

# INDIGENOUS YOUTH SUICIDE: A SYSTEMATIC REVIEW OF THE LITERATURE

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## ABSTRACT

A systematic literature review was conducted to (1) assess the degree of methodological rigor present in the literature on Indigenous youth suicide, and (2) to determine the importance of risk and protective factors. Six databases were searched, for peer-reviewed studies of suicide amongst Indigenous populations published between 1996–2009. Of a total of 771 papers initially selected, only 23 studies were deemed to be of sufficient quality to be included in the review. This systematic review highlights the need for additional research on youth suicide among Indigenous populations, and provides insight into how such research can be conducted in a rigorous manner. It also provides details of the risks and protective influences on Indigenous youth suicide

**Keywords:** suicide, suicidal, Indigenous, youth, systematic review, culture

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This article presents a systematic review of the literature surrounding suicide in Indigenous youth populations. The goal of this research is to make sense of the literature surrounding Indigenous Youth Suicide (IYS) to stimulate and inform future research in this area.

Suicide is an important and tragic public health concern and IYS has been called a crisis and an epidemic. According to the World Health Organization (WHO) (1999), every year about one million people die from suicide and 10–20 million attempt suicide around the world. The global mortality rate from suicide is 16 per 100,000, which equates to about one death every 40 seconds (WHO, 2010).

Historically, suicide rates have not been as prominent as today. In the 1950s, the mortality rate attributable to suicide was around 10 per 100,000. This rate has increased by more than 60% in the last 45 years (WHO, 2010), and likely has not yet reached its plateau.

Once predominant among the elderly, suicide is fast becoming a youth phenomenon localized among those between the ages of 15–24. Young people all over the world are committing suicide at unprecedented rates, replacing unintentional injuries as the number one cause of death among this age group (WHO, 2010). This so-called epidemic of youth suicide is most prominent among Indigenous peoples, who are overrepresented in every suicide statistic (WHO, 2009).

Between 1987–1991, the rate of suicide among the Inuit of Canada was 3.9 times greater than that of the general population (Royal Commission, 1995). This rate was drastically higher among the Inuit youth of Quebec who were some 20 times more likely to commit suicide than their majority counterparts (Kirmayer, 1994). During this same period, Aboriginal youth of British Columbia com-

plete suicide nearly 4.5 times more often than the majority of the youth population (104.8 per 100,000 vs. 24.0 per 100,000) (Chandler and Lalonde, 1998).

Indigenous populations in the United States, New Zealand, and Australia also exhibit uncharacteristically high levels of suicidal behaviour. According to statistics from the Center for Disease Control (CDC) between 2002–2006, American Indian/Alaskan Native (AI/AN) have the highest suicide rates among all ethnic groups in the United States at 16.25 suicides per 100,000, which is 1.8 times the national average (CDC, 2009). The Maori of New Zealand have had higher rates of suicide than their non-Maori peers each year from 1996–2005 (Beautrais and Fergusson, 2006). Similarly, Indigenous Torres Strait Islanders of Australia complete suicide at a higher rate than the remaining age group from the state as a whole (Hunter and Harvey, 2002).

The etiology of these trends is still poorly understood and few theories have attempted to elucidate it. One of the most promising is the cultural continuity theory, which postulates that lack of cultural connectedness may explain why Indigenous youth commit suicide at such alarming rates (Chandler and Lalonde, 1998). This theory proposes that a tight-knit and productive cultural community may buffer against IYS. However, little research has examined cultural continuity theory in the social context in which Indigenous populations are embedded.

The purpose of this article was to systematically assess IYS using peer-reviewed articles that met set criteria for scientific rigour and quality. Two main objectives were addressed through this review process: (1) the methodological rigour present in the current IYS literature was assessed in hopes of guiding the design of future studies in this area; and (2) the relative importance of risk and protective factors across studies of IYS was examined with a particular emphasis placed on culture.

## METHODS

### LITERATURE SEARCH

Research databases available at the University of Northern British Columbia and the University of British Columbia were reviewed: PsychInfo (EBSCO), Web of Sciences (ISI), Academic Search Premier

(EBSCO), Science Direct (Elsevier), Highwire Press, and Medline (OVID). Examples of search terms used include: Aboriginal youth suicid\*\*, Inuit adolescent suicid\*\*, Maori youth suicid\*\*.

### REVIEW PROCESS

Two review authors assessed the studies for eligibility and methodological rigour without consideration of the results. Trials were not blind assessed as author name, institution, and source of publication were known. Throughout this process, any disagreements were resolved until consensus was reached. A third review author decided eligibility in the event that consensus could not be reached.

## INCLUSION AND EXCLUSION CRITERIA FOR THE SELECTION OF ARTICLES

For this systematic review, the inclusion and exclusion criteria were met if the article had the following characteristics: (i) the sample consisted exclusively of Indigenous youth (aged 13–25), or the article contained a specifically defined subsample of Indigenous youth; (ii) the study was empirical offering quantitative data; (iii) the outcome measure was suicidal behavior of all types including suicide, suicide attempt, or suicidal ideation; (iv) the study was published in English; and (v) the article was published after 1996 or was deemed to make a meaningful contribution to the review.

### QUALITY ASSESSMENT

#### *Evaluation guidelines for rating the quality of a study*

Quantitative studies meeting inclusion criteria were assessed for methodological quality using six methodological criteria developed by the authors' consensus. These six methodological criteria were similar to the criteria used by Wulsin et al., (1999) but tailored towards the assessment of suicide research. These criteria were developed into a rating of rigour assessing suicide research on a scale from 0–8. The rating of rigour can be found in Table 1.

The methodological quality of studies scored was on the basis of rigour as follows: high — a score of 5 or greater; medium — a score of 3 to 4; or low — a score of 1 to 2. A study was selected for data extraction if its rating of rigour was 4 or greater.

**Table 1. Checklist for Inclusion/Exclusion and Data Integrity Rating Criteria**

<i>Checklist for study inclusion</i>	
1. Deals with indigenous youths (aged 13-25)	□
2. Contains quantitative data	□
3. Measures suicide or attempted suicide as an outcome	□
<i>Data Integrity Rating Criteria</i>	
4. Contains multiple measures of suicide=2; contains one measure of suicide=1; does not contain or quantify suicide=0	
5. Reports from primary data = 1; Reports from secondary data sources = 0	
6. Precautions are taken to ensure the accuracy of the data = 1; Data accuracy is not confirmed or validated = 0	
7. Employs a randomized longitudinal design = 2; Employs a longitudinal design = 1; Employs a randomized design = 1; Employs a nonrandomized, nonlongitudinal design = 0	
8. Sample size with adequate power ( $n > 300$ ) = 1; Sample size $< 300$ = 0	
9. Controls or otherwise restricts potential confounds (e.g., history of trauma, exposure to suicide, gender, etc.) = 1; No control or measurement of potential confounds = 0	

## DATA EXTRACTION

While some studies sampled both Indigenous and majority youth, only data pertaining exclusively to Indigenous youth were extracted. Standardized forms were developed by the authors to independently assign each article to one, or a combination, of the following three categories: 1) data integrity; 2) risk and protective factors; and 3) emphasis on culture. Data extracted under each category included: 1) study design, variables of interest, population characteristics, methodological strengths, methodological weaknesses; 2) risk and protective factors for each of the following: suicide, attempted suicide, and suicidal ideation; and 3) definition of culture, country of origin, and effect of culture on suicide. Definitions of constructs can be found in Table 2.

