PSYCHOSOCIAL CORRELATES OF SUICIDE IDEATION AND SUICIDE ATTEMPT AMONG INUIT FROM NUNAVUT, NUNATSIAVUT AND INUVIALUIT

By

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B.A., McGill, 2012

A THESIS SUBMITTED TO MCGILL UNIVERSITY IN PARTIAL FULFILLMENT OF THE REQUIREMENTS OF THE DEGREE OF

MASTER OF SCIENCE

in

THE FACULTY OF MEDICINE

(Department of Psychiatry, Division of Social and Transcultural Psychiatry)

MCGILL UNIVERSITY, MONTREAL

August 2017

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Abstract

Objective: *To identify the prevalence as well as the sociodemographic and psychosocial correlates of suicide attempts and suicide ideation in Inuit populations of Nunavut, Nunatsiavut and Inuvialuit; develop multivariate models of risk and protective factors associated with suicide attempts and ideation; and identify the policy and prevention implications of the findings.*

Method: *A secondary analysis of data of 2,240 Inuit aged 18-90 years from the International Polar Year Inuit Health Survey conducted in Nunavut, Nunatsiavut and Inuvialuit in 2007 and 2008. Risk and protective factors that were previously identified in the research literature were tested with bivariate statistics and multivariate logistic regression models for the sample as a whole and for each gender. A novel measure of events occurring at the time of suicide attempt was tested for the first time.*

Results: *Rates of suicide ideation and attempts were higher compared to those reported for Nunavik in the past. The differences in rates of suicide ideation and attempt between females and males were significantly more pronounced than those reported in previous studies. At the bivariate level, risk factors for suicide ideation and attempt were psychological distress, most forms of substance abuse, and all forms of interpersonal violence. Protective factors included participation in different land-based and community activities. Among those who had attempted suicide, the majority reported feeling very depressed, feeling very angry, feeling bored or tired with life, and having conflict(s) with a partner at the time of the attempt. Multivariate logistic regression analyses revealed that psychological distress and marijuana use were the strongest correlates of suicide ideation and attempt for both females and males. Protective factors against lifetime suicide ideation were participation in community activities for females and participation in hunting activities for males. No protective factors for suicide attempts were statistically significant.*

Conclusions: *Culturally specific, community-led programs that promote mental health literacy and traditional land-based activities, while strengthening cultural identity, connectedness, and intergenerational transfer of knowledge and values, may be invaluable in promoting mental health and preventing suicide among Inuit of Northern Canada.*

Key Words: *Inuit, suicide ideation, suicide attempt, gender, risk factors, protective factors*

Résumé

Objectif: *Identifier les taux d'idées suicidaires et tentatives de suicide ainsi que les déterminants sociaux de souffrance mentale chez les Inuits provenant du Nunavut, Nunatsiavut et Inuvialuit, au nord du Canada. Effectuer des analyses multivariées sur le risque potentiel and les facteurs protecteurs potentiels associés aux idées suicidaires et tentatives de suicide parmi les Inuits.*

Méthode: *Une analyse secondaire de données sur 2,240 Inuits agés de 18 à 90 ans provenant d'une enquête sur la santé mené auprès des Inuits du Nunavut, Nunatsiavut et Inuvialuit par Santé Québéc en 2007 et 2008. Les facteurs précédemment repérés dans la recherche ont étés éprouvés à l'aide d'analyses bidimensionnelles et multivariées au moyen d'une régression logistique pour l'échantillon complet et pour les deux sexes. Une nouvelle échelle sur les événements survenant lors d'une tentative de suicide a aussi été éprouvée au cours de cette étude.*

Résultats: *Les taux d'idées suicidaires et de tentatives de suicide sont plus élevés comparément aux taux repérés dans les études antérieures menées au Nunavik. La différence de taux d'idées suicidaires et de tentatives de suicide entre les femmes et hommes est très large comparément à la différence reportée dans les études antérieures menées au Nunavik. Sur le plan bidimensionnel, les corrélations positives d'idées suicidaires et de tentatives de suicide incluaient la détresse psychologique, l'abus de substances, et toutes formes de violence interpersonnelle. Les facteurs protecteurs incluaient la participation à différents types d'activités traditionnelles et communautaires. Parmi ceux qui ont fait une tentative de suicide, la majorité se sentait très déprimée, fâchée et ennuyée par la vie et avait des conflicts avec leurs conjoints lors de la tentative de suicide. L'analyse multivariée effectuée au moyen d'une régression logistique indiquait que la détresse psychologique et l'abus du cannabis étaient les corrélats les plus forts des idées suicidaires et de la tentative de suicide parmi les femmes et hommes. Les facteurs de protection*

contre les idées suicidaires incluaient la participation aux activités communautaires parmi les femmes et la chasse traditionnelle parmi les hommes. Aucun facteur de protection contre les tentatives de suicide a été identifié.

Conclusion: *Les programmes de prévention du suicide et de promotion du bien-être mental devraient être axés sur la sensabilisation à la santé mentale ainsi que les effects protecteurs de la culture et des activités traditionelles et communautaires.*

Mots clés: *Inuit, idées suicidaires, tentatives de suicide, sexe, risque potential, facteurs protecteurs*

Acknowledgements

"Gratitude bestows reverence, allowing us to encounter everyday epiphanies, those transcendent moments of awe that change forever how we experience life and the world."

– John Milton

I would like to express my sincerest gratitude to all Inuit in Nunavut, Nunatsiavut and Inuvialuit Settlement Region, who participated in the 2007-2008 International Polar Year Inuit Health Survey and took the time to share their knowledge and answer questions relating to highly sensitive topics, which allowed us to further our understanding of the health situation of Inuit in the Canadian Arctic. I would also like to thank the Nunavut Research Institute, the Nunatsiavut Steering Committee, the Aurora Research Institute (Inuvialuit Settlement Region), Nunavut Inuit Health Survey Steering Committee (NIHSSC), and Dr. Hope Weiler for granting me access to this data.

This thesis was made possible thanks to the guidance and support of Dr. Laurence J. Kirmayer, my supervisor. Thank you for encouraging me to explore new avenues of knowledge in this field of work, for providing me with your wisdom and insight throughout this journey, and for granting me many opportunities to grow as a researcher. A big thank you to Dr. Brooke Levis, who was critical in helping me with the statistical analysis of the data. Thank you to Dominique Geoffroy and the members of my advisory committee, Dr. Eduardo Chachamovich and Dr. Sarah Fraser, for your words of inspiration and willingness to help.

Throughout this journey, I have met several people who have had a major impact on my approach to my graduate studies as well as my mandate as a future physician. Thank you Dr. Sheila

Watt-Cloutier and Maatalii Okalik for inspiring me in profound ways and eloquently sharing your unique perspectives on issues that continue to plague Canadian Inuit.

I would also like to express my deepest gratitude and appreciation of the sources of financial support I received to complete this project: Réseau de recherche du Québéc sur le suicide et les troubles associés (RQSHA), the Graduate Excellence Fellowship Award from the Faculty of Medicine at McGill University, and the Graduate Research Excellence Award for Travel from the Psychiatry Department at McGill University.

Last but not least, I would like to thank my wonderful family for your infinite patience and support throughout every step of my graduate studies. You have never ceased to encourage me throughout everything I have sought out to accomplish over the years. And for that, I am truly grateful.

Preface

I began my journey in the realm of Aboriginal mental health research in the emergency room at a primary trauma hospital where I worked as a coordinator. There, I saw numerous medical transfers of young Aboriginal patients from the North requiring resources that were not otherwise available in their place of residence. There, I got my first glimpse into the health inequities faced by Canadian Aboriginals. The plight of Aboriginals trying to navigate a complex health system strongly resonated with me. It was at that point that I wanted to learn more about the struggles as well as the sources of resilience of Aboriginals in Canada.

For the past several years, I have been working under Dr. Laurence Kirmayer's supervision on several projects, including the 'Listening to One Another' program, a nation-wide project studying mental health promotion and suicide prevention strategies in First Nations communities, as well as the International Polar Year Health Survey conducted with Inuit in Nunavut, Nunatsiavut and Inuvialuit Settlement Region. Throughout my work, I have had the privilege to attend several national and international meetings that placed emphasis on exploring the social determinants of Aboriginal health and the myriad of protective factors inherent in First Nations and Inuit culture. I have had the privilege to meet inspirational spokespeople of Inuit rights to health, including Sheila Watt-Cloutier at the United Nations Expert Seminar on Indigenous Peoples' Right to Health, and Maatalii Okalik at the Canadian Association for Suicide Prevention Conference in Iqaluit, Nunavut. Their call for a renewed emphasis on the protective factors that can be tapped into from Inuit culture was altogether refreshing and encouraging. I often left these meetings thinking about how much Aboriginals, through the expression of their culture and traditional ways, had taught me about strength and resilience in the face of adversity, and how important these teachings are to improving the wellbeing of Aboriginals all across the country.

Exploring new avenues of knowledge that were kindly opened to me by First Nations and Inuit across Canada has been a uniquely transformative and humbling experience. Writing this thesis was a major step in my personal journey of self-discovery as a future health care physician. I hope to further expand my knowledge in this field of work and contribute to the bridging of the health gaps faced by Aboriginals in Canada.

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Introduction

Over the past several decades, the rates of suicide among Canadian Indigenous Peoples have markedly elevated in comparison to the general population (Fraser et al. 2014). In fact, Inuit have one of the highest rates of death by suicide in the world, with a suicide rate that is estimated to be 16 times greater than that of the national average (Hicks 2015). This public health issue that disproportionately affects Indigenous Peoples is rooted in past socio-historical injustices stemming from colonialism and institutionalized discrimination (Kirmayer et al. 2011). In conjunction with geographic displacement, political oppression, forced assimilation and cultural suppression, these factors have contributed to mental health problems among Indigenous Peoples, including suicidal behaviors (Kirmayer et al. 2011). Understanding the causes of suicide remains an urgent health priority in the North.

Owing to their ability to not only survive but thrive in the harsh, seemingly desolate environment of the Canadian Arctic, Inuit have been among the most intensively studied peoples in the world (Kirmayer, Fletcher & Watt 2009). The stark increase in suicidal rates among the circumpolar Inuit since the 1980's led to a great deal of empirical research. A secondary analysis of survey data on Inuit youth in Nunavik collected in 1992 identified a cluster of psychosocial factors associated with suicide attempts (Kirmayer et al. 1998). Among these correlates were substance use (e.g. solvents, cannabis, cocaine), recent alcohol abuse, psychiatric problems, and a greater number of stressful life events in the last year. Interestingly, there were some gender differences: the strongest correlates of suicide attempts for females were psychiatric problems, recent alcohol abuse and cocaine or crack use, in comparison to solvent use and number of recent stressful life events for males. In an effort to monitor changes over time in health status as well as risk factors in Inuit of Nunavik, another extensive survey was conducted in 2004 (Kirmayer &

Paul 2007). There was a marked increase in suicide ideation and attempts from 1992 to 2004. Suicide attempts were more prevalent among females, who were aged 15-29 or 30-49 years, married, employed and had some high school education. In addition, higher levels of emotional distress, impulsivity, feelings of boredom and lower levels of self-esteem were strongly correlated with past suicide attempts. Using this same data, Fraser and colleagues (2014) identified gender-related risk and protective factors in Inuit of Nunavik. Multivariate analyses indicated that marijuana use, and psychological distress and participation in hunting activities were strongly correlated with suicide attempts in the past 12 months among females, whereas psychological distress and alcohol misuse were strongly correlated with suicide attempts among males.

The International Polar Year Inuit Health Survey conducted across the Arctic in 2007 and 2008 (Engeland 2010a, 2010b, 2010c; Galloway & Saudney 2010) used many of the same mental health indicators developed for the earlier surveys in Quebec (Santé Québéc 1992; Kirmayer & Paul 2007). The original community reports from the IPY present descriptive statistics of some aspects of the mental health and wellbeing components of the survey (Galloway & Saudney 2012). However, important research questions have yet to be addressed.

Suicidal behaviors

The World Health Organization (2014) estimates that 16 people per 100,000 die by suicide every year around the world. However, this estimate only offers one piece of a very complex picture. Suicide behaviour can be thought of in terms of a continuum of severity from suicidal ideation to attempted suicide to death by suicide (Young, Revich & Soininen 2015). At one end of the continuum lies suicidal ideation, which involves "thoughts about ending one's life, being tired of life, or a belief that life is not worth living" (Young et al. 2015). This thought pattern may escalate into developing a plan to end one's life and taking steps to eventually achieve this plan (Kirmayer, Malus & Boothroyd 1996; Wexler, Bertone-Johnson & Fenaughty 2008; Young et al. 2015). On the extreme end of the continuum are attempted suicide and death by suicide, the latter being a conscious and intended act of ending one's life with the goal of escaping a painful and/or unbearable situation (Young et al. 2015). As Young and colleagues (2015) state, "For every successful suicide, there are many more suicide attempts, and for every suicide attempt there are numerous people harbouring suicidal thoughts." Although the research literature consistently points to suicide ideation and attempted suicide as the strongest predictors of death by suicide (Beck et al. 1985; Brent et al. 1988), the magnitude of the effect of the latter tends to be very difficult to assess given that most people suffering from them do not seek the much needed help offered by local health and social services (Young et al. 2015).

A common suicide pattern that has been increasingly observed in small indigenous communities since the 1980's involves suicide clusters (Niezen 2009). This term refers to a "high number of self-inflicted deaths occurring in temporal and geographic proximity" (Gould, Wallenstein & Davison 1989). Researchers have medicalized the phenomenon by likening it to a

disease "outbreak" or "epidemic" that can be transmitted to members of a small community (Gould et al. 1989; Niezen 2009). Gould (1990) put forth the notion of a "contagion" effect as a possible explanation for suicide clusters, arguing that deaths by suicide are either directly or indirectly related to one another by virtue of the strong interconnectedness among members of a community, who collectively share these profound feelings of depression, emotional disturbance, loneliness and increased vulnerability. Intentional self-destruction may then become a strong basis for group belonging, especially among young community members experiencing overwhelming feelings of isolation and a lack of vocational opportunities (Coleman 1987). In this context, suicidal ideation may become an aspect of shared outlook on life (Niezen 2009).

Over the past several decades, circumpolar Inuit have experienced one of the highest rates of death by suicide in the world (Young et al. 2015). This public health issue that disproportionately affects northern Indigenous Peoples occurred in waves of gradually increasing severity, first among Alaska Natives, followed by Inuit of Greenland, and then Inuit of the Nunavik and Baffin regions in the eastern Canadian Arctic (Hicks 2007a; Larsen et al. 2009). Within the Canadian context, the rates of suicide among Indigenous Peoples have markedly elevated in comparison to the general population since the 1980's (Hicks 2007b; Thorslund 1990). Historically, these rates were not always so high in comparison to the general population, with rates as low as 5.2 per 100,000 in the 1950's and 1960's (Health Canada 1994; Thorslund 1990). It must be noted, however, that suicide rates vary widely across indigenous communities (Health Canada 1987, 1995; Royal Commission 1995). However, Canadian Inuit have consistently had higher suicide rates in comparison to both the general population and First Nations and Métis peoples of Canada. Rates of death by suicide were 30 times greater among Inuit youth under the age of 18 compared to the youth of the general population between 1994 and 2008 (Oliver, Peters,

& Kohen, 2012). Figure 1 illustrates the geographic and temporal differences in suicide rates in the general Canadian population compared to the Inuit of Nunangat, Inuvialuit Settlement Region, Nunavut, Nunavik and Nunatsiavut. More recently, Canadian Inuit have an estimated suicide rate that is 16 times greater than that of the national average (Hicks 2015).

