The Social Context and Epidemiology of Suicide in Labrador

by

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Abstract

The Social Context and Epidemiology of Suicide in Labrador

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In Canada, many Inuit and First Nations populations have elevated rates of suicide, though there is substantial variation at the community level. The factors that contribute to suicide are complex and entrenched in colonization. Labrador is a circumpolar region in eastern Canada where suicide has been a persistent social problem in Inuit and Innu communities since the 1970's. As a result, suicide prevention has become a policy and program priority.

Indigenous leaders and health system stakeholders in Labrador identified a need for local evidence on suicide to inform community programs and services. The aim of this thesis was to examine the social context and epidemiology of suicide in the region. To this end, we established research partnerships with community members, Indigenous governments, and the regional health authority. Within a population health approach founded on the principles for ethical research involving Indigenous peoples, we integrated community-based methods with qualitative and epidemiological study designs.

This work began with a series of community consultations which engaged health and social service providers to better understand research priorities related to suicide. In a qualitative study, we then used focus groups to gather information about local risk and protective factors for suicide. Participants viewed suicidal behaviour, problematic alcohol and substance use, and mental disorders as the downstream outcomes of social inequity and historical trauma. To build on this knowledge, we conducted a population-based observational study to investigate disparities in suicide mortality between Innu and Inuit communities and the general population of the province. The results showed that the suicide rate was higher in Labrador (31.8 per 100,000 person-years) than in Newfoundland (8 per 100,000 person-years); at the subregional level, suicide rates were elevated in Inuit and Innu communities, at 165.6 and 114.0 suicide deaths per 100,000 person-years.

To put the data from Labrador in a global context, we undertook a systematic review on the incidence of suicide among Indigenous peoples worldwide. Suicide rates were elevated in many Indigenous populations, though rate variation was common. Strikingly, rate disparities in Labrador were among the highest globally. Recognizing challenges related to monitoring suicide, we analyzed the public health approach to suicide surveillance in Canada. To improve surveillance capacity, we proposed strategies such as integrating Indigenous identifiers into national data sets and building an inclusive data governance model to better track progress in suicide prevention in Indigenous communities. This thesis concludes with a discussion of the scholarly contributions of this work and identifies opportunities for future research.

Key Words

Suicide; epidemiology; community-based research; population health; Indigenous; Inuit; Innu; First Nation; Nunatsaivut; NunatuKavut; Labrador; Circumpolar North.

TABLE OF CONTENTS

CHAPTER 5 : Global Incidence of Suicide among Indigenous Peoples: A Systematic Review 142

Chapter 6: Tracking Progress in Suicide Prevention in Indigenous Communities: A Challenge for Public Health Surveillance in Canada 188

DEDICATION

Loss can never truly be measured.

This work is dedicated to the people in Labrador
who carry so many of us into a future that is just.

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Competing Interests

I declare that I have no competing interests.

CO-AUTHORSHIP STATEMENT

The scholarship contained in this dissertation resulted in three published manuscripts. For each manuscript, citations and details about authors' contributions as per the International Committee of Medical Journal Editors are detailed below. Overall, I (Nathaniel J. Pollock, ORCHID ID: https://orcid.org/0000-0001-5699-7661) had the lead and majority role in conceptualizing and designing all studies, obtaining and analyzing the data, interpreting the results, and writing and revising the manuscripts.

Chapter 4

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LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDICES

LIST OF ABBREVIATIONS

APS	Aboriginal Peoples Survey
ASMR	Age-Standardized Mortality Rate
ASTI	Aboriginal and Torres Strait Islanders
CI	Confidence Interval
C/ME	Coroner and Medical Examiner
CCHS	Canadian Community Health Survey
CCMED	Canadian Coroners and Medical Examiners Database
CHIRPP	Canadian Hospital Injury Reporting and Prevention Program
CIHR	Canadian Institutes of Health Research
CR	Crude Rate
CSIR	Crude Suicide Incidence Rate
CSSIF	Canadian Suicide Surveillance Indicator Framework
CVSDD	Canadian Vital Statistics Death Database
DAD	Discharge Abstract Database
ED	Emergency Department
EHR	Electronic Health Record
FNRHS	First Nations Regional Health Survey
FSM	Federated States of Micronesia
HVGB	Happy Valley-Goose Bay
IBSW	Inuit Bachelor of Social Work
ICD	International Classification of Diseases

ICEHR	Interdisciplinary Committee on Ethics in Human Research
IGA	International Grenfell Association
ITK	Inuit Tapiriit Kanatami
IHSA	Indian Health Services Area
IHS-NU	Inuit Health Survey - Nunavut
LFC	Labrador Friendship Centre
LILACS	Latin American and Caribbean Health Sciences Literature
LGH	Labrador-Grenfell Health
MeSH	Medical Subject Headings
MHA	Mental Health and Addictions Department
MIFN	Mushuau Innu First Nation
NACRS	National Ambulatory Care Reporting System
NAYSPS	National Aboriginal Youth Suicide Prevention Strategy
NCC	NunatuKavut Community Council
NG	Nunatsiavut Government
NIHB	Non-Insured Health Benefits
NL	Newfoundland and Labrador
NU	Nunavut
NW-LIHN	North West Local Health Integration Network
NWT	Northwest Territories
OCAP®	Ownership, Control, Access, and Possession
PHAC	Public Health Agency of Canada
RR	Rate Ratio

RSE	Relative Standard Error
SCiELO	Scientific Electronic Library Online
SPSS	Statistical Package for Social Sciences
SSIR	Standardized Suicide Incidence Rate
SIFN	Sheshatshiu Innu First Nation
TRC	Truth and Reconciliation Commission
UK	United Kingdom
UN	United Nations
US	United States
USA	United States of America
WHO	World Health Organization

TERMINOLOGY

There is no consensus on the definition of "Indigenous."[1] Through policy work that led to the development of the Declaration on the Rights of Indigenous Peoples in 2007, the United Nations developed a 'working definition' that included the following elements:

a) self and group identification as Indigenous;
b) a special attachment to and use of traditional lands;
c) distinct knowledge, language, and culture;
d) distinct social, economic and political systems;
e) a common ancestry with original territorial occupants;
f) participation in maintenance and reproduction of distinct ethnic identity;
g) and a non-dominant socio-political status.

Although this conceptualization is in common use, it may still exclude some populations. International political efforts to deal with this led to the shared position that state adoption of a universal definition was not a required precursor to fulfilling obligations to uphold human rights and redress the often-marginalized status of Indigenous people in many jurisdictions.[1]

In the context of this thesis, and with specific reference to the systematic review described in chapter 5, I used *Indigenous* as a broad term based on the UN's working definition. Similarly, in Canada *Aboriginal* is used as a catch-all, but non-specific term that is meant to include *First Nation*, *Inuit*, and *Métis* communities, peoples, and nations. At present, these terms are appropriate to use in some contexts. In this thesis, I have used all of them. However, as generic terms they often obscure the diversity and specificity of the Indigenous communities, cultures, and nations.

Where possible, I have used nation-specific and self-determined terms to refer to a specific Indigenous people. Although I have attempted to be consistent, the varied terms I used reflect the political and social changes that have taken place in Labrador and globally during the course of my research.

I use the term *Innu* to refer to the First Nations people who are represented by the Innu Nation, and include the *Sheshatshiu Innu* and *Mushuau Innu* who are represented locally by the Sheshatshiu Innu First Nation (in Sheshatshiu) and the Mushuau Innu First Nation (in Natuashish).

I variously refer to Inuit who are represented by the Nunatsaivut Government (formerly the Labrador Inuit Association) and comprise the majority population of the North Coast of Labrador as *Inuit*, *Labrador Inuit*, *Nunatsiavut Inuit*, and *Nunatsiavut communities*.

I refer to the Inuit population in central and southern Labrador who are represented by the NunatuKavut Community Council (formerly the Labrador Metis Nation) as *Southern Inuit*, *NunatuKavut Inuit*, and *NunatuKavut communities*. The term *Inuit-Metis* was previously used by the NunatuKavut Community Council, and may still be used by individuals to self-identify.

PREFACE

Positionality

Researcher reflexivity or theoretical positioning is an important aspect of qualitative and community-based research, and in Indigenous research in particular.[2,3] A reflexive approach makes explicit the values and philosophical assumptions of the researcher in relation to the context and topics of inquiry; it describes the positionality of the researcher, including motives, social location, and disciplinary affiliation.[4,5] Such positioning is important because it locates the researcher's subjectivity as a dimension of the research process, and acknowledges that the researcher's social location and values have a role in shaping the research. This is one of the ways that qualitative research is distinct from epidemiological and other quantitative and positivistic traditions which situate the investigator as a detached, neutral, and objective observer. In an Indigenous community context, reflexivity is a way to help foster a relational approach to research.[2,6,7]

To this end, I situate myself as a White, non-Indigenous settler of Irish, Scottish, and English descent. During the period of my thesis research, I briefly lived in St. John's Newfoundland, then moved to Happy Valley-Goose Bay, Labrador and lived there with my family for six years. My decision to move to Labrador was based on my commitment to building relationships in the communities and the region where my work was focused. This decision was an effort to confront and counter the problematic archetype of the 'extractive researcher' who briefly descends on a community to take information with little interest in sharing results back to communities.

I trained as a social worker and worked in community development, child welfare, health care, and mental health. My clinical experience helped provide a foundation in social justice that became embedded by subsequent training in public health. My interest in research on suicide in Labrador emerged from clinical work; I wanted to contribute to efforts that were not focused solely on individual-level interventions, but that advanced community and population-level change related to health and social equity.

My thesis required paying attention to several tensions and complexities. I am a non-Indigenous researcher that entered a community setting that was predominantly Indigenous. The focus of my research is on suicide, which is a stigmatized, sensitive, and politicized topic. The sense of loss from suicide in Labrador is both deeply intimate and disquietingly social. I wanted an inclusive and comprehensive approach to the design and governance of my project. This required developing formal partnerships with three Indigenous governments and the regional health authority, all of whom had their own mandates and responsibilities which at times were in conflict with each other. In this landscape, there was not always a clear path for me to follow.

I approached the administrative and relational aspects of conducting research in amidst these overlapping tensions by being flexible and responsive. My ability to develop and maintain relationships with communities in the general sense but also with specific people was because of my decision to live in Labrador. There is an accountability and responsibility that comes with being part of a community. In part, this was a conscious effort. I think it helped to express a commitment that extended beyond the boundaries of my research. However, it did not absolve me from recognizing my own privilege or power.

Assumptions

The content of this thesis is the result of direct participation in the communities that invited me in and allowed me to conduct research. The assumptions and knowledge that guided my work evolved over time. In the interest of transparency and a commitment to future research on suicide and suicide prevention, these assumptions warrant mention.

(1) I recognize that the socio-historical origins and individual risk factors for suicide and suicidal behaviour in Indigenous populations are well described. Although the complex pathways between colonization and suicide-related outcomes may not necessarily be comprehensively delineated in the epidemiological literature, a broader body of evidence that includes community knowledge and qualitative research has documented the connections between structural violence, social inequity, trauma and poor mental health, and suicide.[8-18]

(2) The lack of knowledge or evidence about specific interventions to prevent suicide, and the technical challenges that limit the ability to quantify the burden of suicide does not diminish the need for direct action to redress overlapping social inequities faced by Innu and Inuit communities in Labrador, and Indigenous communities elsewhere. There is a legislative and ethical imperative for equitable funding of Indigenous healthcare, transfer of control over health and services, and policy development to ensure that the material needs for clean water, food, and safe housing in communities are secured. This is a matter of fundamental human rights.

(3) Suicide prevention will be strengthened by integrating diverse forms of evidence and multiple ways of knowing including community perspectives, Indigenous knowledge, lived experience, and qualitative, quantitative, participatory, and mixed methods.[3,19-22]

(4) Indigenous communities are in the best position to design and lead interventions to promote mental health and prevent suicide. This means that Indigenous organizations and governments are the key stakeholders and hold the rights to health data and public health evidence as tools in policy decision-making.[23,24] It also means that Indigenous communities and people need a direct role in designing and delivering government-funded services including healthcare and child welfare.

(5) Research in general and on suicide in particular can be hazardous for communities. Suicide research is often deficit-focused and the public discourse about suicide can be stigmatizing rather than helpful, and in some contexts can contribute to a contagion effect.[25] Investigator-driven research in particular can create undue burdens on communities, which may lead to research fatigue and further entrench relationships with an inequitable distribution of power.

(6) Communities have the most to gain from suicide prevention and therefore should have the resources and control over policy decisions in direct relation to their needs. Both research and interventions must respect Indigenous jurisdiction.

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CHAPTER 1

Introduction

BACKGROUND

Suicide is a complex phenomenon that arises from a combination of biological, psychological, socio-economic, environmental, and historical factors.[1-3] Suicide is defined by the World Health Organization (WHO) as the outcome of deliberate actions taken with the intent to kill oneself.[1] Although suicide and suicidal behavior are global public health problems, rates tend to vary along social gradients: populations who experience poverty and deprivation,[4] marginalization,[5] discrimination,[6] and social exclusion[7,8] are disproportionately at risk of and impacted by suicide.[1] For Indigenous peoples in Canada, including First Nation, Inuit, and Métis, disparities in suicide mortality are the consequences of social inequity rooted in the unfolding history of colonization.[3,9-11] In response to the persistence of suicide as a community and national public health problem, suicide prevention has become leading priority for Indigenous communities worldwide,[12-14] and Indigenous-specific prevention frameworks have been developed in Canada and other high-income nations.[10,12-14]

The United Nations Permanent Forum on Indigenous Peoples underscored the need for global action to prevent suicide among Indigenous youth. Similarly, the Arctic Council has made suicide prevention in circumpolar communities a major focus for three consecutive terms.[15] In the landmark report, *Prevention Suicide: A Global Imperative*, the WHO recognized the need for interventions to reduce the disproportionate impact of suicide on socially excluded populations such as Indigenous peoples,[1] and recently led a collaboration with the Pan American Health Organization to promote interventional collaborations in Indigenous wellness and suicide prevention. One of the central recommendations in all of these documents was to improve the quality and specificity of data on suicide among Indigenous peoples.

Suicide surveillance is a first step in the population health approach to suicide prevention.[1] Surveillance involves the systematic collection of data to define and understand the scope of a problem. Yet, many countries around the world do not have high quality or comprehensive data on suicide or suicidal behaviour.[1,16] Data on Indigenous populations in particular is limited due to a lack of legal recognition and variations in how Indigenous peoples are identified in health data.[17-20] In Canada, the need to monitor suicide rates was recently highlighted by the Truth and Reconciliation Commission (TRC) as part of a broader course of action to track changes in Indigenous population health and set targets to reduce inequalities. The TRC's Call to Action #19, stated: "We call upon the federal government, in consultation with Aboriginal peoples, to establish measurable goals to identify and close the gaps in health outcomes between Aboriginal and non-Aboriginal communities, and to publish annual progress reports and assess long-term trends."[21(p. 2-3)] This call to action delegated a specific and achievable goal for public health in Canada and implicated public health systems in reconciliation.

Beginning in the late 1970's, suicide emerged as a major social problem in many Indigenous communities in Canada, but in particular among youth in rural and northern regions.[22] Over the past 40 years, research has consistently shown that First Nations, Inuit, and Métis communities experience a disproportionate burden from suicide compared to non-Indigenous populations.[3,22] Suicide incidence is a core indicator identified by the TRC because suicide rate disparities are one of the sharpest consequences of social inequity and discrimination experienced by Indigenous peoples. Federal, provincial, and territorial governments have dedicated substantial resources to Indigenous suicide prevention and mental health.[23] Yet, there has not been a widespread or coordinated effort to improve the capacity to monitor suicide-related outcomes among Indigenous populations at the community-level or nationally.[17,20]

As a part of the Federal Framework for Suicide Prevention in Canada, the Public Health Agency of Canada developed a suicide surveillance indicator framework.[24] A key limitation of the framework is that it does not include a mechanism for assessing possible rate difference among ethnic or racialized populations or subgroups that may have an elevated risk of suicide. Nor does the system routinely disaggregate data for small areas. Population-specific, 'high resolution' data is essential for community and regional public health decision-makers because it can help inform context-specific interventions, and assess inequalities between populations and geographic areas. This is a fundamental challenge that I explore in this thesis.

OVERVIEW OF CHAPTERS

In Labrador, a circumpolar region in eastern Canada, Indigenous governments and the regional health authority need suicide data for the same reasons national governments need it: to identify high-risk populations, to evaluate the impact of program and policy interventions, to advocate for funding and services, and perhaps most critically, to track progress in suicide prevention. My doctoral research is an effort to explore the social context and epidemiology of suicide in Labrador, and in particular, in Inuit and Innu communities. Overall, my research fits within a population health research framework,[25,26] and is guided by the methods and ethical principles of community-based research with Indigenous peoples.[27-30]

This manuscript-style thesis includes seven chapters. The present introductory chapter provides an overview of the literature on suicide in Indigenous communities, discusses methodological frameworks related to Indigenous health research and population health, describes the social context of Labrador as a setting for health research, and states the rationale and objectives for the subsequent chapters. Chapters 2, 3, and 4 are focused on suicide in Indigenous communities in Labrador. In these chapters, I describe the community consultation process that informed the study designs and report on the results of a qualitative and quantitative study, respectively. Chapters 5 and 6 help broaden the scope of my work in Labrador by considering suicide in a global context, and discussing the methodological challenges of suicide surveillance. In chapter 7, I conclude by reflecting on the highlights and contributions of my dissertation and identify future directions for research on suicide and Indigenous health.

My thesis research was founded on collaborative partnerships with Indigenous governments in Labrador, including the Nunatsiavut Government, the Innu Nation, and the NunatuKavut Community Council, and with the regional healthcare organization, Labrador-Grenfell Regional Health Authority. In 2009, I was invited by these partners to help conduct research on suicide. Since that time, I have worked closely with project advisors, along with a team of researchers from Memorial University, including my supervisory committee. For the early phase of the project, we designed and undertook a community consultation about research on suicide and suicide prevention (chapter 2). Stakeholders in the consultation provided input about local priorities, methods, and ethical issues; this feedback helped us design the qualitative and a quantitative studies.

To explore the social context of suicide in Labrador and gain an understanding of local risk and protective factors in Indigenous communities, we conducted a qualitative study that involved a workshop and focus groups with community and health service providers from the region (chapter 3). Building on the knowledge from our qualitative investigation, we then examined patterns of suicide mortality by age, sex, and geography in a regional population-based, observational study (chapter 4). These two primary studies were a response to research priorities identified in the community consultations. Together, this evidence helped provide a contextualized and regionally-focused understanding of suicide in Inuit and First Nations communities, and in Labrador overall.

Following this work, I then conducted a systematic review (chapter 5) to examine the global incidence of suicide among Indigenous peoples and situate local data from Labrador in an international context. To synthesize and apply knowledge from chapters 2 to 5, I conducted a policy and data systems analysis (chapter 6) of the national approach to suicide surveillance in Canada. In doing so, I identified ways to improve the quality, comprehensiveness, and access to suicide data for community and federal stakeholders in suicide prevention. The guiding objectives of this body of work was to generate contextualized evidence on suicide among Indigenous peoples and explore opportunities for strengthening the role of public health surveillance in Indigenous suicide prevention. In the final chapter (chapter 7), I summarize my thesis research, highlight contributions to the literature and public health, and identify future directions for research.

LITERATURE REVIEW

Epidemiology of suicide and suicidal behaviour in Canada

Since the late 1970's, the incidence of suicide in Canada has remained relatively stable with a rate of 12 deaths per 100,000 population.[31] As an absolute number, there were 4,405 suicide deaths in 2015, which accounted for 1.7% of all fatalities, and made suicide the ninth leading cause of death.[32,33] Nationally, suicide rates were highest among men aged 45 to 54 years old, and older men accounted for the majority of suicide deaths overall.[33] In 2015, suicide rates varied provincially from 4.8 per to 16.2 per 100,000, though were highest in the territories and Nunavut in particular (76.3 per 100,000).[33]

The incidence of hospitalization and emergency department visits due to self injury are two commonly used indicators in suicide surveillance.[16,24] They are proxy measures for suicide attempts and suicide-related hospital visits, although they both use a broad definition that includes non-suicidal self-injury. Rates of self-injury hospitalization follow a similar temporal pattern to suicide deaths, with gradual declines overtime; the incidence rate in 2014/2015 was 50.2 admissions per 100,000 population.[31] In 2016, the rate of emergency departments visits for self-injury in Ontario and Alberta was 113.9 and 160.5 visits per 100,000 people respectively.[24] In contrast to suicide mortality, self-injury rates tend to be higher for women.[31] This "gender paradox" is evident in Canada,[31] and many high-income Western nations.[1]

Suicide surveillance indicators derived from hospitalization and emergency department data are useful tools for measuring the burden of non-fatal suicide attempts and related behaviours at the population level. As some people who attempt suicide do not present for treatment, a key limitation of health service utilization data is that it only captures the subpopulation that has documented contact with health services. Survey data, by contrast, can offer a broader perspective on the population burden of suicidality. National data from 2015 showed that the prevalence rate of suicide attempts amongst those aged 15 years and older was 0.4% (prior 12 months) and 3.4% (lifetime); rates of suicidal ideation were 2.5% (prior 12 months) and 12.3% (lifetime). These estimates were similar to the prevalence in other high-income countries.[34]

Suicide among Indigenous Peoples

Globally, Indigenous peoples in other high-income countries have similarly elevated suicide rates; the situation in low-and-middle income nations is unclear. In Canada, a substantial body of evidence has shown that Indigenous peoples experience disproportionately high rates of suicide and suicidal behaviour.[3,35-37] In the four regions that make up Inuit Nunangat, the Inuit homeland, suicide rates are 4 to 10 times higher than in Canada,[10] and suicide is a significant contributor to the gap in life expectancy between Inuit and the general population.[38] However, elevated rates of suicide are not universal. A landmark study by Chandler and Lalonde reported marked variability in suicide rates in First Nation communities in British Columbia, with rates ranging from zero to 144 deaths per 100,000.[35] National and provincial rates of hospitalization and emergency department visits for self-injury among Indigenous populations follow a pattern similar to suicide mortality.[39-41] Survey data has shown that an estimated 22% of

Indigenous peoples have had suicidal thoughts in their lifetime, which is more than five times higher than in the general population.

In the general population, suicide is strongly associated with mental illness, and as many as 80-90% of people that die by suicide had a diagnosable mental disorder.[42,43] Several studies have shown that established risk factors for suicidal behaviour such as alcohol and substance use, suicide bereavement, and child maltreatment are correlated with suicide in some Indigenous populations.[44-47] However, there also appears to be risks that are unique to Indigenous peoples, such as exposure to residential schooling.[37,48]

While many factors may be common across the population, the social contexts that determine and magnify vulnerability are often specific to Indigenous communities.[10] A study of First Nations communities in British Columbia found that having more control and autonomy over local services and resources was correlated with lower suicide rates.[35] This finding has helped point to a role for Indigenous self-determination and governance as a pathway to improve population health. This is further supported by qualitative research has grounded evidence about suicide in the context of social inequity related to colonization. Community-based studies have helped to deepen knowledge about the relationship between the loss of cultural identity, disconnection from traditional land, and suicide.[49-52] Further, several studies have helped develop conceptual frameworks for understanding the role of grief, historical trauma, and other factors from the social environment in increasing risk for suicide.[52,53] Increasingly, research has used mixed-methods and community-based approaches to help develop a holistic understanding of the problem and implement community-led interventions.[51-55]

METHODOLOGICAL FRAMEWORK

Principles and Policies in Indigenous Health Research

The landscape of Indigenous research and health research ethics in Canada has shifted after years of troublesome and unethical practices. Historically, Indigenous health research has been conducted by non-Indigenous researchers and institutions, and often with little direct benefit or accountability to communities where research was conducted.[56-58] In some instances, research on Indigenous peoples has caused direct harm, and has had a specific and intentional role in colonization. Recent archival investigations found that in the first half of the 20th century, governments sanctioned nutritional and vaccine experiments involving First Nations children.[57,59] Such research exploited impoverished social conditions and neglected all the principles of informed consent that are now the foundation of ethical research involving humans.[57] These are egregious and extreme examples. Research that causes direct harm is part of a continuum of problematic approaches to studying Indigenous health. The more commonplace but still unethical practices that persist in contemporary Indigenous health research are related to control over content, process, and benefits of research.

Since the late 1990's, a vast body of scholarship has helped transform the landscape of Indigenous health research. In contrast to much of the previous work in the health and medical literature, Indigenous knowledge, values, laws, and customs provide the foundations for ethical and decolonizing research.[56,60-66] Other efforts include the creation of interdisciplinary research staff positions in Indigenous organizations and governments, the development of guidelines for community engagement, and methodological frameworks based on Indigenous epistemologies, such as the *Piliriqatigiinniq Partnership Community Health Research Model*.[62,67-69]

A necessary precursor to conducting Indigenous health research is to recognize and respect Indigenous expertise and jurisdictions. First Nations, Métis, and Inuit communities, organizations, and governments have worked to correct earlier research culture, and assert the right to govern research as a facet of self-determination. In the context of northern Canada, this transformation has evolved "from research *on* Inuit to research *with* Inuit and, now, to research *by and for* Inuit"[68]; a similar process has occurred for First Nations and Métis. Indigenous organizations have increasingly prioritized research infrastructure and human resources across the North.

A critical development has been the creation of institutional research policies and licensing authorities that allow Inuit to critically assess and authorize proposed research. Such policies vary by region; however, they are relevant to all Indigenous health research. Although there are commonalities with First Nations research guidelines, Inuit have a distinct procedural, ethical, and epistemological approaches. For example, the OCAP® (Ownership, Control, Access, and Possession) principles,[70] while firmly entrenched in the foundations of many First Nations ethical protocols, are not expressly part of the research policies of Inuit research licensing bodies. All of these developments have helped inform the substantial and necessary policy developments in Indigenous research such as the Tri-Council Policy Statement Chapter 9, *Research involving the First Nations, Inuit and Métis Peoples of Canada*.[28]

For non-Indigenous institutions and researchers, respecting Indigenous expertise and jurisdiction requires collaborative relationships with First Nation, Inuit, and Métis research organizations and with local and regional governments at the outset of the research process. This is not simply a matter of consultation. Rather, researchers are obligated to be well-informed about history, culture, and governance. This needs to be accompanied by knowledge of and adherence to the protocols for licensing research, including ethics boards and institutional requirements. Such procedures are not meant to be administrative obstacles or disincentives – they are processes for increasing transparency and accountability, improving community relevance, promoting valid methods, and for recognizing Indigenous jurisdiction. They are also part of relationship building that should accompany efforts to spend time in communities and with organizations to foster trust, mutual respect, and reciprocity.[27,71]

A Population Health Approach to Research

In this thesis, I have attempted to shape the process, methods, and relationships with research partners to reflect the principles and practices for ethical research with Inuit and Innu communities in Labrador. My methodological choices were founded on a commitment to addressing community-defined priorities, using trauma-informed methods,[72] respecting Indigenous institutions and research governance,[28,58] and were rooted in a relational approach to ethics.[65,66] To this end, I have drawn on methodologies related to community-based research[27,73] and participatory epidemiology,[30,74,75] and used population health[25,26,76,77] as an organizing framework.

Population health research is a transdisciplinary field that serves "the objectives of describing the health status of a population, explaining the causes of diseases, predicting health risks in individuals and communities, and offering solutions to prevent and control health problems."[25(p. 12)] Population health has recently been described as a "pragmatic science" with a focus on application in real-world settings and an interest in understanding and addressing health inequities.[76] In the context of public health practice and policy in Canada, the population health approach involves the use of qualitative and quantitative evidence to inform population, rather than individual interventions, that target the root causes of inequity and social exclusion.

Labonte and colleagues critiqued mainstream population health for having a mostly positivist stance and overly relying on the epidemiology of health inequity, while paying less attention to the social conditions and structures that shape differential exposures to health risks.[77] In the context of Indigenous communities, Richmond and Ross argued that population health research and interventions "cannot advance without blatant recognition of the complex historical, political and social context that has shaped current patterns of health and social inequality and allowed them to grow to such appalling proportions."[26] Counter to positions of scientific neutrality, a critical approach in population health situates action towards social justice as a moral imperative of research.[77] To this end, knowledge production should be grounded in the experiences and priorities of those communities that are most affected by health disparities.[77,78] Research evidence should help mobilize the public to take action and also be linked to policies that redress the structural drivers of health inequity.[78] This thesis reflects an effort to realize the principles of critical population health and ethical research involving Indigenous communities, and implement them in the context of a community-based study of suicide and suicide prevention in Labrador.

SETTING

A Brief Social History of Labrador

Labrador is a large subarctic region in Atlantic Canada with a landmass of 294,330 square kilometers. Labrador shares many cultural, historical, and geographic features with Canada's northern territories, though it is part of the province of Newfoundland and Labrador. The region is the territorial homeland of three distinct Indigenous peoples: Labrador Inuit, Mushuau and Sheshatshiu Innu, and Southern Inuit. Each Indigenous group is represented by a governmental body – the Nunatsiavut Government, Innu Nation, and NunatuKavut Community Council respectively. The population of Labrador is relatively small (Table 1.1).

Table 1.1 Overview of Indigenous governments and populations in Labrador

Indigenous government	2011 Population and language	Communities in Labrador	Land Claim Status
Nunatsiavut Government	Labrador Inuit ~7,500 registered beneficiaries 2,330 population in Nunatsiavut 25% in Nunatsiavut speak Inuktitut	5 communities inside the land claim settlement area: Nain, Hopedale, Makkovik, Postville, and Rigolet Large population in Happy Valley-Goose Bay and North West River	Established the Labrador Inuit Settlement Area and formed the self-government on December 1, 2005.

Innu Nation	Mushuau and Sheshatshiu Innu 2,100 registered population 97% speak Innu-aimun	Sheshatshiu and Natuashish (formerly Davis Inlet) are federal Indian reserves	Signed the Tshash Patapen (New Dawn) Agreement in 2011 which included an agreement-in-principle for self-government and land claim negotiations
NunatuKavut Community Council	Southern Inuit ~6,000 registered members English is the main language spoken in NunatuKavut	NunatuKavut communities in southern Labrador include: Cartwright, Paradise River, Charlottetown, Pinsent's Arm, William's Harbour, Black Tickle/Domino, Norman Bay, Port Hope Simpson, St. Lewis, Mary's Harbour, and Lodge Bay Large population in Happy Valley-Goose Bay, North West River, and Labrador City	Exploratory land claim negotiations with the federal government began in 2018
Sources: Statistics Canada[79,80] and Martin et al. (2012)[81]			

The population is dispersed across 31 communities that range in size from less than 100 people in fishing settlements in southern Labrador to larger population centres (~8,000 pop. each) in Labrador City and Happy Valley-Goose Bay (Figure 1.1). Indigenous peoples comprised approximately 35% of the region's total population of 24,111 in 2011.

The Nunatsiavut Government (NG) was formed in 2005 after the successful negotiation of the Labrador Inuit Land Claims Settlement Agreement. NG represents the ~7,000 Labrador Inuit who qualify for status as 'beneficiaries' of the land claim. The territory of Nunatsiavut is situated on the coastal and inland area of northern Labrador; 31% of the Nunatsiavut Inuit population lives in five communities within the land claim area. The Innu Nation is the organizational body that represents the ~2,100 Innu of Labrador, who live primarily in the communities of Sheshatshiu and Natuashish. The Innu gained official recognition under the federal Indian Act in 2006. In 2009, the Innu negotiated the New Dawn Agreement, which is the agreement-in-principle to carry out land claims negotiations; these negotiations are ongoing. The NunatuKavut Community Council is the representative organization for ~6,000 Southern Inuit who live primarily in communities in central and southern Labrador. The NCC is comprised of a governing council that represents six subregions within NunatuKavut territory. Southern Inuit do not have a land claim agreement, though they began exploratory talks with the federal government in 2018.[82]

The colonial settlement history in Labrador spans approximately 250 years, beginning in second half of the 18th century when Moravian missionaries from Germany established a settlement in Nain, and later in other parts of northern Labrador.[83] European and Newfoundland fishers setup camps and trading posts in the southern coastal region of Labrador in the 19th century. Labrador was determined to be part of the Dominion of Newfoundland (and not Quebec) in 1927 in a ruling by the British Privy Council. In 1948 Labrador voted to join Canada along with Newfoundland.

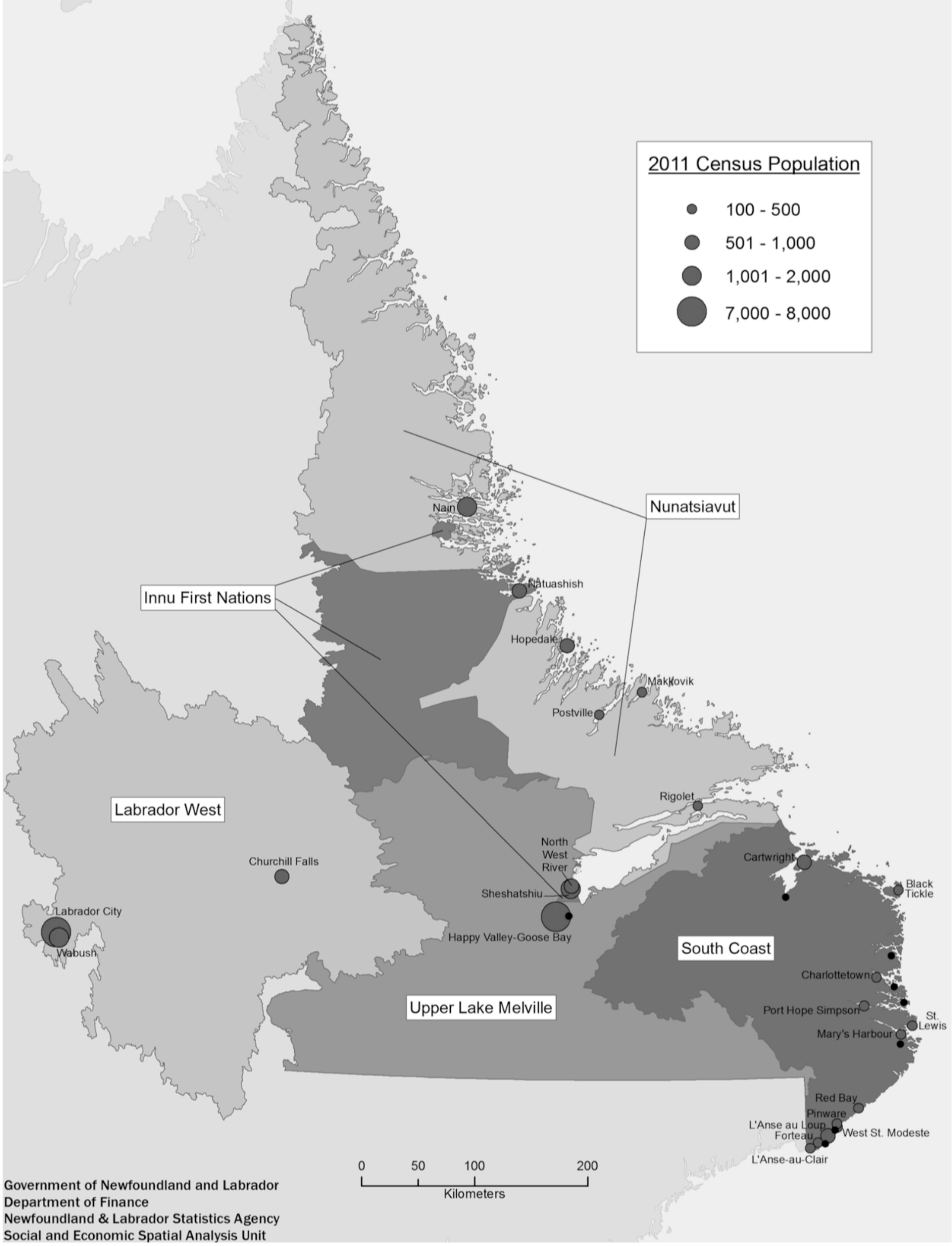

Figure 1.1 Map of Labrador

However, the terms of the agreement to join Canada excluded recognition of the Indigenous peoples whose traditional territories comprised most of Labrador.[84,85] This exclusion meant that the Inuit and Innu did not have status under the Indian Act, the federal legislation that articulates fiduciary obligations to provide government services.[84,85] One implication of not acknowledging Indigenous peoples and their traditional territories in Labrador was that education and health care came under provincial jurisdiction by default, which differed from other provinces and territories where it was a federal responsibility.

Beginning in the 1890's, the Grenfell medical mission from England began to provide medical care in Labrador by visiting camps and villages along the coast and trading posts in the interior of the region.[83] During the 20th century, infectious diseases such as influenza and tuberculosis were common, and some communities in Labrador experienced devastating losses as a result of localized epidemics.[86] Diseases related to poverty were also common, and childhood mortality was high.[86] As colonial governments sought a greater foothold in the region, Innu and Inuit societies were disrupted and underwent immense social change.[84,87-90] The forced relocation of communities in northern Labrador are quintessential examples of this disruption.

In 1959, the provincial government withdrew services such as education and health care in the northern-most Inuit community of Hebron. Without consultation or much support, the new province forced the residents to relocate to Nain, Makkovik, Hopedale, or Goose Bay.[88] In a similar initiative in 1967, the provincial government and the Catholic Church relocated the Mushuau Innu from an inland settlement located near caribou hunting grounds to a coastal island which became the village, Utshimassit (Davis

Inlet). The location was chosen by the province because it wanted the Innu to get involved in the cod fishing industry. However, the island location was a poor choice as it was difficult to access traditional inland hunting areas; the island also had limited habitable space for constructing homes, poor access to potable water, and installation of a sewages system was not possible.[83,91] Both of these relocations were turning points in the colonial history for Indigenous people in Labrador. The collective trauma and loss of control over their own wellbeing and livelihoods has had ripple effects on the health of generations of Nunatsiavut Inuit and Mushuau Innu.[87,88,91,92]

Organization of Health and Indigenous Services

Prior to the 1950's, health services in Labrador were delivered primarily by missionaries, with seasonal visits by physicians from the International Grenfell Association (IGA) hospitals that had been established in St. Anthony, Newfoundland and North West River, Labrador.[88] After confederation, the IGA expanded its services and by the 1970's the provincial government and the IGA had developed a network of hospitals and nursing stations across the region; the IGA also ran the five residential boarding schools in Labrador and northern Newfoundland. In the contemporary context, the region has a complex and overlapping governance structure, especially in health services and research. Indigenous governments have increasingly asserted self-determination in both domains, though relative control over governmental services varies in relation to land claim status. The main health service provider in the region is the provincially funded organization, Labrador-Grenfell Health (LGH).

LGH is one of four health authorities in the province of Newfoundland and Labrador; it operates in Labrador and the northern peninsula in Newfoundland with 17 community clinics and health centres, and three hospitals. For the smaller and primarily Indigenous communities on the north, central, south coasts, nurse-run clinics are the first point of contact in the health system. Physicians are located at the three health centres and visit the community clinics. Primary care and emergency services are delivered by family physicians, nurses, and nurse practioners, while outpatient mental health services are provided by social workers. The region is served by a combination of medical specialists in the three hospitals, visiting consultants, and telemedicine. Patients from remote communities routinely travel to Happy Valley-Goose Bay via the hospital's charter flight, known as the 'mission plane' or 'schedevac;' an air ambulance service provides emergency transfers ('medevacs'). For tertiary care, patients travel mainly to St. John's, the provincial capital.

The Nunatsiavut Government delivers a variety of health and social services in the five Labrador Inuit communities on the north coast. Services include: (1) public health programs related to vaccination, infectious disease surveillance and screening, and family home visits; (2) mental health services and programs such as counselling, case management, and crisis response; and (3) social services including supportive housing, child care, seniors' wellness activities, community kitchens and freezers, recreational activities, and youth development. NG also directly administers the Non-Insured Health Benefits Program, which is a federal funding program that covers costs related to medical travel, prescription medication, and dental care.

In the two Innu communities, the local band councils, Sheshatshiu Innu First Nation (SIFN) and Mushuau Innu First Nation (MIFN), each have social health departments that provide a range of community-based services. In Sheshatshiu, LGH and SIFN jointly provide nursing services, health promotion, and outreach through the community clinic. SIFN and MIFN both provide social work and counselling services, family home visits, and operate a healing lodge, youth treatment centre, group home, and safe house. The federal government provides Non-Insured Health Benefits to the Innu through a regional branch of Health Canada.

The NunatuKavut Community Council provides services to Southern Inuit in Happy Valley-Goose Bay and in communities in central and southern Labrador. Health and social service infrastructure is limited in NunatuKavut compared to in Nunatsiavut and Innu communities. Services primarily consist of outreach and advocacy, and school and community-based programming related to diabetes prevention, mental health promotion, and drug and alcohol awareness. As of 2019, NunatuKavut Inuit do not qualify for Non-Insured Health Benefits.

In addition to services provided by the health authority and Indigenous governments, local organizations in Happy Valley-Goose Bay such as the Labrador Friendship Centre and Mokami Status of Women Council provide a variety of community and social services, and provincial government agencies deliver income support, social housing, and child welfare services. Not-for-profit and religious organizations in many communities also deliver social services related to advocacy, food security, community development, and health promotion.

Research Licensing

As First Nations, Inuit, Métis, and federal government organizations began articulating and institutionalizing policies related to community consent, Indigenous governments in Labrador undertook a parallel process of development.[58] Although social accountability, health equity, and community consent have been foundational principles for some research in the region,[93-95] other work has run counter to the ethical practices for research with Indigenous communities. Community consent in Labrador is jurisdictionally complex as there are many overlapping authorities and the practicality of implementing principles for ethical research can be challenging.[58,96,97] Since 2006, the Nunatsiavut Government, Innu Nation, and NunatuKavut Community Council each developed policies and procedures for research licensing.

The Nunatsiavut Government established a research committee that includes representatives from various departments including health and social development, the environment and natural resources, and economic development. NG also created research staff positions such as an Inuit research advisor and a researcher/evaluator, and setup a community-based research centre in Nain. Applications for research in Nunatsiavut are screened by the Inuit research advisor then reviewed by the committee. The application includes standard information about the purpose and methods, but also requires details about the proposed plan for community engagement and integrating Inuit knowledge.

The Innu Nation developed a research policy and principles to help govern research in Innu territory.[98] Community-specific research requires consent from the band councils and Chiefs in Sheshatshiu and Natuashish respectively. The Innu Nation reviews proposals and may ask researchers to present at a council meeting to discuss the project. The Innu policy articulates the need for community consent, describes data ownership and reporting responsibilities, and emphasizes the importance of including Innu participation in project design.

The NunatuKavut Community Council has a similar, two-step process for community research ethics review. Applicants submit an initial inquiry form with a brief description of the proposed project. This is screened by the NCC Research Manager and by staff from any relevant departments. Screening criteria include assessing if Southern Inuit are directly identifiable in the research and if the project has the potential to impact NunatuKavut communities, people, or lands. If the project meets the criteria, researchers are invited to submit a complete application package. Research projects that progress to the full application stage are reviewed by NCC's research ethics committee which includes the research manager, a community member who is also an Indigenous research ethics scholar, and a bioethicist from Memorial University.[64] For approved projects, researchers and NCC then create a research agreement to outline responsibilities related to project oversight, data governance and custody, and dissemination of results.

In the context of health research, any project that requires resources from the health authority, such as accessing medical records or interviewing staff, needs approval by Labrador-Grenfell Health's research committee. Approval from LGH can only be sought after approvals are obtained from Indigenous governments and one of the two provincial research ethics boards, the Health Research Ethics Authority or Memorial University's Interdisciplinary Committee for Ethics in Human Research.

Overall, Indigenous research governance in Labrador has been strengthened by investments in human resources, the creation of organizational policies, and enhanced oversight procedures. The procedures reflect a distinct set of values, knowledge, and priorities, but all reflect a commitment to increased self-determination in research.[81,96] Collectively, this has helped to transform the research landscape in Labrador into one that is locally governed, focused on community-defined priorities, and considers collaboration and community engagement as foundational practices. Gradually, these practices have been built into much of the health research in the region.[99-104]

In the context of my thesis research, a critical dimension and a point of departure from previous studies in Labrador is that my work involved partnerships with the Nunatsiavut Government, the Innu Nation, and the NunatuKavut Community Council, rather than with one Indigenous government or community. The process of conducting research in an ethical manner required obtaining research licenses from the "community research review committees"[58] of three Indigenous governments and two provincial organizations in the region.

Historical Trends in Suicide Mortality

Although vital statistics were not routinely reported for Labrador prior to joining confederation in 1949, Moravian missionaries kept detailed records for Nunatsiavut Inuit communities. The hand-written ledgers or "church books" were registries of births, marriages, and deaths in each community.[88] Suicide may not have been consistently recorded given the Moravian view that it was a sin,[105] and it has been suggested that suicide was not recorded in official mortality data in Labrador until the late 1970's.[106] Though, Craig identified 24 probable suicide deaths in vital statistics data from 1951 to 1986.[107] Estimated suicide rates for the region during this period ranged from 9.4 to 11.4 deaths per 100,000 (Table 1.2); this was more than two times higher than the other nine provincial census districts.[107]

Table 1.2 Summary of suicide incidence rates in Labrador

Study Authors	**Region/Population**	**Years**	**Suicide rate per 100,000 population**
Craig[107]	Labrador Census District	1951 – 1986	9.4 –11.4 (Estimated range)
Wotton[106]	Northern Labrador (6 Inuit and Innu communities)	1979 – 1983	65.5
Roberts[108]	Nain, Nunatsiavut	1980 – 1984	7 suicide deaths
Aldridge and St. John[109]	Innu and Inuit youth in Northern Labrador	1977 – 1988	180.2
Edwards et al.[110]	Labrador	1997 – 2001	27.7
Alaghehbandan et al.[111]	Labrador	1998 – 2000	210.2 (Hospitalization rate for suicide attempts)

One of the first studies on suicide among Indigenous populations in northern Labrador reported a rate of 65.5 deaths per 100,000 population among Inuit and Innu from 1979 to 1983.[106] The suicide rate was three times higher than the national rate (14.5 per 100,000), and was higher still for youth aged 15-24.[106] In Nain, the northernmost community in Labrador, a subsequent study reported 7 suicide deaths and 55 suicide attempts from 1980 to 1984.[108] Suicide and suicide attempts represented 40% of all urgent clinic visits, and were the most common presenting issue.[108]

A 1993 study reported that the suicide rate among Indigenous youth in northern Labrador was 180.2 deaths per 100,000 compared to a rate of 3.3 among youth in Newfoundland.[109] A subsequent study reported that over a five year period (1997-2001), the age-adjusted suicide rate (for the general population) in Labrador was three times higher than the rate in Newfoundland (27.7 versus 8.5 deaths per 100,000).[110] A similar study reported that the hospitalization rate for suicide attempts in Labrador was 3.5 times higher than in Newfoundland (210.2 admissions vs. 59 per 100,000); in Labrador rates were highest among youth aged 15-25 years old, and there were no attempts in the 65 years old and above age group.[111]

Previous research on suicide in Newfoundland and Labrador consistently identified disparities between the island portion of the province and Labrador, and identified Inuit and First Nations youth as high-risk groups.[106-111] However, this body of evidence has several limitations. The more recent studies suggested that the elevated incidence of suicide attempts and deaths in Labrador may be driven by higher rates among specific Indigenous populations in the region.[110,111] However, this could not be clearly discerned from the data because the analysis did not disaggregate by subregion or community, and none of the data sources included ethnic or Indigenous identifiers. A related challenge was that the studies covered short periods and therefore included only a small number of cases. Given that Newfoundland and Labrador has a relatively small population compared to other provinces, and that suicide is a ‘rare outcome,’ it is difficult to produce stable rates for short periods. Another methodological limitation was the lack of involvement of regional health stakeholders or Indigenous communities, organizations, or governments. Together, these limitations provide a partial rationale for this thesis.

The Social Context of Suicide

The initial attempts to describe the epidemiology of suicide in Labrador occurred along side community efforts to better understand the problem and find solutions. In 1985, community leaders from the Labrador Inuit Association, the predecessor of the Nunatsiavut Government, organized the first regional conference on suicide prevention to bring together youth, health care providers, and community leaders.[112] At the time, there was a recognition of the connection between social factors such as unemployment and cultural identity loss, and suicide; communities also knew that youth were disproportionately impacted. Young people themselves appeared to have acute knowledge of the immensity and consequences of suicide, and began to organize youth-oriented activities and advocacy in several communities. At an annual theatre festival, youth from Labrador began writing plays that featured suicide either as a focal point of the plot or as a background feature to community life. In parallel to this sort of grassroots social commentary, several national media stories called attention to the issue,[113] though often with stigmatizing explanations of the causes.

These early efforts to mobilize around suicide prevention often required confrontation with an immense and collective sense of loss. In 1992, six children died in a house fire in the Mushuau Innu First Nation community of Davis Inlet. Less than a year later, community leaders captured a video of a group of youth who were sniffing gasoline, “yelling they want to die.”[114] Both tragedies received widespread media attention, and helped construct a stigmatizing narrative about the Innu as “the most suicide-ridden people in the world.”[115(p.7)] Labrador Inuit faced a similar stereotype. In 2000, 10 people in Nain died by suicide, many of them young. This community crisis led to a lot of media attention,[116] much of which was negative and compounded the grief many already felt in the community. Thereafter, community leaders worked with the regional media outlets to institute an moratorium on media reporting of specific suicide deaths or clusters.

For Innu and Inuit communities in Labrador, as with Indigenous communities elsewhere in the circumpolar North, escalating rates of suicide often co-occur along with other "social pathologies"[117] such as substance abuse and violence, and are concentrated in places with poor social conditions. In Canada, Indigenous peoples experience overlapping health and social inequities that are rooted in a colonial history characterized by systemic racism. The Innu were forced to settle in Sheshatshiu and Davis Inlet as in the 1960's, and the consequences of government social policies ignored Innu rights and sovereignty are manifest in the poor material conditions experienced by many families in both communities.[87]

Over the past 20 years, community efforts to prevent suicide in Labrador have transformed into advocacy for social justice. Youth, community leaders, families, and increasingly local governments and the health systems have recognized the critical role of the social determinants of health in suicide prevention. With this understanding, community services and interventions, grassroots action, and social policy have begun to take a holistic and life course approach to prevention. In part, this thesis is an effort to support regional planning by providing community leaders, decision-makers, and advocates with local evidence on suicide. This work emerges from a recognition of the value of health data as a social resource and a tool for community empowerment.