## QUANTIFICATION OF RISK AND PROTECTIVE FACTORS

All influences that increased or decreased the risk of suicide (e.g., depression, social support, culture, substance abuse) were converted into standardized effect sizes as Cohen's *d*. Cohen's *d* is a measure of the difference between the means of two groups and by convention *d*'s of .80, .50, or .20 are considered large, medium, and small effects, respectively (Cohen, 1988). Influences that increased the risk of suicide were given effect sizes that were positive in value whereas influences reducing the risk of suicide were given effect sizes that were negative in value.

**Table 2. Definition of Terms and Constructs Used**

Culture	Highly variable systems of meaning which are learned are shared by an identifiable group of people (Betancourt and Lopez, 1993; Rohner 1984). It represents designs and ways of life that are transmitted across generations.
Enculturation	The process by which individuals learn about and identify with their ethnic minority cultures (Zimmerman et al. 1996). It can also be thought of as a lifelong learning experience in which cultural awareness and understanding develops (Wilbert, 1976).
Indigenous	Any ethnic people who inhabit a geographic region in which they have a historical continuity to the land and to pre-colonial and pre-invasion societies (Cobo, 1987). They form non-dominant sectors of society and are determined to preserve, develop and transmit to future generations their ancestral territories, and their ethnic identity, as the basis of their continued existence as peoples, in accordance with their own cultural patterns, social institutions and legal system (Cobo, 1987).
Internal Locus of	Having a tendency to believe that one is personally responsible for, or has control over, the outcomes of their actions (Lefcourt, 1982).
Pan-Indian	A strategy comparing across all Indigenous groups. The prefix pan is Greek for, <i>pas</i> or all.
Self-esteem	An important aspect of self-concept, the broadest evaluation of the self. Perceptions of the self as good or bad or mediocre (Baumeister, 2005).
Suicidal Ideation	Having conscious suicidal intent such as self-destructive thoughts or wishes or uttering suicidal threats (Beck, Kovacs, Weissman 1979)

Converting risk and protective factors into Cohen *d* effect sizes places all effects onto the same metric allowing for the analysis and comparison of effects. Both significant and nonsignificant risk and protective factors were maintained in the analysis, owing to the consideration that null findings may still prove important when comparing across studies.

## THEMATIC CATEGORIZATION

Once all risk and protective factors were standardized, variables were thematically reviewed and categorized using a process of consensus. Variables such as age and gender were considered stand-alone variables that needed no categorization. However, most variables were single item questions such as "family cares about feelings" that could be subsumed by a larger variable of family support. Thematic categories can be found in Table 3.

## EVIDENCE SYNTHESIS

The nature of research in this area is marked by highly heterogeneous study designs, units of analysis, statistical methods, and populations sampled. Consequently, a large net was cast to include the full range of study designs used to evaluate IYS.

**Table 3. Thematic Categorization of Risk and Protective Factors**

<i>Thematic Category</i>	<i>Variables Subsumed</i>
Age	Stand alone
Gender	Stand alone
Depression	Stand alone
Other Psychiatric Condition	PTSD, anxiety, having a family history of other psychiatric diagnosis, eating disorder.
Alcohol Abuse	Stand alone
Substance Abuse	Substance abuse, marijuana use, inhalant use, other substance abuse
Conduct Disorder	Violent behaviour, aggression, violent ideation, anger, delinquency, antisocial behaviour.
Family history	Family member or relative who attempted or committed suicide
Friend attempt	Having a friend who has attempted or committed suicide
Social Support	Having caring friends, high perceived social support.
Family Support	Having a caring family, both parents present and supportive, perceived parental support, family connectedness
Physical Abuse	Self-reported childhood physical abuse, physical or vicarious
Sexual Abuse	Self-reported childhood sexual abuse
Self Esteem	Stand alone
Internal locus of control	Stand alone
Uncomfortable in one's culture	Alienation, discomfort in cultural surroundings
Cultural factors	Involvement in traditional activities, high traditional and spiritual orientation, traditional importance, church attendance

## RESULTS

Our systematic review evaluated 771 articles for inclusion (See Fig. 1 for an illustration of the review process). Only 23 articles met our quality appraisal criteria and were used for data extraction. Information on methodological integrity, risk and protective factors, and cultural influences was extracted from 23, 14, and 6 articles, respectively. Only one article implemented an intervention program.

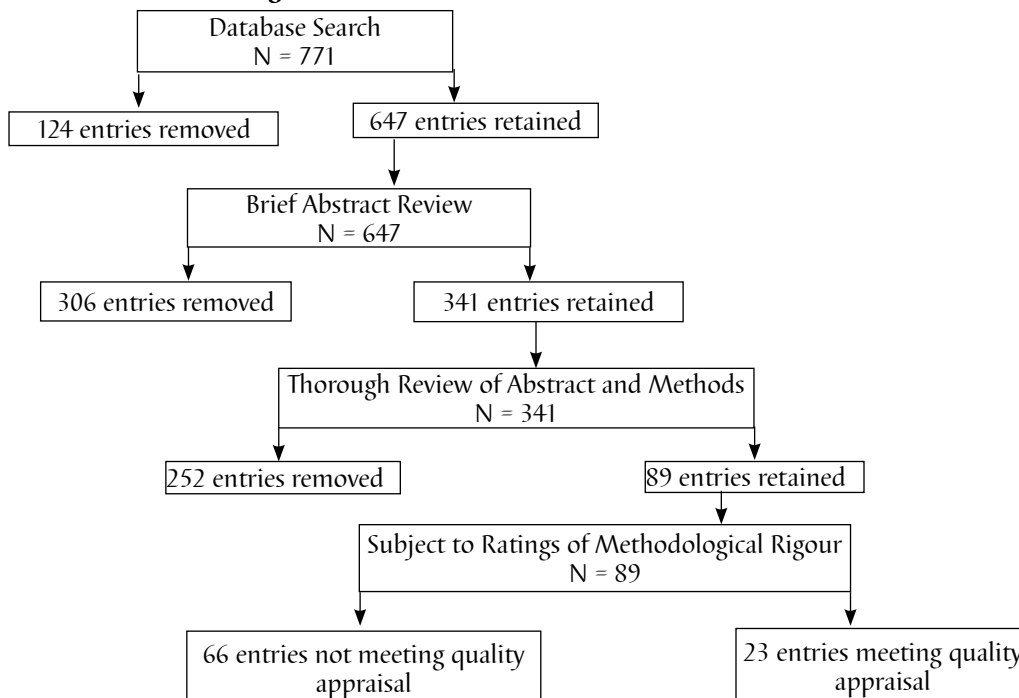
Characteristics of the studies proceeding to data extraction are summarized in Table 4.