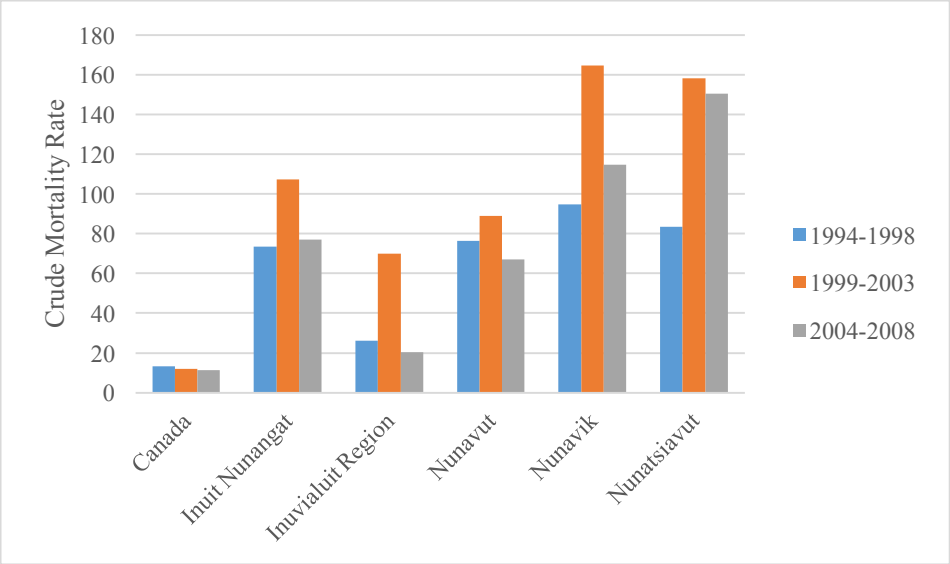

Fig. 1. Crude mortality rate due to suicide among Canadians and Canadian Inuit from 1994-2008. Source: Statistics Canada. CANSIM Table 102-0704 (Statistics Canada 2012). Note: Crude mortality rate refers to the crude suicide rate per 100,000 population. The mortality rate is calculated as follows: the total deaths by suicide for the five reference years are divided by five times the population estimate of the middle year of the five reference years. Inuit Nunangat comprises the Inuvialuit Region in the Northwest Territories, Nunavut, the Nunavik region in northern Quebec province, and Nunatsiavut in Northern Labrador.

In summary, Inuit of Canada, including those from Nunavik and Nunatsiavut, suffer from markedly higher suicide rates than the general population, raising the question of what accounts for this difference. Before detailing the specific risk factors that have been identified in the research literature, it is necessary to provide some background information on the history of the Inuit since the first wave of colonization and the specific circumstances that may have given rise to a wide

array of social, health, geographic, and economic disparities (Kirmayer et al. 2009).

Historical context

Who are Indigenous Peoples of Canada?

The Constitution Act of 1982 legally recognized three official groups of Canadian Indigenous Peoples: First Nations, Inuit, and Métis (Hackett, Feeny & Tompa 2016). Despite the fact these groups share a similar historical experience of colonization and enduring social, economic, and political disparities with the Canadian general population, there are major cultural and social differences (e.g. values, lifestyles, and worldviews) between them, with 11 major language groups and more than 58 dialects that have been identified (Frideres 1998; Kirmayer et al. 2000; Morrison & Wilson 1988). According to the 2011 Census, there are 1,400,685 indigenous peoples living in Canada, constituting approximately 4.3% of the total Canadian population (Statistics Canada 2011). The Indigenous population has an estimated annual growth rate of 20%, which is considerably higher than the 5% growth rate of the general population (Statistics Canada 2011). The median age is 27.7 years, which is significantly younger than the median age of 40.6 years for the general population (Statistics Canada 2011). The Indigenous population of Canada includes 851,560 (60.8%) who self-identify as First Nations, 451,795 (32.2%) as Métis, 59,445 (4.2%) as Inuit, and the remainder as having mixed indigenous heritage (Statistics Canada 2011). Given that registration of Indian status is no longer mandatory, the figures given may be gross underestimates. It has been speculated that approximately 25% of First Nations peoples are not registered (Statistics Canada 2011). As things currently stand, there are 596 First Nations bands, half of whose members reside on the 2,284 reserves in Canada (Frideres 1998; Morrison & Wilson

1988; Statistics Canada 2011). In contrast, fewer than 5% of Métis live on reserve (Statistics Canada 2011). The Inuit represent a distinct sub-group of Indigenous Peoples, who have had different arrangements with the federal government. They have never lived on reserves. Instead, most of the Inuit population (76%) lives in the self-governed Nunangat region, comprised of four distinct sub-regions that, through the signing of land claim agreements, include the Inuvialuit Region in the Northwest Territories, Nunavut, the Nunavik region in northern Quebec province, and Nunatsiavut in Northern Labrador (Statistics Canada 2011). In recent years, there has been some increased migration of Inuit to the major cities of Canada, possibly owing to limited educational and employment opportunities in the Arctic (Kirmayer et al. 2009).

Impact of colonialism

The European colonizers established economic and political systems that would irreversibly change the future of Inuit and subsequent generations, with the enduring effects of colonialism penetrating all sectors of Inuit lives through geographic displacement, sedentarization, forced assimilation, cultural suppression, institutionalized discrimination, and political oppression. Archaeological research suggests that the contemporary Inuit stem from the Thule culture dating back to A.D. 900, and arrived in the Arctic region, more specifically the island of Igloolik, approximately 1,000 years ago (Kral et al. 2014; McGhee 2004; Purich 1992). First contacts with foreigners, or 'Qallunaat', included Scandinavian Vikings around 1008, followed by European and some American whalers, foreign explorers seeking to establish colonies, missionaries, and fur traders beginning in 1822 and extending until the early 20th century (Kirmayer, Tait & Simpson 2000; Kral et al. 2011; Kral 2014). Their arrival began a catastrophic decline in the Indigenous population, who were decimated by warfare and infectious diseases, including smallpox, measles, influenza, bubonic plague, diphtheria, typhus, cholera, scarlet fever, trachoma, whooping cough,

chicken pox, and tropical malaria (Kenleyside 1990; Kirmayer et al. 2000; Stannard 1992; Thornton 1987). Prior to the arrival of European colonizers, the indigenous population of North America was estimated to be around 7 million (Trigger & Swagerty 1996). Approximately 90% of the indigenous population died as a result of the harrowing effects of colonization (Trigger & Swagerty 1996). About two-thirds of the Inuit population died by 1900 as a direct and indirect result of European colonization (Crowe 1991).

The most traumatic social change in Inuit history is incontrovertibly the "government era" that had its most profound impact beginning in 1957 with government-mandated forced sedentarization and the creation of crowded settlements – known today as 'communities' – run by non-Inuit officials, relocation to remote regions, residential schools, and bureaucratic control over Inuit peoples (Kral et al. 2011; Miller 2000; Richardson 1993; Wenzel 1991). This series of government interventions were driven by economic and political interests, and paternalistic, often racist attitudes toward Indigenous Peoples, who were viewed as 'primitive' and 'uncivilized' and ultimately incapable of taking care of themselves and their children, let alone undertaking an active role in the new political landscape (Fournier & Crey 1997; Johnston 1983; Titley 1986).

Inuit have experienced many of the same social, cultural and political changes that have challenged the lives of the other Indigenous peoples in Canada. Forced relocation to undesirable, desolate lands that would not interfere with the government's mercantile and sovereign interests had detrimental consequences to the social dynamics within a given indigenous community as well as between different social groupings that had previously had no contact (Dickason 1997; Marcus 1992; Royal Commission 1994; Tester & Kulchyski 1994). Geographic displacement of Inuit thus caused a profound cultural changes and communities were left to improvise new ways of organizing the roles and responsibilities of their traditional social system to meet the challenges of

these settlements, while being subjected to the discriminatory policies of the Canadian government (Kral et al. 2014).

Furthermore, the federal government introduced policies of forced assimilation and cultural suppression of Aboriginals through the prohibition of religious and cultural practices, including the potlatch or Sun Dance (Hoxie 1996), and enforcement of mandatory attendance of Aboriginals as young as 3 years of age to residential schools (Aboriginal Healing 2008; Royal Commission 1996). Residential schools were boarding schools administered by the Catholic, Anglican and United Churches, which also established communal churches in Inuit settlements (Aboriginal Healing 2008). They were first implemented in the early 17th century and lasted until the beginning of the 20th century, with the last school closing in 1996 on Prince Edward Island (Aboriginal Healing 2008). It is estimated that more than 150,000 Aboriginal children were taken from their homes and enrolled in these residential schools that had as their mandate to 'civilize', educate, and prevent the intergenerational transmission of Aboriginal cultural practices and traditions (TRC 2015). Only with the Royal Commission on Aboriginal Peoples in the early 1990s and the recent Truth and Reconciliation Commission did survivors come forth with public accounts of sexual and physical abuse and neglect, which were officially acknowledged by the federal government.

The government's paternalistic approach to Aboriginals was also propagated through institutionalized discrimination and political oppression. This was most evident in the government's child and welfare services in the 1960's, which emphasized preventing 'child neglect' (Swift 1995). Poverty, the absence of family reunification services, and the lack of access to preventive family counseling services that were offered by provincial child welfare policies to non-Aboriginals exacerbated charges of 'child neglect' (Swift 1995), which ultimately led to

systematic out-adoption and long-term foster care for Aboriginal, including Inuit, children (MacDonald 1995). These practices were later referred to as the "Sixties Scoop" (Johnston 1983). As such, Aboriginal children were in foster care for significantly longer periods of time than non-Aboriginal children, with the percentage of foster care children who were Aboriginal increasing from 1% in 1959 to 30-40% by the end of the 1960's (Fournier & Crey 1997; MacDonald 1995). However, by the late 1970's, nearly all Inuit children were placed in Native foster homes by the Quebec Ministry of Social Affairs (Johnston 1983). This was not the case in the Northwest Territories, where the vast majority of Inuit foster children (75%) were placed in non-Native homes by the Northwest Territories Department of Social Services (Johnston 1983). The effects of this forced assimilation, cultural genocide, and institutionalized discrimination on Aboriginals endure to this day.

Enduring repercussions of colonialism and cultural genocide

The enduring effects of colonialism are still seen today in the social, health, educational, economic, and political disparities afflicting circumpolar Inuit (Allen et al. 2013; Kral et al. 2011; Young & Bjerregaard 2008; Wexler et al. 2013, 2014).

Social discontinuity. Today's indigenous youth are growing up in a strikingly different context than their ancestors (Wexler 2014). Historically, collectivism and kinship were the pillars of Inuit culture and social organization (Bodenhorn 2000; Briggs 1995; Damas 1968; Guemple 1965; Malaurie, 2007; Nuttall 2000; Stevenson 1997; Trott 1982). Elders, members of the extended family and wider social networks of support were responsible for the intergenerational transmission of values and knowledge, including those related to kinship and mutual interdependence (Saagiaqtuq et al. 2001). Important features of mutual interdependence among the Inuit included collaborative partnerships, extended family kinship patterns, and dyadic

relations within the nuclear family (Minor 1992). Gender stratification of roles and arranged marriage at an early age were the norm within traditional collectivistic Inuit societies (Kral et al. 2014). These traditional norms and values were not immune to the fracturing effects of colonialism, and later institutionalized discrimination and cultural suppression by the government. Indeed, sedentarization in larger settlements profoundly changed Inuit social dynamics (e.g. structure, community, family life and communication, parenting, traditional gender roles, and intergenerational relations) (Kral et al. 2011, 2014) and propagated feelings of powerlessness, dispossession, and state dependence among Inuit (Brody, 1991). For instance, men, who had traditionally been hunters and food providers, were disempowered to work as settlement laborers or unemployed welfare recipients (Irwin, 1989). Also, arranged marriages gave way to personal selection of romantic and marital partners without consulting one's parents (Donnor 2002; Graburn 1969), which altogether emphasizes the individualized self and de-emphasizes other important kinship relationships at the community level (Wardlow & Hirsch 2006). These cumulative changes may have contributed to many of the current challenges experienced by Inuit youth, who are charged with the difficult task of finding new ways to navigate an increasingly complex society marked by competing traditional and modern values (Wexler et al. 2014). Cultural change and structural disadvantage have been linked to issues of overcrowded homes due to housing shortage, alcohol abuse, domestic violence, and a wide array of health problems (Erickson, 2005; Gone 2007; Kirmayer, Tait & Simpson 2009; Kral et al. 2014; Purich 1992; Wexler 2006).

Health inequities. The arrival of European colonizers continued to decimate the indigenous population by infectious diseases until the mid-20th century, at which point one-fifth of the Inuit population was estimated to have tuberculosis (Grygier 1997; Kenleyside 1990; Kirmayer e 2000; Stannardt al. 1992; Thornton 1987). In addition to these epidemics, government-mandated

sedentarization caused a drastic shift in (i) Inuit lifestyle from semi-nomadic extended family groups to government-run settlements; (ii) diet, with the Inuit becoming increasingly reliant on European foodstuffs; and (iii) traditional hunting activities, which hindered intergenerational transmission of values and knowledge (Kral et al. 2011). The impacts of many of these changes persist to this day, as evidenced by health and social problems, including: high infant and young child mortality; high maternal morbidity and mortality; infectious diseases (e.g. tuberculosis); malnutrition and retarded growth (i.e. starvation or inadequacy of food and dietary energy); shortened life expectancy at birth; diseases associated with tobacco use; social problems, illnesses and deaths linked to alcohol and other drug abuse; accidents, poisonings, interpersonal violence, homicide, suicide; obesity, diabetes, hypertension, cardiovascular disease, chronic renal disease (lifestyle diseases); and diseases caused by environmental contamination (e.g. by heavy metals, industrial gases, effluent wastes) (Gracey & King 2009; Grygier 1994; Waldram, Herring & Young 1995; Young 1988, 1994). The infant mortality rate for circumpolar Inuit is 3.5 times higher than the national rate (Kral et al. 2011). Life expectancy of Inuit is 12 years lower than that of the general population. These problems are exacerbated by the effects of poverty and poor living conditions.

Educational, economic and political disparities. Owing to their geographic isolation and the residual effects of colonialism, Inuit have a level of educational attainment that is significantly lower than that of the Canadian general population (Lessard et al. 2008). Combined with limited employment opportunities, this has resulted in a large cohort of young Inuit with limited vocational opportunities in the Arctic (Lessard et al. 2008). As a result of limited vocational opportunities and the rise of capitalism and globalization, circumpolar Inuit currently face severe economic and political marginalization in comparison to the general population (Kirmayer et al. 2000). Poverty

has devastated many Northern Inuit communities since the early 1980's following the collapse of the fur trade industry (Frideres 1998). Furthermore, traditional subsistence activities (e.g. hunting, fishing), which once played a pivotal role in the survival of Northern Inuit communities and their culture, have significantly declined due to their devaluing by today's capitalistic society (Krupat 1996) and environmental changes (Furgal & Sequin 2006; Van Oostdam et al. 2005). Indeed, rapid climate change has had detrimental impacts on the lifestyle, livelihoods, culture, health and well-being of Inuit (Cunsolo Willox et al. 2013; Ford et al. 2010; Kirmayer et al. 2000; Krupnik & Jolly 2002; Lehti et al. 2009; Nuttall 2000; O'Donnell & Tait 2004; Parlee & Furgal 2012; Pearce et al. 2010; Ulturgasheva et al. 2014; Young & Bjerregaard 2008). Climate change has potential massive implications for food security and nutritional health in the Arctic (Furgal & Seguin 2006; Ulturgasheva et al. 2014; Van Oostdam et al. 2005).

