

**A Comparison of the Prevalence and Risk Factors of Suicidal Ideation and
Suicide Attempts in American Indian and General Population Samples**

by

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Abstract

Among indigenous populations, there is significant evidence that the rates of completed suicide are much higher than in the general population. The current study examines whether the prevalence and risk factors of suicidal ideation, plans and attempts differ when comparing an American Indian reservation sample to a US general population sample. Data were from the National Comorbidity Survey ($n = 5,877$) and the American Indian Service Utilization, Psychiatric Epidemiology, Risk and Protective Factors Project ($N = 3,084$). The current findings indicate that there are few differences in the likelihood of suicidal behavior in conjunction with particular disorders or traumas. However, American Indians appeared more likely to make a suicide attempt and less likely to have suicidal thoughts in their lifetime when compared with the general population. Although preliminary and exploratory, findings provide evidence that suicide interventions for indigenous populations may require modification based on differential risk factors for suicide.

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Chapter 1: Introduction & Literature Review

Background on suicide

With nearly one million deaths by suicide every year, suicide has become a serious public health concern worldwide.¹ This represents one death every 40 seconds and illustrates that more people are dying from suicide than in all of the several armed conflicts around the world.² Despite considerable efforts to better identify those at risk, suicide prevention strategies have been disappointing. In fact, worldwide, suicide rates have actually increased by approximately 60% in the last 45 years.³ In the United States, the annual number of suicides has not changed in 20 years.¹

The impact of suicide is exacerbated by its preponderance among the young. In all countries it is now one of the three leading causes of death among people aged 15-34 years and is the second-largest cause of death for those between the ages of 25 and 34 years in the US.⁴ Suicide has a devastating effect on families and the community, and robs society of young, potentially productive people. This loss is reflected in annual rates of 20 million disability-adjusted life-years (years of healthy life lost due to disability or premature death), representing 1.8% of the global burden of disease.⁵ As a tragic and potentially preventable problem, the alarming rate of deaths by suicide emphasizes the need for more carefully designed prevention strategies. Research has indicated that suicide attempts are strong risk factors for future attempts⁶ and eventual completed suicide.^{7,8} As well, psychological autopsy studies have demonstrated that a significant proportion of completed suicides occur on the individual's first suicide

attempt.⁹ Taken together, these findings illustrate the importance of understanding risk factors for suicidal behavior, allowing one to intervene prior to the individual making a possibly fatal attempt.

Suicidal ideation refers to thoughts about suicide, which may range from vague or unformed urges to more detailed plans. Suicide attempts describe an action in which a person intentionally tries to end their own life without success. Suicidal ideation and suicide attempts are an extremely important area of study in suicide research for several reasons. First, they are both documented risk factors for eventual suicide completion.⁷ Although numerous risk factors for suicide have been identified, suicide attempts remain among the strongest predictors of future suicide.⁸ Second, they are prevalent in the general population. Approximately 14% of the general population will have suicidal thoughts in the course of their lifetime, while nearly 5% will attempt suicide.^{10, 11} Third, suicidal ideation and suicide attempts often bring the individual to the attention of care providers through emergency room presentation, therefore making them easily identifiable targets for treatment and prevention efforts. Finally, both the World Health Organization¹² and the United States Surgeon General¹³ have prioritized a more comprehensive study of suicide attempts, with the goal of developing health policy that will reduce suicide and suicidal behaviors.

Most studies of suicidal behaviors have been conducted within Western, high-income countries and it is not known whether prevalence estimates and risk factors identified in such studies generalize beyond these groups. Recent work in

several low- and middle-income countries has illustrated that the occurrence of suicidal behavior differs significantly from high-income countries, such that gender and the presence of mental disorders play less of a role.^{14, 15} Suicide risk is also twice as high for white males and females in the US than for African-American males and females, respectively.

In countries other than the US, suicide rates vary widely, ranging from less than 1 in 100 000 persons per year in Syria, Egypt, and Lebanon to more than 40 per 100 000 persons per year in many former Soviet republics.³ As well, the reported rates of suicide in first-generation immigrants to Australia tend to be more similar to rates in their native country than to rates in their country of current residence.¹⁶ Among indigenous populations, there is significant evidence that the rates of completed suicide, especially in youth populations, are much higher than in general population samples.¹⁷⁻²¹ Together, these findings suggest important socio-cultural differences. Of particular interest is the consistently high rate of suicide among diverse indigenous populations, both nationally and internationally.

Suicide in American Indians

Indigenous history

Indigenous communities around the world are highly diverse, with a range of social, cultural, environmental and linguistic differences, as well as an enormous range of values, lifestyles, and perspectives.²²⁻²⁴ While biological, social, cultural, and political factors vary, there are salient similarities in their mental health problems (i.e., high rates of suicide and suicidal behavior).²¹

Research conducted with indigenous peoples in the United States, Canada, Australia, Greenland, and New Zealand suggest that there are common processes at work. In these countries, tribal families and communities share a common social, economic, and political history; that is, a legacy of colonization.

As Kirmayer eloquently describes it,

“The history of the European colonization of North America is a harrowing tale of the indigenous population’s decimation by infectious disease, warfare, and active suppression of culture and identity that was tantamount to genocide.”²⁵

This is not to say that traditional indigenous communities were entirely free of disease or social problems in pre-European contact times.²⁶ However, in the 16th century, the process of cultural change quickly accelerated when European settlers’ economic, political, and religious institutions all contributed to the displacement and oppression of indigenous people.²⁵ Actions were taken by Europeans to take away the indigenous child-rearing practices and cultural teachings to make indigenous people more like them.²⁵ Introducing mandatory boarding school education, externally imposed forms of governance, forced dietary changes, taking away the language, active missionary movements, and making many spiritual and cultural practices illegal are examples of these actions.^{27, 28} Changes have been even more severe for indigenous groups that were once hunter-gatherer societies, wherein the process of becoming sedentary has entirely changed their way of living.²⁸ The indigenous population of North America prior to the arrival of Europeans was an estimated 7 million people.

Sadly, close to 90% of these people died as a result of the direct and indirect effects of contact with the Europeans.²⁵

Since that time, indigenous peoples have continued to experience rapid culture change, marginalization, and acculturation into a world that devalues their identity as indigenous persons. This shared predicament has motivated indigenous peoples to band together in an effort to forge a collective identity and a common political front. This collective effort to reclaim identity and assert self-government illustrates a semblance of resilience in this population. Unfortunately, not all individuals, families or communities have been able to transcend this collective sense of trauma. Indeed, many tribal nations continue to experience the ill effects of colonialism.

Driven both by their own economic interests and by external pressure from various sources (e.g., government, economic, medical, religious),²⁹ cultural change has proceeded at a rate dictated mainly by external interests.²⁸ Indigenous peoples continue to suffer from a wide-range of health and social inequalities, including lowered life expectancies, elevated infant mortality, and a higher rate of mental health and other disorders when compared with the general population.³⁰⁻³⁷ Importantly, this cultural change, often termed cultural discontinuity,³⁸ has been linked to high rates of depression, alcoholism, violence, and suicide, with the most profound impact on youth.

Prevalence of suicide in American Indians

As mentioned previously, there is evidence that the rates of completed suicide and suicidal behaviors in indigenous populations are much higher than in

general population samples.¹⁷⁻²¹ For example, American Indians experience the highest suicide rates of all ethnic groups in the US.³⁹ With an age-adjusted rate of death by suicide of 19.1 per 100,000,²¹ twice as high as the rate in the general US population, the high prevalence of suicide and suicidal behavior in American Indian communities has become a major public health concern.

