2 (114)	12.6 (105)	<.05	4.6 (5,980)	5.6 (4,039)	<.0001
ADL		41.3 (513)	43.0 (359)	.44	45.3 (58,910)	46.6 (33,839)	<.0001
Social Activities		13.9 (172)	11.7 (98)	.16	11.2 (14,530)	11.8 (8,551)	<.0001
Overall Deterioration		43.7 (543)	45.8 (382)	.36	44.1 (57,347)	46.9 (34,025)	<.0001

*Note:* CG = Caregiver, DRS = Depression Rating Scale, ADL = Activities of Daily Living, IADL = Instrumental Activities of Daily Living, CPS = Cognitive Performance Scale, CHESS = Changes in Health, End-stage disease and Signs and Symptoms

<sup>a</sup>0 = no indicators of depression; 1-2 = some indicators of depression; 3+ = indicators of probable depression

<sup>b</sup>0 = no impairment; 1-2 = some functional impairment; 3+ = severe functional impairment

<sup>c</sup>0 = no difficulty; 1-2 = some difficulty; 3+ = great difficulty

<sup>d</sup>0-1 = cognitively intact to borderline cognitive impairment; 2-3 = mild to moderate cognitive impairment; 4+ = cognitively impaired

<sup>e</sup>0 = no health instability; 1-2 = some health instability; 3+ = moderate to high health instability

<sup>f</sup>compliant less than 80% of time, including failure to purchase prescribed medications

#### 4.4 Discussion

The goal of this research was to describe older adults with intentional self-harm to those without such experiences with respect to a number of socio-demographic and clinical characteristics. A number of interesting findings emerged. Results indicated that 1.01% (N=2,077) of the provincial sample of older adults receiving home care services experienced self-harm. This is within the range of previous research on hospitalizations for intentional self-harm among older adults (CIHI, 2010; Patrick et al., 2010). While the prevalence may appear low, a sample of over 2000 older adults with intentional self-harm is a large sample relative to other studies on late-life suicide (Heisel & Duberstein, 2005; Lapierre et al., 2012). According to the CCSMH (2006) approximately 1,000 older adults are admitted to Canadian hospitals each year as a consequence of intentional self-harm. This figure may be an underestimation as just within the province of Ontario, this study found 2077 admissions for self-harm between April 2007 to September 2010. Coupled with data from the rest of the Canadian provinces, the number of admissions to Canadian hospitals for intentional self-harm is likely higher than this previously reported estimate.

Within this study, the young-old age cohort (60-74 years) was more likely than the older age group (85+ years) to have experienced self-harm and older men were more likely to have experienced self-harm than older women which is consistent with previous literature (CCSMH, 2006; CDC, 2007; Krug, Dahlberg, Mercy, Zwi, & Lozano, 2002). When examining marital status, there were twice as many older adults in the group that experienced self-harm who were separated or divorced and fewer widowed older adults compared to the non-ISH group. When marital status is stratified by gender among older adults with self-harm, a different picture emerges. Older men with self-harm were more likely to be married than older women with self-harm, but less likely than older men in the non-ISH group. This may seem counterintuitive as some research has shown that marriage has a protective effect from suicide (Luoma & Pearson, 2002; Rendall, Weden, Favreault, Waldron, 2011). In this

study, older women with and without intentional self-harm were more likely to be widowed. This finding is likely accounted for by women's longer life expectancy rather than a causal association between widowhood and intentional self-harm. While there is some risk of suicide-related behaviour following the death of a spouse (Ajdacic-Gross et al., 2008; Bennett, Smith, & Hughes, 2005; Byrne & Raphael, 1999; Conwell, Rotenberg, & Caine, 1990; Erlangsen, Jeune, Bille-Brahe, & Vaupel, 2004; Kreitman, 1988), further research examining the contribution of widowhood to suicide risk among the older home care population is required.

In this study, older men with ISH were less likely to have a caregiver that lived with them than older men in the non-ISH group. However, caregivers of the ISH group were more likely to report indicators of caregiver distress than the non-ISH group. This result is similar to research showing that caregivers of persons with psychiatric illness were significantly more likely to report caregiver burden than caregivers of persons with chronic medical illness (Ampalam, Gunturu, & Padma, 2012; MacKay & Pakenham, 2012; Schulze & Rossler, 2005). In addition to the caregiver distress, older men in the ISH group demonstrated higher scores than women in both groups on indicators of alcohol use and dependence, cognitive impairment, and measures of ADL impairment and IADL impairment. The combination of these impairments and characteristics may have associated behaviours such as mood swings, violent/aggressive outbursts, and disruptive behaviours that, for an elderly female spouse or caregiving daughter, would be difficult to manage. The caregivers of older adults with ISH in the current study may be feeling overstrained and overburdened by the caregiving role. Further research on caregivers for older adults with a history of self-harm and/or psychiatric illness receiving home care services is warranted, including ways in which caregivers of older men can be supported.

There were noteworthy clinical differences between older adults with ISH and in the non-ISH group. Not unexpectedly, the ISH group was more likely to have a psychiatric diagnosis, more likely

to have higher scores on the Depression Rating Scale indicating probable depression, and more likely to be in receipt of psychotropic medication. Psychiatric illnesses, namely affective disorders, are one of the more significant risk factor for suicide in later life (Conwell, 1995; Fischer, Wei, Solberg, Rush, & Heinrich, 2003; Hansen, Wang, Stage, & Kragh-Sorensen, 2003; Oquendo et al., 2004; Qin, 2011; Stolberg, Clark, & Bongar, 2002; Waern, Rubenowitz, & Wilhelmson, 2003; Yip et al., 2003). The higher prevalence of depression among women than men was consistent with previous literature (Blazer & Hybels, 2009; Jones, Marcantonio, & Rabinowitz, 2003; Newman, Bland, & Orn, 1998; Nolen-Hoeksema, 2002; Patten, 2000; Sivrioglu, Berlow & Ellison, 2004). Older adults in the ISH group were more likely to be in receipt of psychotropic medication than clients without self-harm (66.6% vs. 39.9%). This prevalence is much higher than the 11% of home care clients reported by Alanen, Finne-Soveri, Noro and Leinonen (2008); however, their study only examined antipsychotic medication. Given the strong associations with suicide-related behaviour greater vigilance by home care professionals of older adults with psychiatric conditions and those taking psychotropic medication is warranted.

Older adults in the ISH-group reported higher rates of daily pain than the non-ISH group, consistent with the findings reported by Li and Conwell (2010) for older adults receiving home care. Approximately 57% (n=1,178) of home care clients with ISH and 52% (n=104,623) in the non-ISH group experienced daily pain. This prevalence is approximately 10% higher than the findings reported by Maxwell and colleagues (2008) of Ontario home care clients in 1999-2001, although suicide risk was not assessed in their study. When pain was examined across genders, significantly higher rates were found for older women than men. It is possible that men in the current study underreported or minimized pain. Nonetheless, these findings indicate that managing pain is a clear and straightforward approach to addressing risk for suicide and could be incorporated into a larger mental health and suicide prevention strategy.

Not unexpectedly was that older adults in the ISH group were more likely to report consuming alcohol, as well as needing a drink first thing in the morning to steady the nerves (indicator of dependence). The role of alcohol intoxication in suicide-related behaviour is profound (Oquendo, Currier, Liu, Hasin, Grant, & Blanco, 2010; Qin, 2011; Schneider, 2009). In the current study, the prevalence for alcohol use and dependence was significantly higher among older men with ISH compared to men in the non-ISH sample, and higher compared to older women in the ISH and non-ISH groups, which is consistent with previous research (Qin, 2011). A suicide risk assessment should be performed among older adults with substance misuse, particularly if there are other indicators of poor health present (e.g., depressive symptoms, psychiatric diagnosis, non-adherence to medication).

A decline in communication, mood, and appropriate behaviours was more pronounced for older men with ISH than older women with ISH and the non-ISH group. It is important to note that the items measure changes (i.e., decline) in these domains over a short period of time (e.g., 90 days). Therefore the older adult may be in a process of adjustment or having difficulty adjusting to these changes that increases the risk for suicide. These findings may suggest that the process of decline is important to consider as a risk factor for suicide and that the focus of clinicians should not only be on the impairment itself. Similar to the findings by Grue and colleagues (2010) on recent visual decline, the “recency” or process of visual decline had a greater impact on social life and functioning than stable vision impairment. The proportion of older adults that experienced a decline in vision was higher among the self-harm group; however, the difference was not statistically significant. Further research is required to establish recent declines in functioning as a risk factor; however, monitoring the adjustment process of older adults receiving home care services that are experiencing declines in these domains may be recommended.

One of the more intriguing findings of the current study was the increased prevalence of older adults with cognitive impairment in the ISH group than non-ISH group. Cognitive impairment was more pronounced for older men with self-harm than older women, as was a diagnosis of Alzheimer's Disease and dementia. Research has generally shown that the level of risk for suicide in persons with dementia is generally considered low (Bellini, De Ronchi, Forti et al., 1998; Draper, Moore & Brodaty, 1998; Lim, Rubin, Coats, & Morris, 2005); however, 38% (n=795) of older adults that experienced intentional self-harm had CPS scores equivalent to MMSE scores of 19-15 (i.e., mild to moderate impairment) and 21.5% (n=429) had a diagnosis of Alzheimer's disease or dementia prior to the self-harming event. The awareness of cognitive limitations in the early stages of dementia is considered a risk factor for suicide as are accompanying symptoms of depression (Enache, Winblad, & Aarsland, 2011; Margo & Finkel, 1990; Rubio et al., 2001; Seyfried et al., 2011). However, Rao, Dening, Brayne and Huppert (1997) found no association between suicidal thoughts and awareness of memory difficulties, yet the very small sample size (n=9) made this study difficult to interpret. Further, a difficulty remains in discerning whether the intent of the self-harming behaviour among persons with cognitive impairment was to end their life or a result of disinhibition and impaired behaviour regulation.

The gender difference in cognitive impairment and intentional self-harm may have implications for the assessment of suicide when dementia is diagnosed or suspected. As suggested by Margo and Finkel (1990), the loss of functioning that accompanies cognitive decline is often ignored as a danger signal for suicide. Loss of cognitive function in an older man that is accustomed to high achievement and the frustration that accompanies lapses in memory may be the real suicide risk factor rather than the dementia itself (Margo & Finkel, 1990). Older men with ISH in the current study were less likely to have a caregiver that lived with them than older men in the non-ISH sample and less likely to have positive social relationships than older women with self-harm and older men in the



non-ISH sample. This lower level of informal support coupled with the frustration that accompanies cognitive decline may increase the risk of suicide for older men. Future research to test this hypothesis would be to examine the contribution of cognitive impairment to suicide risk when controlling for other associated factors. In sum, the current evidence suggests that suicide risk is present among home care clients with cognitive impairment and they should not be assumed incapable of suicide-related behaviour or excluded from an assessment of suicide risk.

This comparative description demonstrates that older adults with the experience of intentional self-harm have different socio-demographic and clinical characteristics than older adults without the experience of intentional self-harm. These differences require further exploration yet they are a starting point for identifying older adults that may be at higher risk for self-harm, and initiating a dialogue around suicide risk in older home care clients and suicide prevention in the home care sector. The findings from this research should also be interpreted with the following limitation in mind. The dataset was drawn using a cross-sectional snapshot of older home care clients in Ontario between 2007 and 2010 with a corresponding hospital administration record for intentional self-harm. The results are applicable to older adults receiving home care in Ontario, but may not represent all older adults in the province with the experience of self-harm. Many older adults in Ontario are not recipients of home care services and many older adults that engage in suicide-related behaviour are not hospitalized or do not recover from their self-inflicted injuries (Conwell & Thompson, 2008; Draper, 1996). However, intentional self-harm in the DAD and NACRS data sets drew a large sample size of older adults with recorded intentional self-injuries. This is a strength of the current study as it is very difficult to recruit a sample this large for the purpose of studying a sensitive and stigma-laden topic such as suicide. Further, examining data from hospital administrative records as well as the RAI-HC ensured standardization and little selection bias in the older adult sample, as the data collection tools are provincially mandated in Ontario.

This study of older adults in receipt of home care services who experienced intentional self-harm in the province of Ontario supports a number of relevant findings in the suicide risk literature. The results show several areas that could be explored by home care professionals to potentially mitigate or decrease suicide risk in the older home care client. Of notable interest were the factors that were more prevalent in the groups with self-harm, including important gender differences and implications for informal caregivers. Greater attention to the older adults' adjustment to changes in functioning may be an opportunity to detect older adults at risk for suicide and provide appropriate resources to prevent any future suicide-related behaviour from occurring or reoccurring.

## **5. RISK AND PROTECTIVE FACTORS ASSOCIATED WITH INTENTIONAL SELF-HARM AMONG OLDER COMMUNITY-RESIDING HOME CARE CLIENTS IN ONTARIO**

### **5.1 Introduction**

Suicide prevention strategies for community-residing older adults receiving home care services have received little attention in the research literature. Sirey and colleagues (2008) noted that community-residing older adults are a sub-population at high risk for suicide, yet they may be hidden from view of mainstream mental health and suicide prevention initiatives. The mental health needs of community-residing older adults are typically managed by primary care physicians unless a crisis brings them to the attention of psychiatric services (Callahan, 2001). The estimated prevalence of suicidal thoughts among Canadian community-residing older adults has ranged between 2%-6% (Corna, Cairney, & Streiner, 2010; Lapierre et al., 2012; Vasiliadis, Gagné, & Prévile, 2012), which are similar to rates found in other countries (Almeida et al., 2012; Li & Conwell, 2010; Raue, Meyers, Rowe, Heo, & Bruce, 2006; Scocco & De Leo, 2002; Suzuki et al., 2011). Although this prevalence may seem low, older adults are less likely to report or volunteer suicidal thoughts (Barnow & Linden, 2000; Waern, Beskow, Runeson, & Skoog, 1999) or seek out mental health services (Byers, Arean, & Yaffe, 2012; Pearson, Conwell, Lindsay, Takahashi, & Caine, 1997). Older adults have the highest rate of death by suicide across all age groups (CCSMH, 2006; WHO, 2005) and as many as 75% have never made a prior attempt (Conwell, Rotenberg, & Caine, 1990). Therefore, a greater understanding of risk factors and protective factors that confer suicide risk for older adults living in the community can assist in targeting high-risk individuals and provide interventions that can allow them to remain living independently and safely in the community. The current study examines risk and protective

factors associated with intentional self-harm among community residing older adults receiving home care services in Ontario. Intentional self-harm was established by examining linked emergency department records, hospital discharge records, and psychiatric inpatient records. This research is unique in that it examines older adults not only at risk of suicide, but those who have engaged in suicidal behaviour with a hospitalization to record their injuries.

There are a number of factors that have been reported to increase risk for suicide among older adults including depression and other psychiatric illnesses (Conwell, 1995; Fischer, Wei, Solberg, Rush, & Heinrich, 2003; Hansen, Wang, Stage, & Kragh-Sorensen, 2003; Oquendo et al., 2004; Qin, 2011; Stolberg, Clark, & Bongar, 2002; Waern, Rubenowitz, & Wilhelmson, 2003; Yip et al., 2003), previous suicide-related behaviour (Berman, 2009; Joiner, 2005; O'Connell et al., 2004), pain (Fishbain, 1996; Hinkley & Jaremko, 1994; Juurlink et al., 2004; Li & Conwell, 2010), and poor physical health and functional decline (Bauer et al., 1997; Bergman, Barak, Sigler & Aizenberg, 2011; Goldblatt, 2000; Quan, Arboleda-Florez, Fick, Stuart, & Love, 2002; Tadros & Salib, 2007; Waern, 2003; Waern et al., 2002; Yip et al., 2003). A growing body of literature also identifies several protective and resiliency factors that act as buffers to suicide risk. Research on protective factors and resiliency has received less attention relative to the body of knowledge on risk factors, yet they are as important in the assessment of suicide risk among older adults. Examples of protective factors include meaningful relationships and social support (Awata et al., 2005; Bartels et al., 2002; Clarke et al., 2004; Heisel, 2006; Rowe, Conwell, Schulberg, & Bruce, 2006; Yip et al., 2003), perceived meaning in life (Heisel & Flett, 2008), adaptive beliefs (Edelstein et al., 2009), and religion or spiritual practice and engagement in activities of personal interest (CCSMH, 2006). A gap exists in the literature on suicide in later life that examines how risk and protective factors work in combination to either increase or mitigate suicide risk. Previous research has used latent class analysis to identify patterns of risk factors for suicide (see Logan, Hall, & Karch, 2011); however, protective

factors for suicide have not received the same attention. The goals of our current research therefore are to concurrently explore suicide risk and protective factors among community residing older adults. As the rate of suicide is particularly higher for older men, this study will further explore significant gender differences that could have an impact upon approaches to suicide intervention and prevention. As the time (in days) to the intentional self-harm event is available in the data set, a survival analysis is also performed to add to the understanding of suicide risk and protective factors.

## **5.2 Methods**

### **5.2.1 Data Sources**

Record linkages between Ontario hospital administrative data and Ontario home care data were employed to examine risk and protective factors associated with intentional self-harm among older adults. Ontario hospital administrative data were retrieved from the National Ambulatory Care Reporting System (NACRS) and the Discharge Abstract Database (DAD). Data on admissions to designated adult mental health beds in Ontario for patients that were assessed as a “danger or threat to themselves” were retrieved from the Ontario Mental Health Reporting System (OMHRS). These databases are managed by the Canadian Institute for Health Information (CIHI) and were made available through partnerships between CIHI and the University of Waterloo. NACRS contains information on presenting complaints, discharge diagnoses and interventions during emergency department visits using ICD-10-CA codes. The DAD holds demographic, administrative and clinical information on hospital discharges also using ICD-10-CA codes. OMHRS contains data on individuals admitted to adult mental health beds, specifically their mental and physical health, social supports and services used, as well as care planning and outcome measures. The present study used NACRS, DAD, and OMHRS data from the province of Ontario between 2007 and 2010.

Ontario home care data were retrieved from the Home Care Reporting System (HCRS) database. The HCRS contains demographic, clinical, functional, and resource utilization information on clients receiving services through publicly funded home care programs in Canada (CIHI, 2012). Information in the HCRS is based on the Resident Assessment Instrument – Home Care (RAI-HC), which is an assessment tool used to identify the strengths, preferences and needs of long-stay home care clients (Morris et al., 2009). The NACRS, DAD, OMHRS and HCRS datasets were linked together by CIHI using a common identifier. Personal identifiers and items that might identify an individual were removed to ensure confidentiality and anonymity of the data. The Office of Research at the University of Waterloo provided ethics approval for the analyses of the de-identified data in the current study (certificate #18655).

### ***5.2.2 Sample***

The sample consisted of Ontario long stay home care clients expected to be on service for 60 days or more, aged 60 years or older that were assessed with the RAI-HC between April 2007 and September 2010 regardless of cognitive status or functional impairment (N = 222,149). Clients' initial assessment records in the HCRS dataset were used in the analysis. These were linked to data on corresponding emergency department visits, hospital admission records, and admissions to adult mental health beds where the diagnostic codes (NACRS) or problems (DAD) were coded for intentional self-harm (i.e., X40-X42, X46-X47, X60-X84), or clients were assessed as a “danger/threat to themselves” (OMHRS). The ICD-10-CA codes for intentional self-harm were not solely restricted to primary diagnostic types in order to allow for improved detection of self-harm events in a population with higher rates of multi-morbidity. In the linked data set, 81.3% (n=180,654) of those with NACRS records had a corresponding RAI-HC assessment, of which 1.1% (n=2,055) included an ICD-10 code for intentional self-harm. For those with DAD records, 58.6 (n=130,228)

had a corresponding RAI-HC assessment, of which 1.3% (n=1,638) included an ICD-10 code for intentional self-harm. With regards to OMHRS records, 1.1% (n=2,521) had a corresponding RAI-HC assessment, of which 43.9% (n=1,106) included the “danger/threat to themselves” as the purpose for the psychiatric admission. Incidents of intentional self-harm that were recorded in multiple settings (e.g., emergency department and hospital admission) used the most recent record date and were counted as one event. The RAI-HC is psychometrically strong (Hirdes et al., 2008; Landi et al., 2000; Morris et al., 1997; Poss et al., 2008) and has several measures of psychiatric symptoms such as depression, cognition, and psychosis but it has no items on suicidal ideation or a history of previous suicide-related behaviour. Thus, through the linkages of records between the HCRS database and the DAD, NACRS and OMHRS, a prospective examination of community-residing older adults with recent suicide-related behaviour is possible (See Appendix C).

### ***5.2.3 Measures***

The RAI-HC is a standardized and person-centered assessment tool that informs and guides care planning and services in community-based settings (Canadian Home Care Association, 2008; Morris et al., 2009). It is structured into three main elements that work together; an assessment component to evaluate multiple domains of health, function, social support and service use; outcome scales that identify problems or areas of decline that could benefit from further evaluation; and Clinical Assessment Protocols (CAPs), which provide guidelines for further assessment and person-centered care planning (Morris et al., 1997; Morris et al., 2009). Several countries were involved in the pilot testing of the RAI-HC. The items in the RAI-HC have demonstrated excellent validity, inter-rater and test-retest reliability (Hirdes et al., 2008; Landi et al., 2000; Morris et al., 1997; Poss et al., 2008). In Ontario, the RAI-HC is the provincially mandated common assessment for clients expected

to be on service for greater than 60 days and clients entering into long term care facilities (Canadian Home Care Association, 2008).

The RAI-HC includes over 350 data elements measuring socio-demographic information, cognition, mood, behaviour, functional status, disease diagnoses, medication, social support, and service use (Morris et al., 1997). RAI-HC assessments are completed by trained health professionals using a three-day observation period for most domains. Assessors are trained to consult multiple sources of information when completing the RAI-HC, such as direct observation of the client, consulting available medical records, communicating with the client, the client's family, physician or other available health care professionals (Hawes, Fries, James, & Guihan, 2007; Morris et al., 2009; Morris, Carpenter, Berg, & Jones, 2000).

A number of summary scales representing different clinical and risk domains are embedded in the RAI-HC. The Cognitive Performance Scale (CPS) is based on five items and rates the cognitive status of home care clients. CPS scores range from 0 (intact cognition) to 6 (very severe impairment). It has been validated against the MMSE, the MoCA, and the Test for Severe Impairment demonstrating its appropriateness for measuring cognitive status among clients in home care, as well as in nursing homes, acute care and mental health settings (Büla & Wietlisbach, 2009; Gruber-Baldini, Zimmerman, Mortimore, & Magaziner, 2000; Hansebo, Kihlgren, Ljunggren, & Winblad, 1998; Hartmaier et al., 1995; Hartmaier, Sloane, Guess, & Koch, 1994; Jones, Perlman, Hirdes, & Scott, 2010; Landi et al., 2000; Morris et al., 1994; Paquay et al., 2007; Wellens et al., 2012). The Depression Rating Scale (DRS) is based on seven items and is used as a clinical indicator of depression. DRS scores range from 0 to 14. A score of three or greater is an indicator of major and minor depression symptoms in nursing home populations (Burrows et al., 2000). The DRS has been validated against the Hamilton Depression Rating Scale and the Cornell Scale for Depression (Burrows et al., 2000). Kohler and colleagues (2005) found that the DRS and the Geriatric Depression



Scale (GDS) were both associated with depression diagnoses, but measured depression symptoms in different ways. The DRS has been used nationally and internationally to identify depression symptoms among home care clients (Dalby et al., 2008; Jónsson et al., 2003; Onder et al., 2007; Soldato et al., 2008; Szczerbinska, Hirdes, & Zyczkowska, 2012). The Activities of Daily Living (ADL) Hierarchy Scale measures four items of ADL performance and categorizes abilities into stages at which they can no longer be performed. Difficulty with performance is scored from 0 (independent) to 4 (total dependence). The ADL Hierarchy reliably assesses change in ADL impairment over time (Morris, Fries and Morris, 1999) and is a valid measure of functional status and disability in home care clients (Armstrong, Zhu, Hirdes, & Stolee, 2012; Carpenter et al., 2004; Cook et al., 2013; Landi et al., 2007; Landi et al., 2000; Sørbye et al., 2009). The Instrumental Activities of Daily Living (IADL) scale is based on seven items using performance based ratings. IADL scores range from 0 to 42 and are used to determine IADL ability and decline in home care clients (Armstrong, Zhu, Hirdes, & Stolee, 2012; Cook et al., 2013; Jónsson et al., 2003; June, Lee, & Yoon, 2009; Landi et al., 2000). The Changes in Health, End-stage disease and Signs and Symptoms (CHESS) scale is a measure of health stability (vs. instability) that has been used as a measure of frailty to predict mortality (Armstrong, Stolee, Hirdes, & Poss, 2010; Hirdes, Frijters & Teare, 2003). Scores on the CHESS range from 0 (no instability in health) to 5 (highly unstable health).

Many of the RAI-HC scales and indicators developed for use in community setting (e.g., alcohol misuse, indicators of elder abuse) demonstrated reasonable to excellent reliability (Hirdes et al., 2008; Landi et al., 2000; Morris et al., 1997; Poss et al., 2008). Validation of the core items in the RAI-HC (e.g., ADL performance, IADL performance, Cognitive performance) demonstrated excellent agreement with gold standard tools for geriatric assessment (Landi et al., 2000).

#### **5.2.4 Analysis**

Data for persons with an age less than 60 years old were not included in the analyses. Demographic variables were recoded into categories where appropriate (e.g., age groupings) or dichotomized for ease of interpretation. Caregiver distress was derived from endorsing two items in the RAI-HC: i) caregiver is unable to continue in caring activities – e.g., decline in health of caregiver makes it difficult to continue; and ii) primary caregiver expresses feelings of distress, anger or depression. Two items that measured alcohol consumption were combined into a single ‘alcohol’ variable: i) the person’s alcohol consumption concerns others; and ii) needing a drink first thing in the morning. Items that measures recent (in last 3 months) declines in functional domains (e.g., decline in mood; social activities) were combined into a single variable of recent overall decline. The receipt of any of four types of psychotropic medication (i.e., antipsychotic, anxiolytic, antidepressant, hypnotic) was combined into a single yes/no psychotropic medication variable. Summary scales from the RAI-HC (DRS, ADL, IADL, CPS, CHESS) were collapsed into three levels using cut-offs employed by Hirdes, Mitchell, Maxwell and White (2011). Study variables and corresponding RAI-HC codes are listed in Appendix D. Frequency tables were generated to examine the distribution of variables prior to recoding.