Historical trauma and the mental health crisis. Based on their study of the 1890 Wounded Knee Massacre of the Lakota people in the United States, Brave Heart and Debruyn (1998) coined the term 'historical trauma', or 'historical unresolved grief', to refer to the cumulative effect of emotional and psychological wounding over the lifespan and across generations as a result of shared traumatic experiences (e.g. historical oppression, cultural genocide). This 'collective trauma', which includes: "the structural effects of disrupting families and communities; loss of parenting skills as a result of institutionalization; patterns of emotional response resulting from absence of warmth and intimacy in childhood; carryover of physical and sexual abuse; loss of Indigenous knowledge, traditions and languages; systemic devaluing of Indigenous identity" (King, Smith & Gracey 2009, p.78), has had transgenerational effects on the Inuit population. Along with intergenerational segregation, historical trauma has been linked to health inequities (Durie, Milroy & Hunter 2009) as well as the mental health crisis that continues to affect the Arctic

(Kirmayer et al. 2000; Wexler, 2006; Wexler et al. 2008; Wexler, Silviera, & Bertone-Johnson 2012). In response to the mental health crisis in the North, Health Ministers and representatives from Member States of the Arctic Council signed the Arctic Health Declaration in Nuuk in 2011, with the mandate to ‘‘enhance mental health and prevention of substance abuse and suicide through exchange of experiences and good practices’’ (Arctic Council Secretariat 2011). In order to respond effectively to this mandate, mental health professionals working in the North need to familiarize themselves with Inuit notions of health and wellbeing, and structure the delivery of health care services accordingly.

Indigenous notions of wellbeing

Culture plays an important role in shaping notions of well-being and mental health. Within the Inuit context, ‘ecocentrism’ is strongly reflected in notions of health and well-being in that they incorporate individual physical, emotional, mental, and spiritual wellness while placing emphasis on connections with others (i.e. interdependence and kinship) as well as the land (*nuna*), animals, and spiritual world (Drummond 1997; Gray 1998; Kirmayer 1994; Stairs 1992; Stairs & Wenzel 1992). Such a relational view of the self is central to Inuit culture, thought, and experience. By carrying out subsistence activities (e.g. hunting, fishing) and eating ‘country food’ (e.g. raw meat and fish), the individual is in constant transaction with the environment (Kirmayer et al. 2009). Establishing and maintaining strong connections to the land carry several important implications for Inuit mental health, including: (i) perpetuating feelings of self-efficacy (Brody 1975) and self-sufficiency by reminding them that the Inuit peoples can survive and support themselves in the harsh Arctic environment despite the pressures of capitalism and globalization (Kirmayer et al. 2009); (ii) strengthening kinship bonds with other community members through

acts of sharing (Tanner 1993); (iii) reinforcing their cultural identity, to which eating 'country food' (e.g. whale skin and blubber (*maktak*) or caribou or other grazing animal (*qisaruaq*)) is central (Borré 1991; Graburn 2006; Kirmayer 1988); (iv) facilitating intergenerational transmission of traditional Inuit values and knowledge (*qaujimajatuqangit*), including skills related to living on the land, which provide a source of strength and resilience (Kirmayer et al. 2009); and (v) providing the Inuit peoples with a 'memory-scape' by reminding them of the cultural history attached to their lands (Nuttall 1992). Such connections to the land and animals can thus have protective effects on Inuit mental health. Conversely, when ties to the land have been threatened or broken (e.g. through damage to the land, appropriation of land, etc.), some authors suggest that Inuit have reported feelings of weakness, lassitude, and tiredness as well as irritability, uncooperativeness, lack of interest in daily events, and generalized depression (Borré 1991). For instance, Inuit of Nunavik reported feelings of depression when unable to consume seal meat for long periods of time. Furthermore, interdependence and kinship ties with one's family (Briggs 1995; Kral et al. 2011), extended family and wider social networks of support are central to Inuit notions of wellbeing. In their study of notions of wellbeing and happiness (*quviasungniq*) among Inuit youth, Kral and colleagues (2011) identified three recurring themes that were central to wellbeing: (i) family and kinship (e.g. being with family, speaking with family, visiting, going on the land together, sharing food together, etc.); (ii) talking/communication (e.g. talking with family members, communicating negative feelings, past negative experiences, or remorse); and (iii) traditional Inuit cultural values and practices (e.g. knowledge about or going on the land, hunting, camping, eating country food, spending time with Elders, making traditional tools, skin clothing, building an igloo, and Inuit beliefs and cosmology). Future clinical work needs to

consider the Inuit ecocentric notions of health and wellbeing described above, as well as culturally distinctive notions of mental health and illness.

Indigenous notions of mental illness

Early studies of abnormal behaviors exhibited by Inuit were interpreted through a Westernized lens as 'culture-bound syndromes', "thought to be uniquely linked to cultural beliefs and practices" (Kirmayer et al. 2009, p. 5). However, these reports of culture- in the late 1800s and early 1900s were decontextualized. In the 1960's there was a shift toward exploring Inuit explanations for 'health' and 'mental health' disturbances.

Based on interviews and case studies conducted in Inuit communities on the Hudson coast of Quebec in 1963, Vallee (1966) found that there was no term for 'mental illness' in Inuktitut. In an effort to further characterize what 'mental breakdown' meant to Inuit, he conducted open-ended ethnographic interviews in which he asked participants to elaborate on "happenings in which people were rendered incapable of performing in their everyday capacities and where there was no obvious physical cause for this inability, and where the individuals behaved in an unusual, although not necessarily unpatterned, manner" (Vallee 1966, p. 57). His results highlight four patterns of emotional/behavioural illness: (i) epilepsy; (ii) simple hysteria, or isolated episodes of conversion symptoms or dissociation; (iii) withdrawal with acute melancholy; and (iv) a state of agitated, accelerated, and incoherent behavior (*quajimaillituq*). Vallee (1966) concluded that Inuit tend to label states rather than people. For instance, a person exhibiting abnormal behavior one day may exhibit normal behavior the next day (Nuttall 1998).

To explore Inuit concepts of mental health problems, Kirmayer and colleagues (1994) conducted interviews in Nunavik in the 1990s. They identified four main classes of causes of

mental health problems. First, physical or organic effects of the environment or human behavior (ex: genetic, drug use, sleep deprivation, etc.) were identified as possible causes of mental health disturbances. Second, psychological or emotional factors relating to the workings of the mind and capacity for thought or reason (*isuma*) were highlighted as potential problems for child-rearing, interpersonal relations, and mental health. More specifically, too much thinking (*isumaaluttuq*) or being completely unable to think because of "having no mind" *(isumaqanngituq*) were identified as mental health disturbances and abnormal behavior. *Isumaaluttuq* was characterized by disturbed thought processes, "ranging from ordinary worry and preoccupation to profound depression, withdrawal, and behaviour clinically consistent with psychosis" (Kirmayer et al. 2009; Ootoova et al. 2001). On the other hand, Inuit characterized *Isumaqanngituq* as "he has no mind/brain," "crazy," "doesn't know what's going on around him," "doesn't know what he's doing," "acting strange". Third, mental health problems could also stem from spirit possession, intrusion or attack (*Utuuluttaq*) (Fletcher and Kirmayer 1997; Law and Kirmayer 2005; Merkur 1991). Finally, the impact of cultural change, marginalization and social disadvantage on mental health were also identified. It must be noted that most Inuit informants recognized more than one cause as giving rise to mental health problems (Kirmayer et al. 2009).

In light of the wide diversity of factors underlying Inuit notions of wellbeing and illness as identified by the research literature, one must take caution in interpreting the current suicide crisis ravaging the Arctic as solely due to mental health problems (Kirmayer et al. 2000). A comprehensive approach to the problem is thus warranted.

Risk factors associated with Inuit suicidal behaviors among Inuit

A 1992 survey of 100 Inuit young people aged 14-25 years in a single Nunavik community, which had recently suffered a cluster of suicides, identified parental history of an alcohol or drug problem, having a friend who had attempted or completed suicide, a history of solvent abuse, a personal or mental health problem in the last year, and feelings of alienation from the community and family as positive correlates of suicide attempts (Kirmayer et al. 1996). This study represents a major landmark in the field of Inuit mental health research, because it was the first to examine risk factors associated with attempted suicide among Inuit using epidemiological survey data. Multivariate logistic regression analyses revealed that the odds of suicide attempt were increased by 5 times for victims of physical abuse, 6 times for those with a substance-abusing parent, and 8 times for those who had inhaled solvents in the past. Significant age differences were also found in that younger people, 14-19 years of age, were more likely to report multiple suicide attempts, suicidal thoughts during the previous 6 months, and use of solvents in the past. This is particularly alarming given that more than half of the Inuit population in Northern Canada is under the age of 24 (ITK 2008; Kral et al. 2011). Significant gender differences were also found, with males more likely than females to report past suicide attempts. This observation contrasts with findings from the general population, where females tend to be more likely to report past suicide attempts and men are more likely to die by suicide, perhaps owing to the fact that males tend to use more lethal methods when making a suicide attempt (Garrison 1992). Kirmayer and colleagues (1996) explain these gender differences among Inuit by positing comparatively higher levels of acculturation stress for males stemming from greater discontinuity between their traditional and contemporary social roles men (Condon 1988; Matthiasson 1992; McElroy 1975; O'Neil 1986).

A secondary analysis of data from the Santé Quebec Inuit Health Survey conducted in 1992 identified a cluster of psychosocial factors associated with suicide attempts (Kirmayer et al. 1998). Among these correlates were substance use (e.g. solvents, cannabis, cocaine), recent alcohol abuse, psychiatric problems, and a greater number of stressful life events in the last year. Regular church attendance was negatively associated with attempted suicide. There were gender differences, with the strongest correlates of suicide attempts for females including psychiatric problems, recent alcohol abuse and cocaine or crack use, in comparison to solvent use and number of recent stressful life events for males.

In an effort to monitor changes over time in health status as well as risk factors in Inuit of Nunavik, another extensive survey was conducted in 2004 (Kirmayer & Paul 2007). There was a marked increase in suicide ideation and attempts from 1992 to 2004. Suicide attempts were more prevalent among females, who were aged 15-29 or 30-49 years, married, employed and had some high school education. In addition, higher levels of emotional distress, impulsivity, feelings of boredom and lower levels of self-esteem were strongly correlated with past suicide attempts among both men and women. Other risk factors included having someone who made one worry often or demanded too much, all forms of substance use, all forms of sexual abuse, and interpersonal violence. These results are consistent with previous findings from the research literature (Borowsky et al. 1999; Kirmayer et al.1998; LeMaster et al. 2004; Yoder et al. 2006).

In further analysis of this same data, Fraser et al. (2014) identified gender-based risk and protective factors in Inuit of Nunavik. Unlike Kirmayer and colleagues' 1996 findings, more females (39%) reported past suicide attempts than males (22%). Multivariate analyses indicated that marijuana use, psychological distress and participation in hunting activities were strongly correlated with suicide attempts in the past 12 months among females, whereas psychological

distress and alcohol misuse were strongly correlated with suicide attempts among males (Fraser et al. 2014).

In spite of these risk factors and the continuing challenges faced by Indigenous Peoples, there are several protective factors against mental health problems and suicidal behaviors that have identified in the research literature.

Family, community, and culture-specific protective factors against suicidal behaviors

Resilience, cultural continuity, identity, enculturation, and family cohesiveness have been linked to indigenous well-being and positive mental health (Chandler 2000; Chandler, Lalonde & Sokol 2000; Wexler 2014).

Resilience. Resilience is defined as an individual's ability to strive in the face of adversity and resolve situation-dependent challenges "despite high-risk status, chronic stress, or experiences of prolonged or severe trauma" by making use of internal and external resources (Masten, Best & Garmezy 1990; Rutter & Sroufe 2000; Waters & Sroufe 1983). In family and community contexts, resilience can be found in the durability of interpersonal relationships in the extended family and wider social networks of support (Kral et al. 2014). Indigenous ideas about resilience may be grounded in local cultural values that have persisted despite historical adversity, or that have emerged out of the revival of Indigenous identities (Kirmayer et al. 2003; MacDonald et al. 2013; Stout 2003; Tanner 2004, 2008). An ecological model of resilience is consistent with Indigenous worldviews (Kirmayer et al. 2011; Lafrance, Bodor & Bastien 2008) in that it incorporates the intricate relationships of social, cultural, and developmental factors throughout the lifespan, and across generations (Cicchetti & Lynch 1993; Kirmayer et al. 2009, 2011), which maintain the structural integrity of the overall social-ecological system consisting of the dynamic interplay

between humans and the environment (Allen et al. 2014; Chapin et al. 2011). In accordance with this model, resilience at individual, community and cultural levels can be achieved through the individual's relationships to the land and the animals, through a community's capacity for resourcefulness and adaptability in the harsh Arctic environment, the community's ability to maintain its Indigenous language and culture, or its ability to resist marginalization and external control and reassert collective political agency (Kirmayer et al. 2003, 2009, 2011; Kral et al. 2014; Wexler et al. 2014). An expanded resilience model put forth by Lafrance and colleagues (2008) includes the tightly woven relationships between the spirit world, nature, community, family, and individuals, which collectively work to shape the roles of family, identity, and cultural formation. The specific resilience processes that fall under this framework include community cohesion, cultural connectivity, spiritual traditions, intergenerational transmission of traditional knowledge and values, cultural revival, subsistence activities, acknowledgment of historical oppression and trauma, and different traditional modes of expression, such as metaphor, ritual, and storytelling, also referred to as 'narrative resilience' (Allen et al. 2014; Kirmayer et al. 2011; Kral et al. 2009; Nuttall 2000; O'Donnell & Tait 2004; Parlee & Furgal 2012; Wexler et al. 2013, 2014; Wexler & Gone 2012).

Cultural continuity. Cultural continuity has been defined as the "degree to which individual Aboriginal communities have successfully taken steps to secure their cultural past in light of an imagined future" (Chandler 2000). In a study of suicide among First Nations in BC, Chandler and Lalonde operationalized cultural continuity with an index based on "band-level measures of community control over the delivery of health, education, child protection and policing services, and the achievement of a degree of self-governance, secure access to traditional lands, and the construction of facilities for preserving cultural artefacts and traditions" (2007, p. 392). Low levels

of cultural continuity were found to be an important correlate of community rates of attempted suicide, motor vehicle accidents and high school non-completion (Chandler & Lalonde 1998, 2008; Chandler, Lalonde & Sokol 2003). An important way in which cultural continuity can be manifested is through the transmission of language, a highly tangible symbol of culture, group identity and spiritual vitality, from one generation to the next (Hallett et al. 2007). In fact, suicide rates were found to be six times greater in those bands in which less than half of the members reported conversational knowledge of their native tongue, thus highlighting the importance of cultural continuity in mental health promotion.

Cultural identity. Cultural identity is a complex construct that includes the perception or belief that one is indigenous as well as the degree of importance that one attributes to having and maintaining relationships to one's culture (Berry 1999). A positive cultural identity has been linked to feelings of self-worth, self-efficacy, connectedness, and purpose among Indigenous Peoples (EchoHawk 1997; Minore et al. 1991; Wexler 2014; White & Jodoin 2004). Increased knowledge about one's culture and cultural identity have been linked to less suicidal ideation, fewer symptoms of distress and depression, and greater self-esteem among indigenous adolescents (Chandler et al. 2003).