RATIONALE

Suicide prevention is a strategic priority for Indigenous governments and health stakeholders in Labrador and across Canada. The recent federal parliamentary study, *Breaking Point: The Suicide Crisis in Indigenous Communities* underscored the need for community- and Indigenous-led approaches to suicide prevention.[11] One of the challenges in local and national suicide prevention is the limited availability of high-quality, timely, and disaggregated data on suicide and suicidal behaviour.[17,20] In the *National Inuit Suicide Prevention Strategy*, Inuit Tapiriit Kanatami recommended enhancing capacity for suicide surveillance and more effectively using data to inform interventions and monitor progress over time.[10]

Suicide data can be a valuable resource for suicide prevention in Indigenous communities. However, conducting research in this area is imbued with ethical and methodological challenges.[118,119] Scholars have argued that studies have been overly focused on individual risk factors, lack community involvement, and do not adequately address socio-historical and political contexts.[118,120,121] Despite these criticisms, research can help address key gaps in knowledge about the social context of suicide and local and global patterns of mortality. Disaggregated data can also help identify subpopulations that experience elevated risks and a disproportionate burden from suicide. Overall, such evidence can make important contributions to Indigenous-led suicide prevention by helping to focus interventions on communities and subpopulations in greatest need and improving capacity for monitoring longitudinal trends in health risks and outcomes at the population level.

Research Questions

Taken together, these challenges provide a scholarly and community-centered basis for pursuing population health research on suicide among Indigenous populations with a local, national, and global scope. In collaboration with colleagues and community partners in Labrador, I designed a series of studies to address gaps in knowledge about suicide by exploring the following questions and objectives:

(1) *Research Question #1*: What are the suicide-related research priorities in Labrador?

  1.1. What methods and data sources should be used to conduct research on suicide in Labrador?

(2) *Research Question #2:*What do community and health service providers perceive as the primary risk and protective factors for suicide in Labrador?

(3) *Research Question #3:* What is the incidence rate of suicide in Innu and Inuit communities in Labrador?

  3.1. How do suicide rates vary by age group, sex, and geography in Labrador?

  3.2. Are suicide rates higher among Indigenous populations in Labrador compared to the general population of Newfoundland?

(4) *Research Question #4:* What are the patterns of suicide mortality in Indigenous populations worldwide?

  4.1. What is the incidence rate ratio of suicide among Indigenous populations compared to general or non-Indigenous populations?

(5) *Research Question #5:* In the context of public health surveillance, how are suicide rates among Indigenous populations in Canada tracked?

Research Objectives

1. *Research Objective #1*: To identify community priorities and methods for conducting research on suicide in Labrador;
2. *Research Objective #2*: To explore community and health service providers perspectives on the social context of risk and protective factors for suicide in Labrador;
3. *Research Objective #3*: To examine trends in suicide epidemiology in a regional context in Labrador;
   - 3.1. To examine subpopulation patterns by age, gender, and geography
   - 3.2. To compare suicide rates between Indigenous and general populations in Newfoundland and Labrador
4. *Research Objective #4*: To assess the global incidence of suicide among Indigenous peoples;
   - 4.1. To compare rates between Indigenous and non-Indigenous or general populations to assess relative disparities
5. *Research Objective #5*: To understand the current approach and capacity for Indigenous-specific suicide surveillance in Canada

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CHAPTER 2

Community Consultations for Research on Suicide in Labrador: Identifying Local Priorities and Methods

Abstract

Suicide prevention is a long-standing public health priority for Indigenous communities and governments in Canada. Although suicide is a leading cause of death among Inuit and First Nation populations, the evidence base for effective interventions is limited. A key challenge for research and health system planning is that many communities have limited access to disaggregated data and local evidence that can be useful in identifying high-risk subgroups and developing targeted and context-specific interventions.

In Labrador, as in many regions across the circumpolar North, Indigenous communities have experienced elevated suicide rates for more than 30 years. In 2009, Indigenous leaders identified a need for region-specific data on suicide to help inform community interventions and health service planning. Through a collaborative and community-based approach, we developed research partnerships in Labrador. We planned a community consultation process to build relationships with communities and stakeholders in the region, identify research questions and priorities that were locally meaningful, and seek advice on methods and data sources for conducting research on suicide and suicide prevention.

Alongside efforts to obtain community consent and research ethics board approval, we hosted a consultation workshop to bring together diverse stakeholders from across Labrador to talk about suicide prevention and the potential value of local research. We recruited twenty-two (n=22) participants with knowledge and experience related to suicide prevention in Indigenous communities in the region. Participants included Indigenous government leaders, Elders, youth, community-based researchers, mental health counsellors, physicians, nurses, community workers, and healthcare managers.

The community consultations provided clear direction on priorities and procedures for conducting research on suicide in Labrador. Priorities included gathering up-to-date and region-specific data on suicide-related outcomes. Participants emphasized the need for a community-based methodological approach that adhered to local research governance requirements and minimized the resource burden and unintentional consequences on communities. Based on the consultations, we collaboratively developed a mixed-methods research program on suicide. This chapter provides a detailed look at the steps we took in this process.

Key Words

Suicide prevention; community-based research; population health; epidemiology; community engagement; Indigenous; Nunatsiavut Inuit; Innu; NunatuKavut Inuit; circumpolar health.

BACKGROUND

In 2011, the community of Nain needed a better way to help care for vulnerable youth. Nain is the northern-most community in Nunatsiavut, the traditional territory of the Labrador Inuit, located in the eastern subarctic region of Canada. Labrador Inuit have a rich tradition and culture; community members maintain strong connections to the land, sea ice, and wildlife.[1,2] Subsistence hunting for seal, caribou, fish, and birds is a vital part of life in the region. Food gathering activities are highly valued as a cultural practice in many Indigenous communities in the region, and identity and health are closely tied to relationships with the environment.[2-4]

These relationships were at the core of *Aullak, sangilivallianginnatuk* (Going Off, Growing Strong), a land-based youth outreach program, when it was developed by a group of local service providers, hunters, mental health professionals, and a community research centre in Nain. The program aimed to help support youth who experienced complex mental health and social challenges.[5,6] The objectives were to (a) foster resilience and mental health among young people, (b) promote intergenerational relationships between youth and Elders, (c) share traditional knowledge and skills for hunting and travelling on the land, and (d) improve food security. As a locally-designed mental health intervention, *Aullak, sangilivallianginnatuk* was part of a grassroots response to a cluster of suicide deaths in the community.

In late 1970s, suicide emerged as a leading cause of death amongst Inuit and Innu communities in Labrador.[7-9] Studies have shown that rates of suicide and suicide attempts in Labrador are three times higher than in Newfoundland, and youth are at an elevated risk.[10,11] Across Northern Canada, rate disparities are much the same.[12,13] In the four regions that make up Inuit Nunangat, the Inuit homeland, suicide rates range from 4 to 10 times higher than in the general Canadian population.[14,15] In northern contexts, programs like *Aullak, sangilivallianginnatuk* not only help fill gaps in mental health services, but also serve as instructive examples of locally-designed interventions that reflect Indigenous knowledge and cultures, and that address complex health priorities.[16] Indigenous governments and organizations, along with federal and global bodies, consistently emphasize the necessity of community interventions for suicide prevention in the Circumpolar North.[14,16-18]

Community-Based Approaches to Suicide Prevention

Suicide prevention is a long-standing public health priority for Indigenous communities and governments in Canada.[14,16-19] In 1995, the Royal Commission on Aboriginal Peoples concluded that decreasing suicide rates in Indigenous communities required widespread commitment to improving social conditions while also achieving equitable access to health and mental health services.[20] Over the past 25 years, many Arctic communities have mobilized around suicide prevention by building local crisis response systems and developing community-based mental health services.[16,21,22]

Despite the emphasis on local interventions, Indigenous communities often encounter systemic barriers to program development. Barriers include nominal and short-term funding, limited human resources, lack of jurisdictional control, competing social and infrastructural needs, excessive bureaucratic oversight, and a complex administrative burden. These challenges are often entrenched in colonial systems of governance that do not respect Indigenous epistemologies, concepts of health and wellbeing, or the right to self-determination.

Evidence Gaps in Indigenous Suicide Prevention

Relative to the magnitude of the problem, there is a limited body of evidence on effective approaches to suicide prevention in Indigenous communities.[21,23-25] In part, this is a consequence of the challenges that many communities face to developing local interventions; it is often difficult to sustain or scale-up local programs and many are not evaluated.[21] A related criticism is that part of what has stymied progress towards reducing suicide rates has been the focus on individual-level change rather than on systemic change related to social conditions and human rights.[26-28]

Another challenge is that evidence of 'best practice' interventions from non-Indigenous contexts may not be effective in Indigenous communities. Among the limited number of clinical trials in Indigenous communities, studies of gatekeeper training and brief treatment/follow-up care have not been effective in reducing suicidality.[29,30] Intervention research in this field is challenging because of geography, small populations, the contextual specificity of many interventions, and a lack of culturally-relevant outcome measures.[21,31,32]

In general, suicide research is difficult because suicide deaths are considered a 'rare outcome' which means that it is difficult to detect the potential effects of an intervention.[32] Gaps in knowledge about population interventions also persist because local, regional, and national surveillance data on suicide-related outcomes is limited.[14,31,33,34] Indigenous governments and provincial and federal decision-makers have limited access to disaggregated data[31,35,36] which means that decisions about what services are funded, where programs are located, and who they are for is often not based on up-to-date or community-specific information.

Setting and Objectives

The present study is part of a longitudinal research project aimed at generating context-specific evidence to support community interventions and health system planning related to suicide prevention in Indigenous communities in Labrador. In 2008, the Labrador Aboriginal Health Research Committee identified suicide as a priority area for research in the region. Specifically, the committee was interested in exploring the factors associated with suicide attempts and deaths, assessing the impact of suicide on families and communities, and in understanding the protective factors that promote resilience and wellbeing.

In 2009, community leaders from the Innu Nation and Nunatsiavut Government invited our research team to be part of a collaboration to generate region-specific knowledge that could inform health system. At the time, there was no regional or provincial suicide prevention framework, though reducing the suicide rate was a strategic priority for communities, organizations, and governments.

Labrador is the traditional and ancestral homeland of the Nunatsiavut Inuit, Sheshatshiu and Mushuau Innu, and NunatuKavut Inuit. Respectively, they are represented by the Nunatsiavut Government, Innu Nation, and the NunatuKavut Community Council. We developed partnerships with each Indigenous government in the region and Labrador-Grenfell Health, the regional health service provider.

Initially, we organized project planning meetings with representatives from partner organizations. Together, we planned a community consultation process with the following objectives: (1) to engage and build relationships with Indigenous and health system stakeholders in Labrador; (2) to identify research questions and priorities that were meaningful to knowledge users and community members; and (3) to seek advice on methods and procedures for conducting research on suicide and suicide prevention.

METHODS

Research Approach

Our research was guided by a population health approach[37-39] that integrated community-based participatory research methods[40] with the principles and practices for ethical research in Indigenous communities.[41-44] This type of approach has been conceived of as community-based[36,44,45] and culture-informed[46,47] epidemiology, and has been used for generating local evidence on suicide in Indigenous communities.[48-50] The present study describes the community consultation process we used as a first phase in the development of a research program on suicide. Specifically, we report on findings related to a community workshop in which we sought input into local research priorities.

Community Consultation and Engagement

Community consultation and engagement is essential in participatory and Indigenous research; it serves as a platform for developing relationships with knowledge users, local experts, and community members, and for identifying research needs and methods. During the planning stages of research, consultations can include formal and informal activities such as concept mapping, community meetings, and creating advisory boards.[44,51] Within a population health approach, consultation with community leaders, health system decision-makers, and health professionals is recognized as an important aspect of designing studies that meet the need of communities, knowledge users, and health systems. Consultation and meaningful partnerships are part of an ethical approach to research with Indigenous communities.[42,44,52] However, consultation does not itself constitute a form of community consent, which is a necessary and distinct step.[53]

From 2009 to 2011, research team members met with the Indigenous government collaborators to discuss all aspects of the research process including research priorities, project objectives, research governance, licensing procedures, community engagement, potential study designs and data sources, and knowledge translation. This process helped establish formal partnerships with the Nunatsiavut Government and the Innu Nation. Collaborators identified key people and organizations, such as the NunatuKavut Community Council, to consult during the planning phase, and recommended that the lead author setup meetings and visit communities to support ongoing engagement and relationship-building.

In 2011, the lead author relocated to Happy Valley-Goose Bay, Labrador and travelled throughout the region with community visits in Sheshatshiu, Natuashish, Hopedale, and Nain. During the community visits, the lead author participated in community events and met with local leaders and staff working in health and mental health services. The lead author also continued to meet regularly with collaborators and regional stakeholders to discuss progress and co-plan dissemination activities.

As a part of the consultation process, the lead author was also invited to help organize and contribute to several local activities related to suicide prevention. Activities included World Suicide Prevention Day, a symposium on suicide prevention in the justice system, a networking meeting organized by the Mental Health Commission of Canada, a healthcare working group on suicide risk assessment, and meetings with provincial and federal government representatives. The lead author was also invited to meetings with staff from the Nunatsiavut Government’s Department of Health and Social Development and the Sheshatshiu Innu First Nation band council, Innu Nation leaders, the medical staff at the Labrador Health Centre, and staff from the provincial child welfare agency.

Community Workshop

A major activity in the consultation process was a community workshop. There was an interest in bringing together diverse stakeholders from across Labrador to talk about suicide prevention and the role of research. To support this goal, we obtained funding from the Canadian Institute of Health Research and the Newfoundland and Labrador Centre for Applied Health Research. The workshop was designed and organized in collaboration with project partners, and involved jointly determining the setting, objectives, guiding questions, facilitation process, and participants. The workshop format was similar to other consultation and engagement activities used in community-based research such as town halls, community meetings, and public forums.[51,54] Our objective was to provide an interactive platform to discuss research priorities and data needs, and seek input into research methods. A secondary objective of the workshop was to gather perspectives from local experts on risk and protective factors for suicide in Labrador. The latter objective is discussed in detail in chapter 3.

Participant Recruitment

We used a purposive sampling strategy to recruit twenty-two (n=22) participants to the community workshop. Potential participants from Indigenous, healthcare, and community-based organizations were identified and approached because of their role, knowledge, and/or experience related to suicide prevention. Participants included community leaders and decision-makers, Elders, youth, local researchers, mental health counsellors, physicians, nurses, and community workers. The workshop included Inuit, Innu, and non-Indigenous participants from 7 communities (Nain, Hopedale, Makkovik, Rigolet, Sheshatshiu, North West River, and Happy Valley-Goose Bay).

Project partners made the initial contact with potential participants via phone or email, and the lead author followed-up. Participants who worked in the health and social service sector were permitted to attend the workshop as a part of their job; honorariums were provided to youth and Elders. Grant funding covered air and ground travel, accommodations, and other expenses. Taking part in the workshop was voluntary and all participants provided written informed consent (Appendix B).

Data Collection and Analysis

The workshop was a one-day event held in Happy Valley-Goose Bay in 2012. The workshop included a brief presentation by the research team followed by large and small group discussions. Two members of the research team co-facilitated the workshop; other research team members and project partner staff co-facilitated small group discussions. The following discussion questions were used:

Research Priorities

- What information about suicide would be useful to your work and to communities in Labrador?
- What questions could we ask to learn more about suicide and how to prevent it?

Methods

- What are some ways in which we could find out more about suicide in Labrador?
- What might be useful sources of information?

Ethics

- What are the possible risks or harms to of doing research on suicide?
- What will community members think if we start talking more about suicide and doing research?

Dissemination

- Who in your community would be well suited get involved or help with this research?
- How should we share information about this research?

During workshop planning meetings, research partners recommended against audio recording the discussion due to the sensitive nature of the subject. Out of respect for local concerns and to help increase participant comfort, research team members kept detailed notes during the workshop instead of audio recording. At the end of the workshop, we invited participants and research team members to reflect on the discussion and remark on key themes or messages.

As the workshop was a key part of the consultation process, it served as a form of data collection. We used a qualitative descriptive approach[55,56] to data collection and directed content analysis to analyze the data.[57-59] We developed an analytical framework based on the questions to organize and categorize the workshop notes. The main categories included: research priorities, methods, ethics, and dissemination. Following the workshop, the lead author read all notes, and coded participant comments and questions according to the framework. Through discussion with other research team members, we then summarized the main and sub-categories in the framework, and aggregated into themes.[57,58,60] We reviewed the findings with project partners to validate and clarify the analysis and interpretation.

Ethics Approval

In accordance with principles and policies for research involving Indigenous communities,[41,53,61-63] we obtained ethical and institutional approval from Indigenous partners and the regional healthcare organization. Obtaining community consent involved presenting to the Chief and Council of the Innu Nation, and submitting applications and proposals to the community research ethics review committees for the Nunatsiavut Government and the Labrador-Grenfell Health. We also obtained approval from the university-based research ethics board (ICEHR # 2012-291-ME). Research approval letters are provided in Appendix A.

FINDINGS

The community consultations provided clear direction on priorities and procedures for conducting research on suicide in Labrador. The findings of the analysis are summarized around four categories: suicide-related research priorities, research governance and ethics, and methods and data sources, and knowledge translation. Specific recommendations for each category are reported in Table 2.1.

Table 2.1 Community recommendations for research on suicide in Labrador

Category	Priorities and Recommendations
Suicide-related Research Priorities	1. Gather up-to-date and longitudinal data on suicide-related outcomes including suicide mortality, suicide attempts, and suicidal thoughts; 2. Disaggregate data by community, subregion, age group, gender, and method of injury to understanding local differences; 3. Determine Indigenous-specific rates for Inuit, Innu, Southern Inuit, and non-Indigenous populations; 4. Look at health system contacts/visits by community members who have attempted or died by suicide; 5. Gather data for specific subpopulations in Labrador, such as children and

	youth in foster care; 6. Assess inequalities by comparing local and regional rates to provincial and national benchmarks; 7. Consider ways of measuring strengths, resilience, and mental wellness; 8. Support program evaluations;
Research Governance and Ethics	9. Obtain research ethics approval and community research licenses from all Indigenous governments and healthcare organizations, in additional to the research ethics board; 10. Develop research agreements related to data custodianship and storage, communication and project planning, and dissemination; 11. Respect community schedules and seasonal activities by planning engagement and dissemination activities when timing is appropriate. For example, consult with local experts and follow advice related to timing of cultural events, celebrations and holidays, hunting and food gathering seasons, political and social climate, and other events such as funerals;
Methods and Data Sources	12. Use qualitative and quantitative methods to develop a holistic understanding of the suicide and suicide prevention; 13. Consider the social and historical context of suicide in Labrador, and recognize the impact of specific colonial social policies in the region such as community relocations; 14. Visit and spend time in communities across the region to build relationships outside of research; 15. Minimize direct burden of research on community members and families that are bereaved by suicide loss by using existing sources of quantitative information such as clinical records or administrative data; 16. Finds ways to 'take care of data' by respecting that statistics represent someone from Labrador that has been in distress or who has died;
Knowledge Translation	17. Provide regular project updates to project partners and regional stakeholders/knowledge users through summary reports and presentations at local conferences, meetings, etc.; 18. Plan knowledge translation activities with project partners; 19. Coordinate the release or publication of results during times in the year when communities are expecting to talk about suicide and suicide prevention, such as during World Suicide Prevention Day; 20. For public/community dissemination, report absolute numbers, proportions, and incidence rates on a scale relevant to the context, such as *n* per 1,000 rather than per 100,000 population; and 21. Increase access to up-to-date and region-specific statistics for knowledge users. For example, prepare customized statistical reports on request, provide research support and resources to local organizations to obtain aggregate data requests from national/provincial statistical agencies, and published peer reviewed research in open access journals.

Suicide-Related Research Priorities

Stakeholders identified a range of research priorities related to the epidemiology of suicide (Table 2.1). Overall, they emphasized the importance of having access to up-to-date statistics that were community-specific, and included measures for suicide deaths, attempts, and suicidal thoughts. The reliability and accuracy of suicide statistics was questioned, and several stakeholders suggested that misclassification of deaths could be a problem as community knowledge may differ from official cause of death in some cases. Stakeholders consistently explained that people in Labrador already know a lot about suicide, so to be careful about duplicating what has already been shown.

There was interest in measuring strengths and protective factors for suicide, and in investigating suicide-related behaviour among youth in foster care or those who had a history of contact with child welfare services. Stakeholders emphasized that descriptive or observational research is useful because it can inform planning and advocacy, but that program evaluations and assessing the impact of interventions is also critical to help determine what, how, where, and if interventions are decreasing suicide rates. Stakeholders also recommended using a strengths-based focus and finding ways to measure protective factors, community resilience, and mental wellness.

Research Governance and Ethics

Participants consistently stated that all research in the region needs to involve close collaboration with Indigenous communities, and that health research should involve the health authority and community-based organizations as well. Project collaborators underscored the need for research licensing by each Indigenous government/nation and the health authority in addition to the provincial research ethics board. Project partners also recommended developing research agreements to delineate specific responsibilities related to project planning, data custodianship, communication, and dissemination.

Stakeholders commented on the large amount of research in region. They explained that many community members had “research fatigue” due to regular requests to participate in consultations or interviews. It was recommended that project meetings, presentations, and data collection be coordinated with local partners to ensure that the timing is appropriate (Table 2.1) for a given context.

Methods and Data Sources

Project partners and stakeholders consistently emphasized the need for research to be “community-centered” and recommended several strategies (Table 2.1). Part of achieving this goal involved providing regular updates about activities and results. They also recommended that the lead author should focus on building relationships with community members and local decision-makers. There was also an emphasis on the value of translating results into useable forms of knowledge.

Participants identified recent community-led research projects that were highly valued for both the process used and the knowledge they generated. The examples given included community health needs assessments[3,4] by the Sheshatshiu Innu First Nation and the NunatuKavut Community Council respectively and a population health survey[64] by the Nunatsiavut Government. These projects were important because they were led by community-based researchers and organizations from Labrador with oversight from community members; university-based researchers had varied roles in these projects related to governance, data collection, and analysis.

In the context of suicide research, participants cautioned against speaking directly to recently bereaved community members. There was concern that talking to individuals or in public settings about suicide, especially in communities that had experienced multiple and frequent suicide losses, might unnecessarily cause distress. Participants indicated that suicide was a longstanding local concern and a source of trauma for many people in the region. Participants suggested that the research process carefully balance the value of engaging community members with a respect for their grief. In practical terms, participants recommended that we be selective about choosing data sources that are minimally intrusive or that already exist (e.g. secondary and administrative data) rather than interviewing vulnerable community members. A related message was that we should 'take care of the data' by knowing that it represents a community member who has been in distress or who has died.

Knowledge Translation

Stakeholders explained that health research is often carried out with limited input from community members or local organizations, and that after data is collected results are not shared. Overall, the community consultations revealed a keen interest in getting regular updates about the project and creating opportunities for feedback and planning with the project partners. Co-planning the dissemination of the results was noted as an essential task, and project partners recommended releasing results during times of the year when communities are expecting a public dialogue about suicide to occur (Table 2.1). Recognizing that this may not always happen, stakeholders emphasized that sharing results in an accessible and engaging format and contributing to grassroots and community-initiated discussions would be an effective way to update community members about the project.

Participants in the workshop also expressed critical views of research in general and on suicide specifically. Some community members expressed concern about the unintended consequences of statistics on suicide such as stereotyping. Others expressed concerns about statistics being reductive and not accurately depicting the complexity of suicide or the differences between communities. There was skepticism about the ability of research to have a positive impact on service delivery or prevention when it was focused on a topic that was already well recognized in the community.

Stakeholders who held management and administrative roles explained that they often used data in funding applications, advocacy, strategic planning, public health surveillance, and program evaluation. However, many sources of ‘open data’ are provincial or national in scope, rather than community-, region- or population-specific, and that government statistics and scholarly research is often not accessible or affordable for many organizations. Stakeholders also indicated that it would be useful to have direct access to up-to-date, regional statistics on suicide and mental health indicators, and recommended several strategies to increase community access to such data (Table 2.1).

DISCUSSION

Through the community consultations, stakeholders in Labrador identified research priorities related to measuring the local burden of suicide and suicidal behaviour and recommended using methods and data sources that minimized intrusiveness and limited the risk of distress for communities and families bereaved by suicide. The consultations reinforced the need to develop research partnerships with Indigenous governments and knowledge users throughout the region so that the results could be directly applied in health system planning and social policy. The consultation was an essential process for understanding the complex jurisdictional issues in Labrador related to research governance, health services delivery, and public policy. The consultation also helped clarify needs for specific procedures such as developing research agreements and provided an opportunity for fostering relationships between the research team, Indigenous government collaborators, and other stakeholders.

Research as a Social Resource

Historically, many Indigenous communities have been marginalized from research and treated as objects of study rather than benefactors.[42,65,66] Recent archival work has helped shed light on notorious examples of health research that was both exploitive and harmful.[66,67] Because of this history and its ties to colonial social policy, many communities have a negative view of research.[65,66] Despite this, some communities and nations, including those in Labrador, recognize the value of research and are increasingly taking control over research as an aspect of self-determination. The development of the principles of Ownership, Control, Access, and Possession (the OCAP® Principles) for First Nations helped repositioned Indigenous governance as a foundation of ethical research.[62] The OCAP® Principles and Indigenous scholarship on research helped inform the ethical frameworks in many mainstream research institutions, including the federal research ethics policy in Canada. At the local-level, Indigenous communities and governments have developed research policies and consent procedures to regulate research and help protect against potential harms, while also supporting work that addresses community priorities.[53,61]

In Labrador, all three Indigenous groups have structures for governing research and have gradually strengthened local capacity to conduct research. For example, both the NunatuKavut Community Council and the Nunatsiavut Government created community ethics review committees and established procedures for licensing projects.[53,61] There have also been investments in human resources such as support for community members to obtain graduate education in research, hiring community members for data collection activities, and the creation of interdisciplinary research staff positions and research departments. By strengthening governance, Inuit, Innu, and Southern Inuit communities in Labrador have begun to reposition research as a social resource, and several community-led and collaborative projects in population health[3,4,64,68] have made important contributions to policy-making and program delivery. Our work in suicide prevention aims to build on these foundations and contribute to evidence-informed decision-making.

Strengthening Evidence in Suicide Prevention

In the context of Indigenous health, epidemiological data can be a powerful tool for understanding changes in the health status of a population and in assessing progress towards social equity.[44,69,70] Suicide and suicide prevention has been a keen focus in Indigenous health research. Epidemiological and qualitative studies have helped refine understandings of how individual-level risks lead to suicidal behaviour. Gradually, studies have strengthened evidence about how factors in the social context have made suicide rate disparities endemic in many Indigenous communities in Canada and globally.[71] However, there remain critical gaps in knowledge about what interventions make a difference in suicide prevention in these settings.[14,31,32,72]

In part, knowledge gaps are related to methodological challenges in both suicide and Indigenous research.[31,32,73,74] To advance research on suicide prevention, Wexler and colleagues identified promising directions including focusing on locally-defined research priorities, using methods that reflect and capture Indigenous knowledge, disaggregating epidemiological data, supporting community-designed interventions, and situating evidence within the socio-political context.[31] In Labrador, there is a clear need to better understand the impact of community-based programs such as *Aullak, sangilivallianginnatuk*, and support suicide prevention planning with local evidence. We have attempted to take up these calls through a collaborative research program.

Implementing Community-Defined Research Priorities and Methods

The consultation process provided clear direction for designing a community-based research project on suicide. Research partners, workshop participants, and other community stakeholders identified suicide-related research priorities and described a variety of parameters for undertaking research that was appropriate and respectful for communities. In broad terms, the consultations underscored the need for a process that is aligned with community-based methods and the principles of ethical research in Indigenous communities.

Following the community workshop, the research team worked to operationalize the information gathered and identify processes for implementing the recommendations. We drafted a research plan that was aligned with the overarching goal of generating evidence about suicide in Labrador to inform public health, health service, and community-based interventions. The result was a sequential mixed methods research program that combined qualitative, quantitative, and evidence synthesis study designs.[75] The project had the following primary objectives:

1. To explore community and health service provider perspectives on the social context of risk and protective factors for suicide in Labrador;
2. To examine patterns in suicide mortality in Labrador by age, gender, and region, and assess rate disparities between Indigenous and general populations;
3. To assess the global incidence of suicide among Indigenous people; and
4. To understand the current approach and capacity for Indigenous-specific suicide surveillance in Canada.

The consultation feedback reinforced the need to minimize the burden on communities that experienced research fatigue and limit the need to gather data on suicide directly from vulnerable families and community members. In an effort to respect this paramter, we decided to use methods and data sources that would limit direct interaction with people who had experienced the loss of a family member to suicide, but still address locally-defined priorities. Figure 2.1 depicts the sequence of the research process beginning with the planning and consultation phases. We approached community consultation as an iterative process that combined community-based research methods with integrated knowledge translation.[76]

To address objective 1, we designed a qualitative study (chapter 3) to better understand community knowledge and experiences with suicide prevention, and to help provide a social and historical context for understanding the epidemiology of suicide. The consultation activities provided some insight into local risk and protective factors and approaches to mental health care. By adding additional focus groups with community and health service providers who were under-represented in the community workshop, we sought to deepen our understanding of local concerns by hearing from participants who were actively and directly involved in suicide prevention.

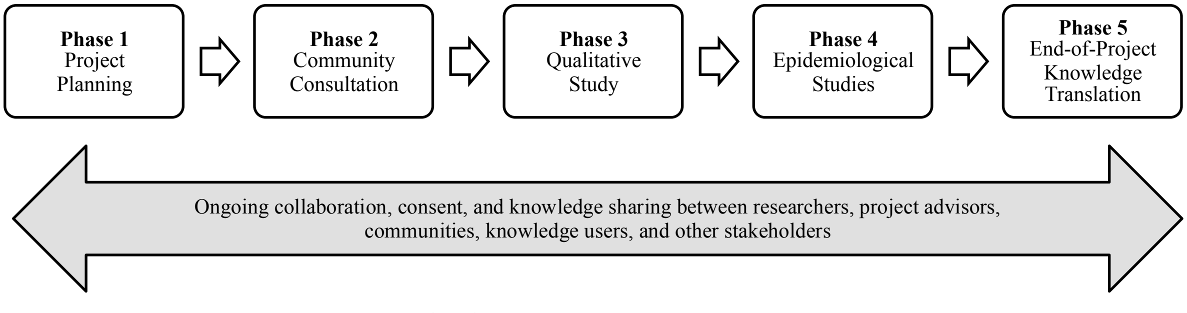

Figure 2.1: Sequence of Research Phases

To build on local knowledge and address objective 2, we designed a population-based, observational study (chapter 5) to describe the geographic and demographic patterns of suicide mortality in the region and assess rate disparities. This study provided an opportunity to integrate community-based Indigenous research methods and ethics with a quantitative analysis of epidemiological data. Integrated approaches to research in Indigenous communities are increasingly common in epidemiological studies that involve primary data collection. However, it is less common in studies based on routinely-collected data. Building on local examples of population health research,[4,64,77-79] we worked with Indigenous governments and health stakeholders to compare suicide rates between Labrador and Newfoundland, and within subregions in Labrador, based on data from the Canadian Vital Statistics Deaths Database.

To address objective 3, we designed a systematic review to synthesize evidence on the incidence of suicide in Indigenous populations worldwide (chapter 6). This was an effort to extend our locally-focused research and help situate the data from Labrador in a global context. In Canada and other high-income nations, it is often difficult to identify Indigenous peoples in health data.[70,80] In low- and middle-income countries, health information systems not only lack ethnic identifiers, but many also have limited infrastructure for registering births and deaths.[81] Acknowledging these limitations, we designed an analysis based on data from published, peer-reviewed sources as part of a global evidence synthesis.

Relational Ethics in Labrador

Through the planning and consultation phases, stakeholders in Labrador identified a range of research priorities and needs. As a gateway to a longitudinal research program, we chose to focus on questions that could establish the necessary context and benchmarks for health system planning and population health research. Addressing objectives related to social environment and epidemiology of suicide required navigating an overlapping and complex research governance structure. From an administrative standpoint, this involved obtaining institutional and community consent from Indigenous, regional, and provincial research governance bodies (Appendix A).

Our initial work in Labrador involved partnerships with the Nunatsaivut Government and the Innu Nation. A key message from the consultation was to recognize and respect the jurisdiction of all three Indigenous groups in the region. Through the consultation phase, we developed a relationship with the NunatuKavut Community Council, and completed NCC's research review and approval process for the quantitative phases of the research. This helped create more opportunities for community input into the research questions and design, and built new partnerships.

For some researchers and institutions, there is a prevailing attitude that the need for Indigenous community consent creates barriers to scientific discovery and innovation. Local requirements for engagement, aligning research questions with community priorities, and collaborating on study design and dissemination are viewed as costly and time-consuming hurdles to be overcome. In part, the latter point is often accurate, and finding ways to navigate the tensions and conflicts in community-based research can be challenging.[82] Rigorous community-based research requires time, funding, proximity, open communication, reflexivity, and pragmatism. These qualities must manifest in the relationships that researchers have with community partners and participants. For non-Indigenous researchers in particular, building trust through a long-term commitment to a community may help to reconcile the colonial legacy of research with the potential for research to contribute to self-determination. In the context of Indigenous health, this is a "relational" approach to research ethics.[83,84]

Consent to undertake research and the accountability that comes with it is built around a sense of caring and justice. This also requires recognizing power imbalances that often exist in community-based research and in studies in Indigenous communities that involve non-Indigenous researchers. Part of our approach to mitigating this imbalance involved paying attention to the power differential and respectfully deferring to project partners and community leaders. We also had to find ways to make decisions about who to consult, how to collect data, and how to share project results without creating an unnecessary burden on the time and resources of project partners. The community consultations offered a platform to begin to foster respectful relationships for the lead author, while for other team members this was already established.

CONCLUSION

Over the last twenty years, Indigenous communities have asserted greater control over all aspects of the research process in an effort to inform community development, service delivery, and public policy. The evolution of the Indigenous research landscape has helped reposition research governance as a facet of self-determination by focusing on community-defined priorities and using methods that reflect and respond to local contexts. Indigenous governments in Labrador identified suicide as a leading health priority and sought evidence to inform health system planning and support community-based interventions.

Our research team partnered with the Nunatsiavut Government, the Innu Nation, and the NunatuKavut Community Council to develop a research program on suicide and suicide prevention. As an entry point, we worked with Indigenous governments and communities to undertake a community consultation process. The objectives of the consultation were to build relationships, better understand the social context, identify suicide-related research priorities, and seek input into study design, methods, and data sources. A key activity in the consultation was a community workshop that brought together stakeholders from across the region including community workers, health professionals, Indigenous leaders, Elders, and youth.

Project partners and stakeholders articulated and prioritized a need for region-specific evidence that included disaggregated data. Stakeholders explained that many communities in Labrador were already experiencing research fatigue, and that research on suicide in particular needed to gather data in a manner that was sensitive to the trauma and grief that people felt in many communities. Based on the recommendations from the consultations, we collaboratively designed a series of community-based qualitative and quantitative studies. This began by establishing formal partnership agreements and obtaining research licenses from Indigenous and provincial research ethics boards.

For the research team, community consultation was a necessary entry point into research because it was a process that valued the knowledge and experience of people who were affected by suicide and those that provide mental health care. Under a population health framework, such a repositioning of community-researcher relations is guided by the belief that the communities with the most to gain from the prevention of suicide have a critical role to play in shaping not only decisions about what is done, but also how those decisions are informed. By engaging communities and service providers as participants and collaborators in the process, the consultation became a platform to consider what is already known about suicide and to explore questions that might lead to new pathways for prevention in Labrador and across the Circumpolar North.

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CHAPTER 3

The Social Context of Risk and Protective Factors for Suicide in Indigenous communities in Labrador: Perspectives of Community and Health Service Providers

Abstract

Globally, Indigenous peoples are disproportionately impacted by suicide compared to non-Indigenous populations. Although there is an emerging evidence base for culturally-informed and community-led interventions, historically, research has been deficit-focused and has not adequately addressed factors related social inequity and structural determinants of health. Recent qualitative studies have helped deepen knowledge about the relationships between colonization and suicide.

In 2009, Indigenous government and health system leaders in Labrador requested local and up-to-date epidemiological data on suicide to inform community programs and health service planning. Community consultations in the region identified a need for region-specific evidence that was situated in knowledge about the socio-historical context in Labrador. The present study describes a qualitative investigation that explored community and health service provider perspectives on risk and protective factors for suicide in Innu and Inuit communities in Labrador. Within a population health framework, we used a community workshop and three focus groups to collect data from 40 community and health service providers, local leaders, and regional decision-makers.

We used content analysis to identify themes related to: (1) risk and protective factors for suicide; and (2) populations with concentrated risks; and (3) integrating community and health system services for prevention. Participants in our study viewed individual-level problems such as suicidal behaviour, problematic alcohol and substance use, and mental disorders as the downstream outcomes of social inequity and historical trauma. The results of this study underscore the value of place-based evidence in community programming, public health, and health services, and provide context for population health research on suicide.

Key Words

Suicide; suicide prevention; risk factors; protective factors; qualitative; community-based research; Indigenous; circumpolar; Labrador; Inuit; Innu; First Nation

BACKGROUND

Suicide is a complex outcome with biological, environmental, and social origins.[1-3] Early scholarship investigated the influence of religion and social cohesion on variations in suicide incidence.[4] More recent evidence has shown that rapid social changes caused by economic crises can increase suicide rates.[5,6] Poor access to mental health care and exposure to sensationalized media reports[7] have also been found to increase risks as part of the broader causal web in suicide. Most research, however, has examined individual-level risk factors including genetics and early-life adversity, personality and behavioural traits, and psychopathology.[2,3]

The focus on quantifying risks and the efficacy of treatments has been largely rooted in fields related to epidemiological and clinical research. The dominance of the positivistic paradigm in suicide prevention research has been criticized for being disengaged from social realities and taking a reductive approach to generating knowledge.[8-11] Hjelmeland and others have argued that qualitative and mixed methods research is needed to better understand the complex pathways to suicide and the implementation of interventions.[12-14] In transcultural settings and among systematically marginalized populations in particular, a better understanding the social contexts of suicide disparities may help point to new opportunities for prevention.

Globally, Indigenous peoples bear a differential burden of suicide compared to non-Indigenous populations.[15-17] In high-income countries, observational studies have shown that alcohol and substance use, prior self-harm, suicidal thoughts, loss of a friend or family members to suicide, and mental disorders are correlated with suicide and suicidal behaviour in Indigenous populations.[18-24] However, this evidence has been critiqued for being overly deficit-focused and individualistic, and too often neglecting to situate data in the context of Indigenous knowledge, social inequity, and structural determinents.[9,11,25] Evidence in suicide prevention has been primarily derived from observational and experimental studies in non-Indigenous populations.[1,26,27] Consequently, interventions based on this evidence may not produce the same benefits in Indigenous communities.

Attempts to apply 'best practices' in suicide prevention such as training community members to identify suicide risks ("gatekeeper training") and implementing hospital-based interventions such as short-term follow-up care has had limited[28] or harmful effects[29] in Indigenous settings. Although there is an emerging evidence base for culturally-informed and community-led interventions,[30,31] recent systematic reviews have shown that relatively few Indigenous-specific programs undergo rigorous evaluation, and overall, effectiveness is limited.[32-34] The lack of progress in reducing suicide rates has led some researchers to argue that mainstream approaches to suicide prevention have limited relevance in Indigenous communities and may reify colonialism.[8,11,25]

Historical Trauma and Conceptual Frameworks of Indigenous Suicide

Suicide prevention policy and research has increasingly recognized the profound impacts of structural violence and colonization on Indigenous peoples in Canada.[15,35-40] In 1995, the Royal Commission on Aboriginal Peoples drew direct connections between racist social policies, contemporary health inequities, and suicide.[35] More recently, the

Truth and Reconciliation Commission deepened knowledge about such connections, and further established the role of the residential school system as a precursor to elevated suicide rates in many communities. The collective and deleterious consequences of the systematic abuse and discrimination experienced by Indigenous peoples is a form of historical trauma.[41-43]

As a concept, historical trauma refers to the "legacy of numerous traumatic events [and] community experiences over generations and encompasses the psychological and social responses to such events."[42] The intergenerational transmission of trauma related to abuse in residential schools has been identified as a correlate for a range of adverse health outcomes including suicidal behaviour.[44-47] Recently, Crawford and Hicks proposed a theoretical model to explain the iatrogenic relationship between socio-historical trauma related to colonization and suicidal behaviour among Inuit.[48] Other conceptual models have further helped frame evidence about the structural, community, family, and individual factors that increase risk for suicide among Indigenous peoples,[39,49-51] which in broad terms fit into a socio-ecological model of suicide (Figure 3.1).

Qualitative Research about Suicide in Indigenous Communities

Qualitative research has helped strengthen evidence on the relationships between colonization, social inequity, and suicide in Indigenous contexts.[50,52-59] Studies have focused on populations in high-income nations in the Arctic and Western Pacific. Across contexts, historical and contemporary dimensions of colonization have been linked to

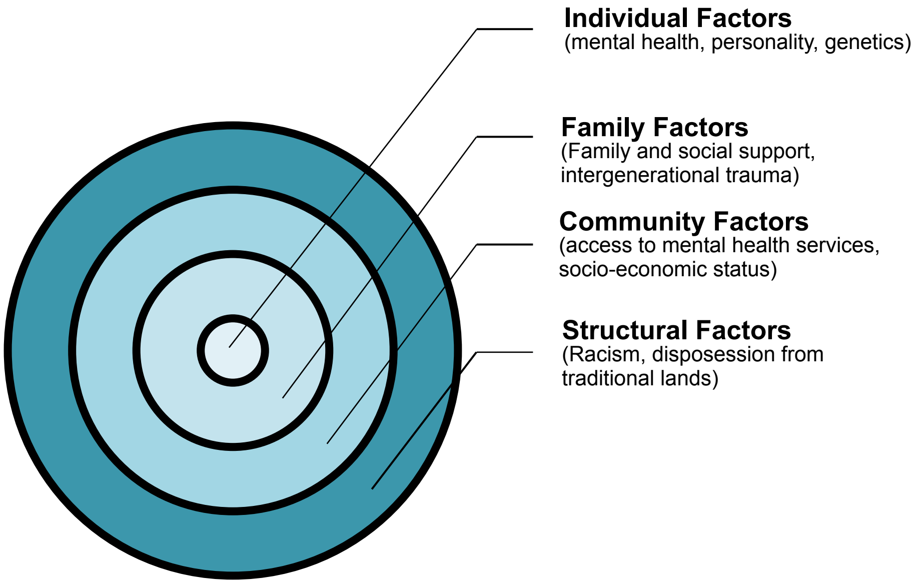

Figure 3.1 Socio-Ecological Model of Suicide

disruptions to cultural identity, intergenerational relationships, and the transmission of language and traditional knowledge.[52,53,55,60] Studies consistently report that residential school attendance is a potent source of trauma and is linked to suicidality in both attendees and later generations.[44-46] The separation from family and community, deprived living conditions, and physical and sexual abuse are substantial adverse children experiences also contribute to pathways to suicidality.[53,54,61] Such adverse experiences are also linked to alcohol and substance abuse, which in turn impact suicide at both the individual and community level.[53]

Methodologically, qualitative studies in Indigenous community settings often integrate community-based and participatory approaches[50,52,62] which aim to share decision-making power and address research questions and priorities that are locally relevant. In many cases, researchers have long-standing relationships with communities and help translate research knowledge into community-led suicide prevention initiatives.[62,63] The application of research findings in public health and clinical settings is complemented by ongoing engagement with diverse community stakeholders including front-line mental health staff and other health professionals, Indigenous leaders, Elders, youth, and public health planners. In several projects, qualitative studies have been combined with community-driven epidemiological investigations in an effort to build a comprehensive understanding of suicide and suicide prevention.[50,52,62,64,65] Going forward, community-based and mixed methods approaches that combine ethnographic and qualitative methods with population-based studies can help contextualize and advance knowledge about suicide prevention in Indigenous communities.[10,13,15]

Setting and Objective

This qualitative study was set in Labrador, a large, subarctic region in Atlantic Canada. The total population of the region is small (27,197 in 2016) and spread across 31 communities ranging in size from less than 100 to 8,109. Labrador is the territorial and ancestral homeland of three distinct Indigenous peoples: the Labrador Inuit, Mushuau and Sheshatshiu Innu, and Southern Inuit, who are represented by the Nunatsiavut Government (NG), Innu Nation (IN), and NunatuKavut Community Council (NCC), respectively. Indigenous peoples make up approximately 40% of the total population of the region, though the majority live in central and coastal communities. The remainder of the population is comprised of non-Indigenous settlers, many of whom are from Newfoundland, and are primarily of European descent.

As described in chapters 1 and 2, Labrador-Grenfell Health is the main healthcare provider in the region. The main hospital in located in the region's largest community, Happy Valley-Goose Bay; coastal communities have nursing clinics that serve as the access points for medical care. Increasingly, Indigenous governments in the region offer health promotion and social service programs

In 2009, Indigenous government and health system leaders in Labrador requested local and up-to-date epidemiological data on suicide to inform community programs and health system planning. As an initial step, we established formal research partnerships with the three Indigenous governments and the health authority and organized a series of community consultations to inform research planning.

A key message from the consultations was that regional decision-makers wanted Labrador-specific evidence that was situated in knowledge about the socio-historical context. The research team, which included a representative from each partner organization, collaboratively developed a community-based research program. The objective of the present study was to explore community and health service provider perspectives on the social context of risk and protective factors for suicide in Indigenous communities in Labrador.

METHODS

As discussed in chapter 2, this research used population health approach[66] that integrated community-based methods[67] with the principles and practices for ethical research in Indigenous communities.[68,69] We used a sequential design[70] that consisted of a planning and consultation phase to identify community research priorities (chapter 2), the present qualitative study (chapter 3), and epidemiological studies (chapter 4 and 5). Our methodological approach was similar other studies aimed at enhancing knowledge for community-led approaches to suicide prevention in Indigenous settings.[50,52,62,64] We wanted to develop an understanding of suicide that was rooted in local expertise, and use this to inform population-based research.

Design

In this study, we used a qualitative descriptive design, which has been shown to be a useful approach in applied health policy and systems research.[71-74] To examine the social context of suicide in Labrador, we explored the perspectives of health and community service providers and local knowledge holders by asking two main questions: (1) What are important risk and protective factors for suicide in Labrador? and (2) What subpopulations are most vulnerable or at highest risk of suicide and suicidal behaviour?

This qualitative study involved a secondary analysis of data collected as part of the community workshop described in chapter 2. We supplemented the workshop data with three additional focus groups. The workshop was organized by the research team and community partners with the objectives of engaging stakeholders from across the region, identifying research priorities, and collecting qualitative data. Participants (n=22) included youth, Elders, community workers, health professionals, and decision-makers from ten health and social service organizations in the region.

Subsequently, we organized three focus groups to supplement data from the community workshop, and include several groups of service providers that were unable to participate in the workshop due to scheduling conflicts, and consequently were under-represented. In both the workshop and the focus groups, we aimed to provide a comfortable and supportive environment to facilitate open discussions on a sensitive topic.[75] In the focus groups, we used the same semi-structured question protocol that was used in the community workshop. Two focus groups were held in Happy Valley-Goose Bay; the third focus group was held at the Mushuau Innu First Nation band office in Natuashish. Each focus group discussion was 1-2 hours in length.

Recognizing that health disparities experienced by Indigenous peoples are directly linked to colonialism,[76,77] we used an analytical framework based on the social determinants of Indigenous health.[39,76] In this framework, inequitable health outcomes such as suicide are understood as arising from a complex interplay of structural factors including historical trauma, socially-engineered disadvantage, and racism.[15,39,76] Such a framework helps to adapt and extend existing models of suicide that integrate social, environmental, and individual factors, but which otherwise tend to focus on proximal risks related to biological, genetic, and behavioural factors.[2,78]

Participant Recruitment

The sampling frame and procedures for the workshop were described in chapter 2. Briefly, we targeted health and social service providers who worked in diverse settings such as mental health and addictions services, housing, child welfare, corrections, primary care, health policy, education, public health, and recreation. In Labrador, these sectors include a mix of Indigenous (Innu, Inuit, and Southern Inuit) and non-Indigenous people from within and outside the region.

For the focus groups, we targeted three specific groups of service providers: 1) students enrolled in an Inuit Bachelor of Social Work (IBSW) program, 2) counsellors from the health authority's Mental Health and Addictions (MHA) program, and 3) health and social service staff in Natuashish. At the time of recruitment, the social work students were in the third year of a four-year cohort program being offered in Labrador. The IBSW was a joint initiative between Nunatsiavut Government and Memorial University, comprised exclusively of Inuit students from Labrador. Students were between 20 and 50 years old, and many had previous experience as community workers and counsellors. Students were invited to participate in the workshop by email by the program coordinator.

The MHA program employs 16 clinical staff with training in psychiatric nursing, social work, and counselling psychology. Ten clinicians work at the regional hospital in Happy Valley-Goose Bay and six staff live and work in communities on the north coast of Labrador. All MHA counsellors were invited by email to take part in the project by the program manager. In Natuashish, the band council's department of health provides a variety of health and social services in the community including mental health counselling, public health nursing, and family outreach. Staff were invited by email by the health director to participate in a focus group.

For each individual that responded affirmatively to the initial emails, the lead author emailed additional information including a copy of the letter of information and informed consent form, and information about dates and locations for each focus group.

The lead author then corresponded by email and phone with potential participants to address any questions or concerns.

Between May and August 2012, we collected data through a community workshop (n=22) and three focus groups (n=18). The community workshop had Indigenous and non-Indigenous participants from eight communities in central and northern Labrador (Table 3.1). Eleven focus group participants self-identified as Inuit, Innu, or Southern Inuit, all from Labrador; seven were non-Indigenous. Participants had a variety of professional roles related to primary care, public health, mental health, community development, violence prevention, housing and food security, health policy, justice, education, and child welfare.