Intentional self-harm events that were retrieved from DAD and NACRS using ICD-10-CA codes X40-X42, X46-X47, X60-X84, and from OMHRS where clients were assessed as a “danger/threat to themselves” were coded into event (=1) vs. no event (=0) to compare between older adults that experienced intentional self-harm to those without. Items from the RAI-HC that were considered protective factors according to the CCSMH guidelines were (i) being socially involved; (ii) low or no indicators of isolation; (iii) having a caregiver with (iv) no indicators of caregiver

burden; and (v) having optimism that functional ability will improve. Protective factor items were recoded into binary variables.

A correlational analysis was performed with the study variables using the Spearman Rank Order correlation method to examine the strength and direction of variable relationships, as well as to check for multi-collinearity using with a threshold of 0.7 (Tabachnick & Fidell, 2001). Selected variables that were not significantly associated with the dependent variable (intentional self-harm) at the bivariate level were included in the regression analyses as an additional check on variable relationships. Unadjusted and adjusted logistic regression techniques were used to examine predictors of intentional self-harm. The forward selection method of model building was used to observe the unique contribution of independent variables that have either a risk or protective relationship to intentional self-harm as supported in research literature. The significance level for entry into the model was set at 0.05. Following the automated modeling procedure, independent variables were manually entered into the regression model to test combinations of variables the forward selection method may have missed due to order-of-entry effects; as well as to test interaction effects between gender and risk and protective variables. ROC curves and Hosmer and Lemeshow's Goodness-of-Fit tests were used to determine goodness-of-fit of the predictive model. Survival analysis measured time in days from RAI-HC assessment to the date on which an event of intentional self-harm was recorded in NACRS, DAD, or OMHRS. Cases became censored at the time of the event, at the time of discharge, or after the four-year observation period if no discharge occurred. Multivariate analyses using Cox's regression modeling was used to predict the time to the intentional self-harm event using significant variables from the adjusted logistic regression model. The proportional hazards assumption was checked and found to be valid for the model. All analyses were performed using SAS software.

### 5.3 Results

There were 222,149 unique RAI-HC assessments performed with older adults between April 2007 and September 2010. Within this sample, 2,077 of home care clients (1.01%) experienced intentional self-harm (ISH) that was recorded on an emergency department visit, an admission to the hospital, or an admission to an adult mental health bed in the province of Ontario. Descriptive statistics and between group differences are presented in Chapter 4. An examination of the distribution of the outcome scales showed a curvilinear relationship between intentional self-harm and scores on the CPS (Figure 5.1). In the bivariate analysis, several independent variables were not associated with intentional self-harm. These included being married, living alone, having a caregiver that lived with the client, scores on the IADL hierarchy, scores on the CHES, a recent decline in functional status, and having optimism that functional abilities will improve. The remaining items in the correlation matrix were examined and none met the threshold for collinearity with the exception of married marital status and widowed marital status ( $r = .78, p < .0001$ ). The majority of study variables showed weak or small associations with the dependent variable, although statistically significant. This may in part be accounted for by the very large sample size and its ability to detect smaller significant differences between study variables.

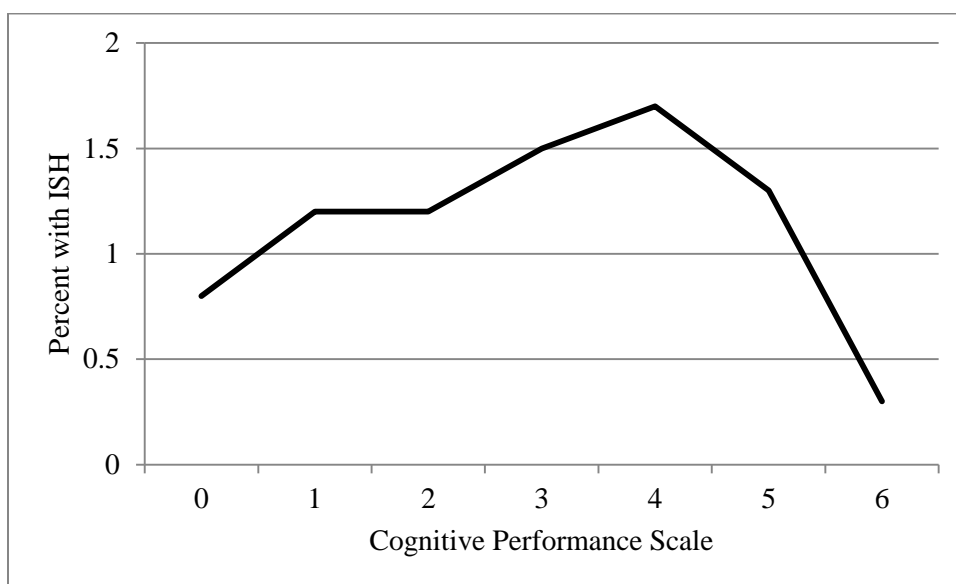


Figure 5.1. Rate of intentional self-harm by CPS scores, Ontario, 2007-2010

Table 5.1 and Table 5.2 shows the unadjusted odds ratios for sociodemographic and clinical characteristics associated with intentional self-harm. Among home care clients the odds of self-harm were significantly higher for those in the 60 to 74 year age group compared to those 85 years and older, men, those that were separated/divorced compared to never married, and persons with English as their primary language. Older adults with limited finances also had higher odds of intentional self-harm compared to older adults with no indication of economic tradeoffs. The odds of self-harm were 4 times higher among older adults with a psychiatric diagnosis compared to no diagnosis, 3 times higher for older adults with indicators of alcohol use and dependence compared to older adults with no indicators, approximately 2.9 times higher for older adults with high scores on the Depression Rating Scale compared to older adults with DRS equal to 0, and 3 times higher for older adults taking psychotropic medications compared to no medications. Similar patterns were found for indicators of loneliness, anhedonia, caregivers in distress, a worsening of mood, and a worsening in behaviours (e.g., verbally abusive to others). The odds of intentional self-harm were lower for older adults that

required extensive to maximal assistance with ADLs compared to no impairments in ADLs, higher for older adults with CPS scores of 4+ compared to intact cognition, and higher for older adults with a diagnosis of Alzheimer's Disease and other dementia compared to no diagnosis.

**Table 5.1: Unadjusted Odds Ratios for Socio-demographic Characteristics Associated with Intentional Self-harm among Older Home Care Clients, Ontario 2007-2010 (N=222,149)**

		% (n)	OR unadjusted	95% CI
Age	60-74 years	1.89 (943)	3.95***	3.49-4.48
	75-84 years	0.93 (800)	1.93***	1.70-2.19
	†85+ years	0.48 (334)	1.00	-
Sex	Male	1.14 (835)	1.20***	1.10-1.32
	†Female	0.95 (1,242)	1.00	-
Marital Status	†Never Married	1.41 (135)	1.00	-
	Married	1.04 (874)	0.73**	0.61-0.88
	Separated/Divorced	2.31 (323)	1.65***	1.35-2.02
	Widowed	0.75 (716)	0.53***	0.44-0.64
Primary Language	English	1.08 (1,797)	1.52***	1.34-1.73
	†Other	0.72 (280)	1.00	-
Living Alone		1.05 (543)	1.02	0.92-1.13
	†Live with Others	1.04 (1,120)	1.00	-
Isolated		1.07 (1,037)	1.11*	1.02-1.21
	†Not Isolated	0.96 (1,040)	1.00	-
Limited Finances		2.64 (70)	2.71***	2.13-3.45
	†None Reported	0.99 (2,007)	1.00	-

Note: \* $p < .05$ , \*\* $p < .001$ , \*\*\* $p < .0001$

†Reference groups

**Table 5.2: Unadjusted Odds Ratios for Clinical Characteristics Associated with Intentional Self-harm among Older Home Care Clients, Ontario 2007-2010 (N=222,149)**

		% (n)	OR unadjusted	95% CI
<b>Clinical Characteristics</b>				
Any Psychiatric Diagnosis	Yes	3.08 (715)	4.21***	3.84-4.61
	†No	0.75 (1,362)	1.00	-
Alcohol Use and Dependence	Yes	3.00 (83)	3.10***	2.48-3.87
	†No	0.99 (1,994)	1.00	-
Loneliness	Yes	1.52 (389)	1.62***	1.45-1.81
	†No	0.94 (1,688)	1.00	-
Anhedonia	Yes	1.48 (436)	1.60***	1.43-1.78
	†No	0.94 (1,641)	1.00	-
Positive Social Relationships	Yes	0.91 (1,603)	0.53***	0.48-0.59
	†No	1.70 (474)	1.00	-
Daily Pain	Yes	1.11 (1,178)	1.23***	1.13-1.34
	†No	0.91 (899)	1.00	-
CG Lives with Client	Yes	0.98 (1,039)	0.92	0.85-1.01
	†No	1.06 (1,038)	1.00	-
Caregiver Distress	Yes	1.31 (435)	1.37***	1.23-1.52
	†No	0.96 (1,642)	1.00	-
Daily Outings	Yes	1.16 (1,331)	1.41***	1.28-1.54
	†No	0.83 (746)	1.00	-
Optimism to Improve	Yes	0.98 (452)	0.96	0.86-1.06
	†No	1.02 (1,625)	1.00	-
DRS score <sup>a</sup>	†0	0.71 (932)	1.00	-
	1-2	1.29 (590)	1.83***	1.65-2.03
	3+	2.01 (555)	2.87***	2.58-3.19
CPS score <sup>d</sup>	†0-1	0.89 (1,191)	1.00	-
	2-3	1.26 (795)	1.42***	1.31-1.56
	4+	1.27 (91)	1.44**	1.17-1.80
ADL Hierarchy Scale score <sup>b</sup>	†0	1.07 (1,509)	1.00	-
	1-2	0.96 (432)	0.90	0.81-1.01
	3+	0.74 (136)	0.69***	0.58-0.82
IADL Capacity Scale score <sup>c</sup>	†0	0.82 (92)	1.00	-
	1-2	1.15 (575)	1.41*	1.13-1.75
	3+	0.98 (1,410)	1.20	0.97-1.48
CHESS Scale score <sup>e</sup>	†0	1.05 (633)	1.00	-
	1-2	1.03 (1,220)	0.98	0.89-1.08
	3+	0.89 (224)	0.85*	0.73-0.99
Number of Medications	†0	1.13 (34)	1.00	-
	1-4	0.98 (338)	0.87	0.61-1.24
	5-8	0.90 (641)	0.80	0.57-1.13
	9+	1.11 (1,064)	0.98	0.70-1.38
Psychotropic Medication	Yes	1.68 (1,383)	3.00***	2.74-3.29
	†No	0.57 (694)	1.00	-



Medication Non-Adherence <sup>†</sup>	Yes	1.83 (55)	1.85***	1.41-2.42
	†No	1.00 (2,022)	1.00	-
<b>Neurological Conditions</b>				
Alzheimer's Disease & Dementia		1.35 (429)	1.43***	1.28-1.59
Stroke		0.96 (341)	0.94	0.84-1.06
Head Trauma		1.36 (25)	1.35	0.91-2.01
Multiple Sclerosis		0.96 (12)	0.95	0.54-1.67
Parkinson's Disease		1.22 (99)	1.22*	1.00-1.50
<b>Decline in Areas of Function</b>				
Communication		1.35 (206)	1.38***	1.19-1.59
Vision		1.08 (142)	1.08	0.91-1.28
Mood		2.14 (452)	2.03***	1.83-2.25
Behavioural Symptoms		10.5 (219)	2.27***	1.97-2.61
ADL		0.93 (872)	0.86**	0.79-0.94
Social Activities		1.16 (270)	1.16*	1.02-1.32
Overall Deterioration		1.00 (925)	0.62	0.90-1.07

Note: \* $p < .05$ , \*\* $p < .001$ , \*\*\* $p < .0001$ ; †Reference group

CG = Caregiver, DRS = Depression Rating Scale, ADL = Activities of Daily Living, IADL = Instrumental Activities of Daily Living, CPS = Cognitive Performance Scale, CHESS = Changes in Health, End-stage disease and Signs and Symptoms

<sup>a</sup>0 = no indicators of depression; 1-2 = some indicators of depression; 3+ = indicators of probable depression

<sup>b</sup>0 = no impairment; 1-2 = some functional impairment; 3+ = severe functional impairment

<sup>c</sup>0 = no difficulty; 1-2 = some difficulty; 3+ = great difficulty

<sup>d</sup>0-1 = cognitively intact to borderline cognitive impairment; 2-3 = mild to moderate cognitive impairment; 4+ = cognitively impaired

<sup>e</sup>0 = no health instability; 1-2 = some health instability; 3+ = moderate to high health instability

<sup>f</sup>compliant less than 80% of time, including failure to purchase prescribed medications

Table 5.3 shows the results for the first of two final logistic regression models predicting intentional self-harm while adjusting for relevant covariates. As widowhood and married marital status were overly correlated ( $r = .78, p < .0001$ ), two predictive models were examined that separated these variables. The variables in Model 1 with the strongest relationship to increase odds of intentional self-harm were younger age, having a psychiatric diagnosis, being in receipt of psychotropic medication, indicators of alcohol use and dependence, and higher scores on the DRS. Specifically, the odds of self-harm were 3.14 times higher among older adults in the 60-74 year age

group compared to older adults in the 85+ age group. The odds of self-harm were 2.29 times higher among older adults with a psychiatric diagnosis compared to older adults without this diagnosis. The odds of self-harm were 1.94 times higher among older adults in receipt of psychotropic medication compared to older adults without this medication. Also, the odds of self-harm were 1.69 times higher among older adults with alcohol use and dependence compared to no alcohol and 1.58 times higher among older adults with DRS scores indicating probable depression compared to DRS scores equal to zero. In addition to these main findings, the odds of intentional self-harm among older adults with ADL hierarchy scores of 3+ (indicating severe functional impairment) were half of that of persons with no impairments in ADL functioning. The odds were 1.14 times higher for older adults reporting daily pain compared with those with no pain. Positive social relationships were protective in this model as the odds of intentional self-harm among older adults that reported positive relationships were 25% lower than older adults with no positive social relationships.

**Table 5.3. Model 1. Multiple Logistic Regression Predicting Intentional Self Harm among Older Home Care Clients, Ontario 2007-2010 (N=222,149)**

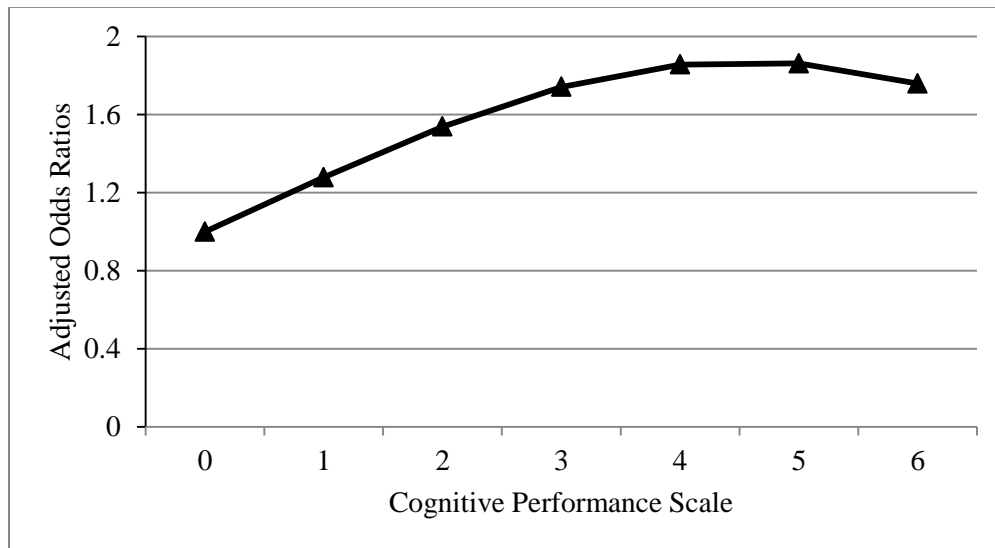
Independent Variables	Parameter Estimate (SE)	Adjusted Odds Ratio (95% CL)	p value
<b>Sociodemographic</b>			
Age 60-74 <sup>i</sup>	1.14 (0.07)	3.14 (2.75-3.59)	<.0001
Age 75-84 <sup>i</sup>	0.51 (0.07)	1.67 (1.46-1.91)	<.0001
Sex (Male)	0.24 (0.07)	See Figure	0.0007
Married <sup>ii</sup>	-0.002 (0.06)	See Figure	0.97
<b>Clinical</b>			
Any Psychiatric Diagnosis	0.83 (0.05)	2.29 (2.06-2.54)	<.0001
Alcohol Use and Dependence	0.53 (0.12)	1.69 (1.34-2.14)	<.0001
Psychotropic Medication	0.66 (0.05)	1.94 (1.75-2.15)	<.0001
DRS score <sup>a,iii</sup> 1-2	0.27 (0.06)	1.31 (1.18-1.46)	<.0001
DRS score <sup>a,iii</sup> 3+	0.46 (0.06)	1.58 (1.40-1.78)	<.0001
ADL Hierarchy Scale score <sup>b,iv</sup> 1-2	-0.33 (0.06)	0.72 (0.64-0.81)	<.0001
ADL Hierarchy Scale score <sup>b,iv</sup> 3+	-0.68 (0.10)	0.51 (0.42-0.62)	<.0001
Daily Pain	0.13 (0.05)	1.14 (1.04-1.25)	.007
Cognitive Performance Scale	0.28 (0.05)	See Figure	<.0001
Cognitive Performance Scale <sup>2</sup>	-0.03 (0.01)	See Figure	.006
Dementia Diagnosis	-0.09 (0.09)	See Figure	0.31
<b>Protective Factors</b>			
Positive Social Relationships	-0.26 (0.06)	0.77 (0.69-0.86)	<.0001
<b>Interaction Effects</b>			
Sex * Married	-0.29 (0.10)	See Figure	.003
Sex * Dementia Diagnosis	0.63 (0.11)	See Figure	<.0001
			AUC = 0.74; Goodness of Fit $\chi^2 = 14.56, df = 8, p=0.07$

Note: <sup>i</sup>Reference group: Age = 85+; <sup>ii</sup>Reference group: Other; <sup>iii</sup>Reference group: DRS = 0; <sup>iv</sup>Reference group: ADL = 0

<sup>a</sup>DRS = Depression Rating Scale; 0 = no indicators of depression; 1-2 = some indicators of depression; 3+ = indicators of probable depression

<sup>b</sup>ADL = Activities of Daily Living; 0 = no impairment; 1-2 = some functional impairment; 3+ = severe functional impairment

A significant quadratic effect for scores on the CPS showed that the odds of intentional self-harm increased up to scores of 4 and 5 on the CPS, and then decreased. At its highest point, the odds of self-harm were 1.86 times higher for older adults with CPS scores of 5, indicating moderate to severe cognitive impairment (Figure 5.2).



*Figure 5.2.* Quadratic effect of Cognitive Performance Scale scores in the prediction of suicide-related behaviour among older home care clients, Ontario, 2007-2010.

Significant interaction effects were found between sex and marital status as well as sex and a diagnosis of dementia (see Figures 5.3 and 5.4). Specifically, the odds of self-harm among older unmarried men were higher than the odds of self-harm for older married men. The interaction between sex and a diagnosis of dementia showed that the odds of self-harm among older men with dementia were significantly higher than older men without a dementia diagnosis. No other interactions between sex and other independent variables were significant.



Figure 5.3. Interaction between sex and married marital status in the prediction of suicide-related behaviour among older home care clients, Ontario, 2007-2010.

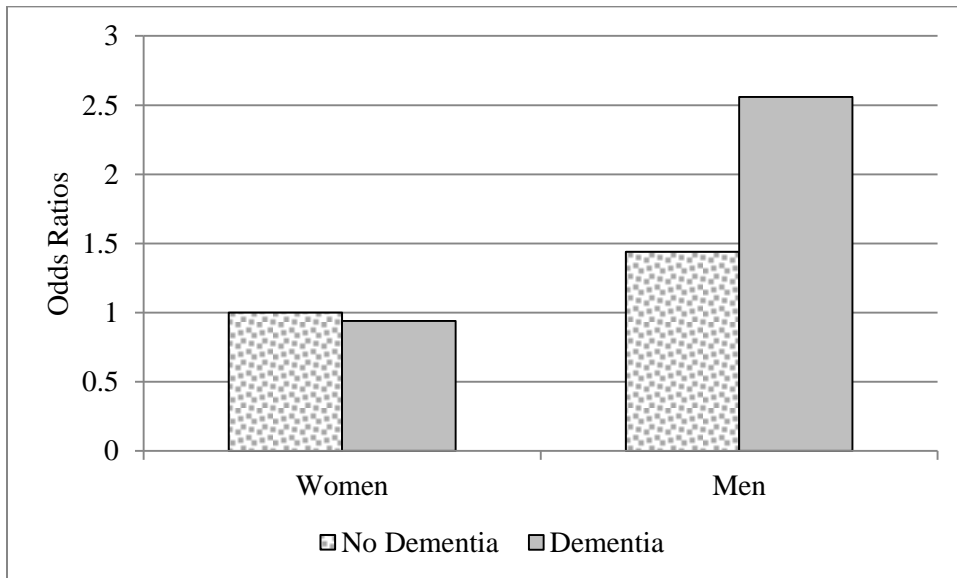


Figure 5.4. Interaction between sex and a dementia diagnosis in the prediction of suicide-related behaviour among older home care clients, Ontario, 2007-2010.

An ROC analysis yielded a corresponding AUC of 0.74 suggesting that the model showed good sensitivity and specificity in predicting intentional self-harm among this sample of older home care clients. Further, Hosmer and Lemeshow's Goodness-of-Fit statistics yielded a p-value of 0.07, indicating that the null hypothesis is not rejected and these data fit the model.

Table 5.4 shows the results for the second final logistic regression model which adjusts for widowhood and other covariates in the prediction of suicide-related behaviour. The main effects in Model 2 are nearly identical to those presented in Model 1 including the quadratic effect for scores on the CPS. Significant interactions were found for sex and widowed marital status and sex and positive social relationships (See Figures 5.5 and 5.6). The interaction between sex and a diagnosis of dementia was replicated as shown in Figure 5.4. The odds of self-harm were higher among older men that were widowed, yet older widowed women had lower odds of self-harm. The odds of self-harm among older men without positive social relationships were higher than the odds of self-harm for older men with positive social relationships, and the odds of self-harm among older men with a dementia diagnosis were higher than older men without a dementia diagnosis.

**Table 5.4. Model 2. Multiple Logistic Regression Predicting Intentional Self Harm among Older Home Care Clients, Ontario 2007-2010 (N=222,149)**

Independent Variables	Parameter Estimate (SE)	Adjusted Odds Ratio (95% CL)	p value
<b>Sociodemographic</b>			
Age 60-74 <sup>i</sup>	1.08 (0.07)	2.95 (2.57-3.39)	<.0001
Age 75-84 <sup>i</sup>	0.47 (0.07)	1.61 (1.41-1.82)	<.0001
Sex (Male)	0.12 (0.11)	See Figure	0.25
Widowed <sup>ii</sup>	-0.24 (0.06)	See Figure	0.0001
<b>Clinical</b>			
Any Psychiatric Diagnosis	0.84 (0.05)	2.31 (2.08-2.57)	<.0001
Alcohol Use and Dependence	0.56 (0.12)	1.76 (1.39-2.22)	<.0001
Psychotropic Medication	0.66 (0.05)	1.94 (1.75-2.15)	<.0001
DRS score <sup>a,iii</sup> 1-2	0.26 (0.06)	1.30 (1.17-1.45)	<.0001
DRS score <sup>a,iii</sup> 3+	0.45 (0.06)	1.57 (1.39-1.76)	<.0001
ADL Hierarchy Scale score <sup>b,iv</sup> 1-2	-0.35 (0.06)	0.71 (0.63-0.79)	<.0001
ADL Hierarchy Scale score <sup>b,iv</sup> 3+	-0.70 (0.10)	0.50 (0.41-0.60)	<.0001
Daily Pain	0.13 (0.05)	1.14 (1.04-1.25)	.007
Cognitive Performance Scale	0.28 (0.05)	See Figure	<.0001
Cognitive Performance Scale <sup>2</sup>	-0.03 (0.01)	See Figure	.004
Dementia Diagnosis	-0.08 (0.09)	See Figure	0.40
<b>Protective Factors</b>			
Positive Social Relationships	-0.16 (0.08)	See Figure	.03
<b>Interaction Effects</b>			
Sex * Widowed	0.38 (0.11)	See Figure	.0004
Sex * Positive Social Relationships	-0.23 (0.11)	See Figure	.04
Sex * Dementia Diagnosis	0.56 (0.11)	See Figure	<.0001
			AUC = 0.74; Goodness of Fit $\chi^2 = 9.11, df = 8, p=0.33$

Note: <sup>i</sup>Reference group: Age = 85+; <sup>ii</sup>Reference group: Other; <sup>iii</sup>Reference group: DRS = 0; <sup>iv</sup>Reference group: ADL = 0

<sup>a</sup>DRS = Depression Rating Scale; 0 = no indicators of depression; 1-2 = some indicators of depression; 3+ = indicators of probable depression

<sup>b</sup>ADL = Activities of Daily Living; 0 = no impairment; 1-2 = some functional impairment; 3+ = severe functional impairment

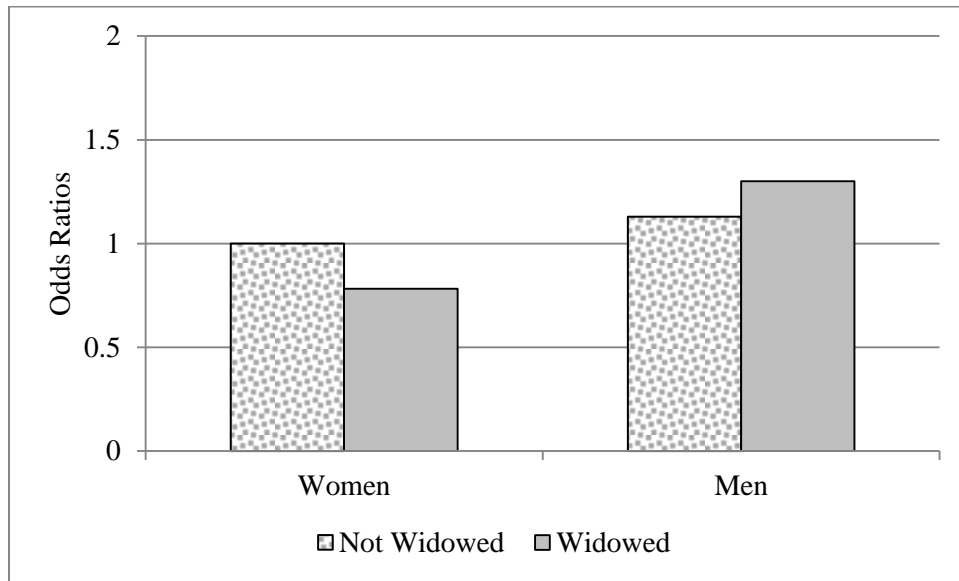


Figure 5.5. Interaction between gender and widowed marital status in the prediction of suicide-related behaviour among older home care clients, Ontario, 2007-2010.