Enculturation and engagement in social activities. Greater involvement in cultural activities and a stronger sense of cultural identity have been linked to enhanced well-being in the form of increased prosocial behavior in adolescents, reduced depressive symptoms in adults, and less alcohol abuse among adults (Chandler 2000; Chandler et al. 2000; Whitbeck et al. 2001, 2004). 'Enculturation' has been viewed by many as a resilience strategy (Ulturgasheva et al. 2014; Wexler et al. 2014). Based on their comparative analysis of adolescent experiences across five circumpolar communities (Alaskan Yup'ik, Alaskan Inupiaq, Canadian Inuit, Norwegian Sami, Siberian

Eveny), Ulturgasheva and colleagues (2014) identified four community-level resilience strategies, including (i) movement on the land; (ii) kinship ties (and intergenerational family relationships); (iii) participation in subsistence activities (e.g. hunting, fishing, gathering); and (iv) sharing, or '*Ningiqtuq*', which enhanced communal solidarity and kinship relationships. Participation in subsistence activities enabled youth to become involved in social and culturally vital interactions, including intergenerational knowledge transmission, family bonding, and rites of passage (Ulturgasheva et al. 2014) that allowed them to attain full adult status or become "a real person", which is what "Inuit" actually means (Gone, Miller & Rappaport 1999). In an analysis of data from the Santé Québec Cree Heath Survey, Kirmayer and colleagues (2003) found that the amount of time spent on land was positively associated with mental well-being. Also, engagement in social and school-related activities, such as church attendance and high level of academic achievement, was found to be negatively associated with risk of suicide attempt among Inuit youth living in Nunavik (Kirmayer et al. 1996).

Family cohesiveness. Finally, family support and cohesiveness, including parental presence, availability and involvement in their child's life, have also been linked to a decrease in risk-taking and delinquent behaviors among American Indian (AI) youth (Mmari, Blum & Teufel-Shone 2010). Other family-level protective factors, such as close relationship with parents (Allen et al. 2006; Mohatt et al. 2004; Spein et al. 2013), affection and praise (Allen et al. 2006; Mohatt et al. 2004; Wexler et al. 2013), models of sobriety and safe/protective family environment (Allen et al. 2006; Mohatt et al. 2004), sense of being treated as special or being valued (Allen et al. 2006; Mohatt et al. 2004), kinship structure (i.e. family connectedness and importance of extended family and adopted kin) (Bals et al. 2010; Bals et al. 2011; Kral et al. 2011; Mohatt et al. 2004; Wexler et al. 2013; Wexler et al. 2014), and ethnic socialization at home (Bals et al. 2010; Bals et al. 2011),

have been identified among circumpolar indigenous peoples, including Inuit.

The power of these community, culture-specific and family factors in protecting Aboriginal people from mental health problems, including suicidal behaviors, stems from the fact "they (i) contribute to developing a supportive social environment; (ii) enhance self-esteem and self-confidence and foster self-reliance; and (iii) enable individuals to participate in their land-based culture" (MacDonald et al. 2013).

Objectives

The present research involved an observational study using secondary analysis of data from the International Polar Year Inuit Health Survey, a large-scale epidemiological survey of Inuit across the arctic of Canada. The IHS used many of the same mental health indicators developed for the earlier surveys in Quebec (Kirmayer et al.1998; Santé Québéc 1992). To date, the large epidemiological dataset of the International Polar Year Inuit Health Survey has not been studied with multivariate models to determine the risk and protective factors for suicide ideation and attempted suicide.

The objectives of this study were to:

i. Identify the prevalence and sociodemographic (e.g. age, gender, SES, location) correlates of suicide attempts and suicide ideation in Inuit populations of Nunavut, Nunatsiavut and Inuvialuit;
ii. Identify the psychosocial (e.g. depressive symptoms, stressors, resilience factors) correlates of suicide attempts and suicide ideation in Inuit populations of Nunavut, Nunatsiavut and Inuvialuit;

iii. Develop multivariate models of risk and protective factors associated with suicide attempts and ideation;

iv. Identify the policy and prevention implications of the findings.

The multivariate analysis presented in this study provides a more robust, in-depth understanding of the interplay of multiple factors. As well, although much research has been conducted on suicide ideation, attempts and completion, there is a lack of information on the correlates of suicide attempts at the actual time of the attempt. This study aimed to address this knowledge gap by analyzing responses to a novel measure that examines events at the time of the actual suicide attempt. This novel measure that was specifically designed for the IPY survey by Dr. Kirmayer may allow the identification of specific patterns or profiles of attempted suicide. Furthermore, research on the factors associated with suicide ideation and attempts has been conducted among the Inuit of Nunavik but, to date, little comparable work has occurred in Nunavut, Nunatsiavut and Inuvialuit Settlement Region. This study therefore aimed to explore whether these factors carry the same impact across these regions, and whether region-specific differences exist.

Based on the literature review presented above, the following potential risk and protective factors for suicide among Inuit were identified: psychological distress; substance abuse; exposure to interpersonal violence; social support; and participation in land-based and community activities. The large sample size in this study allowed for the identification of novel correlates and the examination of their relative contributions to suicide risk in multivariate models. The results of this study will provide relevant information to guide the development and implementation of mental health promotion and suicide prevention programs for Inuit communities

Method

Data Collection and Sample

The International Polar Year Inuit Health Survey (IHS) was conducted across the arctic in 2007 and 2008. Data collection was performed on the Canadian Coast Guard Ship Amundsen, which was renovated for research purposes. The ship visited 36 coastal villages in Nunavut, Nunatsiavut, and Inuvialuit to assess the health status of a representative sample of Inuit residents. Data collection took place in a two-step process. First, households in each village were randomly selected. Survey staff presented themselves to the selected households to ask its residents to participate in the study and provide written consent before completing interviews and clinical tests. Participation was voluntary. A total of 1,901 private Inuit households (1,372 from Nunavut, 240 from Nunatsiavut, and 289 from Inuvialuit) were visited by interviewers, who met the household respondents to complete the Identification Chart and Household Questionnaire on housing, environment, nutrition, and certain health indicators. A respondent was defined as an Inuit adult able to provide information to be collected on every member of the household. Second, all individuals aged 15 years or older belonging to the same household were invited to meet survey staff a few days later on the ship to respond to an interviewer-completed questionnaire (Individual Questionnaire) as well as a self-administered Confidential Questionnaire. The Individual Questionnaire aimed to collect general health information on subjects such as health perceptions, women's health, living habits, and social support. The Confidential Questionnaire dealt with more sensitive issues such as suicide, drugs, violence, and sexuality. The sample for the present study consists of 2,595 permanent residents of the region (1,923 from Nunavut, 310 from Nunatsiavut, and 362 from Inuvialuit) who participated in this health survey.

Measures

Data from the self-administered and interviewer-completed 'Confidential Community and Personal Wellness' and 'Individual' questionnaires were analyzed for the purposes of this study.

Sociodemographic characteristics.

Gender, age, socioeconomic status (SES), and place of residence (e.g. Baffin, Kitikmeot, Kivalliq, Nunatsiavut, and Inuvialuit Settlement Region (ISR)) were obtained from the 'Individual Questionnaire', which was administered by the interviewer.

Suicide Ideation and Attempts.

Suicide ideation and attempt were assessed with a self-report measure completed by adult respondents. This included 4 questions pertaining to suicide ideation and attempts, both lifetime and in the last 12 months prior to the survey. The questions regarding suicide ideation and attempts were hierarchical in that only those who answered "yes" to ""Have you, ever in your life, thought seriously about committing suicide (taking your life)?" were then asked "Have you ever attempted suicide (tried to take your life)?".

In addition, those who had attempted suicide were asked to describe the context of "just before" their most recent attempt through a checklist that include items addressing thoughts and feeling (very angry, very depressed, bored or tired of life, dreaming/thinking of others who died by suicide), stressors (conflict with family, conflict with friends, breakup with partner or spouse, troubles at school or work, legal problems), and substance use (drinking, sniffing or using drugs, (Appendix A).

Psychosocial Correlates

(i) Psychological distress

Serious psychological distress was measured by the Kessler K-6 a measure of non-specific psychological distress based on symptoms of anxiety and mood disorders (Kessler et al. 2003). This scale asks how often in the past 30 days the respondent has been feeling nervous, hopeless, restless, worthless, depressed, and that everything was an effort (Bougie et al. 2016). The K-6 was chosen for this study following survey development workshops with Inuit consultants, which revealed that the item content corresponded well with Inuit modes of expressing distress in clinical settings (Fraser et al. 2014). The scale has good internal reliability in the general population (alpha coefficient =.74, Kessler et al. 2003). The K-6 has been validated in the Canadian general population and widely used in diverse cultural contexts across the world (Browne et al. 2010; Cairney et al. 2007; Andrews & Slade 2001; Fassaert et al. 2009; Furukawa et al. 2003, 2008; Kessler et al. 2002, 2003; Sakurai et al. 2011) and has also recently been validated as a screening tool in two American Indian (AI) populations (Mitchell & Beals 2011) and among First Nations, Métis and Inuit Peoples of Canada (Bougie et al. 2016). Responses were coded on a 5-point rating scale ranging from 0 (*none of the time*) to 4 (*all of the time*) and summered to yield a total score. Scores ≥13 are generally indicative of serious psychological distress.

(ii) Substance use

Participants were asked a series of questions in the 'Community and Personal Wellness Questionnaire' about the frequency of their alcohol consumption in the 12 months prior to the survey. Four other categories of drug consumption over the 12 months prior to the survey were assessed: sniffing glue, gasoline, or other solvents; recreational drugs (e.g. pot/marijuana, hashish);

hard drugs (e.g. cocaine, crystal meth); and use of regular medicine or prescription drugs "to get high" (e.g. Tylenol, Ativan or cough syrup). Participants were also asked to indicate the number of times they 'blacked out' or passed out from drinking alcohol in the 12 months prior to the survey.

(iii) Exposure to interpersonal violence

Participants were asked to complete questionnaires about physical and sexual abuse during their childhood and as an adult. The questions were asked from the victim's perspective only and did not ask the participant to identify the individual(s) who committed the act of violence.

Childhood physical violence. The questions about physical violence were drawn from the Conflict Tactics Scale, which was designed to measure verbal aggression and conflict within the family (Straus 1979; Straus et al. 1996). Participants were asked to answer 5 questions relating to physical violence experienced as a child (up to the age of 16): "Have you as a child ever been subjected to one or more of the following forms of violence: (1) pushed, shaken or struck lightly? (2) kicked, struck with a fist or object? (3) thrown against furniture, into walls, down stairs or similar acts? (4) subjected to strangulation or choking attempt? (5) assaulted with a knife or firearm?" The responses to these questions were summed to create an index of Childhood Physical Violence ranging from 0 to 10. This scale had very good internal reliability (Cronbach's alpha = .78). Participants were also asked to indicate the frequency with which the following 8 forms of violence occurred as a child on a 4-point rating scale ranging from 1 (*never*) to 4 (*often*): (1) subjected to verbal abuse, (2) pushed, grabbed, or shoved, (3) have had someone throw something at them, (4) slapped, or spanked, (5) kicked or bitten, (6) have had someone hit them with something, (7) choked, burned or scalded, and/or (8) physically attacked. The responses to these

questions were summed to create an index of Frequency of Childhood Physical Violence ranging from 8 to 32. This scale had very good internal reliability in the present study (Cronbach's alpha = .95).

Adulthood physical violence. Participants were also asked to indicate the frequency with which they experienced each of the following 6 forms of violence as an adult on a 4-point rating scale ranging from 1 (*never*) to 4 (*often*): (1) subjected to verbal abuse; (2) pushed, shaken, or struck lightly; (3) kicked, struck with a fist or object; (4) thrown against furniture, into walls, down stairs or similar acts; (5) subjected to strangulation or choking attempt; (6) assaulted with a knife or firearm. The responses to these questions were summed to create an index of Adult Physical Violence ranging from 6 to 24 This scale also had good internal consistency (Cronbach's alpha = .95).

Childhood sexual abuse was defined as having been forced to engage in sexual activity including kissing or fondling (Fraser et al. 2014). Participants were asked to indicate on a binary scale (*yes* or *no*) if as a child: (i) someone had ever exposed themselves to you more than once; (ii) threatened to have sex with you; (iii) touched the sex parts of your body; and (iv) tried to have sex with you or sexually attacked you. The 4 items were summed to create a composite scale scored from 0 to 4, which had good internal consistency (Cronbach's alpha = .93).

Adulthood sexual abuse was assessed with a single dichotomous item which asked respondents if they had ever experienced any form of forced or attempted forced sexual activity.

(iv) Sociocultural protective factors.

Social support. Four questions addressing social support were assessed on a 5-point rating scale ranging from 1 (*never*) to 5 (*all of the time*). Two questions asked about the availability of

informal forms of social support: having someone to have a good time with, and having someone to turn to for emotional support. One question asked about feeling alone when one would prefer to be surrounded by others. Finally, another question asked about potential emotional burden due to relationships (e.g. "How often does someone make you feel worried or demand too much from you in everyday life?").

Participants were also asked to indicate if they were happy with their employment situation at the time of the survey, recorded as a single dichotomous (yes/no) response.

Community participation. Two questions were used to assess the level of participation in community activities: one on the frequency of participation in recreational activities, and one on the frequency of participation in activities that benefited the community. These questions were assessed on a 5-point rating scale ranging from 1 (*never*) to 5 (*very often*).

Healing and wellness activities. Respondents were asked to indicate how many days they spent outside of the community on the land in the 12 months prior the survey, and how important/necessary it was for them to spend time on the land on a 4-point rating scale ranging from 1 (*very important*) to 4 (*unimportant*). They were also asked to indicate the types of traditional land-based activities (e.g. hunting, fishing, camping, berry-picking, etc.) they did in the 12 months prior to the survey.

Help-seeking and coping strategies were assessed by asking "What do you do to relieve stress/" with 16 dichotomously scored response categories: meditation/prayer; reading and/or writing; talking to others; spending time with family or friends; camping; hunting; sleep; drugs; alcohol; gambling; TV/movies; internet; sports; food; music/art/crafts; and other (specify).

Data analysis

The participants' performance on the battery of wellness, suicide, alcohol and drug consumption, and interpersonal violence measures was analyzed. Those who refused to answer a question were assigned a "missing" value for the given variable. Mean imputation was performed for missing items on the Kessler-6 composite score if the participant completed a minimum of 80% of the items on the scale. The reliability of the measures was examined using Cronbach's alpha. Bivariate analyses were performed to identify the risk and protective factors that are correlated with suicidal ideation and suicide attempts. Multivariate logistic regression analyses were performed to examine the relative contribution of risk and protective factors to likelihood of suicidal ideation and suicide attempt. Statistical analyses were conducted with the use of the STATA statistical package software (version 12.1).

Ethical Considerations

Data collection was approved and supervised by McGill's Institutional Review Board, the Nunavut Research Institute, the Nunatsiavut Steering Committee, the Aurora Research Institute (Inuvialuit Settlement Region), and Inuit organizations through community-university agreements. Permission to conduct secondary analysis of the data with respect to suicide ideation and attempts was obtained from the Nunavut Inuit Health Survey Steering Committee (NIHSSC) through the current McGill University representative, Dr. Hope Weiler. Upon approval from the NIHSSC, the research project was registered with the Nunavut Research Institute. Relevant aggregate data from the Adult Inuit Health Survey (IHS) was received from the institute via a secure transfer. The thesis supervisor, Dr. Kirmayer, designed the mental indicators for the IHS survey and was authorized

to work with this data. Results will be presented to community representatives for review prior to scientific publication.