## DESCRIPTION OF STUDIES SELECTED FOR DATA INTEGRITY

### Sample

Two articles assessed the Sami people of Scandinavia; two examined the Maori of New Zealand, one looked at Native Hawaiian's, and eighteen sampled Aboriginal populations of North America and New

**Figure 1. Literature Review Process and Decisions**



**Table 4. Characteristics of Studies Included in the Systematic Review**

<i>Author</i>	<i>Variables of Interest</i>	<i>Variables Assessed</i>	<i>Sample Size</i>	<i>Age Range</i>	<i>Data Source</i>	<i>Methodological Strengths</i>	<i>Population</i>	<i>Use in Review</i>
<b>Beautrais and Fergusson (2006)</b>	Suicide Attempt	- Gender	Population	<15 15-24	New Zealand Health Services	- Large sample - Self classified Ethnicity - Compare Maori and non-Maori attempters.	Maori	- Data Integrity
<b>Boothroyd et al. (2001)</b>	Suicide	- Attempts - Psychiatric diagnosis - depression - Conduct disorder - Personality disorder - Psychiatric history - hospital admission	50/71 4/71 17/71	15-24 12-14 25+	Coroner of Quebec from Nunavik Public Health Department	- Case control design - Matched participants on sex, community, and age. - Validated coroner data using medical and police records	Inuit of Nunavik	- Data Integrity - RF/PF
<b>Borowsky et al. (1999)</b>	Suicide Attempt	- Age - Friend attempt - Family attempt - Somatic symptoms - Sexual abuse - Physical abuse - Health concerns - Drug use - Gang involvement - Family connectedness	11,666	Grade 7-12	1990 National American Indian Adolescent Health Survey (NAIAHS)	- Compare attempters to non-attempters - Statistically adjusts confounds - Large sample - Involved pre-testing, trained researchers, and monitored administration.	AI/AN	- Data Integrity - RF/PF
<b>Chandler and Lalonde (1998)</b>	Suicide	- Language - Self governance - Land claims - Education - Health - Cultural facilities - Fire/Police	Population of British Columbia	15-24	- BC Coroner - 1986-1991 BC Census	- Substantiated coroner reports - Large sample - Unique operational definition of culture	B.C. Native Americans	- Data Integrity - Culture
<b>Clark (2007)</b>	Suicide Attempt	- Depression - Age - Gender - Anxiety - Vicarious childhood abuse - Friend or family suicide - Alienation - Social support	2340	12-18	New Zealand Youth 2000 Health Survey	- Consultation with community members - Pilot testing - Cognitive testing as pre-screening - Statistically adjusts confounds - Large sample	Maori	- Data Integrity - RF/PF
<b>Dinges and Duong-Tran (1994)</b>	Suicide Attempt Suicidal Ideation	- Gender - Depression - Drinking - Drug Use	291	14-18	Boarding school	- Instruments tested for cultural language, content, and administration. - Instruments validated through interviews - Intensive interviewer training	AI	- Data Integrity - RF/PF
<b>Freedenthal et al. (2004)</b>	Suicide Attempt	- Alcohol abuse - Family attempt - Social support - Age - Gender - Income	314	13-20	American Indian Multisector Help Inquiry	- Intensive field supervisor and interviewer training - Statistically adjusts confounds	AI	- Data Integrity - RF/PF
<b>Garroutte et al. (2003)</b>	Suicide Attempt	- Importance of cultural and spiritual beliefs	Population	15-54	American Indian Service Utilization, Psychiatric Epidemiology, Risk and Protective Factors (AI-SUPERPPF)	- Large sample - Statistically adjusts confounds - Interviewers were community members - Administrations was standardized and reliable - Stratified random sampling	AI	- Data Integrity - Culture

Grossman et al. (1991)	Suicide Attempt	- Physical abuse - Sexual abuse - Gender - Family history - Friend attempt - Physical health - Mental health - Alienation - Alcohol abuse	7241	Grade 6-12	Navajo Adolescent Health Survey	- Large sample - Compare attempters and non-attempters - Pilot testing - Subjects were pre-screened	Navajo	- Data Integrity - RF/PF
Hallett et al. (2007)	Suicide	- Aboriginal language knowledge	Population of British Columbia	15-24	- BC Coroner - 1986-1991 BC Census	- Substantiated coroner reports - Large sample	B.C. Native	- Data Integrity - Culture
LeMaster et al. (2004)	Suicide Attempt Suicide Ideation	- Gender - Age - Depression - PTSD - Substance abuse - Violence	403	15-24	AI-SUPERFPF	- Interviewers were trained community members - Tribal approval - Quality control procedures used to ensure standard and reliable implementation.	AI	- Data Integrity - RF/PF
Malus et al. (1994)	Suicide Attempt Suicide ideation	- Gender - Friend attempt - Alienation - Age - Family psychiatric history - Physical abuse - Drug use - Church attendance - Family attempt - Friend attempt	99	14-25	Community sample	- Case control design - True random sampling - Instruments were linguistically checked - Assessed seriousness of suicide attempts - Used quantitative and qualitative methodologies. - Interviewed participants in their language	Inuit of Quebec	- Data Integrity - Culture
May et al. (2005)	Suicide Attempt Suicide Ideation	- Intervention led changes in suicidality	- in 1990 = 769 - in 2000 = 829	10-19	Tribal community	- Longitudinal - Large sample - Carefully documented training methods, measurement tools, and intervention policies. - Designed and implemented in collaboration with tribal officials - Regular interactive community workshops.	O'odham Tribe	- Data integrity - Intervention
Novins et al. (1999)	Suicide Ideation	- Age - Gender - Friend attempts - Nuclear family - Locus of control - Self esteem - Social support - Depression - Antisocial behaviour	1378	Grade 9-12	Tribal Communities VOICES project	- Longitudinal - Large sample - Several tribes - Designed through focus groups, pre-testing, and scientific review of results	AI	- Data Integrity - RF/PF - Culture
Pharris et al. (1997)	Suicide Ideation	- Cultural factors - Family support - Involvement in traditional activities	13,929	Grade 7-12	NAIAHS	- Large sample - Used pre-testing, carefully trained researchers, and carefully monitored administration.	AI/AN	- Data Integrity - RF/PF
Rutman et al. (2008)	Suicide Attempt Suicide Ideation	- Ethnic differences	513	Grade 9-12	Youth Risk Behavior Survey	- Large sample - Longitudinal - 3-stage cluster design ensuring nationally representative sample.	AI/AN	Data Integrity
Silviken (2009)	Suicide Suicide Attempt	- Ethnic differences	2691	15-21	Northern Norwegian Youth Study (NNYS)	- Large national sample - Longitudinal design	Sami	Data Integrity
Silviken And Kvermmo (2007)	Suicide Attempt	- Suicide ideation - Depression - Anxiety - Single parent family - Alcohol abuse - Gender - Eating disorder	591	15-21	NNYS	- Compared suicide attempters to non-attempters - Large nationally representative sample - Statistically adjusts confounds	Sami	- Data Integrity - RF/PF