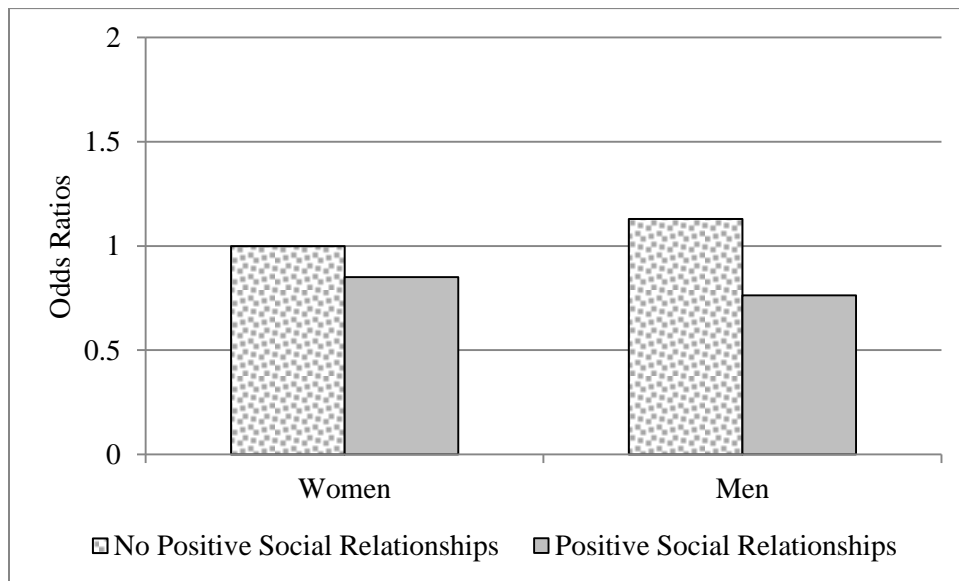


Figure 5.6. Interaction between sex and positive social relationships in the prediction of suicide-related behaviour among older home care clients, Ontario, 2007-2010.



Table 5.5 shows the results of the survival analysis. The average length of time from a RAI-HC assessment to an event of self-harm was approximately 2 years ( $M=732.23$  days,  $SD=438.63$ ), with a median length of 1 year and 8 months. According to the Cox regression model, significant predictors of intentional self-harm following an assessment by the RAI-HC were the same for the adjusted logistic regression model, with the exception of marital status (*ns*) and interaction effects (*ns*). Specifically, the hazard of intentional self-harm following a RAI-HC assessment was 2.19 times more likely among those with a psychiatric diagnosis compared to no diagnosis, approximately 2.0 times more likely among those in receipt of psychotropic medication compared to no psychotropic medication, and 1.82 times more likely among older home care clients with indicators of alcohol use and dependence compared to no indicators. Significant effects were also found for age and gender in this model, whereby the hazard of intentional self-harm was 3.00 times greater among adults in the 60 to 74 year age group compared to the 85 and older age group and approximately 1.37 times greater among men compared to women. The hazard of intentional self-harm decreased by 45% for home care clients whose ADL function was severely impaired compared to independent and decreased by 25% for home care clients who had positive social relationships compared to no positive social relationships. No significant interactions were observed between predictor variables of intentional self-harm. A test of the proportional hazards assumption determined that stratification was unnecessary and the assumption was not violated.

**Table 5.5: Cox Regression Model of Time to Intentional Self-harm following Home Care Assessment, Ontario 2007-2010 (N=222,149)**

	<i>B</i>	<i>HR</i>	<i>95% CI</i>
Age 60-74 <sup>i</sup>	1.09	2.97***	2.61-3.39
Age 75-84 <sup>i</sup>	0.46	1.58***	1.39-1.80
Sex (Male)	0.31	1.37***	1.25-1.50
Any Psychiatric Diagnosis	0.79	2.19***	1.98-2.44
Psychotropic Medication	0.68	1.98***	1.79-2.19
Alcohol Use and Dependence	0.60	1.82***	1.44-2.28
DRS score <sup>a,ii</sup> 1-2	0.33	1.40***	1.25-1.56
DRS score <sup>a,ii</sup> 3+	0.56	1.75***	1.56-1.97
ADL Hierarchy Scale score <sup>b,iii</sup> 1-2	-0.26	0.77***	0.69-0.86
ADL Hierarchy Scale score <sup>b,iii</sup> 3+	-0.59	0.55***	0.46-0.67
CPS score <sup>c,iv</sup> 2-3	0.23	1.26***	1.12-1.40
CPS score <sup>c,iv</sup> 4+	0.41	1.51*	1.16-1.95
Dementia Diagnosis	0.22	1.25**	1.10-1.42
Positive Social Relationships	-0.27	0.76***	0.68-0.85

*Note:* Observation period April 2007-September 2010; \* $p < .01$ \*\*  $p < .001$ \*\*\* $p < .0001$

<sup>i</sup>Reference group: Age = 85+; <sup>ii</sup>Reference group: DRS = 0; <sup>iii</sup>Reference group: ADL = 0; <sup>iv</sup>Reference group: CPS = 0-1;

<sup>a</sup>0 = no indicators of depression; 1-2 = some indicators of depression; 3+ = indicators of probable depression;

<sup>b</sup>0 = no impairment; 1-2 = some functional impairment; 3+ = severe functional impairment;

<sup>c</sup>0-1 = cognitively intact to borderline cognitive impairment; 2-3 = mild to moderate cognitive impairment; 4+ = cognitively impaired

## 5.4 Discussion

This study based on provincial data covering the home care sector in Ontario provides evidence for risk and protective factors associated with intentional self-harm among older adults. Results demonstrated that the odds of self-harm increased for older adults with a psychiatric diagnosis, those with indicators of alcohol use and dependence and those with indicators of probable depression. According to the age groupings, the odds of self-harm were highest for the young-old in the 60 to 74 year age group and the survival analysis supported a 5% decrease in the hazard of intentional self-harm as age increased. These findings define a high risk group of older adults in home care that may be at risk for future suicide-related behaviour.

Sex and marital status showed independent and interactive effects with intentional self-harm; however, for this study only higher order results are reported. Married marital status was not associated with intentional self-harm in the bivariate analysis; however, when it was coupled with sex in the regression model the interaction was significant. Results showed that the odds of intentional self-harm were higher for older un-married men than for older married men. As the literature suggests this finding supports the notion that marriage has a protective effect for men, although this same effect is not present for older women. In examining the interaction between sex and widowhood, a similar pattern was observed. Results showed that the odds of intentional self-harm were higher for older widowed men than for older men that were not widowed. Older widowed women; however, had lower odds of self-harm than older women that were not widowed.

These results support interesting patterns related to the risk and protective gendered-effects of marriage and widowhood in later life. The social support, instrumental support and companionship provided by marriage may be an important protective factor that helps decrease the probability of suicide-related behaviour (Kposowa, 2000), particularly among older men (Van Grootheest et al.,

1999). Older married and older widowed women did not show the same associations with intentional self-harm as their male counterparts. In fact, older widowed women had lower odds of self-harm. Typically, women are more likely than men to have social supports and access to female peers who are already widowed themselves (Fischer & Phillips, 1982; Martin-Matthews, 1991, 2011), which can facilitate adjustment to bereavement, widowhood and other hardships in later life (Allen-Burge, Storandt, Kinscherf, & Rubin, 1994; Canetto, 1992; McLaughlin, Vagenas, Pachana, Begum, & Dobson, 2010). The cultural norms of the older male cohort make it much less acceptable to admit to feelings of loneliness and the need for companionship when a spouse passes away (Lynch, 2000; Martin-Matthews, 2011). Older men therefore may have more difficulty adjusting to widowhood and dismiss offers of support that could potentially assist in reducing feelings of suicide ideation. Although this study could not examine the timing of the bereavement, Bennett and colleagues (2005) and Byrne and Raphael (1999) found that suicide ideation developed among men both in the short and long term following bereavement. Home care professionals should be attentive to the mental health and adjustment of older widowed men, including men whose spouses are sick where the risk of mortality and imminent widowhood is increased.

The gender patterns between sex, marital status and intentional self-harm were paralleled to the interaction effects between sex and positive social relationships. Of the protective factors entered into the regression model, having positive social relationships was significant both independently and in the interaction with sex. In the model, older men and women had lower odds of intentional self-harm when they had positive social relationships. Older men without positive social relationships had higher risk of self-harm than older women without positive social relationships. These observations suggest that positive social relationships are a protective factor to suicide-related behaviour among older adults, which has been supported in the research literature (Awata et al., 2005; Bartels et al., 2002; Clarke et al., 2004; Heisel, 2006; Nelson, Johnston, & Shrivastava, 2010; Rowe, Conwell,

Schulberg, & Bruce, 2006; Yip et al., 2003). The survival analysis showed that the hazard for intentional self-harm decreased by approximately 25% for older adults that had positive social relationships. This suggests that increasing opportunities for positive social relationships particularly for older men receiving home care services is warranted. Such a recommendation may not be given priority in a tight home care service budget when nursing visits and physical therapy are needed. However, Perissinotto, Stijacic Cenzer and Covinsky (2012) note that social services, in addition to medical services, need to be comprehensively integrated for older adults receiving care in the community. In light of the above findings, older men and women are benefitting from social relationships and such experiences may be an under-recognized suicide prevention strategy for the home care sector.

The findings of the present study are consistent with previous research on psychiatric illness and depression associated with intentional self-harm (Conwell, 1995; Fischer, Wei, Solberg, Rush, & Heinrich, 2003; Hansen, Wang, Stage, & Kragh-Sorensen, 2003; Oquendo et al., 2004; Qin, 2011; Stolberg, Clark, & Bongar, 2002; Waern, Rubenowitz, & Wilhelmson, 2003; Yip et al., 2003). Although the majority of people with a psychiatric diagnosis neither attempt nor die by suicide, the heightened potential risk warrants that adequate assessment and continued monitoring of suicide ideation is an approach to prevention among this group (Qin, 2011). While a psychiatric diagnosis is a risk factor that is more distal and empirically derived (Rudd et al., 2006), warning signs such as depression symptoms, alcohol use, and daily pain are more proximal and can be targeted for immediate intervention. This could be seen in the survival analysis as the hazard for intentional self-harm was 1.73 times higher for those with indicators of probable depression and 1.81 times higher for those with indicators of alcohol use and dependence. Depression, alcohol use, and pain are independent risk factors of suicide (Goldblatt, 2000; Hinkley & Jaremko, 1994; Juurlink et al., 2004; Prévile, Boyer, Hébert, Bravo, & Seguin, 2005; Oquendo, Currier, Liu, Hasin, Grant, & Blanco,

2010; Qin, 2011; Schneider, 2009; Waern et al., 2002; Waern, Rubenowitz, & Wilhelmson, 2003). As older adults are less conflicted, more determined, and use methods that are more lethal in suicide attempts (Glass & Reed, 1993; Heisel & Duberstein, 2005; Leenaars, 1994; Osgood, 1992) interventions aimed at treating these warning signs early are especially critical for this age group.

These results also provide support for the predictive validity of the Depression Rating Scale (DRS) for suicide-related behaviour among older home care clients. The DRS has previously been validated for its ability to identify new cases of depression among older adults in long term care facilities and complex continuing care hospitals in Ontario (Martin et al., 2008; Neufeld, Freeman, Joling, & Hirdes, in press). The original developers of the DRS found it highly correlated to the Hamilton Rating Scale for Depression and the Cornell Scale for Depression in Dementia (Burrows et al., 2000) and Koehler and colleagues (2005) found that the DRS and the Geriatric Depression Scale (GDS) were both associated with depression diagnoses, but measured different elements of depression symptoms (e.g., DRS identified greater depression among those with cognitive impairment compared with the GDS). Anderson, Buckwalter, Buchanan, Maas, and Imhof (2003) were not able to support the validity of the DRS as a measure to identify depression in their study of nursing home residents, suggesting that research with larger and more diverse samples was needed. In home care settings, several studies have used the DRS to examine depression among community residing older adults (Dalby et al., 2008; Jónsson et al., 2003; Onder et al., 2007; Soldato et al., 2008; Szczerbinska, Hirdes, & Zyzkowska, 2012); however, the current study is the first to use the DRS in the prediction of suicide-related behaviour among older adults receiving home care services. The results suggest that the DRS is a useful clinical measure for identifying older adults with probable depression in home care at risk for suicide-related behaviour.

The curvilinear pattern of the scores on the CPS among older adults with intentional self-harm was an indication to test a quadratic effect in the multiple regression model. The results of the

test show increasing odds of intentional self-harm as cognitive performance becomes more impaired (i.e., short-term memory, procedural memory, daily decision making, etc.). However, the increased odds reach a peak on the CPS, at which point risk declines when cognitive performance is most impaired. This is an advantage of using a measure such as the CPS in the RAI-HC instrument with the ability to determine at which point suicide-related risk reaches its peak (MMSE =5 equivalent to CPS =5).

Although a controversial topic, these findings suggest that cognitive impairment, to a certain degree, is a significant risk factor for suicide-related behaviour among older adults even when controlling for other risk factors. Lim and colleagues (2005) noted that suicide can occur in the early stages of dementia, yet others have noted that deficits in cognitive function and the need for greater assistance may protect against suicide (Conwell, 1995). Older adults with cognitive impairment experience fluctuating moments of clarity and focus (Pratt, 2002), and persons in the early and moderate stages of dementia may be feeling distressed about their recurring memory loss (Brommelhoff et al., 2009; Enache, Winblad, & Aarsland, 2011). It is conceivable therefore that during those moments of self-awareness, and physical ability is not compromised, suicide-related behaviour may be considered. This may be the pattern that is occurring within the present study as the hazards for intentional self-harm increased as cognitive impairment increased.

Margo and Finkel (1990) hypothesize that the loss of functioning that accompanies cognitive decline is often ignored as a danger signal for suicide. Loss of cognitive function in an older man (and woman) that is accustomed to high achievement and the frustration that accompanies lapses in memory may be the real suicide risk factor rather than the dementia itself. Rao, Denning, Brayne, and Huppert (1997) did not support an association between awareness of memory problems and suicide ideation, yet Qin (2011) notes that suicide risk may be higher for older adults in the young-old age group with cognitive impairment given the poor prognosis of treatment and the anticipation of

progressively losing the ability to control and manage one's life. Results of the current study clearly demonstrated a higher risk of suicide-related behaviour for older men with a dementia diagnosis than older women in the same group indicating some support for the above hypotheses regarding increased risk for suicide with failing cognitive functioning.

The evidence that risk for suicide exists for persons with cognitive impairment is growing. The sub-population of home care clients with cognitive impairments should not be assumed incapable of suicide-related behaviour, particularly older men. While difficulty may remain in discerning whether the intent of the self-harming behaviour among persons with cognitive impairment was to end their life or a result of disinhibition and impaired behaviour regulation, the assessment of thoughts of death or suicide ideation is recommended, including an appraisal of the client's safety (e.g., access to lethal means in the home).

The ADL Hierarchy Scale is a measure of ADL performance and categorizes abilities into stages at which they can no longer be performed. In the multiple regression model, a worsening of ADL ability had lower odds of intentional self-harm compared to older adults whose ADL ability was intact. This might suggest that functional impairment in ADLs is protective against suicide-related behaviour. On the other hand, older adults with severe functional disabilities may be so impaired that they cannot physically engage in self-harm behaviour, despite experiencing suicide ideation. Previous literature has suggested that impairments in ADLs as well as anticipatory fear of losing ADL ability increases risk for suicide-related behaviour (Bauer et al., 1997; Goldblatt, 2000; Ho, Yip, Chiu, & Halliday, 1998; Leenars, 1992; Lester, Wood, Williams, & Haines, 2004; Tadros & Salib, 2007). Results of the current study contradict these findings therefore it appears that the relationship between intentional self-harm and physical ability or disability is more complex. As the current study modeled suicide behaviour, as opposed to suicide ideation, it is possible that impairments in ADLs work differently in terms of risk between thinking about suicide versus acting on suicidal thoughts.



In the Interpersonal Theory of Suicide (IPTS), Joiner (2009) suggests the notion of ‘perceived burdensomeness’ whereby the subjective appraisal of feeling like a burden on others (e.g., family, informal supports, etc.) increases the risk for suicide. Perceived burdensomeness may be more likely to occur in later life as dependence on formal and informal supports is also likely to increase. In the present study; however, this notion was not supported as impairments in ADLs were not associated with increased risk of intentional self-harm after adjusting for depression, alcohol use and psychiatric diagnoses. Further, the hazard of intentional self-harm significantly decreased for home care clients with ADL impairments. As noted above, it can be argued that persons with severe impairments in ADLs are physically incapable of engaging in intentional self-harm, yet they may ruminate or have suicidal thoughts. This discrepancy between the IPTS and the results from the current study may be accounted for by a difference in subjective versus objective levels of burdensomeness. The burdensomeness construct of the IPTS is based on subjective measures of feeling like a burden to others, while the current study measured objective levels of physical impairment. This objective measure could be a proxy for the level of burden placed on caregivers. With aging there is an increased likelihood of dependence on others for assistance with ADLs. As a theoretical framework for suicide in later life, the IPTS may wish to account for both subjective and objective perspectives in the context of suicide risk. Future research may wish to test the effects of ADL performance between suicide-related behaviour and suicide ideation to determine if differences are observed, as well as any interactions between ADL performance and indicators of depression or optimism to further understand its association with suicide among older adults.

The IPTS also suggests the notion of ‘thwarted belongingness’. This construct suggests that feeling lonely and lacking a reciprocally caring relationship is a dynamic state that increases suicide risk. Thwarted belongingness may be more likely to occur in later life following common late-life transitions that decrease the size of one’s social support network (e.g., widowhood, relocation to care

facilities, adult children moving away). In the current study, loneliness was a significant predictor of suicide while positive social relationships were protective in the unadjusted regression model. These findings demonstrated initial support for the thwarted belongingness construct. After controlling for suicide risk factors; however, the adjusted regression model continued to support the protective effects of positive social relationships, yet loneliness did not emerge in the predictive model. These results suggest that the IPTS belongingness construct was only partially supported in the current study of older adults at risk of suicide. Further, unlike the IPTS, this research suggests that loneliness and positive social relationships are independent constructs in the context of late-life suicide risk.

The results of this study describe a sub-population of older adults in the home care sector who may be at risk of suicide-related behaviour. By examining predictors associated with intentional self-harm versus predictors of suicide ideation, it is possible to conclude more accurately which characteristics increase risk, and which characteristics are protective against acts of intentional self-harm. Predictive models for suicide need to be both specific and sensitive, and for older adults, the models should be tailored to the risk and resilience factors that are unique to their cohort. The multi-dimensional profile that was created of older adults at higher risk in the home care population is an important approach to developing targeted suicide prevention initiatives in the home care sector.

The findings from this research should also be interpreted with the following limitations in mind. The dataset was drawn using a cross-sectional snapshot of older home care clients in Ontario between 2007 and 2010 with a subsequent hospital administration record for intentional self-harm. The results are applicable to older adults receiving home care in Ontario, but may not represent all older adults in the province with the experience of self-harm. Many older adults in Ontario are not recipients of home care services and many older adults that engage in suicide-related behaviour are not hospitalized or do not recover from their self-inflicted injuries (Conwell & Thompson, 2008; Draper, 1996). The experience of intentional self-harm in the DAD and NACRS data sets were drawn

from the diagnostic code fields, of which there are up to 25 code fields in the DAD. This was purposefully done to draw a larger sample size of older adults with the experience of intentional self-harm. This approach yielded a large sample size of over 2000 older adults. This is a strength of the current study as it is very difficult to recruit a sample this large for the purpose of studying a sensitive and stigma-laden topic such as suicide. In addition, examining data from hospital administrative records as well as the RAI-HC ensured standardization and little selection bias in the older adult sample, as the data collection tools are provincially mandated in Ontario.

This study of older adults at risk of intentional self-harm in the province of Ontario adds to the existing evidence of suicide risk in later life, as well as the importance of concurrently examining protective factors that might mitigate suicide risk. The results showed several areas that should be assessed by home care professionals to reduce risk in the older home care client. Of notable interest were the risk and protective factors that significantly differed by sex, which suggests that certain approaches to suicide intervention and prevention need to be gender-specific.

## **6. SUICIDE-RELATED BEHAVIOUR AMONG OLDER ADULTS WITH DEMENTIA AND PARKINSON'S DISEASE RECEIVING HOME CARE SERVICES IN ONTARIO**

### **6.1 Introduction**

Suicide risk in persons with neurological conditions (PNC) has been reported to be greater than the general population, yet the impact of neurological conditions (NC) on suicide risk in later life has not been adequately explored (Ayalon, Mackin, Arian, Chen, & McDonel-Herr, 2007; Stenager & Stenager, 1992). Studies that have examined the role of NC in suicide-related ideation and behaviour among older adults have focused on conditions such as dementia, Parkinson's disease and epilepsy which tend to be more common in later life, than traumatic brain injuries (TBI) or spinal cord injuries (SCI) (Ahoniemi, Pohjolainen, & Kautiainen, 2011; Reeves, & Laizer, 2012; Thietje, Pouw, Schulz, Kienast, & Hirschfeld, 2011). With the high rate of suicide in later life coupled with the prevalence of depression (CCSMH, 2006; CDC, 2007; De Leo & Spathonis, 2004; Magnil, Gunnarsson, Björkstedt, & Björkelund, 2008; Prévile, Boyer, Hébert, Bravo, & Seguin, 2005), a higher risk of suicide may be expected with a comorbid neurological condition. However, as NC are not uniform and wide margins exist in terms of experiences and adaptation, it cannot be assumed that all PNC are at risk for suicide. Nor can it be assumed that NC, in and of itself are the causal factor for suicide risk. As Förstl (2008) explains, even persons with dramatically progressive neurological diseases can have a positive attitude on life with no risk, or desire for, ending their life. This suggests that protective factors that mitigate suicide-related ideation may exist in the face of NC, yet additional research is needed to understand these factors among an older adult population. The objectives of the current study were to contribute to the literature on suicide risk among PNC by specifically examining predictors of intentional self-harm among older adults receiving home care services that

have a diagnosis of dementia (including Alzheimer's disease) or Parkinson's disease. Although NC such as dementia and Parkinson's disease cause organic changes to the brain that can increase risk for suicide through impulsive behaviour and disinhibition (Mann, 2012), this study focuses primarily on psychosocial risk and protective factors.

Suicide risk in persons with dementia is generally considered low (Bellini, De Ronchi, Forti et al., 1998; Draper, Moore & Brodaty, 1998; Lim, Rubin, Coats, & Morris, 2005); however, an increase in risk can be observed soon after a person is diagnosed (Haw, Harwood, & Hawton, 2009) and in the early stages of the disease (Lim et al., 2005; Qin, 2011). Ayalon and colleagues (2007) found that 12.4% of cognitively impaired older adults had passive suicide ideation while 18.9% had active suicide ideation. Barak and colleagues (2002) reported in a 10 year retrospective study of admissions to inpatient psychiatry that older adults who experienced suicide-related behaviour were in earlier stages of dementia compared with non-suicidal older adults.

The severe physical limitations imposed by Parkinson's disease (PD) such as tremors, rigidity, bradykinesia, akathisia, and postural instability cause concern regarding the potential for depression and suicide ideation within this population (Baskak, Yolax-Yarpuz, Devrimci-Ozguven, & Atbasoglu, 2010; Kummer, Cardoso, & Teixeira, 2009; Myslobodsky, Lalonde & Hicks, 2001; Nazem et al., 2008). Kostic and colleagues (2010) found that the suicide-specific mortality rate was 5.3 times higher in persons with PD than age- and sex-matched controls, yet Myslobodsky, Lalonde and Hicks (2001) found that the rate of suicide among persons with PD was 10 times lower than age-matched controls. In spite of these differences, both studies found that depressive symptoms were significant predictors of suicide in multivariate regression models.

A review of the literature showed that the above neurological conditions (dementia and PD) had unique predictors of increased suicide risk, but they also shared similarities such as younger age (Haw, Harwood, & Hawton, 2009; Stenager, Wermuth, Stenager, & Boldsen, 1994; Qin, 2011) and

comorbid depressive symptoms (Brommelhoff et al., 2009; Enache, Winblad, & Aarsland, 2011; Lim et al., 2005; Nazem et al., 2008). The current study will examine older adults receiving home care services with dementia diagnoses (including Alzheimer’s disease) and older adults with Parkinson’s disease across several sociodemographic and clinical characteristics. Separate regression models will describe significant predictors of suicide-related behaviour and protective factors that may mitigate risk for these conditions. Results of the analyses will be discussed in the context of similarities and differences between the NC.

## **6.2 Methods**

### ***6.2.1 Data Sources***

Record linkages between Ontario hospital administrative data and Ontario home care data were employed to examine risk and protective factors associated with intentional self-harm among older adults with diagnoses of dementia and Parkinson’s disease. Ontario hospital administrative data were retrieved from the National Ambulatory Care Reporting System (NACRS) and the Discharge Abstract Database (DAD). Data on admissions to designated adult mental health beds in Ontario for patients that were assessed as a “danger or threat to themselves” were retrieved from the Ontario Mental Health Reporting System (OMHRS). These databases are managed by the Canadian Institute for Health Information (CIHI) and were made available through partnerships between CIHI and the University of Waterloo. NACRS contains information on presenting complaints, discharge diagnoses and interventions during emergency department visits using ICD-10-CA codes. The DAD holds demographic, administrative and clinical information on hospital discharges also using ICD-10-CA codes. OMHRS contains data on individuals admitted to adult mental health beds, specifically their mental and physical health, social supports and services used, as well as care planning and outcome

measures. NACRS, DAD, and OMHRS data from the province of Ontario between 2007 and 2010 were used in the present study.

Ontario home care data were retrieved from the Home Care Reporting System (HCRS) database. The HCRS contains demographic, clinical, functional, and resource utilization information on clients receiving services through publicly funded home care programs in Canada (CIHI, 2012). Information in the HCRS is based on the Resident Assessment Instrument – Home Care (RAI-HC), which is an assessment tool used to identify the strengths, preferences and needs of long-stay home care clients (Morris et al., 2009). The NACRS, DAD, OMHRS and HCRS datasets were linked together by CIHI using a common identifier. Personal identifiers and items that might identify an individual were removed to ensure confidentiality and anonymity of the data. The Office of Research at the University of Waterloo provided ethics approval for the analyses of the de-identified data in the current study (certificate #18655).