Table 3.1 Summary of Participants

Activity	**Number of Participants**	**Type of service provider**	**Primary Affiliations**	**Communities Represented**
Community Workshop	22 (Innu, Inuit, and non-Indigenous)	Youth, Elders, Counsellors, Physicians, Nurses, Community Workers, Health Policy Directors and Managers	NG, SIFN, LGH, LFC, and Nain Safe House	Nain, Hopedale, Makkovik, Rigolet, Northwest River, Sheshatshiu, and HVGB
Focus Group (Counsellors)	6 (Inuit and non-Indigenous)	Counsellors	MHA Program (LGH)	Nain, Makkovik, and HVGB
Focus Group (IBSW Students)	7 (Inuit)	Health professional trainees	NG and MUN	Nain, Hopedale, Postville, North West River, and HVGB
Focus Group (Innu)	5 (Innu and non-Indigenous)	Elders, Community Workers, Counsellors	MIFN	Natuashish

Notes: LFC: Labrador Friendship Centre, HVGB: Happy-Valley-Goose Bay

Data Collection

In initial planning meetings with research partners, we decided against audio recording during the workshop and focus groups due to concerns by research partners about confidentiality and the sensitive nature of the topic. During the workshop, four team members took detailed hand-written or typed notes. They documented phrases, quotes, and summaries of the large and small group discussions. We used four note-takers during the workshop in an effort to maximize data collection from discussion and to increase the depth and breadth of the recorded data. Where possible, the notes included direct quotes from participants. However, a complete record of all participant comments was not captured. Note-takers were identified at the outset of the workshop and the focus groups so participants were aware of their role.

The lead author facilitated focus groups 1 and 2, and had prior professional relationships with the majority of participants. A senior researcher who had a 30-year history as a family physician in the region facilitated the focus group in Natuashish. At the beginning of each focus group, we discussed the purpose of the research and reviewed the informed consent process. All participants signed the informed consent forms. To guide the discussion, we used a semi-structured question protocol. The lead researcher recorded detailed hand-written notes during the focus groups. At the end of each focus group, the facilitator provided a brief oral summary of the main discussion points to focus group participants to check the accuracy of the notes.

Data Analysis

We used a qualitative descriptive approach[71,73] to provide an accurate and comprehensive summary of the community workshop and focus group participants' perspectives on suicide in Labrador. We used content analysis[79-81] to synthesize and summarize the data and preserved descriptive validity by minimally interpreting the meaning behind what people shared.[71] We used the following five-step deductive approach[80] to analyze the data: (1) identify an existing conceptual model from the literature to structure the analysis; (2) develop a categorization framework or "matrix" to organize the codes into categories and sub-categories; (3) review the qualitative data, including transcripts, notes, documents, and other materials as relevant; (4) code the data according to the categorization framework; and (5) summarize the main and sub-categories in the framework and aggregate into themes.[79,80,82]

For step one, we selected a conceptual model for the data analysis that aligned with the values and theoretical assumptions of our project partners. Through the project consultation process, historical trauma and the social determinants of health were identified as influential and locally relevant frameworks for understanding suicide in Labrador. Overall, models of suicide in Indigenous communities share an emphasis on social and structural factors, which distinguishes them somewhat from psychological and individual-focused conceptualizations.[10,49]

For step two, we designed a categorization framework based Indigenous-specific conceptual models of suicide,[15,39,48-51] and developed a corresponding list of codes related to risk and protective factors, and at-risk populations. Our framework aimed to identify structural/historical, community, family, and individual risk and protective factors for suicide in Labrador, and was most closely aligned with the model in the National Inuit Suicide Prevention Strategy.[39] This analytical approach was similar to other qualitative studies on suicide in Indigenous communities.[50,53-55]

Immediately following the community workshop and focus groups, the research team met to review notes and share observations and reflections. We talked about the information shared by participants and began to code examples that directly addressed the research questions, and fit into the analytical framework. For example, we identified risk factors that were repeatedly mentioned by participants. For step three, the lead author then read the notes from all of the data collection activities and began to identify content that fit into the main categories. This was then discussed with the research team. After immersion and preliminary coding of the main categories, the lead author re-read all notes and coded the data according to the framework and pre-established codes. We used an inductive approach to code data that did not fit into the framework,[71,79,80] which resulted in the creation of the third analytical category related to community-based care.

For step five, the lead author discussed the preliminary findings with the research team and Indigenous government collaborators to interpret findings. We also used an integrated knowledge translation approach throughout the project[83] by presenting at several local events. This helped to increase the relevance of our findings.

Validity and Trustworthiness

We used triangulation and member checking to maximize the validity and trustworthiness of the results.[84] The lead author resided in Labrador, enabling formal and informal types of community engagement as well as many opportunities to facilitate collaborative relationships between research team members and partner organizations. The lead researchers' prolonged period of engagement and participation in the region helped ensure that results were accurate and interpreted within local contexts,[71,84] helping to foster accountability in the research process.

At the end of the workshop and each focus group, the researchers summarized the discussion and proposed broad themes; participants were then invited to comment on the accuracy of the themes and offer additional insights or points of clarification. Similarly, when research team members presented preliminary findings at community and stakeholder meetings, participants were invited to provide input and feedback.

Ethics

In accordance with regional and national policies governing the ethical conduct of research involving Indigenous peoples,[68,85,86] we obtained research licenses from the Nunatsiavut Government, Innu Nation, and Labrador-Grenfell Health, and the university ethics board (ICEHR # 2012-291-ME).

FINDINGS

Our analysis produced three major themes: (1) risk and protective factors for suicide (Table 3.2); (2) identifying populations with concentrated risks; and (3) integrating community and health system services for prevention.

Table 3.2 Risk and protective factors identified by participants

Social-Ecological Level	Risk Factor	Protective Factors
Individual and Family	Depression Post Traumatic Stress Disorder Alcohol use Substance use Fetal Alcohol Spectrum Disorder	Supportive families Relationship with Elders Connection to culture Going out on the land
Community	Access to land/environment Exposure to suicide Grief and loss Barriers to accessing services	Informal social support Role of women Youth engagement
Structural	Historical trauma (e.g. relocation) Child welfare system Disconnection from cultural identity Material deprivation (poverty, housing, food, and energy insecurity).	Sustainable, community-led programs

“Depression doesn’t begin to cover it”: Risk and Protective Factors

Individual and family factors

At the individual level, participants identified depression, post-traumatic stress, and alcohol use as important risk factors for suicide. Participants explained that social factors such as isolation were also important, especially in combination with substance and alcohol use, which were viewed as factors that accelerated acute risks for suicide attempts. However, one workshop participant suggested that alcohol is an “easy scapegoat for the causes of suicide.”

Clinicians in our study observed that patients commonly present to the nursing clinic or the emergency department with suicidality following “trigger” events such as an argument with a partner/spouse, in combination with heavy alcohol use. In this scenario, suicidality was described as having a rapid onset. Several participants observed that the most serious and fatal suicide attempts often seem “impulsive” and in response to an acute stress, rather than being a planned act.

During the discussions, several participants suggested some community members who had multiple suicide attempts, and some that have died, possibly had undiagnosed fetal alcohol effects. Participants reported that mental illness was not always a proximal risk, especially for young people. A focus group participant suggested that there is a “misconception that [suicide] is always about depression;” another participant noted that “depression doesn’t begin to cover it. It is not an adequate description of how people are suffering.” Others explained that mental disorders have a role in suicide risk, but that some community members may not have formal diagnoses, despite symptoms, because of limited access to health services or because they were reluctant to get help.

In both the focus groups and community workshop, families were viewed as a key source of strength, and that relationships with both immediate and extended family members are vital for wellbeing. Participants explained that in the smaller communities in particular, extended family members such as grandparents and other kin have central roles in providing care for children. Conversely, some participants talked about the role of residential schools in fracturing the relationships between parents and children. As a result, they explained that those who attended residential schools often did not feel equipped to parent when they had children, and that this perpetuated a sense of disconnection from culture and community. Many participants suggested that prevention should involve parents and caregivers in supportive interventions over the long term.

Participants talked about the relationship between Indigenous peoples and the environment as critical for cultural identity, food security, and wellbeing. A focus group participant observed that suicidal thoughts and behaviours follow a seasonal pattern. She noted that "during times when you cannot go off" on the land, community members "feel stuck." She explained that during sea ice "freeze up" in the late fall, and "break up" in the spring, the water and ice around coastal communities are not safe to travel on. Environmental conditions that make it difficult leave the community by boat or snowmobile, restrict opportunities to spend time hunting, fishing, or berry picking, going to the cabin, or travelling to neighboring communities. Participants consistently reported that spending time on the land is necessary for healing and was a protective factor for suicide. However, several commented that land-based activities, both program-based and informal, are only part of what is needed to help people heal; that there "needs to be more than just [being] on the land."

Community factors

Exposure to suicide was repeatedly described as an individual and community risk. Participants suggested that over time, suicide had become a "normal" aspect of life in some communities, and that it may be perceived as an acceptable way of coping with stress. Participants were concerned about the potentially contagious effects of suicide in small communities. A participant commented that "[o]nce a suicide happens, you are on watch." Another participant explained that because communities are small with close social and family networks, "everyone is connected" to suicide loss and "everyone is impacted." A participant described the collective experience of grief related to suicide as having "ripple effects" not only locally, but across the region.

Participants explained that many people in Labrador have experienced the death of a close friend or relative to suicide, and that many community members are bereaved by multiple losses due to suicide and accidental deaths. Several participants suggested that social media has a problematic role in increasing the speed and reach of news about a suicide death. The consequence, they suggested, is that more youth are exposed to suicide loss and details about deaths. Participants explained that suicide bereavement was a key factor in the psychological trauma that many people in the community felt. Several participants commented that direct exposure to the consequences of suicide attempts and providing postvention support to families is a key contributor to post-traumatic stress for community and health service providers.

Participants emphasized the value of informal social supports, especially during times of crisis. Some people expressed concern about formal programs replacing social and kin relationships that traditionally were the main sources of help. Inuit and Innu Elders were highly regarded, but several participants explained that young people, especially those who are marginalized or socially isolated, may not know or have access to Elders. Intergenerational relationships were seen as being important for mental health and for cultural identity. During the focus groups, several participants commented that "women are leading the way" in a lot of community work related to suicide prevention, both in leadership roles and as service providers. Participants also noted that this meant that many women, especially those involved in community crisis responses, had a "heavy load" in both their personal and professional lives, which had health and mental health consequences for them.

Structural factors

Throughout the workshop and focus groups, participants commented on the connections between suicide in Innu and Inuit communities and the shared experiences of historical trauma. Several Elders explained suicide is a relatively recent phenomenon and that prior to settlement in communities it was unknown. One Elder explained that "[We've] never seen a suicide in the country." Another stated "[we have] lost so many things in our culture. I was born in a tent. Grew up in a tent. In the country with my father. He was a hunter. Lived all the time in the country. No alcohol. No drugs. No gas. It was a good life. Now there are problems." Another commented that in the past, "people used to be too busy surviving to think about suicide."

During the workshop, a participant described individual-level risks such as mental illnesses and alcohol use as "surface symptoms" and asked "what is beneath the surface that is making that happen?" Participants pointed to social inequities and historical trauma as being key risk factors for suicide. They consistently referenced historical events that caused immediate and intergenerational harm such as community "relocations" including the resettlement of the Mushuau Innu to Davis Inlet and the closure of Hebron, and the creation of residential schools.

Participants described the Hebron relocation as a potent example of colonial decision-making that caused direct harm to Inuit. Participants described how the provincial government, Moravian mission, and International Grenfell Association closed the community and resettled approximately 200 people without consultation or consent from Inuit. Participants explained that this circumvented Inuit governance and sovereignty, disrupted cultural identity, and led to poverty for many families who struggled to survive in their new environments. Participants suggested that that the descendants of relocatees may be at higher risk for problems such as alcohol abuse.

In a contemporary context, many participants talked about the negative impact of child welfare policies and services in region. Participants referred to the disproportionate number of children from Innu and Inuit communities that were in foster care, and were particularly concerned about children who were placed in remote non-Indigenous communities outside of Labrador. Participants explained that most Labrador children in foster homes outside of the region have limited access to family, and many lose connections to their community, which may have negative impacts on mental health.

“Not on the radar”: Identifying Populations with Concentrated Risks

Participants identified two population subgroups they viewed as being at increased risk for suicide. One subgroup was youth who leave the foster care system. Participants explained that when young people in foster care turn 16 years old, they “age-out” of care. This means that at age 16, young people in care can choose to remain involved in youth services (with the provincial child welfare agency), can stay in the same foster home, or “exit” the system. Some young people who age-out of care have “lived away” (in a foster home in a community outside of the region and/or in another province), and so may be socially and culturally disconnected from their community of origin.

Some youth return to live with family members who may continue to face the social challenges that led to child welfare system involvement in the first place. Participants explained that youth who age-out of care often have limited school and work opportunities, which makes it hard to meet basic material needs and often leads to unsafe housing or homelessness. Participants indicated that youth in these situations have cascading effects that can increase vulnerability and exacerbate suicide risks.

Participants also noted that older youth, especially young men aged 18 to 25 years old, were another subgroup that have elevated risks for suicide. Participants explained that young men between 18 and 25 years are often “not on the radar” for local health service providers because they are physically healthy and therefore contact with the clinic or emergency department is infrequent; older youth may also be “hard to reach” because they do not go to school. Several participants described the ‘treatment as usual’ approach to mental health care, such as attending counselling appointments, as “passive,” and suggested that it was less useful for providing services to young men in particular.

A “wrap around” Model of Care

Participants emphasized that suicide prevention is not solely the responsibility of mental health services and the health system but rather community-based services have a key role in promoting “mental wellness.” Participants repeatedly stated that each community in Labrador is unique, and that interventions should be rooted in community strengths. Several participants underscored the importance of designing programs that reflect Innu and Inuit values, knowledge, and cultural practices. There was also a sense that services should not use a “one size fits all approach.”

Participants commented that many youth who have died by suicide in Labrador did not have contact with the clinic/hospital or counsellors in the period prior to their death. This may point to a need for more active forms of outreach and a “wrap around” model of care. Participants noted that services related to social support, land-based programming, cultural activities, housing and food security, and advocacy already exist in many communities, but that there should be more meaningful and consistent collaboration with health and mental health services.

Participants pointed out the need to improve communication and care coordination between service providers. As an example, several participants suggested when a patient is being discharged from the hospital after a suicide attempt, community health staff could be notified to help plan transportation and follow-up care. Participants consistently emphasized the need for early interventions with young families to promote protective factors, and also suggested that engaging youth in the program design could help to sustain and contextualize services that also reflect needs and interests of youth.

DISCUSSION

In this qualitative study, participants explained that risk factors that are well-established in the literature such as prior suicide attempts, substance use, and mental illnesses such as depression,[1,2,87,88] are relevant risks in Labrador. However, participants viewed these risks and suicide overall, as part of a complex causal web with strong connections between individual risks and the social environment. Some scholars have questioned the strength of the evidence related to the role of mental disorders in suicide risk[89,90] and the generalizability to Indigenous populations.[11,25,91] Several studies have reported low rates of mental disorders among Indigenous people who died by suicide (13.2% to 23.5%)[19,64,92] compared to the general population where rates are as high as 90%.[87,88,93] However in contrast, a recent case-control psychological autopsy study in Nunavut found that among Inuit who died by suicide, 85% had a diagnosable mental illness; further, depression, substance use, and early life adversity were strongly correlated with suicide.[20]

Qualitative research on suicide risks among Indigenous peoples has shown that a sense of disconnection from culture, alcohol use, and psychological problems such as impulsivity, emotional dysregulation, and perceived burdensomeness are risks in some contexts.[50,53-56] However, the primary focus of the majority of these studies has been on family, community, and structural factors.[50,52-55] In a focus group study with First Nations in Canada and the US, Walls noted that participants rarely mentioned mental health problems as a risk factor for suicide, and suggested that this may be due in part to the collectivist nature of Indigenous communities which may de-emphasize individual risks.[53]

Our findings differ somewhat from similar studies in so far as participants appeared to comment directly and frequently on individual-level risks, and observed that depression, alcohol use, and traumatic stress have a role in increasing vulnerability. In part, this may be influenced by the sample we used; many participants were involved in health and mental health service delivery as clinicians and community workers, which meant that part of their professional role is specifically related to addressing the consequences of mental disorders. Notwithstanding this caveat, many participants in our study viewed individual-level problems such as suicidal behaviour, problematic alcohol and substance use, and mental disorders as the downstream outcomes of social inequity and historical trauma. As one participant explained, mental illness “doesn’t begin to describe how people are suffering.” This sentiment was echoed in the community workshop and focus groups; participants viewed the very real and deleterious social problems that people deal with on a daily basis as the effects of persistent and historically entrenched social injustices.

Beyond the individual-level risks, participants described factors in the broader social context that substantially overlap with those identified in other Indigenous community settings. In a study of the impact of community relocations on families in Nunavut, Healey found that parents who experienced relocations as children often had disrupted attachments and kinship bonds.[60] One of the consequences of this trauma was that it “broke the chain of Inuit knowledge transmission.”[60(p. 47)] A recent ethnographic study in the Cowichan First Nation in British Columbia identified family and community factors such as family separation, exposure to suicide, and the loss of tribal lands and the resulting disruption to traditional foodways, as important local risks for suicide.[54] For Innu and Inuit in Labrador, the relationship to the environment is an intrinsic and elemental dimension of culture, identity, health, and soverignty.[94-96]

Participants in this study observed that community members seem to experience an increase in suicidality during seasonal periods when poor environmental conditions such as unsafe sea ice or water limit access to land-based activities. The connection between sea ice, mental health, and suicidality resonates with previous research on the mental health impacts of climate change. Inuit in Nunatsiavut have a strong connection to the environment, and report positive mental health effects from time spent on the land.[94,95,97,98] Inuit also appear to experience an increase in symptoms of distress such as suicidal ideation during periods with less predictable weather conditions that restrict safe access to the land.[97] In other contexts, changing climatic conditions such as droughts and rising temperatures have been found to contribute to increased suicide rates.[99,100]

The wellbeing, livelihoods, and cultures of Indigenous peoples are intimately connected to the landscape, forcing people to adapt to conditions that are increasingly unpredictable. For participants in our study, these changes threaten the continuity of Innu and Inuit livelihoods, and magnify social inequities. For many communities in Labrador, the recent past is heavy with the trauma of forced change. Participants talked about the profound sense of loss following community relocations. In the seminal work on the eviction of Labrador Inuit from Hebron, Brice-Bennett described the totalizing effects:

> “Not only were families separated by having to live in different communities but the frequent deaths of young people, mature adults and also elderly adults — who were often said to have died from heartbreak over leaving their homeland — broke the spirit of their surviving relatives and left them traumatized in overwhelming and silent pain. The destruction of family ties and the degrading circumstances of their lives led many Hebronimiut to drift from community to community as permanently displaced people.”[101(p.153)]

Participants in our study explained that the loss of control and sense of disconnection is rooted in colonial social policy which has reverberated across generations and is expressed in the modern child welfare system.[36]

Across Canada, Indigenous children are overrepresented in foster care, which has led many Indigenous communities and governments to regard the child welfare system as a 21st century version of residential schools.[36] Participants in our study viewed Inuit and Innu children in foster care as one of the most vulnerable populations in the region because of complex and traumatic social histories and foster care experiences. Previous studies have shown a substantial increased risk of suicide and suicidal behaviour among children and youth in care,[102,103] and for mothers of children who are apprehended.[104] Given the extent of the risks recognized by community and health service providers in Labrador, participants consistently underscored the need for early and comprehensive interventions with youth and families to promote resilience and protective factors.

Research on protective factors is a priority in Indigenous-led suicide prevention, and scholars have called for more efforts to understand the contributions of community strengths and resilience to mediating suicide risks.[10,11,15] A qualitative study with Inuit youth in Nunatsiavut reported that a strong connection to the land, Inuit culture, and family were key contributors to mental health and resilience.[98] Other protective factors identified in the literature include having a sense of belonging to a community, having positive role models, mentorship from older generations, and having meaningful opportunities to participate in cultural, community, and religious activities.[105]

While our study adds to the body of qualitative research, relatively few studies have used both qualitative and epidemiological methods to explore the connections between protective social factors and suicide in Indigenous populations.[106,107] Gray and colleagues found that participation in land-based activities, especially those connected to food harvesting, was associated with reduced suicidality, and positively correlated with mental wellness among Inuit in northern Quebec.[106] A study of Inuit in Nunavut found positive family relationships and a stable home environment were protective factors.[107] At the structural level, an ecological study of First Nations in British Columbia found that markers of local governance such as having a land claim and control over health, education, and other essential services correlated with lower rates of suicide, especially among youth.[108] Although this finding does not generalize across the diverse Indigenous contexts in Canada,[109] it does point to Indigenous self-determination as a potential structural factor that can influence health outcomes, though the pathways of such effects are likely complex and varied.

Limitations

Our study has several limitations. First, our participants were primarily recruited from regional health and social services organizations, with few participants from community-based organizations. Similarly, we had a limited number of participants from child welfare, justice/corrections, and education sectors. A related limitation is that we did not collect data directly from patients, families, or other community members who were not otherwise involved in providing care or system-level decision-making. Though, this exclusion was based on direction from project partners due to the potential vulnerability of families who were bereaved by suicide, and to limit community research fatigue.[69] Finally, an important limitation was that we chose not to audio record during the community workshop or focus groups, and that the PI both facilitated and was a note-taker in two focus groups.

CONCLUSION

Suicide prevention is a leading policy and health system priority for Indigenous communities in Labrador. In an effort to reduce suicide rates, local organizations and government agencies have designed programs to promote mental wellness, resilience, and social equity. Grassroots approaches to suicide prevention have emerged alongside improvements in access to mental health services across the region. However, challenges remain and reductions in suicide rates over time have been hard to discern.

As is the case in many rural and northern settings, innovative programs that may have initial success, can be difficult to sustain and scale-up because of a lack of funding and staff turnover.[33,34] Moreover, community-level interventions and national policy initiatives in Indigenous mental health are often not evaluated.[32-34] This is due in part to fundamental problems such as a lack of granular and timely surveillance data. Recognizing the value of place-based evidence in public health and clinical care, it is important to understand the social and historical context of suicide. This knowledge can inform community programs and policy interventions, and serve as an important as a step in population health research.

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CHAPTER 4

Suicide Rates in Aboriginal Communities in Labrador, Canada

Abstract

This study compared suicide rates in Aboriginal communities in Labrador, including Innu, Inuit, and Southern Inuit, with the general population of Newfoundland, Canada. In partnership with Aboriginal governments, we conducted a population-based study to understand patterns of suicide mortality in Labrador. We analyzed suicide mortality data from 1993 to 2009 from the Vital Statistics Death Database. We combined this with community-based methods, including consultations with Elders, youths, mental health and community workers, primary care clinicians, and government decision-makers.

The suicide rate was higher in Labrador than in Newfoundland. This trend persisted across all age groups; however, the disparity was greatest among those aged 10 to 19 years. Males accounted for the majority of deaths, although suicide rates were elevated among females in the Inuit communities. When comparing Aboriginal sub-regions, the Innu and Inuit communities had the highest age-standardized mortality rates of, respectively, 165.6 and 114.0 suicides per 100 000 person-years. Suicide disproportionately affects Innu and Inuit populations in Labrador. Suicide rates were high among male youths and Inuit females.

Key Words

Suicide; Aboriginal; Indigenous; Inuit; First Nation; epidemiology; Circumpolar.

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BACKGROUND

Globally, suicide persists as an urgent public health problem among Indigenous populations in many high-income countries, including the United States[1] and Australia.[2] In Canada, suicide is one of the leading causes of death among Aboriginal people.[3-5] Suicide rates for First Nations (31.8 per 100,000 population)[6] and Inuit (73.6 per 100,000 population)[4] populations are elevated compared with the national rate (10.8 per 100,000 population),[7] although incidence varies substantially at the community level.[8] Rate disparities are especially evident in Indigenous regions such as Nunavut,[4] a territory in northern Canada, and elsewhere in the circumpolar world.[9]

Previous research reported a high suicide rate in Labrador[10,11] and suggested that local First Nations and Inuit populations have elevated rates of suicidal ideation[12] and death.[10,11,13,14] However, these studies used a short study period or regionally aggregated data, focused on youths, or did not distinguish among different Aboriginal groups. As a result, they missed possible subregional inequalities[15] and therefore were unable to identify specific populations with the greatest burden.

Labrador is a large subarctic area in northeastern Canada that borders Quebec and Nunavut and is politically part of the province of Newfoundland and Labrador. The region's diverse population is small, relatively young, and dispersed, with a high proportion of Aboriginal people (Table 4.1). The population includes 3 Aboriginal groups: the Mushuau and Sheshatshiu Innu First Nations, the Labrador Inuit, and the Southern Inuit. These groups are politically separate and have unique cultures, languages, traditional territories, colonial histories, and social circumstances. We identify the

Aboriginal groups with the terms used by the respective governing authorities for collective identity. In some cases, these terms may differ from those used by individuals to self-identify. For example, the NunatuKavut Community Council refers to the group it represents as “Southern Inuit” although individually some community members may use the terms “Metis” or “Inuit-Metis.” Most of Labrador’s Aboriginal communities are located along the remote north and southeast coasts, with limited or no road access.

Table 4.1 Aboriginal populations in Labrador and Newfoundland

Region/Subregion	Population *n* =	% under 30 years*	Aboriginal Identity† % of population	Aboriginal Governance
Provincial Regions				
Newfoundland	479,100	33.4	‡Aboriginal: 2.9	Miawpukek First Nation Qalipu Mi'kmaq First Nation
Labrador	26,365	41.7	First Nation: 7.2 Inuit: 15.0 Southern Inuit: 15.1	
Labrador Subregions				
Innu Communities	1,815	65.3	Innu First Nation: 88.4	Sheshatshiu Innu First Nation Mushuau Innu First Nation
Labrador West	9,660	38.4	Aboriginal: 6.6	
Nunatsiavut (Inuit communities)	2,415	53.4	Inuit: 89.4	Nunatsiavut Government
South Coast-Straits (NunatuKavut communities)	4,410	36.2	Southern Inuit: 50.0	NunatuKavut Community Council
Upper Lake Melville	8,065	39.9	Inuit: 18.7 Southern Inuit: 17.5	

Source: 2006 Census, Statistics Canada
Notes:
* Proportion of region/subregion total population.
† “Aboriginal Identity” is a census variable that refers to an individual's self-reported identification with the constitutionally recognized Aboriginal peoples of Canada (First Nation, Inuit, and Métis).
‡ “Aboriginal” includes the all three Aboriginal identities (Innu First Nation, Inuit, and Metis) combined. In Newfoundland, this includes the Miawpukek First Nation, the Qalipu Mi'kmaq First Nation, and Innu, Inuit, and Inuit-Metis from Labrador who live in Newfoundland.

Our comparison region, Newfoundland, is a large island that is geographically separate from Labrador and is located in the Atlantic region of Canada. Both areas are primarily rural, although Newfoundland's population is older, is mostly non-Aboriginal, and lives within a 300-kilometer drive of a regional center or the provincial capital. The population health profile and socioeconomic and geographic context of Labrador resembles other circumpolar regions such as Alaska and Greenland. Conversely, Newfoundland, although distinct in its own right, has more in common with the provinces of Atlantic Canada.

Objectives

We developed this retrospective, population-based study of suicide mortality in response to requests from communities for local data on suicide. Our objective was to establish baseline trends in suicide epidemiology in Labrador. We compared age, gender, and geographic patterns in incidence rates among Innu, Inuit, and Southern Inuit populations with those of the general population in the Canadian province of Newfoundland and Labrador from 1993 to 2009. This project was a collaborative inquiry that combined community-based and epidemiological research methods.[16,17]

METHODS

From the outset of the project, we partnered with the region's Aboriginal political authorities, including the Innu Nation, the Nunatsiavut Government, and the NunatuKavut Community Council (formerly the Labrador Metis Nation), and with the regional health care organization, Labrador-Grenfell Regional Health Authority. Our goal was to develop an understanding of suicide rooted in the region's historical, cultural, and socioeconomic contexts. For the planning phase, we conducted consultations with Elders, youths, mental health and community workers, primary care clinicians, and government decision-makers (chapters 2 and 3). Through this engagement, suicide prevention and the promotion of resilience emerged as shared priorities among stakeholders. Our partners also indicated that research would be most helpful if it informed health service planning with local evidence.

The institutional review committees of all four community partners provided research licenses for this study, and each had a representative that maintained ongoing project oversight. We also co-developed distinct research agreements with each partner organization. These agreements outlined our joint commitments to project planning, data management, and communication. We shared the preliminary results of this study at meetings with our research partners and roundtable discussions with other local stakeholders. This process helped contextualize our discussion by eliciting interpretations of the results from historical, sociocultural, and clinical perspectives.[18] All project partners reviewed and approved this article before submission.

Data Sources

For our data, we drew on Statistics Canada's Vital Statistics Death Database.[19] This administrative data set covers all physician-certified deaths recorded in provincial registries, and it includes a nearly complete count of all deaths because of the legal requirement for death registration. Each record provides the cause of death as determined by the Canadian Enhancement of the *International Classification of Diseases-Canada*, 10th Revision (ICD-10-CA),[20] date, and demographic information. For our study, we examined the following variables: death by suicide (ICD-10-CA code X60-84), year (1993– 2009), gender, age group, region of residence (Labrador or Newfoundland), and subregion of residence within Labrador (Innu communities, Inuit communities, Southern Inuit communities, Labrador West, and Upper Lake Melville). We defined subregions on the basis of geography, sociopolitical distinctions, and population composition (Table 1).

We used Statistics Canada's census division geographic units to group regional populations for Labrador and Newfoundland, and we determined subregional populations by combining smaller units (census subdivisions) that are approximately equivalent to communities (Appendix C, Supplementary Table 1). We used "subregion" as a geographic proxy for the Aboriginal groups because vital statistics do not include record-level Aboriginal identifiers.[5,15,21,22] We defined each subregion by the proportion of the population that was Aboriginal on the basis of census data (Table 4.1), as has been done elsewhere.[3,5,13] We refer to the subregions that include predominantly Aboriginal communities by their specific population (Innu communities, Inuit communities, and Southern Inuit communities) rather than their place names (e.g., Sheshatshiu and Natuashish, Nunatsiavut, South Coast-Straits).

Statistical Analysis

We examined patterns in suicide mortality among those aged 10 years and older by region, subregion, gender, and age groups using crude rates and directly age-standardized mortality rates (ASMRs), rate ratios (RRs), and 95% confidence intervals

(CIs). We calculated incidence as a rate per 100,000 person-years for the 17-year study period by dividing the total number of deaths in each stratum for all years combined by the corresponding population.

For the denominators, we estimated person-years at risk by totaling the annual population counts by age and gender strata categories within each region and subregion from Statistics Canada's censuses for 1991, 1996, 2001, 2006, and 2011. For the population estimates in non-census years, we imputed counts from the most proximal census. For example, we used the 2001 census as the estimate for each year from 1999 to 2003. To make a comparison of rates, we age-standardized rates on the basis of 5-year age groups to the 1991 Canadian Standard Population and calculated 95% CIs. We selected this commonly used standard population to improve comparability between our research and other studies.

We aggregated data by combining subgroups to achieve a minimum count of 20 deaths per strata or a relative standard error (RSE) below 23%, in accordance with benchmarks for the analysis of small numbers.[23] Rather than uniformly suppressing results for strata above the RSE threshold, we reported findings and interpreted them with caution when they were locally meaningful, had marginal reliability (RSE 23%–25%), or when it was inappropriate to combine cells. For example, we reported the ASMR for women in Inuit communities on the basis of n = 16 deaths, even though rate stability was borderline.

We used Newfoundland as the reference group and calculated RRs with 95% CIs using the method of Greenland and Rothman.[24] After we compared the rates, we considered them to be significantly different if the RR limits did not contain 1. We conducted the analysis with SPSS version 21.0 (SPSS, Inc, Chicago, IL) and Stata version 13.1 (StataCorp LP, College Station, TX).[25,26]

RESULTS

There were 128 suicide deaths in Labrador and 617 in Newfoundland during the study period, and the majority of suicide deaths in Labrador occurred in the Inuit (n = 64; 50.0%) and Innu (n = 28; 21.9%) communities. These two subregions include 7 communities that had a combined population of 4230 in 2006, or 0.84% of the provincial population, but accounted for 12.3% of suicide deaths in the province during the study period.

We found substantial differences in suicide rates between regions and among specific Labrador subregions (Table 4.2). The ASMR for suicide in Labrador was 4 times higher (RR = 4.0; 95% CI = 3.2, 4.8) than was that in Newfoundland (31.8 vs 8.0 per 100 000 person-years). Within Labrador, the Inuit and Innu communities had the proportionately largest Aboriginal populations (Table 4.1) and the highest ASMR and RRs for suicide (Table 4.2).

The gender divide in suicide mortality was similar in Labrador and Newfoundland because males accounted for the majority of deaths (respectively, n = 110; 85.9% and n = 522; 84.6%) and had higher ASMRs than did females in both regions (Table 4.2). However, rates were higher for both genders in Labrador than in Newfoundland. In Labrador, 88.9% (n = 16) of the female suicides were in the Inuit communities, where the ASMR among females was 31 times higher than it was in Newfoundland

Table 4.2 Crude and ASMR per 100,000 per Year and Rate Ratios for Suicide by Region and Gender: Labrador and Newfoundland, Canada, 1993–2009

Region (Aboriginal Group), Gender	Suicide Deaths	Person-Years	Crude Rate[a]	ASMR[a] (95% CI)	ASMR Ratio (95% CI)
Newfoundland (Ref)					
Male	522	3,672,450	14.2	14.0 (12.8, 15.2)	1
Female	95	3,875,800	2.5	2.4 (1.9, 2.9)	1
Both	617	7,549,140	8.2	8 (7.4, 8.7)	1
Labrador					
Male	110	206,050	53.4	55.1 (44.1, 66.1)	3.9 (3.2, 4.9)
Female	18	199,125	9	8.3[b] (4.4, 12.1)	3.5 (2.1, 5.8)
Both	128	405,050	31.6	31.8 (26.0, 37.6)	4.0 (3.2, 4.8)
Nunatsiavut (Inuit communities)					
Male	48	17,605	272.6	248.7 (175.4, 322.0)	17.8 (13.1, 24.1)
Female	16	16,480	97.1	75.5[b] (37.4, 113.6)	31.5 (18.3, 54.4)
Both	64	34,270	186.8	165.6 (122.7, 208.5)	20.6 (15.7, 27.0)
Innu Communities (Innu First Nations)					
Male	28	10,295	272	223.2 (136.0, 310.4)	15.9 (10.7, 23.8)
Female	0	10,405	0	0.0 (0.0, 0.0)	0.0 (0.0, 0.0)
Both	28	20,435	137	114.0 (69.1, 158.9)	14.2 (9.5, 21.2)
Upper Lake Melville (Inuit, Southern Inuit, and non-Aboriginal population)					
Male	14	61,550	22.7	21.7[c] (10.2, 33.2)	1.5* (0.9, 2.6)
Female	1	62,825	1.6	1.5c (0.0, 4.4)	0.6* (0.1, 4.4)
Both	15	124,405	12.1	11.3[c] (5.5, 17.1)	1.4* (0.8, 2.4)
South Coast-Straits (Southern Inuit communities)					
Male	6	36,005	16.7	19.8[c] (3.6, 35.9)	1.4* (0.6, 3.2)
Female	1	32,865	3	2.5[c] (0.0, 7.5)	1.1* (0.1, 7.6)
Both	7	68,965	10.2	11.9[c] (2.7, 21.2)	1.5* (0.7, 3.2)
Labrador West					
Male	14	80,750	17.3	21.5[c] (7.7, 35.2)	1.5* (0.8, 2.9)
Female	0	76,555	0	0.0 (0.0, 0.0)	0.0 (0.0, 0.0)
Both	14	156,990	8.9	11.2[c] (4.1, 18.3)	1.4* (0.7, 2.7)

Notes: ASMR = age-standardized suicide mortality rate; CI = confidence interval; RSE = relative standard error; Person-years may not sum to totals due to rounding; ASMR and ratio estimates are rounded.

[a] Per 100,000 person-years.

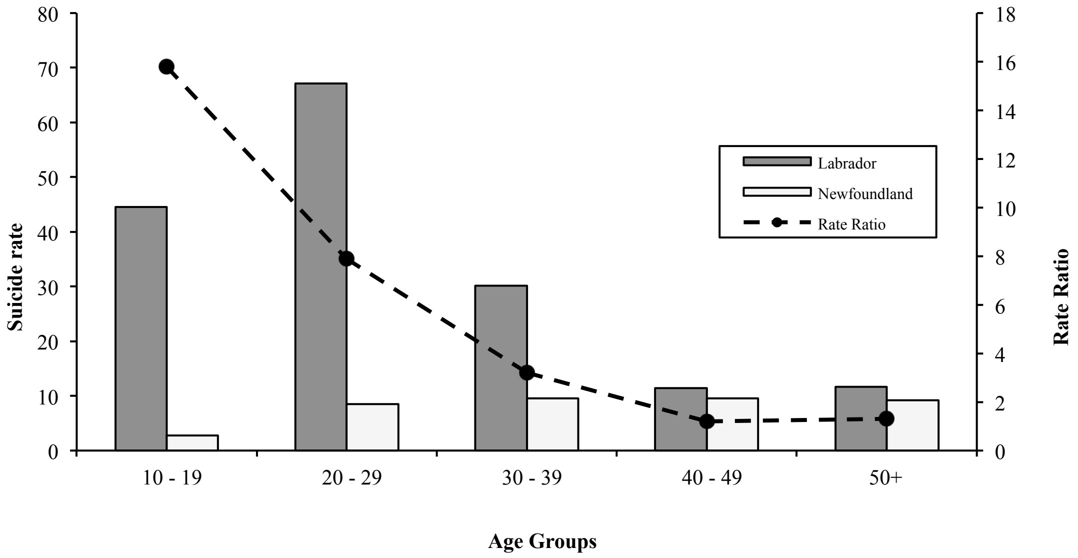
[b] RSE for the ASMR is 23%–25%; therefore, the rate estimate has borderline reliability.

[c] RSE is >,25% for the ASMR; therefore, the rate estimate is less reliable and should be interpreted with caution.

* RR 95% CI includes 1, therefore rates are not significantly different

(RR = 31.5; 95% CI = 18.3, 54.4). The mean age of individuals who died by suicide was 28.8 years (SD = 13.6) in Labrador and 44.3 years (SD = 16.2) in Newfoundland. The suicide rate was highest among those aged 20 to 29 years in Labrador, and 30 to 39 and

40 to 49 years in Newfoundland (Figure 4.1 and Appendix C, Supplementary Table 2), although the age-specific disparity was largest among youth aged 10 to 19 years, the rate being nearly 16 times higher (RR = 15.8; 95% CI = 9.6, 26.0) in Labrador (Figure 4.1 and Appendix C, Supplementary Table 2).



Notes:
Suicide rates are crude rates per 100,000 Person-Years (P-Y).
Results including rate ratio 95% CIs are reported in appendix ?

Figure 4.1 Crude suicide rates and rate ratios by age group in Labrador and Newfoundland, 1993-2009

DISCUSSION

We found large suicide rate disparities between Aboriginal and non-Aboriginal populations in Labrador, with the highest rates in the Innu and Inuit communities. To our knowledge, this is the first study to examine suicide among Southern Inuit and to show subregional suicide rate variation across Labrador. The rate difference between Labrador and Newfoundland is consistent with previous research,[10,11] although our estimated RR is slightly higher (4.0 vs. 3.3). Overall, the suicide rate in Labrador was nearly 3 times higher than the national rate in Canada, while the suicide rates in the Innu and Inuit communities were 10 and 15 times higher, respectively. These patterns are similar to those in Indigenous and circumpolar populations in Canada and internationally.[1,2,4,6,8,9,27]

Males were disproportionately affected by suicide in our study, and the majority of suicide deaths in the Aboriginal communities in Labrador were among males younger than 30 years, which is consistent with the literature.[6,9,27] This trend differs from the general population in Canada, where rates are highest among men aged 45 to 49 years.[28] In Newfoundland, male ASMRs in our study peaked across 2 age groups (30–39 years and 40–49 years), which is also younger than in Canada.

One important gender difference we discovered was the absence of any suicide deaths among women in Innu communities, which contrasted with the high rate among Innu men. This may be partially explained by a gendered trend toward choosing more lethal attempt methods in this community as in the general population.[29] However, the absence of suicide among Innu women also contrasted with women in Inuit communities, where we identified an extraordinary inequality compared with women in Newfoundland. In part, the magnitude of this disparity may be related to the exceptionally low ASMR among women in Newfoundland, who have the lowest incidence rate of either gender in all provinces and territories in Canada.[7,28] Nonetheless, the ASMR for women in Inuit communities in our study was twice as high as the rate in all other Inuit regions in Canada combined and approximately 17 times higher than the national rate among women.[4] We note that the ASMR for women in Inuit communities had borderline reliability as the RSE (25%) was slightly above the threshold.

The geographic and gender differences we found likely arise from complex interactions between risks related to mental health problems, access to care, and socio-ecological conditions. Many Aboriginal communities in Labrador are geographically remote and have limited access to comprehensive mental health services. This may increase vulnerability in communities with an already elevated prevalence of self-reported depression, suicidal ideation, and suicide attempts,[12,30] all of which are known risks for suicide.[31] A recent follow-back study among Inuit in Nunavut found that mental illness, substance abuse, and childhood maltreatment were strong predictors of suicide.[32] Although there is uncertainty about the role of mental illness as a risk factor for suicide in Aboriginal communities,[32,33] psychological distress and social adversity are likely interconnected[32] and may affect suicidality among men and women differently. For those communities that are already at increased risk because of mental health and social problems, young people in particular may be additionally vulnerable following a suicide by a peer, owing to the influence of social contagion.[34]

Increasingly, research has linked suicide in Aboriginal contexts to social distress and historical trauma, which have their origins in persistent and systemic inequality.[33,35,36] Aboriginal communities in Labrador have experienced immense social disruptions such as the government-initiated relocations of northern settlements in the mid-20th century. The health consequences of such historical events and resulting social changes may be long lasting and persist across generations,[37] but the repercussions probably have different impacts on men and women and on different communities. As a risk factor, varied experiences of historical trauma might in part explain the geographic and gender variations in suicide rates.

Political and Socio-Economic Context

At a structural level, political and socio-economic conditions may also contribute to rate disparities. A study of First Nations communities in British Columbia found that low suicide rates were associated with a higher degree of political self-determination related to land claims and local governance but not with socioeconomic factors.[8] The possible influence of community self-determination on suicide or other health indicators in Labrador remains unclear. Local governance and the land claims process evolved for each of the Aboriginal groups during the study period. The Labrador Inuit established their land claims agreement in 2005; the Innu Nation and NunatuKavut Community Council's land claims have not been settled, though the Innu reached an agreement-in-principle in 2011. These groups differ in the degree of control they have over natural resources and health and social services; however, these differences do not seem to correspond with inequalities in suicide.

Kirmayer suggested that the uneven distribution of socioeconomic factors might contribute to suicide rate variability in Aboriginal communities.[38] Evidence from the general literature is mixed but seems to show an inverse relationship between area-level poverty and suicide rates.[39] In contrast to the British Columbia study, to some extent we found that the ASMR variations seemed inversely related to socio-economic indicators. Labrador West had the highest personal income per capita (Table 4.3) and the lowest suicide rate in the region, whereas the Southern Inuit communities had relatively low incomes but the second lowest ASMR (Table 4.3). By contrast, for Aboriginal communities in northern Labrador, where suicide rates were the highest, per capita income was the third lowest of any region in the province (Table 4.3). In addition to low incomes, families in many of the Aboriginal communities experience food and housing insecurity.[12,30]

Table 4.3 Economic inequality by subregion in Labrador

Local Area[a]	**Personal income per capita**[b]	**% of families below low income threshold**[c]	**Income support assistance rate %**[d]
Labrador North	$15,200 (73)	42.1 (77)	21.3 (74)
Goose Bay Area	$27,100 (3)	19.0 (56)	10.6 (39)
Labrador West	$35,800 (1)	7.9 (1)	4.5 (4)
Pinware River	$20,100 (19)	13.7 (14)	4.1 (3)
Labrador East Coast	$17,000 (62)	21.6 (70)	10.4 (36)
Entire Province	$22,900 (n/a)	18.6 (n/a)	11.4 (n/a)

Source: Indicators of Wellbeing, Community Accounts, NL Statistics Agency, Government of Newfoundland and Labrador

[a] 'Local Areas' do not correspond exactly with subregions in the study. Pinware River and Labrador East Coast are equal to the "South Coast-Straits" subregion; Labrador North includes Nunatsiavut communities (except Rigolet) plus Natuashish Innu First Nation; Goose Bay area is equal to Upper Lake Melville plus Sheshatshiu Innu First Nation and Rigolet.

[b] Rank out of 76
[c] Rank out of 78
[d] Rank out of 80

The suicide rate disparities we identified are important in the context of broader social inequality because they help reveal high-risk areas where Aboriginal-specific health determinants are likely important factors. For example, many circumpolar regions are facing new public health threats related to climate change; recent studies in Inuit communities have shown that less predictable environmental conditions are decreasing safe access to the land, which in turn may affect mental health.[40] This emerging evidence is part of a broader recognition of the relationships between colonial policies, marginalization, connections to the land, and disparities in Aboriginal health.[35-37] In suicide prevention, and in Aboriginal health research in general, we continue to be challenged by calls to bridge the "epistemological divide"[16(p5)] between Western and Indigenous forms of evidence and approaches to intervention.

In Canada, landmark efforts such as those of the Royal Commission on Aboriginal Peoples[41] and the Truth and Reconciliation Commission[42] have made vital contributions to our understanding of the complex relationships between historical and contemporary social factors and inequitable health status. These works have helped reveal and give voice to the individual and collective experiences of intergenerational trauma related to Canada's residential school system. This trauma has fostered and compounded the poor health and mental health that persists in many Aboriginal communities today.[35-37] This understanding helps us trace the pathways that contribute to social distress and, conversely, to resilience. As suicide remains an important driver of the overall health gap between Aboriginal and non-Aboriginal people,[13] knowledge of the determinants of Indigenous health must continue to inform the evolution of suicide prevention.

Suicide Prevention in Aboriginal Communities

At present, there is limited but emerging evidence of effective approaches to suicide prevention in Aboriginal populations.[43,44] It suggests that we are most likely to prevent suicide when communities have sustainable resources and are in control of the intervention process. More specifically, the literature emphasizes the need for interventions that redress structural inequalities such as poverty, are focused on collective change rather than individual deficits, are embedded in a social context, and are rooted in culturally specific knowledge.[8,33,35,43-46] Elsewhere, comprehensive public health interventions have successfully reduced suicide and suicide attempt rates,[47,48] including rates among youth and rural populations.[48] Some components of these approaches may be relevant in some Aboriginal contexts.

Limitations and Strengths

One limitation in our study was the possibility that suicides may have been under-reported or misclassified.[11,49] Another limitation was that Canada's vital statistics registry lacks Aboriginal identifiers.[21] To overcome this, we used a geographic approach similar to that used in other studies.[3,5,22] Although this could result in the misclassification of non-Aboriginal deaths in Aboriginal subregions and contribute to conservative rate estimates, it is less likely where populations are predominantly Aboriginal. Another consequence of the lack of identifiers was that we could not determine group-specific rates within a subregion with more than one Aboriginal group, such as Upper Lake Melville. The geographic approach is also problematic because the Canadian census under-enumerates Aboriginal people.[21] This results in incomplete dominator data and consequently may have effected the accuracy of our mortality estimates.[21]

Another limitation was that we were unable to examine community-level rate variation because of small cell counts and wide CIs, which occurred even at the sub-regional level. Our ASMRs for Upper Lake Melville, Labrador West, and the Southern Inuit communities were less stable for these reasons, as were our estimates for specific subpopulations such as females. However, because data before 1993 was of poor quality and data after 2009 was not released for analysis, our data set was the largest, most reliable, and most up-to-date mortality data available in the province. Overall, we believe that these limitations are balanced by the comprehensiveness of the dataset and a cautious interpretation of our results.

Our study also had multiple strengths. We were the first, to our knowledge, to examine suicide mortality differences by subregion and in all Aboriginal groups in Labrador. We used disaggregated data and uncovered dramatic inequalities between Innu, Inuit, and non-Aboriginal populations that otherwise might have remained hidden. Too often, health disparities are obscured in provincial and national estimates that do not detect localized differences such as the relative absence of suicide[15,16] or are unable to distinguish between specific cultural groups.[15] Although we reported select rates that were less reliable, including those for strata with counts of 0 or 1, the majority of our ASMR and age-specific rates were stable, especially when disparities were the greatest. This disaggregation offers specificity for local contexts, which is integral for Indigenous statistics.[16,21] This approach reflects our community-based methodology, which is another strength of our study.

Community-Based Epidemiology

Epidemiological methods are often seen as incongruent with the qualitative and participatory approaches that are favored in many Aboriginal contexts.[50] Indeed much quantitative research in Aboriginal health is investigator driven and does not respect community governance, research priorities, or autonomy over data.[16,50] Recent studies[12,17,30,45] demonstrated that community-based epidemiology is both feasible and valuable, and some authors argue that this is a critical methodological shift that must take place in future research on suicide in Indigenous communities.[16]

Our study contributes to this literature by focusing on meeting a community-identified research need through collaborative relationships, which we demonstrated in multiple ways. We obtained research permits from our partners' institutional review committees and co-developed research agreements related to data management and knowledge translation. We also conducted consultations to guide study planning and to develop a contextual understanding of our results. Last, we disaggregated suicide rates to provide subregional estimates. By conducting research in this manner and by reporting these processes, we respected key ethical standards in Aboriginal health research.

As Aboriginal communities and governments continue to assert control over territories, economic resources, and health systems, this study can serve as an example of a multi-sector collaboration in public health research that can inform these efforts. Our results underscore the need to disaggregate data to uncover variations in local health status and identify the most vulnerable groups.