Walls (2007)	Suicide Ideation	- Gender - Age - Remote living - Discrimination - Negative life events - Traditional importance - Enculturation - Self esteem - Alcohol use - Anger - Delinquency - Depression	746	10-12	Community sample	- Longitudinal - Focus group interviewing - Community involvement - Employed community members. - Statistically adjusts confounds	AI/Canadian	- Data Integrity - RF/PF - Culture
Walls et al. (2007)	Suicide Attempt Suicide Ideation	- Depression - Discrimination - Drug use - Negative emotionality - Coercive parenting	721	10-12	Community sample	- See above	AI/Canadian	Data Integrity
Yuen et al. (1996)	Suicide Attempt	- Gender - Depression - Substance abuse - Family support	1779	Grade 9-12	Community sample	- Large sample - Longitudinal and cross sectional. - Developed in collaboration with the National Center for AI/AN Mental Health Research	Native Hawaiian	- Data Integrity - RF/PF
Zitrow and Desjarlait (1994)	Suicide Suicide Attempt Suicide Ideation	- Mental confusion - Relationship problems - Loss due to death - Disability	130	12-24	Suicide registry for rural plains	- Substantiated suicide registry with medical and police records - Full spectrum of suicide behaviour. - Examined protocol for face, content and construct validity.	AI/Ojibwa	Data Integrity
Center for Disease Control and Prevention	Suicide Attempt	- Age	3225	15-19	CDC	- Large national sample	AI Western Anthabaskan Tribes	Data Integrity

Note. AI = American Indian, AN = Alaskan Native, RF/PF = Analysis of Risk and Protective Factors.

Mexico. All of the articles used large samples recruited through analysis of communities or populations. Specifically, three studies sampled tribes, four used retrospective data obtained from coroner reports and eighteen utilized large scale epidemiological type designs.

#### Outcomes considered

Of the 23 articles deemed methodologically rigorous, 8 (34.8%) measured suicidal ideation, 18 (78.3%) assessed attempted suicide and 6 (26.1%) examined suicide (Table 4). Suicidal ideation and attempted suicide were measured by self-report. Suicide was mainly assessed through Coroner Service data. This data was often mapped onto population estimates using an epidemiological approach, and was occasionally substantiated with police reports and medical history (see Boothroyd et al., 2001).

#### Data integrity analysis

Only 23 (2.9%) of the 771 articles reviewed were deemed eligible for inclusion in the review. Clearly, there is a paucity of methodologically sound research examining IYS and further research is required to address the issue in any scientifically rigorous way.

Eight studies assessed more than one facet of suicidal behaviour (e.g., suicidal ideation, suicide attempts and completed suicides), with only one of these studies assessing all three facets (Table 4). Although suicidal ideation is private by nature, no study assessed validity of ratings by obtaining third party reports from a family member or close friend. Due to the private nature of suicidal behaviour, future studies should implement multiple measures, or use multiple items, to capture suicidal behaviour and, wherever possible, utilize multiple sources of inquiry.

Finally, although many studies used population data with large samples, only three implemented longitudinal or case-control designs (Boothroyd et al. 2001; Malus et al., 1994; May et al., 2005). Such designs are good for determining causation because they allow for repeated observations of the same individual over longer periods of time, and are excellent at making allowances for confounding factors while maintaining adequate statistical power.

### METHODOLOGICAL STRENGTHS

Each study offered information on the ways in which future research exploring IYS can be strengthened (Table 4). Four methodological strengths to emerge were: 1) community involvement; 2) pilot testing; 3) ensuring accuracy of data; and 4) controlling for, or limiting, the presence of extraneous influences.

1. Community involvement at every level of study design and implementation proved one of the most useful methodological strengths. Many of the population or community level studies made it a priority to gain involvement and support of the participating community during study implementation. Community involvement ranged in degree. Some studies obtained minimal community involvement by attaining tribal approval prior to implementation (Chandler and Lalonde, 1998) while others obtained significantly more community involvement through the construction of cultural advisory groups that were consulted during every step of study designed and implementation (Clark, 2008; May et al., 2005). Some researchers went one step further in hiring and training community members as research assistants (Freedenthal and Stiffman, 2004; LeMaster et al., 2004; Walls, 2007).

Attaining community involvement and support is important to show respect for both the individual and the culture, and to ensure validity of the findings (Tchacos and Vallenge, 2004) The Canadian Institute of Health Research (CIHR) promotes participatory research approaches at all stages in the research process (CIHR, 2007).

One particular intervention study summarized by May and colleagues (2005) illustrates just how active involvement from key commu-

ity constituencies — tribal leadership, health care providers, parents, elders, youth, and clients — can be effective. This intervention took place between the years 1988–2003 and served a tribal population of approximately 3,000 residents. More than 50 active community workgroup sessions were held addressing questions about problem issues in the community (May et al., 2005). This process resulted in a document forming the foundation for the program components.

The results of this intervention study were promising. Suicidal gestures and suicide attempts decreased throughout the course of the program. Annual averages dropped from 15 gestures and 19.5 attempts before 1988 down to 4 gestures and 4 attempts in 2002 (May et al., 2005). The annual average for self-destructive acts was also reduced from 36 to 14. The only form of suicide that remained impervious to the intervention was completed suicides, which remained at 1 to 2 incidents per annum.

2. Many of the studies performed pilot testing prior to commencement of the larger research project. For example, researchers involved in the 2000 New Zealand Health Survey conducted pilot projects and cognitive testing prior to implementation to ensure that the questions were appropriate and easy to understand across a wide range of literacy levels (Clark, 2008). Other authors pretested their tools to ensure that the language, content, and administration were appropriate for the culture being studied (Dinges and Duong-Tran, 1994; Malus et al., 1993; Novins et al., 1999).
3. Accuracy and validity of the statistical analyses is another important issue addressed by most studies. Limiting confounding factors often enhanced validity of statistical analysis. For example, epidemiological studies employed case-control designs by comparing individuals who experienced problems with suicide to those who did not have such problems (Boothroyd et al., 2001; Borowsky et al., 1999; Malus et al., 1993; Silviken and Kvernmo, 2007). In another example, researchers using Coroner Service



data removed extraneous variability by validating such reports with medical records and police reports (Boothroyd et al., 2001; Zitzow and Desjarlait, 1994).

4. Finally, only seven studies included in this review attempted to control for potential confounding influences by measuring and statistically controlling relevant variables using fully adjusted models (Borowsky et al., 1999; Clark, 2007; Freedenthal and Stiffman, 2004; Garroutte et al., 2003; Silviken and Kvernmo, 2007; Walls, 2007; Walls et al., 2007). Variables that were controlled for include demographic information such as age, gender, marital status, socioeconomic status, employment and education.