Results

Prevalence and sociodemographic correlates of suicide ideation and attempts

A total of 2,240 Inuit from Nunavut, Inuvialuit and Nunatsiavut, between the ages 18 and 90 completed the survey in 2007 and 2008. The characteristics of respondents as well as gender- and age-related differences on sociodemographic and psychosocial variables are presented in Table 1. The average age was 42 years. Most respondents were from Nunavut (76%), more specifically from the Baffin region of Nunavut (36%), compared with Inuvialuit (12%) and Nunatsiavut (12%). The majority of respondents (54%) reported an annual income of less than $20,000.

The average psychological distress score on the Kessler-6 scale was 11.3. A cut-off score of 13 identified 45% of the Inuit population as possible cases of depression or other common mental disorder. Individual item analysis revealed that most respondents reported feeling anxious (73%), restless or fidgety (58%), or that everything was an effort (60%) in the 30 days prior to the survey. The vast majority of respondents (61%) reported having had alcohol in the 12 months prior to the survey. Nearly 20% of participants reported that someone made them worry or demanded too much from them in their everyday lives either all or most of the time. On the other hand, the majority of respondents reported going hunting (63%), fishing (71%), or berry-picking (55%) in the 12 months prior to the survey; that being able to go out on the land was important and necessary (88%); being happy with their job (59%); and that their communities were very or moderately peaceful places to live (65%). Approximately half reported having someone to turn to if troubled or in need of emotional support “most” or “all of the time”.

Females had a slightly higher average score (M = 12, SD = 7) on the Kessler-6 in comparison to their male counterparts (M = 10, SD = 7), but this difference was not statistically

significant. In fact, significantly more females (17%) than males (11%) scored above the cut-off score of 13. Also, a significantly greater proportion of females than males reported drinking alcohol and using recreational drugs (e.g. marijuana) to get high during the 12 months prior to the survey (Appendix B). However, significantly more males (58%) than females (43%) reported using regular medicine or prescription drugs (e.g. Tylenol, Ativan, cough syrup, etc.) to get high during the 12 months prior to the survey. There were no statistically significant gender differences in other forms of substance abuse. Significantly more females than males reported having experienced sexual abuse as a child and as an adult, and physical violence as an adult (Appendix B). In terms of communal or land-based activities, a significantly greater proportion of males than females reported going hunting and participating in activities where people came together to work for the benefit of the community in the 12 months prior to the survey (Appendix B). However, significantly more females reported going fishing and berry-picking in the 12 months prior to the survey. Females were also more likely to report being happy with their current employment status (Appendix B).

Participants were divided into three age categories: 18-29, 30-49, and 50 and above. Comparisons of these different age groups revealed that those aged 18-49 years scored significantly higher on the Kessler-6 as well as on its individual items (Appendix C). In addition, a significantly greater proportion of respondents aged 30-49 years scored above the cut-off score of 13 compared to other age groups. Interestingly, those aged 30-49 years were more likely to report drinking alcohol and using recreational drugs (e.g. marijuana) to get high during the 12 months prior to the survey. However, those aged 18-29 years were more likely to report using solvents (e.g. gasoline, propane, naphtha, sniffing glue, hairspray, vanilla, etc.) and/or hard drugs (e.g. cocaine, crystal meth, etc.) to get high during the 12 months prior to the survey (Appendix

C). A significantly greater proportion of respondents aged 30-49 years reported having experienced physical violence as a child and an adult. Respondents aged 18-29 years were less likely to report childhood sexual abuse. Furthermore, significantly more respondents aged 30-49 years reported going hunting, fishing, and/or berry-picking, and participating in activities where people came together to work for the benefit of the community in the 12 months prior to the survey. They were also more likely to report having someone for emotional support and being happy with their current employment status.

A total of 863 (45%) respondents reported having had suicide thoughts in their lifetime, with significantly more females (65%) reporting suicidal ideation in their lifetime than did men (35%). Also, 12% of respondents reported having had suicide thoughts in the 12 months prior to the survey; 27% reported having attempted suicide in their lifetime; and 5% reported having attempted suicide in the 12 months prior to the survey (Table 2). All rates were significantly higher for females in comparison to males. Interestingly, although respondents aged 18-29 years (54%) were more likely to report suicidal ideation in their lifetime, respondents aged 30-49 years were more likely to report suicidal ideation in the 12 months prior to the survey, having attempted suicide in their lifetime, and having attempted suicide in the 12 months prior to the survey. Also, all rates were significantly higher for respondents from Nunavut in comparison to Inuvialuit and Nunatsiavut (Table 3). All rates were also higher for respondents with an annual income of less than $20,000 (Table 4).

TABLE 1

Sociodemographic and Psychosocial Characteristics of all Inuit Respondents (N=2,240)

	All		Male		Female		18-29 years old		30-49 years old		>50 years old	
	n	%	N	%	n	%	n	%	n	%	n	%
Region												
All	2240	-	863	38.5	1377	61.5	532	23.8	1055	47.1	653	29.1
Nunavut												
Baffin	804	35.9	308	38.3	496	61.7	196	24.4	377	46.9	231	28.7
Kivalliq	540	24.1	227	42.0	313	58.0	135	25.0	259	48.0	146	27.0
Kitikmeot	366	16.3	144	39.3	222	60.7	135	25.0	259	48.0	146	27.0
Inuvialuit	268	12.0	85	31.7	183	68.3	55	20.5	119	44.4	94	35.1
Nunatsiavut	262	11.7	99	37.8	163	62.2	44	16.8	128	48.9	90	34.3
Income level												
<$20,000	1045	54.0	390	37.3	655	62.7	327	31.3	437	41.8	281	26.9
$20,000-$40,000	399	20.0	187	46.9	212	53.1	73	18.3	222	55.6	104	26.1
$40,000-$60,000	251	13.0	106	42.2	145	57.8	30	11.9	149	59.4	72	28.7
>$60,000	258	13.0	113	43.8	145	56.2	26	10.1	147	57.0	85	32.9
Substance use (past 12 months)												
Alcohol	1250	60.7	523	41.8	727	58.2	370	29.6	659	52.7	221	17.7
Blackouts due to alcohol (Mean ± SD)	1158	3.4±4.7	503	3.2±4.7	655	3.5±4.7	358	3.3±5.0	596	3.4±4.6	204	3.4±4.5
Solvent	45	3.0	24	53.3	21	46.7	23	51.1	16	35.6	6	13.3
Marijuana	707	47.6	340	48.1	367	51.9	272	38.5	382	54.0	53	7.5
Hard drugs	69	4.7	32	46.4	37	53.6	34	49.3	33	47.8	2	2.9
Prescription drugs	73	5.1	42	57.5	31	42.5	23	31.5	39	53.4	11	15.1
Psychological attributes												
Psychological distress, K-6 (Mean ± SD)	1829	11.3±7.2	707	10.4±7.3	1122	11.9±7.1	444	12.5±6.8	871	12.2±7.1	514	8.8±7.1
Anxious[a]	1372	72.7	490	67.7	882	75.8	342	74.2	686	76.4	344	65.2
Hopeless[a]	911	48.2	299	41.2	612	52.6	240	51.7	496	54.9	175	33.6
Restless/fidgety[a]	1082	57.5	400	55.3	682	58.9	304	65.1	552	61.9	226	43.3
Depressed[a]	907	48.0	317	43.5	590	50.7	249	53.4	459	51.0	199	37.9
Everything was an effort[a]	1132	60.4	418	58.0	714	61.9	309	67.5	585	65.7	238	45.3
Worthless[a]	748	39.5	223	30.8	525	44.9	205	44.1	384	42.8	159	29.9
Someone to worry about	388	19.7	109	14.5	279	22.9	101	20.8	224	23.8	63	11.6
Interpersonal violence												
Child sexual abuse index (Mean ± SD)	1493	.97±1.4	564	.49±1.1	929	1.3±1.5	374	.79±1.3	719	1.0±1.5	400	1.0±1.4
Child physical violence index (Mean ± SD)	1540	11.3±4.9	584	11.3±4.5	956	11.4±5.1	388	10.9±4.6	739	12.1±5.0	413	10.5±4.7
Adult sexual abuse	285	17.1	33	5.2	252	24.4	57	13.6	147	18.2	81	18.4
Adult physical violence index (Mean ± SD)	1547	9.2±3.9	584	8.4±3.1	963	9.7±4.3	386	8.8±3.7	743	9.8±4.1	418	8.5±3.5
ß												
Potential protective factors												
Goes hunting	1084	63.1	591	54.5	493	45.5	256	23.6	511	47.1	317	29.3
Goes fishing	1214	70.7	515	42.4	699	57.6	274	22.6	571	47.0	369	30.4
Goes berry-picking	946	55.1	305	32.2	641	67.8	205	21.7	427	45.1	314	33.2
Participates in community Activities[b]	471	23.9	214	28.4	257	21.1	42	22.7	77	41.6	66	35.7
Someone for emotional support[a]	983	49.8	368	48.9	615	50.5	235	48.2	490	52.0	258	47.7
Happy with job	1140	58.6	466	62.8	674	56.0	269	55.6	617	66.5	254	47.6

[a] A cumulative percentage of respondents who answered "all" and "most of the time" to these questions is presented.

[b] A cumulative percentage of respondents who answered "very often" and "often" to these questions is presented.

TABLE 2

Prevalence of Suicide Thoughts and Attempts, Lifetime and Past 12-Months Among Inuit (N=2,240)

	All		Male		Female		18-29 years old		30-49 years old		>50 years old	
	n	%	n	%	N	%	n	%	n	%	n	%
Lifetime thoughts	863	44.6	299	34.7	564	65.3	466	54.0	238	27.6	159	18.4
Past 12-month thoughts	219	11.8	57	26.0	162	74.0	86	39.3	113	51.6	20	9.1
Lifetime attempts	500	26.6	161	32.2	339	67.8	145	29.0	285	57.0	70	14.0
Past 12-month attempts	87	4.7	24	27.6	63	72.4	36	41.4	47	54.0	4	4.6

TABLE 3

Prevalence of Suicide Thoughts and Attempts, Lifetime and Past 12-Months Among Inuit by Region (N=2,240)

	All		Baffin, NU		Kivalliq, NU		Kitikmeot, NU		Inuvialuit		Nunatsiavut	
	n	**%**	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**
Lifetime thoughts	863	44.6	351	49.2	178	40.4	158	50.2	86	37.7	90	38.3
Past 12-month thoughts	219	11.8	101	14.7	46	11.0	47	15.8	13	6.0	12	5.3
Lifetime attempts	500	26.6	220	31.5	91	21.0	96	31.9	47	21.6	46	20.2
Past 12-month attempts	87	4.7	39	5.7	18	4.3	19	6.4	5	2.3	6	2.6

TABLE 4

Prevalence of Suicide Thoughts and Attempts, Lifetime and Past 12-Months Among Inuit by Socioeconomic Status (N=2,240)

	All		Income of <$20,000		Income of $20,000-$40,000		Income of $40,000-$60,000		Income of >$60,000	
	n	**%**	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**
Lifetime thoughts	863	44.6	417	53.5	147	18.9	99	12.7	113	14.5
Past 12-month thoughts	219	11.8	137	69.2	26	13.1	20	10.1	15	7.6
Lifetime attempts	500	26.6	260	56.8	82	17.9	50	10.9	64	14.0
Past 12-month attempts	87	4.7	57	74.0	9	11.7	7	9.1	4	5.2

Characteristics of suicide attempts obtained from a novel measure that was designed by Dr. Kirmayer for the IPY study (Appendix A) are summarized in Table 5. Among those who had attempted suicide, the majority reported that at the time they were feeling very depressed (71%), very angry (70%), bored or tired with life (52%), and having conflict(s) with a partner (53%). Although significantly more men reported having trouble with the law at the time of their suicide attempt, more women reported experiencing every other item on the scale at the time of their suicide attempt, but these differences were only statistically significant for items pertaining to feelings of depression and intense anger, and thinking of someone who committed suicide (Appendix B). Age-based comparisons revealed that more respondents aged 30-49 years reported experiencing every item on the scale at the time of their attempt, without exception; however, these differences were only statistically significant for items pertaining to feelings of depression, conflict with family, and thinking of someone who committed suicide (Appendix C).

Table 6 provides a detailed breakdown of the number of participants, organized by gender and age category, who use different types of help-seeking behaviors and coping strategies when distressed.

TABLE 5

Context of Suicide Attempts at the Time of the Attempt (N=500)

	All		Male		Female		18-29 years old		30-49 years old		>50 years old	
	n	%	n	%	n	%	n	%	n	%	n	%
Very depressed	282	70.9	76	27.0	206	73.0	89	31.5	155	55.0	38	13.5
Very angry	275	69.6	78	28.4	197	71.6	78	28.4	159	57.8	38	13.8
Bored or tired with life	205	51.6	70	34.1	135	65.9	62	30.2	117	57.1	26	12.7
Conflict with partner	210	52.8	62	29.5	148	70.5	55	26.2	128	60.9	27	12.9
Conflict with family	171	43.4	47	27.5	124	72.5	53	31.0	100	58.5	18	10.5
Conflict with friends	95	25.1	29	30.5	66	69.5	31	32.6	53	55.8	11	11.6
Trouble with the law	47	12.4	24	51.1	23	48.9	17	36.2	27	57.4	3	6.4
Troubles at school	42	11.4	16	38.1	26	61.9	16	38.1	23	54.8	3	7.1
Troubles at work	22	5.9	9	40.9	13	59.1	6	27.3	11	50.0	5	22.7
Drinking alcohol	155	39.6	54	34.8	101	65.2	38	24.5	88	56.8	29	18.7
Drug or solvent use	65	16.9	26	40.0	39	60.0	22	33.9	37	56.9	6	9.2
Thinking of someone who committed suicide	73	19.2	31	42.5	42	57.5	27	37.0	41	56.2	5	6.8

TABLE 6

Rates of Help-Seeking Behaviors and Coping Strategies When Distressed (N=2,240)

	All		**Male**		**Female**		**18-29 years old**		**30-49 years old**		**>50 years old**	
	n	**%**	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**
Meditation/prayer	873	39.0	278	32.2	595	43.2	148	27.8	394	37.3	331	50.7
Reading and/or writing	548	24.5	193	22.4	355	25.8	112	21.1	243	23.0	193	29.6
Talking to others	1113	48.7	377	43.7	736	53.4	283	53.2	548	51.9	282	43.2
Spending with family or friends	1145	51.1	414	48.0	731	53.1	316	59.4	567	53.7	262	40.1
Camping	634	28.3	288	33.4	346	25.1	119	22.4	302	28.6	213	32.6
Hunting	598	26.7	369	42.8	229	16.6	117	22.0	289	27.4	192	29.4
Sleep	529	23.6	205	23.8	324	23.5	165	31.0	252	23.9	112	17.2
TV/movies	696	31.1	300	34.8	396	28.8	184	34.6	357	33.8	155	23.7
Internet	371	16.6	123	14.3	248	18.0	130	24.4	193	18.3	48	7.4
Sports	319	14.2	200	23.1	119	8.6	124	23.3	143	13.6	52	8.0
Food	393	17.5	136	15.8	257	18.7	109	20.5	203	19.2	81	12.4
Music/arts/crafts	622	27.8	225	26.1	397	28.8	178	33.5	301	28.5	143	21.9
Drugs	290	12.9	138	16.0	152	11.0	121	22.7	155	14.7	14	2.1
Alcohol	239	10.7	107	12.4	132	9.6	77	14.5	132	12.5	30	4.6
Gambling	183	8.2	49	5.7	134	9.7	64	12.0	87	8.2	32	4.9

Bivariate analyses

The variables that were significantly associated at the bivariate level with suicidal ideation in the 12 months prior to the survey were sex, age, region of residency, annual income level, psychological distress as assessed by the Kessler-6, all forms of substance abuse except for use of regular medicine or prescription drugs, and all forms of interpersonal violence, including sexual abuse and physical violence (Table 7). Protective factors that reduced the likelihood of suicidal ideation in the 12 months prior to the survey were engaging in different land-based activities (e.g. hunting, fishing, berry-picking) and community activities, and having someone for emotional support.