Indeed, among American Indian young people aged 15 to 34 years, suicide is the second leading cause of death.⁴⁰ As well, research indicates that 14% to 30% of American Indian adolescents (15-24 years of age) attempt suicide, while the rate of completed suicide in this group is more than 3 times higher than that of other youth in the US (37.4 and 11.4 per 100,000, respectively).²¹ Despite these alarmingly high suicide rates, federal efforts in the US on suicide prevention have been slow to reach the American Indian communities.

While rates are significantly higher than in the general US population, there are wide variations in average suicide rates among different American Indian communities, with the highest rates (up to 150 per 100,000) being reported in the Western US and Alaska.^{21, 41-44} While acknowledging tribal diversity in suicide patterns, there are several general characteristics of American Indian suicides. Suicides in American Indians typically (1) occur among young males, (2) tend to involve highly violent or lethal methods, such as firearms or hanging, (3) are more frequently alcohol-related, (4) occur more in tribes with a higher degree of individuality rather than in those that encourage conformity, and (5) occur more in tribes undergoing rapid change and acculturation stress.⁴⁵

Conceptual frameworks of suicide

There are a number of well-established risk factors for suicide and suicidal behavior. These include presence of a mental disorder,^{10, 46-49} presence of a medical illness,⁵⁰⁻⁵³ poor family relationships,^{54, 55} and particular personality characteristics.⁵⁶⁻⁵⁹ More recent studies have extended these associations to investigate the impact of traumatic life events, including childhood abuse, on suicidal behaviors.^{49, 60-62} Other contributory factors include availability of highly lethal means, sex, level of educational attainment, genetic components, marital status, social support, life stressors (such as a psychosocial crisis), and various other factors.^{10, 63, 64}

A number of theoretical models of suicidal behavior have been proposed, although no single model encompasses the range of influences demonstrated to play a part in determining future suicidal behavior in the general population. Three separate reviews on suicide and suicide prevention strategies by Mann^{1, 63, 65} explore a number of the correlates of suicidal behavior. These correlates can be combined in a meaningful way, following Mann's theory of the relationship of risk factors and suicidal behavior according to a diathesis-stress model (Figure 1). The model begins with early life experiences (e.g., childhood adversity),

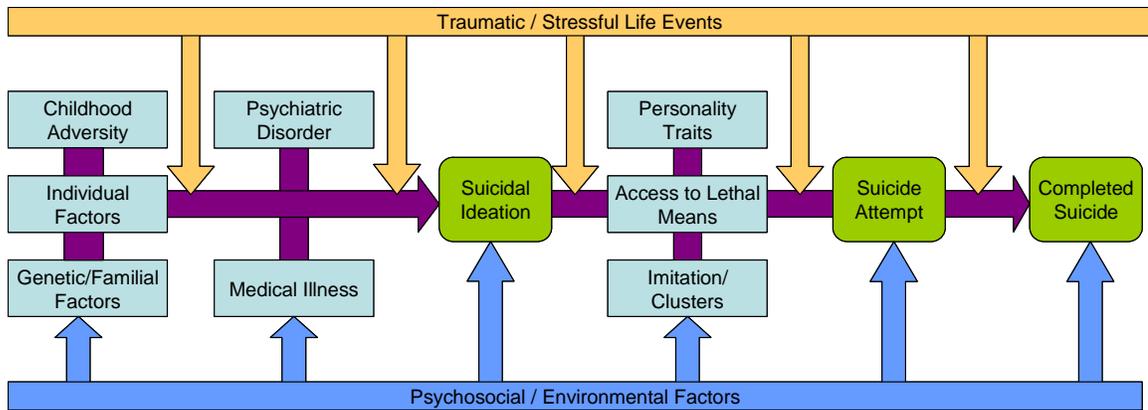


Figure 1. Theoretical model of suicide adapted from Mann 2002, 2003, & 2005.

genetic and familial factors (e.g., family history of suicidal behavior), and individual factors (e.g., age or sex) which are conceptualized as a diathesis. These factors then interact with psychiatric disorders and medical illnesses. The accumulation of these factors may lead the individual to have suicidal thoughts. Once the person has had suicidal thoughts, additional factors including specific personality traits, the availability of lethal means, and the role of imitation can then enable a suicide attempt. The outcome of this attempt can either be suicide completion or an unsuccessful attempt. Throughout this pathway, psychosocial and other environmental factors (e.g., unemployment), as well as traumatic or stressful life experiences (e.g., dissolution of a significant relationship), may also act as stressors by exerting an influence over the individual's likelihood of developing suicidal behavior at any stage. This model combines a wide variety of risk factors according to results from epidemiologic and cohort studies on suicidal behavior and completed suicide. The key limitation of this model is its lack of inclusion of cultural influences or race/ethnic differences in suicidal behavior.

Suicidal behavior among indigenous populations, similar to other populations, has also been conceptualized to have multiple complex layers of determinants.^{28, 66} There are also a number of particular issues that are especially relevant in indigenous suicides, which include specific physical and social environmental factors (e.g., isolated rural communities, high latitude communities, social disorganization), cultural factors (e.g., colonization, acculturation issues), specific familial factors (e.g., increased number of children, single parent families), and specific individual factors (e.g., poverty, low levels of education).^{17, 23, 25, 28, 66, 67} Although a theorized model by Kirmayer²⁸ (Figure 2)

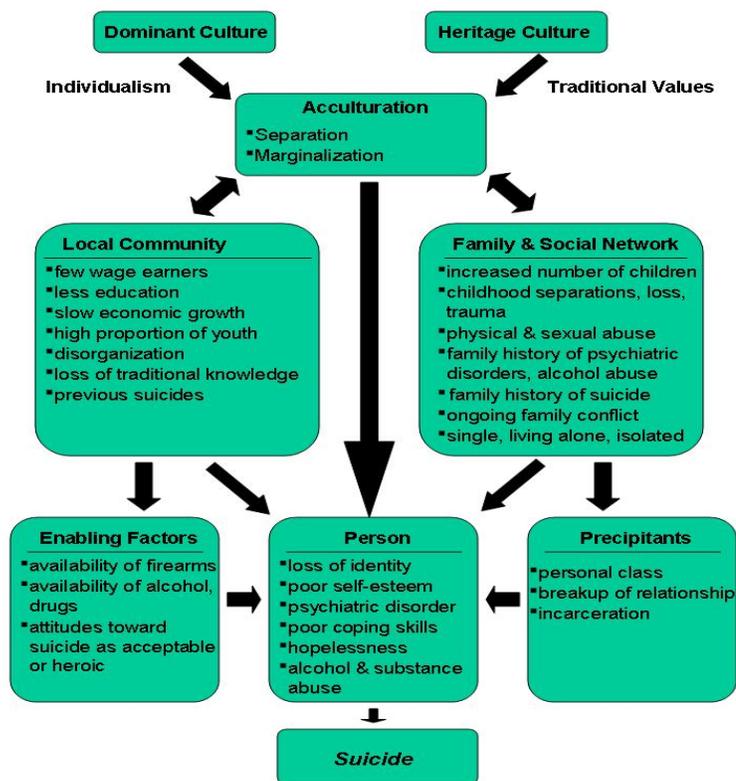


Figure 2. Kirmayer's theoretical model of Aboriginal suicidal behaviour.

suggests a complex interplay between individual, family, cultural and community factors involved in indigenous suicide, we were unable to find any empirical

evaluations of this model. Kirmayer’s model describes the collision of two cultures, which results in acculturation stress that acts at three levels: the local community, the family and social network, and the person. In this model, enabling factors and precipitants are key influences on the development of suicidal behavior in the individual.

In comparing the two models, the Mann model stood out as the more comprehensive model as far as describing a wide range of risk factors for suicidal behavior. Therefore, the present study uses a framework (Figure 3) based on Mann’s model of suicidal behavior with modification of this model to include key items from Kirmayer’s model. Acculturation was added to the model in order to discuss potential cultural influences on suicide risk, demonstrating its effect over a variety of processes similar to the effect of psychosocial/ environmental factors. This new framework will be used as a guide to discuss risk factors for suicide and suicidal behavior below.