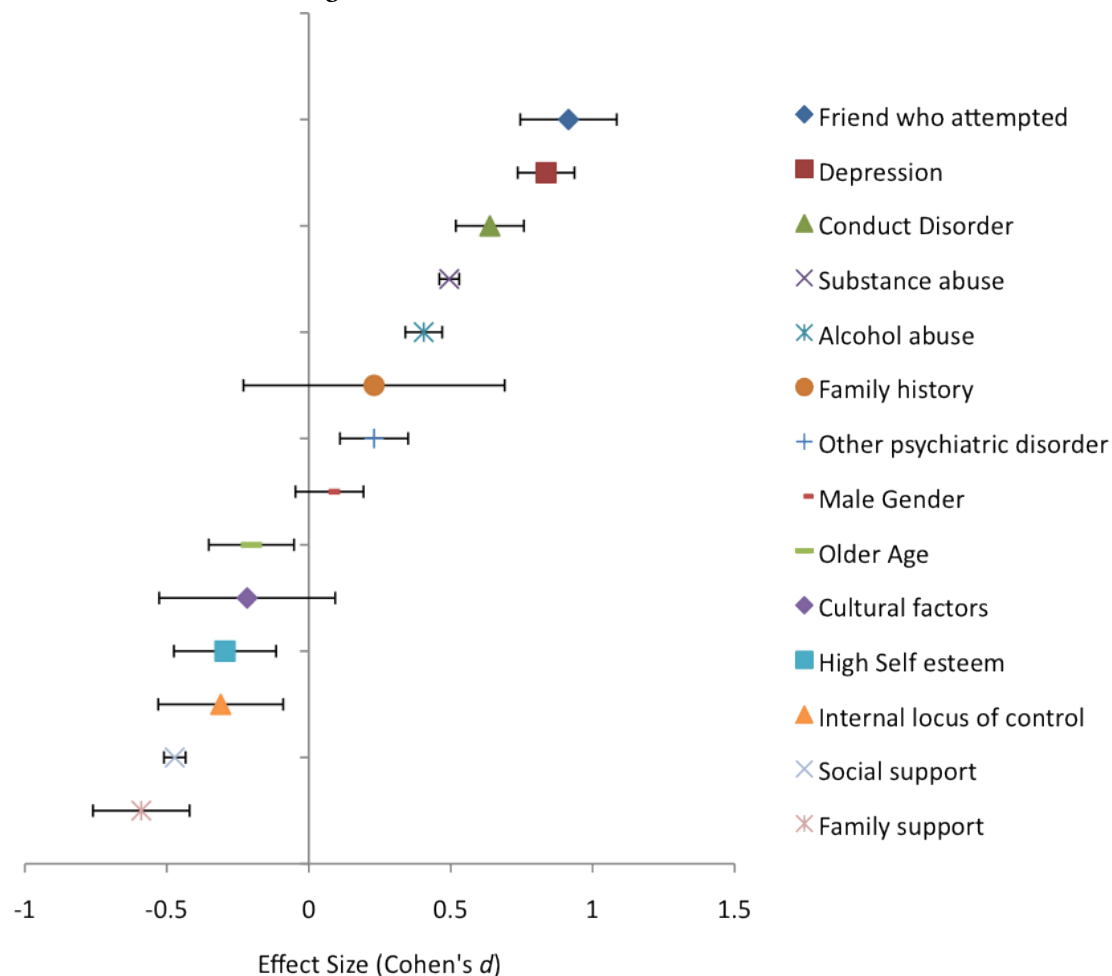
### ANALYSIS OF RISK AND PROTECTIVE FACTORS

Fourteen of the twenty-three articles (61%) measured and supplied enough information regarding

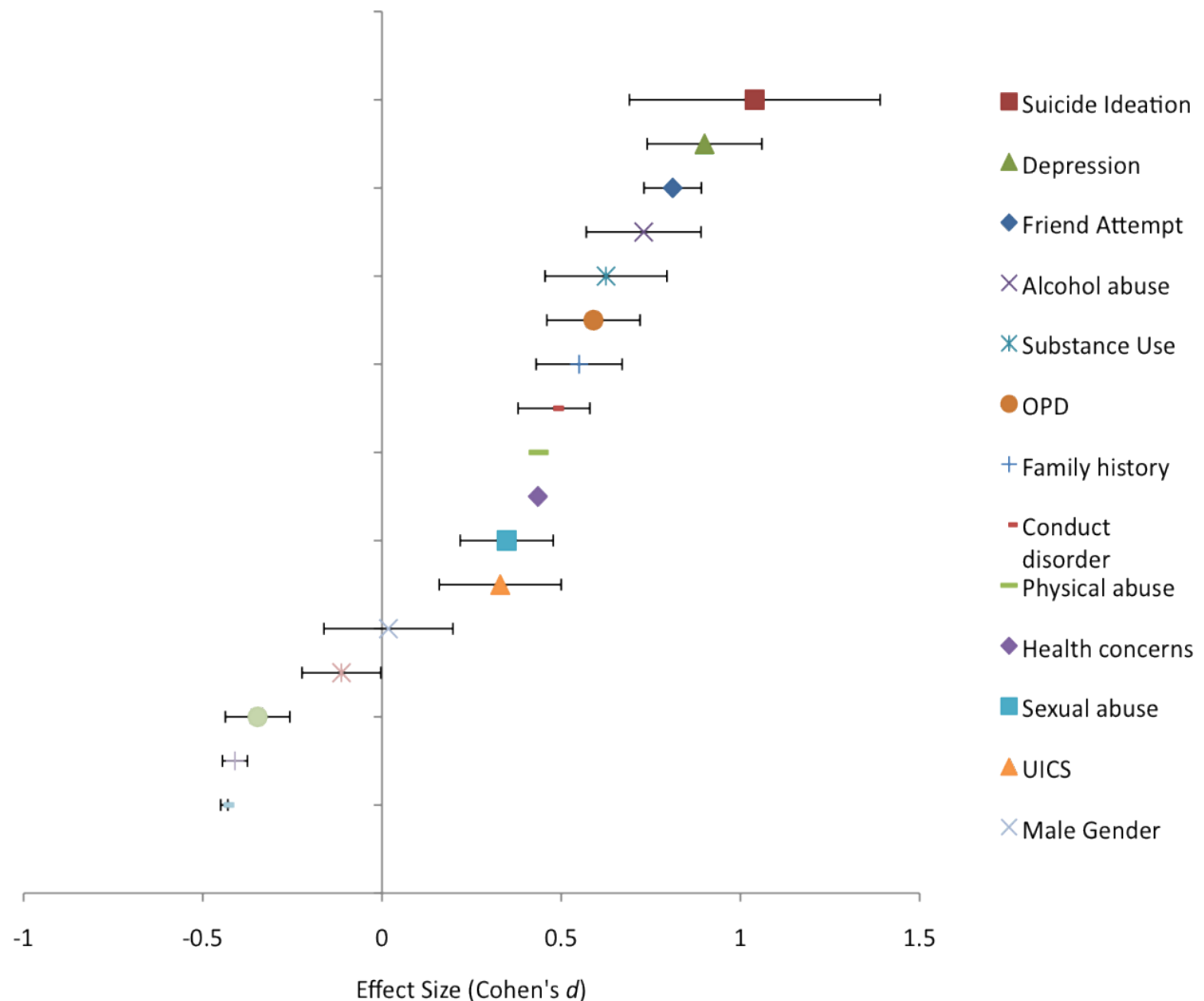
risk and protective factors to merit inclusion in this analysis. Standardized measures of effects coded for each study were imported into SPSS version 18.0 for analysis. However, the data points in the thematic categories were too few to permit statistical analysis. Owing to this consideration, the average effect and standard error was computed for each of suicidal ideation, suicide attempts, and completed suicides. Results of this process can be found in Figures 2–4.