### ***6.2.2 Sample***

The sample consisted of Ontario long stay home care clients (expected to be on service for 60 days or more) aged 60 years or older that were assessed with the RAI-HC between April 2007 and September 2010 regardless of cognitive status or functional impairment (N = 222,149). Clients' initial assessment records in the HCRS dataset were used in the analysis. Corresponding emergency department visits, hospital admission records, and admissions to adult mental health beds where the diagnostic codes (NACRS) or problems (DAD) were coded for intentional self-harm (i.e., X40-X42, X46-X47, X60-X84), or clients were assessed as a “danger/threat to themselves” (OMHRS) were then identified. The ICD-10-CA codes for intentional self-harm were not solely restricted to primary diagnostic types in order to allow for improved detection of self-harm events in a population with higher rates of multi-morbidity. In the linked data set, 81.3% (n=180,654) of those with NACRS

records had a corresponding RAI-HC assessment, of which 1.1% (n=2,055) included an ICD-10 code for intentional self-harm. For those with DAD records, 58.6% (n=130,228) had a corresponding RAI-HC assessment, of which 1.3% (n=1,638) included an ICD-10 code for intentional self-harm. With regards to OMHRS records, 1.1% (n=2,521) had a corresponding RAI-HC assessment, of which 43.9% (n=1,106) included the “danger/threat to themselves” as the purpose for the psychiatric admission. Incidents of intentional self-harm that were recorded in multiple settings (e.g., emergency department and hospital admission) used the most recent record date and were counted as one event. The RAI-HC is psychometrically strong (Hirdes et al., 2008; Landi et al., 2000; Morris et al., 1997; Poss et al., 2008) and has several measures of psychiatric symptoms such as depression, cognition, and psychosis, but it has no items on suicidal ideation or a history of previous suicide-related behaviour. Thus, through the linkages of records between the HCRS database and the DAD, NACRS and OMHRS, a prospective examination of community-residing older adults, including those with diagnoses of dementia, Parkinson’s disease, and recent suicide-related behaviour is possible (See Appendix C).

### **6.2.3 Measures**

The RAI-HC is a standardized and person-centered assessment tool that informs and guides care planning and services in community-based settings (Canadian Home Care Association, 2008; Morris et al., 2009). It is structured into three main elements that work together; an assessment component to evaluate multiple domains of health, function, social support and service use; outcome scales that identify problems or areas of decline that could benefit from further evaluation; and Clinical Assessment Protocols (CAPs), which provide guidelines for further assessment and person-centered care planning (Morris et al., 1997; Morris et al., 2009). Several countries were involved in the pilot testing of the RAI-HC. The items in the RAI-HC have demonstrated excellent validity, inter-



rater and test-retest reliability (Hirdes et al., 2008; Landi et al., 2000; Morris et al., 1997; Poss et al., 2008). In Ontario, the RAI-HC is the provincially mandated common assessment for clients expected to be on service for greater than 60 days and clients entering into long term care facilities (Canadian Home Care Association, 2008).

The RAI-HC includes over 350 data elements measuring socio-demographic information, cognition, mood, behaviour, functional status, disease diagnoses, medication, social support, and service use (Morris et al., 1997). RAI-HC assessments are completed by trained health professionals using a three-day observation period for most domains. Assessors are trained to consult multiple sources of information when completing the RAI-HC, such as direct observation of the client, consulting available medical records, communicating with the client, the client's family, physician or other available health care professionals (Hawes, Fries, James, & Guihan, 2007; Morris et al., 2009; Morris, Carpenter, Berg, & Jones, 2000).

A number of summary scales representing different clinical and risk domains are embedded in the RAI-HC. The Cognitive Performance Scale (CPS) is based on five items and rates the cognitive status of home care clients. CPS scores range from 0 (intact cognition) to 6 (very severe impairment). It has been validated against the MMSE, the MoCA, and the Test for Severe Impairment demonstrating its appropriateness for measuring cognitive status among clients in home care, as well as in nursing homes, acute care and mental health settings (Büla & Wietlisbach, 2009; Gruber-Baldini, Zimmerman, Mortimore, & Magaziner, 2000; Hansebo, Kihlgren, Ljunggren, & Winblad, 1998; Hartmaier et al., 1995; Hartmaier, Sloane, Guess, & Koch, 1994; Jones, Perlman, Hirdes, & Scott, 2010; Landi et al., 2000; Morris et al., 1994; Paquay et al., 2007; Wellens et al., 2012). The Depression Rating Scale (DRS) is based on seven items and is used as a clinical indicator of depression. DRS scores range from 0 to 14. A score of three or greater is an indicator of major and minor depression symptoms in nursing home populations (Burrows et al., 2000). The DRS has been

validated against the Hamilton Depression Rating Scale and the Cornell Scale for Depression (Burrows et al., 2000). Kohler and colleagues (2005) found that the DRS and the Geriatric Depression Scale (GDS) were both associated with depression diagnoses, but measured depression symptoms in different ways. The DRS has been used nationally and internationally to identify depression symptoms among home care clients (Dalby et al., 2008; Jónsson et al., 2003; Onder et al., 2007; Soldato et al., 2008; Szczerbinska, Hirdes, & Zyczkowska, 2012). The Activities of Daily Living (ADL) Hierarchy Scale measures four items of ADL performance and categorizes abilities into stages at which they can no longer be performed. Difficulty with performance is scored from 0 (independent) to 4 (total dependence). The ADL Hierarchy reliably assesses change in ADL impairment over time (Morris, Fries and Morris, 1999) and is a valid measure of functional status and disability in home care clients (Armstrong, Zhu, Hirdes, & Stolee, 2012; Carpenter et al., 2004; Cook et al., 2013; Landi et al., 2007; Landi et al., 2000; Sørbye et al., 2009). The Instrumental Activities of Daily Living (IADL) scale is based on seven items using performance based ratings. IADL scores range from 0 to 42 and are used to determine IADL ability and decline in home care clients (Armstrong, Zhu, Hirdes, & Stolee, 2012; Cook et al., 2013; Jónsson et al., 2003; June, Lee, & Yoon, 2009; Landi et al., 2000). The Changes in Health, End-stage disease and Signs and Symptoms (CHESS) scale is a measure of health stability (vs. instability) that has been used as a measure of frailty to predict mortality (Armstrong, Stolee, Hirdes, & Poss, 2010; Hirdes, Frijters & Teare, 2003). Scores on the CHESS range from 0 (no instability in health) to 5 (highly unstable health).

Many of the RAI-HC scales and indicators developed for use in community setting (e.g., alcohol misuse, indicators of elder abuse) demonstrated reasonable to excellent reliability (Hirdes et al., 2008; Landi et al., 2000; Morris et al., 1997; Poss et al., 2008). Validation of the core items in the RAI-HC (e.g., ADL performance, IADL performance, Cognitive performance) demonstrated excellent agreement with gold standard tools for geriatric assessment (Landi et al., 2000).

#### **6.2.4 Analysis**

Data for persons with an age less than 60 years old were not included in the analyses. Demographic variables were recoded into categories where appropriate (e.g., age groupings) or dichotomized for ease of interpretation. Caregiver distress was derived from endorsing two items in the RAI-HC: i) caregiver is unable to continue in caring activities – e.g., decline in health of caregiver makes it difficult to continue; and ii) primary caregiver expresses feelings of distress, anger or depression. Two items that measured alcohol consumption were combined into a single ‘alcohol’ variable: i) the person’s alcohol consumption concerns others; and ii) needing a drink first thing in the morning. Items that measures recent (in last 3 months) declines in functional domains (e.g., decline in mood; social activities) were combined into a single variable of recent overall decline. The receipt of any of four types of psychotropic medication (i.e., antipsychotic, anxiolytic, antidepressant, hypnotic) was combined into a single yes/no psychotropic medication variable. Summary scales from the RAI-HC (DRS, ADL, IADL, CPS, CHESS) were collapsed into three levels using cut-offs employed by Hirdes, Mitchell, Maxwell and White (2011). A diagnosis of Alzheimer’s disease or dementia was combined into a single binary variable labeled ‘dementia diagnosis’. The Parkinson’s disease diagnosis was also coded as a binary variable based on a single item. Study variables and corresponding RAI-HC codes are listed in Appendix D. Frequency tables were generated to examine the distribution of variables prior to recoding.

Intentional self-harm events that were retrieved from DAD and NACRS using ICD-10-CA codes X40-X42, X46-X47, X60-X84, and from OMHRS where clients were assessed as a “danger/threat to themselves” were coded into event (=1) vs. no event (=0) variables to compare between older adults with diagnoses of dementia and Parkinson’s disease that experienced intentional self-harm to the general home care population. Items from the RAI-HC that were considered

protective factors according to the CCSMH guidelines (2006) were (i) being socially involved; (ii) low or no indicators of isolation; (iii) having a caregiver with (iv) no indicators of caregiver burden; and (v) having optimism that functional ability will improve. Protective factor items were recoded into binary variables.

A correlational analysis was performed with the study variables using the Spearman Rank Order correlation method to examine the strength and direction of variable relationships, as well as to check for multi-collinearity using with a threshold of 0.7 (Tabachnick & Fidell, 2001). Selected variables that were not significantly associated with the dependent variable (intentional self-harm) at the bivariate level were included in the regression analyses as an additional check on variable relationships. Unadjusted and adjusted logistic regression techniques were used to examine predictors of intentional self-harm. The forward selection method of model building was used to observe the unique contribution of independent variables that have either a risk or protective relationship to intentional self-harm as supported in research literature. The significance level for entry into the model was set at 0.05. Following the automated modeling procedure, independent variables were manually entered into the regression model to test combinations of variables the forward selection method may have missed due to order-of-entry effects; as well as to test interaction effects between gender and risk and protective variables. ROC curves and Hosmer and Lemeshow's Goodness-of-Fit tests were used to determine goodness-of-fit of the predictive models. All analyses were performed using SAS software.

### **6.3 Results**

There were 222,149 unique RAI-HC assessments performed with older adults between April 2007 and September 2010. Within this sample, 2,077 of these home care clients (1.01%) experienced intentional self-harm (ISH) that was recorded on an emergency department visit, an admission to the

hospital, or an admission to an adult mental health bed in the province of Ontario. Prevalence rates of ISH by diagnosis, age, sex, and region are displayed in Table 6.1. A greater proportion of clients with dementia and ISH were between 60 and 74 years old and male. The proportion of clients with dementia and ISH was highest in the South West CCAC and the lowest in the Toronto Central CCAC. For home care clients with Parkinson's disease a greater proportion with ISH were between 60 and 74 years old and female. The proportion of clients with Parkinson's disease and ISH was highest in the North West CCAC and the lowest in the North East CCAC yet the differences between them were not significant.

**Table 6.1: Prevalence Rates of Intentional Self Harm among Older Home Care Clients with Diagnoses of Dementia and Parkinson’s Disease, Ontario**

		Rate (n) of ISH (95% CI)	
		Dementia	Parkinson’s
Age	60-74 years	3.5 (147) (3.0-4.1)	2.5 (53) (1.8-3.1)
	75-84 years	1.4 (207) (1.2-1.5)	1.0 (41) (0.7-1.3)
	85+ years	0.61 (75) (0.5-0.7)	0.3 (5) (0.0-0.5)
Sex	Male	1.9 (230) (1.7-2.2)	1.1 (47) (0.8-1.4)
	Female	1.0 (199) (0.9-1.1)	1.4 (52) (1.0-1.8)
Region	Central	0.8 (18) (0.4-1.1)	0.7 (6) (0.1-1.3)
	Central East	0.9 (28) (0.6-1.3)	1.2 (9) (0.4-1.9)
	Central West	0.7 (8) (0.2-1.2)	0.7 (2) (-0.3-1.6)
	Champlain	1.9 (76) (1.5-2.4)	1.5 (12) (0.7-2.4)
	Erie St. Clair	1.3 (25) (0.8-1.9)	0.8 (4) (0.0-1.6)
	HNHB	1.0 (50) (0.7-1.2)	1.5 (18) (0.8-2.2)
	Mississauga Halton	1.5 (30) (1.0-2.1)	1.0 (5) (0.1-1.8)
	North East	1.0 (13) (0.4-1.5)	0.5 (2) (-0.2-1.1)
	North Simcoe Muskoka	1.1 (12) (0.5-1.7)	1.3 (8) (0.0-2.5)
	North West	2.7 (20) (1.5-3.9)	3.0 (5) (0.4-5.6)
	South East	2.0 (29) (1.3-2.7)	1.7 (6) (0.3-3.0)
	South West	3.1 (89) (2.5-3.7)	2.2 (16) (1.1-3.2)
	Toronto Central	0.4 (10) (0.2-0.7)	0.8 (5) (0.1-1.5)
	Waterloo Wellington	0.9 (18) (0.5-1.3)	0.8 (4) (0.0-1.5)

*Note:* ISH=Intentional Self-Harm

Table 6.2 shows differences across several sociodemographic characteristics between persons with dementia and PD by intentional self-harm event. Older adults with dementia in the intentional self-harm group were 4 years older on average than older adults with Parkinson's disease and intentional self-harm (mean age 77.3 years vs. 73.3 years, SD 7.7 and 8.0, respectively). Compared to older adults with dementia in the non-ISH sample, there was a greater proportion of older adults with dementia and ISH in the 60 to 74 year age group, more men, and a greater proportion with married marital status. They were less likely to live alone or have indicators of isolation than older adults with dementia in the non-ISH sample. Among older adults with PD and ISH, there was a much greater proportion in the 60 to 75 year age group, more women, and a smaller proportion with married marital status than older adults with PD in the non-ISH sample. They were much more likely to live alone and have indicators of isolation than older adults with PD in the non-ISH sample.

**Table 6.2: Sociodemographic Characteristics of Older Home Care Clients with Diagnoses of Dementia and Parkinson’s Disease by Intentional Self Harm, Ontario**

		ISH Sample % (n)			Non-ISH Sample % (n)		
		Dementia	PD <sup>a</sup>	Other	Dementia	PD <sup>a</sup>	Other
		21.5 (429)	4.8 (99)	0.9 (1557)	16.1 (36,666)	3.9 (8549)	99.1 (164,949)
Age	60-74 years	34.3 (147)	53.5 (53)	47.9 (745)	13.2 (4,432)	26.8 (2287)	26.2 (43,193)
	75-84 years	48.3 (207) †	41.4 (41) *	35.8 (558) ◇	47.9 (16,133) +	52.0 (4,446) †	40.5 (66,773)
	85+ years	17.5 (75)	5.1 (5)	16.3 (254)	38.9 (13,101)	21.3 (1,816)	33.3 (54,983)
Women		46.4 (199) †	52.5 (52)	63.8 (994)	62.6 (21,077) †	45.2 (3,863) †	65.1 (107,425)
Men		53.6 (230)	47.5 (47)	36.2 (563)	37.4 (12,589)	54.8 (4,686)	34.9 (57,524)
Marital Status	Married	61.1 (258)	50.0 (49)	37.4 (575)	45.1 (15,033)	59.8 (5,073)	40.1 (65,479)
	Never Married	2.6 (11)	6.1 (6)	7.7 (118) ◇	3.5 (1,155)	3.8 (322)	5.0 (8,090)
	Separated/Divorced	8.1 (34) †	16.3 (16)	17.8 (273)	4.7 (1,580) +	5.4 (454)	7.3 (11,840)
	Widowed	28.2 (119)	27.6 (27)	37.1 (570)	46.8 (15,602)	31.0 (2,631)	47.7 (77,904)
Primary Language	English	85.3 (366)	80.8 (80)	87.2 (1,358) ◇	80.7 (27,177)	79.0 (6,751)	80.9 (133,379)
	Other	14.7 (63)	19.2 (19)	12.8 (199)	19.3 (6,489)	21.0 (1,798)	19.1 (31,570)
Living Alone		15.8 (58) †	27.1 (19)	37.8 (466) ◇	20.5 (5,475) +	17.4 (1,093) †	35.1 (45,139)
Isolated		28.7 (123) †	55.6 (55)	55.2 (859) ◇	33.9 (11,403) +	32.1 (2,742) †	50.3 (82,962)
Limited Finances		1.6 (7) †	3.0 (3)	3.9 (60) ◇	0.9 (285) +	1.3 (107)	1.4 (2,235)

Note: ISH=Intentional Self-Harm

<sup>a</sup>PD = Parkinson’s disease; † = significant difference compared to non-dementia in ISH sample ( $p < .0001$ ); \* = significant difference compared to non-PD in ISH sample ( $p < .0001$ ); + = significant difference compared to non-dementia in non-ISH sample ( $p < .0001$ ); † = significant difference compared to non-PD in non-ISH sample ( $p < .0001$ ); ◇ = significant difference compared to other (not-including dementia & PD) in non-ISH sample ( $p < .0001$ )



Table 6.3 shows the clinical characteristics by intentional self-harm among older adults with diagnoses of dementia and Parkinson's disease to those without. Older adults with dementia and ISH were more likely to have a comorbid psychiatric diagnosis, have indicators of alcohol use and dependence, indicators of anhedonia, and have fewer positive social relationships than older adults with dementia in the non-ISH sample. They were more likely to have a caregiver that lived with them and these caregivers were more likely to endorse indicators of caregiver distress compared to older adults with dementia in the non-ISH sample. An approximate 15% difference was observed in the proportion of older adults in the dementia and ISH group that reported going out of the house on a daily basis (i.e., daily outings) compared to those with dementia in the non-ISH sample. Notable differences were observed between outcome scores on the DRS indicating probable depression and on the ADL hierarchy indicating less functional impairment between older adults with dementia and ISH and older adults with dementia in the non-ISH sample. A 16% difference was observed between older adults with dementia and ISH and older adults with dementia in the non-ISH sample on the receipt of psychotropic medication. A greater proportion of older adults with dementia and ISH experienced declines in communication, mood and a worsening of behavioural symptoms compared to older adults with dementia in the non-ISH sample.

The proportion of older adults with PD and ISH with a psychiatric diagnosis was double the proportion for older adults with PD in the non-ISH group. They were more likely to express loneliness, have fewer positive social relationships and report daily pain than older adults with PD in the non-ISH sample. Older adults with PD and ISH were less likely to have a caregiver that lived with them than older adults with PD in the non-ISH sample, yet no differences emerged between indicators of caregiver distress. Older adults with PD and ISH were more likely to report going out of the house on a daily basis (i.e., daily outings) and had optimism that their functional potential would improve compared to older adults with PD in the non-ISH sample. Only minor differences were observed

between older adults with PD in the ISH and non-ISH samples on the outcome measures, with the exception of ADL Hierarchy and IADL Capacity scores. A 22% difference was observed between older adults with PD and ISH and older adults with PD in the non-ISH sample on the receipt of psychotropic medication. A greater proportion of older adults with PD and ISH experienced a decline in mood and a worsening of behavioural symptoms compared to older adults with PD in the non-ISH sample.

**Table 6.3: Clinical Characteristics of Older Home Care Clients with Diagnoses of Dementia and Parkinson's Disease by Intentional Self Harm, Ontario**

	ISH Sample			Non-ISH Sample			
	Dementia 21.5 (429) % (n)	Parkinson's 4.8 (99) % (n)	Other 0.9 (1,557) % (n)	Dementia 16.1 (36,666) % (n)	Parkinson's 3.9 (8549) % (n)	Other 99.1 (164,949) % (n)	
<b>Clinical Characteristics</b>							
Any Psychiatric Diagnosis	23.1 (99)	36.4 (36)	37.4 (582)	13.6 (4,586)	15.8 (1,354)	10.5 (17,248)	
Alcohol Use & Dependence	4.2 (18)	0 (0)	4.2 (65)	1.8 (611)	0.5 (44)	1.3 (2,105)	
Loneliness	11.7 (50)	20.2 (20)	20.6 (321)	11.1 (3,741)	12.3 (1,047)	12.7 (20,938)	
Anhedonia	22.8 (98)	12.1 (12)	21.1 (328)	18.1 (6,087)	16.1 (1,375)	13.5 (22,319)	
Positive Social Relationships	65.7 (282)	82.8 (82)	80.0 (1,244)	79.2 (26,674)	86.0 (7,354)	87.8 (144,792)	
Daily Pain	32.4 (139)	54.6 (54)	63.5 (988)	31.8 (10,712)	48.3 (4,132)	55.4 (91,339)	
CG lives with Client	65.0 (279)	55.6 (55)	45.8 (713)	58.5 (19,691)	68.4 (5,844)	50.1 (82,697)	
Caregiver Distress	35.4 (152)	25.3 (25)	16.8 (261)	29.5 (9,932)	24.0 (2,049)	13.4 (22,173)	
Daily Outings	74.1 (318)	64.7 (64)	61.5 (957)	57.5 (19,364)	52.4 (4,479)	55.8 (91,984)	
Optimism to Improve	10.3 (44)	21.2 (21)	24.9 (388)	9.2 (3,084)	14.6 (1,251)	25.3 (41,749)	
DRS score <sup>a</sup>	0	41.0 (176)	54.6 (54)	45.3 (706)	57.0 (19,187)	59.2 (5,059)	65.9 (108,648)
	1-2	32.6 (140)	27.3 (27)	27.2 (424)	26.1 (8,786)	25.1 (2,142)	21.5 (35,465)
	3+	26.3 (113)	18.2 (18)	27.4 (427)	16.9 (5,693)	15.8 (1,348)	12.6 (20,836)
CPS score <sup>d</sup>	0-1	10.3 (44)	57.6 (57)	70.0 (1,090)	11.4 (3,749)	54.0 (4,614)	76.3 (125,826)
	2-3	76.5 (3285)	37.4 (37)	28.1 (437)	75.5 (25,418)	40.4 (3,451)	22.0 (36,348)
	4+	13.3 (57)	5.1 (5)	1.9 (30)	13.4 (4,499)	5.7 (484)	1.7 (2,775)
ADL Hierarchy Scale score <sup>b</sup>	0	55.5 (238)	61.6 (61)	77.8 (1,212)	51.1 (17,199)	47.8 (4,084)	73.2 (120,768)
	1-2	35.7 (153)	27.3 (27)	16.5 (257)	33.8 (11,387)	33.6 (2,876)	19.1 (31,559)
	3+	8.9 (38)	11.1 (11)	5.7 (88)	15.1 (5,080)	18.6 (1,589)	7.7 (12,622)
IADL Capacity Scale score <sup>c</sup>	0	2.1 (9)	4.0 (4)	5.1 (79)	2.4 (816)	1.6 (139)	6.2 (10,269)
	1-2	18.9 (81)	28.3 (28)	30.0 (466)	12.9 (4,338)	14.7 (1,253)	26.9 (44,404)
	3+	79.0 (339)	67.7 (67)	65.0 (1,012)	84.7 (28,512)	83.7 (7,157)	66.9 (110,276)
CHESS Scale score <sup>e</sup>	0	31.0 (133)	36.4 (36)	30.0 (467)	30.1 (10,144)	28.1 (2,398)	29.5 (48,714)
	1-2	58.5 (251)	52.5 (52)	59.0 (919)	57.0 (19,204)	60.4 (5,161)	58.1 (95,889)

	3+	10.5 (45)	11.1 (11)	11.0 (171)	12.8 (4,318)	11.6 (990)	12.3 (20,346)
Number of Medications	0	3.3 (14)	2.0 (2)	1.2 (19)	2.4 (817)	0.6 (48)	1.3 (2,212)
	1-4	23.3 (100)	13.1 (13)	14.6 (227)	21.6 (7,279)	14.5 (1,239)	16.2 (26,650)
	5-8	38.0 (163)	29.3 (29)	29.0 (451)	37.7 (12,705)	35.0 (2,995)	34.1 (56,321)
	9+	35.4 (152)	55.6 (55)	55.2 (860)	38.2 (12,865)	49.9 (4,267)	48.4 (79,766)
Psychotropic Medication		63.9 (274)	70.7 (70)	67.2 (1,046)	47.1 (15,845)	48.2 (4,119)	38.3 (63,136)
Medication Non-Adherence <sup>f</sup>		3.5 (15)	1.0 (1)	2.5 (39)	3.3 (1,120)	0.8 (70)	1.1 (1,851)
<b>Neurological Conditions</b>							
Alzheimer's Disease & Dementia		NA	8.7 (8)	NA	NA	19.2 (1,553)	NA
Stroke		15.9 (68)	19.2 (19)	16.4 (256)	18.1 (6,079)	15.1 (1,288)	17.3 (28,470)
Head Trauma		0.9 (4)	0 (0)	1.4 (21)	1.1 (382)	1.1 (96)	0.8 (1,389)
Multiple Sclerosis		0 (0)	0 (0)	0.8 (12)	0.1 (43)	0.3 (21)	0.7 (1,185)
Parkinson's Disease		1.9 (8)	NA	NA	4.6 (1,553)	NA	NA
<b>Decline in Areas of Function</b>							
Communication		26.3 (113)	7.1 (7)	5.7 (89)	19.0 (6,390)	11.9 (1,020)	5.2 (8,502)
Vision		4.7 (20)	7.1 (7)	7.4 (115)	4.4 (1,485)	8.3 (709)	6.7 (10,986)
Mood		26.8 (115)	16.2 (16)	20.9 (325)	15.8 (5,303)	13.0 (1,109)	11.4 (18,783)
Behavioural Symptoms		24.5 (105)	12.1 (12)	6.8 (106)	14.8 (4,982)	5.0 (429)	3.1 (5,154)
ADL		43.6 (187)	50.5 (50)	41.1 (640)	46.5 (15,661)	53.8 (4,600)	45.3 (74,721)
Social Activities		8.9 (38)	10.1 (10)	14.4 (224)	6.9 (2,305)	11.8 (1,012)	12.2 (20,167)
Overall Deterioration		50.1 (215)	45.5 (45)	43.0 (669)	50.0 (16,802)	49.9 (4,265)	44.0 (72,588)

*Note:* CG = Caregiver, DRS = Depression Rating Scale, ADL = Activities of Daily Living, IADL = Instrumental Activities of Daily Living, CPS = Cognitive Performance Scale, CHESS = Changes in Health, End-stage disease and Signs and Symptoms

<sup>a</sup>0 = no indicators of depression; 1-2 = some indicators of depression; 3+ = indicators of probable depression

<sup>b</sup>0 = no impairment; 1-2 = some functional impairment; 3+ = severe functional impairment

<sup>c</sup>0 = no difficulty; 1-2 = some difficulty; 3+ = great difficulty

<sup>d</sup>0-1 = cognitively intact to borderline cognitive impairment; 2-3 = mild to moderate cognitive impairment; 4+ = cognitively impaired

<sup>e</sup>0 = no health instability; 1-2 = some health instability; 3+ = moderate to high health instability

<sup>f</sup>compliant less than 80% of time, including failure to purchase prescribed medications

In the correlations analysis, only two independent variables were not associated with the neurological conditions. Having a diagnosis of dementia was not correlated with being widowed or scores on the CHESS. Having a diagnosis of PD was not correlated with positive social relationships or scores on the CHESS. The remaining items in the correlation matrix were examined and none met the threshold for collinearity with the exception of married marital status and widowed marital status ( $r = .78, p < .0001$ ). The majority of study variables showed weak or small associations with a diagnosis of dementia or PD, although statistically significant. This may in part be accounted for by the very large sample size and its ability to detect smaller significant differences between study variables.