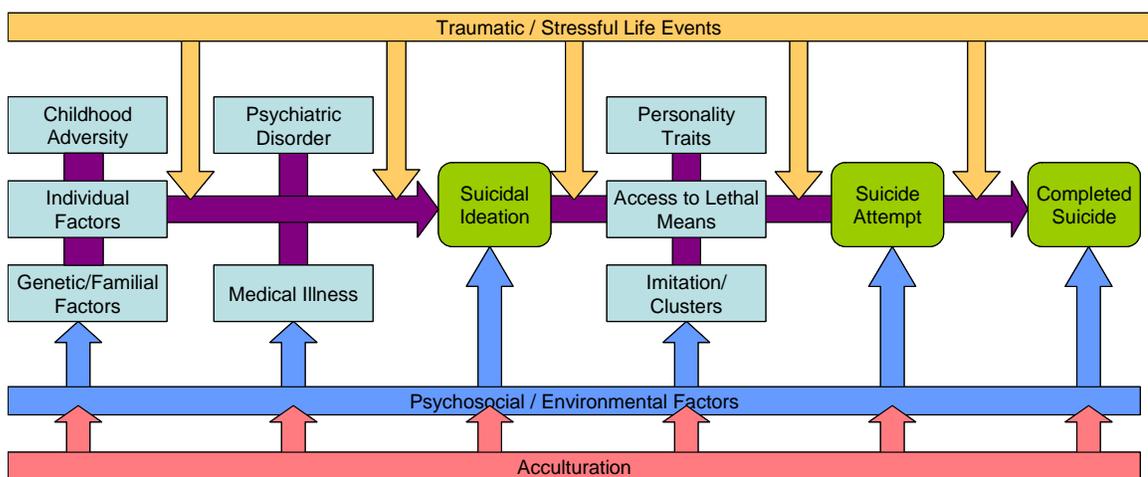


Figure 3. Theoretical model of suicidal behavior, as adapted from Mann and Kirmayer.

Risk factors for suicide in American Indians

To date, there are no systematic evaluations comparing risk factors for suicide and suicidal behavior among American Indians with those among the general population. As such, it remains unclear whether those risk factors found to be important in non-indigenous populations are the same in American Indian populations. These may include psychiatric disorders, access to lethal means, previous suicide attempts, sexual abuse, and stressful life events.⁶⁶ Some risk factors simply may not generalize from non-indigenous populations, while others may differ in their importance for American Indian communities. Below is a review of the limited literature exploring this area.

Individual factors

In most countries, the suicide rate in males is more than four times that in females,^{1, 3} whereas females often have a higher rate of attempted suicide and other suicidal behaviors.⁶⁸ Gender differences in suicide rates among American Indians are comparable to those of the general population, although amplified by higher rates in both males and females.¹⁷⁻²¹

In the general population, suicide rates vary markedly over the life span. Suicide under age 12 is very uncommon, while the rate increases over the teenage years to reach a peak between the late teens and early 20s.¹⁰ In females, suicide rates remain relatively constant beginning in the midteens.³ In males, suicide rates are stable from the late teens until the mid 70s, when the rate demonstrates a second peak.³ Over the last 50 years, the age distribution of cases of completed suicide in the world has changed markedly, from an

overrepresentation of older adults to a majority of young people (55% under 44 years).⁴

Most indigenous people who die by suicide are male and 15 to 24 years of age.⁶⁹ Although these findings appear similar to those in the general population, previous work has indicated that indigenous people that complete suicides are younger at the time of suicide compared to non-indigenous people²¹ and indigenous adolescents are 5-6 times more likely to die from suicide than the average non-indigenous adolescent.⁷⁰ As well, after age 55 the rate among American Indians drops below that for the general US population.⁴³ This preponderance of suicide among the young in American Indians is a huge public health issue given the high number of youth in this population. The American Indian population is about 6 years younger, on average, than the general US population, with a median age of 29 years for American Indians (25 years for American Indians on reserve) versus the national average of 35 years.⁷¹ As well, about 33% of the American Indian population is under age 18, compared with 26% of the general US population.⁷¹ Looking at the older age, only 5.6% of American Indians are 65 years and older compared with 12.4% of the total US population.⁷¹

In the general population, difficulties in school and not going to college pose significant risks for completed suicide,⁷² and more serious attempters have been shown to be more likely to drop out of high school or not attend college.⁷³ In general, most studies demonstrate an association between lower levels of educational attainment and increased risk of suicidality.^{10, 64} Although studies

have not looked at the effect of education on suicidal behavior in indigenous populations, it appears that they may be at a disadvantage. In fact, the educational attainment of American Indians is below that of the general population with variations among the tribal groupings and place of residence.⁷¹ As well, only seventy-one percent of American Indians 25 years and older had at least a high school education and 11% had at least a bachelor's degree, compared with 80% and 24% of the total US population, respectively.⁷¹

The recurrent influence of income on a number of models of suicidality emphasizes the pervasive impact of poor socioeconomic conditions in indigenous communities. Indeed, poor socioeconomic status was noted more frequently in indigenous suicides compared with non-indigenous suicides.²⁰ However, in the general population findings have been mixed on the effect of socioeconomic disadvantage. Studies have demonstrated no effect of low socioeconomic status on suicide completion,^{72, 74} whereas studies of suicide attempts have consistently found higher rates of socioeconomic disadvantage.^{60, 73, 75}

Psychiatric disorders

Psychiatric disorders are identified in more than 90% of suicide attempters and completers^{73, 76-79} and therefore have been a major area of suicide research. Mood disorders, principally major depression and bipolar disorder, are associated with approximately 60% of suicides.⁷⁹⁻⁸³ Other psychiatric disorders associated with completed suicide include alcohol and drug use disorders,⁸⁴⁻⁸⁶ personality disorders,^{46, 87} and schizophrenia.⁸⁸⁻⁹⁴ The role of anxiety disorders in

suicide has been less studied and remains controversial, although several recent studies have shown that they are risk factors for incident suicide attempts.⁹⁵⁻⁹⁷

Mental disorder comorbidity (i.e., co-occurring mental disorders) is also an important risk factor – having more disorders elevates the risk of suicide attempt and completion.^{10, 68, 98}

Comparable results have been illustrated in indigenous populations, wherein those who die by suicide were more likely to have a psychiatric diagnosis, especially depression or a personality disorder, or a psychiatric history.^{69, 99, 100} These findings have also been demonstrated in American Indian male adolescents, wherein a history of being treated for emotional problems was associated with a past suicide attempt.⁶⁶ Yet, American Indians and other indigenous persons appear to be at higher risk than other racial and ethnic groups in the US for many mental health problems, and are consistently overrepresented among high-need populations.^{34, 35, 101}

Additionally, completed suicides among indigenous persons are more often associated with frequent alcohol or marijuana use, having ever used drugs, alcohol or drug abuse, and a higher mean level of alcohol at the time of suicide compared to non-indigenous populations.^{20, 43, 99, 102-104} Similar findings have been noted specifically in American Indians.^{66, 105, 106}

Hopelessness is a key correlate of psychiatric disorders and appears to be strongly involved in pathways to suicidal behavior and completion.¹⁰⁷⁻¹⁰⁹ Suicidal people differ from non-suicidal people in that they experience more subjective hopelessness and perceive fewer reasons for living, despite having the same

objective severity of psychiatric illness and a similar number of adverse life events.⁵⁹ One proposed explanation for this greater sense of hopelessness may be a predisposition towards such feelings in the face of life stressors.⁶³

Previous findings have illustrated that indigenous peoples report lower levels of hopelessness than non-indigenous peoples in relation to suicide attempts.¹¹⁰ These findings suggest that indigenous populations may experience or report hopelessness differently than non-indigenous populations, and this may relate to their judgments about the future.¹¹⁰ In fact, several authors have noted that indigenous peoples tend to emphasize the present rather than the future.²⁸

Personality traits

Personality traits such as impulsivity and aggression have been shown to be risk factors for suicide attempts^{56-59, 111} and completed suicide.^{58, 112} Impulse control disorders, such as intermittent explosive disorder and attention-deficit/hyperactivity disorder, which have impulsivity as a feature, have demonstrated a strong relationship with suicidal behaviors across countries.⁶⁸ This relationship was even more pronounced in low- and middle-income countries, wherein impulse-control disorders were the strongest predictor of suicidal behavior.⁶⁸ Those with lifetime aggression and impulsivity are not only more aggressive toward others and their environment, but are more impulsive in other ways that involve day-to-day life decisions.⁶³ With the combination of a greater likelihood of suicidal behaviors and the diathesis of aggression and impulsivity, it may be that these individuals have a greater likelihood of acting out on suicidal feelings making them more at risk for suicide attempt and completion.