Figures 2–4 show the risk and protective factors related to suicidal ideation, attempts, and completions. Any effect size whose standard error does not bisect zero was viewed as exerting a significant influence on IYS. Effects that are greater than zero were interpreted as variables increasing the likelihood of suicidal behaviour (risk factors), whereas effects less than zero were interpreted as variables reducing it (protective factors).

**Figure 2. Risk and Protective Factors of Suicidal Ideation**



**Figure 3. Risk and Protective Factors of Attempted Suicide**



OPD = Other psychiatric disorder; UICS = Uncomfortable in cultural surroundings

This form of analysis only allows for the interpretation of risk and protective factors in isolation. It is not possible to identify the combined or interactive effects between risk and protective factors due to small sample size of effects. However, wherever possible, effects were used from fully adjusted models in which combined effects were statistically controlled and parsed out.

**INTERPRETATION OF RISK AND PROTECTIVE FACTORS ANALYSIS**

A comparison of risk factors predisposing suicidal ideation, attempts, and completions identifies remarkable consistency in the variables of importance. First, the two strongest risk factors consistently emerging are depression and having a friend

attempt or commit suicide. The next strongest predisposing factors were conduct disorder and substance or alcohol abuse. Finally, having a psychiatric disorder, other than depression, and suffering from previous childhood abuse also increase the likelihood of attempting suicide.

Although no study explicitly examined the protective factors of completed suicides, a breakdown of the protective factors of suicide ideation and attempts show similar patterns. The variable most strongly buffering against suicide was high support, whether social or familial. The importance of culture was more profound for suicide attempts than for suicidal ideation. Personality variables of high self-esteem and having an internal locus of con-

Figure 4. Risk Factors of Attempted Suicide

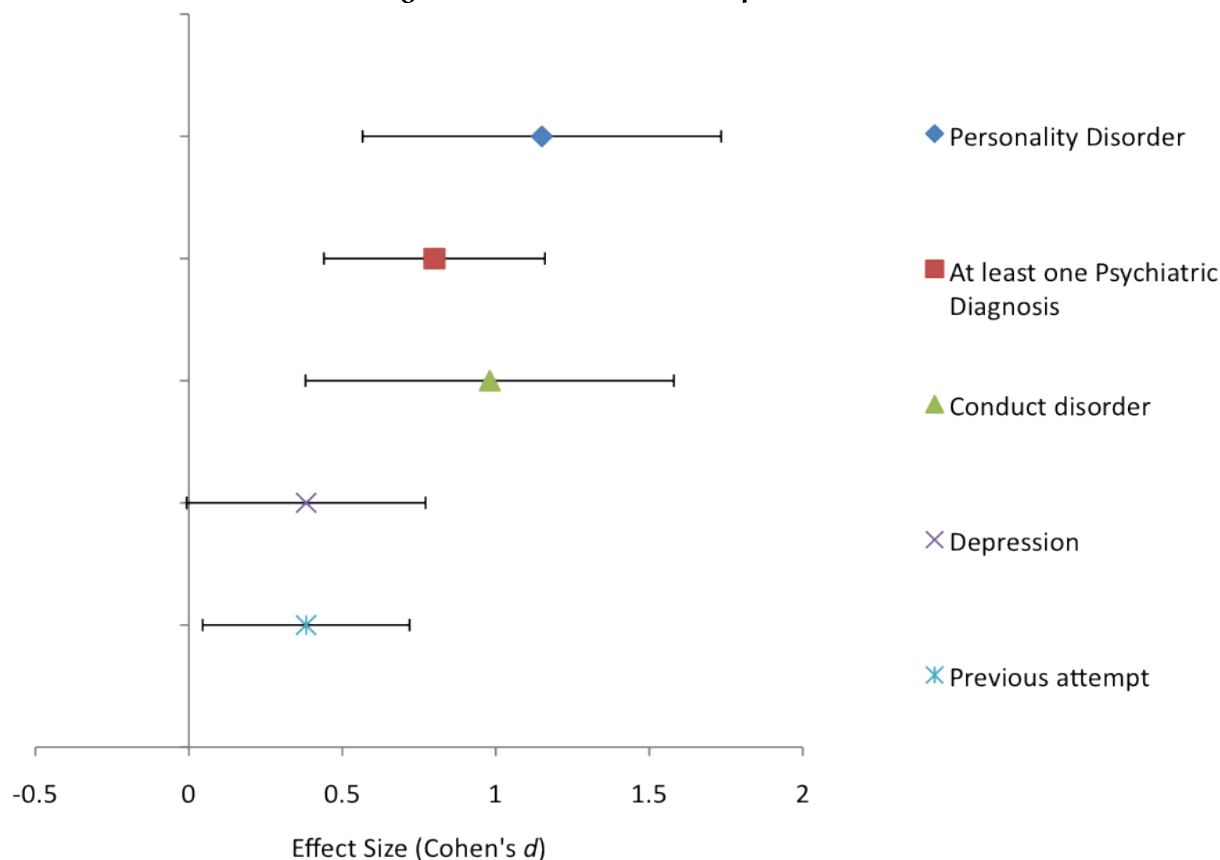


Table 5. Definition and Measures of Culture

Author Country	Cultural Construct Assessed	Cultural Measures	Findings and Implications
Chandler and Lalonde (1998) Canada	Cultural continuity Cultural fragmentation and dislocation	Self-governance Land claims Cultural amenities available	Suicide was 102.8, 60.5, 45.4, 36.1, 29.3, and 24.7 per 100,000 fewer for bands containing self-governance, land claims, education services, health services, cultural facilities, and police and fire services, respectively. The effects of cultural continuity factors are additive.
Garrouette et al. (2003) United States	Commitment to spiritual beliefs Cultural importance and connectedness	Importance of cultural beliefs Cultural orientation Cultural commitment	Suicide attempts were highest (12.1%) among those reporting cultural beliefs as unimportant. Those reporting a high commitment to cultural and spiritual beliefs had the fewest suicide attempts (4.3%).
Hallett et al. (2007) Canada	Cultural continuity/fragmentation	Knowledge and use of Aboriginal traditional language	Suicide rates were six times lower among bands in which more than half of the members have a conversational knowledge of an aboriginal language.
Malus et al. (2004) Canada	Importance of spirituality.	Participation in spiritual activities Feelings of alienation	Suicide ideation and attempts were lower among those who attended church every Sunday. Youth with suicide ideation and who attempted suicide suffered greater alienation
Novins et al. (1999) United States	Bicultural ethnic identity compared across three tribal groups	Connection with Native and Caucasian cultures	Ethnic identity was not associated with suicide among any of the three tribal groups
Walls (2007) Canada and United States	Cultural continuity, involvement and identification	Discrimination Enculturation Cultural identification Participation in traditional and spiritual activities	Traditional spirituality and enculturation in the preteen and early adolescent years show indirect, life course relevant, relations to suicidal tendencies. Greater endorsement of the importance of traditional spirituality was negatively related to suicidal tendencies through lessened levels of depressive symptoms, anger, and alcohol use, and greater reports of self-esteem.

trol further reduced the risk of suicide. Finally, the natural process of aging reduced the associated risk of suicide only minimally. The importance of these variables across the spectrum of suicide is suggestive of some underlying common process.