Table 6.4 shows the results for the final logistic regression model predicting intentional self-harm among older home care clients with a diagnosis of dementia. The variables with the strongest relationship to increase odds of intentional self-harm were younger age, being male, having a psychiatric diagnosis, and being in receipt of psychotropic medication. Specifically, the odds of self-harm were 4.37 times higher among older adults in the 60-74 year age group compared to older adults in the 85+ age group. The odds of self-harm were 1.68 times higher among older men than older women. Also, the odds of self-harm were 1.32 times higher among older adults with a concurrent psychiatric diagnosis compared to older adults without this diagnosis, and the odds of self-harm were 1.63 times higher among older adults in receipt of psychotropic medication compared to those without this medication. In addition to these main findings, the odds of intentional self-harm among older adults with a DRS score of 3+ (indicating probable depression) was 1.44 times higher compared to older adults with DRS scores of zero. Lastly, the odds of intentional self-harm among older adults with ADL hierarchy scores of 3+ (indicating severe functional impairment) were half of that of persons with no impairments in ADL functioning. Positive social relationships was a protective factor that had a significant relationship with intentional self-harm, with 39% lower odds of self-harm for

older adults with dementia with positive social relationships compared to no positive social relationships. There were no significant interaction effects between independent variables. A ROC analysis yielded a corresponding AUC of 0.73 suggesting that the model showed good sensitivity and specificity in predicting intentional self-harm among this sample of older home care clients with a diagnosis of dementia. Further, Hosmer and Lemeshow's Goodness-of-Fit statistics yielded a p-value of 0.28, indicating that the null hypothesis is not rejected and these data fit the model.

**Table 6.4. Multiple Logistic Regression Predicting Intentional Self Harm among Older Home Care Clients with a Dementia Diagnosis, Ontario 2007-2010 (N=33,666)**

Independent Variables	Parameter Estimate (SE)	Adjusted Odds Ratio (95% CL)	p value
<b>Sociodemographic</b>			
Age 60-74 <sup>i</sup>	1.47 (0.18)	4.37 (3.27-5.83)	<.0001
Age 75-84 <sup>i</sup>	0.64 (0.14)	1.90 (1.45-2.49)	<.0001
Sex (Male)	0.52 (0.10)	1.68 (1.37-2.06)	<.0001
Married <sup>ii</sup>	0.25 (0.11)	1.28 (1.04-1.58)	.02
<b>Clinical</b>			
Any Psychiatric Diagnosis	0.28 (0.12)	1.32 (1.04-1.69)	.02
Psychotropic Medications	0.49 (0.11)	1.63 (1.32-2.01)	<.0001
DRS score <sup>a,iii</sup> 1-2	0.32 (0.12)	1.38 (1.10-1.74)	.006
DRS score <sup>a,iii</sup> 3+	0.37 (0.13)	1.44 (1.11-1.87)	.006
ADL Hierarchy Scale score <sup>b,iv</sup> 1-2	-0.15 (0.11)	0.86 (0.70-1.06)	.16
ADL Hierarchy Scale score <sup>b,iv</sup> 3+	-0.71 (0.18)	0.49 (0.35-0.70)	<.0001
<b>Protective Factors</b>			
Positive Social Relationships	-0.49 (0.11)	0.61 (0.49-0.76)	<.0001
			AUC = 0.73
			Goodness of Fit $\chi^2 = 9.73, df = 8, p < 0.28$

Note: <sup>i</sup>Reference group: Age = 85+; <sup>ii</sup>Reference group: Other; <sup>iii</sup>Reference group: DRS = 0; <sup>iv</sup>Reference group: ADL = 0

<sup>a</sup>DRS = Depression Rating Scale; 0 = no indicators of depression; 1-2 = some indicators of depression; 3+ = indicators of probable depression

<sup>b</sup>ADL = Activities of Daily Living; 0 = no impairment; 1-2 = some functional impairment; 3+ = severe functional impairment

Table 6.5 shows the results for the final logistic regression model predicting intentional self-harm among older home care clients with a diagnosis of Parkinson's disease. The variables with the strongest relationship to increased odds of intentional self-harm were younger age and being isolated. Specifically, the odds of self-harm were 7.51 times higher among older adults with PD in the 60-74 year age group compared to older adults in the 85+ age group. The odds of self-harm were 2.63 times higher among older adults with PD that were isolated compared to older adults that were not isolated. In addition to these main findings, the odds of intentional self-harm was 1.87 times higher among older adults with PD with a concurrent psychiatric diagnosis compared to no diagnosis and 1.89 times higher among older adults with in receipt of psychotropic medication compared to those without this medication. There were no significant protective factors that emerged, nor were there significant interaction effects between independent variables. A ROC analysis yielded a corresponding AUC of 0.75 suggesting that the model showed good sensitivity and specificity in predicting intentional self-harm among this sample of older home care clients with a diagnosis of PD. Further, Hosmer and Lemeshow's Goodness-of-Fit statistics yielded a p-value of 0.28, indicating that the null hypothesis is not rejected and these data fit the model.

**Table 6.5. Multiple Logistic Regression Predicting Intentional Self Harm among Older Home Care Clients with Parkinson’s Disease, Ontario 2007-2010 (N=8,549)**

Independent Variables	Parameter Estimate (SE)	Adjusted Odds Ratio (95% CL)	p value
<b>Sociodemographic</b>			
Age 60-74 <sup>1</sup>	2.02 (0.47)	7.51 (2.98-18.9)	<.0001
Age 75-84 <sup>1</sup>	1.20 (0.48)	3.33 (1.31-8.45)	.01
<b>Clinical</b>			
Any Psychiatric Diagnosis	0.64 (0.23)	1.87 (1.19-2.94)	.007
Psychotropic Medication	0.64 (0.24)	1.89 (1.18-3.04)	.009
Isolated	0.97 (0.21)	2.63 (1.76-3.93)	<.0001
<b>Protective Factors</b>			
N/A			
			AUC = 0.75
			Goodness of Fit $\chi^2 = 9.75, df = 8, p < 0.28$

Note: <sup>1</sup>Reference group: Age = 85+

## 6.4 Discussion

This study based on provincial data covering the home care sector in Ontario provides evidence for risk and protective factors associated with intentional self-harm (ISH) among older adults with dementia diagnoses (including Alzheimer’s disease) and older adults with Parkinson’s disease. Several sociodemographic and clinical characteristics were examined for each neurological condition (NC), as well as regression models to predict risk and protective factors associated with ISH. The results of the study suggest that the two NC share some similarities; however, they are also two heterogeneous populations in terms of what places them at risk for suicide. The evidence suggests that a one-size-fits-all approach to suicide prevention is not appropriate for these NC, as their specific risk and protective factors need to be taken into consideration.

An important initial observation is the prevalence rate of ISH between the two NC. Both NC hold higher rates in the 60 to 74 year age group, yet higher rates for men were found in the dementia



group while higher rates for women were found in the PD group. This gender difference in rates of intentional self-harm was unexpected. The literature tends to support higher rates of suicide among older men (CCSMH, 2006; CDC, 2007; Krug, Dahlberg, Mercy, Zwi, & Lozano, 2002), yet among those with PD in this study, older women held higher rates than men. Sex differences in risk of PD have not been well established (Tanner & Goldman, 1996; Wooten, Curries, Bovbjerg, Lee, & Patrie, 2004) and previous studies of PD and suicide also show mixed gender results (Kostic et al., 2010; Mainio, Karvonen, Hakko, Särkioja, & Räsänen, 2009). As sex did not emerge in the adjusted regression model for older adults with PD (but did for AD) it does not appear to be as strong a component of their suicide risk profile.

The regions in Ontario with higher rates of intentional self-harm were South West CCAC for the dementia group and North West for the PD group. Geographically both regions are on the perimeter of the province which is also characterized by increased rural populations. This may in part be a reflection of the difficulty in accessing health services or mental health resources in these areas, as well as potential regional differences in service allocation and utilization. Future research using multi-level modeling would be a well suited approach to understanding the regional effects on person-level outcomes, such as the differences in suicide rates revealed in the current research.

Differences between the two NC were also observed in whether the older adults lived alone, experienced indicators of isolation, or report loneliness. Older adults with dementia and ISH were less likely to live alone, be isolated, or report loneliness compared to older adults with dementia and no experience of ISH. Persons with PD and ISH were similar to the rest of the general home care population with ISH in that they were more likely to live alone, have indicators of isolation, and report loneliness. The risk for suicide has shown to be higher among older adults with these indicators (Conwell, Van Orden & Caine, 2011; Dennis, Wakefield, Molloy et al., 2007; Perissinoto, Stijacic Cenzer, & Covinsky, 2012; Rurup, Deeg, Poppelaars, Kerkhof, & Onwuteaka-Philipsen, 2011; Rurup

et al., 2011; Wiktorsson, Runeson, Skoog, Ostling, & Waern, 2010), yet older adults with dementia and ISH did not show higher proportions of these risk factors. In the adjusted regression models, isolation was a significant risk factor for older adults with PD only, independent of living alone, loneliness and depressive symptoms. Being mindful of these aspects of social connectedness is recommended in home care assessments given the associations with negative outcomes such as suicide risk.

Similarities were noted between older adults with diagnoses of dementia and PD and ISH in that they were more likely to have a psychiatric diagnosis, be in receipt of psychotropic medications, exhibit depressive symptoms, experience less functional decline, and experience fewer positive social relationships than the older adults without ISH. In this sense, having the NC did not considerably change the clinical profile of older adults at risk for suicide from the profile outlined in the results of chapter 4 on the general home care population.

In terms of differences, older adults with dementia and ISH were unlike older adults with PD and ISH and the general home care population in terms of having a caregiver that lived with the client. More than two-thirds of older adults with dementia and ISH had caregivers available. This suggests that intentional self-harm among older adults with dementia occurred in spite of caregiver observation (and supervision) that has been suggested to offer protection against such events (Conwell, 1995). Caregivers of persons with dementia and PD and ISH were more likely to report indicators of distress compared to caregivers of clients without these experiences. The literature on caregiver distress among older adults with dementia has been well documented (Alzheimer's Association, 2012; Eters, Goodall, & Harrison, 2008); however, the compounded burden, stress and emotions that follow a suicide attempt in addition to caring for dementia symptoms have been less studied in caregiver research. McCabe, Firth and O'Connor (2009) found that caregivers of people with certain neurological conditions (i.e., motor neurone disease and Huntington's disease)

experienced higher levels of anxiety and depression and poorer quality of life than caregivers of other illness groups. Future research needs to explore this issue further for caregivers of older adults with NC and suicide-related behaviour, including ways in which these caregivers can be supported to reduce burnout and the potential for early entry into nursing homes.

The results of the regression analyses for the two NC showed similarities and differences in suicide risk and protective factors compared to the general home care population. Suicide-related behaviour in both NC were highly associated with younger age (i.e., in the 60 to 74 year age group), having a psychiatric diagnosis, and being in receipt of psychotropic medication. These results correspond to previous reports (Ayalon et al., 2007; Haw, Harwood, & Hawton, 2009; Mainio et al., 2009; Nazem et al., 2008) whereby the characteristics of suicide-related behaviour for older adults with dementia and PD were younger age, having a psychiatric disorder and having depression symptoms. The literature also supports that a diagnosis of these NC in the early stages of late-adulthood (e.g., 60-74 years) has an effect on suicide risk, given the poor prognosis of these progressive neurodegenerative illnesses and increased likelihood for concurrent depression symptoms during the course of the disease (Baller et al., 2010; Enache, Winblad, & Aarsland, 2011; Mainio et al., 2009; Qin, 2011). In the condition-specific regression models, results showed that risk factors for older adults with dementia were not as different from the general home care population (including the protective effects of positive social relationships) relative to the risk factors for older adult with PD. Sex demonstrated a larger and independent effect in the dementia regression model unlike the regression models for Parkinson's disease and general home care population, showing that being an older man with a dementia diagnosis was an independent suicide risk factor. The regression model for older adults with PD was the only model in this thesis that highlighted a higher risk of suicide for older adults that were isolated (2.63 times higher), over and above depression symptoms and a psychiatric diagnosis. The risk for suicide among isolated older adults has been described earlier;

however, its effect on risk among older adults with PD cannot be over stated. No protective factors emerged for older adults in this study with PD who experienced ISH indicating some challenges for suicide prevention initiatives. In sum, the combination of these risk factors from the predictive models among home care clients with these NC require close monitoring by home care professionals. Appropriate social interventions may facilitate suicide prevention strategies for these individuals.

This study is one of the first in Canada to utilize RAI-HC data in evidence of the risk and protective factors associated with intentional self-harm among older adults with dementia diagnoses (including Alzheimer's disease) and older adults with Parkinson's disease. The results of the study showed similarities and marked differences in what drives suicide risk for older adults with these conditions, suggesting that a one-size-fits-all approach to suicide prevention is not appropriate for older adults with these conditions. This study supports the need for tailoring suicide prevention practices in the home care sector.

## **7. GENERAL DISCUSSION AND SUMMARY**

The prevalence of suicide-related behaviour among the older community-residing Ontario home care client sample was low (1.01%) although certainly not trivial. Older adults receiving home care services represent a subpopulation with clinically complex health care needs but their mental health needs may be overlooked. Over one-third of older adults with suicide-related behaviour had a concurrent psychiatric diagnosis and over two-thirds were in receipt of psychotropic medication. The direct appraisal of suicide risk within Ontario's home care population is currently not a standardized component of the assessment process. Facilitated by linked data sets, this research describes suicide risk profiles for the Ontario home care population that have implications for practice and the development of appropriate suicide intervention strategies. Future research is required to determine whether these findings and implications are applicable beyond the province of Ontario.

### **7.1 Descriptive Comparison of Intentional Self-Harm among Older Home Care Clients**

This is the first comprehensive description of suicide-related behaviour among community-residing older adults receiving home care services in Ontario. Data linkages between the Ontario home care population and hospital administrative records showed that the prevalence of suicide-related behaviour was found to be similar to that observed in other Canadian studies (CIHI, 2010; Patrick et al., 2010). Compared to home care clients without the experience of intentional self-harm (ISH) during the study period, older adults with ISH were younger and male, with more psychiatric symptoms (e.g., depression, cognitive impairment), psycho-social risk factors (e.g., alcohol use, caregiver distress), and neurological conditions (e.g., dementia and Parkinson's disease). Differences were further observed between older men and women across risk factors, such as a higher proportion of daily pain among older women with ISH and a higher proportion of dementia diagnoses among

older men with ISH. These differences from the home care population without ISH highlight tangible areas needing exploration in an appraisal of suicide risk, as well as gender-specific considerations. The proportion of caregiver distress was higher among the ISH sample compared to the non-ISH sample which is consistent with other research (Ampalam, Gunturu, & Padma, 2012; MacKay & Packenham, 2012; Schulze & Rossler, 2005). Strategies for minimizing this distress should be taken into account to reduce the potential for burn-out and early entry into institutional care. As the RAI-HC was the basis for discovering these differences, home care professionals can use this information collected as part of regular practice in tailoring prevention plans for clients and caregivers.

## **7.2 Risk and Protective Factors Associated with Intentional Self-Harm among Older Home Care Clients**

The literature has established several risk and protective factors associated with suicide-related behaviour in later life, yet a gap exists in how these factors work in combination to either increase or mitigate risk. Unadjusted and adjusted regression models revealed several important characteristics that were predictive of an intentional self-harm event, some of which were gender-specific. Younger age, psychiatric diagnosis, and alcohol use and dependence were among the top predictors of risk factors, while positive social relationships was the only independent protective factor against suicide, after adjusting for the risk variables. Interaction effects showed that for older men, marriage was protective against suicide-related behaviour while widowhood was found to increase risk. The associations of adverse outcomes with marital status have been shown in previous research and have implications in the risk assessment of home care clients. The current study also revealed that cognitive impairment was associated with intentional self-harm and that older men with a diagnosis of dementia (including Alzheimer's disease) were 1.5 times more likely to experience

intentional self-harm than older women with the same diagnosis. Few studies exist that examine suicide-related behaviour among cognitively impaired older adults and often the data are retrieved through psychological autopsies with very small sample sizes. Cognitive impairment has been found to both increase risk and protect against suicide as insight into failing cognition decreases. This research found that cognitive impairment was a risk factor over and above established elements of risk, among a large representative population-level sample. The notion that cognitively impaired older adults are not at risk, or incapable of suicide-related behaviour is an assumption that can no longer be supported. Time-to-event analyses further supported these high risk profiles of older adults receiving home care services.

### **7.3 Suicide-Related Behaviour among Older Adults with Dementia and Parkinson's Disease**

The findings from this research provide much needed evidence to the risk and protective factors among older adults with dementia and Parkinson's disease using a large representative sample. Older adults with a dementia diagnosis receiving home care services showed risk and protective factors for suicide that were similar to the factors for the general home care population, with the exception of male gender which demonstrated a magnified risk for older men with a dementia diagnosis. The predictive model for older adults with Parkinson's disease was unique, with no evidence of protective factors and a clear risk for suicide that is tied to social isolation. These results highlight that although the two neurological conditions share some similarities in sociodemographic and clinical characteristics, they are also two heterogeneous populations in terms of what places them at risk for suicide. These results further suggest that a one-size-fits-all approach to suicide prevention is not appropriate for older adults with these conditions, as their specific risk and protective factors need to be tailored into suicide prevention strategies.

This work is one of the first Canadian and international studies to use the RAI-HC to examine older home care clients with experiences of suicide-related behaviour. This venture would not have been possible without the linkages between home care and hospital data sets. The evidence presented in this thesis define high risk groups of older adults and point to several areas that should be assessed by home care professionals to reduce suicide risk and keep older adults living safely in their home. Age, gender differences, and the risk and protective factors taken together depict a multi-dimensional profile of high risk older adults upon which mental health and suicide prevention strategies can be initiated. There is great potential at the policy level to use this evidence as the basis for a dialogue regarding aging and mental health in Ontario's home care sector.

#### **7.4 Considerations for Suicide Prevention Strategies in Ontario's Home Care Sector**

Home care plays a vital role in Ontario's evolving health care system and aging population with the mandate of helping individuals remain independent in their homes and community (CHCA, 2008). RAI-HC assessments are completed for all long stay home care clients expected to be on service for 60 days or more. As an established information tracking system in Ontario and other Canadian provinces, RAI-HC data can form the basis for understanding the characteristics of older adults at risk of suicide-related behaviour and facilitate the development of comprehensive suicide prevention strategies for these individuals.

The prevalence of suicide-related behaviour in Ontario's home care population was 1.01% between April 2007 and September 2010. This prevalence may appear low, although for a short observation period and for only one Canadian province, the prevalence is within range or slightly higher than previous Canadian research on hospitalizations for intentional self-harm among older adults (CIHI, 2010; Health Canada, 1994; Patrick et al., 2010). Regional prevalence rates showed some disparity in areas of the province where suicide-related hospital admissions were higher.



Although further examination is required, CCAC services responsible for these regions may be under-resourced and under-capacity to address the mental health needs of these clients. As the expected demand for home care services increases with the aging population and the rates of suicide are expected to increase as the baby boom generation reaches late adulthood (CCSMH, 2006; CHCA, 2008, Phillips, Robin, Nugent, & Idler, 2010), strategies to prevent suicide risk will be critical.

Evidence from this research demonstrated several areas for appraisal by home care professionals that could reduce the potential for suicide-related behaviour. Taken at a provincial or national level, this evidence could form the introduction of a suicide prevention initiative for the home care sector. In order to facilitate this initiative, changes to how RAI-HC data is utilized are warranted. The direct assessment of suicide risk in Ontario's home care population is currently not a standardized component of the RAI-HC instrument. The addition of a mental health supplement to the RAI-HC, similar to that which is available for the interRAI Community Health Assessment (CHA) is a change in home care practice and policy that is worth considering. The interRAI CHA is used in the assessment of persons living in a range of settings from the community to assisted living residences (interRAI.org). The mental health supplement (CHA MH) is based on five items and two outcome scales from the core CHA instrument and these items serve as specific triggers for mental health intervention and care planning. A similar mental health supplement could be created for the RAI-HC based on the profiles of the high risk older adults identified in this thesis research. This approach is favourable to changing items in the RAI-HC instrument that would increase its length to complete. A mental health supplement would only be triggered based on certain high risk characteristics or at the clinical discretion of the assessor. Further discussion and research regarding this suggestion is needed.

## **7.5 A Future Theoretical Framework for Suicide-Related Behaviour in Later Life**

The results of this research challenge the assumptions of the Interpersonal Theory of Suicide (IPTS, Joiner, 2005; Van Orden et al., 2010) as a theoretical framework for suicide in later life. An important consideration the IPTS fails to address pertains to the possible links between suicide risk and objective (e.g., ADL, physical symptoms) and subjective dimensions of burden. To date, the evidence originates from associations between subjective (not objective) burdensomeness and suicide risk in samples of healthy older adults and in samples of older adults with terminal illness (Wilson, Curran and McPherson, 2005). Self-reported measures of perceived burden have been shown to be significantly confounded by social desirability (O'Rourke et al., 1996). In other words, subjective measures of burden do not simply gauge perception, but instead the degree of burden one wishes to report. This represents a shift away from the assumptions of previous research on subjective reports of burden, and increases the rationale to concurrently measure objective burden in the context of suicide risk. A second challenge to the applicability of the IPTS in an older adult population is the difference between the perceptions of burdensomeness on the part of the older adult versus burden perceived by caregivers. A positive feature of the IPTS is that it accounts for "self-perceived burden" which has received less attention in the research literature. While this is important, the perception of burden by the caregiver cannot be discounted in the context of suicide risk. Burden is conceptually grounded within the caregiving context and the caregiver's perceptions of his or her care-recipient (O'Rourke et al., 1996). This thereby distinguishes burden as a systemic construct that may have reciprocal negative outcomes within the caregiving dyad. Given the factors that affect the well-being of caregivers and care-recipients alike (Iecovich, 2011; Kosberg, Kaufman, Burgio, Leeper, & Sun, 2007), a framework for conceptualizing suicide risk in later life should include both self-perceived burden and caregiver burden.

Thirdly, in previous validation studies of the IPTS with older adults, individuals that showed signs of cognitive impairment were excluded from the research (e.g., MMSE score less than 24; Cukrowicz et al., 2011; Jahn et al., 2011). This makes it difficult to determine the applicability of the existing IPTS model among the large population of older adults that are affected by cognitive impairment and memory decline. As noted above, cognitive impairment was a significant risk factor for suicide-related behaviour within the Ontario home care sample, even among individuals with equivalent MMSE scores of 7 to 5. As such, persons with cognitive impairment cannot be excluded from research if the goal is to further understand impaired cognition in the context of suicide risk.

Lastly, a factor relevant to later life that the existing IPTS fails to address is the difference in suicide risk for illnesses and circumstances that are stable versus those that are progressively worsening (e.g., stable vs. increasing functional impairment; marriage vs. transitions to widowhood). In the context of suicide risk, it is conceivable that persons anticipating functional decline, or are in transitional periods are at higher risk than persons with existing (i.e., stable) circumstances. Moreover, this conceptualization also affects perceived burdensomeness as the experience of burden (on both the caregiver and care-recipient) is both stable and anticipatory depending on the health state of the older adult. A framework to explain suicide in later life should consider the effects of these fluctuating states on suicide risk.

In sum, the current line of research using IPTS has provided limited insight into the prediction of suicide risk among frail older adults with multiple comorbidities. Additional research is required to extend the current evidence of the IPTS by adapting the theory's constructs to better fit the frail older adult population and develop a modified theory that accounts for risk and protective factors unique to the experiences in later life.

## 7.6 Strengths & Limitations

Using linked data sets for Ontario's home care population and hospital administrative data, this research provided the first comprehensive profile of older home care clients with experiences of suicide-related behaviour. Typically, suicide research among community-residing older adults has been limited by sample sizes and disparities in methodologies. Further, the outcome variable is often suicide ideation as a proxy for future suicide risk. This research is unique in that it examined community-residing older adults who engaged in suicide-related behaviour with a hospitalization to record their injuries. For aging research, this approach in study design may have an advantage as older adults are less likely to report or volunteer thoughts of suicide and minimize psychological distress (Barnow & Linden, 2000; Callahan, 2001; Waern, Beskow, Runeson, & Skoog, 1999), which would result in an underestimation. That is not to state, however, that hospital admissions for suicide-related behaviour are a full reflection of the prevalence in the aging population, as many suicides in later life are of high lethality that decrease the likelihood for hospital admission and recovery (Draper, 1996; Heisel & Duberstein, 2005) and a potential exists for misclassification of late-life suicide-related behaviours in hospital administrative data (Rhodes et al., 2002). Nonetheless, the instruments used in the collection of the data for this research are provincially mandated and subject to strict data quality checks. These circumstances are an assurance of the quality of the data and subsequent results, as well as its representativeness of the sample and reduced likelihood for selection biases.

The linkages between data sets and availability of dates to mark events, such as hospital admissions for self-harm, allowed for the prospective examination of suicide-related behaviour following an initial home care assessment. The nature of the data allowed for temporal associations to be drawn, as well as more robust analyses such as survival, or time to event analysis which increased the evidence for which risk and protective factors were affecting the hazard (or time to) a

hospitalization for suicide-related behaviour. The evidence from this research also contributes to the understanding of risk and protective factors for suicide in later life. The concurrent examination of risk and protective factors in the same predictive models has received less attention in late life suicide research. The RAI-HC instrument was paramount to filling this gap in the research given its comprehensive scope of the needs and strengths of home care clients that could be examined together. Arguably not as many protective factors are available in the RAI-HC that have been identified in suicide literature (e.g., religious service attendance, subjective indicators of meaning in life), yet this research still demonstrated which protective factors are important in the appraisal of suicide risk in the home care population (e.g., positive social relationships) that can be leveraged into interventions and tailored care plans.