Results from a Northern Plains community-based American Indian reservation sample revealed a greater percentage of the sample had attempted suicide in their lifetime than had engaged in suicidal ideation or planning.¹⁸ The authors suggest that these paradoxical results may provide evidence for conceptualizing suicide attempts as impulsive acts within American Indians more so than theorized within the suicide risk continuum model that appears in the general population, wherein ideation is suggested as a preliminary behavior to attempts.

Medical illness

Physical illness, especially chronic physical illness, has been shown to be associated with increased likelihood of suicidal behavior.^{52, 113} Potentially fatal illnesses, such as cancer, carry a two- to four-fold increased risk of suicide according to studies in general population samples.¹¹⁴ Physical illnesses that affect the brain also have a larger effect on suicide risk than other medical conditions.^{50, 51, 59, 115}

Similar to general population samples, indigenous persons who die by suicide have been noted to experience more severe medical illnesses on average than living indigenous persons.⁶⁹ Somatic symptoms, such as headaches and stomach problems, and other health concerns have been shown to be significantly associated with a history of attempted suicide in American Indians.⁶⁶

Psychosocial and other environmental factors

Suicidality is more frequent among both men and women who are single, separated, divorced or widowed compared to those who are married.^{6, 64, 68, 116-118}

A change from single or widowed to married status reduces suicide risk for men significantly more than for women, however both sexes benefit equally in reducing suicide risk.¹¹⁷ Those who are married with children have still lower rates of attempt, but may be more likely to have suicidal ideation when their children are under age 12.⁶

Most indigenous people who die by suicide are also single.⁶⁹ Unfortunately, it is unknown to what degree common-law living or other cohabitation arrangements confer the same benefits as a spouse. In many American Indian communities, extended family and kinship networks take the place of reliance on a spouse. As a result, it is unclear to what extent this finding can be generalized to all indigenous peoples.

High rates of unemployment, living in a rural area, a lack of social capital, and poverty have all been proposed as important risk factors for suicide in both the general population and indigenous populations.¹¹⁹⁻¹³⁰ Notably, rates of unemployment and poverty are much higher among American Indian communities than in the general population.⁷¹ The labor force participation rate for American Indians was lower than that in the general population, particularly for men (66% versus 71%, respectively).⁷¹ Even when employed full-time, median earnings for American Indians was nearly \$10,000 less per year than for the rest of the US population.⁷¹ Similarly, the ratio of American Indians living

below the official poverty level in 1999 to that of all others in the US was more than 2.⁷¹

Risk factors for suicide are clearly interrelated, and their effect individually on suicidal behavior is unknown. Since psychiatric disorders can also lead to a decline in socioeconomic status, cause a relationship breakup, or lead to job loss,¹³¹⁻¹³⁴ these factors are difficult to separate from the psychosocial effect of the psychiatric illness itself. Moreover, psychiatric illness and psychosocial adversity can combine to increase stress on the person, thereby potentially increasing the risk for suicidal behavior.¹

Acculturation

Acculturation and other social change as a result of colonization have occurred in American Indian cultures, disrupting their traditional way of life. This experience is unique to indigenous groups. Several studies have found that in less traditional tribes, where pressures to acculturate have been great, the suicide rate is especially high.^{42, 105, 135} Suicide rates have also been demonstrated to correlate with the level of cultural continuity in Canadian Aboriginal populations.³⁸ Cultural continuity was measured in seven areas: (1) the level of self-government, (2) involvement in land claims, (3) band control of education, (4) health services, (5) cultural facilities, (6) police and (7) fire services. Communities with all seven factors had no suicides while those with none of the factors had extremely high suicide rates.³⁸ Further preliminary investigations in Canada have shown that Aboriginal youth suicide rates relate to community-level variability in knowledge of Aboriginal language, indicating that

tribes in which a majority of members reported a conversational knowledge of their traditional language experienced low to absent youth suicide rates.¹³⁶

Seventy-two percent of American Indian individuals report speaking only English at home; in some tribes, this percentage rose higher than 90%.⁷¹ Along the same lines, indigenous persons' feelings of alienation from one's community or family have been shown to be positively associated with suicide attempts.¹⁰⁰

Childhood adversity and traumatic/stressful life events

In an investigation of the population-attributable risk of suicidal ideation in a community sample, 38% of the risk for suicidal ideation was attributed to exposure to traumatic events.¹²⁶ Literature on this relationship has primarily focused on two areas: childhood physical/sexual abuse and combat trauma. Rape and physical or sexual abuse, especially during childhood, have been shown to be associated with increased risk of suicidal behaviors in a number of populations.^{47, 49, 54, 55, 60-62, 137-139} In looking at combat trauma, numerous studies have shown that combat exposure is highly associated with the development of posttraumatic stress disorder^{140, 141} but controversy exists around whether combat may also lead to subsequent suicidal ideation, suicide attempts, and completed suicide.^{61, 95, 142-146}

Previous work by myself and colleagues has demonstrated that likelihood of suicidal ideation and suicide attempts is increased among individuals who have experienced particular traumatic events, independent of the development of a mental disorder.^{61, 143} The findings were consistent in two different samples, one in a US general population sample⁶¹ and another in a representative sample

of military personnel.¹⁴³ Specifically, interpersonal traumas (i.e., childhood physical abuse, sexual assault, rape, and physical attack) have demonstrated strong associations with suicidality in both males and females, even after accounting for the effect of a diagnosable mental disorder. It has been suggested that children who are physically or sexually abused may have difficulty developing the social skills necessary for healthy relationships, which leads to social isolation and/or antagonistic interactions with others, which in turn puts them at increased risk for suicidal behavior.⁵⁵ Additionally, findings from our studies provided evidence for a dose-response relationship wherein increasing number of traumatic exposures increased likelihood of suicidal behavior.⁶¹

A history of sexual or physical abuse has also shown a significant association with history of attempted suicide in American Indians.⁶⁶ It is important to note, however, that there are higher rates of exposure to trauma in indigenous populations compared to non-indigenous groups, partially due to the experience of residential schools and partially due to the adverse social and physical environments in which many live.^{32, 147-149} The residential school experience itself also seems to confer additional risk of suicidal behavior.¹⁵⁰

Life stressors, such as interpersonal conflicts, breakup of a significant relationship, financial problems, or loss of personal resources are among the most common precipitants of suicide and suicidal behavior in indigenous and non-indigenous populations.^{60, 72, 98, 99, 102, 126, 151-153} Additionally, personal unemployment has been found to be strongly correlated with suicide rates.^{127, 154-157} In fact, studies have shown that these types of negative life events occur in

the vast majority of cases of completed suicide⁹⁸ and are a strong risk factor for suicidal behavior.¹¹⁸ Potential loss of freedom or independence (e.g., fear of imprisonment) also frequently appear among the final events in the life of the suicide completer.⁹⁸ In American Indian women, particularly young adult females, intimate partner violence and interpersonal conflict stand out as important risk factors for suicidality.¹⁵⁸