### EMPHASIS ON CULTURE AS A PROTECTIVE FACTOR

The current review focuses on trends present across a broad range of Indigenous populations due to a lack of studies in the extant literature. Only six of the articles reviewed presented enough data to examine the effects of culture on IYS (Chandler and Lalonde, 1998; Garrouette et al., 2003; Hallett et al., 2007; Malus et al., 2004; Novins et al., 1999; Walls, 2007). Operational definitions of culture can be found in Table 5. All of the studies examined various Indigenous populations in North America. Some interesting details emerged that merit attention. The three main trends to emerge were: 1) a lack of empirical research; 2) the need for a unified definition of culture; 3) the effects of culture depended upon which level the construct was analyzed.

1. Very few studies have examined culture as a protective factor of IYS in a methodologically sound manner. A lack of evidence makes it difficult to ascertain the true importance of culture in IYS.
2. The influence of culture was also difficult to determine, in part because the operational definitions of culture used in the selected studies were ambiguous and lacked consensus. No study gave a formal definition of what they believed culture to be at the outset, and only a few studies gave an adequate operational definition of culture during implementation. Furthermore, not a single study assessed construct of validity by mapping participants' perceptions of culture onto researcher's notion of the construct. Assessing face and construct validity is of particular importance when working with Indigenous population who could have different meanings of intertribal culture.

Culture was assessed through an amalgam of cultural activities, spiritual beliefs, self-governance, and knowledge of cultural language that proved highly variable across studies. This degree of variability made culture a ubiquitous construct.

Broadly speaking, culture was analyzed at two levels. One group of researchers evaluated culture as a group process. For example, Chandler and Lalonde (1998) measured cultural continuity operationalized as degree of self-governance using today's Chief and Council structure rather than Indigenous governance systems. This was designed to reflect the degree that groups have maintained societal integration by using their traditional culture to build a collective future. Hallett et al. (2007) included Aboriginal language knowledge as a proxy measure of culture and reanalyzed this data with the idea that language maps reality in culture-specific ways and that traditional knowledge is an essential way to transfer and learn about culture. These were the most objective uses of culture.

The remaining authors assessed individual perceptions of culture with an implicit assumption that participants have a cogent internal definition of this construct. Garrouette and colleagues (2003) defined culture as the orientation, value, and commitment that people experience towards their cultural heritage. This definition of culture was similar to that of Novins et al. (1999) who measured level of cultural orientation to both Indian and Caucasian cultures. Malus and colleagues (2004) did not directly measure culture but did ascertain indexes of spirituality, which they likened to cultural history. Finally, Walls (2007) assessed level of participation in traditional cultural activities (e.g., participation in traditional pow-wow among 19 other traditional activities, and knowledge and use of traditional language), comfort in cultural surroundings, and cultural identification. These conceptualizations differ markedly from those put forward by Chandler and colleagues in that they focus measurement on the individual.

3. The effects of culture depended upon how the construct was measured. The influence of culture on IYS was most pronounced when culture was examined as a group process, and it was more diffuse when measured as individual perception or participation.

Two studies measured cultural continuity as the degree to which bands along the west coast of

British Columbia have been able to fight for and maintain a strong sense of culture by challenging the government to allow them to live in, govern, and perform cultural rituals on their native lands (Chandler and Lalonde, 1998; Hallett, et al., 2007). The idea is that bands undertaking an active role in maintaining and preserving their culture will reduce youth suicide by providing a thread between self and culture, thus promoting the development of a strong sense of self. While difficult to quantify and evaluate empirically, their general findings suggest that this is the case.

Valuing, maintaining, and participating in traditional cultural and spiritual practices had mixed effects on buffering against suicide. Three studies assessed the effectiveness of identifying with one's culture at buffering against suicide (Garrouette et al., 2003; Novins et al., 1999; Walls, 2007). One study (Novins et al., 1999) found no relationship between ethnic identity and youth suicide, while two studies found that identifying and committing to one's culture buffers against suicide (Garrouette et al., 2003; Walls, 2007). Garrouette et al. (2003) found that youth scoring higher in cultural spiritual orientation made fewer attempts at suicide. Interestingly, this relationship was only found for youth scoring in the highest one third on a measure of cultural spiritual orientation. Walls (2007) found that being embedded within one's culture and valuing traditional spirituality led to fewer suicidal tendencies over time, although this relationship was complex and most pronounced when cultural identification was endorsed at an earlier age. Similarly, actively participating in spiritual practices on a regular basis was found to buffer against suicide (Malus et al., 1993).

Only one study assessed the developmental pathway of enculturation on IYS. Importantly, Walls (2007) was able to assess the influence of enculturation while taking into account causal pathways. Walls found that enculturation and endorsement of traditional spirituality led to lower levels of suicidal tendencies, however this relationship was complex. The endorsement

of enculturation and traditional spirituality at age 10, but not at subsequent assessments, was found to decrease the risk of current and future suicidal tendencies suggesting that the beneficial effects of culture may be limited to certain developmental stages. Importantly, this effect was partially explained by reductions in depression, negative life events, anger and alcohol use, and through an enhanced sense of self worth. It is worth noting that the majority of youth assessed by Walls (2007) came from isolated and socially disadvantaged reserves across North America. This study indicates the need to assess pathways to suicidal tendencies among Indigenous youth. A life-course perspective needs to be adopted in order to better understand how culture attenuates the risk of suicidal tendencies conferred by factors such as poverty, genetics, psychopathology, social disadvantage, discrimination, and stressful events. Only once the pathways to IYS are understood can interventions be implemented that properly address risk and protective factors identified by epidemiological research.

## DISCUSSION

### ASSESSMENT OF METHODOLOGIES

Designing methodologically sound research with a lens focused on IYS is by no means an easy task. This review highlighted many of the difficulties in the current literature. For example, few studies utilized multiple measures of suicidal ideation or verified the accuracy of these measures. It also became apparent that research in this area is reliant on large scale populations data often obtained from Coroner reports and other secondary sources in which the researcher had no decision making control.

Since acts of suicide are relatively low with estimates ranging between 48 per 100,000 to 108 per 100,000 (Beautrais and Fergusson, 2006; Chandler and Lalonde, 1998), large-scale community and population-based samples of Indigenous youth are required to ensure that findings are meaningfully interpretable rather than statistical artifacts. Large aggregate samples offer the benefit of easily identifying and tracking universal trends in IYS. However,

such samples do not permit a detailed analysis of the factors affecting Indigenous youth at the local or geographic level. Thus, while the use of population sampling seems like a necessity in this research area it comes at the cost of detecting more subtle influences.