Although the sample size was large to support the generalizability to Ontario's home care population, the results of this research may not apply to all older adults. Eligibility for home care services are determined based on the outcomes and items from the RAI-HC assessment (CHCA, 2008). This implies that the sample used in this research are already impaired in areas such as ADLs and/or IADLs which deems them entitled for services and part of the home care population. This in some respects limits the generalizability of the study findings to older adults outside the home care population with or without functional impairments. However, as the percentage of the Canadian population currently in receipt of home care services ranges from 1% to 5% (CHCA, 2008), the implications from this study may still apply to a large proportion of older adults in Canada receiving these services.

An additional consideration regarding the large sample size was the ability to detect very small effects. This may create difficulty in drawing clinical inferences when statistical significance is achieved for so many demographic and risk factors (Siontis & Ioannidis, 2011). This limitation was acknowledged by focusing the results and discussion sections on findings of substantiality.

## **7.7 Future Research**

This research adds to current knowledge in many ways, yet there are avenues to improve and continue its work. An initial first step would be to replicate this research with other provinces in Canada that use the RAI-HC instrument. With cross-national data, even stronger conclusions could be drawn regarding the nation's home care population and suicide risk. Evidence of this magnitude would further support a national strategy for suicide in later life and promote greater awareness of the mental health needs of the aging population. As the RAI-HC instrument is also used in jurisdictions outside of Canada (e.g., USA, Australia) international comparisons is an available possibility.

Variations in prevalence of suicide-related behaviour were observed across CCAC regions in Ontario. As mentioned above, these data are well suited to a multi-level model approach that would account for the regional effects on person-level outcomes. For simplicity and ease of interpretation, only one record per home care client and only one corresponding hospital record per client were examined. However, for a multi-level model analysis, multiple episodes of care would not be removed in order to account for between-subject (i.e., CCAC region) and within-subject (multiple RAI-HC assessments) correlations.

As noted above the addition of a mental health supplement to the RAI-HC, similar to that which is available for the interRAI CHA is a future research initiative worth exploring. Using the profiles of the high risk older adults identified in this thesis research a mental health supplement could be developed and pilot tested in collaboration with Ontario CCACs. Should the results of a pilot test be favorable and of practical value for the home care sector, greater dialogue could be initiated regarding the implementation of a mental health supplement in Ontario as part of the interRAI suite of assessment instruments.

This research did not examine service use and recommended treatments for the home care clients that experienced intentional self-harm. These data are available in the RAI-HC and their examination would be of interest to the home care sector in terms of accountability, available resources, ongoing training of care coordinators regarding aging and mental health, and quality of care for home care clients. Future research using this linked data set regarding service use and treatments will build on the evidence for a suicide prevention strategy in home care.

The Ontario hospital administration records (DAD, NACRS) identifies cases of intentional self-harm using ICD-10-CA codes X60 through X84. Other researchers, however, have used ICD-10 codes outside the 'X'-range to identify individuals with suicide-related behaviour such as lacerations at the wrist and/or forearm (codes S51.7-S51.71); poisoning by psychotropic agents (code T43); poisoning by other drugs (code T50.9); or asphyxiation (code T71) (Grafstein et al., 2008; Martens et al., 2010; Patrick et al., 2010). While this approach to suicide research introduces some ambiguity in whether the injury was self-inflicted, the under-reporting of suicide-related behaviour from unwanted stigma necessitates that researchers expand the standard definition of suicide-related behaviour particularly when using administrative records for research. The current research modeled the approaches of Fransoo and colleagues (2009) and Martens and colleagues (2010) in defining suicide-related behaviour by operationalizing intentional self-harm through ICD-10-CA codes X40-X42, X46-X47, and X60-X84. Future research may wish to reexamine whether this approach should be replicated in suicide research with older adults.

In summary, the current research has contributed new knowledge to the understanding of suicide risk among community residing home care clients in Ontario. Several areas were identified that defined a high risk group of older adults, and a mental health supplement to the RAI-HC was recommended to better assess their needs and care plans. Building upon this evidence base would

broaden the results at the national and possibly international level, and aid in the development of targeted suicide prevention strategies for the home care population.



## REFERENCES

- Adams-Fryatt, A. (2010). Acknowledging, recognizing, and treating depression in elderly long term care residents. *Annals of Long Term Care, 18*, 30-32.
- Ahoniemi, E., Pohjolainen, T., & Kautiainen, H. (2011). Survival after spinal cord injury in Finland. *Journal of Rehabilitation Medicine, 43*, 481-485.
- Ajdacic-Gross, V., Ring, M., Gadola, E., Lauber, C., Bopp, M., Gutzweiller, & Rossler, W. (2008). Suicide after bereavement: An overlooked problem. *Psychological Medicine, 38*, 673-676.
- Alanen, H. M., Finne-Soveri, H., Noro, A., & Leinonen, E. (2008). Use of antipsychotics in older home care patients in Finland. *Drugs & Aging, 25*, 335-342.
- Allen-Burge, R., Storandt, M., Kinscherf, D. A., & Rubin, E. H. (1994). Sex differences in the sensitivity of two self-report depression scales in older depressed inpatients. *Psychology and Aging, 9*, 443-445.
- Almeida, O. P., Draper, B., Snowdon, J., Lautenschlager, N. T., Pirkis, J., Byrne, G., Sim, M., Stocks, N., Flicker, L., & Pfaff, J. (2012). Factors associated with suicidal thoughts in a large community study of older adults. *British Journal of Psychiatry, 201*, 466-472.
- Alzheimer's Association. (2012). Alzheimer's disease facts and figures. *Alzheimer's & Dementia, 8*, 1-72.
- Anderson, R. L., Buckwalter, K. C., Buchanan, R. J., Maas, M. L., & Imhof, S. L. (2003). Validity and reliability of the minimum data set depression rating scale (MDSDRS) for older adults in nursing homes. *Age and Aging, 32*, 435-438.
- Ampalam, P., Gunturi, S., & Padma, V. (2012). A comparative study of caregiver burden in psychiatric illness and chronic medical illness. *Indian Journal of Psychiatry, 54*, 239-243.
- Armstrong, J. J., Stolee, P., Hirdes, J. P., & Poss, J. (2010). Examining three frailty conceptualizations in their ability to predict negative outcomes for home-care clients. *Age and Aging, 39*, 755-758.
- Armstrong, J. J., Zhu, M., Hirdes, J. P., & Stolee, P. (2012). K-means cluster analysis of rehabilitation service users in the home health care system of Ontario: Examining the heterogeneity of a complex geriatric problem. *Archives of Physical Medicine and Rehabilitation, 93*, 2198-2205.
- Awata, S., Seki, T., Koizumi, Y., Sato, S., Hozawa, A., Omori, K., Kuriyama, S., Arai, H., Nagatomi, R., Matsuoka, H., & Tsuju, I. (2005). Factors associated with suicidal ideation in an elderly urban Japanese population: A community-based cross-sectional study. *Psychiatry and Clinical Neurosciences, 59*, 327-336.

- Ayalon, L., Mackin, S., Arean, P., Chen, H., McDonel Herr, E. (2007). The role of cognitive functioning and distress in suicidal ideation in older adults. *Journal of the American Geriatrics Society*, *55*, 1090-1094.
- Baller, M., Boorsma, M., Frijters, D. H. M., van Marwijk, H. W. J., Nijpels, G., & van Hout, H. P. J. (2010). Depression in Dutch homes for the elderly: under-diagnosis in demented residents? *International Journal of Geriatric Psychiatry*, *25*, 712-718.
- Barnow, S., & Linden, M. (2000). Epidemiology and psychiatric morbidity of suicidal ideation among the elderly. *Crisis: The Journal of Crisis Intervention and Suicide Prevention*, *21*, 171-180.
- Barak, Y., & Aizenberg, D. (2002). Suicide amongst Alzheimer's disease patients: A 10-year survey. *Dementia and Geriatric Cognitive Disorders*, *14*, 101-103.
- Bartels, S. J., Coakely, E., Oxman, T. E., Constantino, G., Oslin, D., & Chen, H. (2002). Suicidal and death ideation in older primary care patients with depression, anxiety, and at-risk alcohol use. *American Journal of Geriatric Psychiatry*, *10*, 417-427.
- Baskak, B., Yolax-Yarpuz, A., Devrimci-Ozguven, H., Atbasoglu, C. (2010). The relationship of akathisia with psychiatric symptoms, suicidality and other movement disorders in patients on antipsychotic treatment. *Moropsikiyatri Arsivi*, *47*, 307-313.
- Bauer, M. N., Leenaars, A. A., Berman, A. L., Jobes, D. A., Dixon, J. F., & Bibb, J. L. (1997). Late adulthood suicide: A life-span analysis of suicide notes. *Archives of Suicide Research*, *3*, 91-108.
- Beautrais, A. (2002). A case control study of suicide and attempted suicide in older adults. *Suicide & Life Threatening Behavior*, *32*, 1-9.
- Beekman, A. T., Copeland, J. R., & Prince, M. J. (1999). Review of community prevalence of depression in later life. *British Journal of Psychiatry*, *174*, 307-311.
- Beck, A. T., Brown, G., Berchick, R. J., Stewart, B. L., & Steer, R. A. (1990). Relationship between hopelessness and ultimate suicide: A replication with psychiatric outpatients. *American Journal of Psychiatry*, *147*, 190-195.
- Beck, A. T., Steer, R. A., Kovacs, M., & Garrison, B. (1985). Hopelessness and eventual suicide: A 10-year prospective study of patients hospitalized with suicide ideation. *American Journal of Psychiatry*, *142*, 559-563.
- Bellini, M., De Ronchi, D., Forti, P., Maioli, F., Ravaglia, G. (1998). Suicidal thoughts and dementia. *Archive of Gerontology and Geriatrics*, *6*, 33-38.
- Bergman, L. T., Barak, Y., Sigler, M., & Aizenberg, D. (2011). Suicide attempts and burden of physical illness among depressed elderly inpatients. *Archives of Gerontology and Geriatrics*, *52*, 115-117.

- Berman, A. L. (2009). Depression and suicide. In I. H. Gotlib & C. L. Hammen (Eds.), *Handbook of depression. Second edition.* (pp. 510-530). New York, NY: The Guilford Press.
- Berman, M. E., & Walley, J. C. (2003). Imitation of self-aggressive behavior: An experimental test of the contagion hypothesis. *Journal of Applied Social Psychology, 33*, 1036–1057.
- Bennett, K. M., Smith, P. T., & Hughes, G. M. (2005). Coping, depressive feelings and gender differences in late life widowhood. *Aging & Mental Health, 9*, 348-353.
- Biermann, T., Sperling, W., Bleich, S., Kornhuber, J., & Reulbach, U. (2008). Particularities of suicide in the elderly. A population-based study. *Aging Clinical and Experimental Research, 21*, 470-474.
- Blazer, D. G., & Hybels, C. F. (2009). Depression in later life. Epidemiology, assessment, impact, and treatment. In I. H. Gotlib & C. L. Hammen (Eds.), *Handbook of depression. Second edition.* (pp. 492-509). New York, NY: The Guilford Press.
- Brommelhoff, J. A., Gatz, M., Johansson, B., McArdle, J. J., Fratiglioni, L., & Pedersen, N. L. (2009). Depression as a risk factor of prodromal feature for dementia? Findings in a population-based sample of Swedish twins. *Psychology & Aging, 24*, 373-384.
- Brown, L. M., Bongar, B., & Cleary, K. M. (2004). A profile of psychologists' views of critical risk factors for completed suicide in older adults. *Professional Psychology: Research and Practice, 35*, 90-96.
- Burrows, A. B., Morris, J. N., Simon, S. E., Hirdes, J. P., & Phillips, C. (2000). Development of a Minimum Data Set-based depression rating scale for use in nursing homes. *Age and Ageing, 29*, 165-172.
- Büla, C. J., & Wietlisbach, V. (2009). Use of the Cognitive Performance Scale (CPS) to detect cognitive impairment in acute care settings: concurrent and predictive validity. *Brain Research Bulletin, 80*, 179-178.
- Byers, A. L., Arean, P. A. & Yaffe, K. (2012). Low use of mental health services among older Americans with mood and anxiety disorders. *Psychiatric Services, 63*, 66-72.
- Byrne, G. J. A., & Raphael, B. (1999). Depressive symptoms and depressive episodes in recently widowed older men. *International Psychogeriatrics, 11*, 67-74.
- Cairney, J., Corna, L. M., & Streiner, D. L. (2010). Mental health care use in later life: Results from a national survey of Canadians. *The Canadian Journal of Psychiatry, 55*, 157-164.
- Callahan, C. M. (2001). Quality improvement research on late life depression in primary care. *Medical Care, 39*, 772–784.
- Callahan, C. M. & Berrios, G. E. (2005). Reinventing depression. A history of the treatment of depression in primary care, 1940-2004. New York NY: Oxford University Press.

- Canadian Coalition for Seniors Mental Health [CCSMH] (2006). The assessment and treatment of depression. *National Guidelines for Seniors Mental Health*. Toronto, ON: Baycrest.
- Canadian Home Care Association. (2008). *Portraits of Home Care in Canada*. Ottawa, ON: Author
- Canadian Institute for Health Information. (2011). Discharge Abstract Database (DAD) Metadata. Available at [http://www.cihi.ca/CIHI-ext-portal/internet/en/document/types+of+care/hospital+care/acute+care/dad\\_metadata](http://www.cihi.ca/CIHI-ext-portal/internet/en/document/types+of+care/hospital+care/acute+care/dad_metadata).
- Canadian Institute for Health Information. (2012). Home Care Reporting System (HRCS). Available at [http://www.cihi.ca/CIHI-ext-portal/internet/en/document/types+of+care/community+care/home+care/hcrs\\_metadata](http://www.cihi.ca/CIHI-ext-portal/internet/en/document/types+of+care/community+care/home+care/hcrs_metadata).
- Canadian Institute for Health Information. (2012). Seniors' use of emergency departments in Ontario, 2004-2005 to 2008-2009. Ottawa, ON: CIHI.
- Canadian Institute for Health Information (CIHI). (2004). National trauma registry analytic bulletin: Hospitalizations due to suicide attempts and self-inflicted injury in Canada, 2001-2002. Toronto (ON): CIHI.
- Canetto, S. S. (1992). Gender and suicide in the elderly. *Suicide and Life-Threatening Behaviour*, 22, 80-97.
- Carpenter, I., Gambassi, G., Topinkova, E., Schroll, M., Finne-Soveri, H., Genrard, J. -C., Garms-Homolova, V., Jonsson, P., Frijters, D., Ljunggren, G., Sorbye, L. W., Wagner, C., Onder, G., Pedone, C., & Bernabei, R. (2004). Community care in Europe. The Aged in Home Care project (AdHOC). *Aging – Clinical and Experimental Research*, 16, 259-269.
- Centers for Disease Control and Prevention [CDC] (2007). Nonfatal self-inflicted injuries among adults aged > or =65 years-United States, 2005. *Morbidity and Mortality Weekly Reports*, 56, 989-993.
- Centers for Disease Control and Prevention [CDC] (2007). Web-based Injury Statistics Query and Reporting System (WISQARS) [Online]. National Center for Injury Prevention and Control, CDC (producer). Available from [www.cdc.gov/injury/wisqars/index.html](http://www.cdc.gov/injury/wisqars/index.html).
- Clarke, D., E., Colantonio, A., Heslegrave, R., Rhodes, A., Links, P., & Conn, D. (2004). Holocaust experience and suicidal ideation in high-risk older adults. *American Journal of Geriatric Psychiatry*, 12, 65-74.
- Cole, S., & Raju, M. (1996). Making the diagnosis of depression in the primary care setting. *The American Journal of Medicine*, 101, 10-17.
- Collister, B., Stein, G., Katz, D., DeBruyn, J., Andrusiw, L., & Cloutier, S. (2012). Service guidelines based on resource utilization groups version III for home care provide decision-making support for case managers. *Healthcare Quarterly*, 15, 75-81.

- Conwell, Y. (1995). Suicide among elderly persons. *Psychiatric Services, 46*, 563-564.
- Conwell, Y., & Brent, D. (1995). Suicide and aging: patters of psychiatric diagnosis. *International Psychogeriatrics, 7*, 149-164.
- Conwell, Y., Duberstein, P. R., Cox, C., Herrmann, J., Forbes, N., & Caine, E. D. (1998). Age differences in behaviors leading to completed suicide. *American Journal of Geriatric Psychiatry, 6*, 122-126.
- Conwell, Y., Lyness, J. M., Duberstein, P., Cox, C., Seidlitz, L., DiGiorgio, A., Caine, E. (2000). Completed suicide among older patients in primary care practices: a controlled study. *Journal of the American Geriatrics Society, 48*, 23-29.
- Conwell, Y., Pearson, J., & DeRenzo, E. G. (1996). Indirect self-destructive behaviour among elderly patients in nursing homes: A research agenda. *American Journal of Geriatric Psychiatry, 4*, 152-163.
- Conwell, Y., Rotenberg, M., & Caine, E. (1990). Completed suicide at age 50 and over. *Journal of the American Geriatrics Society, 38*, 640-644.
- Conwell, Y., & Thompson, C. (2008). Suicidal behaviour in elders. *Psychiatric Clinics of North America, 31*, 333-356.
- Conwell, Y., Van Orden, K., Caine, E. (2011). Suicide in older adults. *Psychiatric Clinics of North America, 34*, 451-468.
- Cook., R. J., Berg, K., Lee, K. A., Poss, J. W., Hirdes, J. P., & Stolee, P. (2013). Rehabilitation in home care is associated with functional improvement and preferred discharge. *Archives of Physical Medicine and Rehabilitation, 2*, doi: 10.1016/j.apmr.2012.12.024.
- Coren, S. & Hewitt, P. L. (1999). Sex differences in elderly suicide rates: Some predictive factors. *Aging & Mental Health, 3*, 112-119.
- Corna, L. M., Cairney, J., & Streiner, D. L. (2010). Suicide ideation in older adults: Relationship to mental health problems and service use. *Gerontologist, 50*, 785-797.
- Cornette, M. M., Abramson, L. Y., & Bardone, A. M. (2000). Toward an integrated theory of suicidal behaviours: Merging the hopelessness, self-discrepancy, and escape theories. In T. Joiner and M. D. Rudd (Eds.), *Suicide Science: Expanding the Boundaries*, (pp 43-65), Norwell, MA: Kluwer Academic Publishers.
- Cousineau, N., McDowell, I., Hotz, S., Hebert, P. (2003). Measuring chronic patients' feelings of being a burden to their caregivers: development and preliminary validation of a scale. *Medical Care, 41*, 110-118.
- Cukrowicz, K., Cheavens, J., Van Orden, K., Tagain, M., & Cook, R. (2011). received burdensomeness and suicide ideation in older adults. *Psychology and Aging, 26*, 331-338.

- Dalby, D. M., Hirdes, J. P., Hogan, D. B., Patten, S. B., Beck, C. A., Rabinowitz, T., & Maxwell, C. J. (2008). Potentially inappropriate management of depressive symptoms among Ontario home care clients. *International Journal of Geriatric Psychiatry, 23*, 650-659.
- DeCatanzaro, D. (1995). Reproductive status, family interactions, and suicidal ideation: Surveys of the general public and high-risk groups. *Ethology & Sociobiology, 16*, 385-394.
- De Leo, D. & Spathonis, K. (2004). Suicide and suicide behaviour in late-life. In D. De Leo, U. Bille-Brahe, A. Kerkhof, & A. Schmidtke (Eds.), *Suicidal Behaviour: Theories and Research Findings* (pp. 253-286). Göttingen, Germany: Hogrefe & Huber Publishers.
- Deisenhammer, E. A., Huber, M., Kemmler, G., Weiss, E. M., & Hinterhuber, H. (2007). Suicide victims' contacts with physicians during the year before death. *European Archives of Psychiatry and Clinical Neuroscience, 257*, 480-485.
- Dennis, M., Molloy, C., Andrews, H., & Friedman, T. (2005). Self-harm in older people with depression. *British Journal of Psychiatry, 186*, 538-539.
- Dennis, M. S., Wakefield, P., Molloy, C., Andrews, H., & Friedman, T. (2007). A study of self-harm in older people: Mental disorder, social factors and motives. *Aging & Mental Health, 11*, 520-525.
- Dramé, M., Lang, P., Jolly, D., Narbey, D., Mahmoudi, R., & Lanièce, I. (2012). Nursing home admission in elderly subjects with dementia: Predictive factors and future challenges. *Journal of the American Medical Directors Association, 13*, 83.e17-83.e20.
- Draper, B. (1996). Attempted suicide in old age. *International Journal of Geriatric Psychiatry, 11*, 577-587.
- Draper, B., Moore, C., & Brodaty, H. (1998). Suicidal ideation and the "wish to die" in dementia: the role of depression. *Age and Ageing, 27*, 503-507.
- Duckworth, G. & McBride, H. (1996). Suicide in old age: a tragedy of neglect. *Canadian Journal of Psychiatry, 41*, 217-222.
- Edelstein, B. A., Heisel, M. J., McKee, D. R., Martin, R. R., Koven, L. P., Duberstein, P. R., & Britton, P. C. (2009). Development and psychometric evaluation of the reasons for living-older adults scale: A suicide risk assessment inventory. *The Gerontologist, 49*, 736-745.
- Enache, D., Winblad, B., & Aarsland, D. (2011). Depression in dementia: Epidemiology, mechanisms, and treatment. *Current Opinion in Psychiatry, 24*, 461-472.
- Erlangsen, A., Jeune, B., Bille-Brahe, U., & Vaupel, J. W. (2004). Loss of partner and suicide risks among oldest old: a population-based register study. *Age and Ageing, 33*, 378-383.

- Etters, L., Goodall, D., & Harrison, B. E. (2008). Caregiver burden among dementia patient caregivers: A review of the literature. *Journal of the American Academy of Nurse Practitioners, 20*, 423-428.
- Faison, K. J., Faria, S. H., Frank, D. (1999). Caregivers of chronically ill elderly: Perceived burden. *Journal of Community Health Nursing, 16*, 243-253.
- Fischer, C. S., & Phillips, S. L. (1982). Who is alone? Social characteristics of people with small networks. In L. A. Peplau & D Perlman (Eds.), *Loneliness: A sourcebook of current theory, research, and therapy*. New York: Wiley Interscience.
- Fischer, L. R., Wei, F., Solberg, L. I., Rush, W. A., & Heinrich, R. L. (2003). Treatment of elderly and other adult patients for depression in primary care. *Journal of American Geriatrics Society, 51*, 1554-1562.
- Fishbain, D. A. (1996). Current research on chronic pain and suicide. *American Journal of Public Health, 86*, 1320.
- Forbes, D., Montague, P., Gibson, M., Hirdes, J. & Clarke, K. (2011). Social support deficiency in home care clients. *Gerontological Nursing Association Perspectives, 34*, 5-17.
- Förstl, H. (2008). The will to live instead of euthanasia. Neurodegenerative diseases as seen by the sufferers themselves. *Deutsches Arzteblatt International, 105*, 395-396.
- Fransoo, R., Martens, P., Burland, E., The Need to Know Team., Prior, H., & Burchill, C. (2009). *Manitoba RHA Indicators Atlas 2009*. Winnipeg, MB: Manitoba Centre for Health Policy.
- Gaymu, J., & Springer, S. (2010). Living conditions and life satisfaction of older Europeans living alone: A gender and cross-country analysis. *Aging and Society, 30*, 1153-1175.
- Glass, J. K., & Reed, S. E. (1993). To live or die: A look at elderly suicide. *Educational Gerontology, 19*, 767-778.
- Goldblatt, M. J. (2000). Physical illness and suicide. In R. Maris, A. Berman, & M. Silverman (Eds.), *Comprehensive textbook of suicidology* (pp. 342-356). New York: The Guilford Press.
- Grafstein, E., Bullard, M. J., Warren, D., Unger, B., CTAS Working Group. (2008). Revision of the Canadian Emergency Department Information System (CEDIS) presenting complaint list version 1.1. *Canadian Journal of Emergency Medicine, 10*, 151-161.
- Gray, L. C., Berg, K., Fries, B. E., Henrard, J-C., Hirdes, J. P., Steel, K., & Morris, J. N. (2009). Sharing clinical information across care settings: The birth of an integrated assessment system. *BMC Health Services Research, 9*, 71.1-71.10.
- Grol, R., & Grimshaw, J. (2003). From best evidence to best practice: effective implementation of changes in patients' care. *The Lancet, 362*, 1225-1230.

- Gruber-Baldini, A. L., Zimmerman, S. I., Mortimore, E., Magaziner, J. (2000). The validity of the minimum data set in measuring the cognitive impairment of persons admitted to nursing homes. *Journal of the American Geriatrics Society*, 48, 1601-1606.
- Grue, E. V., Finne-Soveri, H., Stolee, P., Poss, J., Sørbye, L. W., Noro, A., Hirdes, J. P., & Ranhoff, A. H. (2010). Recent visual decline-a health hazard with consequences for social life: A study of home care clients in 12 countries. *Current Gerontology & Geriatrics Research*, doi: 10.1155/2010/503817.
- Gubrium, J. F. (1974). Marital desolation and the evaluation of everyday life in old age. *Journal of Marriage and the Family*, 36, 107-113.
- Haight, B. K. (1995). Suicide risk in frail elderly people relocated to nursing homes. *Geriatric Nursing*, 16, 104-107.
- Hansebo, G., Kihlgren, M., Ljunggren, G., & Winblad, B. (1998). Staff views on the Resident Assessment Instrument, RAI/MDS, in nursing homes, and the use of the Cognitive Performance Scale, CPS, in different levels of care in Stockholm, Sweden. *Journal of Advanced Nursing*, 28, 642-653.
- Hansen, P. E. B., Wang, A. G., Stage, K. B., & Kragh-Sorensen, P. (2003). Comorbid personality disorder predicts suicide after major depression: A 10-year follow up. *Acta Psychiatrica Scandinavica*, 107, 436-440.
- Hartmaier, S. L., Sloane, P. D., Guess, H. A., Koch, G. C. (1994). The MDS Cognition Scale: A valid instrument for identifying and staging nursing home residents with dementia using the minimum data set. *Journal of the American Geriatrics Society*, 42, 1173-1179.
- Hartmaier, S. L., Sloane, P. D., Guess, H. A., Koch, G. C., Mitchell, C. M., & Phillips, C. D. (1995). Validation of the Minimum Data Set Cognitive Performance Scale: agreement with the Mini-Mental State Examination. *Journals of Gerontology. Series A, Biological Sciences and Medical Sciences*, 50, M128-M133.
- Haw, C., Harwood, D., Hawton, K. (2009). Dementia and suicidal behaviour: A review of the literature. *International Psychogeriatrics*, 21, 440-453.
- Hawes, C., Fries, B. E., James, M. L., & Guihan, M. (2007). Prospects and pitfalls: Use of the RAI-HC assessment by the Department of Veterans Affairs for home care clients. *Gerontologist*, 47, 378-387.
- Hawgood, J., & De Leo, D. (2008). Anxiety disorders and suicidal behaviour: An update. *Current Opinion in Psychiatry*, 21, 51-64.
- Health Canada. (1994). *Suicide in Canada: Update of the report of the task force on suicide in Canada*. Ottawa, ON: Minister of National Health and Welfare.