The likelihood of lifetime suicidal ideation was increased by such factors as sex, age, region of residency, psychological distress, all forms of substance abuse except for regular medicine or prescription drugs, and all forms of interpersonal violence (Table 8). The same protective factors that were found to be significantly associated with suicide thoughts in the 12 months prior to the survey were also significantly associated with lifetime suicidal ideation.

Risk factors that increased the likelihood of attempted suicide in the 12 months prior to the survey included sex, age, annual income level, psychological distress, suicidal ideation during the lifetime and in the 12 months prior to the survey, all forms of substance abuse except for alcohol and regular medicine or prescription drugs, and all forms of interpersonal violence (Table 9). The same holds true for attempted suicide during one's lifetime, except that alcohol consumption increased the likelihood of lifetime suicide attempt (Table 10). On the other hand, some of the protective factors that reduced the likelihood of suicide attempt in the 12 months prior to the survey were engaging in land-based activities, such as hunting and fishing, but not berry-picking, and

participating in community activities (Table 9). Interestingly, all protective factors assessed reduced the likelihood of lifetime suicide attempt (Table 10).

TABLE 7

Bivariate analyses of potential risk factors associated with past 12-month suicide ideation among Inuit, aged 18 years and older (N=1851)

	No suicidal ideation (n=1632)		**Suicidal ideation (n=219)**		X^2 **(df)**	**p > |z|**
	N	% or mean ± SD	n	% or mean ± SD		
Sex						
Female	988	60.5	162	74.0	14.8 (1)	<.001
Male	644	39.5	57	26.0		
Age group						
18-29y	361	22.1	86	39.3	54.9 (2)	<.001
30-49y	779	47.7	113	51.6		
>50y	492	30.2	20	9.1		
Region						
Nunavut						
Baffin	585	35.8	101	46.1		
Kivalliq	375	23.0	46	21.0	26.9 (4)	<.001
Kitikmeot	251	15.4	47	21.5		
Inuvialuit	205	12.6	13	5.9		
Nunatsiavut	216	13.2	12	5.5		
Income level						
<$20,000	717	48.7	137	69.2		
$20,000-40,000	317	21.5	26	13.1	29.5 (3)	<.001
$40,000-60,000	209	14.2	20	10.1		
>$60,000	224	15.2	15	7.6		
Psychological attributes						
Psychological distress, K-6 (mean ± SD)	1530	10.5±7.1	204	17.2±5.3	230.8 (35)	<.001
Anxious	1104	70.2	192	91.0	45.5 (8)	<.001
Hopeless	674	42.9	180	84.9	154.7 (12)	<.001
Restless/fidgety	855	54.5	168	80.0	66.0 (13)	<.001
Depressed	676	42.9	182	86.3	153.8 (7)	<.001
Everything was an effort	896	57.5	175	81.8	80.7 (14)	<.001
Worthless	534	33.9	171	79.2	169.1 (12)	<.001
Someone to worry about	286	17.6	84	38.3	15.5 (2)	.002
Substance use in last 12 months						
Alcohol	979	60.6	146	67.9	17.5 (4)	.002
Solvent	30	2.5	10	5.2	12.1 (3)	.007
Marijuana	538	44.1	137	70.6	50.6 (3)	<.001
Hard drugs	43	3.6	22	11.6	25.0 (3)	<.001
Prescription drugs	58	4.9	12	6.3	1.9 (3)	.6
Alcohol blackout (mean ± SD)	917	3.3±4.5	133	4.0±6.3	72.6 (25)	<.001
Interpersonal violence						
Child sexual abuse index (mean ± SD)	1292	.9±1.4	164	1.6±1.6	32.4 (4)	<.001
Child physical violence index (mean ± SD)	1310	11.1±4.8	179	13.0±5.5	42.7 (21)	.003
Adult sexual abuse	216	15.3	62	32.6	37.4 (3)	<.001
Adult physical violence index (mean ± SD)	1318	8.9±3.7	178	11.3±4.6	89.9 (18)	<.001
Potential protective factors						
Goes hunting	926	64.7	88	50.3	13.8 (1)	<.001
Goes fishing	1044	72.9	99	56.6	20.3 (1)	<.001
Goes berry-picking	812	56.7	79	45.1	8.4 (1)	.004
Participates in community activities	388	35.9	28	12.9	24.9 (6)	<.001
Someone for emotional support	854	52.4	77	35.2	27.4 (6)	<.001
Happy with job	977	61.0	102	46.8	.10 (2)	.9

TABLE 8

Bivariate analyses of potential risk factors associated with lifetime suicide ideation among Inuit, aged 18 years and above (N=1843)

	No suicidal ideation (n=1756)		Suicidal ideation (n=87)		X^2 (df)	p > |z|
	n	% or mean ± SD	n	% or mean ± SD		
Gender						
Female	593	59.3	564	65.4	7.2 (1)	.007
Male	407	40.7	299	34.6		
Age group						
18-29y	215	21.5	238	27.6	66.9 (2)	<.001
30-49y	431	43.1	466	54.0		
>50y	354	35.4	159	18.4		
Region						
Nunavut						
Baffin	338	33.8	351	40.7		
Kivalliq	249	24.9	178	20.6	22.7 (4)	<.001
Kitikmeot	143	14.3	158	18.3		
Inuvialuit	132	13.2	86	10.0		
Nunatsiavut	138	13.8	90	10.4		
Income level						
<$20,000	441	49.0	417	53.5		
$20,000-40,000	200	22.2	147	18.9	5.1 (3)	.2
$40,000-60,000	131	14.5	99	12.7		
>$60,000	126	14.0	113	14.5		
Psychological attributes						
Psychological distress, K-6 (mean ± SD)	920	9.0±6.9	822	14.0±6.7	256.1 (35)	<.001
Anxious	617	64.9	688	81.8	72.8 (8)	<.001
Hopeless	320	33.6	542	64.4	187.9 (12)	<.001
Restless/fidgety	453	47.7	577	68.9	96.8 (13)	<.001
Depressed	331	34.7	535	63.5	160.0 (7)	<.001
Everything was an effort	486	51.5	591	70.5	95.6 (14)	<.001
Worthless	251	26.4	459	54.3	154.6 (12)	<.001
Someone to worry about	137	13.7	237	27.5	56.5 (2)	<.001
Substance use in last 12 months						
Alcohol	550	55.7	586	68.5	72.2 (4)	<.001
Solvent	14	2.0	27	3.7	5.9 (3)	.1
Marijuana	257	37.1	424	57.8	64.2 (3)	<.001
Hard drugs	14	2.1	53	7.4	25.2 (3)	<.001
Prescription drugs	30	4.4	41	5.7	1.9 (3)	.6
Alcohol blackout (mean ± SD)	522	3.5±5.1	536	3.3±4.3	56.5 (25)	<.001
Interpersonal violence						
Child sexual abuse index (mean ± SD)	794	.62±1.2	667	1.4±1.5	131.4 (4)	<.001
Child physical violence index (mean ± SD)	796	10.0±4.1	700	12.9±5.3	166.1 (21)	<.001
Adult sexual abuse	863	10.0	194	25.9	75.8 (3)	<.001
Adult physical violence index (mean ± SD)	803	8.2±3.2	701	10.4±4.3	172.3 (18)	<.001
Potential protective factors						
Goes hunting	581	67.0	439	58.5	12.6 (1)	.001
Goes fishing	638	73.6	511	68.0	6.0 (1)	.01
Goes berry-picking	505	58.3	390	51.9	6.5 (1)	.01
Participates in community activities	262	26.3	185	21.6	16.1 (6)	.01
Someone for emotional support	522	52.3	412	47.9	56.5 (2)	<.001
Happy with job	620	63.3	465	54.6	4.3 (1)	.04

TABLE 9

Bivariate analyses of potential risk factors associated with past 12-month suicide attempt among Inuit, aged 18 years and above (N= 1843)

	Non-attempter (n=1756)		Attempter (n=87)			
	n	% or mean ± SD	n	% or mean ± SD	X^2 (df)	p > |z|
Gender						
Female	1079	61.5	63	72.4	4.2 (1)	.04
Male	677	38.5	24	27.6		
Age group						
18-29y	408	23.2	36	41.4	29.6 (2)	<.001
30-49y	840	47.8	47	54.0		
>50y	508	29.0	4	4.6		
Region						
Nunavut						
Baffin	644	36.7	39	44.8		
Kivalliq	401	22.8	18	20.7	8.5 (4)	.07
Kitikmeot	278	15.8	19	21.8		
Inuvialuit	212	12.1	5	5.8		
Nunatsiavut	221	12.6	6	6.9		
Income level						
<$20,000	789	49.7	57	74.0		
$20,000-40,000	336	21.2	9	11.7	17.6 (3)	.001
$40,000-60,000	221	13.9	7	9.1		
>$60,000	235	14.8	4	5.2		
Psychological attributes						
Psychological distress, K-6 (mean ± SD)	1649	11.0±7.2	76	17.2±5.3	101.7 (35)	<.001
Anxious	1217	71.8	71	86.6	38.1 (8)	<.001
Hopeless	777	45.9	69	83.1	48.7 (12)	<.001
Restless/fidgety	953	56.5	62	75.6	35.2 (13)	.001
Depressed	778	45.9	71	86.6	57.1 (7)	<.001
Everything was an effort	994	59.1	67	82.7	38.1 (14)	<.001
Worthless	627	36.9	68	81.9	74.6 (12)	<.001
Someone to worry about	340	19.4	30	34.9	7.6 (2)	.02
Suicidal ideation in last 12 months	137	7.8	77	89.5	531.44 (1)	<.001
Suicidal ideation lifetime	756	43.1	87	100.0	108.3 (1)	<.001
Substance use in last 12 months						
Alcohol	1058	60.8	62	74.7	9.0 (4)	.06
Solvent	32	2.4	7	9.9	14.9 (3)	.002
Marijuana	615	45.9	54	75.0	32.7 (3)	<.001
Hard drugs	56	4.3	9	13.0	15.7 (3)	.001
Prescription drugs	65	5.0	5	7.3	1.7 (3)	.64
Alcohol blackout (mean ± SD)	991	3.3±4.4	53	4.7±6.8	73.1 (24)	<.001
Interpersonal violence						
Child sexual abuse index (mean ± SD)	1392	.95±1.4	58	1.7±1.6	17.4 (4)	.002
Child physical violence index (mean ± SD)	1419	11.3±4.8	66	13.2±5.6	38.5 (21)	.01
Adult sexual abuse	252	16.5	25	34.7	20.3 (3)	<.001
Adult physical violence index (mean ± SD)	1426	9.1±3.8	66	11.8±5.1	65.7 (18)	<.001
Potential protective factors						
Goes hunting	981	64.1	31	44.3	11.3 (1)	.001
Goes fishing	1108	72.4	31	44.3	25.7 (1)	<.001
Goes berry-picking	847	55.3	39	55.7	.0041 (1)	.9
Participates in community activities	438	25.0	7	8.1	18.6 (6)	.005
Someone for emotional support	895	51.1	33	38.4	8.5 (6)	.2
Happy with job	1032	59.8	40	46.5	.22 (2)	.9

TABLE 10

Bivariate analyses of potential risk factors associated with lifetime suicide attempt among Inuit, aged 18 years and above (N=1353)

	Non-attempter		Attempter			
	n	% or mean ± SD	n	% or mean ± SD	X^2 (df)	p > |z|
Gender						
Female	813	60.1	339	67.8	9.2 (1)	.002
Male	540	39.9	161	32.2		
Age group						
18-29y	304	22.5	145	29.0	63.6 (2)	<.001
30-49y	607	44.8	285	57.0		
>50y	442	32.7	70	14.0		
Region						
Nunavut						
Baffin	465	34.4	220	44.0		
Kivalliq	333	24.6	91	18.2	28.2 (4)	<.001
Kitikmeot	203	15.0	96	19.2		
Inuvialuit	171	12.6	47	9.4		
Nunatsiavut	181	13.4	46	9.2		
Income level						
<$20,000	592	48.8	260	56.8		
$20,000-40,000	263	21.7	82	17.9	10.1 (3)	0.02
$40,000-60,000	179	14.8	50	10.9		
>$60,000	175	14.4	64	14.0		
Psychological attributes						
Psychological distress, K-6 (mean ± SD)	1264	10.1±7.1	469	14.6±6.4	186.0 (35)	<.001
Anxious	894	68.8	402	83.1	48.6 (8)	<.001
Hopeless	523	40.3	331	68.1	127.9 (12)	<.001
Restless/fidgety	681	52.6	341	70.5	59.4 (13)	<.001
Depressed	525	40.4	333	68.5	118.9 (7)	<.001
Everything was an effort	716	55.5	352	73.0	80.7 (14)	<.001
Worthless	415	31.9	288	59.0	125.1 (12)	<.001
Someone to worry about	220	16.3	152	30.5	26.1 (2)	<.001
Suicidal ideation lifetime	353	26.1	500	100.0	2.2E03 (4)	<.001
Substance use in last 12 months						
Alcohol	770	57.5	358	72.6	51.1 (4)	<.001
Solvent	22	2.2	19	4.4	8.5 (3)	<.001
Marijuana	392	39.8	282	65.3	84.5 (3)	<.001
Hard drugs	25	2.6	41	9.7	33.7 (3)	<.001
Prescription drugs	42	4.4	29	6.9	4.3 (3)	.2
Alcohol blackout (mean ± SD)	727	3.4±4.8	323	3.3±4.5	44.3 (25)	.01
Interpersonal violence						
Child sexual abuse index (mean ± SD)	1090	.80±1.3	364	1.5±1.6	75.4 (4)	<.001
Child physical violence index (mean ± SD)	1103	10.6±4.8	387	13.7±5.5	138.7 (21)	<.001
Adult sexual abuse	160	13.5	119	28.5	52.7 (3)	<.001
Adult physical violence index (mean ± SD)	1110	8.6±3.4	387	11.1±4.7	136.0 (18)	<.001
Potential protective factors						
Goes hunting	779	68.9	235	55.2	22.7 (2)	<.001
Goes fishing	869	73.5	273	64.1	19.8 (2)	<.001
Goes berry-picking	676	57.1	213	50.0	10.7 (2)	.005
Participates in community activities	356	26.4	90	18.1	28.5 (12)	.005
Someone for emotional support	697	51.6	335	47.2	42.3 (12)	<.001
Happy with job	817	61.6	262	52.9	8.7 (2)	.01

Multivariate analyses

Multiple logistic regression analysis of the sample as a whole was performed to identify the risk and protective factors associated with suicide ideation throughout one's lifetime (Table 11) and in the 12 months prior to the survey (Table 12). Based on the first analysis, age, psychological distress, childhood sexual abuse, and adult physical violence were positively associated with having had suicide thoughts at one point in one's life (Table 11, Model A). On the other hand, age, psychological distress, and childhood sexual abuse were positively associated with suicidal ideation, whereas participating in hunting activities was negatively associated with suicidal ideation (Table 12, Model D).