In developing partnerships and sharing these results with Aboriginal groups, our study provides evidence to health system decision-makers who can then allocate resources in proportion to community need[15] and support community mobilization in suicide prevention.

CONCLUSION

Our results confirmed that the suicide rate in Labrador was higher than that in Newfoundland and revealed that rates were elevated in two specific Aboriginal populations. Young males accounted for the majority of all suicides and had the highest rates in all areas, although females in Inuit communities had the greatest rate disparity. Our results illuminate an area of substantial health inequality between the two regions and between Aboriginal and non-Aboriginal populations. These findings reinforce the need to close the gap on health inequality between Aboriginal and non-Aboriginal communities. In Labrador, this will be aided by long-term public health approaches to suicide prevention that target high-risk subregions.

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CHAPTER 5

Global Incidence of Suicide among Indigenous Peoples: A Systematic Review

Abstract

Suicide is the second leading cause of death among adolescents worldwide and is a major driver of health inequity among Indigenous people in high-income countries. However, little is known about the burden of suicide among Indigenous populations in low- and middle-income nations, and no synthesis of the global data is currently available. Our objective was to examine the global incidence of suicide among Indigenous peoples and assess disparities through comparisons with non-Indigenous populations.

We conducted a systematic review of suicide rates among Indigenous peoples worldwide and assessed disparities between Indigenous and non-Indigenous populations. We performed text word and Medical Subject Headings searches in PubMed, MEDLINE, Embase, Cumulative Index of Nursing and Allied Health (CINAHL), PsycINFO, Latin American and Caribbean Health Sciences Literature (LILACS), and Scientific Electronic Library Online (SciELO) for observational studies in any language, indexed from database inception until June 1, 2017. Eligible studies examined crude or standardized suicide rates in Indigenous populations at national, regional, or local levels, and examined rate ratios for comparisons to non-Indigenous populations.

The search identified 13,736 papers and we included 99. Eligible studies examined suicide rates among Indigenous peoples in 30 countries and territories, though the majority focused on populations in high-income nations. Results showed that suicide rates are elevated in many Indigenous populations worldwide, though rate variation is common, and suicide incidence ranges from 0 to 187.5 suicide deaths per 100,000 population. We found evidence of suicide rate parity between Indigenous and non-Indigenous populations in some contexts, while elsewhere rates were more than 20 times higher among Indigenous peoples.

This review showed that suicide rates in Indigenous populations vary globally, and that suicide rate disparities between Indigenous and non-Indigenous populations are substantial in some settings but not universal. Including Indigenous identifiers and disaggregating national suicide mortality data by geography and ethnicity will improve the quality and relevance of evidence that informs community, clinical, and public health practice in Indigenous suicide prevention.

Keywords

Indigenous; First peoples; Inuit; Health disparities; Suicide; Mortality; Surveillance; Epidemiology

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BACKGROUND

Globally, suicide accounts for approximately 800,000 deaths annually[1] and is the second leading cause of mortality among adolescents.[2] According to the World Health Organization (WHO), low-and-middle-income and high-income countries have similar annual age-standardized suicide rates at 11.2 and 12.7 per 100,000 respectively; however low-and-middle-income countries account for 75% of suicide deaths worldwide.[1] National suicide rates range from less than one to 44 per 100,000 population, though there is often a disproportionate burden among specific subgroups within countries, such as Indigenous peoples.[1] Studies from high-income countries including Australia,[3,4] New Zealand,[5] the USA,[6,7] Canada,[8-10] and other Arctic nations[11-14] consistently find elevated suicide rates among Indigenous populations, with substantial rate disparities compared to non-Indigenous populations. Several studies have shown that regional suicide rates vary greatly among Indigenous peoples, and that some Indigenous populations have low rates or no incidence of suicide.[15,16]

Indigenous peoples and nations differ vastly in culture, language, political autonomy, and relative wealth, yet many face similar social disadvantages and health disparities as a result of colonization.[17-19] Colonial governments have used discriminatory legislation and policies to deny rights and economic opportunities, and have attempted to acculturate Indigenous people into non-Indigenous societies.[17,19,20] Structural violence meted out by governments has taken many forms including dispossessing Indigenous peoples from traditional and sovereign lands, forced settlement and relocation, and outlawing cultural practices and languages.[17-21] This violence is grossly evident in the 20th century assimilationist policies of former British colonies such as Canada and Australia. Indigenous children were systematically removed from their communities and placed in non-Indigenous institutions or families with the policy mandate to “weaken family ties and cultural linkages, and to indoctrinate children into a new culture.”[20(p. v)] The contemporary legacy of this type of social engineering manifests in differential exposures to health threats and in inequitable outcomes that show up across generations.[20,22] Intergenerational trauma from institutionalized abuse and racism experienced by Indigenous peoples has been linked to persistent social and mental health problems in some communities.[19,20,23]

Although evidence has shown a disproportionate burden of suicide among Indigenous populations in national and regional studies, a global and systematic investigation of this topic has not been undertaken to date. Previous reviews of suicide epidemiology among Indigenous populations have tended to be less comprehensive or not systematic, and have often focused on subpopulations such as youth,[24,25] high-income countries,[9,26] or regions such as Oceania[27] or the Arctic.[24,28] Given that approximately 80% of the world’s more than 300 million Indigenous people live in Asia, Latin America, and Africa,[17,18] a comprehensive study of global suicide rates that includes low-and-middle-income countries is needed. Our aim was to examine the published findings on the incidence of suicide among Indigenous peoples worldwide, and to compare rates with non-Indigenous or general populations to assess relative disparities.

METHODS

Search strategy

We systematically reviewed findings on the incidence of suicide in Indigenous populations worldwide. We searched for studies that analyzed population-based data on suicide deaths, and included papers that reported crude or standardized mortality rates. Health science librarians were consulted about the design of the search strategy with the aim to capture all peer-reviewed literature. The search combined terms related to three concept areas: population (Indigenous), outcome (suicide mortality rates), and study design (observational). Term selection was based on previous systematic reviews and combined key terms adapted for each database and also Medical Subject Headings (MeSH) as applicable. The study protocol is available in Appendix D; additional details about the methods are reported in Appendix E, including citations for previous reviews, a list of included terms, a description of the procedures used for study selection and eligibility criteria, and a complete list of databases and hand-searched review articles.

One author (NJP) performed online text word and MeSH searches for articles indexed in PubMed, MEDLINE, Embase, Cumulative Index of Nursing and Allied Health (CINAHL), PsycINFO, Latin American and Caribbean Health Sciences Literature (LILACS), and Scientific Electronic Library Online (SCiELO). A second author (KN) replicated the search in PubMed and obtained the same number of articles as the first author. We searched for studies in any language, indexed from database inception until June 1, 2017. We conducted a secondary search with a comprehensive list of terms for specific tribal groups, nations, and populations identified in previous reviews. As no additional studies were identified, this approach validated the primary search. We also searched the WHO's regional medical literature indexes, Indigenous-specific online research portals, and journals focused on Indigenous health. We hand-searched the reference lists of included articles and previous reviews to identify other eligible studies. Appendix E includes a list of all databases and hand-searched sources.

One author (NJP) imported the results into a reference management program and removed duplicates. Two authors (NJP and KN) read the abstracts and screened in papers if they (1) reported a population-based crude and/or standardized suicide rate, or count and population data; (2) reported a rate for an Indigenous population; and (3) used an observational design. We excluded articles that did not include an Indigenous population, focused only on a specific age, gender, clinical subgroup, or deaths from a specific cause (for example, firearms), or were not peer-reviewed. Articles were also excluded if they were iterations, program evaluations or experimental studies, not primary studies, from the gray literature, or used identical data sources as prior studies.

Although there is no international consensus on the definition of Indigenous, we used the United Nation's working definition to assess study population eligibility.[17,18] The UN's conceptualization of Indigenous involves: self and group identification; a special attachment to and use of traditional land; distinct knowledge, language, and culture; distinct social, economic and political systems; common ancestry with original territorial occupants; participation in maintenance and reproduction of distinct ethnic identity; and a non-dominant socio-political status.[17,18] A paper was eligible based on this criterion if it reported an outcome for an Indigenous population, tribe, community, nation, or group, including papers that used the geographic proxy method. For the proxy method, census data is used to detect areas where Indigenous people are a majority population.[29,30] We considered an area to be a proxy identifier if 80% or more of the population self-identified as Indigenous.

Two authors reviewed the full text of each paper and assessed eligibility based on inclusion criteria. At this stage, we excluded papers that did not report rates for the majority of the population (aged 15–65 years), did not conduct the primary data analysis, or provided rates in figures only and did not report count and population data. If two eligible articles used the same data source with a period of overlap, we included the article with the longer study period. During screening, full text review, and data extraction, we resolved disagreements through discussion or consultation with a third author. Translators helped assess non-English language articles and assisted with data extraction for four included studies. The following data was independently extracted by two authors (AL and NJP), then compared: citation, study design, country and region/community, Indigenous population, data source, standard population, number of suicide deaths, population count, crude and standardized suicide rates (overall and by gender and age group), comparative rates for a non-Indigenous or general population, and the measure of relative effect (incidence rate ratio).

Data analysis

We summarized all included studies in a table and reported counts, population, crude and standardized suicide mortality rates, and rate ratios. We calculated crude suicide mortality incidence rates for articles that reported only count and population data, and we estimated rate ratios when not otherwise reported by dividing the Indigenous population rate by the comparison population rate. To identify global patterns, we presented rates and rate ratios in tables and figures grouped by WHO region, country, population, and gender; we did not pool the data due to heterogeneity. We also reported on trends in suicide mortality over time and by age group; reported time trends reflect results from included studies, not pooled and recalculated rates. We modified the Newcastle-Ottawa Scale and used it to assess the quality of included articles. Appendix F includes a description of the quality assessment procedures and scoring, and the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) checklist is provided in Appendix G.[31]

RESULTS

The search identified 13,736 papers; after removing duplicates, screening abstracts, and full text review, we included 99 in our analysis (Figure 5.1). Included studies examined suicide rates in Indigenous populations in 30 countries and territories across six decades (Table 5.1), though the majority focused on those in high-income countries such as American Indian and Alaska Natives in the USA (n=35) and Inuit and First Nations in Canada (n=14). Studies in low- and middle-income countries (n = 22) were mostly from Brazil (n = 4), China and Taiwan (n=6), and Fiji (n=5). Coverage included circumpolar Indigenous peoples such as Sámi (n=3) and Nenets (n=1), and populations from the Western Pacific region including Aboriginal and Torres Strait Islanders in Australia (n = 6) and Māori and other Pacific peoples (n=16). Four studies were transnational comparisons,[32-35] though numerous papers included multiple Indigenous groups within a single country. Studies were mostly of moderate quality (mean 2.79 on a 4-point scale) based on our assessment of study characteristics, as reported in Appendix F.

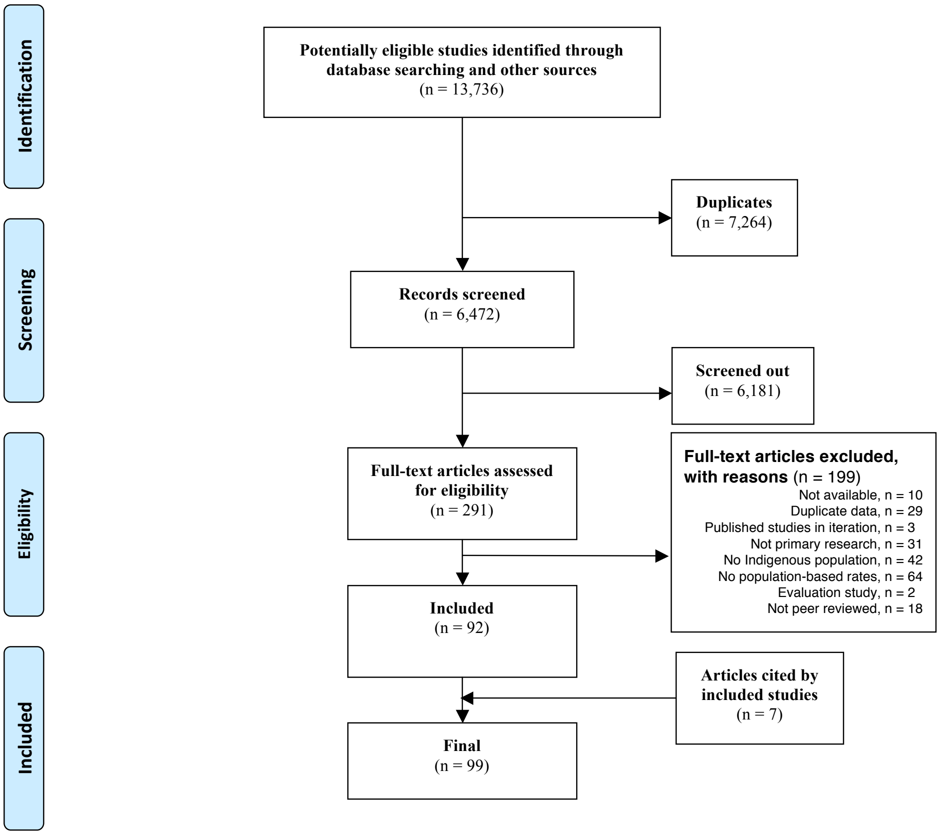

Figure 5.1 Flow diagram of study selection

Incidence

We extracted population-based suicide mortality rates from 93 papers (Table 5.2) and included gender-specific incidence data from six additional studies.[5,10,36-39] Overall, suicide rates among Indigenous peoples varied at all levels of aggregation in both high-income and low- and middle-income countries, and spanned from zero to 187.5 deaths per 100,000 person-years (PY; Table 5.2). In high-income countries, national and provincial suicide rates among Indigenous peoples ranged from 1.7 per 100,000 in Brunei Darussalam[40] to 50.4 per 100,000 among Aboriginal and Torres Strait Islanders in Northern Territory, Australia.[41] Rates in high-income countries were highest among rural

Table 5.1 Overview of included studies

	# of studies (N =)	% of total (n/99)
Decade of publication		
1960 - 1979	12	12.1%
1980's	23	23.2%
1990's	25	25.3%
2000's	17	17.2%
2010's	22	22.2%
World Bank Income		
High-Income	76	76.8%
Low-and-Middle-Income	22	22.2%
Multiple	1	1.0%
WHO Region		
Western Pacific	33	33.3%
European	8	8.1%
Region of the Americas	56	56.6%
Multiple regions	2	2.0%
Total Indigenous population		
Less than 10,000	17	17.2%
10,000 - 99,999	32	32.3%
100,000 - 999,999	12	12.1%
1,000,000 +	4	4.0%
Not reported	34	34.3%
Number of suicide deaths among Indigenous population		
Under 20	18	18.2%
21 - 99	23	23.2%
100 - 999	23	23.2%
1000 +	4	4.0%
Not reported	31	31.3%

Indigenous populations and in sparsely populated regions such as the Arctic. Among low- and middle-income countries, Palawan communities in the Philippines had the highest crude suicide rates (134 per 100,000),[42] while Indigenous peoples in Malaysia[43] and some Pacific small island states such as Fiji had crude rates under 7 per 100,000 population. The number of suicide deaths used for rate calculations ranged from zero to 4,219 (Table 5.2).

Measure of Relative Effect

Incidence rate ratios were reported or calculated for 102 Indigenous populations in 69 studies. The results showed rate disparities in the majority of studies (Figure 5.2), though 22 reported rate ratios below one. The rate ratios ranged from 0.04 in China[44] to more than 20 in Brazil[45] and Canada (Appendix H, Supplementary Table 3).[30] Most Indigenous populations had higher suicide rates than comparison groups; disparities were widest in studies with small populations. One study reported a suicide rate of zero for an urban Indigenous population in Brazil compared the general population rate of 4.8 per 100,000 in the same city.[46]

Time Trends

Suicide rates appeared to increase over time, especially in the latter half of the twentieth century, though reports were limited. Among studies with reported time series (n = 24), most (83%, n = 20) had fewer than 10 data points and covered an average of 19 years. A study in Greenland was the exception; it reported longitudinal data that showed a

Table 5.2 Suicide mortality rates among Indigenous populations by WHO region and country

WHO Region	Country	Indigenous Peoples*	Population	Period	Deaths	CSIR	SSIR
EUROPEAN REGION							
Soininen (2008)[14]	Finland (Northern region)	Sámi	2,091	1979-2005	24	50.0	-
Thorslund (1989)[47]	Greenland	Kalaallit (Inuit)	-	1986	57	129	-
Bjerregaard (2015)[12]	Greenland	Kalaallit (Inuit)	57,000	1970-2011	1,678	87.7	-
	East/North regions	Kalaallit (Inuit)	-	1970-2011	307	187.5	-
	Nuuk	Kalaallit (Inuit)	-	1970-2011	303	86.6	-
	Towns in Western region	Kalaallit (Inuit)	-	1970-2011	837	81.2	-
	Villages in Western region	Kalaallit (Inuit)	-	1970-2011	222	61.4	-
Klomek (2016)[48]	Israel	Bedouin	-	1999-2011	39	4.4	3.2
Silviken (2009)[11]	Norway (Northern region)	Sámi	19,801	1970-1998	89	18.9	-
Sumarokov (2014)[49]	Russia (Nenets Autonomous Okrug)	Nenets	7,504	2002-2012	67	79.8	72.7
Hassler (2005)[13]	Sweden	Sámi	41,721	1961-2000	114	11.7	-
		Sámi (Non-herding)	-	1961-2000	76	9.8	-
		Sámi (Reindeer herding)	-	1961-2000	38	19.6	-
WESTERN PACIFIC REGION (AUSTRALIA)							
Clayer (1991)[50]	Australia (South Australia)	Aboriginal & Torres Strait Islander	13,298	1988	14	105.3	-
Cantor (1997)[51]	Australia (Queensland)	Aboriginal & Torres Strait Islander	-	1990-1992	-	-	17.1
Stevenson (1998)[34]	Australia	Aboriginal & Torres Strait Islander	-	1990-1992	67	-	11.1
Bramley (2004)[32]	Australia	Aboriginal & Torres Strait Islander	-	1999	-	-	19.4
De Leo (2011)[4]	Australia (Queensland)	Aboriginal & Torres Strait Islander	-	1994-2007	544	-	27.2
Measey (2006)[41]	Australia (Northern Territory)	Aboriginal & Torres Strait Islander	-	2002	-	-	50.4
Pridmore (2009)[3]	Australia (Northern Territory)	Aboriginal & Torres Strait Islander	-	2001-2006	130	-	36.7
Campbell (2016)[52]	Australia (Kimberley)	Aboriginal & Torres Strait Islander	11,550	2005-2014	102	-	74

WESTERN PACIFIC REGION (OCEANIA)

Booth (1999)[33]	American Samoa	Samoan	54,800	1990-1991	-	18	-
Hezel (1984)[53]	FSM (Chuuk)	Chuukese	37,488	1971-1983	129	30	-
Hezel (1989)[35]	Federated States of Micronesia	Pacific peoples	142,298	1984-1987	134	25.8	-
	Chuuk	Chuukese	44,000	1984-1987	51	28.3	-
	Kosrae	Kosraen	6,448	1984-1987	6	25.9	-
	Pohnpei	Pohnpeian	28,879	1984-1987	18	16.7	-
	Yap	Yapese	10,139	1984-1987	5	20.2	-
Booth (1999)[33]	Federated States of Micronesia	Pacific peoples	105,700	1988-1992	-	31	-
	Chuuk	Chuukese	-	1988-1992	-	35	-
	Kosrae	Kosraen	-	1988-1992	-	48	-
	Pohnpei	Pohnpeian	-	1988-1992	-	20	-
	Yap	Yapese	-	1988-1992	-	48	-
Ree (1971)[54]	Fiji (Macuata)	iTaukei	9,950	1962-1968	4	5.7	-
Price (1975)[55]	Fiji	iTaukei	-	1971-1972	6	1.3	-
Haynes (1984)[56]	Fiji (Macuata)	iTaukei	8,111	1979-1982	2	6.7	-
Pridmore (1994)[57]	Fiji (Western Division)	iTaukei	-	1986-1992	-	2	-
Pridmore (1995)[58]	Fiji	iTaukei	-	1969-1989	-	3.6	-
Booth (1999)[33]	Fiji	iTaukei	-	1982-1983	-	3	3
Booth (1999)[33]	French Polynesia	Polynesian	218,000	1988-1992	-	9	9
Booth (2010)[59]	Guam	Chamorro	-	1998-2000	-	21	-
Hezel (1989)[35]	Marshall Islands	Marshallese	39,060	1984-1987	39	26.5	-
Booth (1999)[33]	Marshall Islands	Marshallese	54,700	1988-1992	-	26	-
Langley (1990)[60]	Aotearoa/New Zealand	Māori	-	1984	22	-	8
Langley (2000)[61]	Aotearoa/New Zealand	Māori	-	1985-1994	271	8.8	-
Bramley (2004)[32]	Aotearoa/New Zealand	Māori	-	1999	-	-	12.9
Hezel (1989)[35]	Palau	Palauan	13,772	1984-1987	15	28.8	-
Booth (1999)[33]	Palau	Palauan	16,500	1988-1992	-	29	-

Parker (1966)[62]	Papua New Guinea	Pacific peoples	-	1961-1965	41	0.7	-
Smith (1981)[63]	Papua New Guinea (Southern Highlands)	Huli	50,000	1971-1976	26	17	-
Booth (1999)[33]	Papua New Guinea	Pacific peoples	4,216,100	1990	-	<1	-
Booth (1999)[33]	Samoa	Samoan	163,400	1981	-	31	34
Pridmore (1997)[64]	Solomon Islands (Honiara area)	Pacific peoples	75,000	1989-1993	13	3.9	-
Vivili (1999)[65]	Tonga	Tongan	98,200	1982-1997	43	2.9	-
Booth (1999)[33]	Vanuatu	ni-Vanuatu	164,100	1990-1992	-	3	-
De Leo (2013)[66]	Vanuatu	ni-Vanuatu	245,619	2010	2	0.8	-
WESTERN PACIFIC REGION (EAST ASIA)							
Telisinghe (2014)[40]	Brunei Darussalam	Indigenous peoples (7 tribes)†	14,000	1991-2010	4	1.7	-
Wang (1997)[67]	China (Hohhot, Inner Mongolia)	Meng	27,000	1986-1991	-	2.4	-
		Hui	21,600	1986-1991	-	1.2	-
Lu (2013)[44]	China (Yunnan Province)	Dai	325,126	2004-2005	-	12	-
		Yi	582,596	2004-2005	-	20.8	-
		Li su	147,794	2004-2005	-	50.8	-
		Other ethnic minorities	1,922,430	2004-2005	-	0.96–36.4‡	
Ali (2014)[43]	Malaysia (Sabah and Sarawak)	Bumiputera	2,981,300	2009	11	0.4	-
Jollant (2014)[42]	Philippines	Palawan	1,192	2002-2012	16	134	-
Cheng (1992)[68]	Taiwan	Atayal	-	1981-1985	-	46.3	-
		Ami	-	1981-1985	-	5.3	-
		Bunun	-	1981-1985	-	64.8	-
		Paiwan	-	1981-1985	-	16.3	-
Hsieh (1994)[69]	Taiwan	Indigenous peoples	200,000	1971-1990	1,597	40.1	-
		Atayal	-	1971-1990	928	57.6	-
		Bunun	-	1971-1990	222	44.7	-
		Paiwan	-	1971-1990	204	21.3	-
Wen (2004)[70]	Taiwan	Indigenous peoples	200,537	1998-2000	128	21.9	-

Liu (2011)[71]	Taiwan (East region)	Ami	-	1979-1981	30	15.6	-
		Atayal	-	1979-1981	30	68.2	-
REGION OF THE AMERICAS (BRAZIL and CANADA)							
Coloma (2006)[45]	Brazil (Mato Grosso do Sul)	Indigenous peoples (6 tribes)§	53,325	2000-2003	194	96.2	-
Souza (2013)[46]	Brazil (Amazonas)	Indigenous peoples	184,764	2006-2010	131	-	18.4
	Manaus	Indigenous peoples	-	2006-2010		-	0
	Sao Gabriel da Cachoeira	Indigenous peoples	-	2006-2010		-	41.9
	Tabatinga	Indigenous peoples	-	2006-2010		-	75.8
Machado (2015)[72]	Brazil	Indigenous peoples	-	2012	-	14.4	-
Orellana (2016)[21]	Brazil (Mato Grosso do Sul)	Indigenous peoples (3 tribes)¶	75,000	2009-2011	-	-	65.2
Butler (1965)[73]	Canada (NWT/Nunavut)	Inuit	7,949	1959-1964	9	18.8	-
	NWT	First Nation	5,284	1959-1964	0	0	-
	Yukon	First Nation	2,207	1959-1964	5	37.7	-
Young (1983)[74]	Canada (Northwestern Ontario)	Cree & Ojibway	10,000	1972-1981	17	16.1	-
Fox (1984)[75]	Canada (Wikwemikong, Ontario)	Anishinaabe	3,000	1976-1980	-	26.7	-
Wotton (1985)[76]	Canada (Labrador)	Innu and Inuit	2,500	1979-1983	8	65.5	-
Spaulding (1985)[77]	Canada (Northern Ontario)	Ojibway	3,005	1975-1982	14	61.7	-
Mao (1986)[78]	Canada (7 provinces)	First Nation (On reserve)	168,529	1977-1982	344	34	-
Ross (1986)[79]	Canada	Cree	2,822	1981-1984	7	83	-
Garro (1988)[80]	Canada (Manitoba)	First Nation (Status Indians)	43,000	1973-1982	174	40.2	-
		Dene	-	1973-1982	-	13	-
		Ojibway (Northern)	-	1973-1982	-	5	-
		Cree	-	1973-1982	-	22	-
		Saulteaux	-	1973-1982	-	48	-
		Dakota	-	1973-1982	-	80	-
Malchy (1997)[81]	Canada (Manitoba)	First Nation and Métis	-	1988-1994	227	38	31.8
Chandler (1998)[16]	Canada (British Colombia)	First Nation	-	1987-1992	220	45.2	-

Isaacs (1998)[82]	Canada (NWT)	Dene	-	1994-1996	-	29	-
	NWT/Nunavut	Inuit	-	1994-1996	-	79	-
Bramley (2004)[32]	Canada	First Nation	-	1999	-	-	27.8
Macaulay (2004)[8]	Canada (Kivalliq, Nunavut)	Inuit	7,131	1987-1996	31	-	45.1
Penney (2009)[83]	Canada (Nunavut)	Inuit	20,489	1999-2003	-	-	95.6
	Canada (Nunavik)	Inuit	7,628	1999-2003	-	-	159.8
Pollock (2016)[30]	Canada (Labrador)	Innu	1,815	1993-2009	28	137.0	114
		Inuit	2,415	1993-2009	64	186.8	165.6
REGION OF THE AMERICAS (USA, National)							
Ogden (1970)[84]	USA (24 Western states)	American Indian & Alaska Native	630,000	1967	94	17	23.1
Young (1993)[85]	USA (IHSA)	American Indian & Alaska Native	-	1979-1981	-	18.6	-
Lester (1994)[86]	USA	American Indian & Alaska Native	-	1980	-	13.3	-
Lester (1995)[87]	USA (48 states)	American Indian & Alaska Native	984-166,464¶	1980	-	0.0-64.7**	
Stevenson (1998)[34]	USA	American Indian	-	1990-1992	572	-	15.5
Bramley (2004)[32]	USA	American Indian & Alaska Native	-	1999	-	-	12
Howard (2014)[88]	USA	American Indian & Alaska Native	2,439,419	1999-2010	4,219	-	14.2
Herne (2014)[6]	USA (IHSA)	American Indian & Alaska Native	-	1999-2009	3600	-	21.1
	Pacific Coast IHSA	American Indian & Alaska Native	-	1999-2009	532	-	18.2
	Southwest IHSA	American Indian & Alaska Native	-	1999-2009	1066	-	19.9
	South Plains IHSA	American Indian & Alaska Native	-	1999-2009	626	-	18.7
	North Plains IHSA	American Indian & Alaska Native	-	1999-2009	755	-	26.2
	East IHSA	American Indian & Alaska Native	-	1999-2009	93	-	8.4
	Alaska IHSA	American Indian & Alaska Native	-	1999-2009	528	-	42.5
REGION OF THE AMERICAS (USA, ALASKA)							
Kraus (1979)[89]	USA (Alaska)	Alaska Native	56,477	1970	-	29.6	-
Travis (1983)[90]	USA (Alaska)	Alaska Native	-	1975-1979	-	15.8–52.6††	

Travis (1984)[91]	USA (NANA, Alaska)	Inupiat	7,345	1974-1980	-	106	-
	USA (Arctic Slope, Alaska)	Inupiat	-	1974-1980	-	19.2	-
Hlady (1988)[92]	USA (Alaska)	Alaska Native	-	1983-1984	65	-	42.9
Forbes (1988)[93]	USA (Alaska)	Alaska Native	-	1985	47	64.9	68.8
Kettl (1991)[94]	USA (Alaska)	Alaska Native	-	1979-1984	90	23.4	-
Andon (1997)[95]	USA (Alaska)	Athabascan	6,041	1977-1987	40	55.1	-
Marshall (1998)[96]	USA (Alaska)	Alaska Native	25,000	1979-1990	186	49	-
		Yupik	-	1979-1990	103	53	-
		Inupiat	-	1979-1990	60	89	-
		Athabascan	-	1979-1990	23	147	-
Day (2003)[97]	USA (Alaska)	Alaska Native	91,300	1989-1998	-	-	49.7
Day (2009)[98]	USA (Alaska)	Alaska Native	97,012	1999-2003	204	-	36.1
Wexler (2012)[7]	USA (Northwestern Alaska)	Alaska Native	7,965	2001-2009	38	60	-
Holck (2013)[99]	USA (Alaska)	Alaska Native	138,312	2004-2008	252	-	42.4
REGION OF THE AMERICAS (USA, LOWER 48 states + HAWAI‘I)							
Levy (1965)[100]	USA (New Mexico)	Navajo	87,000	1954-1963	59	8.3	-
Kalish (1968)[101]	USA (Hawai‘i)	Kānaka Maoli (Native Hawaiian)	-	1959-1965	-	17.8	-
		Other Pacific peoples	-	1959-1965	-	6.8	-
Conrad (1974)[102]	USA (Arizona)	Tohono O’odham	12,179	1967-1971	10	-	18
Shore (1975)[103]	USA (Pacific Northwest)	American Indian	23,921	1969-1971	20	27.8	-
Sievers (1975)[104]	USA (Arizona)	American Indian	40,361	1971-1973	17	16.8	-
		Apache	-	1971-1973	-	40	-
		Akimel O'odham	-	1971-1973	-	7	-
		Other American Indian tribes	-	1971-1973	-	26	-
Miller (1979)[105]	USA (Southwest)	American Indian	-	1977	-	57.8	-
Humphrey (1982)[106]	USA (North Carolina)	Cherokee	-	1974-1976	-	31.1	-
		Lumbee	-	1974-1976	-	10.3	-

Broudy (1983)[107]	USA (Mexico & Arizona)	American Indian	162,303	1975-1977	-	-	28.5
Simpson (1983)[108]	USA (North-eastern Arizona)	Hopi	9,406	1979-1980	5	27	-
Levy (1987)[109]	USA (Northern Arizona)	American Indian	7,600	1981	-	23.7	-
Copeland (1989)[110]	USA (Florida)	American Indian	11,050	1982-1986	1	11	-
Sievers (1990)[111]	USA (Arizona)	Akimel O'odham	4,915	1975-1984	26	53	51
Van Winkle (1993)[15]	USA (New Mexico)	Apache	-	1980-1987	179‡‡	-	48.8
		Navajo	58,936	1980-1987		-	18.2
		Pueblo	-	1980-1987		-	32.2
Wissow (2001)[112]	USA (Southwest)	American Indian	12,000	1985-1996	-	30.7	24.6
Mullany (2009)[113]	USA (Arizona)	White Mountain Apache	15,500	2001-2006	41	45.5	40
Martin (2010)[114]	USA (North Carolina)	American Indian	-	2004-2007	39	8.5	-
Christensen (2013)[115]	USA (South Dakota)	American Indian	82,073	2000-2010	236	29	28

NOTES: WHO=World Health Organization. CSIR=Crude Suicide Incidence Rate. SSIR=Standardised Suicide Incidence Rate. FSM=Federated States of Micronesia. NWT=Northwest Territories. IHSA=Indian Health Services Area. Standardised rates were adjusted with various populations, therefore they are not directly comparable. Population *n* are based on reported estimates in each article, but may not reflect denominators used to calculate incidence. *General terms such as Indigenous, Pacific Peoples, or First Nation were used when a specific nation or tribe was not identifiable. †Indigenous tribes in Brunei Darussalam included Kedayan, Belait, Tutong, Bisya, Murut, Dusun and Iban. ‡Rate range for 10 ethnic minority groups in Yunnan Province, China: Hui, Ha ni, A chang, Pumi, Bai, Yao, Zhuang, Miao, Meng gu, and Jing po minorities. §Indigenous tribes in Mato Grosso do Sul, Brazil included Kadiwe'u, Guato, Ofaie´-Xavante, Guarani-Kaiowá, Guarani-Ñandeva, and Terena. ¶Indigenous tribes included Guarani-Kaiowá, Guarani-Ñandeva, and Terena. **Population and rate range included 48 states. ††Rate range for 9 Native regional corporations in Northwest Alaska Athna, Bering Straits, Bristol Bay, Calista, Chugach, Cook Inlet, Doyon, Koniag, and Sealaska (NANA and Arctic Slope not extracted due to duplicate data with Travis 1984[91]). ‡‡Total number of deaths for Apache, Navajo, and Pueblo populations combined.

steady suicide rate increase among Inuit that began with the near absence of suicide in the early part of the twentieth century (2.4 per 100,000) and climbed exponentially to a rate of 110.4 per 100,000 in 2010–2011; the average number of suicides per year changed from less than one to 55 during this period.[12] Aboriginal and Torres Strait Islanders in Northern Territory, Australia experienced similar rate accelerations (6.1 per 100,000 in 1981 to 50.4 per 100,000 in 2002),[41] while incidence among Alaska Natives was relatively stable, though high, from the 1980s to the early 2000s.[97,99] Indigenous peoples in the Micronesian islands experienced a six-fold increase in suicide rates between the 1960s and the late 1980s (from 4.3 to 25.8 per 100,000),[35] and one study reported slight rate declines for both Māori and non-Māori in New Zealand from 1996 to 2002.[5] Annual rates tended to fluctuate in studies with small populations.

Age Differences

Age-specific rates were reported in 39 studies; various age categories were used, and rates were often only available for select strata. Youth less than 30 years old, especially those aged 15–24 years old, had the highest suicide rates of any age group in 89% of studies (n = 34) that reported age-specific rates. In the larger studies (> 100 total suicides) with age-specific incidence, youth suicide rates ranged from 15.9 to 108 per 100,000 population. Very few studies reported deaths or rate estimates for adults more than 60 years old.

Figure 5.2(a): Western Pacific Region (Oceania and Australia)

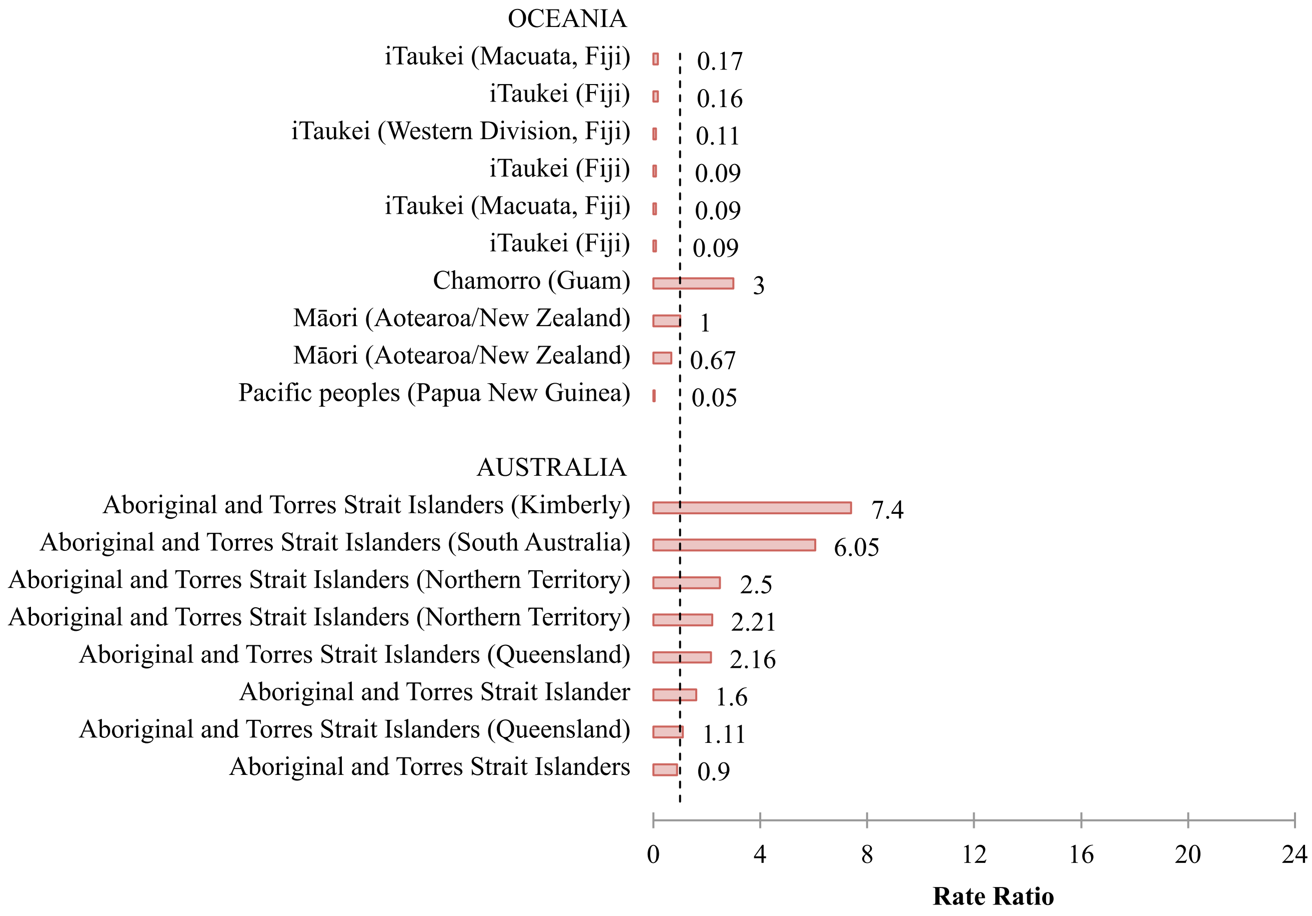

Figure 5.2(b): Western Pacific Region (East Asia)

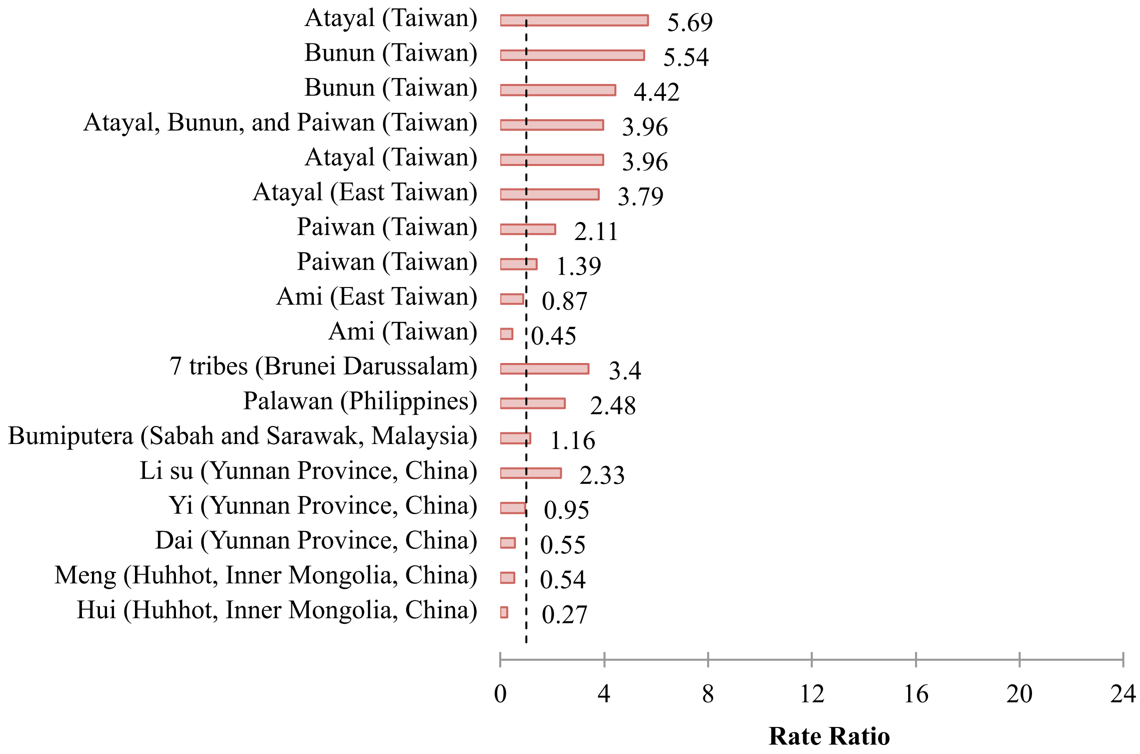

Figure 5.2(c): European Region

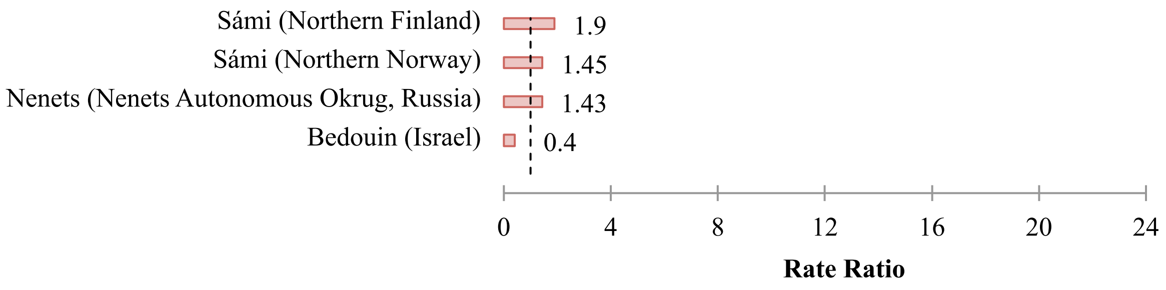

Figure 5.2(d): Region of the Americas (Canada and Brazil)

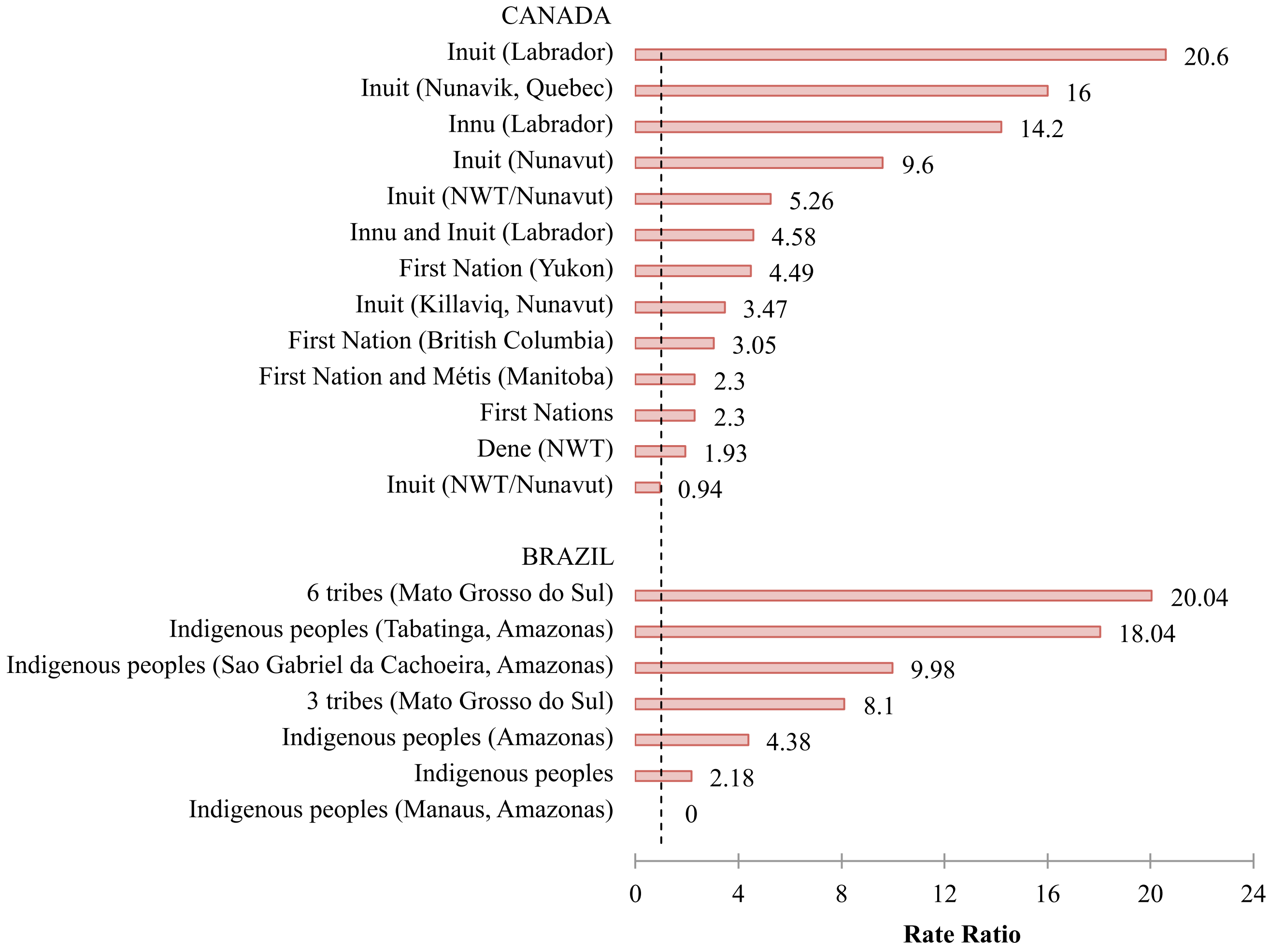

Figure 5.2(e): Region of the Americas (USA, National)

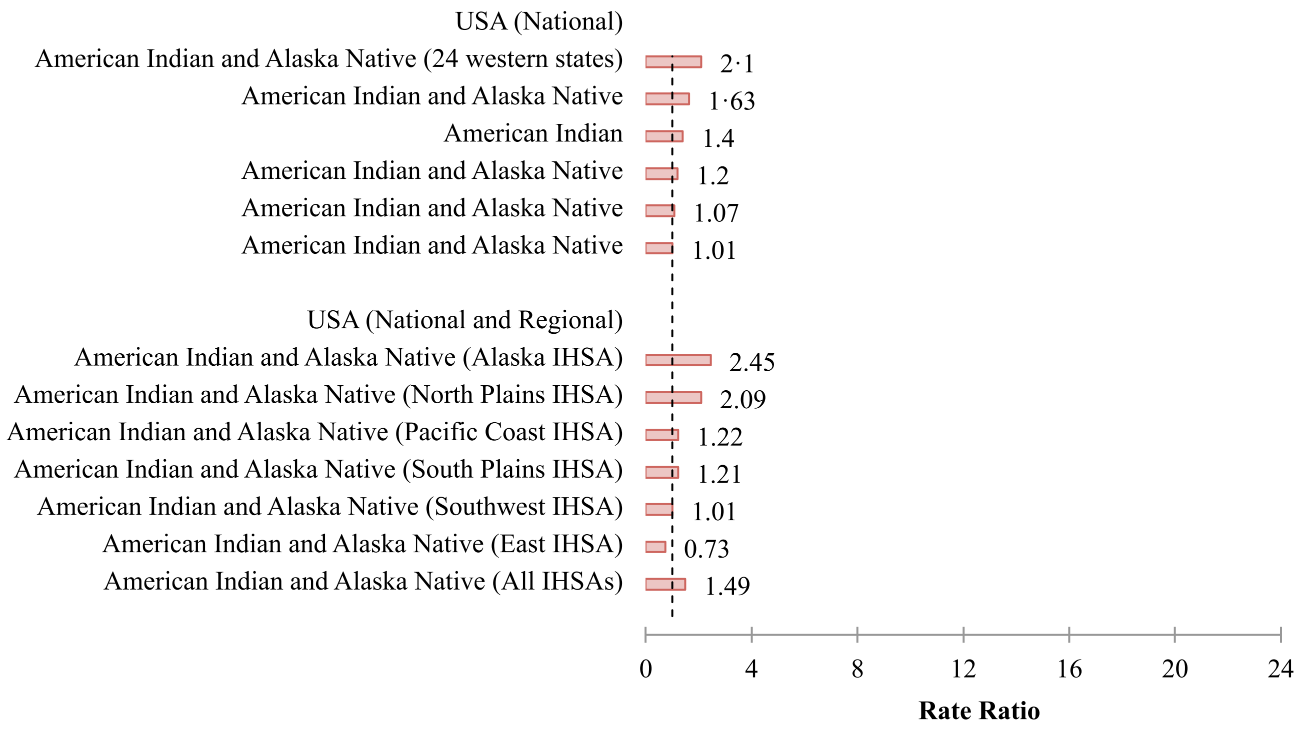

Figure 5.2(f): Region of the Americas (USA, Alaska)

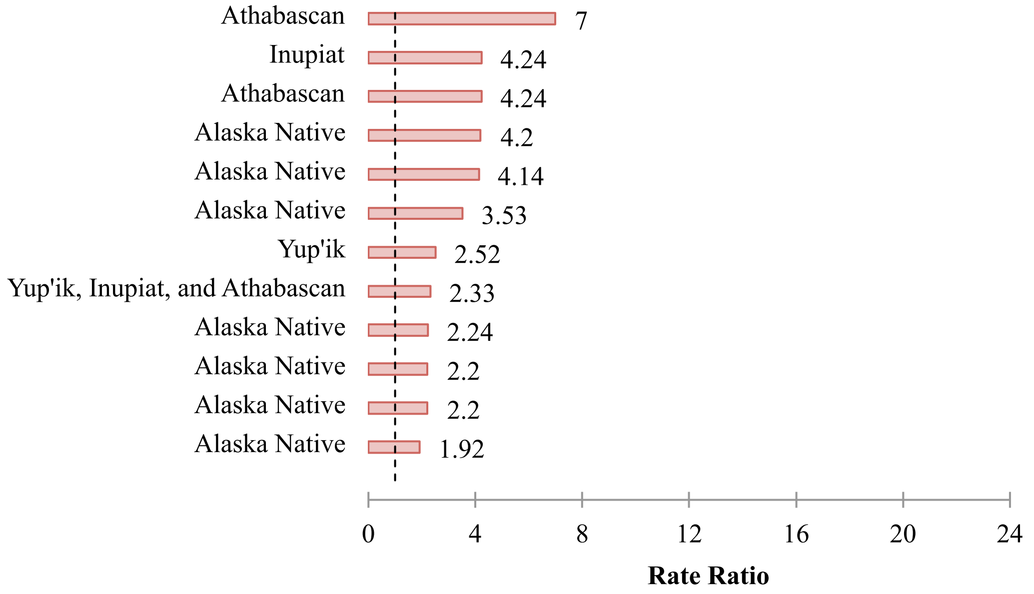

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Figure 5.2(g): Region of the Americas (Lower 48 states and Hawai'i)

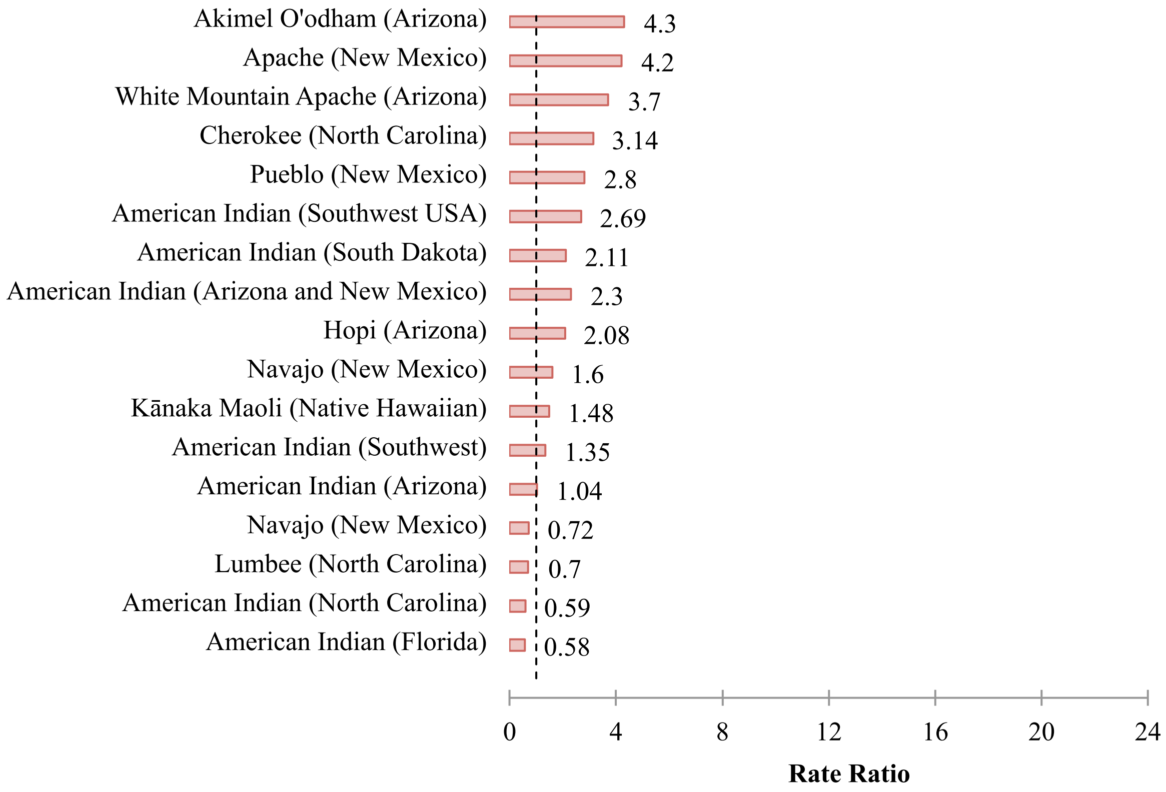

Figure 5.2 Global suicide mortality incidence rate ratios among Indigenous and comparison populations
This figure is displayed in 7 panels (a-g)

NOTES: NWT=Northwest Territories. IHSA=Indian Health Services Area. The dotted line indicates a rate ratio of one (RR=1). This means that there is rate parity (no difference) between the incidence of suicide in Indigenous and comparative populations. Rate ratios to the left of the dotted line (RR<1) indicate that rates are comparatively higher in the non-Indigenous population. Conversely, rate ratios to the right of the dotted line (RR>1) show that the Indigenous population has a comparatively higher rate. Citations for each study are reported in the Appendix and references in Appendix H, Supplementary Table 3.