- Health Canada. (2002). *A report on mental illness in Canada*. Ottawa, ON: Health Canada Editorial Board Mental Illness in Canada.
- Heisel, M. J. (2006). Suicide and its prevention among older adults. *Canadian Journal of Psychiatry, 51*, 143-154.
- Heisel, M. J., & Duberstein, P. (2005). Suicide prevention in older adults. *Clinical Psychology: Science and Practice, 12*, 242-259.
- Heisel, M. J., & Flett, G. L. (2008). Psychological resilience to suicide ideation among older adults. *Clinical Gerontologist, 31*, 51-70.
- Heisel, M. J., Grek, A., Moore, S. L., Jackson, F., Vincent, G., Malach, F. M., & Mokry, J. (2006). National guidelines for seniors' mental health: The assessment of suicide risk and prevention of suicide. *The Canadian Journal of Geriatrics, 9*, S65-S71.
- Hill, R., Gallagher, D., & Thompson, L., & Ishida, T. (1988). Hopelessness as a measure of suicidal intent in the depressed elderly. *Psychology and Aging, 3*, 230-232.
- Hinkley, B. D., & Jaremko, M. E. (1994). Effects of pain duration on psychosocial adjustment in orthopedic patients: The importance of early diagnosis and treatment of pain. *Journal of Pain Symptom Management, 9*, 175-185.
- Hirdes, J. P., Fries, B. E., Morris, J. N., Steel, K., Mor, V., Frijters, D. H., LaBine, S., Schalm, C., Stones, M. J., Teare, G., Smith, T., Marhaba, M., Perez, E., & Jónsson, P. (1999). Integrated health information systems based on the RAI/MDS series of instruments. *Healthcare Management Forum, 12*, 30-40.
- Hirdes, J. P., Frijters, D. H., & Teare, G. F. (2003). The MDS-CHESS Scale: A new measure to predict mortality in institutionalized older people. *Journal of the American Geriatrics Society, 51*, 96-100.
- Hirdes, J. P., Ljunggren, G., Morris, J. N., Frijters, D. H., Finne-Soveri, H., Gray, L., Björkgren, M., & Gilgen, R. (2008). Reliability of the interRAI suite of assessment instruments: A 12-country study of an integrated health information system. *BMC Health Services Research, 8*, 277.
- Hirdes, J. P., Mitchell, L., Maxwell, C., & White, N. (2011). Beyond the 'iron lungs of gerontology': using evidence to shape the future of nursing homes in Canada. *Canadian Journal of Aging, 30*, 371-390.
- Hirdes, J. P., Smith, T. F., Rabinowitz, T., Yamauchi, K., Pérez, E., Telegdi, N. C., Prendergast, P., Morris, J. N., Ikegami, N., Phillips, C. D., & Fries, B. E. (2002). The Resident Assessment Instrument-Mental Health (RAI-MH): Inter-rater reliability and convergent validity. *Journal of Behavioural Health Services and Research, 29*, 419-432.

- Ho, T. P., Yip, P. S. F., Chiu, C. W., Halliday, P. (1998). Suicide notes: what do they tell us? *Acta Psychiatrica Scandinavica*, 98, 467-473.
- Inoue, K. (2009). Significant correlation of the change in the divorce rate with the suicide rate in Japan from 1992 to 2004. *American Journal of Forensic Medicine & Pathology*, 30, 311-318.
- Inoue, K., Fukunaga, T., & Okazaki, Y. (2012). Study of an economic issue as a possible indicator of suicide risk: A discussion of stock prices and suicide. *Journal of Forensic Sciences*, 57, 783-785.
- Iecovich, E., (2011) Quality of relationships between care recipients and their primary caregivers and its effect on caregivers' burden and satisfaction in Israel. *Journal of Gerontological Social Work*, 54, 570-591.
- Jahn, D., Cukrowicz, K., Linton, K., & Prabhu, F. (2011). The mediating effect of perceived burdensomeness on the relation between depressive symptoms and suicide ideation in a community sample of older adults. *Aging & Mental Health*, 15, 214-220.
- Joiner, T. (2005). *Why people die by suicide*. Cambridge, MA: Harvard University Press.
- Joiner, T. E., Pettit, J. W., Walker, R. L., Voelz, Z. R., Cruz, J., Rudd, M. D., et al. (2002). Perceived burdensomeness and suicidality: Two studies on the suicide notes of those attempting and those completing suicide. *Journal of Social and Clinical Psychology*, 21, 531-545.
- Joiner, T. E., Van Orden, K., Witte, T., Selby, E. Tibeiro, J., Lewis, R., et al. (2009). Main predictions of the interpersonal-psychological theory of suicidal behaviour: Empirical tests in two samples of young adults. *Journal of Abnormal Psychology*, 118, 634-646.
- Jones, K., Perlman, C. M., Hirdes, J. P., & Scott, T. (2010). Screening cognitive performance with the Resident Assessment Instrument for Mental Health Cognitive Performance Scale. *Canadian Journal of Psychiatry*, 55, 736-740.
- Jones, R. N., Marcantonio, E. R., & Rabinowitz, T. (2003). Prevalence and correlates of recognized depression in U. S. nursing homes. *Journal of the American Geriatrics Society*, 51, 1404-1409.
- Jones, D. A., Victor, C. R., & Vetter, N. J. (1985). The problem of loneliness in the elderly in the community: characteristics of those who are lonely and the factors related to loneliness. *Journal of the Royal College of General Practitioners*, 35, 136-139.
- Jónsson, P. V., Guðmundsdóttir, H., Friðbjörnsdóttir, F., Haraldsdóttir, M., Olafsdóttir, T., Jensdóttir, A. B., Hjaltadóttir, I., Harðarson, O., & Pálsson, H. (2003). Health care needs and quality of life of elderly in home care in Reykjavik, 1997. *Laeknabladid*, 89, 313-318.
- June, K. J., Lee, J. Y., & Yoon, J. L. (2009). Effects of case management using Resident Assessment Instrument-Home Care (RAI-HC) in home health services for older people. *Journal of Korean Academic Nursing*, 39, 366-375.

- Juurlink, D. N., Herrmann, N., Szalai, J. P., Kopp, A., & Redelmeier, D. A. (2004). Medical illness and the risk of suicide in the elderly. *Archives of Internal Medicine*, *164*, 1179-1183.
- Keefe, J. (2011). *Supporting Caregivers and Caregiving in an Aging Canada*. IRPP Study 23. Montreal: Institute for Research on Public Policy.
- Kennedy, G., Metz, H., & Lowinger, R. (1996). Epidemiology and inferences regarding etiology of late-life suicide. In G. J. Kennedy (Ed.), *Suicide and depression in late life. Critical issues in treatment, research, and public policy*. (pp. 3-22). New York, NY: John Wiley & Sons, Inc.
- Kessler, R. C., Borges, G., & Walters, E. E. (1999). Prevalence of and risk factors for suicide attempts in the national comorbidity survey. *Archives of General Psychiatry*, *56*, 617-626.
- Ketelaar, M., Russell, D. J., & Gorter, J. W. (2008). The challenge of moving evidence-based measures into clinical practice: lessons in knowledge translation. *Physical and Occupational Therapy in Pediatrics*, *28*, 191-206.
- Kjolseth, I., Ekeberg, O., Steilhaug, S. (2010). Why suicide? Elderly people who committed suicide and their experience of life in the period before their death. *International Psychogeriatrics*, *21*, 209-218.
- Koehler, M., Rabinowitz, T., Hirdes, J., Stones, M., Carpenter, G. I., Fries, B. E., Morris, J. N., & Jones, R. (2005). Measuring depression in nursing home residents with the MDS and GDS: An observational psychometric study. *BMC Geriatrics*, *5*, doi: 10.1186/1471-2318-5-1.
- Kosberg, J. I., Kaufman, A. V., Burgio, L. D., Leeper, J. D., & Sun, F. (2007). Family caregiving to those with dementia in rural Alabama: Racial similarities and differences. *Journal of Aging and Health*, *19*(1), 3-21.
- Kostic, V. S., Pekmezovic, T., Tomic, A., Jecmenica-Lukic, M., Stojkovic, T., Spica, V., Scetel M., Stefanova, E., et al. (2010). Suicide and suicidal ideation in Parkinson's Disease. *Journal of the Neurological Sciences*, *289*, 40-43.
- Koven, L. P., Edelstein, B., & Charlton, A. S. (2001). *Reasons for living across the lifespan*. Poster presented at meeting of the Gerontological Society of America, Chicago.
- Kposowa, A. J. (2000). Marital status and suicide in the National Longitudinal Mortality Study. *Journal of Epidemiology and Community Health*, *54*, 254-261.
- Kreitman, N. (1988). Suicide, age and marital status. *Psychological Medicine*, *18*, 121-128.
- Krug, E. G., Dahlberg, L. L., Mercy, J. A., Zwi, A., & Lozano, R. (2002). *World report on violence and health*. Geneva: World Health Organization. Available from [http://www.who.int/violence\\_injury\\_prevention/violence/world\\_report/en/](http://www.who.int/violence_injury_prevention/violence/world_report/en/).
- Kummer, A., Cardoso, F., & Teixeira, A. L. (2009). Suicidal ideation in Parkinson's Disease. *CNS Spectrums*, *14*, 431-436.

- Landi, F., Tua, E., Onder, G., Carrara, B., Sgadari, A., Rinaldi, C., Gambassi, G., Lattanzio, F., & Bernabei, R. (2000). Minimum data set for home care: a valid instrument to assess frail older people living in the community. *Medical Care*, *38*, 1184-1190.
- Landi, F., Onder, G., Carpenter, I., Cesari, M., Soldato, M., & Bernabei, R. (2007). Physical activity prevented functional decline among frail community-living elderly subjects in an international observational study. *Journal of Clinical Epidemiology*, *60*, 518-524.
- Lapierre, S., Boyer, R., Desjardins, S., Dubé, M., Lorrain, D., Préville, M., & Brassard, J. (2012). Daily hassles, physical illness, and sleep problems in older adults with wishes to die. *International Psychogeriatrics*, *24*, 243-252.
- Latham, A. E., & Prigerson, H. G. (2004). Suicidality and bereavement: Complicated grief as psychiatric disorder presenting greatest risk for suicidality. *Suicide and Life-Threatening Behaviour*, *34*, 350-362.
- Leach, M. M. (2006). Cultural diversity and suicide: Ethnic, religious, gender, and sexual orientation perspectives. New York, NY: Haworth Press.
- Lee, G. R., & DeMaris, A. (2007). Widowhood, gender, and depression. A longitudinal analysis. *Research on Aging*, *29*, 56-72.
- Lee, G. R., DeMaris, A., Bavin, S., & Sullivan, R. (2001). Gender differences in the depressive effect of widowhood in later life. *Journal of Gerontology Social Sciences*, *56B*, S56-S61.
- Leenaars, A. (1992). Suicide notes of the older adult. *Suicide and Life-Threatening Behavior*, *22*, 62-79.
- Leenaars, A. (1994). Suicide across the life span with particular reference to the elderly. In D. Lester & M. Tallmer (Eds.), *Now I lay me down, Suicide in the elderly* (pp. 31-42). Philadelphia, PA: The Charles Press, Publishers, Inc.
- Leenaars, A. (1999). Domestic integration and suicide in the province. *Crisis*, *20*, 59-62.
- Leenaars, A. (2003). Can a theory of suicide predict all "suicides" in the elderly? *Crisis*, *24*, 7-16.
- Lester, D., Wood, P., Williams, C., Haines, J. (2004). Motives for suicide- a study of Australian suicide notes. *Crisis*, *25*, 33-34.
- Li, L. W., & Conwell, Y. (2010). Pain and self-injury ideation in elderly men and women receiving home care. *Journal of the American Geriatric Society*, *58*, 2160-2165.
- Liew, H. P. (2011). Trajectories of alcohol consumption among the elderly widowed population: A semi-parametric, group-based modeling approach. *Advances in Life Course Research*, *16*, 124-131.

- Lim, W. S., Rubin, E. H., Coast, M., Morris, J. C. (2005). Early-stage Alzheimer Disease represents increased suicidal risk in relation to later stages. *Alzheimer Disease Association Disorder, 19*, 214-219.
- Linehan, M. M., Goodstein, J. L., Nielsen, S. L., & Chiles, J. A. (1983). Reasons for staying alive when you are thinking of killing yourself: The reasons for living inventory. *Journal of Consulting and Clinical Psychology, 51*, 276-268.
- Linehan, M. M., Tutek, D. A., Heard, H. L., & Armstrong, H. E. (1994). Interpersonal outcome of cognitive behavioral treatment for chronically suicidal borderline patients. *American Journal of Psychiatry, 151*, 1771-1776
- Loboprabhu, S., & Molinari, V. (2012). Severe loneliness in community-dwelling aging adults with mental illness. *Journal of Psychiatric Practice, 18*, 20-28.
- Loebel, P., Loebel, J. S., Dager, S. T., Centerwall, B. S., & Reay, D. T. (1991). Anticipation of nursing home placement may be a precipitant of suicide among the elderly. *Journal of the American Geriatrics Society, 39*, 407-408.
- Logan, J., Hall, J., & Karch, D. (2011). Suicide categories by patterns of known risk factors. A latent class analysis. *Archives of General Psychiatry, 68*, 935-941.
- Luoma, J. B., & Pearson, J. L. (2002). Suicide and marital status in the United States, 1991-1996: Is widowhood a risk factor? *American Journal of Public Health, 92*, 1518-1522.
- Lynch, J. J. (2000). *A Cry Unheard: New Insights into the Medical Consequences of Loneliness*. Baltimore, MD: Bancroft Press.
- Mackay, C., & Pakenham, K. I. (2012). A stress and coping model of adjustment to caring for an adult with mental illness. *Journal of Community Mental Health, 48*, 450-462.
- Magnil, M., Gunnarsson, R., Björkstедt, K., & Björkelund, C. (2008). Prevalence of depressive symptoms and associated factors in elderly primary care patients: A descriptive study. *Journal of Clinical Psychiatry, 10*, 462-468.
- Mainio, A., Karvonen, K., Hakko, H., Särkioja, T., & Räsänen, P. (2009). Parkinson's disease and suicide: A profile of suicide victims with Parkinson's disease in a population-based study during the years 1988-2002 in Northern Finland. *International Journal of Geriatric Psychiatry, 24*, 916-920.
- Mann, J. J. (2012). *Neurobiological aspects of suicide*. Retrieved on October 27, 2011 from the New York State Office of Mental Health. <http://www.omh.state.ny.us/omhweb/savinglives/volume2/neurobiological.html>.
- Margo G. M., & Finkel J. A. (1990). Early dementia as a risk factor for suicide. *Hospital and Community Psychiatry, 6*, 676-678.

- Maris, R., Berman, A., & Silverman, M. (2000). *Comprehensive Textbook of Suicidology*, New York, NY: The Guilford Press.
- Martens, P. J., Brownell, M., Au, W., MacWilliam, L., Prior, H., Schultz, J., Guenette, W., Elliott, L., Buchan, S., Anderson, M., Caetano, P., Metge, C., Santos, R., & Serwonka, K. (2010). *Health Inequities in Manitoba: Is the Socioeconomic Gap Widening or Narrowing Over Time?* Winnipeg, MB: Manitoba Centre for Health Policy.
- Martin, L., Poss, J. W., Hirdes, J. P., Jones, R. N., Stones, M. J., Fries, B. E., & Rabinowitz, T. (2008). Predictors of a new depression diagnosis among older adults admitted to complex continuing care: implications for the depression rating scale (DRS). *Age and Aging, 37*, 51-56.
- Martin Matthews, A. (1991). *Widowhood in later life*. Markham, ON: Butterworths Canada Ltd.
- Martin-Matthews, A. (2011). Revisiting widowhood in later life: Changes in patterns and profiles, advances in research and understanding. *Canadian Journal on Aging, 30*, 339-354.
- Marty, M. A., Segal, D. L., Coolidge, F. L., & Klebe, K. J. (2012). Analysis of the psychometric properties of the Interpersonal Needs Questionnaire (INQ) among community-dwelling older adults. *Journal of Clinical Psychology, 68*, 1008-1018.
- Maxwell, C., Dalby, D. M., Slater, M., Patten, S. B., Hogan, D. B., Eliasziw, M., & Hirdes, J. P. (2008). The prevalence and management of current daily pain among older home care clients. *Pain, 138*, 208-216.
- McCabe, M. P., Firth, L., O'Connor, E. (2009). A comparison of mood and quality of life among people with progressive neurological illnesses and their caregivers. *Journal of Clinical Psychology in Medical Settings, 16*, 355-362.
- McConaghy, R., Caltabiano, M. L. (2005). Caring for a person with dementia: exploring relationships between perceived burden, depression, coping and well-being. *Nursing and Health Sciences, 7*, 81-91.
- McIntosh, J.L., Santos, J. F., & Hubbard, R. W. (1994). *Elderly suicide research, theory and treatment*. Washington, DC: American Psychological Association.
- McLaughlin, D., Vagenas, D., Pachana, N. A., Begum, N., & Dobson, A. (2010). Gender differences in social network size and satisfaction in adults in their 70s. *Journal of Health Psychology, 15*, 671-679.
- Mechakra-Tahiri, S. D., Zunzunegui, M. V., Prévile, M., & Dubé, M. (2010). Gender, social relationships and depressive disorders in adults aged 65 and over in Quebec. *Chronic Diseases in Canada, 30*, 56-64.
- Meeks, S., & Tennyson, K. (2003). Depression, hopelessness, and suicide ideation in nursing home residents. *Journal of Mental Health and Aging, 9*, 85-96.

- Mellor, D., Davison, T., McCabe, M., & George, K. (2008). Professional carers' knowledge and response to depression among their aged-care clients: The care recipients' perspective. *Aging and Mental Health, 12*, 389-399.
- Mental Health Commission of Canada. (2012). Changing directions, changing lives: The mental health strategy for Canada. Calgary, AB: Author.
- Miller, J. S., Segal, D. S., & Coolidge, F. L. (2001). A comparison of suicidal thinking and reasons for living among younger and older adults. *Death Studies, 25*, 357-365.
- Milner, A., McClure, R., & De Leo, D. (2012). Socio-economic determinants of suicide: An ecological analysis of 35 countries. *Social Psychiatry and Psychiatric Epidemiology, 47*, 19-27.
- Morris, J. N., Carpenter, G. I., Berg, K., & Jones, R. N. (2000). Outcome measures for use with home care clients. *Canadian Journal on Aging, 19*, 87-105.
- Morris, J. N., Fries, B. E., Bernabei, R., Steel, K., Ikegami, N., et al. (2009). interRAI Home Care (HC) Assessment Form and User's Manual. Version 9.1. Washington, DC: interRAI.
- Morris, J. N., Fries, B. E., Mehr, D. R., Hawes, C., Phillips, C., Mor, V., & Lipsitz, L. (1994). MDS Cognitive Performance Scale. *Journal of Gerontology, 49*, M174-M182.
- Morris, J. N., Fries, B. E., & Morris, S. A. (1999). Scaling ADLs within the MDS. *Journals of Gerontology. Series A, Biological Sciences and Medical Sciences, 54*, M546-M553.
- Morris, J. N., Fries, B., Steel, K., Ikegami, N., Bernabei, R., & Carpenter, G. (1997). Comprehensive clinical assessment in community setting: Applicability of the MDS-HC. *Journal of the American Geriatric Society, 45*, 1017-1024.
- Motto, J. A., & Bostrom, A. (1990). Empirical indicators of near-term suicide risk. *Crisis, 11*, 52-59.
- Myslobodsky, M., Lalondo, F. M., & Hicks, L. (2001). Are patients with Parkinson's Disease suicidal? *Journal of Geriatric Psychiatry and Neurology, 14*, 120-124.
- Navaneelan, T. (2012). Suicide rates: An overview. *Health at a Glance, Statistics Canada Catalogue no. 82-624-X*. Ottawa, ON: Statistics Canada.
- Nazeem, S., Siderowf, A. D., Duda, J. E., Brown, G. K., Have, T. T., Stern, M. B., & Weintraub, D. (2008). Suicidal and death ideation in Parkinson's disease. *Movement Disorders, 23*, 1573-1579.
- Nelson, C., Johnston, M., & Shrivastava, A. (2010). Improving risk assessment with suicidal patients: A preliminary evaluation of the clinical utility of the Scale for Impact of Suicidality - Management, Assessment and Planning of Care (SIS-MAP). *Crisis, 31*, 231-237.

- Neufeld, E., Freeman, S., Joling, K., & Hirdes, J. P. "When the golden years are blue:" Changes in depressive symptoms over time among older adults newly admitted to long term care facilities. *Clinical Gerontologist*, in press.
- Neurological Health Charities Canada (NHCC). (2010). *Parkinson's disease*. Retrieved from <http://www.mybrainmatters.ca/en/condition/parkinson%E2%80%99s-disease>.
- Newman, S. C., Bland, R. C., & Orn, H. T. (1998). The prevalence of mental disorders in the elderly in Edmonton: A community survey using GMS-AGECAT, Geriatric Mental State-Automated Geriatric Examination for Computer Assisted Taxonomy. *Canadian Journal of Psychiatry*, *43*, 910-914.
- Nolen-Hoeksema, S. (2002). Gender differences in depression. In I. H. Gotlib & C. L. Hammen (Eds.), *Handbook of depression* (pp. 492-507). New York, NY: The Guilford Press.
- O'Connell, H., Chin, A., Cunningham, C., & Lawlor, B. A. (2004). Recent developments: Suicide in older people. *BMJ*, *329*, 895-899.
- O'Connor, R. C. (2011). Towards an integrated motivational-volitional model of suicidal behaviour. In O'Connor, RC, Platt, S, & Gordon, J. (Eds.). *International Handbook of Suicide Prevention: Research, Policy and Practice*. West Sussex, UK: John Wiley & Sons, Ltd.
- O'Reilly, R. L., Truant, G. S., & Donaldson, L. (1990). Psychiatrists' experience of suicide in their patients. *Psychiatric Journal of the University of Ottawa*, *15*, 173-176.
- O'Rourke, N., Haverkamp, B. E., Rae, S., Tuokko, H., Hayden, S., & Beattie, B. L. (1996). Response biases as a confound to expressed burden among spousal caregivers of suspected dementia patients. *Psychology and Aging*, *11*, 377-380.
- O'Rourke, N., Haverkamp, B. E., Tuokko, H., Hayden, S., & Beattie, B. L. (1996). The relative contribution of subjective factors to expressed burden among spousal caregivers of suspected dementia patients. *Canadian Journal on Aging*, *15*, 583-596.
- Onder, G., Liperoti, R., Soldato, M., Cipriani, M. C., Bernabei, R., & Landi, F. (2007). Depression and risk of nursing home admission among older adults in home care in Europe: Results from the Aged in Home Care (AdHOC) study. *Journal of Clinical Psychiatry*, *68*, 1392-1398.
- Oquendo, M. A., Currier, D., Liu, S. M., Hasin, D. S., Grant, B. F., & Blanco, C. (2010). Increased risk for suicidal behaviour in comorbid bipolar disorder and alcohol use disorders: results from the National Epidemiologic Survey on Alcohol and Related Conditions (NESARC). *Journal of Clinical Psychiatry*, *71*, 902-909.
- Oquendo, M. A., Galfalvy, H., Russo, R., Ellis, S. P., Grunebaum, M. F., Burke, A., & Mann, J. J. (2004). Prospective study of clinical predictors of suicidal acts after a major depressive episode in patients with major depressive disorder or bipolar disorder. *American Journal of Psychiatry*, *161*, 1433-1440.



- Orbach, I., Mikulincer, M., King, R., Cohen, D., & Stein, D. (1997). Thresholds and tolerance of physical pain in suicidal and nonsuicidal adolescents. *Journal of Consulting and Clinical Psychology, 65*, 646-652.
- Osgood, N. (1992). *Suicide in Later Life: Recognizing the Warning Signs*. New York: Lexington Books.
- Owens, D., Horrocks, J., & House, A. (2002). Fatal and non-fatal repetition of self harm: Systematic review. *British Journal of Psychiatry, 181*, 193-199.
- Ozawa-De Silva, C. (2010). Shared death: Self, sociality and internet group suicide in Japan. *Transcultural Psychiatry, 47*, 392-418.
- Paquay, L., De Lepeleire, J., Schoenmakers, B., Ylief, M., Fontaine, O., & Buntinx, F. (2007). Comparison of the diagnostic accuracy of the cognitive performance scale (minimum data set) and the mini-mental state exam for the detection of cognitive impairment in nursing home residents. *International Journal of Geriatric Psychiatry, 22*, 286-293.
- Parry, J. (2012). Suicide in a central Indian steel town. *Contributions to Indian Sociology, 46*, 145-180.
- Patten, S. B. (2000). Incidence of major depression in Canada. *Canadian Medical Association Journal, 163*, 714-715.
- Patrick, A. R., Miller, M., Barber, C. W., Wang, P. S., Canning, C. F., Schneeweiss, S. (2010). Identification of hospitalizations for intentional self-harm when E-codes are incompletely recorded. *Pharmacoepidemiology and Drug Safety, 19*, 1263-1275.
- Pearson, J., Conwell, Y., Lindsay, J., Takahashi, Y., & Caine, E. (1997). Elderly suicide: A multinational view. *Aging and Mental Health, 1*, 107-112.
- Perissinotto, C. M., Stijacic, Cenzer, I., & Covinsky, K. E. (2012). Loneliness in older persons: a predictor of functional decline and death. *Archives of Internal Medicine, 172*, 1078-1083.
- Perlman, C. M., Neufeld, E., Martin, L., Goy, M., & Hirdes, J. P. (2011). *Suicide Risk Assessment Inventory: A Resource Guide for Canadian Healthcare Organizations*. Toronto, ON: Ontario Hospital Association and Canadian Patient Safety Institute.
- Phillips, J. A., Robin, A. V., Nugent, C. N., Idler, E. L. (2010). Understanding recent changes in suicide rates among the middle-aged: period or cohort effects? *Public Health Reports, 125*, 680-688.
- Phillips, M. R., Yang, G., Zhang, Y., Wang, L., Ji, H., & Zhou, M. (2002). Risk factors for suicide in China: a national case-control psychological autopsy study. *Lancet, 360*, 1728-1736.