Additional multiple logistic regression analysis of the sample as a whole were performed to identify the risk and protective factors associated with dichotomous dependent variables of ever having made a suicide attempt throughout one's life (Table 13) and having made a suicide attempt in the 12 months prior to the survey (Table 14). The same potential predictor variables were included in each analysis. The factors that were significantly related to having attempted suicide at one point in one's life were age, psychological distress, marijuana use, childhood sexual abuse, and adult physical violence (Table 13, Model G). In contrast to the findings from previous analyses, only age and psychological distress were significantly associated with suicide attempts in the 12 months prior to the survey (Table 14, Model J).

Females. Five of the same potential predictor variables, including age, psychological distress, marijuana use, participation in community activities, and participation in hunting activities, were included in every multivariate analysis for females. In the multivariate model for lifetime suicide ideation, age, psychological distress, and marijuana use remained significant (Table 11, Model B). In the multivariate model for suicidal ideation in the 12 months prior to the

survey, age, psychological distress, marijuana use, and participation in community activities were all statistically significant for females (Table 12, Model E). Interestingly, in the multivariate model for lifetime suicide attempt, only psychological distress and marijuana use were statistically significant for females (Table 13, Model H).

Males. The same potential predictor variables included in the multivariate analyses for females were entered into multivariate models for males. With regard to lifetime suicide ideation, psychological distress, marijuana use, and participation in hunting activities remained significant (Table 11, Model C). On the other hand, age and psychological distress were significantly associated with suicide ideation in the 12 months prior to the survey (Table 12, Model F). Similar to the multivariate results for lifetime suicide attempts among females, psychological distress and marijuana use were significant for males (Table 13, Model I).

TABLE 11

Multivariate logistic regression models explaining lifetime suicide ideation

	Exp (B)	95% CI	*p* value	R^2
Model A (N = 888)				.15**
Gender	.13	-.21, -.47	.5	
Age	.018	.005-.030	.005	
Psychological distress	-.073	-.095, -.051	<.001	
Marijuana use	-.30	-.62, .022	.07	
Childhood sexual abuse	-.37	-.49, -.26	<.001	
Adult physical violence	-.084	-.13, -.041	<.001	
Participation in community activities	.085	-.021, .19	.1	
Participates in hunting activities	.16	-.18, .50	.4	
Model B (females only, N = 659)				.10**
Age	.015	.0017-.028	.03	
Psychological distress	-.094	-.12, -.068	<.001	
Marijuana use	-.39	-.75, -.026	.04	
Participation in community activities	.10	-.011, .22	.08	
Participates in hunting activities	-.0019	-.34, .33	.9	
Model C (males only, N = 476)				.10**
Age	-.0087	-.025, .0075	.3	
Psychological distress	.079	.052-.11	<.001	
Marijuana use	.49	.068-.92	.02	
Participation in community activities	.014	-.14, .16	.8	
Participates in hunting activities	-1.04	-1.62, -.46	<.001	

**p<.001

TABLE 12

Multivariate logistic regression models explaining suicidal ideation in the past 12 months

	Exp (B)	95% CI	*p* value	R^2
Model D (N = 884)				.20**
Gender	-.018	-.56, .52	.9	
Age	-.047	-.070, .024	<.001	
Psychological distress	.14	.095-.18	<.001	
Marijuana use	.48	-.016, .98	.06	
Childhood sexual abuse	.21	.058-.37	.007	
Adult physical violence	.040	-.017, .097	.2	
Participation in community activities	-.15	-.30, -.0053	.06	
Participates in hunting activities	-.57	-1.05, -.081	.02	
Model E (females only, N = 654)				.20**
Age	-.036	-.060, -.013	.002	
Psychological distress	.16	.11-.21	<.001	
Marijuana use	.64	.13-1.16	.01	
Participation in community activities	-.20	-.36, -.045	.01	
Participates in hunting activities	-.42	-.91, .066	.1	
Model F (males only, N = 474)				.17**
Age	-.051	-.084, -.019	.002	
Psychological distress	.15	.093-.21	<.001	
Marijuana use	-.020	-.15, .11	.7	
Participation in community activities	-.093	-.33, .15	.4	
Participates in hunting activities	-.60	-1.39, .18	.1	

**p<.001

TABLE 13

Multivariate logistic regression models explaining lifetime suicide attempts

	Exp (B)	95% CI	*p* value	R^2
Model D (N = 883)				.14**
Gender	.051	-.33, .43	.8	
Age	-.016	-.030, -.0016	.03	
Psychological distress	.052	.028-.078	<.001	
Marijuana use	.78	.43-1.13	<.001	
Childhood sexual abuse	.26	.15-38	<.001	
Adult physical violence	.091	.050-.13	<.001	
Participation in community activities	-.061	-.17, .052	.3	
Participates in hunting activities	-.18	-.54, .18	.3	
Model E (females only, N = 656)				.10**
Age	-.0081	-.022, .0063	.3	
Psychological distress	.082	.054-.11	<.001	
Marijuana use	.72	.35-1.10	<.001	
Participation in community activities	-.10	-.22, .017	.1	
Participates in hunting activities	-.15	-.50, .20	.4	
Model F (males only, N = 473)				.088**
Age	-.0094	-.028, .0097	.3	
Psychological distress	.063	.032-.094	<.001	
Marijuana use	.96	.44-1.47	<.001	
Participation in community activities	-.026	-.19, .14	.7	
Participates in hunting activities	-.38	-.94, .19	.2	

**p<.001

TABLE 14

Multivariate logistic regression models explaining suicide attempts in the past 12 months

	Exp (B)	95% CI	*p* value	R^2
Model D (N = 881)				.18**
Gender	.12	-.76, 1.00	.8	
Age	-.056	-.095, -.017	.005	
Psychological distress	.099	.034-.16	.003	
Marijuana use	.61	-.19, 1.42	.1	
Childhood sexual abuse	.20	-.035, .44	.1	
Adult physical violence	.067	-.016, .15	.1	
Participation in community activities	-.17	-.40, .061	.2	
Participates in hunting activities	-.62	-1.39, .14	.1	

**p<.001

Discussion

This paper presents secondary analysis of the large epidemiological dataset from the International Polar Year Inuit Health Survey conducted among 2,240 Inuit aged 18-90 years from Nunavut, Nunatsiavut and Inuvialuit, identifying the prevalence and sociodemographic and psychosocial correlates of suicide attempts and ideation. This study provides a more detailed picture of contributors of suicide behavior among Inuit in the Canadian Arctic.

Prevalence of suicide behaviors

In this study, rates of lifetime suicide attempts (27%) were much higher than the rates reported in Nunavik in 1992 (13%, Jetté 1995) and 2004 (21%, Kirmayer & Paul 2007). These rates were significantly higher than the rates of lifetime suicide attempt reported by the general population in 2002 (3%, Public Health Agency of Canada 2006). On the other hand, the rates of suicide attempt in the 12 months prior to the survey (5%) were similar to rates reported in Nunavik in 1992 (6%, Jetté 1995) and 2004 (7%, Kirmayer & Paul 2007). With regard to suicide ideation, 45% of Inuit in this study reported having seriously thought about suicide in their life, which is higher than the rates reported in Nunavik in 1992 (12%, Jetté 1995) and 2004 (35%, Kirmayer & Paul 2007) and for the Canadian general population in 2002 (13%, Public Health Agency of Canada 2006). Rates of suicide ideation in the 12 months prior to the survey were 12%, which is slightly lower than those reported in Nunavik in 2004 (14%, Kirmayer & Paul 2007). Once again, this difference was non-significant. As well, psychological distress as assessed by the Kessler-6 scale was higher in this study (11.3±7.1) compared to that reported among Inuit of Nunavik in 2004 (8.7±4.4, Fraser et al. 2014). A conservative cut-off score of 13 identified 45% of the Inuit population as possible cases of depression or other common mental disorder. This rate is

considerably higher than those reported for the general population and other cultures, which generally range between 8% to 12% (Andrade et al. 2013).

Based on findings from the general population, women tend to be more likely to report past suicide thoughts and attempts (Beautrais 2002; LeMaster et al. 2004; Yoder et al. 2006), and men are more likely to die by suicide (Johnson, Krug & Potter 2000), perhaps owing to the fact that men tend to use more lethal methods when making a suicide attempt (Garrison 1992). In this study, gender-based comparisons revealed that significantly more females (65%) than males (35%) reported having seriously thought about committing suicide in their life. This is consistent with previous findings with Inuit from Nunavik (Fraser et al. 2014; Jetté 1995). A similar trend was observed in the general population in 2002; however, the gender difference in the general population survey was significantly smaller, with 14.4% of women and 12.3% of men having reported that they had seriously thought about suicide at some point in their life (Public Health Agency of Canada 2006). Similarly, while in the present study, significantly more females (68%) than males (32%) reported attempting suicide in their life. This gender difference was also pronounced in other studies with Inuit from Nunavik, in which, for instance, 22% males and 39% females reported past suicide attempts (Fraser et al. 2014). Overall, these results are consistent with findings among other Canadian indigenous peoples (Spaulding 1985). Once again, a similar trend was observed in the general population in 2002; however, the gender difference was significantly smaller, with 2.0% of men and 4.2% of women having reported that they had attempted suicide at one point in their life (Public Health Agency of Canada 2006).

Age-based comparisons revealed that although more respondents aged 18-29 years were more likely to report suicide ideation in their lifetime, respondents aged 30-49 years were more likely to report suicide ideation in the 12 months prior to the survey, having attempted suicide in

their lifetime, and having attempted suicide in the 12 months prior to the survey. With regard to rates of suicide attempt, these results are inconsistent with previous findings among Inuit from Nunavik, where the prevalence of attempted suicide at one point in one's life was consistently higher among younger people aged 15-29 years (19%, Santé Québéc 1992; 31%, Kirmayer & Paul 2007) in comparison to older people aged 30-49 years (9%, Santé Québéc 1992; 17%, Kirmayer & Paul 2007). Age-based comparisons of rates of lifetime suicide ideation across these different studies could not be performed given that previous studies either did not provide statistics on suicide ideation and/or only looked at Inuit aged 15-24 years (Fraser et al. 2014; Kirmayer et al. 1996, 1998; Santé Québéc 1992). The present study's findings may reflect a time-trend in which suicide thoughts at a young age eventually escalate into an attempt to take one's life at an older age. Also, given that more respondents aged 30-49 years reported suicide ideation and attempted suicide in the 12 months prior to the survey, it is possible that factors at the family and/or community levels (e.g. recent change in employment status of which we were unware) that were specifically relevant to this age cohort detrimentally affected them during this precise time period.

Novel measure of context of suicide attempt

Although much research has been conducted on correlates of suicidal ideation, attempts and completion, there is a lack of information on the characteristics of actual attempts. The present study addressed this knowledge gap by examining the responses to a novel measure of feelings, thoughts, substance use and stressful events at the time of the respondents last suicide attempt. Among those who had attempted suicide, the majority reported that at the time of the event, they were feeling very depressed, very angry, bored or tired with life, and were having conflict(s) with a partner. Although significantly more men reported having trouble with the law at the time of

their suicide attempt, more women reported experiencing every other item on the list at the time of their suicide attempt, but these differences were only statistically significant for items pertaining to feelings of depression and intense anger, and thinking of someone who had died by suicide. Age-based comparisons revealed that more respondents aged 30-49 years reported experiencing every item on the scale at the time of their attempt; however, these differences were only statistically significant for feelings of depression, conflict with family, and thinking of someone who had died by suicide.

Psychosocial correlates of suicide behaviors

When the sample was analyzed as a whole, significant risk factors for suicide ideation (both lifetime and 12 months prior to the survey) and suicide attempt (both lifetime and 12 months prior to the survey) at the bivariate level include: gender, age, psychological distress as assessed by the Kessler-6, most forms of substance abuse (e.g. marijuana, hard drugs), and all forms of interpersonal violence, including sexual abuse and physical violence. The risk factors identified in the present study are consistent with previous findings. For instance, a history of substance abuse (e.g. alcohol, solvent, cannabis), personal or mental health problems in the year prior to the survey, and physical abuse were identified as risk factors for suicide attempt among Inuit of Nunavik in 1992 (Kirmayer et al. 1996, 1998). Similarly, Kirmayer and Paul (2007) identified emotional distress, having someone who made them worry often or demanded too much, all forms of substance use, and all forms of sexual abuse and interpersonal violence as risk factors for suicide attempt among Inuit of Nunavik in 2004.

These risk factors can be interpreted as long-term consequences of the colonialism that has influenced all sectors of Inuit lives through geographic displacement, sedentarization, forced

assimilation, cultural suppression, institutionalized discrimination, and political oppression (Kirmayer et al. 2009). Along with social, health, educational, economic, and political disparities in relation to the Canadian general population (Allen et al. 2013; Kral et al. 2011; Young & Bjerregaard 2008; Wexler et al. 2013, 2014), the collective historical trauma endured by Inuit has been linked to social discontinuity and lack of intergenerational transmission of traditional knowledge and values (Kirmayer et al. 2000). These factors have been identified as strong correlates of depression, alcoholism, suicide, and violence among Indigenous Peoples (Kirmayer et al. 2000, 2009). As such, historical trauma may directly and indirectly account for the propagation of lateral interpersonal violence across generations (e.g. sexual abuse, physical violence), substance abuse problems, and mental health problems (e.g. psychological distress, suicidal behaviors) observed in the present study.

Protective factors that reduced the likelihood of both suicide ideation (both lifetime and 12 months prior to the survey) and suicide attempt (both lifetime and 12 months prior to the survey) included engaging in different land-based activities (e.g. hunting, fishing, berry-picking) and community activities, and having someone for emotional support. These results are consistent with previous findings on the protective of effects of social and cultural factors, including resilience through the durability of interpersonal relationships in the wider social networks of support (Kral et al. 2014), and cultural continuity and identity through the maintenance of connections to the land and community (Chandler & Lalonde 1998, 2008; Chandler et al. 2003; Hallett et al. 2007). For instance, regular church attendance, a social activity that may provide a supportive environment or mark a sense of inclusion in family and community, was identified as a protective factor against suicide attempts among Inuit in Nunavik (Kirmayer et al. 1998). Accordingly, Inuit ecocentric notions of wellbeing, maintaining kinship bonds by participating in activities where

people come together for the benefit of the community and carrying out subsistence activities (e.g. hunting, fishing, berry-picking) can enhance Inuit health and wellbeing (Kirmayer et al. 2009). As previously mentioned, such activities may work to enhance wellbeing by (i) perpetuating feelings of self-efficacy (Brody 1975) and self-sufficiency by reminding them that the Inuit peoples can survive and support themselves in the harsh Arctic environment despite the pressures of capitalism and globalization (Kirmayer et al. 2009); (ii) strengthening kinship bonds with other community members through acts of sharing (Tanner 1993); (iii) reinforcing Inuit cultural identity through participation in culturally valued activities (Borré 1991; Graburn 2006; Kirmayer 1988); (iv) facilitating intergenerational transmission of traditional Inuit values and knowledge (*qaujimajatuqangit*), including skills related to living on the land, which represent a source of strength and resilience (Kirmayer et al. 2009); and (v) providing Inuit with a 'memory-scape' that reinforces a sense of belonging and situated identity by reminding them of the collective history attached to their lands (Nuttall 1992).