In youth, several studies have confirmed that the immediate precipitants of suicide are often an acute disciplinary crisis, a rejection or a humiliation (e.g., academic failure, loss of a girlfriend/boyfriend).^{151, 159} In American Indian adolescents in particular, a history of non-parental caretakers, arrest of caretakers, and arrest in previous 12 months were important interpersonal factors identified as precursors of suicidal behavior.¹⁶⁰

Additional studies have demonstrated that a significant traumatic separation from one or both parents in childhood, often related to residential schooling or foster care, led indigenous persons to suicidal behavior or completion.^{69, 161} Similar findings have been noted in the general population.¹⁶² However, single parent families are more common among American Indians.⁷¹ In addition, American Indian youths who completed suicide were much more likely to have had a change of caretaker during their childhood or adolescence, likely related to education in residential schools.^{150, 160} American Indians have a higher percentage of family households maintained by a person with no significant other present (either male or female head) and a larger average household size than the general population.⁷¹

In general, the relationship between life events and likelihood of suicidal behavior exhibits a dose-response relationship; odds of suicide attempts increase with a greater number of life events.¹⁷

Genetic and familial factors

Twin studies have demonstrated a heritable component to both suicide attempts and suicide completion, with the concordance rates for both being much higher among monozygotic twins compared with dizygotic twins.¹⁶³⁻¹⁶⁵ As well, the rate of suicide attempts has been shown to be significantly higher among offspring of depressed parents compared with those of non-depressed parents, illustrating the strong link between psychiatric disorders and suicidal behavior.¹⁶⁶

Family history of suicide attempts or suicide completion has also demonstrated a strong link with suicidal behavior in offspring in both indigenous and non-indigenous populations.^{59, 66, 72, 167} Because suicide and psychiatric illness almost always co-occur, account has to be taken of whether apparent familiarity reflects suicide specifically or instead an association with parental psychiatric illness.¹⁶⁸

Access to lethal means

Access to highly lethal suicide methods (e.g., gun ownership) and rates of suicide appear to be related.¹⁶⁹⁻¹⁷¹ In particular, a number of studies have examined rates of firearm ownership in a community, demonstrating a strong relationship between firearm ownership and the suicide rate.¹⁷²⁻¹⁷⁵ Additional studies have shown that where firearm control legislation has been implemented, or where other measures have been taken to reduce the availability of a highly

lethal option (e.g., detoxification of domestic gas in the UK), the rate of suicide has decreased.^{176, 177}

Availability of a lethal method, particularly firearms, also influences suicide rates in American Indians. Importantly, firearms are more readily available in indigenous communities as tribal members frequently employ firearms for traditional land use activities, such as hunting, and there is little control over such access.²⁸ Along these lines, knowing where to access a firearm was associated with suicide attempts, but only in American Indian females.⁶⁶

Imitation and suicide clustering

Mortality data files have revealed that clustering of suicides, both in time and location, occurs in the general population particularly among teenagers and young adults.¹⁷⁸ The transmission of increased suicidality may occur through glamorous portrayal of suicides in the electronic or print media, through personal ties, or through emotional identification with the predicament and actions of the suicide victim.¹⁷⁸⁻¹⁸⁰ Regardless of the route of transmission, increased attention following a suicide can carry the risk for imitation or copycat suicides.¹⁷⁹ For example, the prominent display of a suicide in the media leads to a significant increase in deaths over a one to two week period following the display.^{178, 179, 181} Importantly, this relationship is also dose-responsive, in that the more intense the media coverage in amount, duration and prominence of coverage, the greater the increase in the suicide rate.¹⁸²

Previous work has identified having a friend attempt or complete suicide as one of the strongest predictors of attempted or completed suicide for both

American Indian males and females.^{66, 100} Suicide clusters appear as an especially influential factor in indigenous communities in which many individuals are closely related and share the same predicaments. The impact of one suicide, therefore, is felt more deeply within the whole community, which may increase the risk of clustering.

Additional factors

Even in the most high risk groups (i.e., indigenous persons with psychiatric disorders with high likelihood of suicidal behavior), most people never contemplate or attempt suicide, indicating the importance of a diathesis or predisposition to suicidal behavior that is independent of the risk factor (e.g., psychiatric disorder) itself. It appears that the likelihood of attempting suicide increases dramatically as the number of risk factors to which the person is exposed increases; this holds true in both American Indian and general population samples.^{10, 66}

Analytic framework and hypotheses

The present study examines whether the prevalence and risk factors of suicidal ideation, suicide plans and suicide attempts differ when comparing an American Indian reservation sample to a US general population sample. Although the high rate of completed suicide in indigenous populations has been well-documented, to date, few empirical studies have systematically evaluated the prevalence and risk factors of suicidal behaviors among American Indians. To the best of my knowledge, this will be the first empirical examination in the

world using large population-based samples to examine the correlates of suicidal behavior comparing indigenous to non-indigenous groups.

Preliminary analyses investigated differences between the two American Indian populations. These results are presented in Appendices A through I. Due to similarities in rates of suicidal behaviors and correlates of suicidal behaviors, further analyses combined the tribes. This method is in line with suggestions from authors of reviews of suicide in American Indians who recommend that “due to the large number of different American Indian tribes and their diversity, research on suicide needs to aggregate data across these diverse groups” to allow for exploration of general or common social, psychological, and economic risk factors for suicide.⁶⁷

Objectives and hypotheses

The first aim is to examine the differences between American Indians and the US general population on prevalence of suicidal ideation, suicide plans, and suicide attempts. Based on previous findings illustrating higher prevalence of suicide in indigenous populations,^{17-21, 39} it is hypothesized that the American Indian population will have higher rates of all types of suicidal behavior compared with the general population.

The second aim is to examine whether differential correlates exist for suicidal behavior in American Indians when compared with the general population. Correlates will be grouped according to three theme areas, based on the review of risk factors for suicide.

Theme 1 will explore sociodemographic correlates of suicide, including age, level of formal educational attainment, poverty status, and marital status. Previous findings have illustrated that younger age is associated with higher risk for suicidal behavior in indigenous populations, whereas older age is less associated with risk for suicidal behavior when compared with non-indigenous.¹⁹ Therefore, a site-by-age interaction is anticipated, such that American Indians will differ with respect to the association between age and suicidal behavior from the general population sample.

Theme 2 will explore psychiatric disorder correlates of suicide, including a range of mood, anxiety and substance use disorders. Since substance use has been noted to more frequently associated with suicide in indigenous populations, a site-by-disorder interaction is anticipated, such that American Indians will demonstrate a stronger association between substance use disorders and suicidal behavior than the general population.

Theme 3 will explore traumatic event correlates of suicide, including childhood adversity. Due to the fact that American Indians experience higher rates of traumatic experiences, and likelihood of suicide associated with traumatic events exhibits a dose-response relationship, it is anticipated that the relationship between traumatic events and suicidal behavior will be stronger in American Indians and therefore a site-by-trauma interaction will be present. Overall, it is expected that most other correlates of suicidal behavior will look similar between the two groups.

Main hypotheses:

1. The American Indian population will have higher rates of all types of suicidal behavior compared with the general population.
2. A site-by-age interaction will exist, such that American Indians will differ with respect to the association between age and suicidal behavior from the general population sample.
3. A site-by-disorder interaction is anticipated, such that American Indians will demonstrate a stronger association between substance use disorders and suicidal behavior than the general population.
4. A site-by-trauma interaction will be present, such that the relationship between traumatic events and suicidal behavior will be stronger in American Indians and therefore.