Gender Differences

Men accounted for the majority of suicide deaths in all but four studies; only two of these four studies reported a greater number of suicide deaths among women.[63,64] Studies with gender-specific crude and age-standardized rates (n = 35) ranged from zero to 75.5 per 100,000 among Indigenous women (Appendix H, Supplementary Table 2). Suicide rates were higher among Indigenous men compared to Indigenous women, though rate differences were marginal among some Pacific populations.[33,55] Suicide rates were also higher among Indigenous men than for men in comparison populations in all countries except Israel and Fiji. Outside of the relatively low rates among Indigenous men in these countries, estimates ranged from 19.5 among Sámi[13] to 248.7 per 100,000 among Inuit.[30]

DISCUSSION

This study showed that the rate of suicide is elevated in many Indigenous populations globally, but that rate variation is common (Table 5.1). The evidence of substantial rate disparities for Indigenous peoples in Australia, Brazil, Taiwan, and circumpolar countries is notable. Equally important, we found that disparities were marginal or non-existent in some US territories and Pacific nations; we also identified 21 studies in which Indigenous populations had lower suicide rates than non-Indigenous populations. These results demonstrate that the high incidence of suicide and large rate disparities are not universal among Indigenous peoples. This confirms and extends findings from prior research that reported variation in localized estimates in the USA[116] and Canada.[16]

Worldwide variation in the incidence of suicide among Indigenous peoples has complex and place-based social origins. These origins are traceable to regional differences in the impact of colonization, which is widely recognized as a major determinant of Indigenous health.[17-19,117] Colonial governments have historically threatened the well-being of Indigenous peoples through chronic and often state-sanctioned discrimination and human rights abuses, and continue to do so in many countries.[18,20,23] Until 2016, several high-income countries had not ratified the United Nations Declaration on the Rights of Indigenous Peoples, and therefore legislative reforms to recognize Indigenous self-determination lagged. As a result, many Indigenous nations have yet to attain political sovereignty over lands and natural resources, education, or health care.

Globally, Indigenous peoples commonly experience social and economic marginalization and, as a consequence, some of the most disparate health outcomes.[17,18,117] In this context, the extent and the persistence of high suicide rates and rate disparities reveal a striking deficit in the global effort to prevent suicide and achieve social and health equity. This is further challenged by overlapping barriers to accessing health care and community supports, especially in rural areas and low- and middle-income countries. Barriers include fragmented care networks, lack of access to services due to geography, discriminatory attitudes from health care providers, and services that are not culturally safe or provided in the necessary language.[18,118,119] In resource-limited and conflict settings in particular, mental health services are inadequate in scope and quality, chronically under-funded, and in some places non-existent.[18,118]

Challenges in accessing mental health care are compounded by the limited relevance and generalizability of some "best practice" interventions in Indigenous contexts.[120,121] Recent clinical trials with hospital-based interventions, mobile self-help applications, and gatekeeper training reported adverse[121] or limited[122,123] effects on suicide-related outcomes for Indigenous peoples. Overall, intervention studies with Indigenous populations are rare, and community-based programs are often not evaluated or have weak study designs.[124-127] These challenges point to a need to expand efforts to generate Indigenous-specific evidence.[23,120,124] Indeed, many communities have developed contextualized and complex approaches to suicide prevention that respond to local priorities. There is emergent evidence that such programs increase protective factors and reduce suicide-related behaviour.[127-129] However, knowledge about programs' effectiveness, implementation, and capacity to scale up is limited, and many programs are not sustainably funded.[120,124-126]

Indigenous organizations and governments in New Zealand, Canada, and several Arctic states have moved beyond programmatic approaches and designed Indigenous-specific suicide prevention strategies.[23,119,130] These strategies integrate evidence-based public health and clinical interventions with Indigenous knowledge about the consequences of colonization, institutionalized violence and racism, and the value of culture. They also recognize that social conditions have an important role in shaping mental health, especially during the early years of life, and that improving these conditions can have a positive impact on population mental health and suicide-related outcomes. The path to lowering the incidence of suicide among Indigenous peoples and achieving health equity requires broader social transformation both within states and globally. This transformation must be collaborative, with Indigenous organizations and communities as leaders and rights-holders in knowledge production and decision-making.[23,29,117,120,130,131] Public health systems can also enhance capacity for Indigenous suicide prevention with efforts to increase the visibility of community-level differences in health status and by accurately tracking changes in suicide mortality over time.

Limitations

This study is a comprehensive synthesis of the published evidence on the global epidemiology of suicide among Indigenous peoples. Although it is the first review of this scale, our study has several important limitations. First, included studies varied in the methods of identifying Indigenous populations. Self-identification is the gold standard in administrative and registry data.[131] However, this is a recent benchmark. Its uptake has varied internationally, and some countries do not identify Indigenous populations in health data at all.[117,131] The majority of included studies relied on linkages with census or registry data, geographic proxies, or observer-determined assessments. These procedures are useful approximations, but they use varied definitions and tend to under-count Indigenous people, especially groups without legal recognition.[29,117,131] This can lead to ascertainment bias and underestimation of inequities.[117,131] A second and related limitation is the under-representation of studies from low- and middle-income countries. In our review, we may have missed studies, particularly from the Global South, due to the conceptualization of Indigenous and the search terms used, which do not necessarily apply in all contexts. We attempted to limit this bias by searching databases focused on low- and middle-income countries and including non-English language papers.

The third limitation was that it was difficult to compare suicide rates between countries. Included studies were heterogeneous in population size, number of cases, aggregation, data source and outcome assessment, method of identifying Indigenous peoples, and coverage period. Many papers provided crude estimates only and did not report numerator and denominator data by age group, gender, or ethnicity. For studies with adjusted rates, different standard populations were used, and confidence intervals were rarely reported. Differences in analytic and reporting practices made it challenging to directly and reliably compare suicide rates across studies. To address this, we examined rate ratios to assess relative differences between Indigenous and non-Indigenous/general populations. This allowed us to estimate rate disparities, which were compared globally.

The fourth limitation was that studies reporting low suicide rates may be under-represented, which is a potential publication bias. It is unclear whether the lack of low incidence populations is related to the common finding of elevated rates of suicide among Indigenous peoples compared to non-Indigenous populations or, as we suspect is more likely, to the possibility that suicide rates are rarely studied when they are low. Additional low incidence reports may exist outside of peer-reviewed studies; however, these were not identified because we did not search the gray literature. The primary reason for excluding gray literature reports was the extensive volume of sources with variable quality and also the risk of over-including data from high-income nations where public reporting of mortality data is common and vital statistics infrastructure is of high quality. Nonetheless, we identified 23 papers that reported rate parity or had a rate ratio below one, but these tended to use older data. A related problem is that case studies tended to examine suicide clusters in small populations.[42,79] The advantage of using localized data is the ability to contextualize a complex health issue. The disadvantage is that the potential to compare health status between multiple groups, across regions, and over time is reduced.

Strengthening Surveillance in Indigenous Suicide Prevention

Our results substantiate previous work[16,116] to demonstrate that elevated suicide rates are not universal among Indigenous people and debunk notions that Indigeneity increases risk for suicide. Our results also point to several gaps in knowledge about the epidemiology of suicide in Indigenous populations globally. The lack of published suicide data on Indigenous populations in low- and middle-income countries is a glaring absence. Previous studies noted a scarcity of Indigenous-specific data in the Global South overall.[18,117] Poor infrastructure for death registration is a key limitation.[1] In the context of suicide this is especially problematic because countries in Asia, Africa, and Latin and South America are the homelands for the majority of the world's Indigenous peoples[18] and, at a national level, account for more than three quarters of all suicide deaths.[1] Suicide data in high-income countries tends to be of better quality than that in low- and middle-income countries; however, many governments do not include Indigenous or other ethnic identifiers in administrative health data, and do not routinely link census or Indigenous registries with national health datasets such as vital statistics. In Canada for example, the federal government does not know how many Indigenous people die by suicide in a given year. Globally, there is a critical need to strengthen capacity for surveillance in Indigenous suicide prevention.

National governments can take several steps to improve suicide surveillance in Indigenous populations. Actions should include efforts to enhance suicide data quality and standardized classification by improving vital registration infrastructure, especially in low- and middle-income countries, and integrating mortality data with monitoring of suicide attempts.[1] Countries should adopt an equity-based approach to data collection that includes Indigenous identifiers derived from self-reported sources and linked to registries or census data to address gaps in identification, and align Indigenous identification procedures with recommendations from the International Group for Indigenous Health Measurement, adapted for each national context.[1,117,120,131,132] Building inclusive, Indigenous-centered models of data governance in suicide prevention will be a critical element of strengthened surveillance. To achieve this will require national statistical agencies to not only consult Indigenous communities, organizations, and leaders about priorities, but to respect Indigenous rights to determine the parameters of data ownership, custodianship, access, and use.[29,120,131]

Future research and global suicide surveillance efforts will be further strengthened with longitudinal and up-to-date national and state-level datasets that allow disaggregation and comparisons of outcomes in small areas and subpopulations by ethnicity.[1,17,117,120] Overall, these actions will help maintain robust public health surveillance systems in order to monitor health status, increase knowledge about the social determinants of suicide, target interventions, and evaluate strategies aimed at reducing the incidence of suicide among Indigenous peoples worldwide.[1,120] Increasing the visibility of populations that bear the greatest burden from suicide can help drive efforts to achieve the WHO and Sustainable Development Goals of reducing national suicide rates by up to 30%.[1,132]

CONCLUSION

Suicide among Indigenous peoples is not a universal or intractable problem. Our study showed substantial global rate variation, with striking disparities in some countries. Efforts to understand these differences and to continue to build the knowledge base for effective interventions will require sustained political and financial investments in Indigenous communities, health systems, and governments. Across sectors and countries, Indigenous peoples have called for suicide prevention strategies that are community-led, strengths-based, and trauma-informed, and that redress intersecting forms of structural discrimination, social inequity, and their downstream consequences. Global efforts to reduce suicide rates among Indigenous peoples must include actions focused on communities that experience the most profound disparities, while also seeking to promote population mental health and improve health equity.

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CHAPTER 6

Tracking Progress in Suicide Prevention in Indigenous Communities: A Challenge for Public Health Surveillance in Canada

Abstract

Indigenous peoples in Canada experience disproportionate rates of suicide compared to non-Indigenous populations. Indigenous communities and organizations have designed local and regional approaches to prevention, and the federal government has developed a national suicide prevention framework. However, public health systems continue to face challenges in monitoring the population burden of suicide and suicidal behaviour. National health data systems lack Indigenous identifiers, do not capture data from some regions, and do not routinely engage Indigenous communities in data governance. These challenges hamper efforts to detect changes in population-level outcomes and assess the impact of suicide prevention activities. Consequently, this limits the ability to achieve public health prevention goals and reduce suicide rates and rate inequities.

This paper provides a critical analysis of the challenges related to suicide surveillance in Canada and assesses the strengths and limitations of existing data infrastructure for monitoring outcomes in Indigenous communities. To better understand these challenges, we discuss the policy context for suicide surveillance and examine the survey and administrative data sources that are commonly used in public health surveillance. We then review recent data on the epidemiology of suicide and suicidal behaviour among Indigenous peoples, and identify challenges related to national-level surveillance.

To enhance capacity for suicide surveillance, we propose strategies to better track progress in Indigenous suicide prevention. Specifically, we recommend establishing an independent community and scientific governing council, integrating Indigenous identifiers into population health datasets, increasing geographic coverage, improving suicide data quality, comprehensiveness, and timeliness, and developing a platform for making suicide data accessible to all stakeholders and decision makers. Overall, the strategies we propose can build on the strengths of the existing national suicide surveillance system by adopting a collaborative and inclusive governance model that recognizes the stake Indigenous communities and other socially excluded populations have in suicide prevention.

Key Words

Suicide prevention; Self-harm; Epidemiology; Indigenous; Inuit; First Nation; Circumpolar; Administrative data; Data governance; Health disparities.

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BACKGROUND

Suicide is a leading cause of death among Indigenous peoples in Canada.[1-5] Although incidence rates vary by community and region,[3,6,7] studies consistently show that Inuit, First Nations, and Métis have disproportionate rates of suicide compared to non-Indigenous populations.[4-9] Disparities in suicide mortality are so stark that suicide prevention has become a public health priority for many Indigenous communities and governments.[9-14] As a priority, governments and stakeholders have undertaken substantial efforts to understand the root causes of suicide[8,9,11,13,15] and to chart a path towards a "low-suicide reality."[16] Despite all that is known about the causes and impacts of suicide, population-specific statistics are not widely available and often do not describe the full extent of the problem. The picture we have is only a partial one: of the approximately 4,000 people who die by suicide in Canada each year, neither governments nor communities know how many were Indigenous.

The fourteen publicly-funded provincial, territorial, and federal health care systems in Canada are inconsistent in their approach to identifying Indigenous peoples in health information, and some provinces/territories, such as Newfoundland and Labrador, do not include ethnic identifiers in administrative or clinical data.[17-19] The omission of ethnic identifiers makes it difficult to measure changes in health status at the population level.[20,21] Yet, a core responsibility of public health is to report on markers of population health such as mortality rates.[22-24] The need for Indigenous-specific population health data was underscored in several recent studies [25-27] and notably in 2015 by the Truth and Reconciliation Commission (TRC). The TRC's Call to Action #19 states: "We call upon the federal government, in consultation with Aboriginal peoples, to establish measurable goals to identify and close the gaps in health outcomes between Aboriginal and non-Aboriginal communities, and to publish annual progress reports and assess long-term trends."[28] The TRC pointed to key indicators for assessing health equity; suicide was among them.[28] This call gives Canadian public health organizations a specific, achievable mandate, and a role in reconciliation.

Progress on this particular TRC Call to Action has been slow because in addition to the lack of ethnic identifiers, several long-standing factors make it difficult to measure suicide. In 1995, the Royal Commission on Aboriginal Peoples identified challenges such as incomplete geographic coverage in some datasets and a lack of data on suicide attempts.[15] Data gaps still exist today, and national organizations including Inuit Tapiriit Kanatami, the Canadian Association for Suicide Prevention, and the Mental Health Commission of Canada and Indigenous governments have called for enhanced suicide surveillance capacity that includes accurate and Indigenous-specific data.[9,12,29,30] Globally, the World Health Organization (WHO) recommended that all countries develop a national suicide prevention strategy that integrates a comprehensive suicide surveillance program with policy and interventions.[31] As recently as 2017, the Public Health Agency of Canada (PHAC) responded to the WHO's call by developing the Canadian Suicide Surveillance Indicator Framework (CSSIF),[32] which was an essential step for suicide prevention in Canada. The inaugural CSSIF publication reported baseline incidence and prevalence rates for monitoring suicide and suicide-related outcomes.[32] But like many population health measurement strategies, the CSSIF does not include a mechanism for tracking outcomes among Indigenous peoples.[32]

In recent years, Indigenous-focused suicide prevention programs have received major government investments but have operated without detailed data on the epidemiology of suicide. From 2005/06 to 2015/16, the federal government committed $108,000,000 to the National Aboriginal Youth Suicide Prevention Strategy.[33,34] An evaluation described outputs of the strategy, such as the number and types of programs that were funded; however the evaluation explained that the lack of suicide surveillance data prevented both performance measurement and "a comprehensive assessment of the trends and achievement of long term outcomes (improved health status)."[33] (p.8) The absence of quantitative outcome data connected to the strategy meant that there was no clear picture of whether or not the NAYSPS had an impact, positive or negative, on suicide rates. At the most basic level, the lack of Indigenous-specific suicide data means that communities, health systems, and governments are unable to tell if suicides are being prevented.

Our objective for this paper is to offer a review of the challenges related to suicide surveillance in Canada and discuss strengths and limitations for monitoring outcomes related to suicide prevention among Indigenous peoples. We aim to address this by: (1) examining the policy context for suicide surveillance in public health; (2) describing the sources of population health data commonly used in suicide surveillance; (3) synthesizing recent data on the epidemiology of suicide among Indigenous populations; (4) identifying challenges related to Indigenous-specific suicide surveillance; and (5) proposing strategies to better track progress in Indigenous suicide prevention.

The statistics reported in this paper are aligned with the national suicide surveillance framework (Figure 6.1a) which includes the following indicators: suicide mortality, hospitalization due to self-injury, emergency department visits for self-injury, suicide attempts, and suicidal thoughts (also called suicidal ideation).[32] PHAC uses "self-injury," whereas other organizations and scholars choose terms such as "self-harm" and "suicide-related behaviours." Broadly speaking, there is overlap in the definitions of these terms. They generally refer to a group of non-fatal outcomes that include suicide attempts, 'parasuicide,' other forms of intentional self-injury and self-poisoning, and behaviours where the intent is undetermined.[31,35] Our use of terms in this paper reflects those used in the original data sources.

The Policy Context for Suicide Surveillance

Public health surveillance is the systematic and ongoing process of collecting, analyzing, and interpreting data on the health of the population.[23,24] Surveillance systems provide much needed information to decision-makers who are responsible for planning, funding, delivering, and evaluating interventions that fall under the umbrella of suicide prevention.[31,36,37] Health indicators are tools used in surveillance to measure various health outcomes and risk factors, and to establish reference points for tracking health status over time and in relation to health services, public health interventions, and social conditions.[23,24] Public health surveillance systems are useful because they can help detect changes that occur among subgroups of people, uncover new risk and protective factors, identify and predict disease outbreaks, and mobilize interventions.[23,24,31,38] To address our first objective, in this section we discuss the policy context for suicide surveillance in Canada. By highlighting some recent developments in public health approaches to suicide prevention, we aim to situate our subsequent analysis about the challenges related to surveillance.

In 2014, the World Health Organization released the landmark report, *Preventing Suicide: A Global Imperative.*[31] The report included a synthesis of the clinical and public health evidence in suicide prevention, and provided a framework for the creation of national suicide prevention strategies. One of WHO's recommendations was that federal governments should develop a comprehensive suicide surveillance system as a part of a national strategy, and integrate surveillance with policy decisions and intervention evaluations. The recommendation was necessary because expertise and technical infrastructure for population health monitoring is varied and poor in many countries. Death registration, especially of suicide, is a complex process that crosses government sectors and is influenced by social norms and taboos.[31,39] The WHO estimated that 112 of the 192 member states have low quality or non-existent death registration systems.[31] Despite having strong vital statistics systems, even high-income countries such as Canada face challenges related to death misclassification and under-reporting,[40,41] and only a few countries such as Ireland have robust systems for monitoring suicide attempts.[37,42,43] The WHO produced guidelines for prospective and standardized monitoring of suicide deaths and attempts to help countries act on the recommendation to improve surveillance.[37,44]

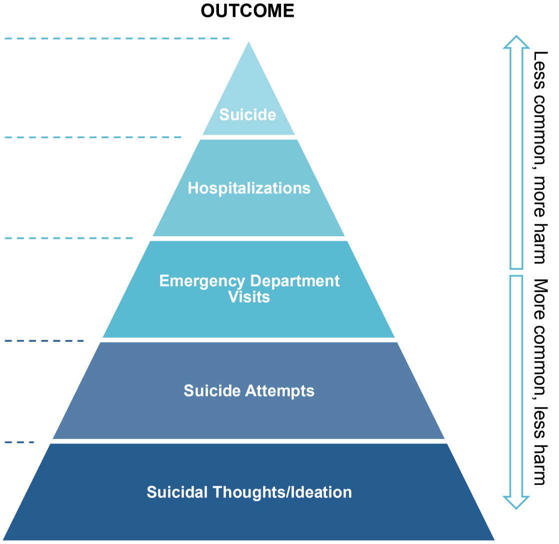
Prior to the release of the WHO report, the Government of Canada took some important steps to advance a national suicide prevention agenda. In 2012, the federal government passed Bill C-300, *An Act respecting a Federal Framework for Suicide Prevention.*[10,45] Bill C-300 helped create a policy framework for suicide prevention, which led to several initiatives by the Public Health Agency of Canada. One of the objectives of Bill C-300 was to increase public access to statistics.[10] To comply with the legislation and operationalize the WHO recommendations for improving data collection, PHAC developed the Canadian Suicide Surveillance Indicator Framework in 2017. The framework included suicide-related outcomes, and measures for risk factors including chronic pain and mental illness, and protective factors such as social support and sense of belonging.[32,46] Outcomes included incidence rates of suicide mortality, hospitalization and emergency department visits for self-injury, and prevalence rates of suicide attempts and suicidal thoughts (Figure 6.1a).

The inclusion of both fatal and non-fatal outcomes reflects the ‘iceberg’ model of suicide (Figure 6.1b), which is a conceptual model for measuring the full extent of suicide-related outcomes in a population [23,37,47-49]. The iceberg model of suicide is based on three common patterns in population health. First, suicide deaths (the top level in the iceberg model; Figure 6.1b) account for a very small percentage of all forms of fatal and non-fatal suicide-related behaviour in a population. Second, the least harmful outcomes such as suicidal thoughts occur most frequently. And third, many people who think about suicide do not seek help through the health system, and therefore cannot be identified with administrative or clinical data. Overall, the iceberg model helps illustrate the magnitude of suicide as a public health problem.[47,48]

NATIONAL HEALTH DATABASES AND SUICIDE SURVEILLANCE

In this section, we describe the primary outcomes and corresponding datasets used in the Canadian Suicide Surveillance Indicator Framework (Figure 6.1a and 6.1b).

INDICATOR MEASURE	DATA SOURCE & CUSTODIAN
Suicide rate Mortality rate for deaths due to intentionally self-inflicted injury (Incidence of deaths per 100,000 population)[b]	**Canadian Vital Statistics Database – Mortality** Statistics Canada
Hospitalization rate for self-injury Suicide attempts and non-suicidal self-harm related to injuries or poisoning (Incidence of admissions per 100,000 population)	**Discharge Abstract Database** Canadian Institute for Health Information
ED[c] visit rate for self-inflicted injury Suicide attempts and non-suicidal self-harm related to injuries or poisoning (Incidence of visits per 100,000 population)	**National Ambulatory Care Reporting System** Canadian Institute for Health Information
Prevalence of suicide attempts % of the population[d] who report having attempted suicide (in the past year or lifetime)	**Canadian Community Health Survey** Statistics Canada
Prevalence of suicidal thoughts/ideation % of the population[d] who report having serious thoughts about suicide (in the past year or lifetime)	**Canadian Community Health Survey** Statistics Canada



NOTES: (a) Suicide Surveillance Indicator Framework is based on model by the Public Health Agency of Canada (2017);[32] (b) Suicide mortality rates are typically calculated based on data from the population ≥ 10 years old; (c) ED = Emergency Department; (d) Age ≥ 15 years old;

Figure 6.1(a) Suicide Surveillance Indicator Framework

Figure 6.1(b) Iceberg Model of Suicide

We examine the following five outcomes: suicide deaths, hospitalization due to self-injury, emergency department visits for self-injury, and self-reported suicide attempts and suicidal thoughts/ideation. The CSSIF includes additional outcomes and risk and protective factors[32] which we do not examine. We comment on how the data is derived for each primary outcome and identify potential limitations, providing the necessary background for an in-depth analysis of challenges related to Indigenous-specific surveillance.

Suicide deaths

Suicide deaths are recorded in a national dataset, the Canadian Vital Statistics Death Database (CVSD). In Canada, death registration is a federal legal requirement, and medico-legal investigations are the responsibility of provinces and territories.[50,51] CVSD is an administrative dataset derived from an annual census of all provincial and territorial vital statistics registries.[52] The registries include demographic data and record the cause of death for all individuals who die in Canada each year. Deaths are coded by cause according to International Classification of Disease (ICD-10) system.[46] The data source for the CVSD includes death registration forms that contain information from funeral directors, and a medical certificate of cause of death from a physician or coroner.

For sudden, unexpected, and deaths under suspicious circumstances, legislation requires that a medical examiner or a coroner determine the final cause of death.[53] Medical examiners are physicians, whereas coroners are non-physicians in all jurisdictions except in Ontario. In most places, police or health care staff notify the coroner or medical examiner (C/ME) about a suspected case of suicide, homicide, and 'accidental' (unintentional) death. C/MEs then determine the final cause of death by performing autopsies and toxicological tests, reviewing medical and police records, and talking to families or other witnesses. Nationally, C/MEs investigate approximately 15% of deaths (approximately 35-45,000 deaths) each year.[54] In the provincial/territorial and municipal context, C/ME data is relatively accessible and comprehensive; Nova Scotia, New Brunswick, Nunavut, and Newfoundland and Labrador, and Toronto and Montreal use C/ME data for suicide surveillance, health system planning, research;[12,41,51,55-57] other provinces/territories and municipalities likely have similar surveillance initiatives but may not publicly report data or results. National surveillance with C/ME data, by contrast, is not possible because of the lack of a national dataset, and the level of agreement between vital statistics and C/ME data on deaths coded as suicide is not known for all provinces and territories.

From 2006 to 2010, federal agencies maintained the Canadian Coroners and Medical Examiners Database (CCMED). The CCMED resembled a national dataset, though jurisdictions with medical examiners (Alberta, Manitoba, Nova Scotia, and Newfoundland and Labrador) did not contribute data.[54] CCMED was useful insofar as it contained data not covered in vital statistics and attempted to use standardized case and variable definitions.[53] Unfortunately, the data was not kept up-to-date, and the system was not expanded, which made it less useful, though this may change in the future. By virtue of the absence of national C/ME dataset, national public health surveillance of mortality is based on vital statistics.

Hospitalization due to self-injury

The second indicator is hospitalization due to self-injury. Following a suicide attempt, many individuals visit or are taken to the emergency department. Patients who have serious injuries or who are assessed as being at high-risk for self-harm may be voluntarily or involuntarily admitted to hospital for medical and/or psychiatric care. In Canada, the main indicator for this type of event is hospitalization due to intentional self-injury, which includes intentional self-poisonings and self-inflicted injuries irrespective of suicidal intent.[46,58]

Hospitalization self-injury data comes from two sources of 'hospital separations.' A hospital separation is an episode of inpatient care that ends with discharge or death. The national data sources include the Discharge Abstract Database (DAD) and the Hospital Morbidity Database.[46,58] The DAD includes mandatory reporting from all hospitals and health centres in the country except in Quebec.[46,58] DAD uses ICD-10-CA codes to identify self-injury or self-poisoning in discharge diagnoses fields following hospitalization. Although the database reliably captures episodes of patient hospitalization, the major limitation is that DAD cannot document a patient's intention to die,[58] and therefore includes events related to both suicide attempts as well as non-suicidal self-injury, which is increasingly understood as a distinct outcome.[31,35] For this reason, hospitalization is a proxy indicator for suicide attempts. A related limitation is that suicide-related behaviours may be under-captured in administrative data compared to clinical data because coding has poor sensitivity,[59-61] which in turn underestimates the population burden of self-harm.

In the context of rural and remote populations, indicators related to health service use such as hospitalization may differentially undercount suicide attempts. Many northern Indigenous communities do not have local access to a hospital; rather, they are served by nursing stations that provide the first point of health care in an emergency. Medically serious attempts that result in traumatic injuries or poisonings are usually transferred by flight to regional hospitals or southern tertiary care institutions and therefore would be counted in national and provincial hospitalization data. However, events with less severe injuries may not require hospitalization and may be managed and treated locally via telehealth.[62]

Emergency department visits for self-injury

The third indicator in the suicide surveillance framework is the rate of emergency department (ED) visits for self-injury.[32] At present, Canada lacks a national dataset for emergency department care.[63] Since health care is primarily a provincial/territorial responsibility, much of the data from EDs is housed in clinical information systems such as electronic health records (EHRs). Studies from several provinces have shown that extracting ED data on suicidal behaviour from clinical databases is feasible. [64-66] However, provincial/territorial EHR systems are varied, and some do not use standardized codes for diagnoses, making it difficult to accurately and consistently capture cases of self-injury.

Instead of clinical data, the suicide surveillance framework uses data from the National Ambulatory Care Reporting System (NACRS). NACRS is an administrative database that compiles ambulatory care visit data for several provinces, territories, and health regions, and includes a set of demographic and clinical variables with ICD-10-CA diagnostic codes.[67] In 2015-2016, NACRS covered 64% of emergency departments across Canada, with complete coverage only for Alberta, Ontario, and Yukon, and no coverage for 3 provinces (Quebec, New Brunswick, and NL) and two territories (NU, NWT).[67] Although NACRS is the largest ED care dataset, reporting is voluntary, and not nationally representative.

The second ED data source used in the suicide surveillance indicator framework is the Canadian Hospital Injury Reporting and Prevention Program (CHIRPP). CHIRPP is a registry-based injury surveillance system that receives data from 17 participating health care facilities, most of which are urban paediatric hospitals.[68] Data collection involves patient and physician reporting forms completed during the ED visit. The recent creation of an electronic platform for CHIRPP improved the program's timeliness, flexibility, and data management procedures.[68] However, CHIRPP has several limitations including varied case-capture rates, which range from 68% to 100% across reporting sites.[68,69]

Poor capture of injury cases at some sites may be due in part to the recording burden on patients and families during a distressing time. A recent study that compared CHIRPP to clinical records found that 27% of injury cases were not included in CHIRPP data, mostly because patients or parent/guardians did not submit the data collection form.[69] The study also found severe injuries were at increased risk of being missed by the registration system, as were cases of self-injury or self-poisoning.[69] Patient/parent participation might also be influenced by literacy, English and French language proficiency, and stigma.[70,71] A subsequent CHIRPP study on self-injury found that the form captured complete details about injuries, but suggested that youth may under report self-harm due to privacy concerns related to the data collection process.[60] Another limitation of CHIRPP is that population-based estimates of injury burden cannot be calculated because reporting hospitals do not have a complete capture of injuries for their catchment area, and the population at risk (the denominator in rate calculations) is unknown.

Suicide attempts and suicidal ideation

The fourth and fifth indicators in the suicide surveillance framework are self-reported suicide attempts and suicidal ideation (Figure 6.1a and 6.1b). Clinical and administrative data includes populations with the most serious injuries who also have contact with the health system.[31] Measuring the incidence of suicide-related behaviour with routinely collected data is inherently limited because the majority of people with suicidal thoughts or attempts do not seek help from the health system and do not die by suicide.[48,49] Health surveys are a more effective way to measure rates of non-fatal suicide-related outcomes at the population-level because they include people who do not have contact with the health system.

In Canada, several national and regional health surveys contain questions on self-reported suicidal ideation and attempts. The suicide surveillance indicator framework used data from the Canadian Community Health Survey (CCHS) to determine the prevalence of suicidal ideation and suicide attempts.[32] Since 2007, the CCHS has been conducted annually with a sample of approximately 65,000 people.[72] The survey asks participants: “have you ever [and in the past 12 months] seriously contemplated suicide?” and “have you ever [and in the past 12 months] seriously attempted suicide”[72]? These questions provide data for national and provincial/territorial estimates of lifetime and recent prevalence of suicidal ideation and suicide attempts. CCHS is nationally representative and contains a question about Aboriginal identity. However, by design the sample omits about 3% of the national population[72] including First Nations living on-reserve, military personnel, and institutionalized populations who are disproportionately made up of Indigenous peoples, such as prisoners.[72,73]

The baseline rates for all suicide-related outcomes in the CSSIF are benchmarks for three vital public health tasks: (1) tracking changes in rates over time; (2) evaluating population health interventions; and (3) assessing health equity. The third task is not yet part of the existing suicide surveillance framework.[32] Nonetheless, PHAC’s work is aligned with the WHO guidelines[31,37] and is essential for suicide prevention in Canada.

EPIDEMIOLOGY OF SUICIDE AMONG INDIGENOUS PEOPLES IN CANADA

We have attempted to respond to the TRC’s Call to Action #19 by examining the most recent data for five suicide-related outcomes from the national suicide surveillance indicators framework. We collected incidence and prevalence data for Indigenous and non-Indigenous populations for a convenience sample of jurisdictions across four geographic scales: country (Canada), province (Alberta), territory (Nunavut), and health region (Northwestern Ontario). We captured the most recent statistics (as of May 2018) that were publicly available online from the following organizations:

Statistics Canada,[74-76] Public Health Agency of Canada,[32] Canadian Institute for Health Information,[77] Public Health Ontario,[78] and Alberta Health,[79] Nunavut Tunngavik Inc.,[80] and the First Nations Information Governance Centre.[81]

We compared incidence and prevalence rates between Indigenous and non-Indigenous or general populations. We report count and population data, crude and age standardized incidence and prevalence rates, and 95% confidence intervals (Table 6.1 and Table 6.2); age-standardized rates were based on the 2011 Canadian standard population. We report rates for specific Indigenous groups including Inuit, First Nations, and Métis, and use nation- and region-specific terms where possible. Mortality and health service use data for Northern Ontario is for the North West Local Health Integration Network (NW-LIHN), which is an administrative division within Ontario's health care system. Indigenous-specific outcomes based on individual-level ethnic identifiers were not available for small areas in Ontario from open data sources. For mortality, hospitalization, and ED visit rates in Ontario, we used the NW-LIHN as a geographic proxy because it has the proportionately largest Indigenous population in Ontario compared to all other local health networks (~37%).

Overall, the suicide rate in Canada is similar to other high-income nations.[31] The rate declined slightly since the late 1970's,[46] and has been relatively stable during the 21st century.[74] In 2015, 4,405 people died by suicide, and the age-standardized suicide incidence rate was 12.3 deaths per 100,000 population.[74] This made suicide the 9th leading cause of death overall,[74] and the second leading cause among youth.[46] Based on the most recent data, our analysis revealed that across all five indicators, rates of suicidality were higher in Indigenous populations than in general or non-Indigenous populations.

Lifetime suicidal ideation (Table 6.1), compiled from a variety of data sources, ranged from 12.8% among Métis in Canada to 48% among Inuit in Nunavut, compared to 11.7% in the non-Indigenous population. Lifetime suicide attempt prevalence rates (Table 6.1) ranged from 13.4% among on-reserve First Nations populations in Ontario to 29% among Inuit in Nunavut; the general population rate in Canada was 3.4%. In Nunavut, estimates of the prevalence of suicidal ideation were three times higher (Table 6.1) in the Inuit Health Survey compared to the Aboriginal Peoples Survey (2012), which is a notable difference between sources. Incidence rates of emergency department visits for self-injury (Table 6.2) were 4 to 5 times higher in northern Ontario and among First Nations in Alberta compared to general population estimates. Rates of hospitalization due to intentional self-injury (Table 6.2) were 2.9 to 4.6 times higher in Indigenous populations than in general populations. Age-standardized suicide mortality rates (Table 6.2) were significantly higher among Indigenous compared to non-Indigenous populations, ranging from 39.1 deaths per 100,000 in northern Ontario to 62.7 deaths per 100,000 population in Nunavut.

A notable finding was the difference in the reported prevalence rates of suicidal ideation in Nunavut. The Inuit Health Survey and the Aboriginal Peoples Survey sampled a similar number of participants in the territory, with a similar response rate,[80,82] and both included questions about suicidal ideation. The difference in prevalence between the surveys may reflect changes in rates over time, as there was a five-year gap (2007/08 versus 2012) between surveys. The prevalence difference may also be related to the slightly higher proportion of women in the IHS-NU than in the APS (60% versus

Table 6.1 Recent and lifetime prevalence of suicidal thoughts and suicide attempts among Indigenous populations in Canada

Region, Indigenous Group	Number of survey participants	Age Group	Suicidal Thoughts		Suicide Attempt		Source
			Recent	Lifetime	Recent	Lifetime	
Canada							
General Population	~65,000	15+	2.5%	12.3%	0.4%	3.4%	CCHS (2015)
First Nations (Off Reserve)	28,409[a]	18+	5.2%	14.7%	-	-	APS (2012)
Inuit	-	18+	5.5%	15.2%	-	-	APS (2012)
Métis	-	18+	3.8%	12.8%	-	-	APS (2012)
Nunavut							
Inuit	1,710	18+	14.0%	48.0%	5.0%	29.0%	IHS-NU (2008)
Inuit	1,581	18+	5.8%	16.3%	-	-	APS (2012)
Ontario							
First Nations (On Reserve)	1,500	18+	18.6%	25.3%	10.5% [b]	13.4%	FNRHS (2008/10)
First Nations (Off Reserve)	4,286[a]	18+	6.4% [b]	12.2%	-	-	APS (2012)
Métis	-	18+	3.2% [b]	15.7%	-	-	APS (2012)
Alberta							
First Nations (On Reserve)	1,418	18+	15.2%	22.1%	-	14.4%	FNRHS (2008/10)
First Nations (Off Reserve)	3,765[a]	18+	5.5%[b]	18.6%	-	-	APS (2012)
Métis	-	18+	4.3%[b]	13.8%	-	-	APS (2012)

NOTES: [a] Total number of APS (2012) survey participants in region including all First Nation, Inuit, and Métis. [b] Interpret with caution; high sampling variability. CCHS=Canadian Community Health Survey. APS=Aboriginal Peoples Survey. IHS-NU=Inuit Health Survey-Nunavut. FNRHS=First Nations Regional Health Survey.

55%),[75,80] as women tend to have higher rates of self-reported SI. Methodological and governance differences in the surveys may also be a factor that influenced participant willingness to disclose sensitive health information.

Overall, publicly accessible statistics were not available for all indicators or geographic areas. For example, we were not able to find a public source of data on ED visit rates for Nunavut. A previous study with data from the Canadian Hospital Injury Reporting and Prevention Program identified 926 emergency department visits for intentional self-injuries over a 20 year period at data collection sites in Nunavut and the Northwest Territories.[83] However, the study did not calculate incidence rates because the total number of people at risk was not known. A limitation of our own analysis is that we used the geographic proxy method to identify regions that were primarily Indigenous, such as Northern Ontario, and for select outcomes in Nunavut. We discuss the limitations of this approach in the next section. Notwithstanding these limitations, the most up-to-date data shows a clear trend: suicide continues to disproportionately impact Inuit and First Nations in Canada.

CHALLENGES IN SUICIDE SURVEILLANCE

The Canadian Suicide Surveillance Indicator Framework draws data from national administrative databases and surveys. Although, such data sources provide good coverage of the population and high-quality information, the current data infrastructure in Canada has limitations that make it difficult to monitor suicide-related outcomes in Indigenous populations. In this section, we examine challenges in suicide surveillance related to

Table 6.2 Incidence of emergency department visits for self injury, hospitalization for self injury, and suicide mortality among Indigenous and non-Indigenous populations in Canada

		ED Visits for Self Injury				**Hospitalization for Self Injury**				**Suicide Mortality**			
Province/Territory & Subpopulation	Population (Year)	Cases, n=	CR	ASR	95% CI or SE	Cases, n=	CR	AR	95% CI or SE	Cases, n=	CR	ASR	95% CI or SE
Alberta													
First Nations	162,921 (2014)	1,373	838.99	716.01	(SE 29.4)	382	233.47	212.69	(SE 24.11)	73	44.81	45.59	(SE 23.21)
Non-First Nations	3,957,981 (2014)	5,763	142.9	142.96	(SE 1.91)	1,824	45.23	45.85	(SE 1.09)	454	11.47	11.8	(SE 0.57)
Ontario													
Northern	70,994 (2012)	449	632.9	615.6	(558.2-673.0)	131	184.7	183.7	(151.9-15.4)	28	39.4	39.1	(24.5-53.7)
General Population	11,968,556 (2012)	15,976	129.5	132.4	(130.3-134.5)	7,620	61.8	63	(61.6-64.4)	1,223	10.2	10.2	(9.7-10.8)
Nunavut													
Inuit	30,424 (2014)	-	-	-	-	-	-	194	(146-242)	26	72.1	62.7	-
General Population	35,535,348 (2014)	-	-	-	-	-	-	66	(66-67)	4,254	12	12	-

NOTES: ED=Emergency Department; CR=Crude Rate; AR=Age-adjusted Rate; CI=95% Confidence Interval; SE=Standard Error; Not reported (-); Population estimates are not those used in the rate calculations; Nunavut Inuit population is from the Nunavut Bureau of Statistics; ED and hospitalization data is for 2015; mortality data is for 2012 in Ontario, and 2014 elsewhere; hospitalization and suicide rates for Nunavut are calculated based on the event and population for the territory including Inuit and non-Inuit. DATA SOURCES: Statistics Canada,[84] Canadian Institute for Health Information,[77] Public Health Ontario,[78] and Alberta Health.[79]

outcome measurement, timeliness, geographic coverage, identification of Indigenous peoples, and data governance (Table 6.3).

Conceptualizing and measuring suicide

One of the major challenges in suicide surveillance and research is the lack of a shared set of definitions of suicide and non-fatal outcomes. Public health and clinical disciplines have not reached consensus on a nomenclature for the spectrum of suicide-related thoughts, communications, behaviours, and consequences.[31,85,86] In part, definitions are elusive because suicide is not a disease with a singular or observable cause. Rather, suicidality is described as an event or a psychological state with intersecting and compounding risks that can emerge over a lifetime.[35]

One of the tasks in conceptualizing and measuring suicide is determining the intent leading up to an act of self-harm. For example, it can be difficult to tell the difference between an overdose that was on purpose or accidental, and to distinguish between suicidal and non-suicidal (self) cutting. Making these distinctions is challenging for clinicians; it is also difficult in retrospective research using secondary data. As a result of the ambiguity, population health assessments often use broad categories of self-harm as proxies for suicide deaths and attempts.

ICD-10 codes for “intentional self-harm” are used to classify suicide deaths and attempts; in Canada, ICD-10-CA is used for hospitalization data. ICD codes cannot distinguish between intentional self-injury with or without the desire to die (suicide attempt versus non-suicidal self-injury),[35] nor do the codes capture episodes of suicidal thoughts in the absence of self-injurious behaviours. Recent studies of emergency department visits used "suicide-related behaviour" and "self-harm" with inclusive definitions that captured non-fatal suicide attempts due to self-poisoning or self-injury, along with events with undetermined intent.[65,87] Inclusive definitions are used by national statistical agencies because ICD codes under-estimate suicide attempts by more than 50%.[61,66,88]

Historically, evidence has shown that vital statistics data may under-report and misclassify suicide deaths as unintentional or undetermined injuries, which can contribute to underestimated suicide rates.[39-41,89-91] Yet, a 2017 study found high rates of concordance (up to 98.8%) between C/ME and vital statistics data in Ontario,[92] which suggests that misclassification may be less of a problem in some provinces and territories. However, agreement between C/ME data and vital statistics likely varies across jurisdictions. Overall, the lack of universal definitions for outcomes makes it difficult to accurately measure the burden in a population or to compare rates between two populations.

Low base rates, 'rare events,' and small populations

One of the universal challenges in assessing the impact of public health interventions on suicide is the low base rate.[93] Even though rates may be especially high in some northern Inuit and First Nations communities, the actual number of deaths is low compared to cities in southern Canada. Suicide is considered a 'rare event,' therefore it is difficult to determine whether a change in the absolute number of cases is attributable to an intervention.[93] In a northern and rural context, this is made even more challenging because it is difficult to detect statistically significant changes in small populations such as those in the Arctic. This is also challenging because public health approaches to suicide prevention are multifaceted; it is hard to discern which intervention components contribute to changes in mortality rates.

Timeliness of data access

Timely data access is another challenge is suicide surveillance. Administrative data sources often have lengthy delays between event occurrence and data release. In May 2018, the most recent national mortality data available were for 2015;[74] data for non-fatal indicators are updated faster, usually in two years or less. There are likely several reasons for these time lags. Health information systems are complex; they require prompt and standardized submissions from multiple jurisdictions. Although Canada has universal health care, in reality, care is not delivered by a single system, but rather thirteen provincial/territorial healthcare systems, and one federal system for specific groups including federal prisoners, veterans, and on-reserve First Nations. The two or more year time lag before administrative and other secondary data can be used makes it difficult for public health systems to identify and be responsive to trends.

As an alternative to vital statistics data for monitoring deaths, some provinces/territories and municipalities use coroner and medical examiner data because it can be more timely. In Newfoundland and Labrador for example, the provincial health statistics agency conducts an annual census of suicide from C/ME cases, and maintains a database that can be used for surveillance and research.[41] In addition to being more current, C/ME data also has the advantage of capturing more detailed information about method and precipitating factors than vital statistics, though there is variation in the amount and quality information collected by C/MEs, and mental health history is inconsistently recorded.[51,56]

A key limitation in using C/ME data for national surveillance is that to get a complete dataset with all suicide deaths, information would have to be extracted from the 13 chief C/ME offices across the country.[54] Data extraction from each C/ME office would require substantial resources since C/ME data is often recorded on paper rather than in digital form in some jurisdictions. Statistics Canada has developed a data capture tool to improve the consistency of data entry and transmission, which is being used by several provinces and territories.[54] However, data processing may still be time consuming. Relatedly, there is no national system of electronic clinical records to capture non-fatal behaviours such as suicide attempts and suicidal ideation.