Multivariate models of risk and protective factors

In multivariate logistic regression analysis of the sample as a whole, the significant predictors of lifetime suicide ideation were age, psychological distress, childhood sexual abuse, and adult physical violence. The same factors, in addition to marijuana use, were also significant predictors of lifetime suicide attempt. As for suicide ideation in the 12 months prior to the survey, age, psychological distress and childhood sexual abuse remained significant at the multivariate level. Interestingly, participating in hunting activities was a significant protective factor for suicide ideation in the 12 months prior to the survey. At the multivariate level, only age and psychological distress were significant for suicide attempt in the 12 months prior to the survey.

For females, multivariate regression analysis showed that the strongest associations to lifetime suicide ideation, suicide ideation in the 12 months prior to the survey, and lifetime suicide attempt were psychological distress and marijuana use. These results are consistent with previous findings with respect to psychological distress (Fraser et al. 2014; Kirmayer et al. 1998) and marijuana use (Fraser et al. 2014). Age was also a significant risk factor for suicide ideation (both lifetime and in the 12 months prior to the survey) among females in that females aged 18-29 years were at greater risk for suicide ideation. Participation in community activities was a significant protective factor only for lifetime suicide ideation among females. Furthermore, both psychological distress and marijuana were significant predictors of lifetime suicide ideation and suicide attempt among males at the multivariate level. Interestingly, participation in hunting activities was a significant protective factor only for lifetime suicide ideation among males. This result is inconsistent with Fraser and colleagues' findings (2014), which identified participation in hunting activities as a significant protective factor for females only. It is possible that traditional land-based activities, such as hunting, which historically have been an important component of male traditional social roles and, as such, their cultural identity, have a particularly protective effect for mental health among Inuit men. It is also possible that region-specific gender differences exist in the importance attributed by local Inuit to traditional land-based activities carried out by women and men.

Limitations

This study has several important limitations. First, the cross-sectional and retrospective nature of the study prevents us from establishing a causal relationship between the risk factors and suicidal behaviors assessed. Second, in light of the highly sensitive nature of most of the questions

being asked, respondents may have not divulged entirely accurate and/or complete information in self-report or interview, particularly in relation to sensitive issues like suicide, substance use and violence or abuse. Third, the absence of many potential relevant variables and standardized measures (e.g. CAGE to assess alcohol abuse; impulsivity; boredom; self-esteem) prevented us from drawing comparisons with results from previous studies (Fraser et al. 2014; Kirmayer et al. 1996, 1998; Kirmayer & Paul 2007). Fourth, many of the measures used have not been empirically validated among Inuit according to Flaherty's (1988) five dimensions of cross-cultural equivalence (content, semantic, technical, criteria, and conceptual equivalence). Given these limitations, the results must be cautiously interpreted. Finally, given that several tests were conducted at the 95% confidence level, there was a possibility for alpha inflation and committing Type 1 error, which may have been offset by the large sample size and data set used. Future analyses would have to correct for this possibility of alpha inflation by performing a Bonferroni correction.

Implications

Despite these limitations, the results of this study have important implications, both for understanding suicide among Inuit and for policy and prevention. First, this study presents updated prevalence rates of suicide ideation and attempt among Inuit living in the Canadian arctic. They also further our understanding of the risk and protective factors associated with suicide ideation and suicide attempt. Second, the results can guide ongoing and future intervention programs aimed at promoting mental health and wellbeing and preventing suicide among Inuit. Based on the findings, it is important that suicide prevention programs include efforts to promote traditional land-based and community activities, which were identified as protective factors in this study. Interventions should also aim to improve mental health literacy and address stressors among

younger Inuit, who experienced higher rates of suicide ideation in the present study compared to other age cohorts. Focusing on the strengths of Inuit throughout past historical injustices may encourage cultural revitalization and enhance individual and collective wellbeing.

Future directions

In future work it would be important to validate the scales used in the present study in order to ensure that the items truly measure the constructs they are designed to measure. In their discussion of methodological challenges of cross-cultural mental health research, Canino and colleagues (1997) raise the issue of the extent to which "local cultural diversity can be incorporated into an established diagnostic instrument before the degree of alteration renders the instrument incapable of measuring the original constructs for which it was designed." Future efforts should therefore be focused on establishing cross-cultural validity of key measures as well as validating the novel measure of circumstances of suicide attempts developed for this study.

Conclusion

Given the steady increase in rates of death by suicide among Inuit since the 1980's, especially among young males (Kirmayer & Paul 2007), research on risk and protective factors associated with suicidal behaviors, including suicide ideation and suicide attempt, is of great importance. Results from the International Polar Year Inuit Health carried out in Inuit regions of northern Canada from 2007 to 2008 reveal that rates of suicide ideation and attempts are higher than those reported for Nunavik in the past (Kirmayer et al. 1996; Kirmayer and Paul 2007; Santé Québéc 1992). Given that this study is the first to our knowledge to examine the rates of suicide ideation and attempts among Inuit from Nunavut, Nunatsiavut and Inuvaluit Settlement Region, comparisons of rates across time were not possible. Compared to previous data collected in Nunavik, the differences between females and males in rates of suicide ideation and attempt were significantly greater. Also, in compared to previous findings, these rates were higher among Inuit aged 30-49 years, suggesting that social and/or cultural factors that are specifically relevant to this age cohort need to be identified.

Risk factors for suicide ideation and attempt included psychological distress, most forms of substance abuse, and all forms of interpersonal violence. Protective factors included participation in different land-based and community activities. Gender differences were found, suggesting that females and males are differentially exposed to or benefit from certain risk and protective factors, which should be taken into account when developing mental health promotion and suicide prevention programs for Inuit.

In the future, it would be interesting and useful to validate the novel measure that was used in this survey and conduct an exploratory followed by a confirmatory factor analysis. Such analyses will allow us to identify specific patterns or profiles of attempted suicide.

In light of these findings, culturally specific, community-led programs that promote mental health literacy and traditional land-based activities, while strengthening cultural identity, connectedness, and intergenerational transfer of knowledge and values, may be invaluable in promoting mental health and preventing suicide among Inuit of Northern Canada.

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Appendix A

Novel measure of context of suicide attempt at the time of the attempt

"Just before you made this suicide attempt, were you:

1. *Feeling bored or tired of life?*
2. *Having trouble with the law?*
3. *Dreaming/thinking of/hearing being called by someone who has committed suicide?*
4. *Having a fight or break up with your spouse, partner, boyfriend or girlfriend?*
5. *Drinking alcohol?*
6. *Sniffing or using drugs?*
7. *Feeling very depressed?*
8. *Feeling very angry?*
9. *Having conflict with your family?*
10. *Having conflict with your friends?*
11. *Having troubles at work?*
12. *Having troubles at school?"*

Appendix B

Gender differences

TABLE A1

Comparison of the mean level of psychological distress (K6) by sex, population aged 18 and over

	All		Male		Female		Significance level
	n	%	n	%	n	%	
Psychological distress, K-6 (mean ± SD)	1829	11.3±7.2	707	10.4±7.3	1122	11.9±7.1	.2
Anxious[a]	1372	72.7	490	67.7	882	75.8	.004
Hopeless[a]	911	48.2	299	41.2	612	52.6	.002
Restless/fidgety[a]	1082	57.5	400	55.3	682	58.9	.5
Depressed[a]	907	48.0	317	43.5	590	50.7	.06
Everything was an effort[a]	1132	60.4	418	58.0	714	61.9	.3
Worthless[a]	748	39.5	223	30.8	525	44.9	<.001
K-6 score above 13-point cutoff	840	45.9	288	34.3	552	65.7	<.001

[a] A cumulative percentage of respondents who answered "all" and "most of the time" to these questions is presented.

TABLE A2

Comparison of the prevalence of different forms of substance abuse by sex, population aged 18 and over

	All		Male		Female		Significance level
	n	%	n	%	n	%	
Alcohol	1250	60.7	523	41.8	727	58.2	.05
Blackouts due to alcohol (mean ± SD)	1158	3.4±4.7	503	3.2±4.7	655	3.5±4.7	.5
Solvent	45	3.0	24	53.3	21	46.7	.06
Marijuana	707	47.6	340	48.1	367	51.9	<.001
Hard drugs	69	4.7	32	46.4	37	53.6	.2
Prescription drugs	73	5.1	42	57.5	31	42.5	.001

TABLE A3

Comparison of the prevalence and mean level of interpersonal violence by sex, population aged 18 and over

	All		Male		Female		Significance level
	n	%	n	%	n	%	
Child sexual abuse index (mean ± SD)	1493	.97±1.4	564	.49±1.1	929	1.3±1.5	<.001
Child physical violence index (mean ± SD)	1540	11.3±4.9	584	11.3±4.5	956	11.4±5.1	.02
Adult sexual abuse	285	17.1	33	5.2	252	24.4	<.001
Adult physical violence index (mean ± SD)	1547	9.2±3.9	584	8.4±3.1	963	9.7±4.3	<.001

TABLE A4

Comparison of the prevalence of specific community activities and forms of social support by sex, population aged 18 and over

	All		Male		Female		Significance level
	n	%	n	%	n	%	
Goes hunting	1084	63.1	591	54.5	493	45.5	<.001
Goes fishing	1214	70.7	515	42.4	699	57.6	.003
Goes berry-picking	946	55.1	305	32.2	641	67.8	<.001
Participates in community activities[b]	471	23.9	214	28.4	257	21.1	.001
Someone for emotional support[a]	983	49.8	368	48.9	615	50.5	.007
Happy with job	1140	58.6	466	62.8	674	56.0	.5

[b] A cumulative percentage of respondents who answered “very often” and “often” to these questions is presented.

TABLE A5

Comparison of the prevalence of specific circumstances of suicide attempts by Inuit at the time of the attempt by sex

	All (n=2,240)		Male		Female		Significance level
	n	%	n	%	n	%	
Very depressed	282	70.9	76	27.0	206	73.0	<.001
Very angry	275	69.6	78	28.4	197	71.6	.02
Bored or tired with life	205	51.6	70	34.1	135	65.9	.3
Conflict with partner	210	52.8	62	29.5	148	70.5	.2
Conflict with family	171	43.4	47	27.5	124	72.5	.06
Conflict with friends	95	25.1	29	30.5	66	69.5	.8
Trouble with the law	47	12.4	24	51.1	23	48.9	.003
Troubles at school	42	11.4	16	38.1	26	61.9	.4
Troubles at work	22	5.9	9	40.9	13	59.1	.4
Drinking alcohol	155	39.6	54	34.8	101	65.2	.3
Drug or solvent use	65	16.9	26	40.0	39	60.0	.2
Thinking of someone who committed suicide	73	19.2	31	42.5	42	57.5	.04

Appendix B

Age-related differences

TABLE B1

Comparison of the mean level of psychological distress (K6) by age, population aged 18 and over

	All		18-29 years old		30-49 years old		>50 years old		Significance level
	n	%	n	%	n	%	n	%	
Psychological distress, K-6 (mean ± SD)	1829	11.3±7.2	444	12.5±6.8	871	12.2±7.1	514	8.8±7.1	<.001
Anxious[a]	1372	72.7	342	74.2	686	76.4	344	65.2	<.001
Hopeless[a]	911	48.2	240	51.7	496	54.9	175	33.6	<.001
Restless/fidgety[a]	1082	57.5	304	65.1	552	61.9	226	43.3	<.001
Depressed[a]	907	48.0	249	53.4	459	51.0	199	37.9	<.001
Everything was an effort[a]	1132	60.4	309	67.5	585	65.7	238	45.3	<.001
Worthless[a]	748	39.5	205	44.1	384	42.8	159	29.9	<.001
K-6 score above 13-point cutoff	840	45.9	229	27.3	462	55.0	149	17.7	<.001

[a] A cumulative percentage of respondents who answered "all" and "most of the time" to these questions is presented.

TABLE B2

Comparison of the prevalence of different forms of substance abuse by age, population aged 18 and over

	All		18-29 years old		30-49 years old		>50 years old		Significance level
	n	%	n	%	n	%	n	%	
Alcohol	1250	60.7	370	29.6	659	52.7	221	17.7	<.001
Blackouts due to alcohol (mean ± SD)	1158	3.4±4.7	358	3.3±5.0	596	3.4±4.6	204	3.4±4.5	.2
Solvent	45	3.0	23	51.1	16	35.6	6	13.3	.002
Marijuana	707	47.6	272	38.5	382	54.0	53	7.5	<.001
Hard drugs	69	4.7	34	49.3	33	47.8	2	2.9	<.001
Prescription drugs	73	5.1	23	31.5	39	53.4	11	15.1	.4

TABLE B3

Comparison of the prevalence and mean level of interpersonal violence by age, population aged 18 and over

	All		18-29 years old		30-49 years old		>50 years old		Significance level
	n	%	n	%	n	%	n	%	
Child sexual abuse index (mean ± SD)	1493	.97±1.4	374	.79±1.3	719	1.0±1.5	400	1.0±1.4	.006
Child physical violence index (mean ± SD)	1540	11.3±4.9	388	10.9±4.6	739	12.1±5.0	413	10.5±4.7	<.001
Adult sexual abuse	285	17.1	57	13.6	147	18.2	81	18.4	.2
Adult physical violence index (mean ± SD)	1547	9.2±3.9	386	8.8±3.7	743	9.8±4.1	418	8.5±3.5	<.001

TABLE B4

Comparison of the prevalence of specific community activities and forms of social support by age, population aged 18 and over

	All		18-29 years old		30-49 years old		>50 years old		Significance level
	n	%	n	%	n	%	n	%	
Goes hunting	1084	63.1	256	23.6	511	47.1	317	29.3	.02
Goes fishing	1214	70.7	274	22.6	571	47.0	369	30.4	<.001
Goes berry-picking	946	55.1	205	21.7	427	45.1	314	33.2	<.001
Participates in community activities[b]	471	23.9	42	22.7	77	41.6	66	35.7	.004
Someone for emotional support[a]	983	49.8	235	48.2	490	52.0	258	47.7	.001
Happy with job	1140	58.6	269	55.6	617	66.5	254	47.6	.007

[b] A cumulative percentage of respondents who answered “very often” and “often” to these questions is presented.

TABLE B5

Comparison of the prevalence of specific circumstances of suicide attempts by Inuit at the time of the attempt by age

	All (n=2,240)		18-29 years old		30-49 years old		>50 years old		Significance level
	n	%	n	%	n	%	n	%	
Very depressed	282	70.9	89	31.5	155	55.0	38	13.5	.02
Very angry	275	69.6	78	28.4	159	57.8	38	13.8	.2
Bored or tired with life	205	51.6	62	30.2	117	57.1	26	12.7	.1
Conflict with partner	210	52.8	55	26.2	128	60.9	27	12.9	.2
Conflict with family	171	43.4	53	31.0	100	58.5	18	10.5	.03
Conflict with friends	95	25.1	31	32.6	53	55.8	11	11.6	.3
Trouble with the law	47	12.4	17	36.2	27	57.4	3	6.4	.1
Troubles at school	42	11.4	16	38.1	23	54.8	3	7.1	.2
Troubles at work	22	5.9	6	27.3	11	50.0	5	22.7	.6
Drinking alcohol	155	39.6	38	24.5	88	56.8	29	18.7	.2
Drug or solvent use	65	16.9	22	33.9	37	56.9	6	9.2	.2
Thinking of someone who committed suicide	73	19.2	27	37.0	41	56.2	5	6.8	.03