Chapter 2: Methods

Population of interest

Based on the 2000 census, the US Census Bureau estimated the national indigenous population at 4.1 million or 1.5% of the total US population, with about a third who live on reservations.⁷¹ Four out of ten American Indians live in the western part of the US, with more than half living in just 10 states highly concentrated in counties in the West and Midwest US.⁷¹ According to census, 74% report enrollment in a particular tribe, with the largest tribes being Cherokee, Navajo, Latin American Indian, Choctaw, Sioux, and Chippewa.⁷¹

Survey Databases

The current study utilizes a landmark new survey collected in collaboration between the National Institute of Mental Health and enrolled members of two large US tribal groups, one from the Northern Plains and the other from the Southwest (see Figure 4 for a map of the tribal areas). The American Indian

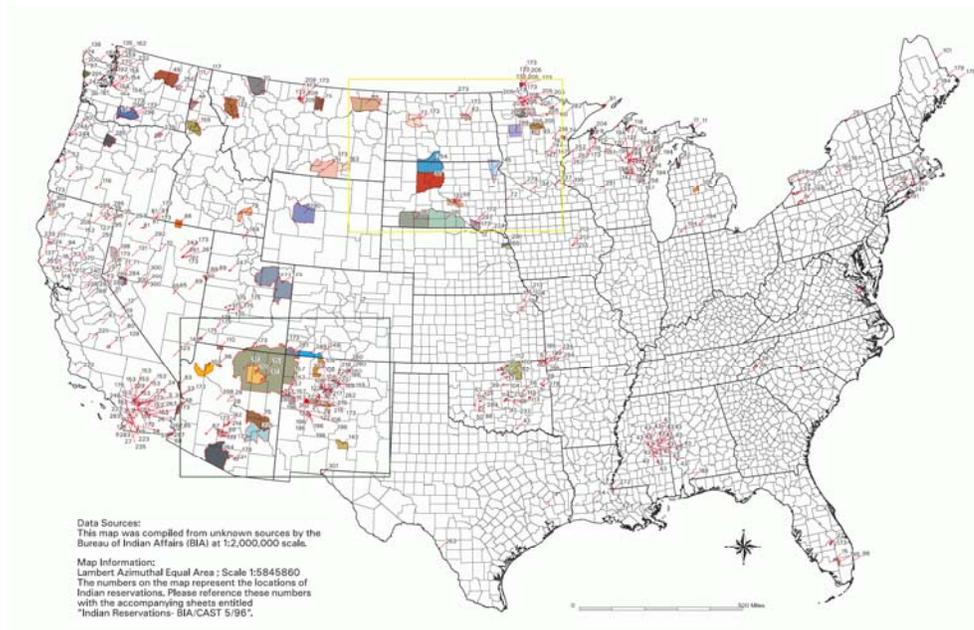


Figure 4. Indian Reservations in the Continental United States.

Service Utilization, Psychiatric Epidemiology, Risk and Protective Factors Project (AI-SUPERPFP) is a landmark American survey because it provides the first comprehensive examination of prevalence of alcohol, drug, and mental health problems in two well-defined samples of American Indians. The AI-SUPERPFP utilized a state of the art diagnostic interview in a large representative sample of American Indians (N=3,084). This survey is also unique in that it was designed to allow for direct comparisons between the baseline National Comorbidity Survey (NCS) and two American Indian tribes. The NCS has guided the national agenda regarding mental health planning over the last decade and thus provides an important point of reference for epidemiological studies of this nature.

Design and Methodology of the National Comorbidity Survey (NCS)

The NCS was a congressionally-mandated, nationwide survey studying the prevalence and correlates of DSM-III-R mental disorders in the United States.¹⁸³ The NCS was the first survey to administer a structured psychiatric interview to a nationally-representative sample. The survey included 8098 individuals, based on a stratified multistage area probability sample of the non-institutionalized civilian US population in the 48 coterminous states. Participants were those aged 15 to 54 years, with data collection between 1990 and 1992. The response rate for the survey was 82.6%. Verbal informed consent was obtained from all participants, and parental informed consent was obtained for those participants between the ages of 15 and 17 years. Sampling weights were

provided to correct for differential probabilities of within-household selection and differential nonresponse.^{183, 184}

The NCS interview was administered in participants' homes averaging more than 2 hours in length for completion of the 2 parts. Part I included a structured diagnostic interview assessment of DSM-III-R mental disorders. Part II was administered to a large representative sub-sample of respondents ($n = 5,877$) who completed a more detailed assessment, which included questions about traumatic events and suicidal behavior.^{10, 183} Additional sampling weights were provided to adjust for differential probabilities of selection into the Part II interview.

Interviews were performed by trained lay interviewers using a modified version of the Composite International Diagnostic Interview (CIDI) to assess lifetime diagnoses based on DSM-III-R criteria.^{185, 186} DSM-III-R diagnoses assessed by the CIDI in this survey were panic disorder, agoraphobia without panic, generalized anxiety disorder, social phobia, simple phobia, major depression, dysthymia, bipolar disorder, alcohol abuse or dependence, substance abuse or dependence, and antisocial personality disorder. The CIDI is a structured interview, developed by the World Health Organization, based on the Diagnostic Interview Schedule (DIS) and the Present State Examination (PSE).¹⁸⁷ The CIDI has documented reliability and validity for all mental disorders examined in the current survey.^{187, 188}

Data access

The NCS dataset is available publicly for researchers and has been used to publish extensively.^{10, 61, 183, 187, 189, 190} The NCS can be accessed from principal investigators at Harvard School of Medicine from their website (<http://www.hcp.med.harvard.edu/ncs/>). The Mood and Anxiety Disorders Research Group at the University of Manitoba has previously used the NCS to publish in a range of academic journals.^{61, 191-193}

Design and Methodology of the American Indian Service Utilization, Psychiatric Epidemiology, Risk and Protective Factors Project (AI-SUPERPFP)

The American Indian Service Utilization, Psychiatric Epidemiology, Risk and Protective Factors Project (AI-SUPERPFP) is a cross-sectional survey of two American Indian reservation populations, a Northern Plains tribe and a Southwestern tribe.¹⁹⁴ The AI-SUPERPFP was conducted between 1997 and 2000. Participants were enrolled members living on or near (within 20 miles of the boundaries) their respective tribes who were between the ages of 15 and 54 years in 1997. Of those located and found eligible, 73.7% in the Southwest and 76.8% in the Northern Plains agreed to participate. Tribal approvals were obtained before project initiation. Informed consent was obtained from all participants, and parental informed consent was obtained for those participants between the ages of 15 and 17 years.

Stratified random sampling procedures were used with strata defined by cultural group, gender, and age. Sample weighting procedures were used to

account for differential selection probabilities across all strata and for patterns of nonresponse, and have been reported previously.^{34, 195, 196} The specific aim of the AI-SUPERPFP was to provide the first comprehensive assessment of the prevalence of alcohol, drug, and DSM-III-R mental disorders and mental health service utilization in two well-defined reservation samples of American Indians [see the following website for further details:

<http://www.uchsc.edu/ai/ncaianmhr/research/superpfp.htm#AISUPERPFP>].

The research design of the AI-SUPERPFP was modeled after Part II of the National Comorbidity Survey for assessment of DSM-III-R¹⁹⁷ mental disorders based on the CIDI. Effort was made to maintain the content validity of the measures, while also quantifying culturally-specific mediators. Beals and Manson, co-Principal Investigators of the AI-SUPERPFP, adapted the World Health Organization CIDI^{27, 198} to be culturally-sensitive to indigenous populations.¹⁹⁹ This instrument was subjected to extensive focus group review and rendered more culturally appropriate. This procedure was conducted with the aim being to determine estimates of the prevalence of DSM disorders that could be compared to other national and international data, but in ways that honored the cultural distinctiveness of American Indians.