Geographic coverage

Incomplete geographic coverage is another challenge for suicide surveillance. Of the five databases used in the PHAC suicide surveillance indicator framework, only vital statistics has complete national coverage and three databases exclude one or more provinces or territories (Table 6.3). CHIRPP has limited coverage outside of urban centres, especially in rural and northern regions where Indigenous peoples make up most of the population. NACRS also has limited or no coverage in more rural provinces such as in Atlantic Canada, and in territories and health regions that are predominantly Indigenous. More than half of Indigenous people in Canada live in cities where NACRS coverage is good, but the absence of Indigenous identifiers in health data is a barrier to producing estimates for provinces with large urban Indigenous populations. The CCHS excludes participants who live on reserves and in communities in the territories. Overall, rural regions in Canada face undercoverage in several administrative and survey datasets.

Indigenous identifiers

Another challenge in suicide surveillance is the lack of ethnic identifiers.[18] According to the 2016 census, there are 1.6 million Indigenous people in Canada.[94] In broad terms, the population is comprised of three ethno-cultural groups: Inuit, First Nations, and Métis. Within these constitutionally defined groups, there is immense diversity in culture, language, traditional territory, political self-determination, colonial history, and social, economic, and health status. Provincial and territorial governments differ in how they approach identifying Indigenous people in health information systems: some jurisdictions include Indigenous identifiers, and some do not. In Nunavut, where Inuit comprise the majority of the territory's population, healthcare card numbers include a digit that identifies individuals as Inuit. By contrast, in Newfoundland and Labrador where Inuit and First Nations are proportionately small populations, healthcare card numbers do not specify ethnicity, nor do other provincial databases. In British Columbia, provincial vital statistics are linked with health insurance and other registries with 'Aboriginal status' identifiers.[95] The lack of a standard and universal method for ethnic

Table 6.3 National health databases used in suicide surveillance

Outcome, Data Source, and Most Recent Year available	Definitions, Coding, and Information Sources	Geographic coverage	Population Exclusions	Indigenous identifiers	Other Challenges and Limitations
Suicide mortality Canadian Vital Statistics Database - Deaths (2016)	ICD-9 (pre 2000); ICD-10 (2000 - present). Death certificate from physician or funeral director. For 'non-natural' deaths, cause codes are determined by coroner/medical examiners. Under-reporting of suicide due to misclassification as unintentional injuries or undetermined intent; Extent of misclassification may vary by jurisdiction.	National	None	No	n/a
Self-inflicted injuries, Hospitalization Hospital Morbidity Database (2011-2012) Discharge Abstract Database (2015-2016)	ICD-10-CA. Does not distinguish between self-injury with suicidal intent (suicide attempt) and without suicidal intent (non-suicidal self injury); lacks suicide-specific codes.	National except Quebec (DAD), National (HMDB)	Patients admitted to acute care psychiatric hospitals; Institutionalized populations;	No	Hospital separations include both discharges and deaths, therefore DAD has overlap with CVSD for suicide deaths that occurred during a hospitalization related to a suicide attempt; poor sensitivity in case coding contributes to undercounting.
Self-inflicted injuries, Emergency Department visit National Ambulatory Care Database (2015)	ICD-10-CA. Does not distinguish between self injury with suicidal intent (suicide attempt) and without suicidal intent (non-suicidal self injury), and lacks suicide-specific codes; Does not include data on visits related to suicidal ideation as these are not covered by ICD-10 codes.	64% of all EDs; Complete coverage for AB, ON, and YT; No coverage for 5 provinces/territories (QC, NL, NB, NWT, and NU)	None	No	Poor sensitivity in case coding contributes to undercounting and thus under-estimates of the population burden of self-harm.
Self-inflicted injuries, Emergency Department visit Canadian Hospital Injury Registration and Prevention Program (2016)	Registry-specific case definitions with narrative component; does not use ICD coding scheme. Patient/parent and physician completed forms, and medical record review	17 hospitals (primarily urban, paediatric facilities)	Children that present to general hospitals; Adults aged 18 and older; Rural populations including Inuit, First Nations, and Métis living on reserve or in rural or northern communities;	No	Under-coverage of events with higher injury severity such as trauma and suicide attempts; reporting burden on patients and clinicians; Literacy and English/French language requirements; Population estimates not possible because of unknown denominators due to a lack of defined catchment
Suicide attempts Canadian Community Health Survey (2015)	Standardized self-report questionnaire administered by telephone. Survey question: "Have you ever [and in the past 12 months] seriously attempted suicide?"	National sample, but elevated non-response rates in territories and rural regions	Excludes populations that tend to report higher rates of suicidal ideation and attempts: First Nations living on-reserve, military personnel, and institutionalized populations such as people in prison, hospital, or foster care.	Yes	n/a
Suicidal thoughts Canadian Community Health Survey (2015)	Standardized self-report questionnaire administered by telephone. Survey question: "Have you ever [and/or in the past 12 months] seriously contemplated suicide?"	National sample, but elevated non-response rates in territories and rural regions	Excludes populations that tend to report higher rates of suicidal ideation and attempts: First Nations living on-reserve, military personnel, and institutionalized populations such as people in prison, hospital, or foster care.	Yes	n/a

identification across provincial, territorial, and federal health systems makes it difficult to produce comparative or national statistics on Indigenous populations.

Within the CSSIF, four of the five databases do not include broad or specific Indigenous identifiers. Only CCHS identifies Indigenous survey participants as Inuit, First Nation, or Métis based on self-reported identity. High-income countries with large Indigenous populations such as Australia, New Zealand, and the United States include Indigenous identifiers in vital statistics, administrative, and survey data.[18,21] However, circumpolar countries like Norway and Finland do not.[96] In Canada, the omission of ethnic identifiers in some administrative datasets makes it difficult for communities, governments, and researchers to compare rates of suicide for specific ethnic groups with the general population.[18]

One of the ways that researchers and governments in Canada cope with the absence of Indigenous identifiers is to link administrative data with government registries such as the Indian Register or Non-Insured Health Benefits lists.[18] However, this method can miss individuals who are not registered under these programs, such as Métis, non-status First Nations, and some Inuit.[18] In 2014/15, the NIHB program included 779,300 First Nations and 44,733 Inuit,[97] but did not cover nearly 40% of the self-identified Indigenous population in Canada. One of the reasons for this was that specific Indigenous peoples do not qualify for health benefits under the federal government program. A second reason is that select jurisdictions such as British Columbia and Nunatsiavut, the Inuit region in northern Labrador, directly administer non-insured benefits rather than going through Health Canada, and therefore maintain a separate client list.[97] Another data linkage option is to use the census. The Canadian census includes an "Aboriginal identity" question, which provides a comprehensive capture of people who self-identify as Indigenous. Although these two methods are feasible, routine data linkage for surveillance and research on suicide among Indigenous populations has not occurred.

An alternative and commonly used approach for measuring mortality among Indigenous populations is the "geozone" method.[4,7,18] The geozone method involves using census data to identify geographic areas where a majority of the population self identifies as Inuit, First Nations, or Métis. This is an ecological approach that is most pragmatic in rural and northern regions where communities are primarily Indigenous, such as on reserves or in the Arctic. However, there is a risk of the ecological fallacy with this method and it may underestimate health disparities.[18] Overall, area-based approaches are less useful for cities in southern Canada and the increasingly urbanized and culturally diverse regional centres in the North.

Simply put, governments do not know how many Indigenous people die by suicide each year in Canada, nor where the burden is concentrated. Nor is it known how many Indigenous people visit the emergency department or are hospitalized after attempting suicide. The current approaches to Indigenous identification in health data are varied, haphazard, and have several threats to quality. The lack of a standardized and comprehensive approach to Indigenous identification in health data camouflages inequity[18] and impedes outcome monitoring in suicide prevention. Resolving this challenge likely requires technical, legislative, and political support.

Indigenous data governance

A final and substantial challenge in suicide surveillance is the absence of Indigenous governance over data. This absence is problematic because health statistics often construct and perpetuate stigmatizing narratives of illness in Indigenous health.[98] Historical and contemporary research by non-Indigenous scholars and institutions has tended to reinforce dominant cultural discourses of indigeneity as pathology, and characterize Indigenous communities as "desperate, disorganized, and depressed environments."[99 (p.34)] Such depictions are compounded by deficit-focused studies that often fail to measure strengths and assets in Indigenous communities.[18,21,100] Even though ethical standards and methodological frameworks for Indigenous health research are well established in federal research policies, academic institutions, and community settings in Canada, problematic research practices persist.[101-104] Similarly, public health surveillance by government agencies can pose similar risks if Indigenous communities are excluded from decision making about the process and control of the data.[98]

Indigenous scholars and leaders have raised important critiques about epidemiological studies that neglect to meaningfully engage Indigenous communities as rights-holders, collaborate with communities implicated in data, misinterpret results, focus on descriptions of problems rather than interventions, and fail to adhere to ethical guidelines for Indigenous research.[18,100,105-107] Indigenous communities, organizations, and governments also appear to have, at best, a limited role in overseeing national health information systems.[18,19] For example, the Vital Statistics Council of Canada which provides oversight and operational direction for the collection of data on births and deaths,[52] has representation from provinces and territories as well as Statistics Canada; however, Indigenous representation is notably absent from the council. Similarly, Indigenous organizations have been absent from some key national dialogues on equity in health status and health system performance measurement.[108]

The lack of Indigenous involvement in national health information governance is problematic because there is an ethical imperative to be inclusive. Indigenous peoples have the right to sovereignty over resources and decisions that impact wellbeing and Indigenous control over health information is an essential aspect of community empowerment and self-determination.[18,21] Health data is a crucial resource, and data-informed decision-making can help drive change in Indigenous health and suicide prevention.[17,21,109] As such, Indigenous communities, organizations, and scientific networks are asserting sovereignty over research, and increasingly over health data.[18,21] Canada and other high-income countries such as Australia, New Zealand, and the US are without a national policy framework for Indigenous data governance,[21] though in Canada national initiatives have emerged for the governance of survey data. The First Nations Regional Health Survey and the Inuit Health Survey are two examples. The surveys were designed by First Nations and Inuit partners to reflect priorities, and were rooted in the values and research principles specific to Indigenous governance. Of critical importance for First Nations populations, the sampling frame for the FNRHS is for on-reserve First Nations, who are otherwise excluded from the APS and other national surveys. Along with localized initiatives,[26,110,111] these examples illustrate the fundamental shift in the assertion of rights over Indigenous population health data and how it is governed. They also provide instructive models for suicide surveillance.

IMPROVING SURVEILLANCE TO SUPPORT SUICIDE PREVENTION

Health systems are unable to determine the impact of interventions without the ability to tease out rate differences between population groups. As a result, governments may over-invest in interventions that have limited or negative effects on outcomes for the highest risk populations or under-invest in services that work because gains went unmeasured. In the US, Indigenous communities in Alaska and Arizona developed suicide surveillance systems that were locally controlled and integrated with intervention planning.[112,113] These systems used clinical, administrative, and registry data to support outreach and follow-up care with community members, and broader public health intervention planning. Surveillance data from the Arizona setting helped provide evidence that a regional prevention strategy contributed to a reduction in suicide deaths and attempts among Indigenous youth.[113]

Notwithstanding the value of local surveillance, Canada needs a national suicide surveillance system that provides equitable coverage of Indigenous populations and communities, and can inform suicide prevention policy with systematically collected data. In this section, we propose strategies to strengthen the existing Canadian Suicide Surveillance Indicator Framework by enhancing capacity for suicide surveillance among rural and urban Indigenous populations. Our recommendations aim to build on the positive developments in suicide surveillance and the strengths of Canada's existing administrative and survey data. Our goal is to help stimulate interest in creating a comprehensive and equity-focused suicide monitoring system that is useable by stakeholders in all contexts, from community-based organizations to federal government departments.

A first step to enhance the national suicide surveillance system is to develop a collaborative and inclusive governance model that recognizes the stake Indigenous communities and other socially excluded populations have in suicide prevention. This step would align with the WHO recommendation to create a "permanent task force that is specifically responsible for monitoring and improving the quality of suicide-related data."[31 (p. 102)] Increasingly, Indigenous health systems and research are being transformed and redesigned to reflect the values and ways of knowing that are specific to Indigenous communities.[22,114-116] As an extension of these changes, efforts to build a public health surveillance system that is relevant to Indigenous peoples must reflect the diverse interests and perspectives of the communities who are represented in the data and those who use it.[22,110] However, decisions about the governance of data cannot assume a uniform perspective – Inuit, First Nations, and Métis communities, organizations, and scholars in northern, rural, and urban contexts may have distinct values, concerns, and interests with respect to how suicide is monitored. So too may other stakeholder groups that face differential impacts from suicide such as gender non-binary and sexual minority communities. Part of an inclusive approach to governance should involve establishing an independent community and scientific governing council. In the United Kingdom, the National Confidential Inquiry includes a Independent Advisory Group comprised of researchers and members of the public.[117] In the Canadian context, such a council should include representatives from communities that face differential impacts from suicide, and should publicly report on membership and activities.

A second step to improve the national suicide surveillance system is to add “equity stratifiers”[118] to all data sources, including Indigenous identifiers. Health systems can work to integrate and validate Indigenous identifiers by routinely linking databases with suicide-related outcomes to databases that contain ethnic identifiers, including self-reported sources such as the census, and registry-based systems such as the Indian registry and non-insured health beneficiary lists. Using multiple sources would provide both conservative and inclusive rate estimates based on the varied approaches to identifying Indigenous people at the record-level. In Nunavut, this is already done with coroner data, which is publicly reported on an annual basis and stratified by region, age group, gender, and ethnicity.

A third step is to increase geographic coverage of administrative and health survey data to make them truly national in scope. A national data system will require mandating and standardizing administrative or clinical health information from emergency departments, conducting an annual census of C/ME records, and harmonizing federal and Indigenous health surveys such as the First Nations Regional Health Survey and the Inuit Health Survey. An interim or alternative approach to capture high-quality and longitudinal data based on health system visits could include setting up monitoring systems in representative locations[31] including urban, rural, and northern sites. A multi-site based monitoring initiative would have the advantage of being able to contextualize local data in knowledge about a specific place and inform interventions that are designed and led by the community. The second advantage would be that data for multiple sites could be combined to inform a broader understanding about the distribution of suicide-related contacts with the health system.

The Multi-Centre Study of Self-Harm in England is an example of distributed, site-based system that collects detailed information about patients who are treated in hospital following self-harm. A recent analysis showed that routinely collected hospital data undercounted self-harm events and underestimated incidence compared to the Multi-Centre Study data.[119] Such limitations need to be considered when using Canadian administrative data,[59,60] as might combining multiple sources of information.[60] Relatedly, a factor that needs to be considered for future surveys is content duplication. The health component of the Aboriginal Peoples Survey overlaps in several domains with the Inuit Health Survey, including with questions about suicidal ideation, though, the IHS includes additional questions about suicide attempts. Research fatigue is a reality in small and often-studied populations – this is the case for many communities in the Arctic. Minimizing redundancy in research and being minimally intrusive at the community level by using existing data sources rather than replicating is a necessary consideration for suicide surveillance and for population health research.

A fourth step is to improve the quality, comprehensiveness, and timeliness of suicide data. This step should include efforts to create a standardized medico-legal investigation framework and seek consensus on suicide-related outcome definitions and measures. This step could also involve integrating additional data sources into suicide surveillance including data from medical charts, EHRs, and police records, and exploring opportunities for using technological innovations to create real-time monitoring applications to detect suicide clusters and identify emerging at-risk populations. Such innovations should accompany efforts to improve data quality overall, not only for Indigenous populations. Efforts to enhance suicide surveillance should also be inclusive and support intersectional analyses. Initiatives should improve data quality and coverage for other minority groups, and embed or link equity stratifiers such as age, sex, non-binary gender, income, education and geographic location, in addition to ethnicity, sexual orientation, disability, and immigration status in all datasets.[108,118]

A fifth step is to create a harmonized suicide surveillance system that is accessible to Indigenous and local governments, frontline, clinical, and public health staff, community organizations, and health system decision-makers. At the regional level, data-informed decision making needs to be directed by stakeholders with contextualized knowledge, while also respecting the need for privacy and confidentiality related to data collection in small communities. Community leaders and organizations, Indigenous governments, and local clinicians are well positioned to understand community assets and priorities, design contextualized programs and policies, and use evidence from public health surveillance to deliver interventions where and when they are needed most. This would be facilitated by a mechanism for disaggregating national data into small areas to improve evidence of local variability and focus interventions on regions where rates are highest and on populations with emerging risks.[7,27,38,100] Better data access will also support efforts to evaluate local interventions.[120] Large-scale federal and provincial/territorial surveillance initiatives would be complemented by government investments in community-based population health monitoring that covers suicide and mental health-related outcomes, as well as risk and protective factors.

CONCLUSION

In 2009, the Truth and Reconciliation Commission was established to investigate the experiences and impact of the residential school system on Indigenous peoples in Canada. Residential schools were part of a sweep of colonial policies whose express purpose was the assimilation and enculturation of Inuit, First Nation, and Métis into white, settler, Euro-Canadian society. The TRC's work made visible the direct link between colonization, intergenerational trauma, and the persistent health disparities experienced by Indigenous people. Suicide is one of the sharpest markers of this reality. Yet, this is a marker that can, in some ways, be difficult to see in official statistics.

Health systems that prioritize health equity must take steps to detect variations in health status and compare differences between general populations and those at the margins, at risk, or who are otherwise invisible in statistics. Stakeholders can work together to respond to the TRC by establishing a shared framework for governing national health data to track progress towards better health. Improving the quality of suicide surveillance and Indigenous health status monitoring can be part of the process of reconciliation in public health.

A comprehensive public health approach to suicide prevention in Indigenous communities requires more than simply gathering better data – it requires social change. The path to social change must be rooted in an understanding that the origins of suicide risk for Indigenous peoples were intentional and socially engineered.[8] Many Indigenous communities face concentrated and intersecting vulnerabilities for suicide due to social exclusion, economic inequality, and systemic discrimination. Redressing such circumstances requires suicide prevention to extend beyond the borders of healthcare. Suicide prevention in Indigenous communities must be founded upon a broader effort to reinstate Indigenous knowledge and sovereignty over resources and services, integrate human rights into policy change, take steps to improve social equity, and promote health across the life course.[8,9,11] There also must be additional efforts to expand the knowledge base.[100,120] While better data on its own does not prevent suicide, improving suicide surveillance can help track progress towards health equity and help keep governments accountable for funding evidence-based and community-designed interventions to prevent suicide.

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Chapter 7

Conclusions, Contributions, and Future Directions

SUMMARY AND CONTRIBUTIONS

In this dissertation, I used a community-based approach to population health research on suicide in Labrador. I explored the social context and epidemiology of suicide in Indigenous communities by situating the experiences of communities in Labrador in a wider national and global context. Overall, my thesis is the outcome of a program of research that was community-centered, addressed regional research priorities, and examined suicide as a complex phenomenon. In this concluding chapter, I aim to synthesize the findings and reflect on the contributions to policy and research. I then offer a brief discussion of the role of population health research and public health surveillance, and identify future research areas in Indigenous health and suicide epidemiology.

My research addressed five objectives (Table 7.1). Although the objectives and corresponding chapters were organized to reflect the progressive development of knowledge, the path to identifying and undertaking work related to each objective was not linear. Rather, my positionality, relationships, and methods were iterative. The phases of project development, planning, and implementation emerged over time by maintaining a flexible and pragmatic approach which embodied my personal commitment to communities and project partners in Labrador.

As described in chapter 2, my thesis began by building partnerships with Indigenous communities and governments in Labrador. A launching point for these partnerships came from a community consultation process used to identify local priorities and methods for conducting research on suicide. A necessary part of this approach was to respect Inuit and Innu rights to govern research by adhering to institutional research licensing procedures. The second aspect of the methodology was to situate the research process in a historical context that recognized the social origins of suicide in Labrador. In chapter 3, I offered an in-depth exploration of local community and health service provider perspectives on risk and protective factors for suicide. Participants identified

Table 7.1 Overview of thesis objectives and chapters

Objective	**Chapter**
Introduction	**Chapter 1** Background, literature review, methodological framework, setting, rationale, and objectives
Objective 1 To identify community priorities and methods for conducting research on suicide in Labrador	**Chapter 2** Community consultations for research on suicide in Labrador: Identifying local priorities and methods
Objective 2 To explore community and health service providers perspectives on the social context of risk and protective factors for suicide in Labrador	**Chapter 3** The social context of risk and protective factors for suicide in Indigenous communities in Labrador: Perspectives of community and health service providers
Objective 3 To examine trends in suicide epidemiology in a regional context in Labrador	**Chapter 4** Suicide rates in Aboriginal communities in Labrador, Canada
Objective 4 To assess the global incidence of suicide among Indigenous peoples	**Chapter 5** Global incidence of suicide among Indigenous peoples: a systematic review
Objective 5 To understand the current approach and capacity for Indigenous-specific suicide surveillance in Canada	**Chapter 6** Tracking progress in suicide prevention in Indigenous communities: a challenge for public health surveillance in Canada
Conclusion	**Chapter 7** Summary, original contributions, and future directions for research

individual, community, and structural factors that were important in Indigenous communities in the region.

In chapter 4, I widened the scope to look at patterns of suicide mortality in Labrador compared to Newfoundland. The results revealed substantial disparities between Indigenous communities and the general population of Newfoundland. In chapter 5, I examined the global evidence on the incidence of suicide among Indigenous populations worldwide and placed the data from Labrador in a broader context. This systematic review showed substantial incidence rate variations across geographic scales, but that overall, disparities between Indigenous and non-Indigenous populations are common. Strikingly, the review showed that Indigenous populations in Labrador have some of the largest disparities in suicide globally.

In chapter 6, I examined the public health approach to suicide surveillance in Canada. Through my analysis, I identified challenges that limit the capacity to track suicide-related outcomes in Indigenous populations and offered recommendations for enhancing surveillance capacity. These studies contribute to the evidence base in suicide prevention in Indigenous communities. As a unified body of work, this thesis helped to establish relationships, methods, and knowledge for future research.

Chapter 2: Community Engagement in Suicide Research

In chapter 2, I described the theoretical and methodological foundations of my thesis. Within a population health framework, I integrated community-based participatory research and the principles and practices for ethical research involving Indigenous communities. To operationalize this approach, I worked with collaborators from three Indigenous governments and the regional health authority in Labrador to develop a process that respected Indigenous governance and addressed locally-defined research priorities related to suicide prevention. This involved several substantive actions:

(1) Developing collaborative relationships with representatives from the Nunatsiavut Government, the Innu Nation, and the NunatuKavut Community Council
(2) Relocating to Happy Valley-Goose Bay;
(3) Establishing research agreements with each partner organization;
(4) Obtaining research licenses from each of the three Indigenous community research review committees;
(5) Spending time visiting and having informal discussions in communities;
(6) Undertaking community consultations with youth, Elders, community and hospital-based mental health service providers, nurses, and physicians; and
(7) Collaboratively designing a series of studies to address specific locally-determined research objectives.

During all phases of my thesis research, I prioritized values such as collaboration, open communication, and social accountability. These were taken up by focusing on reciprocity in relationships, having regular planning meetings, and sharing decision-making in study design, interpretation of results, and knowledge translation.

In the context of Indigenous health research in Labrador, seeking community input into research design was a necessary task for several reasons. First, many communities were already burdened with intensive research activities, which caused 'research fatigue' for many organizations and community members.[1,2] Further, I wanted to better understand how to minimize the potential harm associated with research for individuals and communities. The consultation helped to generate guidance about how to gather data about suicide in a manner that was sensitive to the trauma and grief that people felt in many communities in the region. I also sought input on how to disseminate research results in a way that reduced the risk of stigmatizing or misrepresenting communities.[1] Community consultation was a form of engagement and way of fostering relationships throughout my research, though it was distinct from community consent.[1]

This work was not without challenges or tensions. Although we included a consistent focus on collaborative processes, the study designs and analytical methods remained largely rooted in the traditions of Western medical research, rather than specifically in Indigenous ways of knowing.[3-5] As well, the research objectives mostly reflected a deficit-model of health that is common in epidemiology, rather than a strengths or wellness-based paradigm.[6] Although we took steps to minimize the potential for this work to further stigmatize communities in Labrador, some risk remained. Further, the relationships I had with Indigenous governments and project collaborators were varied. Although I made concerted efforts to build meaningful partnerships throughout the region, the ways that I engaged with some individuals and organizations was more substantial and frequent than others.

In part, these challenges reflect the messiness of community-based research. The process of turning principles and values for ethical research into actions and relationships is not linear or static. Communities are dynamic and evolving places. Labrador in particular has a complex social history – suicide is both part of this history and a consequence of it. Finding ways to give substance to the guidelines for Indigenous health research and reconcile the dilemmas that arise in the process is a necessary task in relational research.[7] A key contribution of this chapter and of my thesis overall is that it offers an example of how to conduct research in Indigenous population health in ways that are rigorous, adhere to ethical guidelines, and reflect community priorities. Although these practices are well-established in qualitative research in Indigenous health, recent epidemiological studies, especially those that use routinely collected data, do not consistently integrate these ethical principles.[8]

Chapter 3: The Social Context of Risk and Protective Factors for Suicide

In chapter 3, I reported on a qualitative study that examined the social context of risk and protective factors for suicide in Innu and Inuit communities in Labrador. Prior research on suicide among Indigenous peoples has primarily focused on tracking epidemiological trends and disparities for provincial and national contexts, with comparatively few examinations of regional and local incidence, and a limited number of qualitative and experimental studies.[6,9,10] Research on suicide in Indigenous communities has been critiqued for being investigator- rather than community-driven, reinforcing stereotypical and marginalizing narratives about Indigenous peoples, and not adequately addressing the structural origins of suicide.[11-13] Leading scholars have also argued that to advance the evidence base in suicide prevention in Indigenous communities, research needs to integrate the following dimensions: use community-based and mixed methods; respond to local priorities; be rooted in knowledge about the social context and the impact of colonization; disaggregate epidemiological data; and directly inform local and Indigenous-led decision-making.[6,9,14-16]

Throughout my thesis I have attempted to respond to these critiques. In chapter 3, I examined local knowledge about the complex interplay of individual, community, and structural factors in a rural and northern region where Indigenous peoples have experienced an elevated burden of mortality from suicide for over thirty years. Workshop participants viewed individual-level risk factors such as mental disorders as the consequences of inequitable social conditions and structural violence. Although the purpose of qualitative research is to specify and deepen knowledge about context, not generalize, there is congruence between our findings and several previous studies.[17,18] This points to some consistency in how Indigenous communities experience and understand the differential burden of suicide. In broad terms, the results from chapter 3 align with Indigenous-specific models of suicide.[19,20] Understanding the social context of suicide in Labrador from the perspective of community and health service providers helps lay a necessary foundation for the epidemiological investigation in chapter 4 and beyond. Together, this body of evidence will help inform community-defined priorities for prevention and strengthen knowledge about the social context of suicide in Labrador.

Chapter 4: Disparities in Suicide Mortality

In chapter 4, I described a study in which we were able to overcome some of the challenges and limitations that are common in research on suicide. One challenge is that suicide is considered a ‘rare outcome’ in epidemiological research.[21] Even for populations who experience high rates of suicide, the absolute number of deaths that occur, relative to other leading causes, is relatively small. Studying suicide in Labrador is further complicated because the population is both small and dispersed, and most secondary data sources do not include Indigenous identifiers.[8,22] Combined, these factors make it challenging to produce reliable and disaggregated incidence rates of suicide mortality.

In collaboration with Indigenous governments in Labrador, myself and colleagues conducted a population-based study on suicide. We were able to limit and overcome the challenges associated with conducting population-based research on rare outcomes in small populations. Our results showed substantial subregional variation in suicide mortality and revealed striking rate disparities between the general population and Indigenous communities. These results align with previous investigations of suicide among Indigenous peoples in Canada and globally.[15,23,24]

One of the unique findings was the elevated rate of suicide among women in Nunatsiavut. This is important to consider for programming at the community level and in clinical care. In high income countries, women typically have lower suicide rates than men, though women tend to make more attempts.[25] One of the factors in the gender differences in suicide mortality is related to the method used to attempt suicide – in Western countries, women typically use less lethal means than men.[26] Although we did not examine methods specifically, the high suicide rate among women in Nunatsiavut compared to women in Newfoundland suggests that there may be a different social pattern in the methods used to attempt suicide in Nunatsiavut. An implication of this finding for clinical care is that suicide risk assessment and safety planning for Inuit women should include questions about access to lethal means.

One of the contributions of this study is related to the methodology. Previous research on suicide in Labrador produced incidence rates for specific populations, such as Indigenous youth or Inuit communities or for the region overall.[27-30] Design limitations included a relatively brief study period and a lack engagement or collaboration with Indigenous governments. We used a large dataset with a long study period to produce granular and comparative estimates for a region with a small population. We used routinely-collected data and integrated community-based research methods into our study design. An implication of our approach was that it allowed us to produce relatively stable and precise incidence rates, which we could situate in the historical, social, and service delivery contexts of the region.

Furthermore, there was immediate uptake of the study results by Indigenous partners. Since the paper was published, leaders from the Nunatsiavut Government and the Innu Nation have used the results in regional and community planning, funding proposals, and federal and provincial advocacy related to mental health services and child welfare. I regularly respond to requests for suicide statistics from project partners and other community-based organizations in Labrador. In addition to publishing chapter 4 as an open access journal article,[31] I regularly share briefing notes, tables/figures, and slides that can easily be used in reports, applications, policy documents, and speaking notes. As an example, I recently prepared a report on suicide indicators for the Nunatsaivut Government. The Nunatsiavut Government's Department of Health and Social Development requested data on suicide indicators to help inform the regional strategic health plan. By ensuring the results of my research are accessible, I am helping to both disseminate and apply evidence in ways that are useful to stakeholders in Labrador.

Chapter 5: Global Incidence of Suicide among Indigenous Peoples

In chapter 5, I conducted a systematic review to synthesize data on the incidence of suicide among Indigenous peoples globally. This was an effort to further situate regionally-focused evidence on suicide in an international context. Although previous reviews have examined suicide epidemiology among Indigenous peoples, most focused on specific countries/regions[32-34] or subpopulations such as youth,[35] or did not use a systematic approach to searching the literature. As a consequence, much of the evidence synthesis is derived from studies in high income countries. This is problematic given that the majority of the world's Indigenous peoples live in low-and-middle income nations,[36] where approximately 75% of suicide deaths occur globally.[26] To my knowledge, chapter 5 is the most comprehensive and rigorous review of suicide mortality rates among Indigenous populations worldwide.

A key finding of this systematic review was that suicide rates were elevated in many Indigenous populations, and that rate disparities were substantial but not universal. Overall, suicide rates in Indigenous populations vary worldwide, and in populations where rates are high, mortality was greatest among young Indigenous men. While elevated rates and rate disparities were common and particularly high in nations such as Australia, Brazil, Canada, and Greenland, low rates and minimal rate differences compared to non-Indigenous populations exist in several countries including China, Israel, Fiji, and in some communities in the US. An important contribution of this study is that it not only revealed the heavy burden of suicide among Indigenous peoples on a global scale, it also showed the value of data to highlight populations with low rates and the absence of disparities. The review underscored the necessity of conducting comprehensive assessments in population health by providing additional evidence that suicide mortality is unevenly distributed.

One of the limitations of the review was we that identified relatively few studies in contexts with low suicide rates. We suggested that the lack of low incidence studies is less likely about the universality of suicide among Indigenous peoples, and more likely related to limited data coverage of Indigenous populations and a tendency to focus on communities where there is already a evidence of an elevated suicide rate. Yet, knowing where rates are low or non-existent is as important as knowing where rates are elevated. In an era of limited government resources, disaggregated data can help inform the equitable distribution of resources and help target interventions where need is greatest. This is important for local settings such as in Labrador, but also for moving forward in national prevention policy, and for surveillance in particular.[6,22,37]

Chapter 6: Enhancing Suicide Surveillance

In chapter 6, I integrated thematic dimensions from the previous studies such as social context, Indigenous research governance, and Indigenous identification in heath data, into a critical analysis of the public health approach to suicide surveillance in Canada. I argued that although suicide is a well-recognized problem, difficulties with the ways governments track indicators over time have resulted in a limited understanding of the scale of the problem in Indigenous communities. I used the Canadian Suicide Surveillance Indicator Framework[38] as the basis for a comprehensive examination of the data sources that are commonly used in national suicide surveillance. My critique centered on the limitations of the current approach to surveillance for Indigenous communities, though the analysis revealed a host overlapping challenges (Table 7.2).

Table 7.2 Challenges and recommendations for suicide surveillance in Indigenous communities

Challenges and limitations	**Recommendations**
Exclusion and lack of engagement of Indigenous communities and governments from national data governances and oversight structures;	Develop a collaborative and inclusive governance model that includes Indigenous organizations, governments, and community members; Establish an independent scientific and community governing council;
Haphazard use of Indigenous identifiers in national and provincial/territorial health data; Variations in methods for Indigenous identification;	Create and better integrate ‘equity stratifiers,’ including ethnicity and race, sexual orientation, and non-binary gender into routinely-collected national and provincial/territorial data;
Geographic undercoverage of rural and northern regions in routinely-collected health data;	Nationalize geographic coverage of administrative and health survey data on suicide; Establish sentinel suicide surveillance sites in rural, northern, and urban locations that include proportionately large Indigenous populations;
ICD coding in administrative data does not distinguish between suicide- and non-suicidal forms of self-injury; Lack of standardization in medico-legal definitions of suicide; Substantial time lags between event occurrence and the availability of data for analysis/monitoring; and	Improve the quality, comprehensiveness, and timeliness of suicide data with standardized definitions, routine reporting, and increase use of technology to support near real-time monitoring; and
Barriers to accessing disaggregated data include cost, limited local capacity for analytics, and prioritization of provincial and national rates.	Increase access to comprehensive and disaggregated data for public health stakeholders in local and national settings.

Part of the value of the critique is that it built on and reflected my experience conducting locally-focused research. Although the challenges were identified in the national context, they have implications and resonance for communities and regional decision-makers, and in global settings. The problem of a lack of Indigenous identifiers and limited geographic coverage in chapter 6 were similarly evident the international literature reviewed in chapter 5. In this regard, there is much overlap in the kinds of challenges that Indigenous communities face in trying to accurately measure the burden of suicide and track progress in prevention over time.

Reducing suicide rates is a global, national, and local goal; eliminating the inequities that result in disparities in suicide is an ethical imperative and matter of social justice. At a fundamental level, achieving success in both of these domains is dependent on being able to measure progress towards them. To conclude in chapter 6, I offered recommendations to enhance national suicide surveillance and better track progress in suicide prevention in Indigenous communities. Although Canada was the focus, the recommendations are applicable elsewhere.

KNOWLEDGE SHARING AS RECIPROCITY AND ETHICAL IMPERATIVE

In community-based and population health research, returning the results to the community is an essential task.[39,40] As a part of my effort to apply the findings from my research in locally relevant ways, I have worked closely with community partners to plan and share the results. Part of this effort has been focused on end-of-study knowledge sharing activities such as conference presentations (Appendix I) and publishing three chapters in open access journals.[31,41,42] However, I have also integrated knowledge translation throughout my thesis. This has involved responding to requests for data on suicide from community partners, accepting invitations to talk about my research at local events, and being involved in working groups to help to develop interventions and enhance regional services (Table 7.3).

Through diverse activities and forms of engagement, I have aimed to share the results of my research with the project partners and allied stakeholders in the region and help apply local evidence to the collaborative development of services and programs related to suicide prevention, mental health, and child welfare. These activities were an effort to counter the extractive nature of much research in Indigenous health and demonstrate a commitment to reciprocal research relationships. Part of what made these modest forms of reciprocity and accountability possible was living in Labrador. Perhaps more important factors were the invitations to contribute that I received from my collaborators. As discussed in chapter 2, this was part of a relational approach to ethics and research.

RESEARCH SIGNIFICANCE

One of the tensions in epidemiology and public health research is related to the value of evidence that is disaggregated and contextualized versus generalizable and scalable. I have attempted to balance these interests. The research described herein contributes to both the local evidence base and the broader literature on suicide and Indigenous health. In the context of Labrador, my work has helped to identify stakeholder

Table 7.3 Integrated Knowledge Translation Activities

Knowledge Translation Domains	**Activities and Contributions**
Prepared statistical reports and briefing notes for Indigenous, regional, and national health stakeholders in Labrador by request	Prepared customized statistical reports for: • Innu Nation • Sheshatshiu Innu First Nation • Department of Health and Social Development, Nunatsiavut Government • Mental Health and Addictions Program, Labrador-Grenfell Health • Population Health Division, Labrador-Grenfell Health • Medical Services Division, Labrador-Grenfell Health Policy briefs submitted to: • Department of Health and Social Development, Nunatsiavut Government • Standing Committee on Indigenous and Northern Affairs, Government of Canada • Quality of Life Secretariat, Department of Health, Government of Nunavut
Presentations/talks about suicide prevention and suicide research at organizational meetings community events in Labrador	Presented at community and professional development events organized by local and regional stakeholders, including: 1) Mental Health Team Retreat, Department of Health and Social Development, Nunatsiavut Government 2) Band Council Meeting, Sheshatshiu Innu First Nation 3) Counselling Centre Team Meeting, Department of Mental Health and Addictions, Labrador-Grenfell Health 4) Research Roundtable Meeting, NunatuKavut Community Council 5) Atlantic First Nations Health Conference, Atlantic Policy Congress of First Nations Chiefs Secretariat 6) *Suicide Prevention in the Justice System in Labrador: A symposium*, Canadian Bar Association 7) #308 Conversations, Mental Health Commission of Canada & MP Yvonne Jones 8) Presentation at Patient Safety and Quality Review Rounds, Labrador Health Centre 9) *Suicide Prevention – the Interface between Indigenous and Western Healing* Stakeholder Workshop, Labrador-Grenfell Health 10) World Suicide Prevention Day in Nain, Nunatsiavut Government *11) Your Life Matters: Youth Suicide Prevention Workshop*, Nunatsiavut Government 12) *PHAC Café*, Public Health Agency of Canada (Atlantic Division) 13) *Labrador Research Forum*, Labrador Institute 14) *Northern, Rural, and Remote Health Conference*, Canadian Society for Circumpolar Health

Supported community and regional planning related to suicide prevention, mental health, and child welfare	Invited to take part in working groups to collaborative develop interventions and enhance regional capacity for mental health and child welfare services: 1) Support for program development and implementation, and student services, for the Inuit Bachelor of Social Work Program 2) Lead the development and submission of a grant application to the Movember Foundation to support a land-based mental health intervention. The team was awarded a $3 million grant for the 3-year project; 3) Working group member for Labrador-Grenfell Health suicide risk assessment initiative; 4) Research support for program evaluation of the Nunatsiavut Government's *Family Connections Program* 5) Research support for the Inuit Child Welfare Review conducted by the Newfoundland and Labrador Office of the Child and Youth Advocate 6) Working group member for the development of the provincial suicide prevention strategy organized by the Department of Health and Community Services, Government of Newfoundland and Labrador

priorities related to suicide research (chapter 2), deepen knowledge about the social context of risk and protective factors for suicide (chapter 3), and quantify geographic and demographic disparities in the burden of suicide (chapter 4).

In a wider context, my systematic review (chapter 5) was one of the most rigorous and comprehensive assessments of the global burden of suicide among Indigenous populations to date, and helped to reveal the international variation in suicide incidence and disparities. In my final study (chapter 6), I applied my knowledge about the social contexts and epidemiology of suicide to an analysis of the current approach to suicide surveillance in Canada. From this, I offered specific recommendations for policy and practice in public health surveillance. As a body of work, my thesis builds on previous collaborative research on suicide in Indigenous communities,[43,44] and can serve as a methodological example for community-centered approaches to Indigenous population health research. Despite these contributions, important gaps in evidence about suicide prevention in Indigenous communities remain.

FUTURE DIRECTIONS FOR RESEARCH

Based on the work I have done for my thesis, I believe there is need to develop research in several overlapping areas.

Indigenous-defined research priorities related to the suicide, mental wellness and community-led interventions

Increasingly, Indigenous organizations and governments have identified research priorities related to suicide, mental health, and community wellness. Several questions identified by research partners in Labrador (chapter 2) that need to be addressed include investigations related to suicide attempt rates, health service use, and vulnerable subpopulations such as children and youth in foster care. At the national level, Inuit Tapiriit Kanatami identified key areas for future research in the National Inuit Suicide Prevention Strategy. Priorities include determining the efficacy of evidence-based interventions in an Inuit context, evaluating community-based mental health programs, and examining the longitudinal impact of changes in social equity on mental health and suicide.[45] Not withstanding the challenges associated with conducting suicide research in Indigenous communities,[6,13,21] there is a clear need to continue to develop an evidence base that can inform Indigenous-led programming, health services, and policy.[6,46]

Global burden of suicide among Indigenous Peoples

A central theme that unites several chapters of my thesis is a concern about the ability to identify Indigenous populations in health data. This is a challenge in many jurisdictions in Canada and indeed globally. One of the findings of my systematic review was the relative absence of national studies on suicide among Indigenous populations – most of the incidence studies included used provincial/state, regional, or community-level data. This is likely influenced by the lack of political recognition of Indigenous peoples in some countries,[47] and the poor quality of vital statistics systems in many low-and-middle income nations.[26]

A recent global collaboration investigated the health status of 28 distinct Indigenous peoples in 23 countries,[47] but it did not examine suicide as an indicator. Reducing suicide mortality by 33% is one of the aims of the United Nation's Sustainable Development Goals.[48] Given the persistence and gravity of the health inequities experienced by Indigenous peoples worldwide, conducting primary and longitudinal research on national rates of suicide and suicide attempts among Indigenous peoples globally is an important area for future research.

Enhancing surveillance and population health research on suicide

As discussed in chapter 6, the datasets that are commonly used for research and surveillance on suicide in Canada have strengths and limitations. Going forward, research and public health agencies can work together to enhance the quality, coverage, and analysis of routinely collected data on suicide. This could include efforts to bolster data quality and comprehensiveness with surveillance initiatives similar to those in Ireland,[49] the UK,[50] and Australia,[51] and experiment with technological innovations and diverse forms of data to support real-time monitoring and syndromic surveillance.[52-54]

As well, greater efforts are needed to conduct spatial analysis of suicide data using disaggregated data for small areas. In population health, uncovering geographic heterogeneity in incidence can help inform community-specific interventions for populations that face the most concentrated risks. As Chandler and Lalonde pointed out two decades ago, being able to see local rate variations has helped to challenge assumptions about the universality of suicide among Indigenous peoples.[55] Evidence of low rates may also help uncover protective factors or point to places where community interventions may have had some success.

Relatedly, there should also be a concerted effort to conduct intersectional analyses in observational research on suicide. Data linkage can help create 'equity stratifiers' and stimulate research focused on reducing disparities and increasing health equity in suicide prevention. This may also help strengthen the focus on populations that experience elevated suicide risks due to social exclusion and systemic discrimination.

Application of principles and practices for research with Indigenous communities to epidemiological research with routinely-collected data

Principles for ethical conduct in Indigenous health research have affirmed the necessity of community engagement and adherence to community research licensing procedures, among other practices that respect the sovereignty of Indigenous nations in knowledge creation. Fundamentally, recognizing Indigenous sovereignty over research means respecting the right of Indigenous communities and governance structures to define and determine the parameters, process, and content of research. Population health research faces some unique challenges in adapting to this context. The routinely-collected data that is increasingly used in epidemiology is very often detached from the people and places that generate it. This reality adds a complicating dimension for community consent and other critical elements of ethical research with Indigenous communities. In practice, the application of Indigenous-specific ethical principles in epidemiological research has been uneven and is often absent in studies that use secondary health data.[8,56]

The Indigenous data sovereignty movement has begun to translate the principles and practices for ethical research with Indigenous communities into population health research.[57] Studies with administrative and linked data can build on the methodological and epistemological foundations of community-centered processes that are relatively common in qualitative and survey research. In this context, epidemiological research with administrative data should intensify efforts to collaborate in meaningful ways, focus on Indigenous-defined research priorities, seek community consent even when data appears disconnected from people, disaggregate data, ensure results are accessible to communities and decision-makers, and transparently report on community collaboration and consent.

CONCLUSION

Surveillance is a cornerstone of public health and a necessary part of a comprehensive approach to suicide prevention.[26] Within a population health framework, suicide surveillance can offer clues about how and why suicide rates change over time, identify subgroups of the population that experience disproportionate risks, and help establish benchmarks for assessing the impact of program and policy interventions. In Canada, the Truth and Reconciliation Commission expressly called for the longitudinal measurement of suicide in Indigenous communities as a way to track progress towards health equity. As of 2019, this has not been achieved. The Government of Canada does not systematically or accurately track rates of suicide or suicide attempts among Indigenous peoples. National data systems do not routinely include ways of identifying Inuit, First Nations, or Métis. This invisibility can mask health inequalities and make it difficult to target specific high-risk populations with evidence-based public health and clinical interventions.[8] This was one of the challenges I addressed in my dissertation.

Inuit and Innu leaders in Labrador identified a need for research on suicide to help inform regional and community approaches to mental health promotion and suicide prevention. Historically, Indigenous peoples have had an uneasy relationship with research. Ethical and community-led research can advance Indigenous self-determination; however exploitive and tokenistic research can be harmful. In a qualitative study on the ethical governance of research in Labrador, a participant explained that Innu communities 'want a marriage, not a one night stand.'[2] The message in this sentiment and more broadly in the scholarship on Indigenous research is that meaningful and respectful relationships are paramount.[2,4,58,59] Integral aspects of the research process including community consent, social license, local relevance, and methodological rigor and validity are predicated on this condition. To this end, a focus on relationships has been an undercurrent of my dissertation research.

The planning, design, licensing, data collection and analysis, and dissemination phases of my doctoral research built on each other through an iterative planning process, and reflect a commitment to collaborative, community-centered research on suicide prevention. I sought to build relationships with Indigenous partners to identify appropriate procedures and objectives, understand the local context for suicide through qualitative methods, and use epidemiological methods to describe the scope of the problem. I have prioritized values such as collaboration, open communication, and social accountability. These have been realized in the joint project planning sessions, shared decision-making related to study design, interpretation of results, knowledge translation, and uptake of evidence into programming, service planning, policy, and advocacy. Although my research offers useful insights about many aspects of suicide, epidemiology and indeed any scientific study of suicide "does not provide a full reflection of the pain in the North."[60]

The advancement of knowledge about suicide prevention in Indigenous communities must be Indigenous-led, ethically conducted, and scientifically robust. Ultimately, the ability to prevent tragedies such as suicide is connected to the collective capacity to know where and when it happens, identify which populations are most at risk, and understand the impact of interventions. In Labrador and across Canada, this mandate is not only about choosing which questions to answer. It is also about understanding how Indigenous and non-Indigenous peoples can share the process of research, mobilize evidence, and remain accountable to communities that have the most to gain from progress in suicide prevention.

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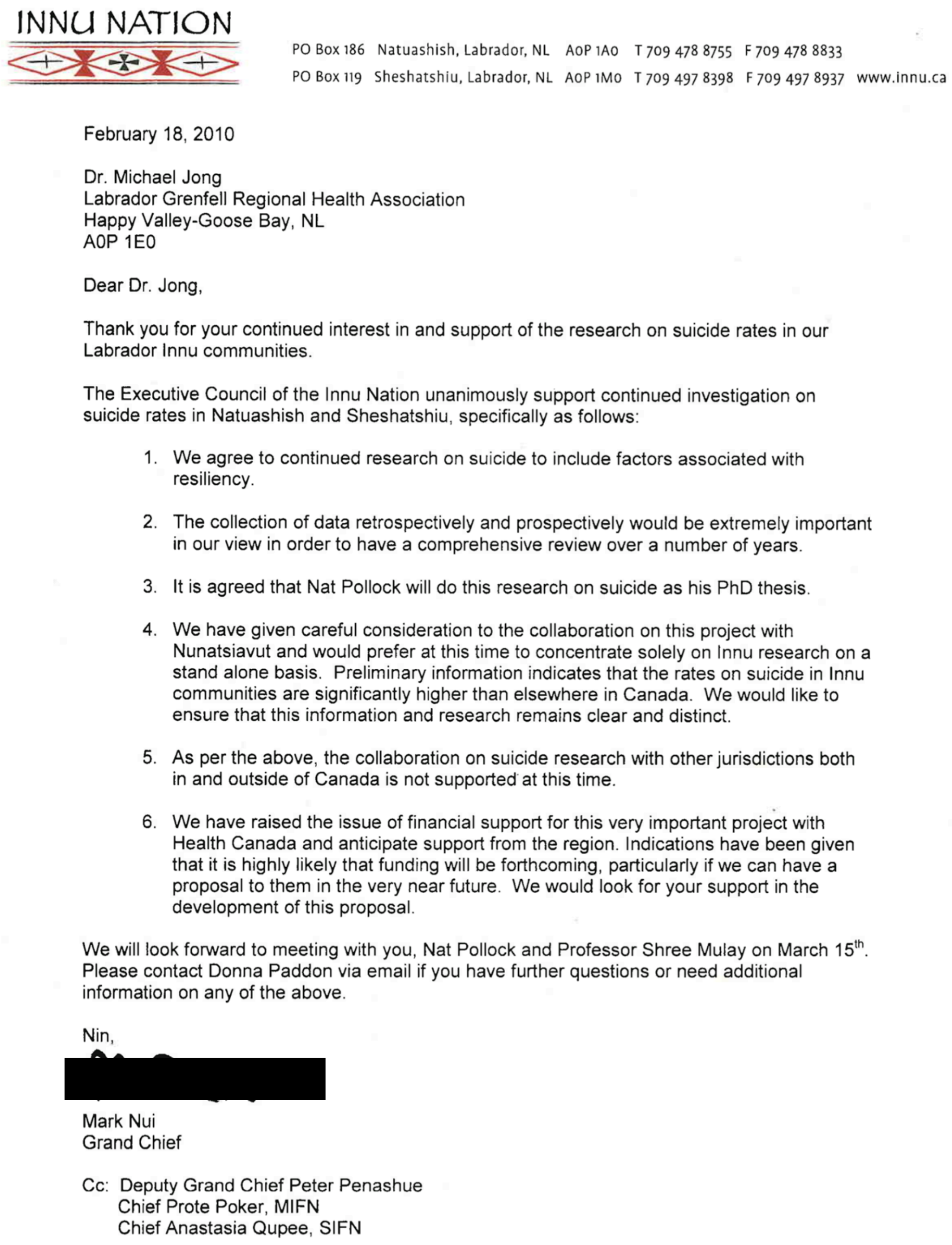
APPENDIX A: Research Approvals and Licenses

Innu Nation



INNU NATION

PO Box 186 Natuashish, Labrador, NL A0P 1A0 T 709 478 8755 F 709 478 8833
PO Box 119 Sheshatshiu, Labrador, NL A0P 1M0 T 709 497 8398 F 709 497 8937 www.innu.ca

February 18, 2010

Dr. Michael Jong
Labrador Grenfell Regional Health Association
Happy Valley-Goose Bay, NL
A0P 1E0

Dear Dr. Jong,

Thank you for your continued interest in and support of the research on suicide rates in our Labrador Innu communities.