- Platts-Mills, T. F., Leacock, B., Cabanas, J. G., Shofer, F. S., & McLean, S. A. (2010). Emergency medical service use by the elderly: Analysis of a statewide database. *Prehospital Emergency Care, 14*, 329-333.
- Poss, J. W., Hirdes, J. P., Fries, B. E., McKillop, I., & Chase, M. (2008). Validation of Resource Utilization Groups Version III for Home Care (RUG-III/HC): Evidence from a Canadian home care jurisdiction. *Medical Care, 46*, 380-387.
- Poss, J. W., Jutan, N. M., Hirdes, J. P., Fries, B. E., Morris, J. N., Teare, G. F., & Reidel, K. (2008). A review of evidence on the reliability and validity of Minimum Data Set data. *Healthcare Management Forum, 21*, 33-39.
- Pratt, R. (2002). 'Nobody's ever asked how I felt'. In H. Wilkinson (Ed). *The Perspectives of People with Dementia. Research Methods and Motivations*. London, UK: Jessica Kingsley Publishers Ltd. pp. 165-182.
- Préville, M., Boyer, R., Hébert, R., Bravo, G., & Séguin, M. (2005). Correlates of suicide in the older adult population in Quebec. *Suicide & Life-Threatening Behaviour, 35*, 91-105.
- Prinstein, M. J. (2008). Introduction to the special section on suicide and nonsuicidal self-injury: A review of unique challenges and important directions for self-injury science. *Journal of Consulting and Clinical Psychology, 76*, 1-8.
- Public Health Agency of Canada. (2005). *Leading causes of death, Canada, 2005, males and females combined*. Retrieved from [http://dsol-smed.hc-sc.gc.ca/dsol-smed/is-sb/leadcauses/leading\\_causes\\_mort\\_2005-eng.pdf](http://dsol-smed.hc-sc.gc.ca/dsol-smed/is-sb/leadcauses/leading_causes_mort_2005-eng.pdf).
- Qin, P. (2011). The impact of psychiatric illness on suicide: Differences by diagnosis of disorders and by sex and age of subjects. *Journal of Psychiatric Research, 45*, 1445-1452.
- Qin, P., & Nordentoft, M. (2005). Suicide risk in relation to psychiatric hospitalization evidence based on longitudinal registers. *Archives of General Psychiatry, 62*, 427-432.
- Quan, H., Arboleda-Florez, J., Fick, G. H., Stuart, H. L., & Love, E. J. (2002). Association between physical illness and suicide among the elderly. *Social Psychiatry and Psychiatric Epidemiology, 37*, 190-197.
- Ramsey, R., Tanney, B., Lang, W., Kinzel, T., & Turley, B. (1999). *Suicide intervention handbook*. Calgary, AB: Living Works Education.
- Rao, R., Dening, T., Brayne, C., & Huppert, F. A. (1997). Suicidal thinking in community residents over eighty. *International Journal of Geriatric Psychiatry, 12*, 337-343.
- Raue, P., Meyers, B. S., Row, J. L., Heo, M., & Bruce, M. L. (2007). Suicidal ideation among elderly homecare patients. *International Journal of Geriatric Psychiatry, 22*, 32-37.

- Reeves, R. R., & Laizer, J. T. (2012). Traumatic brain injury and suicide. *Journal of Psychosocial Nursing, 50*, 32-38.
- Rendall, M. S., Weden, M. M., Favreault, M. M. & Waldron, H. (2011). The protective effects of marriage for survival: A review and update. *Demography, 48*, 481-506.
- Revenson, T. A., & Johnson, J. L. (1984). Social and demographic correlates of loneliness in late life. *American Journal of Community Psychology, 12*, 71-85.
- Rhodes, A. E., Links, P. S., Streiner, D. L., Dawe, I., Cass, D., & Janes, S. (2002). Do hospital E-codes consistently capture suicidal behaviour? *Chronic Diseases in Canada, 23*, 139-145.
- Ribeiro, J. D., & Joiner, T. E. (2009). The interpersonal-psychological theory of suicidal behaviour: Current status and future directions. *Journal of Clinical Psychology, 65*, 1291-1299.
- Roskar, S., Podlesek, A., Kuzmanic, M., Demsar, L. O., Zaletel, M., & Marusic, A. (2011). Suicide risk and its relationship to change in marital status. *Crisis, 32*, 24-30.
- Rowe, J. L., Conwell, T., Schulberg, H. G., & Bruce, M. (2006). Social support and suicidal ideation in older adults using home healthcare services. *American Journal of Geriatric Psychiatry, 14*, 758-766.
- Rubenowitz, E., Waern, M., Wilelmson, K., Allbeck, P. (2001). Life events and psychosocial factors in elderly suicides – case-control study. *Psychological Medicine, 31*, 1193-1202.
- Rubio, A., Vestner, A. L., Stewart, J. M., Forbes, N. T., Conwell, Y., Cox, C. (2001). Suicide and alzheimer's pathology in the elderly: a case-control study. *Society of Biological Psychiatry, 49*, 137-145.
- Rudd, M. D., Berman, A. L., Joiner, T. E., Nock, M. K., Silverman, M. M., & Mandrusiak, M., (2006). Warning signs for suicide: theory, research and clinical applications. *Suicide and Life-Threatening Behavior, 36*, 255-262.
- Rudd, M. D., Schmitz, B., McClenen, R., Joiner, T., Elkins, G., & Claasen, C. A. (2010). *The suicide cognitions scale: A suicide-specific measure of hopelessness*. Manuscript submitted for publication.
- Rurup, M. L., Deeg, D. J., Poppelaars, J. L., Kerkhof, A., J., & Onwuteaka-Philipsen, B. D. (2011). Wishes to die in older people: a quantitative study of prevalence and associated factors. *Crisis, 32*, 194-203.
- Rurup, M. L., Pasma, H. R., Goedhart, J., Deeg, D. J., Kerkhof, A., J., & Onwuteaka-Philipsen, B. D. (2011). Understanding why older people develop a wish to die: a qualitative interview study. *Crisis, 32*, 204-216.

- Rutter, M. (2008). Developing concepts in developmental psychopathology. In J.J. Hudziak (ed.), *Developmental psychopathology and wellness: Genetic and environmental influences* (pp.3-22). Washington, DC: American Psychiatric Publishing
- Sanchez, H. (2001). Risk factor model for suicide assessment and intervention. *Professional Psychology and Practice, 32*, 352-358.
- Schneider, B. (2009). Substance use disorders and risk for completed suicide. *Archives of Suicide Research, 13*, 303-316.
- Scocco, P., & De Leo, D. (2002). One-year prevalence of death thoughts, suicide ideation and behaviours in an elderly population. *International Journal of Geriatric Psychiatry, 17*, 842-846.
- Scocco, P., Fantoni, G., Rapattoni, M., de Girolamo, G., Pavan, L. (2009). Death ideas, suicidal thoughts, and plans among nursing home residents. *Journal of Geriatric Psychiatry and Neurology, 22*, 141-148.
- Segal, D. L., & Needham, T. N. (2007). An exploration of gender differences on the Reasons for Living Inventory among older adults. *Death Studies, 31*, 573-581.
- Seyfried, L. S., Kales, H. C., Ignacio, R. B., Conwell, Y., & Valenstein, M. (2011). Predictors of suicide in patients with dementia. *Alzheimer's and Dementia, 7*, 567-573.
- Sharma, B. R., Sharma, A., & Bano, S. (2009). Suicidal behavior: A global public health concern. *Journal of Chinese Clinical Medicine, 4*, 353-360.
- Shneidman, E. (1996). *The suicidal mind*. New York: Oxford University Press.
- Shneidman, E. (1998). Further reflections on suicide and psychache. *Suicide and Life-Threatening Behaviour, 28*, 245-250.
- Silverman, M. M., Berman, A. L., Sanddal, N. D., O'Carroll, P. W., & Joiner, T. E. (2007a). Rebuilding the tower of babel: A revised nomenclature for the study of suicide and suicide-related behaviours. Part 1: Background, rationale, and methodology. *Suicide and Life-Threatening Behaviour, 37*, 248-263.
- Silverman, M. M., Berman, A. L., Sanddal, N. D., O'Carroll, P. W., & Joiner, T. E. (2007b). Rebuilding the tower of babel: A revised nomenclature for the study of suicide and suicide-related behaviours. Part 2: Suicide-related ideations, communications, and behaviours. *Suicide and Life-Threatening Behaviour, 37*, 264-277.
- Sirey, J., Bruce, M. L., Carpenter, M., Booker, D., Reid, M. C., Newell, K., & Alexopoulos, G. S. (2008). Depressive symptoms and suicidal ideation among older adults receiving home delivered meals. *International Journal of Geriatric Psychiatry, 23*, 1306-1311.

- Siontis, G. C. M., & Ioannidis, J. P. A. (2011). Risk factors and interventions with statistically significant tiny effects. *International Journal of Epidemiology*, *40*, 1292-1307.
- Sivrioglu, E. Y., Berlow, Y. A., & Ellison, J. M. (2004). Recognition and management of late-life depression in primary care. *Primary Psychiatry*, *11*, 61-65.
- Soldato, M., Liperoti, R., Landi, F., Carpenter, I. G., Bernabei, R., & Onder, G. (2008). Patient depression and caregiver attitudes: Results from the AgeD in Home Care study. *Journal of Affective Disorders*, *106*, 107-115.
- Solomon, R. L. (1980). The opponent-process theory of acquired motivation: The costs of pleasure and benefits of pain. *American Psychologist*, *35*, 691-712.
- Solomon, R. L., & Corbit, J. D. (1974). An opponent-process theory of motivation: I. Temporal dynamics of affect. *Psychological Review*, *81*, 119-145.
- Sørbye, L. W., Finne-Soveri, H., Ljunggren, G., Topinkova, E., Garms-Homolova, V., Jensdóttir, A. B., Bernabei, R., AdHOC Project Research Group. (2009). Urinary incontinence and use of pads-clinical features and need for help in home care at 11 sites in Europe. *Scandinavian Journal of Caring Sciences*, *23*, 33-44.
- Sørbye, L. W., Garms-Homolová, V., Henrard, J. C., Jónsson, P., Fialová, D., Topinková, E., & Gambassi, G. (2009). Shaping home care in Europe: The contribution of the Aged in Home Care project. *Maturitas*, *62*, 235-242.
- Soulas, T., Gurruchaga, J. M., Palfi, S., Cesaro, P., Nguyen, J. P., Fenelon, G. (2008). Attempted and completed suicides after subthalamic nucleus stimulation for Parkinson's Disease. *Journal of Neurology, Neurosurgery and Psychiatry*, *79*, 952-954.
- Statistics Canada. (2012). Mortality, summary list of causes. Catalogue no. 84F0209XWE. Ottawa, ON: Minister of Industry.
- Statistics Canada. (2002). Unmet needs for health care. *Health Reports*, *13*, 23-34.
- Statistics Canada (2010). Suicides and suicide rate, by sex and by age group. CANSIM, table 102-0551 and Catalogue no. 84-F0209-X. Ottawa, ON: Statistics Canada.
- Stenager, E. N., & Stenager, E. (1992). Suicide and patients with neurological disease. Methodologic problems. *Archives of Neurology*, *49*, 1296-1303.
- Stenager, E. N., Wermuth, L., Stenager, E., & Boldsen, J. (1994). Suicide in patients with Parkinson's disease. *Acta Psychiatry Scand*, *90*, 70-72.
- Stensman, R. & Sundqvist-Stensman, U. B. (1988). Physical disease and disability among 416 cases in Sweden. *Scandinavian Journal of Social Medicine*, *16*, 149-153.

- Stimpson, J. P., Kuo, Y. F., Ray, L. A., Raji, M. A., & Peek, M. K. (2007). Risk of mortality related to widowhood in older Mexican Americans. *Annals of Epidemiology*, *17*, 313-319.
- Stolberg, R. A., Clark, D. C., & Bongar, B. (2002). Epidemiology, assessment, and management of suicide in depressed patients. In I. H. Gotlib & C. L. Hammen (Eds.), *Handbook of depression* (pp. 581-601). New York: The Guilford Press.
- Stone, L. J., Clements, J. A. (2009). The effects of nursing home placement on the perceived levels of caregiver burden. *Journal of Gerontological Social Work*, *52*, 193-214.
- Suominen, K., Isometsa, E., Suokas, J., Haukka, J., Achte, K., & Lonnqvist, J. (2004). Completed suicide after a suicide attempt: A 37-year follow-up study. *American Journal of Psychiatry*, *161*, 562-563.
- Suzuki, Y., Tsutsumi, A., Fukasawa, M., Honma, H., Someya, T., & Kim, Y. (2011). Prevalence of mental disorders and suicidal thoughts among community-dwelling elderly adults 3 years after the Niigata-Chuetsu earthquake. *Journal of Epidemiology*, *21*, 144-150.
- Szczerbińska, K., Hirdes, J. P., & Zyczkowska, J. (2012). Good news and bad news: Depressive symptoms decline and undertreatment increases with age in home care and institutional settings. *American Journal of Geriatric Psychiatry*, *20*, 1045-1056.
- Tabachnick, B., & Fidell, L. (2001). *Using Multivariate Statistics*, 4<sup>th</sup> Edition. Toronto, ON: Allyn & Brown.
- Tadros, G., & Salib, E. (2007). Elderly suicide in primary care. *International Journal of Geriatric Psychiatry*, *22*, 750-756.
- Tanner, C. M., & Goldman, S. M. (1996). Epidemiology of parkinson's disease. *Neurology Clinics*, *14*, 317-335.
- Thietje, R., Pouw, M. H., Schulz, A. P., Kienast, B., & Hirschfeld, S. (2011). Mortality in patients with traumatic spinal cord injury: Descriptive analysis of 62 deceased subjects. *Journal of Spinal Cord Medicine*, *34*, 482-487.
- Traphagan, J. W. (2010). Intergenerational ambivalence, power, and perceptions of elder suicide in rural Japan. *Journal of Intergenerational Relationships*, *8*, 21-37.
- Turner, R. J., Frankel, B. G., & Levin, D. M. (1983). Social support: Conceptualization, measurement, and implications for mental health. In J. R. Greenley (Ed.), *Research in community and mental health* (pp. 67-111). Greenwich, CT: JAI Press.
- Van Grootheest, D. S., Beekman, A. T. F., Broese van Groenou, M. I., & Deeg, D. J. H. (1999). Sex differences in depression after widowhood. Do men suffer more? *Social Psychiatry and Psychiatric Epidemiology*, *34*, 391-398.

- Van Orden, K. A., Lynam, M. E., Hollar, D., & Joiner, T. E. (2006). Perceived burdensomeness as an indicator of suicidal symptoms. *Cognitive Therapy and Research, 30*, 457-467.
- Van Orden, K. A., Witte, T. K., Cukrowicz, K. C., Braithwaite, S. R., Selby, E. A., & Joiner, T. E. (2010). The interpersonal theory of suicide. *Psychological Review, 117*, 575-600.
- Van Orden, K. A., Witte, T. K., Gordon, K., Bender, T., & Joiner, T. E. (2008). Suicidal desire and the capability for suicide: Tests of the interpersonal-psychological theory of suicidal behaviour among adults. *Journal of Consulting and Clinical Psychology, 76*, 72-83.
- Vasiliadis, H., Gagné, S., & Prévile, M. (2012). Gender differences in determinants of suicidal ideation in French-speaking community living elderly in Canada. *International Psychogeriatrics, 24*, 2019-2026.
- Waern, M. (2003). Physical illness and suicide in the elderly. *Geriatrics and Aging, 6*, 56-59.
- Waern, M., Beskow, J., Runeson, B., & Skoog, I. (1999). Suicidal feelings in the last year of life in elderly people who commit suicide. *Lancet, 354*, 917-918.
- Waern, M., Rubenowitz, E., Runeson, B., Skoog, I., Wilhelmson, K., & Allebeck, P. (2002). Burden of illness and suicide in elderly people: Case-control study. *BMJ, 324*, 1-4.
- Waern, M., Rubenowitz, E., & Wilhelmson, K. (2003). Predictors of suicide in the old elderly. *Gerontology, 49*, 328-334.
- Wellens, N I., Flamaing, J., Tournoy, J., Hanon, T., Moons, P., Verbeke, G., Boonen, S., & Milisen, K. (2012). Convergent validity of the Cognitive Performance Scale of the interRAI Acute Care and the Mini-Mental State Examination. *American Journal of Geriatric Psychiatry, 17*,
- Whitlock, F. A. (1985). Suicide and physical illness. In *Suicide*, A. Roy (Ed.). Baltimore: Williams and Wilkins, pp. 151-170.
- Wiktorsson, S., Runeson, B., Skoog, I., Ostling, S., & Waern, M. (2010). Attempted suicide in the elderly: characteristics of suicide attempters 70 years and older and a general population comparison group. *American Journal of Geriatric Psychiatry, 18* 57-67.
- Wilson, K. G., Curran, D., & McPherson, C. J. (2005). A burden to others: A common source of distress for the terminally ill. *Cognitive Behaviour Therapy, 34*, 115-123.
- Wooten, G. F., Currie, L. J., Bovbjerg, V. E., Lee, J. K., & Patrie, J. (2004). Are men at greater risk for parkinson's disease than women? *Journal of Neurology and Neurosurgical Psychiatry, 75*, 637-639.
- World Health Organization [WHO]. (2005). *Distribution of suicide rates (per 100,000), by gender and age, 2000*. Available from: [http://www.who.int/mental\\_health/prevention/suicide/suicidecharts/en/](http://www.who.int/mental_health/prevention/suicide/suicidecharts/en/).

- World Health Organization [WHO]. (2008). *Suicide and suicide prevention in Asia*. Available from: [http://www.who.int/mental\\_health/resources/suicide\\_prevention\\_asia.pdf](http://www.who.int/mental_health/resources/suicide_prevention_asia.pdf).
- World Health Organization [WHO]. (2012). *International classification of diseases and related health problems, 10<sup>th</sup> Revision*. Retrieved from <http://apps.who.int/classifications/icd10/browse/2010/en>.
- World Health Organization [WHO]. (2012). *Suicide rates per 100,000 by country, year and sex, 2011*. Available from: [http://www.who.int/mental\\_health/prevention/suicide\\_rates/en/](http://www.who.int/mental_health/prevention/suicide_rates/en/).
- Yip, P. S. F., Chi, I., Chiu, H., Chi Wai, K., Conwell, Y., & Caine, E. (2003). A prevalence study of suicide ideation among older adults in Hong Kong SAR. *International Journal of Geriatric Psychiatry, 18*, 1056-1062.
- Yip, P. S. F., & Liu, K. Y. (2006). The ecological fallacy and the gender ratio of suicide in China. *British Journal of Psychiatry, 189*, 465-466.



## APPENDIX A: SUICIDE RATES BY CULTURE

Suicide rates per 100,000 by highest 25 countries, year and sex, 2011

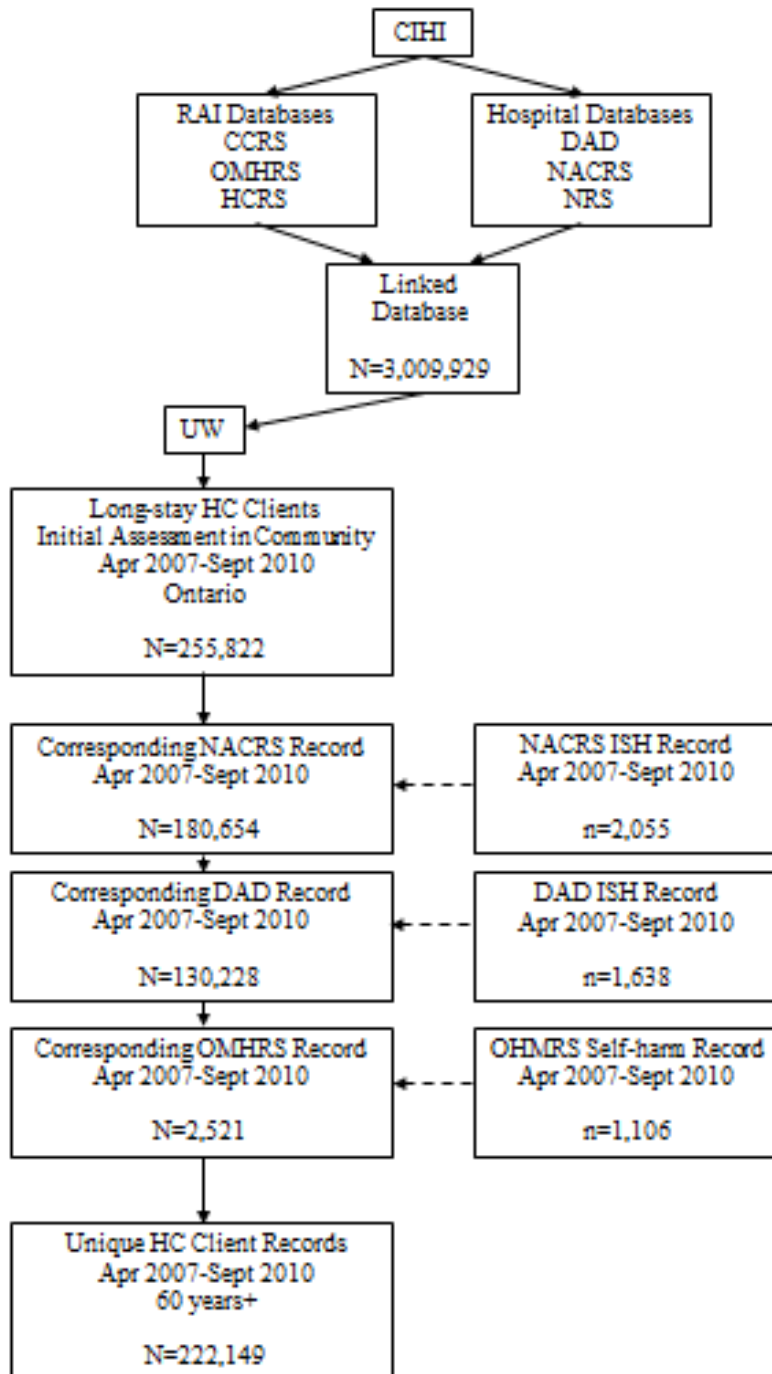
Country	Year	Males	Females	Total
LITHUANIA	2009	61.3	10.4	71.7
RUSSIAN FEDERATION	2006	53.9	9.5	63.4
REPUBLIC OF KOREA	2009	39.9	22.1	62.0
SRI LANKA	1991	44.6	16.8	61.4
BELARUS	2007	48.7	8.8	57.5
KAZAKHSTAN	2008	43.0	9.4	52.4
GUYANA	2006	39.0	13.4	52.4
HUNGARY	2009	40.0	10.6	50.6
JAPAN	2009	36.2	13.2	49.4
LATVIA	2009	40.0	8.2	48.2
UKRAINE	2009	37.8	7.0	44.8
SLOVENIA	2009	34.6	9.4	44.0
BELGIUM	2005	28.8	10.3	39.1
FINLAND	2009	29.0	10.0	39.0
SERBIA	2009	28.1	10.0	38.1
ESTONIA	2008	30.6	7.3	37.9
CROATIA	2009	28.9	7.5	36.4
SWITZERLAND	2007	24.8	11.4	36.2
REPUBLIC OF MOLDOVA	2008	30.1	5.6	35.7
FRANCE	2007	24.7	8.5	33.2
URUGUAY	2004	26.0	6.3	32.3
AUSTRIA	2009	23.8	7.1	30.9
POLAND	2008	26.4	4.1	30.5
CHINA (Hong Kong SAR)	2009	19.0	10.7	29.7
SURINAME	2005	23.9	4.8	28.7

## APPENDIX B: LEENAARS' THEORY

### Dynamic Elements to Conceptualize Suicide among Older Adults

<b>Intrapsychic/Personality Elements</b>	
<b>1. Unbearable psychological pain</b>	Older adult wants to escape from pain, feeling hopeless and helpless
2. Cognitive constriction	Older adult experiences tunnel vision, can only think negatively
3. Indirect expressions	Older adult is ambivalent, has contradicting attitudes and feelings
4. Inability to adjust	Older adults considering suicide view themselves as unable to adjust and too weak to survive life's demands
5. Ego	Ego strength is a protective factor against suicide. Ego for the older adult considering suicide is weakened by negative and traumatic life events
<b>Interpersonal/Contextual Factors</b>	
6. Interpersonal relations	The older adult experiences interpersonal conflict (establishing and/or maintaining relationships)
7. Rejection-aggression	The older adult experiences loss (in some form), often a rejection that leads to pain and self-directed aggression
8. Identification-escape	The older adult wants to escape the pain caused by the loss or rejection with that which it has strong identification (e.g., health, employment, etc.)

**APPENDIX C: FLOW DIAGRAM OF STUDY SAMPLE**



## APPENDIX D: STUDY VARIABLES FROM RAI-HC

Variable	Item(s) for Coding from RAI-HC
<b>Socio-Demographic</b>	
Age	BB2a
Sex	BB1
Marital Status	BB4
Primary Language	BB5
Living Alone	CC6 (1)
Isolated	F3a (2,3)
Limited Finances	P7
<b>Clinical Characteristics</b>	
Any Psychiatric Diagnosis	J1s (1,2)
Alcohol Use & Dependence	K7a (1) K7b (1)
Loneliness	F3b (1)
Anhedonia	E1h (1,2) E1i (1,2)
Positive Social Relationships	F1a (0) F1b (0)
Daily Pain	K4a (2,3)
Caregiver Lives with Client	G1ea (0)
Caregiver Distress	G2a (1) G2c (1)
Daily Outings	H6a (0,1)
Optimism to Improve	H7a (1)
Depression Rating Scale	©Burrows et al., 2000
Cognitive Performance Scale	©Morris et al., 1994
ADL Hierarchy Scale	©Morris, Fries, & Morris, 1999
IADL Capacity Scale	H1 a-g
CHESS Scale	©Hirdes, Frijters, & Teare, 2003
Number of Medications	Q1
Psychotropic Medications	Q2a (1) Q2b (1) Q2c (1) Q2d (1)
Medication Non-Adherence	Q4 (2)
<b>Neurological Conditions</b>	
Alzheimer's Disease & Dementia	J1g (1,2) J1h (1,2)
Stroke	J1a (1,2)
Head Trauma	J1i (1,2)
Multiple Sclerosis	J1k (1,2)
Parkinson's Disease	J1l (1,2)
<b>Decline in Areas of Function</b>	
Communication	C4 (1)
Vision	D3 (1)
Mood	E2 (1)
Behavioural Symptoms	E4 (1)
ADLs	H3 (1)
Social Activities	F2 (2)
Overall Deterioration	P6 (2)