The UM-CIDI was modified in three ways. First, culturally specific phrases regarding feelings of distress were added to the mental health symptom scale for major depressive disorder and dysthymic disorder. Second, culturally appropriate queries were incorporated after the standardized CIDI questions to ensure cultural validity of the items. This modification also affected the major depressive

disorder module. In particular, irritability and emptiness were identified as additional common markers of depression. The original UM-CIDI items remained intact. Third, the wording of some of the questions was simplified in some instances. In questions that were too complex, especially when assessments of multiple circumstances were included within one question, the questions were divided into separate questions with possible answers to any of these being considered equivalent to a response to the original item. This modification may have affected multiple CIDI diagnoses (Appendix J also details the comparison of the NCS questions to the changes made to the CIDI in the AI-SUPERPFP).

Data collection was conducted rigorously in many challenging settings, wherein many homes did not have electricity or telephone services and addresses often did not exist or were meaningless. Trained tribal members conducted interviews during stage one of data collection. During stage two, clinicians administered the Structured Clinical Interview (SCID) for DSM-III-R²⁰⁰ to those meeting criteria for psychiatric disorders and subsamples of those meeting criteria for the three primary psychiatric disorders (major depressive disorder, PTSD, and alcohol use disorders) as well as those not meeting criteria for a psychiatric diagnosis. This reappraisal of approximately 10% of the lay interview participants was done to obtain data concerning the relative agreement between lay- and clinician-administered interview methods. This survey had a detailed assessment of nine lifetime DSM-III-R mental disorders including major depressive episode, dysthymic disorder, generalized anxiety disorder, panic disorder, posttraumatic stress disorder, alcohol abuse, alcohol dependence, drug

abuse, and drug dependence. There was also a detailed assessment of the experience of traumatic events (e.g., sexual trauma, physical violence, and residential school experience), family history of psychopathology, as well as cultural identity and spirituality. During stage three, nearly 100 members of the stage two participants were interviewed ethnographically to further explore the context of their illness experiences and the cultural validity of DSM diagnoses.

Preliminary studies examining mental disorders and suicidal behavior in the AI-SUPERPPF have been recently published,^{18, 32, 34, 194, 201} indicating high rates of suicidal behaviors, high rates of exposure to traumatic events, and rates of mental disorder comparable or greater than in the general population.

However, to date, complex models of understanding suicidal behavior in this dataset have not been conducted.

Tribal identification

The AI-SUPERPPF focused on one Southwest tribe and two closely affiliated Northern Plains tribes. These communities have different histories of migration, subscribe to different principles of kinship and residence, have historically pursued different forms of subsistence, and belong to different linguistic families. Yet both tribes share similar histories of colonization, including dramatic military resistance, externally imposed forms of governance, forced dietary changes, mandatory boarding school education, and active missionary movements. Traditional systems of healing are active in both tribes, although based on different epistemologies. Both tribes have considerable variability in acculturation, education, and income, however, unemployment is widespread.

Previous research has shown that the Northern Plains population seems to be at the highest risk of developing substance use disorders and associated problems, while the Southwest tribe has been noted to have less risk.²⁰²⁻²⁰⁵ In the past, a number of American Indian communities have regretted their participation in research efforts, often due to negative publicity.²⁰⁶ Therefore, specific tribal names are not used, nor a detailed cultural history provided, in order to maintain tribal-level confidentiality.¹⁹⁴ Instead, more general cultural descriptors approved by the community oversight committee are used; the AI-SUPERPFP communities are referred to as Southwest and Northern Plains.

Data access

The AI-SUPERPFP dataset is available to researchers on request. In February 2006, our research group gained approval to access the AI-SUPERPFP and to test multivariate models of suicidal behavior that have not previously been conducted by the AI-SUPERPFP Team. All publications undergo a tribal review process prior to submission.

Measures

Suicidal behaviors

Suicidal behaviors, which included ideation, plans and attempts, were measured in both datasets in very similar ways (see Appendix J for a detailed list of the specific questions used in the analyses). The questions about suicidal behaviors in the NCS were part of the life-event history section of the NCS interview. Separate questions were asked about the lifetime occurrence of suicidal ideation (“Have you ever seriously thought about committing suicide?”),

suicide plans (“Have you ever made a plan for committing suicide?”), and suicide attempts (“Have you ever attempted suicide?”). Although not identical, similar questions were asked in the AI-SUPERPFP. Everyone was asked whether they had ever seriously thought about committing suicide or had attempted suicide. Those who answered affirmatively to seriously thinking about suicide were then asked about lifetime suicidal plans.

Sociodemographic correlates

Sociodemographic correlates (see Appendix J for specific questions) included age (15-24 years, 25-34 years, and 35-44 years compared with 45 years or older), formal educational attainment (high school or general equivalency diploma and some postsecondary education compared with less than high school), marital status (separated/widowed/ divorced and never married compared with married/cohabitating), and poverty status based on household income level, household size, and US federal standards (living in poverty compared with not living in poverty). Sex of the respondent was included as a level of stratification for all analyses.

Psychiatric disorder correlates

Nine lifetime mental disorders were comparable between the two surveys, namely major depressive episode, dysthymic disorder, generalized anxiety disorder, panic disorder, posttraumatic stress disorder, alcohol abuse, alcohol dependence, drug abuse, and drug dependence (see Appendix J for a comparison of diagnostic criteria). In addition, aggregate lifetime disorder categories were created and include any depressive disorder, any anxiety

disorder, any depressive or anxiety disorder, any substance use disorder, and any lifetime DSM-III-R disorder. These disorder groupings have been used previously.³⁴

Traumatic event correlates

The NCS asked about lifetime occurrences of each of 12 types of traumatic event. Eleven questions addressed specific events and experiences listed as traumas in the DSM-III-R. The twelfth question was an open-ended item addressing “any other terrible experience that most people never go through.” The AI-SUPERPFP respondents were asked about 16 possible traumatic events drawn from other major epidemiological studies. These were designed to include events commonly reported in most populations and to be consistent with stressors identified in the DSM-III-R and DSM-IV.

For comparative purposes, individual traumas included in the AI-SUPERPFP were recoded to parallel the broad categories reported in the NCS, resulting in nine types of trauma: physical abuse as a child, life-threatening accident, natural disaster, trauma occurred to a loved one, physical attack, sexual assault other than rape, rape, combat exposure, and witnessing a traumatic event. Appendix J lists the specific traumatic event questions in each survey and how they were combined to create comparative variables. These variables have been used previously³² in this fashion with the exception of one, physical abuse as a child. For physical abuse as a child, we defined physical abuse happening at age 16 or younger as childhood physical abuse in the AI-SUPERPFP; the NCS posed this question directly.

Statistical Analyses

Due to similarities in the designs of the NCS and the AI-SUPERPPF, it was possible to investigate the associations between suicidal behaviors with the aforementioned variables. All analyses were stratified by sex due to differences in prevalence of suicidal behaviors between males and females.^{1, 3, 18, 68}

Additionally, analyses were also stratified by sample group (i.e., American Indian tribes versus NCS general population) to allow statistical comparisons between these groupings on the correlates of suicidal behaviors.

The two separate datasets were merged and the appropriate statistical weights were employed in all analyses to ensure the representativeness of the data. Multivariate logistic regression analyses were used to examine the strength of the association of each correlate with suicidal ideation, plans and attempts. As well, multivariate logistic regression analyses determined whether the relationship between the correlate and suicidal behavior differed depending on membership in a particular sample group (i.e., American Indian versus general US population). Standard errors were calculated using the Taylor Series Linearization method in the SUDAAN program²⁰⁷ based on stratification information from the dataset that is available specifically for this purpose.