The Executive Council of the Innu Nation unanimously support continued investigation on suicide rates in Natuashish and Sheshatshiu, specifically as follows:

1. We agree to continued research on suicide to include factors associated with resiliency.
2. The collection of data retrospectively and prospectively would be extremely important in our view in order to have a comprehensive review over a number of years.
3. It is agreed that Nat Pollock will do this research on suicide as his PhD thesis.
4. We have given careful consideration to the collaboration on this project with Nunatsiavut and would prefer at this time to concentrate solely on Innu research on a stand alone basis. Preliminary information indicates that the rates on suicide in Innu communities are significantly higher than elsewhere in Canada. We would like to ensure that this information and research remains clear and distinct.
5. As per the above, the collaboration on suicide research with other jurisdictions both in and outside of Canada is not supported at this time.
6. We have raised the issue of financial support for this very important project with Health Canada and anticipate support from the region. Indications have been given that it is highly likely that funding will be forthcoming, particularly if we can have a proposal to them in the very near future. We would look for your support in the development of this proposal.

We will look forward to meeting with you, Nat Pollock and Professor Shree Mulay on March 15th. Please contact Donna Paddon via email if you have further questions or need additional information on any of the above.

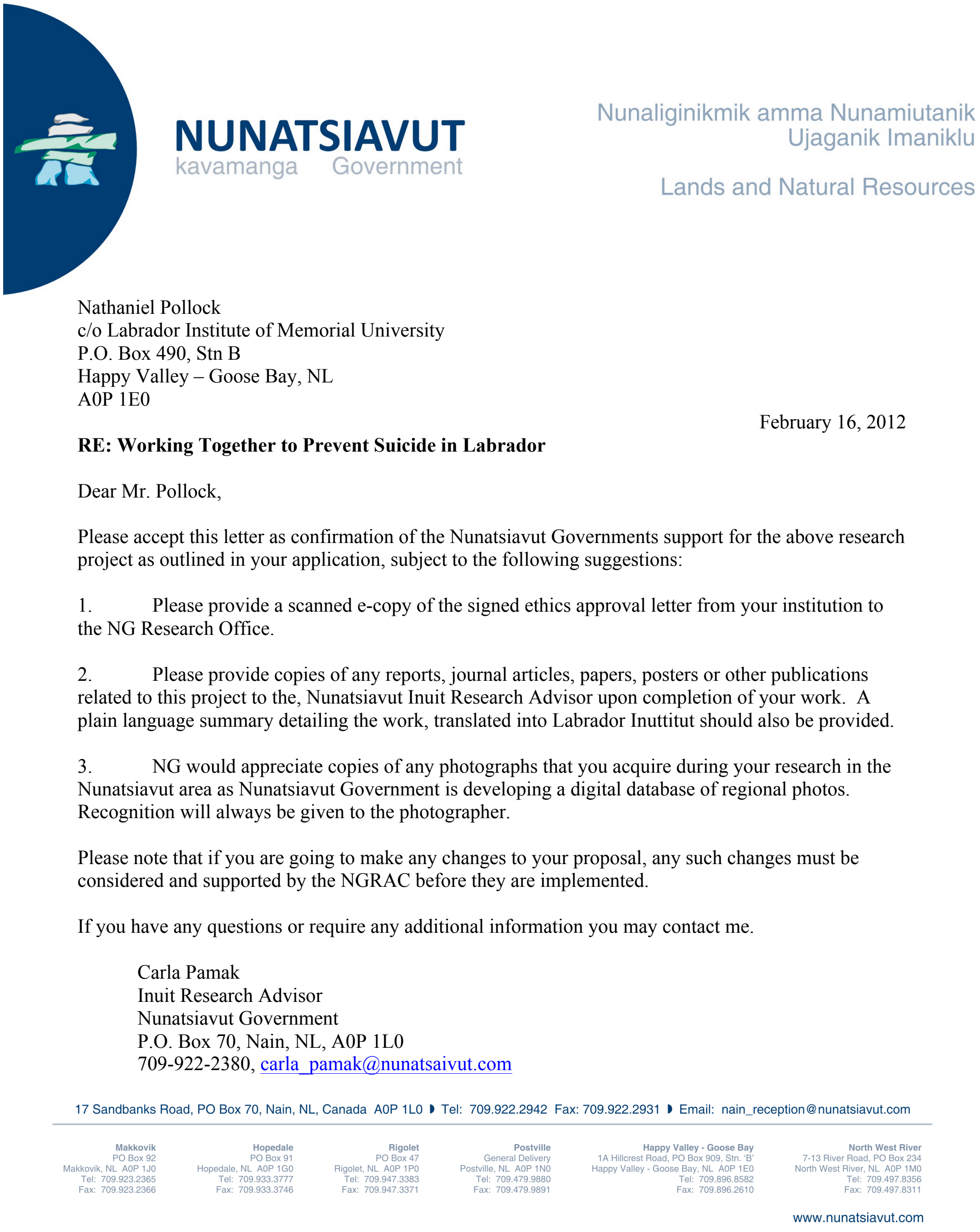
Nin,

[redacted]

Mark Nui
Grand Chief

Cc: Deputy Grand Chief Peter Penashue
Chief Prote Poker, MIFN
Chief Anastasia Qupee, SIFN

Nunatsiavut Government



NUNATSIAVUT
kavamanga Government

Nunaliginikmik amma Nunamiutanik
Ujaganik Imaniklu

Lands and Natural Resources

Nathaniel Pollock
c/o Labrador Institute of Memorial University
P.O. Box 490, Stn B
Happy Valley – Goose Bay, NL
A0P 1E0

February 16, 2012

RE: Working Together to Prevent Suicide in Labrador

Dear Mr. Pollock,

Please accept this letter as confirmation of the Nunatsiavut Governments support for the above research project as outlined in your application, subject to the following suggestions:

1. Please provide a scanned e-copy of the signed ethics approval letter from your institution to the NG Research Office.

2. Please provide copies of any reports, journal articles, papers, posters or other publications related to this project to the, Nunatsiavut Inuit Research Advisor upon completion of your work. A plain language summary detailing the work, translated into Labrador Inuttitut should also be provided.

3. NG would appreciate copies of any photographs that you acquire during your research in the Nunatsiavut area as Nunatsiavut Government is developing a digital database of regional photos. Recognition will always be given to the photographer.

Please note that if you are going to make any changes to your proposal, any such changes must be considered and supported by the NGRAC before they are implemented.

If you have any questions or require any additional information you may contact me.

Carla Pamak
Inuit Research Advisor
Nunatsiavut Government
P.O. Box 70, Nain, NL, A0P 1L0
709-922-2380, carla_pamak@nunatsaivut.com

17 Sandbanks Road, PO Box 70, Nain, NL, Canada A0P 1L0 ◗ Tel: 709.922.2942 Fax: 709.922.2931 ◗ Email: nain_reception@nunatsiavut.com

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General Delivery
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Fax: 709.479.9891

Happy Valley - Goose Bay
1A Hillcrest Road, PO Box 909, Stn. 'B'
Happy Valley - Goose Bay, NL A0P 1E0
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North West River
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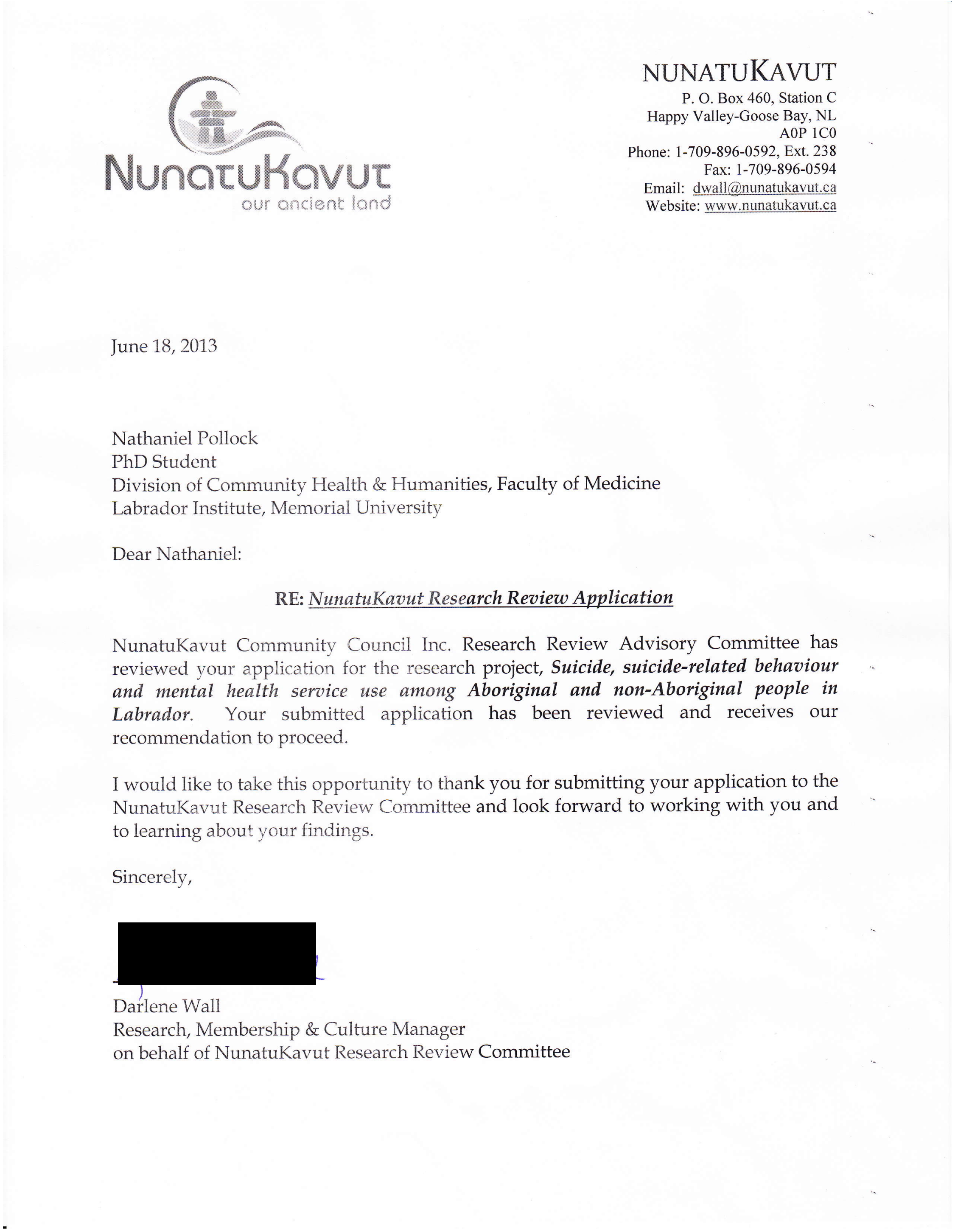
North West River, NL A0P 1M0
Tel: 709.497.8356
Fax: 709.497.8311

www.nunatsiavut.com

NunatuKavut Community Council



NUNATUKAVUT
P. O. Box 460, Station C
Happy Valley-Goose Bay, NL
A0P 1C0
Phone: 1-709-896-0592, Ext. 238
Fax: 1-709-896-0594
Email: dwall@nunatukavut.ca
Website: www.nunatukavut.ca

June 18, 2013

Nathaniel Pollock
PhD Student
Division of Community Health & Humanities, Faculty of Medicine
Labrador Institute, Memorial University

Dear Nathaniel:

RE: *NunatuKavut Research Review Application*

NunatuKavut Community Council Inc. Research Review Advisory Committee has reviewed your application for the research project, ***Suicide, suicide-related behaviour and mental health service use among Aboriginal and non-Aboriginal people in Labrador***. Your submitted application has been reviewed and receives our recommendation to proceed.

I would like to take this opportunity to thank you for submitting your application to the NunatuKavut Research Review Committee and look forward to working with you and to learning about your findings.

Sincerely,

[redacted]

Darlene Wall
Research, Membership & Culture Manager
on behalf of NunatuKavut Research Review Committee

Labrador-Grenfell Health

Labrador-Grenfell
Health

30 April 2012

Nathaniel Pollock
P.O. Box 2078, Stn B
Happy Valley-Goose Bay
NL A0P 1E0

Dear Mr. Pollock,

The Labrador-Grenfell Health Research Review Committee has reviewed amendments to your proposed research project titled 'Working together to prevent suicide in Labrador' and is pleased to extend approval initially given on March 5, 2012 for the first phase of the program.

We trust that the consultation workshop will be productive and assist you in designing future stages of the project in conjunction with Aboriginal community representatives.

Sincerely,

[redacted]

Carol Brice-Bennett
Director of Aboriginal Health Programs
& Research
Labrador-Grenfell Health Authority
P.O. Box 7000 Stn C
Happy Valley-Goose Bay,
NL A0P 1C0
Ph. (709)897-3104
Carol.brice-bennett@lghealth.ca

Interdisciplinary Committee on Ethics in Human Research, Memorial University

ICEHR Number:	**2012-291-ME**
Approval Period:	**February 6, 2012 – February 28, 2013**
Funding Source:	**CIHR, NLCAHR, AAHRP-CIHR**
Responsible Faculty:	**Dr. Keith Chaulk, Labrador Institute** **Dr. Shree Mulay, Faculty of Medicine**
Title of Project:	***Working together to prevent suicide in Labrador***

February 6, 2012

Dr. Keith Chaulk, Labrador Institute
Dr. Shree Mulay, Faculty of Medicine
Memorial University of Newfoundland

Dear Dr. Chaulk and Dr. Mulay:

Thank you for your submission of the full application to the Interdisciplinary Committee on Ethics in Human Research (ICEHR) seeking ethical clearance for the above-named research project.

The Committee has reviewed the proposal and would like to commend you and your team on a well written and comprehensive proposal, in particular to its detailed attention to the TCPS2, *Chapter 9 – Research involving the First Nations, Inuit and Métis peoples of Canada*.

We agree that the proposed project is consistent with the guidelines of the *Tri-Council Policy Statement on Ethical Conduct for Research Involving Humans* (TCPS2). *Full ethics clearance* is granted to February 28, 2013 for Phase 1 of the multi-phased research project. [We have closed our files on RF09-10-ME and RF10-01-ME].

Although ethics clearance has been granted, a copy of the approval letter or request for revisions from the Nunatsiavut Government Institutional Review Board should be forwarded to the ICEHR for inclusion in our file on the research project.

If you intend to make changes during the course of the project which may give rise to ethical concerns, please forward a description of these changes to Mrs. Brenda Lye at icehr@mun.ca for the Committee's consideration.

The TCPS2 requires that you submit an annual status report on your project to ICEHR, should the research carry on beyond February 28, 2013. Also, to comply with the TCPS2, please notify us upon completion of your project.

We wish you success with your research.

Yours sincerely,

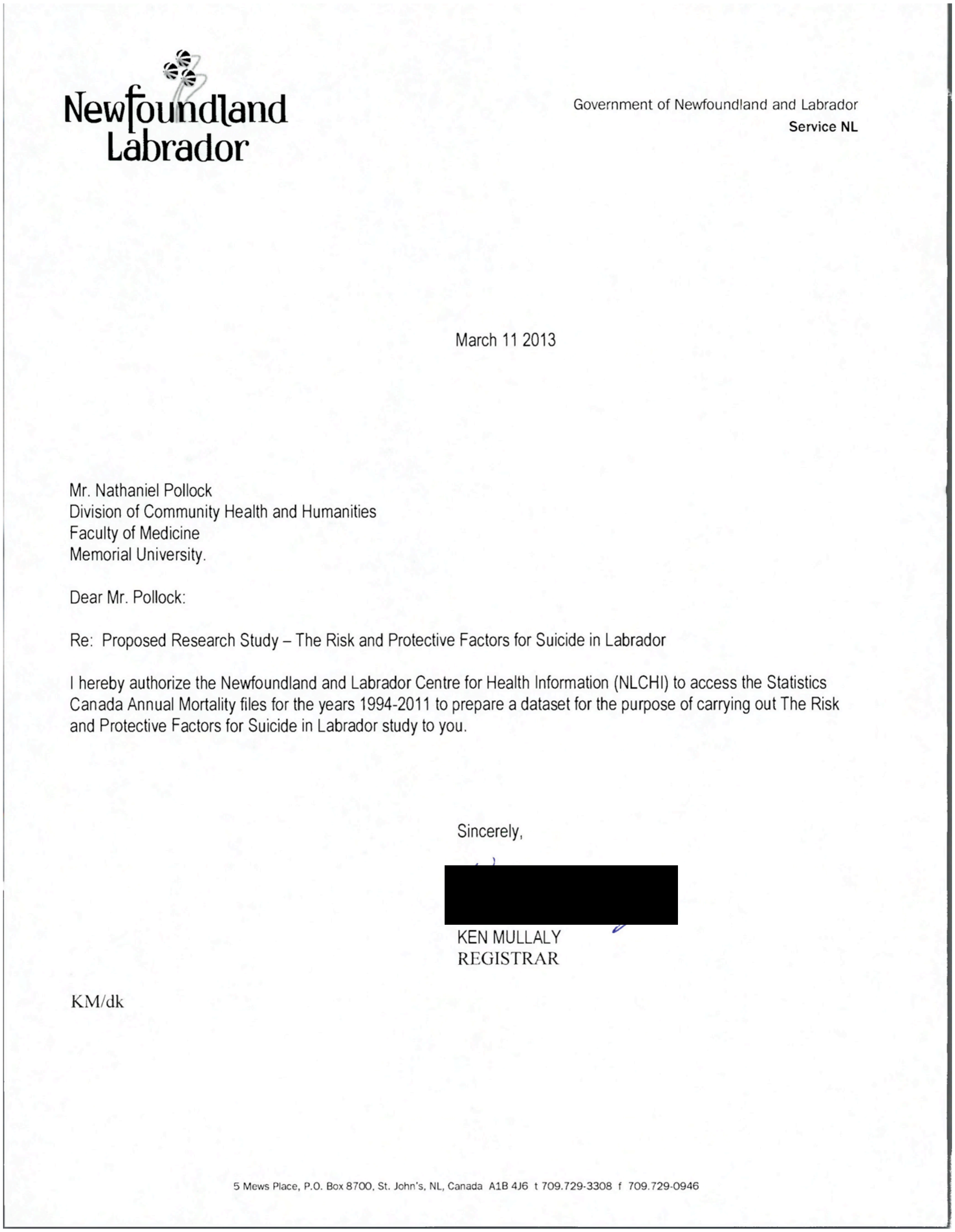
[redacted]

Michael Shute, Th.D.
Chair, Interdisciplinary Committee on
Ethics in Human Research

MS/bl

copy: Director, Office of Research Services

Government of Newfoundland and Labrador



Newfoundland
Labrador

Government of Newfoundland and Labrador
Service NL

March 11 2013

Mr. Nathaniel Pollock
Division of Community Health and Humanities
Faculty of Medicine
Memorial University.

Dear Mr. Pollock:

Re: Proposed Research Study – The Risk and Protective Factors for Suicide in Labrador

I hereby authorize the Newfoundland and Labrador Centre for Health Information (NLCHI) to access the Statistics Canada Annual Mortality files for the years 1994-2011 to prepare a dataset for the purpose of carrying out The Risk and Protective Factors for Suicide in Labrador study to you.

Sincerely,

[redacted]

KEN MULLALY
REGISTRAR

KM/dk

5 Mews Place, P.O. Box 8700, St. John's, NL, Canada A1B 4J6 t 709.729-3308 f 709.729-0946

APPENDIX B: Letter of Information and Consent Form

Letter of Information for Health Research
Working together to prevent suicide in Labrador

Researcher(s):
Dr. Michael Jong
Labrador Grenfell Health/Memorial University
(709) 897-2000
mjong@hvgb.net

Dr. Shree Mulay
Faculty of Medicine
Memorial University
(709) 777-8393
shree.mulay@med.mun.ca

Dr. Keith Chaulk
Labrador Institute, Memorial University
(709) 896-6211
keith.chaulk@mun.ca

Jennifer Wight
Labrador Institute, Memorial University
(709) 896-6215
jennifer.wight@mun.ca

Nathaniel Pollock (Research Coordinator, PhD student)
Faculty of Medicine, Memorial University
Co-Supervisors: Dr. Michael Jong and Dr. Shree Mulay
(709) 896-6393
npollock@mun.ca

You are invited to take part in a research project entitled "Working together to prevent suicide in Labrador." We would like to speak to you because you have been identified as someone who may have knowledge about suicide and suicide prevention in Labrador. We hope you will be interested in sharing this with us as a part of our research project's community consultation.

This letter is part of the process of informed consent. It should give you a basic idea about what the research is for and what your participation will involve. If you would like more details about something mentioned here, or information not included here, you should feel free to ask. Please take the time to read this carefully and to understand any other information given to you by the researchers.

It is entirely up to you to decide whether you will take part in this research. If you choose not to take part in this research or if you decide to withdraw from the research once it has started, there will be no negative consequences for you, now or in the future.

Introduction

This research is being conducted by a group of researchers from Labrador Grenfell Health and Memorial University (MUN) together with the Innu Nation and the Nunatsiavut Government. Nathaniel Pollock is the research coordinator and is involved as a part of his PhD thesis. This project is funded by grants from the Canadian Institute of Health Research, the Newfoundland and Labrador Centre for Applied Health Research, and the Atlantic Aboriginal Health Research Program.

Although suicide is a serious problem in communities in Labrador, the causes are not known. Even though help is available to those who have mental health problems, many people in Labrador, especially youth, die from suicide and even more attempt it. Together, we can work to learn more about suicide and mental health in Labrador. This knowledge may help create new programs to support healing and prevent suicide.

Purpose of study:

We are currently in phase 1 of a 3-year research project on suicide prevention in Labrador. In this phase, we are talking to people from across Labrador to help us understand what kind of research would be useful to communities and service providers. We will be speaking with youth, elders, health and social care professionals, and other people from Innu and Inuit communities on the north coast and in the Upper Lake Melville area. We will be asking people to share their perspectives about why suicide happens and ideas about what can be done to prevent it. This information will help us to plan future research projects on suicide prevention in Labrador.

Withdrawal from the study:

If you decide to take part in the community workshop, you can withdraw at any time during your participation and for up to two weeks afterwards. If you withdraw after the community workshop, if requested, we can exclude any identifying information you provide from the summary report of the workshop. There are no other consequences to withdrawing.

If you would like to take part in this research, but would prefer to do so in a different way, please contact Nathaniel Pollock to discuss other options.

Possible benefits:

If you participate in the community workshop on May 2, your name will be entered into a draw to win an Apple iPad. There are no other direct benefits that you will gain from taking part in the community workshop. The information we collect will be used to plan future research on suicide prevention in Labrador. This research will help communities and services in Labrador develop useful programs to prevent suicide.

Possible risks:
There is no direct risk of physical or financial harm for taking part in the community workshop. However, we will be asking you to share your thoughts and ideas about suicide in Labrador. Even though we will not ask you to talk about your own health or family situation, suicide is still a very sensitive topic. It may be upsetting or stressful for you to talk about. Because of this, you can choose to take a break from the discussion by leaving the room at any time and returning when you are ready.

Also, we will have counsellors available to provide help if you need it. After the workshop, if you need help in your home community, the researchers can offer to refer you to a mental health service and/or be available for a follow-up phone call or meeting.

Confidentiality vs. Anonymity
There is a difference between confidentiality and anonymity: Confidentiality is ensuring that identities of participants are accessible only to those authorized to have access; anonymity is a result of not disclosing participant's identifying characteristics (such as name or description of physical appearance). Please see the *Informed Consent Form* for additional information about confidentiality and anonymity.

Questions:
You are welcome to ask questions at any time during your participation in this research. If you would like more information about this study, please contact the research coordinator, Nathaniel Pollock (npollock@mun.ca or (709) 896-6393/(709) 897-4531).

Consent to take part in research: ***Community Workshop***
Working together to prevent suicide in Labrador

Coordinator: Nathaniel Pollock (PhD student)
Project Coordinator
Faculty of Medicine, Memorial University
(709) 897-4531
npollock@mun.ca

The attached *Letter of Information* describes the research related to this consent form. Please read it carefully and ask the researcher(s) any questions that you may have or ask for more information before taking part. Additional information about the research is provided in this consent form.

What you will do in this study:
As a participant in this research, you will attend a 1-day community workshop on May 2, 2012 from 8:30am to 4:30pm. The workshop will be at the hospital in Happy Valley-Goose Bay and will be hosted by Labrador Grenfell Health and the Labrador Institute, with support from the Innu Nation and the Nunatsiavut Government.

During the community workshop, you will be asked to take part in a 3 different group sessions. In these sessions, participants will be asked to talk about suicide prevention and mental health. We will ask groups to talk about the possible causes of suicide, ways to help people who are thinking about suicide, and what communities, health and social service systems could do to prevent suicide. You will not be asked to speak about personal health history or any experiences your family may have had with suicide.

Travel, accommodations, and food costs will be paid for by Memorial University.

Recording and Storage of Data:
The discussions that take place at the community workshop will be recorded by hand-written and typed notes by note-takers and the researchers. After the workshop, all notes will be typed and saved in a computer file. The consent forms, written and typed notes, and any other materials with identifiable information about participants will be stored in a locked filing cabinet in a locked office in the Labrador Institute. Digital files will be password protected and stored on external hard drives.

Duplicate copies of all digital files will be password protected and stored in a locked filing cabinet in a locked office at the Labrador Health Centre. The data will be stored for a 5-year period, and then destroyed if it is no longer needed. Only approved researchers will have access to the data.

Confidentiality and Limits:
If you decide to take part in the workshop, other people in your community may ask questions about it. We will not share information about your participation with people

who are not directly involved as organizers or researchers. This means that we will keep your information private. We will ask all participants not to share personal information discussed in the group with others in the community. In other words, we will ask people to keep information confidential. However, we cannot prevent people from talking about this experience with others.

During the workshop, if you share information that makes us think that you, someone else, or a child is at risk of being harmed or abused, we are required by law to tell this information to Child, Youth, and Family Services, the RCMP, or another authority to help keep people safe.

Anonymity:
It is not possible to offer you complete anonymity if you choose to take part in community workshop because it involves group discussions. Given the small population of Labrador communities, you may know other people who are taking part in the workshop or are helping to organize it. When we write the reports and publications that summarize what people tell us, we will take every reasonable effort to make sure you will not be personally identified.

Sharing of Results:
The information we gather during the workshop will be organized by theme and analyzed. We will write a report about the workshop and other community consultations that will be given to the Innu Nation, the Nunatsiavut Government, and Labrador Grenfell Health. When it is available, a copy of this report will be provided to participants at their request by contacting Nathaniel Pollock (npollock@mun.ca or 709-896-6393).

Information from the community workshop will be used to plan future research. It also may appear in reports from the Innu Nation, the Nunatsiavut Government, Labrador Grenfell Health, a PhD thesis by Nathaniel Pollock, academic journal articles, or presentations.

At the end of this consent form, you have the option of deciding if we can use the exact words you say or only a summary of your comments in any future reports, publications, or presentations.

Questions:
You are welcome to ask questions at any time during your participation in this research. If you would like more information about this study, please contact: Nathaniel Pollock (npollock@mun.ca or 709-896-6393 or 709-897-4531).

Ethics Board:
The proposal for this research has been reviewed by the Interdisciplinary Committee on Ethics in Human Research and found to be in compliance with Memorial University's research ethics policy. If you have ethical concerns about the research (such as the way you have been treated or your rights as a participant), you may contact the Chairperson of

the ICEHR at icehr@mun.ca or by telephone at 709-864-2861. The Innu Nation, the Nunatsiavut Government, and Labrador Grenfell Health have also approved the proposal.

Consent:
Your signature on this form means that:

- You have read the information about the research.
- You have been able to ask questions about this study.
- You are satisfied with the answers to all your questions.
- You understand what the study is about and what you will be doing.
- You understand that you are free to withdraw from the study at any time, without having to give a reason, and that doing so will not affect you now or in the future.
- You understand that any data collected from you up to the point of your withdrawal will be retained by the researcher for use in the research study.

If you sign this form, you do not give up your legal rights and do not release the researchers from their professional responsibilities.

Your signature:
I have read and understood what this study is about and appreciate the risks and benefits. I have had adequate time to think about this and had the opportunity to ask questions and my questions have been answered.

☐ I agree to participate in the research project understanding the risks and contributions of my participation, that my participation is voluntary, and that I may end my participation at any time.

☐ I agree to the use of quotations and that my name will not be identified in any reports or publications resulting from this study.

☐ I do not agree to the use of quotations.

A copy of this Informed Consent Form has been given to me for my records.

Signature of participant ______________________ Date ______________________

Researcher's Signature:
I have explained this study to the best of my ability. I invited questions and gave answers. I believe that the participant fully understands what is involved in being in the community workshop, any potential risks of the workshop and that he or she has freely chosen to be in the workshop.

______________________________ ______________________________
Signature of Principal Investigator Date

______________________________ ______________________________
Telephone number Email address

APPENDIX C: Supplementary Tables from Chapter 4

Supplementary Table 1 Geographic Subregions and Populations by Statistics Canada's 2006 Census Subdivisions

Census Division	Census Subdivision	Region/Subregion	Community	Primary Population	Aboriginal identity %[d]	Total Population[d]
1 to 9	-	Newfoundland	All	-	2.9	479,100
10 + 11	-	Labrador	All	-	37.3	26,365
Labrador Subregions						
10	1010801	Innu Communities	Natuashish[a]	Innu (First Nations)	93.5	706
10	1010020	Innu Communities	Sheshatshiu[b]	Innu (First Nations)	93.5	1112
10	1010029	Labrador West	Churchill Falls	Multiple	6.6	681
10	1010032	Labrador West	Labrador City	Multiple	6.1	7,240
10	1010034	Labrador West	Wabush	Multiple	8.3	1739
11	1011030	Nunatsiavut	Hopedale	Nunatsiavut Inuit	90.6	530
11	1011020	Nunatsiavut	Makkovik	Nunatsiavut Inuit	88.4	362
11	1011035	Nunatsiavut	Nain	Nunatsiavut Inuit	91.4	1,034
11	1011015	Nunatsiavut	Postville	Nunatsiavut Inuit	89	219
11	1011010	Nunatsiavut	Rigolet	Nunatsiavut Inuit	94.8	269
10	1010001	South Coast-Straits	Capstan Island	Multiple	14.5	69
10	1010012	South Coast-Straits	Cartwright	NunatuKavut Inuit	87.9	552
10	1010013	South Coast-Straits	Charlottetown	NunatuKavut Inuit	84.7	336
10	1010008	South Coast-Straits	Multiple[c]	NunatuKavut Inuit	70.5	475
10	1010005	South Coast-Straits	Forteau	NunatuKavut Inuit	27.9	448
10	1010004	South Coast-Straits	L'Anse-au-Clair	NunatuKavut Inuit	33.2	226
10	1010002	South Coast-Straits	L'Anse-au-Loup	Multiple	6.7	593
10	1010011	South Coast-Straits	Mary's Harbour	NunatuKavut Inuit	60	417
10	1010007	South Coast-Straits	Pinware	NunatuKavut Inuit	39.5	114
10	1010009	South Coast-Straits	Port Hope Simpson	NunatuKavut Inuit	86	529
10	1010003	South Coast-Straits	Red Bay	Multiple	8.8	227
10	1010010	South Coast-Straits	St. Lewis	NunatuKavut Inuit	71.4	252
10	1010006	South Coast-Straits	West St. Modeste	NunatuKavut Inuit	25	140
10	1010025	Upper Lake Melville	HVGB	Inuit[e]	35.9	7,572
10	1010022	Upper Lake Melville	North West River	Inuit[e]	69.1	492

Notes: HVGB = Happy Valley-Goose Bay; [a]Relocated from Davis Inlet in 2002 and became a federal Indian reserve in 2003; [b]1991 to 2006 population included the non-Innu community of Mud Lake in this CSD; in 2011, Mud Lake and Sheshatshiu were enumerated separately, but we combined them to improve estimate consistency; [c]CSD Division No. 10, Subd. B includes the following communities: Black Tickle-Domino, Lodge Bay, Pinsent's Arm, William's Harbour, Norman's Bay, Paradise River, and areas/settlements between communities; [d]Estimate based on the 2006 Census, Statistics Canada and may be different than sum of all communities due to rounding; [e]Includes both Nunatsiavut Inuit and NunatuKavut (Southern) Inuit; Communities with less than 20% Aboriginal population have multiple cultural groups including non-Aboriginal groups, rather than a single predominant population. Source: 2006 Census, Statistics Canada

Supplementary Table 2 Crude suicide rates and rate ratios by age group and region, 1993-2009

	Labrador			Newfoundland				
Age Group (years)	**Suicide deaths (n =)**	**P-Y**	**Crude rate[a] per 100,000 P-Y**	**Suicide deaths (n =)**	**P-Y**	**Crude rate[a] per 100,000 P-Y**	**RR (95% CI)**	
10 - 19	36	80,910	44.49	34	1,207,330	2.82	15.8	(9.6 - 26.0)
20 - 29	48	71,535	67.1	94	1,111,965	8.45	7.9	(5.5 - 11.4)
30 - 39	24	79,630	30.14	120	1,258,115	9.54	3.2	(1.9 - 4.9)
40 - 49	9	78,975	11.4*	130	1,367,645	9.51	1.2**	(0.5 - 2.3)
50+	11	94,125	11.7*	239	2,603,195	9.18	1.3**	(0.6 - 2.3)
Total	128	405,175	31.59	617	7,548,250	8.17	3.9	(3.2 - 4.7)

Notes: P-Y = Person-years; RR = Rate Ratio; CI = Confidence interval; Crude rates and rate ratios have been rounded.

[a] Crude rates are for both sexes (male and female) combined. *Relative Standard Error (RSE) for crude rate > 23%, therefore the rate estimate is less reliable and should be interpreted with caution. ** RR 95% CI includes 1, therefore rates are not significantly different

APPENDIX D: Chapter 5 – Review Protocol

Title

The global burden of suicide among Indigenous populations: a systematic review

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Background

Worldwide, Indigenous peoples experience substantial health inequities compared to non-Indigenous populations.[1,2] In high-income nations, the gap is largely due to non-communicable diseases and injuries,[1] whereas in low- and middle-income nations, disparities are due to infant mortality and communicable diseases.[1,2] In some high-income countries in particular, Indigenous populations experience a substantially elevated rates of suicide.[3-6] Previous reviews have synthesized the literature for specific populations and regions,[3,4,7-13] but have not provided a systematic and global investigation of suicide incidence amongst Indigenous populations.

Objectives

The objective of this study is to conduct a systematic review of the peer reviewed literature on suicide epidemiology amongst Indigenous populations globally. This study aims to report the incidence rates of suicide mortality in Indigenous populations, and compare rates to general and non-Indigenous populations to assess relative disparities. This review will report results in accordance with the PRISMA guidelines.[14]

Questions

This systematic review is guided by the following questions:

1. What are the patterns in suicide mortality in Indigenous populations worldwide?
2. What is the incidence rate ratio of suicide among Indigenous populations compared to general or non-Indigenous populations?

Search Strategy

We will combine search terms related to three concept areas: population (Indigenous), outcome (suicide), and study design (observational). Key and MeSH Term selection to identify global Indigenous populations is based on previous reviews in Indigenous health.[11,15-21] We will include terms related to geographic regions (ex. Greenland) because some studies use regions or countries with a high proportion of Indigenous people as a proxy for Indigenous status, and mortality data in many countries does not include individual-level Indigenous identifiers.

Search Terms

We will use the following search terms adapted for each database:

Table 1: Search Terms

Concept 1 (Population)	Concept 2 (outcome)	Concept 3 (Study design)
"first nation"	suicid*	"ecological study"
"first nations"		cohort
"pacific islander"	suicide [mesh]	"case control"
"pacific islanders"		"observational"
"torres strait islander"		"population-based"
"torres strait islanders"		epidemiolog*
aborigin*		incidence
africa*		mortality
alaska*		
aleut*		epidemiologic studies [mesh]
amerind*		incidence [mesh]
arctic		mortality [mesh]
aymara		
bushmen		
chukchi		
chukotka*		
circumpolar		
eskimo*		
greenland*		
hmong		
indian*		
indigen*		
inuit*		
inupiaq		
inupiat		
khanty		
maori*		
mapuche		
metis		
native*		
navaho*		
navajo*		

nenets
quechua
saami
sami
samoan*
siberia
skolt
tribal
tribe*
xingu*
yup'ik
yupik
zuni

"African continental ancestry group" [Mesh]
"American Native continental ancestry group" [Mesh]
"Asian continental ancestry group" [Mesh]
"Health Services, Indigenous"[Mesh]
"Oceanic ancestry group"[Mesh]
"arctic regions" [Mesh]
"ethnic groups" [mesh]

Search Databases

We will search the following databases with a search string customized for each based on the listed terms:

1. PubMed
2. MEDLINE
3. Embase
4. CINAHL
5. PsycINFO
6. Lilacs
7. SciELO

We will perform text word and Medical Subject Heading searches in each database as applicable. We will also hand-search the reference lists of included studies and previous reviews for additional eligible articles. Finally, we will conduct secondary searches in World Health Organization regional literature databases and select publications and databases focused on Indigenous health.

Types of studies to be included

This systematic review will include primary, observational studies of population-based data. Case reports, editorials and commentaries, reviews, qualitative designs, program evaluations, intervention or experimental studies, articles that have not been peer-reviewed or are not primary research, iterations, and those with duplicate data will also be excluded. We will not examine studies in the grey literature.

Inclusion Criteria

1. Design: Observational, population-based study that includes a cohort element in the design;
2. Population: Indigenous population that is identifiable at individual level or by geographic proxy;
3. Outcome: crude or standardized suicide mortality incidence rates;
4. Includes at minimum the population aged 15-65 years old.

Exclusion Criteria

1. Design: Case report/series, qualitative, review, editorial, intervention/experimental/program evaluation;
2. Not peer reviewed;
3. Not primary research (e.g. studies that re-reported rates calculated by another source or did not conduct original data analysis);
4. Indigenous people are not identifiable as a group for comparison (e.g. studies with area-based estimates where the Indigenous peoples accounted for less than 80% of the total population);
5. Study reporting on a specific strata only (e.g. specific method, age group, or sex);
6. Clinical subpopulation (e.g. prisoners, substance users);
7. Rates and count data in figures only.

We will not exclude papers on the basis of language, though we may miss papers written and indexed in non-European languages.

Condition or domain being studied
Suicide mortality

Population
Indigenous

Although there is no global consensus on the definition of Indigenous for the purpose of this review we will use the United Nations' 'working definition.[1,2] *Indigenous* is conceptualized as involving:

- Self-identification;
- Recognition by community;
- Connection to a specific territory;
- Distinct political, economic and social systems;
- Distinct language, culture, and beliefs;
- Form non-dominant groups of society;
- Maintain ancestral connections with environment and systems as a distinct people;
- Historical continuity with pre-colonial societies.

Intervention(s)
Not applicable.

Comparator(s)/Control
This review will consider non-Indigenous or general populations for the comparison groups, though a comparison population is not a requirement for inclusion.

Outcome(s)
Primary
Crude or age-standardized incidence rate.

Secondary
Measure of relative effect (incidence rate ratio).

If crude rates are not reported, but numerator (suicide deaths) and denominator (population) are provided, we will calculate rates. Similarly, for studies that do not report an incidence rate ratio but provide a comparator rate (or numerator and denominator data), we will calculate the rate ratio.

Data extraction (selection and coding)
Two authors will independently validate the search strategy. One author will remove duplicates, and two authors will then screen the titles and abstracts of all articles and remove those that are unambiguously ineligible. Two teams (with two authors in each) will review the full text of all screened-in articles to assess for eligibility against the inclusion and exclusion criteria. Any disagreements between authors on article eligibility will be resolved by discussion with the third author to reach consensus. Two authors will extract information from each eligible study using a standardized data extraction form developed for this study. The following details will be obtained from each paper: citation, country, design, sample characteristics (Indigenous group, age groups included, population count by gender and overall), comparison population, data source, study period, number of deaths, crude and standardized incidence rates, rate ratio, and confidence intervals.

Protocol for Title/Abstract Screening and Full Text Review
The title/abstract screening process includes 3 yes/no questions based on the study inclusion criteria. If all questions are answered 'yes' or 'maybe' for a given article, then it will be included in the full text review; 'no' answers result in the article being screened out. If the questions cannot be answered based on the abstract, then the article will be included in the full text review. The following questions will be used to assess eligibility:

1. Does the article study an identifiable Indigenous population or a region with a predominantly Indigenous population (example: Greenland)?
2. Does the study use an observational design with population-based data as defined by the inclusion criteria?
3. Does the article report a suicide incidence rate for the Indigenous population or report original count and population data?

Risk of bias (quality) assessment

Two authors will independently assess each included full text article using a modified version of the Ottawa-Newcastle Quality Assessment Scale for Cohort Studies.[22] This tool was selected because of its utility is assessing the quality of observational research.

Data Synthesis

We expect heterogeneity in the data from included studies in terms of case and population data sources used, study period, age and sex stratification, population size, and comparators. Therefore, we anticipate that a meta-analytic approach to pooling the data may not be possible. We will conduct a narrative review of studies that report incidence rate estimates and rate ratios. This will include descriptions of data sources, populations, methods, and findings. We will synthesize results in figures and tables, and in a narrative report.

Dissemination Plan

We will submit the final manuscript for publication in a peer-reviewed journal, and present the results at a conference. The manuscript will also be included in the doctoral thesis for one of the authors (NP).

Funding sources

None

APPENDIX E: Chapter 5 – Supplementary Methods

Search strategy

We combined search terms related to three concept areas: (1) population (Indigenous); (2) outcome (suicide); and (3) study design (observational). Term selection to identify global Indigenous populations was based on previous reviews in Indigenous health,[11,15-21] and combined key and MeSH terms adapted for each database. We used a combination of general terms that are common in the literature such as "indigenous," "native," and "aboriginal", geographic terms such as "arctic" and "circumpolar", nation-, tribe-, or group-specific terms such as Mapuche, Khanty, and Sámi. We also included terms that have been used historically and presently in some countries, but are viewed as derogatory in other contexts (ex. "Eskimo"). We included terms related to geographic regions because some studies use regions with a high proportion of Indigenous peoples as a proxy for Indigenous status because mortality data in many countries does not include individual-level ethnic identifiers. We used only English language terms in the primary search, however, the truncated root of our primary search terms, "indigen*" "suicid*" are the same in English, Spanish, Portuguese, and French.

To create the search strategy, we used a stepped procedure similar to a previous systematic review.[18] We conducted a pilot search with a preliminary list of Indigenous terms. We then removed a single term, re-ran the search, and compared the results. If the removal of a given term did not change the number of results; the removed term was deemed redundant, and removed from the final search string.

Search Terms in PubMed

Concept #1 (Outcome: Suicide)

(suicid*[Text Word]) OR "Suicide"[Mesh]

AND

Concept #2 (Population: Indigenous Peoples)

("first nation"[Text Word]) OR "first nations"[Text Word]) OR "pacific islander"[Text Word]) OR "pacific islanders"[Text Word]) OR "torres strait islander"[Text Word]) OR "torres strait islanders"[Text Word]) OR aborigin*[Text Word]) OR africa*[Text Word]) OR alaska*[Text Word]) OR aleut*[Text Word]) OR amerind*[Text Word]) OR arctic[Text Word]) OR aymara[Text Word]) OR bushmen[Text Word]) OR chukchi[Text Word]) OR chukotka*[Text Word]) OR circumpolar[Text Word]) OR eskimo*[Text Word]) OR greenland*[Text Word]) OR hmong[Text Word]) OR indian*[Text Word]) OR indigen*[Text Word]) OR inuit*[Text Word]) OR inupiaq[Text Word]) OR inupiat[Text Word]) OR khanty[Text Word]) OR maori*[Text Word]) OR mapuche[Text Word]) OR metis[Text Word]) OR native*[Text Word]) OR navaho*[Text Word]) OR navajo*[Text Word]) OR nenets[Text Word]) OR quechua[Text Word]) OR saami[Text Word]) OR sami[Text Word]) OR samoan*[Text Word]) OR siberia*[Text Word]) OR skolt[Text Word]) OR tribal[Text Word]) OR tribe*[Text Word]) OR xingu*[Text Word]) OR yup'ik[Text Word]) OR yupik[Text Word]) OR zuni[Text Word]) OR

"African continental ancestry group"[Mesh]) OR "African continental ancestry group"[Mesh]) OR "Asian continental ancestry group"[Mesh]) OR "Health Services, Indigenous"[Mesh]) OR "Oceanic ancestry group"[Mesh]) OR "arctic regions"[Mesh]) OR "ethnic groups"[mesh]

AND

Concept #3 (Study Design: Observational)
("ecological study"[Text Word]) OR "case control"[Text Word]) OR cohort[Text Word]) OR observational[Text Word]) OR "population based"[Text Word]) OR epidemiolog*[Text Word]) OR incidence[Text Word]) OR mortality[Text Word]) OR "epidemiologic studies" [Mesh]) OR "incidence" [Mesh]) OR "mortality" [Mesh]

We conducted an secondary search to compare results based on the included search terms with an expanded and comprehensive list of terms identified in previous reviews.[11,15-19,21] This secondary search included terms for specific tribal groups and nations such as Innu, Batwa, Maasai, and Cherokee. No additional eligible studies were identified; this outcome validated the original search strategy.

Throughout the paper, to we refer specific nations, tribal groups, or peoples (ex. Navajo). When this is not possible, we use country- or region-specific terms (ex. Aboriginal and Torres Strait Islander), or the general term, Indigenous peoples.

Databases

We conducted computerized searches of the following electronic literature databases from inception until June 1, 2017: PubMed, MEDLINE, Embase, CINAHL, PsycINFO, Lilacs, and SciELO. In effort to identify additional studies, especially those with data from low-and-middle income countries, we hand searched the reference lists of previous reviews on suicide in Indigenous populations, and select reviews of suicide epidemiology in Africa and South Asia.[3,4,7-13,20,23-50] We also conducted searches with the term "suicide" in all fields in supplementary databases and peer reviewed journals focused on Indigenous peoples or regional populations. The following supplementary sources were examined:

Supplementary Databases:

1. Bibliography of Native Americans (EBSCO)
2. Arctic and Antarctic Regions (EBSCO)
3. Indigenous Studies Portal (University of Saskatchewan)
4. Circumpolar Health Bibliographic Database (University of Alberta)
5. International Journal of Circumpolar Health Special Issue (2015, Volume 73, Issue 1): Suicide and Resilience in Circumpolar Populations
6. WHO Journal Database: Western Pacific Region Index Medicus
7. WHO Journal Database: African Index Medicus
8. WHO Journal Database: Index Medicus for South-East Asian Region

Peer-Reviewed Journals:

1. Journal of Aboriginal Health/International Journal of Indigenous Health
2. Pimatisiwin: A Journal of Aboriginal and Indigenous Community Health
3. Aboriginal Policy Studies
4. White Cloud: Journal of American Indian and Alaska Native Mental Health

Types of studies to be included

This systematic review included primary, observational studies of population-based data. We excluded case reports, editorials and commentaries, reviews, qualitative designs, program evaluations, intervention or experimental studies, articles that were not peer-reviewed or not primary research, iterations, and those with duplicate data. We did not examine studies reported in books, theses/dissertations, government reports, or elsewhere in the grey literature.

Inclusion Criteria

5. Design: Observational, population-based study that included a cohort element;
6. Population: Indigenous population that is identifiable at individual level or by geographic proxy;
7. Outcome: crude or standardized suicide mortality incidence rates;
8. Included at minimum the population aged 15-65 years old.

Exclusion Criteria

8. Design: Case report/series, qualitative, review, editorial, intervention/experimental/program evaluation;
9. Not peer reviewed;
10. Not a primary research (e.g. studies that re-reported rates calculated by another source or did not conduct original data analysis);
11. Study focused on specific subgroup (specific method, age group, or sex);
12. Clinical subpopulation (i.e. prisoners, substance users);
13. Indigenous people are not identifiable as a group for comparison (e.g. studies with area-based estimates where the Indigenous peoples accounted for less than 80% of the total population)

We did not exclude papers on the basis of language, though we may have missed papers that were written and indexed in non-European languages.

Protocol for Abstract/Title Screening and Full Text Review

The abstract/title screening process included three yes/no questions based on the study inclusion criteria. If all questions were answered ‘yes’ or ‘maybe’ for a given article, then it was included in the full text review; ‘no’ answers resulted in the article being screened out. If the questions could not be answered based on the abstract, then the article was included in the full text review. The following questions were used:

1. Does the article study an identifiable Indigenous population or a region (or territory/state) with a predominantly Indigenous population (ex. Vanuatu, Greenland, etc.)?

2. Does the article use an population-based, observational design with a cohort element?
3. Does the article report a suicide mortality incidence rate for the Indigenous population or provide numerator and denominator data?

During the title and abstract screening stage, we excluded papers based on the follow-criteria:

1. Duplicates;
2. Not peer reviewed;
3. Did not examine suicide mortality;
4. Did not examine a specific Indigenous population or geographic proxy >80%;
5. Did not include a cohort element in the study design;
6. Examined only suicide deaths by a specific method (i.e poisoning, firearm);
7. Was not a population-based study (i.e. focused on a specific subpopulation only such as prisoners, substance users, men, or children).