A heavy focus was placed on data obtained from the Coroner's office. As noted by Chandler and Lalonde (1998), relying on data from the Coroner Service allows for two significantly potential sources of error. First, a death may be labeled accidental unless there is compelling reason for classification as a suicide; this can lead to a misunderstanding about the true incidence and factors preceding a suicide. Second, Indigenous populations may seek to under-report deaths as suicides in an attempt to reject a perception of themselves as being particularly prone to suicide. Unfortunately, the best source of data for assessing suicides is Coroner Service data, imposing a limitation on suicide research.

This review also uncovered some successes in the IYS literature. Cultural relevance was often obtained by pilot testing instruments before study implementation. A high degree of community involvement further ensured that data was reported accurately. In addition, potential confounds were often measured and statistically controlled using fully adjusted models. However, only one intervention was found that utilized these strengths indicating a relative lack of support for youth to maintain their overall resilience. Future research examining the efficacy of intervention elements is sorely needed.

#### APPLICATION TO THEORIES ON INDIGENOUS YOUTH SUICIDE

Some preemptive findings into the etiology of IYS emerged from our systematic review that could be of benefit to future studies. As suggested by Chandler et al. (2003), the common element underlying the pathways to IYS could be an inability to form a sense of identity and purpose in life. This theoretical framework could explain the influences of IYS identified in the present review.

Individuals are likely to search for identity during developmental crises where psychological growth can be triggered through the experience of stressful life events (e.g., having a friend attempt

suicide or contemplating the inevitability of death; Anthis, 2002). If such meaning cannot be located and the struggle for identity cannot be resolved, then a serious period of hopelessness or depression occurs (Duran and Duran, 1995). Being unable to find continuity and a sense of belonging in the self, individuals devoid of an identity often adopt and cling to an addictive lifestyle; such a lifestyle can include problematic use of drugs and alcohol, gambling, and sex (Alexander, 2006). This myriad of negative effects resulting from discontinuity in the self is believed to precede suicide (Ball and Chandler, 1989; Chandler et al., 2003). Such negative effects are believed to be more abundant among Indigenous populations.

Indigenous populations are fragmented and suffer acculturation and oppression as a result of colonization. The effects and presence of acculturation are still evident in today's reality, which includes poverty, discrimination, racism, and the history of assimilation (e.g., being forced to attend residential schools; Berry, 1997). Such fragmentation and dislocation of culture negatively effects the formation of identity, self-esteem, and purpose among Indigenous populations.

The maintenance of culture and formation of social and familial supports are ingredients that may offset IYS. Social and family support positively influences the development of relational, occupational, and self-identity (Meeus and Dekoviic, 1995), and it was found to be the strongest protective factor reducing the risk of suicide among the studies examined. The assessment of culture as a protective factor for IYS presented in other studies (e.g., Chandler and Lalonde, 1998; Walls, 2007) is but one of many necessary interventions. We agree that connection with one's culture of origin is an important preventive factor for reducing the incidence of suicide among Indigenous peoples. However, this needs to be put into the ongoing context of the realities that Indigenous peoples face today including crippling poverty, unequal access to health and wellness services as well as ongoing issues with access to social services, and education.

Culture connectedness may well be a useful measure of resilience among Indigenous populations, but this review has shown that such effects are

far more complex than originally believed. For instance, the intervention study summarized by May et al. (2005) shows that while culture is important it is the integration of social, family, education and training, job creation, and other elements that bring cohesion to a community. Indigenous youth suicide must be addressed as a community by forming community cohesion (see also Middlebrook et al., 2001).

## CONCLUSION

This systematic review of the scientific literature relevant to Indigenous youth suicide indicates that suicidal behaviour among Indigenous youth is a complex issue. The evidence suggests that it is not only having a sense of culture that buffers against the negative pathways of suicide, but rather the act of engaging in culturally relevant activities with respected others in the community. This larger process can be theoretically likened to how Indigenous youth search for and develop a sense of meaning and purpose in their lives. However, there is little to no data that speaks to this theoretical assertion — at present it will have to remain a theoretical speculation.

This stringent search of the literature pertaining to IYS identified a small number of studies that were high in methodological rigour. These studies were mostly epidemiological in nature with very few pertaining to interventions for the prevention of IYS. Although these studies offer insight into the etiology of IYS, additional methodologically rigorous intervention studies are needed to promote and develop an effective program for suicide prevention.

## RECOMMENDATIONS AND FUTURE

### DIRECTIONS

Indigenous youth suicide is a poorly researched area in which further investigation is urgently needed. The present review has identified several risk and protective factors of IYS but cannot indicate how these influences interact to culminate in suicidal tendencies among Indigenous youth. Future research examining the interactive nature of the risk and protective factors identified in this review in a longitudinal manner are required. Particularly, research examining pathways to IYS that evaluate the

interactions between demographics (e.g., poverty, social disadvantage), psychopathology (e.g., depression, substance abuse), social support, life stress, cultural connection, and future occurrences of suicide among this population is of vital importance. Such studies are critical to determine the impact of culture on youth suicide and determine the underlying mechanisms involved. This is a necessary step if epidemiological research is to be translated into effective interventions.

Unexpectedly, not one study gave an explicit definition of culture at the outset. This came as quite a surprise considering six studies attempted to measure the influence of culture on suicide among Indigenous populations. Beyond that, studies assessing culture poorly defined and operationalized the construct. A unified definition of culture is required to evaluate operational definitions that ensure accurate interpretations can be made across studies.

Finally, further research is needed into the effects of community involvement. Studies that utilized higher degrees of community involvement appeared to fare well but this conclusion is difficult to substantiate without empirical assessment into its unique contributions.

## LIMITATIONS AND POTENTIAL BIASES

All systematic reviews require that the process focuses on the commonalities across studies at the expense of features that are unique to each study. We have attempted to diminish this limitation by referencing details of each study whenever possible.

This review used a scale of quality assessment that may be overly rigorous given the difficulties of performing research on suicide with Indigenous populations. In an attempt to overcome this problem, we performed a systematic evaluation of all articles deemed moderately rigorous (i.e., all articles scoring a 3 or a 4) and included only those that were found to make an adequate contribution to this review.

Selection bias may also have occurred when choosing articles to be cited, this is a problem in systematic review methodologies. To minimize the potential selection bias we added a third review au-

thor, who acted as an independent evaluator to resolve disagreement between other reviewers.

Curiously, the literature search did not return a single article that utilized Indigenous methodologies. One possibility is that such manuscripts exist, but may not be published in English. Thus, they were missed by our database searches as only studies written in English were included. Similarly, the databases searched may not carry more obscure Indigenous journals, which are likely candidates to publish articles that utilize Indigenous methodologies.

Finally, the studies reviewed often used a pan-Indian approach in amalgamating evidence across a large and heterogeneous group of Indigenous peoples. Localized Indigenous populations may be distinct and it is unclear as to how well such findings could be generalized at a local level.

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