During the full text review stage, we further excluded papers based on the following related criteria:

1. Did not include, at minimum, age groups between 15-65 years;
2. Did not include an identifiable Indigenous population or geographic proxy at the individual or ecological level;
3. Did not include crude, age-specific or adjusted suicide mortality rates or sufficient data (count and population) in numerator and denominator to estimate rates for an Indigenous population;
4. Reported rates in figures only;
5. Did not conduct the primary data analysis (i.e. systematic review or reproduced rates from a government report) and/or was not a primary study; and
6. Reported incidence rates from same dataset and with a period of overlap as another paper, but was less comprehensive (i.e. examined a shorter period).

Data extraction and Analysis

Two authors extracted information from each eligible study using a standardized data extraction form developed for this study. In the absence of a reported incidence rate (IR), we calculated crude incidence rates (number of deaths/population) if numerator (suicide deaths, n=) and denominator (Indigenous population count, n=) data was provided in accordance with inclusion criteria. Similarly, when the measure of relative effect was not reported, we calculated an incidence rate ratio (IRR) if a rate was reported or derived for an Indigenous population and a comparison population. The rate ratio was calculated as $IRR=IR_{Indigenous}/IR_{Comparison}$ and reported in figures and tables.

APPENDIX F: Chapter 5 – Quality Assessment Tool

Quality Assessment

We conducted quality assessments of included studies with a modified version of the Newcastle-Ottawa Scale (NOS) Quality Assessment Scale for Cohort Studies.[22] We selected this tool because of the utility for assessing the quality of observational research, and adapted the scale to reflect the specific needs of our study. We modified the scale by removing two items that were not applicable to our study (*Selection* item #2: selection of non exposed cohort; *Selection* item #4: demonstration that outcome of interest was not present at start of study). Three items from the NOS corresponded with study eligibility criteria: *Selection* item #1: representativeness of the exposed cohort; *Outcome* item #2: was the follow-up long enough to occur; and *Outcome* item #3: adequacy of follow-up of cohorts. All included studies scored a point for these items by virtue of eligibility for inclusion in the review. Therefore, we assessed quality based on a the following items from each domain, adapted for the study:

SELECTION (1 point max.)

1) Ascertainment of exposure (Data source and method of determining Indigenous identity)
    a) secure record (e.g., administrative source or registry), self report (e.g. linked to census), or community informant (e.g. interview with family) = **1 point**
    b) geographic proxy
    c) no description

COMPARABILITY (1 point max.)

2) Comparability of cohorts on the basis of design or analysis (
    a) study controlled for age = **1 point**
    b) study reported crude rates only
    c) no description

OUTCOME (2 point max.)

3) Assessment of outcome (Data source)
    a) independent blind assessment: Physician certification or medico-legal records (death certificate in vital statistics, medical examiners report, other governmental registry, or coroner/police records) = **1 point**
    b) verbal report, verbal autopsy by non-physician, or other field work
    c) no description

4) Adequacy of Ascertainment of suicide data
    a) Near complete capture of all cases of suicide in population (Linked and cross-referenced multiple data sources) = **1 point**
    b) Cases identified with a single, routinely collected data source (some misclassification or under-reporting expected) = **1 point**
    c) Specific threat to capture of suicide cases is reported

We accounted for limitations related to under-counting of Indigenous peoples in the quality assessments. Studies that used data with Indigenous self-identification were rated the highest quality, whereas studies with geographic proxy or observer-determined Indigenous status, were rated the lowest. To assess the comparability of results within each paper, we selected age as the primary factor and assigned a score of 1 in this domain for studies that adjusted for this factor in their rate estimation.

Our modified scale includes the assessment of three domains (Selection, Comparability, and Outcome), with a maximum score of one point each for the first two domains, and two points for Outcome. On the modified four point scale, we considered papers with a score of 1 or less to be poor quality, two to three of moderate quality, and four of high quality. Two authors independently assessed each study with the modified NOS. To resolve disagreements, we reached consensus through discussion or by consultation with a third author.

Supplementary Table 1 Quality assessments with modified Newcastle-Ottawa Scale

First Author (Year)	NOS
International, n=4	
Stevenson (1998)[51]	4
Bramley (2004)[52]	4
Hezel (1989)[53]	1
Booth (1999)[54]	3
European Region, n=8	
Soininen (2008)[55]	3
Bjerregaard (2015)[56]	2
Thorslund (1989)[57]	3
Bjorksten (2005)[58]	3
Klomek (2016)[59]	4
Silviken (2009)[60]	3
Sumarokov (2014)[61]	4
Hassler (2005)[62]	3
Western Pacific Region (Oceania), n=22	
Pridmore (2009)[63]	4
Measey (2006)[64]	4
Clayer (1991)[65]	3
Campbell (2016)[66]	4
De Leo (2011)[67]	4
Cantor (1997)[68]	3
Langley (2000)[69]	3
Langley (1990)[70]	3
Beautrais (2006)[71]	4
Rubinstein (1983)[72]	2
Hezel (1984)[73]	2
Pridmore (1995)[74]	3
Price (1975)[75]	2
Haynes (1984)[76]	2

Ree (1971)[77]	2
Pridmore (1994)[78]	3
Booth (2010)[79]	2
Parker (1966)[80]	2
Smith (1981)[81]	1
Pridmore (1997)[82]	2
Vivili (1999)[83]	1
De Leo (2013)[84]	2
Western Pacific (East Asia), n=9	
Telisinghe (2014)[85]	2
Wang (1997)[86]	2
Lu (2013)[87]	2
Ali (2014)[88]	2
Jollant (2014)[89]	1
Hsieh (1994)[90]	2
Cheng (1992)[91]	3
Wen (2004)[92]	2
Liu (2011)[93]	2
Region of the Americas (Brazil & Canada), n=20	
Machado (2015)[94]	3
Orellana (2016)[95]	4
Coloma (2006)[96]	3
Souza (2013)[97]	4
Mao (1992)[98]	4
Isaacs (1998)[99]	2
Wotton (1985)[100]	3
Hislop (1987)[101]	4
Macaulay (2004)[102]	3
Ross (1986)[103]	3
Chandler (1998)[104]	3
Young (1983)[105]	2
Pollock (2016)[106]	3
Fox (1984)[107]	2
Garro (1988)[108]	3
Spaulding (1985)[109]	2
Mao (1986)[110]	4
Malchy (1997)[111]	4
Penney (2009)[112]	3
Butler (1965)[113]	2
Region of the Americas (Alaska, USA), n=12	
Marshall (1998)[114]	2
Kraus (1979)[115]	2
Kettl (1991)[116]	2
Holck (2013)[117]	3
Hlady (1988)[118]	3
Forbes (1988)[119]	3
Day (2009)[120]	3
Day (2003)[121]	4
Andon (1997)[122]	3

Travis (1983)[123]	2
Travis (1984)[124]	2
Wexler (2012)[125]	3
Region of the Americas (USA), n=24	
Lester (1994)[126]	2
Howard (2014)[127]	3
Young (1993)[128]	2
Ogden (1970)[129]	3
Sievers (1975)[130]	2
Conrad (1974)[131]	4
Copeland (1989)[132]	3
Sievers (1990)[133]	4
Kalish (1968)[134]	2
Herne (2014)[135]	4
Lester (1995)[136]	2
Broudy (1983)[137]	4
Becker (1990)[138]	4
Levy (1965)[139]	2
Van Winkle (1993)[6]	4
Martin (2010)[140]	3
Humphrey (1982)[141]	2
Simpson (1983)[142]	2
Levy (1987)[143]	3
Shore (1975)[144]	2
Christensen (2013)[145]	4
Wissow (2001)[146]	3
Miller (1979)[147]	2
Mullany (2009)[148]	4
Mean NOS Score	**2.79**
NOS=Newcastle-Ottawa Scale score	

APPENDIX G: Chapter 5 – PRIMSA Checklist

Section/topic	#	Checklist item	Reported on page #
TITLE Global incidence of suicide among Indigenous Peoples: a systematic review			
Title	1	Identify the report as a systematic review, meta-analysis, or both.	1
ABSTRACT			
Structured summary	2	Provide a structured summary including, as applicable: background; objectives; data sources; study eligibility criteria, participants, and interventions; study appraisal and synthesis methods; results; limitations; conclusions and implications of key findings; systematic review registration number.	2
INTRODUCTION			
Rationale	3	Describe the rationale for the review in the context of what is already known.	3-4
Objectives	4	Provide an explicit statement of questions being addressed with reference to participants, interventions, comparisons, outcomes, and study design (PICOS).	3-4
METHODS			
Protocol and registration	5	Indicate if a review protocol exists, if and where it can be accessed (e.g., Web address), and, if available, provide registration information including registration number.	Supplement 1
Eligibility criteria	6	Specify study characteristics (e.g., PICOS, length of follow-up) and report characteristics (e.g., years considered, language, publication status) used as criteria for eligibility, giving rationale.	5 + Supplement 2
Information sources	7	Describe all information sources (e.g., databases with dates of coverage, contact with study authors to identify additional studies) in the search and date last searched.	5 + Supplement 2
Search	8	Present full electronic search strategy for at least one database, including any limits used, such that it could be repeated.	5 + Supplement 2
Study selection	9	State the process for selecting studies (i.e., screening, eligibility, included in systematic review, and, if applicable, included in the meta-analysis).	6 + Supplement 2

Data collection process	10	Describe method of data extraction from reports (e.g., piloted forms, independently, in duplicate) and any processes for obtaining and confirming data from investigators.	6
Data items	11	List and define all variables for which data were sought (e.g., PICOS, funding sources) and any assumptions and simplifications made.	6 + Supplement 2
Risk of bias in individual studies	12	Describe methods used for assessing risk of bias of individual studies (including specification of whether this was done at the study or outcome level), and how this information is to be used in any data synthesis.	7 + Supplement 2
Summary measures	13	State the principal summary measures (e.g., risk ratio, difference in means).	6
Synthesis of results	14	Describe the methods of handling data and combining results of studies, if done, including measures of consistency (e.g., I^2) for each meta-analysis.	6
Risk of bias across studies	15	Specify any assessment of risk of bias that may affect the cumulative evidence (e.g., publication bias, selective reporting within studies).	7-8
Additional analyses	16	Describe methods of additional analyses (e.g., sensitivity or subgroup analyses, meta-regression), if done, indicating which were pre-specified.	n/a
RESULTS			
Study selection	17	Give numbers of studies screened, assessed for eligibility, and included in the review, with reasons for exclusions at each stage, ideally with a flow diagram.	8 + Figure 1
Study characteristics	18	For each study, present characteristics for which data were extracted (e.g., study size, PICOS, follow-up period) and provide the citations.	12-16 + Supplement
Risk of bias within studies	19	Present data on risk of bias of each study and, if available, any outcome level assessment (see item 12).	Supplement
Results of individual studies	20	For all outcomes considered (benefits or harms), present, for each study: (a) simple summary data for each intervention group (b) effect estimates and confidence intervals, ideally with a forest plot.	7-9 + Supplement 3
Synthesis of results	21	Present results of each meta-analysis done, including confidence intervals and measures of consistency.	n/a
Risk of bias across studies	22	Present results of any assessment of risk of bias across studies (see Item 15).	12-13 + Supplement

Additional analysis	23	Give results of additional analyses, if done (e.g., sensitivity or subgroup analyses, meta-regression [see Item 16]).	n/a
DISCUSSION			
Summary of evidence	24	Summarize the main findings including the strength of evidence for each main outcome; consider their relevance to key groups (e.g., healthcare providers, users, and policy makers).	9-11
Limitations	25	Discuss limitations at study and outcome level (e.g., risk of bias), and at review-level (e.g., incomplete retrieval of identified research, reporting bias).	12-13
Conclusions	26	Provide a general interpretation of the results in the context of other evidence, and implications for future research.	9-10
FUNDING			
Funding	27	Describe sources of funding for the systematic review and other support (e.g., supply of data); role of funders for the systematic review.	7, 15

APPENDIX H: Chapter 5 – Supplementary Results

Supplementary Table 1: Characteristics of included studies

First Author (Year)	**Country (Region)**	**Indigenous Peoples, Nation, or Tribe***	**Indigenous Population estimate**	**Data source for Indigenous identity of decedents**	**Comparison Population**	**Age limits†**	**Mortality data source‡**	**Type of rate (Standard population)**
International, n=4								
Stevenson (1998)[51]	Australia and USA	American Indians, Aboriginal and Torres Strait Islander (excluding Queensland)	n/r	Death certificate	Non–Indigenous (USA and Australia)	All ages	Registry	Age adjusted (WHO Standard Population)
Bramley (2004)[52]	International (Aotearoa/New Zealand, Australia, Canada, and USA)	Maori, Aboriginal and Torres Strait Islander, First Nation (“on reserve”), and American Indian and Alaska Native	n/r	Varies by country (Linkage with census, vital statistics, and administrative registry)	Non–Indigenous	All ages	Registry	Age adjusted (World Standard Population)
Hezel (1989)[53]	International (Federated States of Micronesia [Yap, Chuuk, Pohnpei, Kosrae], Palau, and Marshall Islands)	Yapese, Chuukese, Pohnpeian, Kosraen, Palauan, Marshallese	142,298[¶]	Geographic proxy	n/r	All ages	Linked	Crude
Booth (1999)[54]	International (Papua New Guinea, Fiji, Vanuatu, FSM [Pohnpei, Kosrae, Yap, and Chuuk], Marshall Islands, Palau, American Samoa, French Polynesia, and Western Samoa)	Pacific peoples (iTuakei, ni–Vanuatu, Yapese, Chuukese, Pohnpeian, Kosraen, Marshallese, Palauan,Samoan, Polynesian)	Range: 16,500–4,216,100[§]	Geographic proxy for all states, except iTuakei (Fijians) in Fiji	Guam	≥5 years	Police records, health records, case studies, and coroner	Age adjusted (WHO Standard Population)
European Region, n=8								

Soininen (2008)[55]	Finland (Northern)	Sámi	2,091	Linked to self–reported identity in census	Non–Sámi	All ages	Registry	Crude
Bjerregaard (2015)[56]	Greenland	Kalaallit (Inuit)	57,000	Geographic proxy	n/r	≥10 years	Linked	Crude
Thorslund (1989)[57]	Greenland	Kalaallit (Inuit)	n/r	Place of birth in vital registration is a proxy identifier	n/r	All ages	Linked	Crude
Bjorksten (2005)[58]	Greenland (West region)	Kalaallit (Inuit)	44,217	Place of birth in vital registration is a proxy identifier	n/r	All ages	Registry	Crude
Klomek (2016)[59]	Israel	Bedouin	n/r	Death Certificate	Arab population (Israel)	≥15 years	Registry	Age adjusted (2009 Israel population)
Silviken (2009)[60]	Norway (Northern)	Sámi	19,801[‖]	Census linked	General population (Norway)	All ages	Registry	Crude
Sumarokov (2014)[61]	Russia (Nenets Autonomous Okrug)	Nenets	7,504	Passport and medical records	Non–Indigenous (NAO)	All ages	Linked	Age adjusted (European Standard Population)
Hassler (2005)[62]	Sweden	Sámi	41,721	Linked administrative registry	n/r	All ages	Registry	Crude
Western Pacific Region (Oceania), n=22								
Pridmore (2009)[63]	Australia (Northern Territory)	Aboriginal and Torres Strait Islander	n/r	Coroner/Medical Examiner records	Non–Indigenous (Northern Territory)	All ages	Medico–legal investigation records or database	Age adjusted (n/r)
Measey (2006)[64]	Australia (Northern Territory)	Aboriginal and Torres Strait Islander	n/r	Vital registration	Non–Indigenous (Northern Territory)	≥10 years	Linked	Age adjusted (1991 Australian population)

Clayer (1991)[65]	Australia (South Australia)	Aboriginal and Torres Strait Islander	13,298	Probabilistic identification based on name, place of residence, and local consultation	Non–Indigenous South Australia)	≥10 years	Medico–legal investigation records or database	Crude
Campbell (2016)[66]	Australia (Kimberley)	Aboriginal and Torres Strait Islander	11,050	Medical records	Non–Indigenous	All ages	Linked	Age and sex adjusted (n/r)
De Leo (2011)[67]	Australia (Queensland)	Aboriginal and Torres Strait Islander	n/r	Psychological autopsy interview by police with family	Non–Indigenous (Australia)	≥5 years	Linked	Age adjusted (WHO World Standard Population)
Cantor (1997)[68]	Australia (Queensland)	Aboriginal and Torres Strait Islander	n/r	n/r	General population (Queensland)	15–64 years	Linked	Age adjusted (n/r)
Langley (2000)[69]	Aotearoa/New Zealand	Māori	n/r	"Sole Māori" code in Vital Statistics registry	n/r	All ages	Registry	Crude
Langley (1990)[70]	Aotearoa/New Zealand	Māori	n/r	n/r	Non–Māori	≥14 years	Registry	Age adjusted (n/r)
Beautrais (2006)[71]	Aotearoa/New Zealand	Māori	586,000	Census linked and Interview with family or community informant	Non–Māori	All ages	Registry	Age adjusted (n/r)
Rubinstein (1983)[72]	Federated States of Micronesia	Micronesian	115,000	Geographic proxy	n/r	≥15 years	Linked	Crude
Hezel (1984)[73]	Federated States of Micronesia (Chuuk)	Chuukese	37,488**	Geographic proxy	n/r	≥10 years	Linked	Crude
Pridmore (1995)[74]	Fiji	iTaukei	n/r	Medical records	Indian (Fiji)	All ages	Hospital	Crude
Price (1975)[75]	Fiji	iTaukei	n/r	n/r	Indian (Fiji)	All ages	Linked	Crude

Haynes (1984)[76]	Fiji (Macuata)	iTaukei	8,111	n/r	Indian (Fiji)	≥15 years	Police	Crude
Ree (1971)[77]	Fiji (Macuata)	iTaukei	9,950	n/r	Indian (Fiji)	All ages	Police	Crude
Pridmore (1994)[78]	Fiji (Western Division)	iTaukei	n/r	Medical records	Indian (Fiji)	All ages	Hospital	Crude
Booth (2010)[79]	Guam	Chamorro	n/r	n/r	Filipino (Guam)	All ages	Registry	Crude
Parker (1966)[80]	Papua New Guinea	Pacific peoples	n/r	n/r	European (Papua New Guinea)	All ages	Linked	Crude
Smith (1981)[81]	Papua New Guinea (Southern Highlands)	Huli people	50,000	n/r	n/r	All ages	Linked	Crude
Pridmore (1997)[82]	Solomon Islands (Honiara area)	Melanesian	75,000	Geographic proxy	n/r	All ages	Hospital	Crude
Vivili (1999)[83]	Tonga	Tongan	98,200†	Geographic proxy	n/r	All ages	Police	Crude
De Leo (2013)[84]	Vanuatu	ni–Vanuatu	245,619	Geographic proxy	n/r	All ages	Registry	Crude
Western Pacific (East Asia), n=9								
Telisinghe (2014)[85]	Brunei Darussalam	Indigenous tribes including Kedayan, Belait, Tutong, Bisya, Murut, Dusun and Iban	14,000	n/r	Malay–Brunei	≥10 years	Linked	Crude
Wang (1997)[86]	China (Hohhot, Inner Mongolia)	Mengs, Huis	27,000 (Mengs), 21,600 (Huis)	n/r	Han Chinese	All ages	Linked	Crude

Lu (2013)[87]	China (Yunnan Province)	Dai, Yi, Lu si, Hui, Ha ni, A chang, Pumi, Bai, Yao, Zhuang, Miao, Meng gu, and Jing po ethnic minority groups	2,977,346	n/r	Han Chinese	All ages	Linked	Crude
Ali (2014)[88]	Malaysia (Sabah and Sarawak)	Bumiputera of Sabah and Sarawak	2,981,300	n/r	Malay	≥5 years	Linked	Crude
Jollant (2014)[89]	Philippines	Palawan	1,192	Interview with family or community informant	Matched Palawan villages	All ages	Informants	Crude
Hsieh (1994)[90]	Taiwan	Atayal, Bunun, Paiwan	200,000	Geographic proxy	General population (Taiwan)	All ages	Registry	Crude
Cheng (1992)[91]	Taiwan	Atayal, Ami, Bunun, Paiwan	n/r	Interview with family or community informant	General population (Taiwan)	All ages	Registry	Crude
Wen (2004)[92]	Taiwan ("Aboriginal townships")	Indigenous peoples	200,537	Geographic proxy	General population (Taiwan)	All ages	Registry	Crude
Liu (2011)[93]	Taiwan (East)	Ami, Atayal	n/r	n/r	Han Chinese (Taiwan)	≥15 years	Linked	Crude
Region of the Americas (Brazil and Canada), n=20								
Machado (2015)[94]	Brazil	Indigenous peoples	n/r	Linked to self–reported identity in census	White population (Brazil)	≥10 years	Registry	Crude
Orellana (2016)[95]	Brazil (Mato Grosso do Sul)	Guarani–Kaiowá, Guarani–Ñandeva, and Terena	75,000	Linked to self–reported identity in census	Non–indigenous	≥9 years	Registry	Age adjusted (WHO Standard Population)

Coloma (2006)[96]	Brazil (Mato Grosso do Sul)	Indigenous tribes: Kadiwe'u, Guato, Ofaie´–Xavante, Guarani–Kaiowá, Guarani–Ñandeva, and Terena	53,325	Census linked	General population (Brazil)	All ages	Linked	Crude
Souza (2013)[97]	Brazil (Amazonas)	Indigenous peoples	184,764[‡‡]	Self–reported in census	Non–Indigenous (Brazil)	All ages	Registry	Age adjusted (WHO World Standard Population)
Mao (1992)[98]	Canada	First Nation[¶]	n/r	Linked to administrative registry	General population (Canada)	0–64 years	Registry	Age adjusted (1981 Canadian population)
Isaacs (1998)[99]	Canada (NWT)	Inuit & Dene	n/r	n/r	Non–Aboriginal and Western NWT	All ages	Medico–legal investigation records or database	Crude
Wotton (1985)[100]	Canada (Labrador)	Innu and Inuit	2,500	n/r	General population (Canada)	All ages	Linked	Age adjusted (n/r)
Hislop (1987)[101]	Canada (British Columbia)	First Nation[¶]	55,000	Linked to administrative registry	Non–Indigenous (British Columbia)	All ages	Registry	Age adjusted (1971 Canadian Census)
Macaulay (2004)[102]	Canada (Kivalliq, Nunavut)	Inuit	7,131	Geographic proxy	General population (Canada)	All ages	Linked	Age adjusted (1991 Canadian Standard Population)
Ross (1986)[103]	Canada (Norway House Cree Nation, Manitoba)	Cree[¶]	2,822	Linked to administrative registry	Non–Indigenous population living on reserve	All ages	Hospital	Crude
Chandler (1998)[104]	Canada (British Columbia)	Native	n/r	Coroner/Medical Examiner records	General population (British Columbia)	All ages	Medico–legal investigation records or database	Crude
Young (1983)[105]	Canada (Sioux Lookout Zone, Northwest Ontario)	Cree–Ojibway	10,000	n/r	n/r	All ages	Linked	Crude

Pollock (2016)[106]	Canada (Labrador)	Innu and Inuit	Innu (1,815), Inuit (2,415)	Geographic proxy	General population (Newfoundland)	≥10 years	Registry	Age adjusted (1991 Canadian population)
Fox (1984)[107]	Canada (Wikwemikong Unceded Indian Reserve, Ontario)	Anishnaabe	3,000	n/r	n/r	All ages	Linked	Crude
Garro (1988)[108]	Canada (Manitoba)	First Nation¶	43,000	Probabilistic identification based on name, place of residence, and local consultation	n/r	All ages	Linked	Crude
Spaulding (1985)[109]	Canada (Northwest Ontario)	Ojibway	3,005	n/r	n/r	All ages	Linked	Crude
Mao (1986)[110]	Canada (7 provinces)§§	First Nations ("On Reserve")	168,529	Linked to administrative registry	General population (Canada)	1–69 years	Registry	Age adjusted (1971 Canadian Standard Population)
Malchy (1997)[111]	Canada (Manitoba)	First Nations and Métis	n/r	Coroner/Medical Examiner records	Non–Indigenous (Manitoba)	≥10 years	Medico–legal investigation records or database	Age adjusted (1991 Canadian Census population of Manitoba)
Penney (2009)[112]	Canada (Nunavik, Quebec and Nunavut)	Inuit	20,489 (Nunavut), 7,628 (Nunavik)	Geographic proxy	n/r	All ages	Registry	Age adjusted (2001 Inuit population)
Butler (1965)[113]	Canada (Yukon, NWT, Nunavut)	Inuit and First Nation	15,440‖‖	n/r	Non–Indigenous (Yukon, NWT, Nunavut)	All ages	Linked	Crude
Region of the Americas (Alaska, USA), n=12								
Marshall (1998)[114]	USA (Alaska)	Yup'ik, Inupiat, and Athabascan	25,000	n/r	General population (Alaska)	All ages	Medico–legal investigation records or database	Crude

Kraus (1979)[115]	USA (Alaska)	Alaska Native	56,477	n/r	General population (USA)	≥15 years	Registry	Crude
Kettl (1991)[116]	USA (Alaska)	Alaska Native	n/r	n/r	General population (USA)	All ages	Registry	Crude
Holck (2013)[117]	USA (Alaska)	Alaska Native	138,312	n/r	White population (USA)	All ages	Registry	Age adjusted (2000 US Standard Population)
Hlady (1988)[118]	USA (Alaska)	Alaska Native	n/r	n/r	White population (Alaska, USA)	All ages	Linked	Age Adjusted (n/r)
Forbes (1988)[119]	USA (Alaska)	Alaska Native	n/r	n/r	White population (Alaska, USA)	≥15 years	Registry	Age adjusted (1988 US Census)
Day (2009)[120]	USA (Alaska)	Alaska Native	97,012	n/r	White population (Alaska, USA)	All ages	Registry	Age adjusted (2000 US Standard Population)
Day (2003)[121]	USA (Alaska)	Alaska Native	91,300	Death certificate	White Population (USA)	All ages	Registry	Age adjusted (1940 Standard million)
Andon (1997)[122]	USA (Alaska)	Athabascan	6,041	Linked to administrative registry	American Indians	5–65 years	Linked	Crude
Travis (1983)[123]	USA (Northwestern Alaska)	Alaska Native	n/r	n/r	n/r	All ages	Linked	Crude
Travis (1984)[124]	USA (NANA and Arctic Slope, Alaska)	Inupiat	7,345	n/r	n/r	All ages	Linked	Crude
Wexler (2012)[125]	USA (Northwestern Alaska)	Alaska Native	7,965	n/r	n/r	All ages	Linked	Age and sex adjusted (2000 US Census, Northwest Alaska)
Region of the Americas (USA), n=24								

Lester (1994)[126]	USA	American Indian	n/r	n/r	White population (USA)	≥15 years	Registry	Crude
Howard (2014)[127]	USA	American Indian and Alaska Native (non–Hispanic)	>2,000,000	n/r	Non–Hispanic White population (USA)	All ages	Registry	Age adjusted (2000 US Standard Population)
Young (1993)[128]	USA (12 Indian Health Services Areas)	American Indian and Alaska Native	n/r	n/r	General population (USA)	≥15 years	Registry	Crude
Ogden (1970)[129]	USA (24 Reservation states west of Mississippi)	American Indian and Alaska Native	630,000	n/r	General population (USA)	All ages	Registry	Age adjusted (1940 US resident population)
Sievers (1975)[130]	USA (Arizona)	Apache, Akimel O'odham, and other American Indian tribes	40,361	n/r	n/r	≥10 years	Linked	Crude
Conrad (1974)[131]	USA (Arizona)	Tohono O'odham	12,179	Indian Health Service Registry	n/r	All ages	Linked	Age adjusted (n/r)
Copeland (1989)[132]	USA (Florida)	American Indian	11,050	Coroner/Medical Examiner records	General population (Dade County, Florida)	All ages	Medico–legal investigation records or database	Crude
Sievers (1990)[133]	USA (Gila River Indian Community, Arizona)	Akimel O'odham	4,915	Death Certificate	General population (USA)	All ages	Linked	Age and sex adjusted (1980 US Population)
Kalish (1968)[134]	USA (Hawai‘i)	Kānaka Maoli (Native Hawaiian)	n/r	n/r	White population (Hawai‘i, USA)	≥14 years	Linked	Crude
Herne (2014)[135]	USA (all Indian Health Service Areas)	American Indian and Alaska Native	n/r	Death certificate and/or linkage between Indian Health Service registration and National Death Index	White populations (USA by region)	All ages	Registry	Age adjusted (2000 US Standard Population)

Lester (1995)[136]	USA (Lower 48 states)	American Indian and Alaska Native	Range by state: 984 – 166,464	n/r	White population (USA)	All ages	Registry	Crude
Broudy (1983)[137]	USA (New Mexico and Arizona)	Navajo	162,303	Indian Health Service Registry	General population (USA)	All ages	Registry	Age adjusted (1940 US population)
Becker (1990)[138]	USA (New Mexico)	American Indian	n/r	Death certificate	White population (USA)	≥15 years	Registry	Age adjusted (US 1970 Standard Population)
Levy (1965)[139]	USA (New Mexico)	Navajo	87,000	n/r	General population (New Mexico, USA)	≥10 years	Linked	Crude
Van Winkle (1993)[6]	USA (New Mexico)	Apache, Navajo, and Pueblo	58,936 (Navajo)	Death Certificate	General population (USA)	≥5 years	Linked	Age adjusted (1940 US resident population)
Martin (2010)[140]	USA (North Carolina)	American Indian	n/r	Linked to administrative registry	White population (USA)	≥10 years	Linked	Crude
Humphrey (1982)[141]	USA (North Carolina)	Lumbee and Cherokee	n/r	n/r	Population of adjacent counties (North Carolina)	All ages	Medico–legal investigation records or database	Crude
Simpson (1983)[142]	USA (North–eastern Arizona)	Hopi	9,406	n/r	General population (USA)	All ages	Linked	Crude
Levy (1987)[143]	USA (Northern Arizona)	Hopi	7,600	Linked to administrative registry	Yavapai county (primarily non–Indigenous population)	All ages	Linked	Crude
Shore (1975)[144]	USA (Pacific Northwest)	American Indian	23,921	n/r	n/r	All ages	Linked	Crude
Christensen (2013)[145]	USA (South Dakota)	American Indian	82,073	Funeral directors consulted families and reported on death certificate	White population (South Dakota, USA)	All ages	Registry	Age adjusted (2000 US Standard Population)

Wissow (2001)[146]	USA (Southwest)	American Indian	12,000	Death Certificate	Non–Indigenous population in neighbouring counties	All ages	Linked	Crude
Miller (1979)[147]	USA (Southwest)	American Indian	n/r	n/r	General population	All ages	Registry	Crude
Mullany (2009)[148]	USA (White Mountain Apache Reservation, Arizona)	White Mountain Apache	15,500	Local surveillance system with multiple data sources (informant, medical, police)	General population (USA)	≥5 years	Linked	Age adjusted (2000 US Census)

n/r=Not reported. WHO=World Health Organization. NAO= Nenets Autonomous Okrug, Russia. NWT=Northwest Territories, Canada. Population *n* are estimates based on reported counts in each article unless otherwise specified; these may not reflect denominators used to calculate incidence. [*]General terms such as Indigenous, Pacific Peoples, or First Nation, were used when a specific nation or tribe was not identifiable. Where possible, contemporary terms were used. [†] Assumed all age groups were included in rate estimate calculations unless otherwise specified. [‡]Mortality data sources included: registry data such as death certificates or vital statistics databases; medico–legal records from a coroner or medical examiner investigation; hospital or police records; information based on interviews with key informants such as family members; multiple linked sources which variously included two or more specific sources. [¶]Total population for Micronesia: 142,298. Specific state/territory populations: 13,772 (Palau); 10,139 (Yap); 44,000 (Chuuk); 28,879 (Pohnpei); 6,448 (Kosrae); and 39,060 (Marshall Islands). [§]State/territory populations: Papua New Guinea (4,216,100), Fiji (n/r), Vanuatu (164,100), FSM (105,700), Marshall Islands (54,700), Palau (16,500), American Samoa (54,800), French Polynesia (218,000), and Western Samoa (163,400). [‖]Population was not reported in Silviken et al. (2009)[60] but was reported in earlier study by the lead author (Silviken et al. 2006)[149] that used the same mortality and population data sources. [**]Reported in Hezel (1989).[53] [††]Reported in Booth (1999).[54] [‡‡]Calculated Indigenous population based on info available in article: 20.6% of Brazil's Indigenous population of 896,917 live in this region/state. [¶¶]In Canada, First Nations people registered under the *Indian Act* are referred to “Status Indians” or “Registered Indians” by the federal government.[150] [§§]Included “on reserve” First Nation populations in 7 Canadian provinces: Prince Edward Island, Nova Scotia, Quebec, Ontario, Manitoba, Saskatchewan, and Alberta. [‖‖]By Indigenous group and territory: 5,284 (NWT, First Nation), 7,949 (NWT, Inuit), 2,207 (Yukon, First Nation).

Supplementary Table 2 Gender-specific suicide mortality incidence rates by WHO region and country

				Women					**Men**			
				Indigenous		**Comparison Population**			**Indigenous**		**Comparison Population**	
WHO Region	**Country**	**Indigenous population**	**Period**	**CSIR**	**SSIR**	**CSIR**	**SSIR**		**CSIR**	**SSIR**	**CSIR**	**SSIR**
EUROPEAN REGION												
Bjorksten (2005)[58]	Greenland (West)	Kalaallit (Inuit)	1995	46.0	-	-	-		124.0	-	-	-
Silviken (2009)[60]	Norway (Northern)	Sámi	1970-1998	8.4	-	-	-		28.5	-	-	-
Hassler (2005)[62]	Sweden	All Sámi	1961-2000	3.8	-	-	-		19.5	-	-	-
		Sámi (Non-herding)	1961-2000	3.3	-	-	-		16.4	-	-	-
		Sámi (Reindeer herding)	1961-2000	5.9	-	-	-		30.1	-	-	-
Sumarokov (2014)[61]	Russia (NAO)	Nenets	2002-2012	29.0	-	12.7	-		138.1	-	86.3	-
Klomek (2016)[59]	Israel	Bedouin	1999-2011	2.9	2.0	3.3	3.2		5.9	4.5	12.9	13.0
WESTERN PACIFIC REGION												
Clayer (1991)[65]	Australia (South Australia)	ATSI	1988	27.3	-	-	6.2		172.4	-	28.5	-
Cantor (1997)[68]	Australia (Queensland)	ATSI	1990-1992	-	3.8	-	6.5		-	30.7	-	24.4
De Leo (2011)[67]	Australia (Queensland)	ATSI	1994-2007	-	9.4	-	5.3		-	45.8	-	20.1
Measey (2006)[64]	Australia (NT)	ATSI	1999	-	11.2	-	5.9		-	66.3	-	34.0
Campbell (2016)[66]	Australia (Kimberly)	ATSI	2005-2014	-	39.5	-	-		-	117.0	-	-
Rubenstein (1983)[72]	FSM	Micronesian	1976-1979	4.5	-	-	-		49.5	-	-	-
Booth (1999)[54]	Papua New Guinea	Pacific peoples	1990	<1	-	-	-		<1	-	-	-
	Samoa	Samoan	1981	21.0	-	-	-		41.0	-	-	-
	Vanuatu	ni-Vanuatu	1990-1992	2.0	-	-	-		3.0	-	-	-
	American Samoa	Samoan	1990-1991	0.0	-	-	-		34.0	-	-	-

	French Polynesia	Polynesian	1988-1992	5.0	-	-	-		12.0	-	-	-
	Fiji	iTaukei	1982-1983	3.0	-	-	-		4.0	-	-	-
Haynes (1984)[76]	Fiji (Macuata)	iTaukei	1979-1982	0.0	-	71.9	-		11.6	-	61.0	-
Price (1975)[75]	Fiji	iTaukei	1971-1972	0.4	-	15.3	-		2.1	-	14.9	-
Beautrais (2006)[71]	Aotearoa/New Zealand	Māori	2002	-	5.9	-	4.8		-	19.7	-	15.6
Jollant (2014)[89]	Philippines	Palawan	2002-2012	70.0	-	-	-		193.0	-	-	-
Hsieh (1994)[90]	Taiwan	Indigenous peoples	1971-1990	29.9	-	8.3	-		48.4	-	11.8	-
		Atayal	1971-1990	41.2	-	8.3	-		71.0	-	11.8	-
		Bunun	1971-1990	40.7	-	8.3	-		48.2	-	11.8	-
		Paiwan	1971-1990	12.4	-	8.3	-		28.8	-	11.8	-
Wen (2004)[92]		Indigenous peoples	1998-2000	12.5	-	-	-		28.6	-	-	-
REGION OF THE AMERICAS												
Souza (2013)[97]	Brazil (Amazonas)	Indigenous peoples	2006-2010	-	8.6	-	1.3		-	28.2	-	8.8
Hislop (1987)[101]	Canada (British Columbia)	First Nation	1953-1978	-	13.1	-	8.0		-	39.4	-	20.7
Mao (1986)[110]	Canada (7 provinces)	First Nation	1977-1982	-	17.0	-	6.4		-	53.0	-	19.9
Mao (1992)[98]	Canada	First Nation	1981	-	19.4	-	6.6		-	58.6	-	21.5
Ross (1986)[103]	Canada (Manitoba)	Cree	1981-1984	24.0	-	0.0	-		142.0	-	0.0	-
Macaulay (2004)[102]	Canada (Nunavut)	Inuit	1987-1996	-	12.0	-	-		-	74.0	-	-
Pollock (2016)[106]	Canada (Labrador)	Innu	1993-2009	0.0	0.0	2.5	2.4		272.0	223.2	14.2	14.0
		Inuit	1993-2009	97.1	75.5	2.5	2.4		272.6	248.7	14.2	14.0
Young (1993)[128]	USA (All IHSAs)	AI/AN	1979-1981	4.8	-	5.7	-		33.1	-	18.9	-
Lester (1994)[126]	USA	AI/AN	1980	4.9	-	6.1	-		22.0	-	20.6	-
Herne (2014)[135]	USA (All IHSAs)	AI/AN	1999-2009	-	8.7	-	5.9		-	34.7	-	23.2
	USA (Pacific Coast IHSA)	AI/AN	1999-2009	-	8.4	-	6.3		-	29.0	-	24.3
	USA (Southwest IHSA)	AI/AN	1999-2009	-	6.8	-	8.6		-	33.9	-	31.5
	USA (South Plains IHSA)	AI/AN	1999-2009	-	6.9	-	6.3		-	31.5	-	21.3
	USA (North Plains IHSA)	AI/AN	1999-2009	-	11.9	-	4.6		-	41.6	-	21.0

	USA (East IHSA)	AI/AN	1999-2009	-	4.1	-	4.8		-	13.0	-	18.9
	USA (Alaska IHSA)	AI/AN	1999-2009	-	19.3	-	6.7		-	65.4	-	27.9
Forbes (1988)[119]	USA (Alaska)	Alaska Native	1985	24.1	-	6.8	-		100.1	-	24.1	-
Kettl (1991)[116]	USA (Alaska)	Alaska Native	1979-1984	8.5	-	6.1	-		38.2	-	20.7	-
Day (2003)[121]	USA (Alaska)	Alaska Native	1989-1998	-	17.1	-	4.6		-	82.4	-	19.4
Day (2009)[120]	USA (Alaska)	Alaska Native	1999-2003	-	15.4	-	6.6		-	56.7	-	27.1
Holck (2013)[117]	USA (Alaska)	Alaska Native	2004-2008	-	21.4	-	5.0		-	62.8	-	19.6
Becker (1990)[138]	USA (New Mexico)	American Indian	1983-1987	-	2.7	-	5.0		-	39.9	-	19.7
Kalish (1968)[134]	USA (Hawai'i)	Native Hawaiian	1959-1965	10.2	-	8.3	-		24.8	-	15.2	-
		Other Pacific peoples	1959-1965	4.0	-	8.3	-		9.7	-	15.2	-

WHO=World Health Organization. CSIR=Crude Suicide Incidence Rate. SSIR=Standardized Suicide Incidence Rate. NAO=Nenets Autonomous Okrug. NT=Northern Territory. ATSI=Aboriginal and Torres Strait Islander. FSM=Federated States of Micronesia. IHSA=Indian Health Service Area. AI/AN=American Indian and Alaska Native.

Supplementary Table 3 Incidence rate ratios by WHO region and country

First Author (Year)	Indigenous peoples, tribe, or group (Region)	IRR
EUROPEAN REGION		
Soininen (2008)[55]	Sámi (Northern Finland)	1.90
Silviken (2009)[60]	Sámi (Northern Norway)	1.45
Sumarokov (2014)[61]	Nenets (Nenets Autonomous Okrug, Russia)	1.43
Klomek (2016)[59]	Bedouin (Israel)	0.40
WESTERN PACIFIC REGION (Australia)		
Campbell (2016)[66]	Aboriginal and Torres Strait Islanders (Kimberly)	7.40
Clayer (1991)[65]	Aboriginal and Torres Strait Islanders (South Australia)	6.05
Pridmore (2009)[63]	Aboriginal and Torres Strait Islanders (Northern Territory)	2.50
Measey (2006)[64]	Aboriginal and Torres Strait Islanders (Northern Territory)	2.21
De Leo (2011)[67]	Aboriginal and Torres Strait Islanders (Queensland)	2.16
Bramley (2004)[52]	Aboriginal and Torres Strait Islander	1.60
Cantor (1997)[68]	Aboriginal and Torres Strait Islanders (Queensland)	1.11
Stevenson (1998)[51]	Aboriginal and Torres Strait Islanders	0.90
WESTERN PACIFIC REGION (Oceania)		
Booth (2010)[79]	Chamorro (Guam)	3.00
Bramley (2004)[52]	Māori (Aotearoa/New Zealand)	1.00
Langley (1990)[70]	Māori (Aotearoa/New Zealand)	0.67
Parker (1966)[80]	Pacific peoples (Papua New Guinea)	0.05
Ree (1971)[77]	iTaukei (Macuata, Fiji)	0.17
Pridmore (1995)[74]	iTaukei (Fiji)	0.16
Pridmore (1994)[78]	iTaukei (Western Division, Fiji)	0.11
Booth (1999)[54]	iTaukei (Fiji)	0.09
Haynes (1984)[76]	iTaukei (Macuata, Fiji)	0.09
Price (1975)[75]	iTaukei (Fiji)	0.09
WESTERN PACIFIC REGION (East Asia)		
Hsieh (1994)[90]	Atayal (Taiwan)	5.69
Cheng (1992)[91]	Bunun (Taiwan)	5.54
Hsieh (1994)[90]	Bunun (Taiwan)	4.42
Hsieh (1994)[90]	Atayal, Bunun, and Paiwan (Taiwan)	3.96
Cheng (1992)[91]	Atayal (Taiwan)	3.96
Liu (2011)[93]	Atayal (East Taiwan)	3.79
Hsieh (1994)[90]	Paiwan (Taiwan)	2.11
Cheng (1992)[91]	Paiwan (Taiwan)	1.39
Liu (2011)[93]	Ami (East Taiwan)	0.87
Cheng (1992)[91]	Ami (Taiwan)	0.45
Telisinghe (2014)[85]	7 tribes (Brunei Darussalam)	3.40
Jollant (2014)[89]	Palawan (Philippines)	2.48
Ali (2014)[88]	Bumiputera (Sabah and Sarawak, Malaysia)	1.16
Lu (2013)[87]	Li su (Yunnan Province, China)	2.33

	Yi (Yunnan Province, China)	0.95
	Dai (Yunnan Province, China)	0.55
	10 ethnic minority groups*	0.04-1.67
Wang (1997)[86]	Meng (Hohhot, Inner Mongolia, China)	0.54
Wang (1997)[86]	Hui (Hohhot, Inner Mongolia, China)	0.27
REGION OF THE AMERICAS (Brazil and Canada)		
Coloma (2006)[96]	6 tribes (Mato Grosso do Sul)	20.04
Souza (2013)[97]	Indigenous peoples (Tabatinga, Amazonas)	18.04
Souza (2013)[97]	Indigenous peoples (Sao Gabriel da Cachoeira, Amazonas)	9.98
Orellana (2016)[95]	3 tribes (Mato Grosso do Sul)	8.10
Souza (2013)[97]	Indigenous peoples (Amazonas)	4.38
Machado (2015)[94]	Indigenous peoples	2.18
Souza (2013)[97]	Indigenous peoples (Manaus, Amazonas)	0.00
Pollock (2016)[106]	Inuit (Labrador)	20.60
Penney (2009)[112]	Inuit (Nunavik, Quebec)	16.00
Pollock (2016)[106]	Innu (Labrador)	14.20
Penney (2009)[112]	Inuit (Nunavut)	9.60
Isaacs (1998)[99]	Inuit (NWT/Nunavut)	5.26
Wotton (1985)[100]	Innu and Inuit (Labrador)	4.58
Butler (1965)[113]	First Nation (Yukon)	4.49
Macaulay (2004)[102]	Inuit (Killaviq, Nunavut)	3.47
Chandler (1998)[104]	First Nation (British Columbia)	3.05
Malchy (1997)[111]	First Nation and Métis (Manitoba)	2.30
Bramley (2004)[52]	First Nations	2.30
Isaacs (1998)[99]	Dene (NWT)	1.93
Butler (1965)[113]	Inuit (NWT/Nunavut)	0.94
REGION OF THE AMERICAS (USA, National and Regional)		
Herne (2014)[135]	American Indian and Alaska Native (Alaska IHSA)	2.45
	American Indian and Alaska Native (North Plains IHSA)	2.09
	American Indian and Alaska Native (Pacific Coast IHSA)	1.22
	American Indian and Alaska Native (South Plains IHSA)	1.21
	American Indian and Alaska Native (Southwest IHSA)	1.01
	American Indian and Alaska Native (East IHSA)	0.73
	American Indian and Alaska Native (All IHSAs)	1.49
Ogden (1970)[129]	American Indian and Alaska Native (24 western states)	2.10
Young (1993)[128]	American Indian and Alaska Native	1.63
Stevenson (1998)[51]	American Indian	1.40
Bramley (2004)[52]	American Indian and Alaska Native	1.20
Howard (2014)[127]	American Indian and Alaska Native	1.07
Lester (1994)[126]	American Indian and Alaska Native	1.01
REGION OF THE AMERICAS (USA, Alaska)		
Marshall (1998)[114]	Athabascan	7.00
Marshall (1998)[114]	Inupiat	4.24

Andon (1997)[122]	Athabascan	4.24
Day (2003)[121]	Alaska Native	4.20
Forbes (1988)[119]	Alaska Native	4.14
Holck (2013)[117]	Alaska Native	3.53
Marshall (1998)[114]	Yup'ik	2.52
Marshall (1998)[114]	Yup'ik, Inupiat, and Athabascan	2.33
Kraus (1979)[115]	Alaska Native	2.24
Hlady (1988)[118]	Alaska Native	2.20
Day (2009)[120]	Alaska Native	2.20
Kettl (1991)[116]	Alaska Native	1.92
REGION OF THE AMERICAS (USA, Lower 48 States and Hawai‘i)		
Sievers (1990)[133]	Akimel O'odham (Arizona)	4.30
Van Winkle (1993)[6]	Apache (New Mexico)	4.20
Mullany (2009)[148]	White Mountain Apache (Arizona)	3.70
Humphrey (1982)[141]	Cherokee (North Carolina)	3.14
Van Winkle (1993)[6]	Pueblo (New Mexico)	2.80
Miller (1979)[147]	American Indian (Southwest USA)	2.69
Broudy (1983)[137]	American Indian (Arizona and New Mexico)	2.30
Christensen (2013)[145]	American Indian (South Dakota)	2.11
Simpson (1983)[142]	Hopi (Arizona)	2.08
Van Winkle (1993)[6]	Navajo (New Mexico)	1.60
Kalish (1968)[134]	Kānaka Maoli (Native Hawaiian)	1.48
Wissow (2001)[146]	American Indian (Southwest)	1.35
Levy (1987)[143]	American Indian (Arizona)	1.04
Humphrey (1982)[141]	Lumbee (North Carolina)	0.70
Levy (1965)[139]	Navajo (New Mexico)	0.72
Martin (2010)[140]	American Indian (North Carolina)	0.59
Copeland (1989)[132]	American Indian (Florida)	0.58

***Supplemental Table 4*: Incidence rate ratios by WHO region and country**

APPENDIX I: Conference Presentations

1. **Pollock, N. J.**, Naicker, K., Loro, A., Mulay, S., & Colman, I. (2018, September). *Global incidence of suicide among Indigenous peoples: a systematic review.* Paper presented at the Canadian Academy of Psychiatric Epidemiology 2018 Scientific Symposia, Toronto, Canada.

2. **Pollock, N. J.** (2018, August). *Enhancing suicide surveillance in Labrador, Canada: A case study in community-based population health research.* Paper presented at International Congress on Circumpolar Health, Copenhagen, Denmark.

3. **Pollock, N. J.**, Healey, G., Jong, M., Young, T.K., and Mulay, S**.** (2017, October). *Enhancing public health surveillance for suicide prevention in the Circumpolar North.* Paper presented at Northern, Rural, and Remote Health Conference, Happy Valley-Goose Bay, NL.

4. Chatwood, S., & **Pollock, N. J.** (2015, June). *Diverse perspectives on wellness, resiliency, and suicide prevention in the circumpolar world.* Symposium at the 28th World Congress of the International Association for Suicide Prevention, Montreal, Canada.

5. **Pollock, N. J.** (2013, December). *Mortality in Labrador and Newfoundland, 1993-2009: Suicide rates by region, sex, and age.* Poster presentation at the ArcticNet Annual Scientific Meeting, Halifax, Canada.

6. **Pollock, N. J.**, Jong, M., Mulay, S., Chaulk, K., Wight, J., & Al-Krenawi, A. (2013, August). The role of community consultations in suicide prevention research in Labrador. *International Journal of Circumpolar Health, 72*(Supplement 1), 265. Paper presented at the 15th International Congress on Circumpolar Health, Fairbanks, Alaska.

7. **Pollock, N. J.** (2012, June). *Community consultations in suicide prevention research in Labrador.* Poster presentation at the Canadian Student Health Research Forum, University of Manitoba, Winnipeg, Canada.

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