To address Theme 1, comparable sociodemographic correlates were examined (both individual factors and psychosocial factors) from both datasets (Figure 5) in terms of their association with suicidal behaviors (ideation, plans, and attempts) in each sample group. Further analyses determined whether sociodemographic correlates differed between the American Indians and the

general US population. To address Theme 2, the nine comparable psychiatric disorder diagnoses were explored, as well as aggregate disorder categories, in separate analyses to determine whether they were differentially associated with

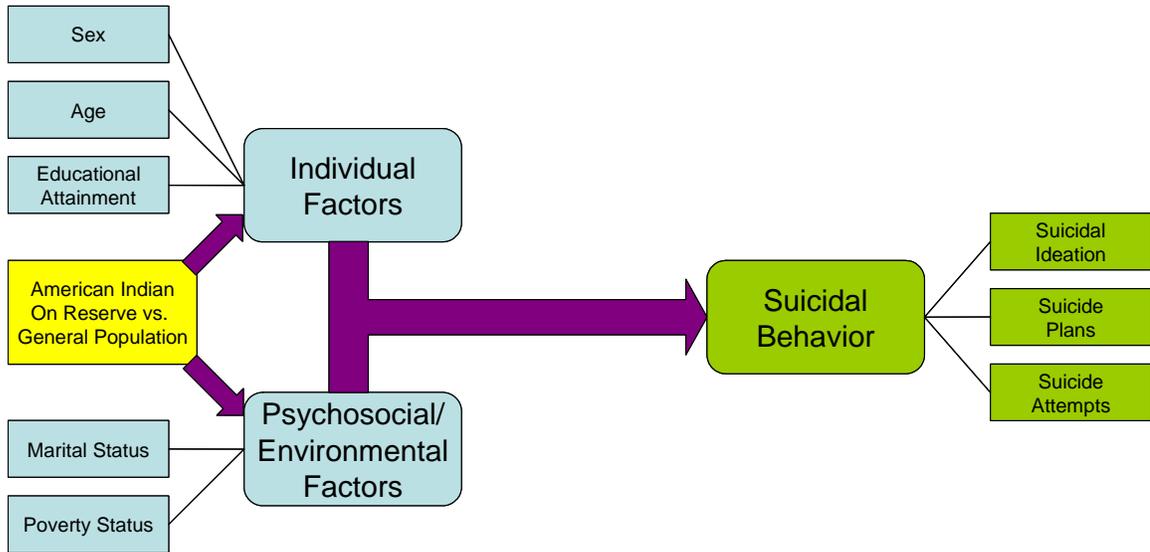


Figure 5. Analytic framework for theme 1, exploring sociodemographic correlates of suicidal behavior and examining differences between American Indians on reserve and the general population.

suicidal behavior in the different sample groups (Figure 6). All analyses exploring

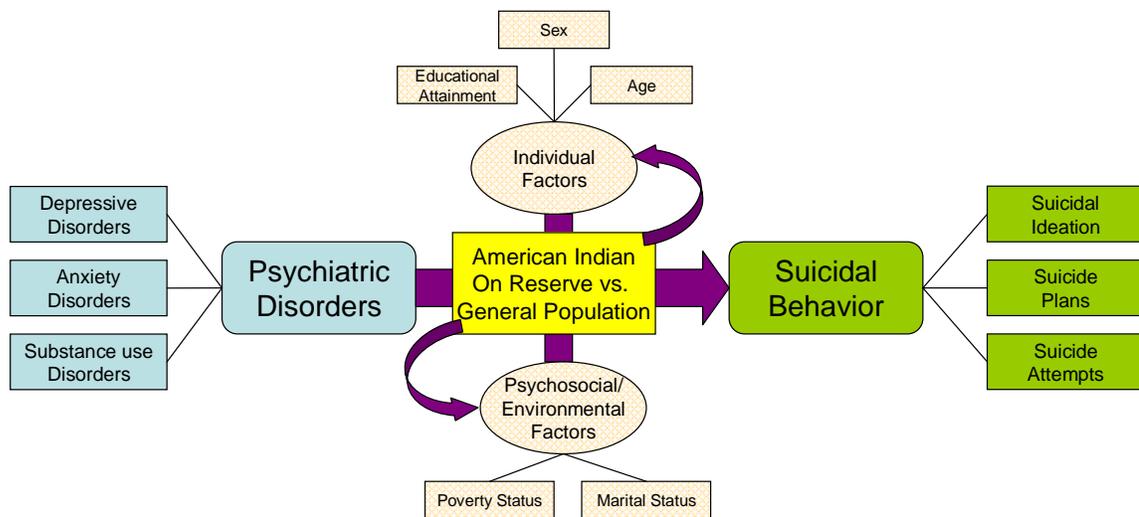


Figure 6. Analytic framework for theme 2 exploring lifetime psychiatric disorder correlates of suicidal behavior and examining differences between American Indians on reserve and the general population.

psychiatric disorder correlates were adjusted for sociodemographic (individual and psychosocial) factors included in Theme 1. To address Theme 3, the thirteen comparable lifetime traumatic events (childhood adversity and traumatic event correlates) and an aggregate any lifetime traumatic experience variable were examined to determine whether the experience of a trauma was differentially associated with suicidal behavior when comparing the different sample groups (Figure 7). All analyses exploring traumatic event correlates were also adjusted for sociodemographic (individual and psychosocial) factors included in Theme 1.

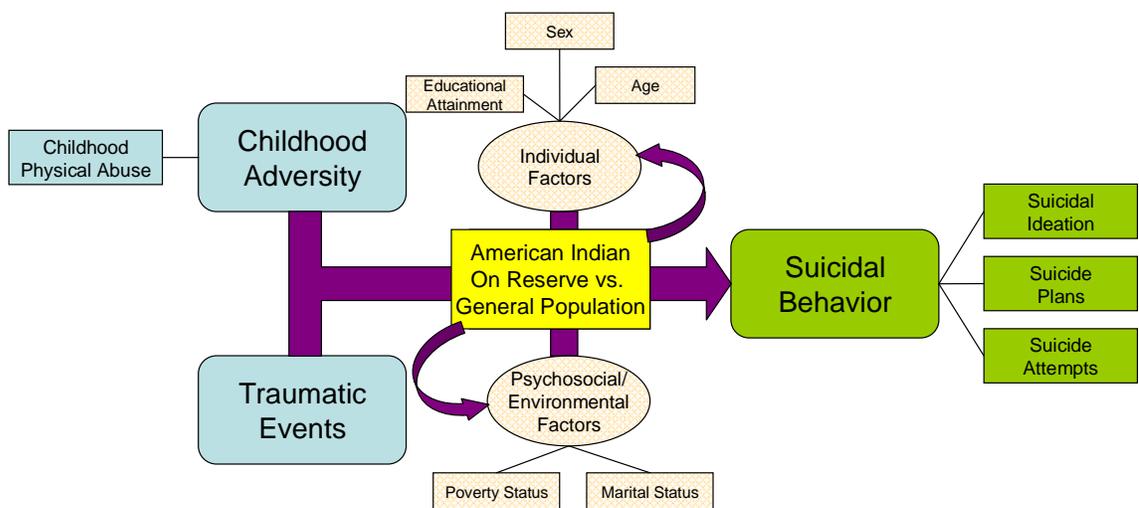


Figure 7. Analytic framework for theme 3 exploring lifetime traumatic event correlates of suicidal behavior and examining differences between American Indians on reserve and the general population.

Due to the exploratory nature of the analyses, an alpha of .05 was employed. This method has been noted previously, suggesting that adjustment for multiple testing is not required in exploratory studies.²⁰⁸ As well, cell sizes of

less than 5 persons were removed from tables and no further analyses were performed, due to the instability of these results.

Ethical Considerations

Ethical approval has been received by the AI-SUPERPFP Team for collection of the data from the tribal rolls. As projects are completed, further approvals must be received from each of the two tribal groups. The NCS data collection was also approved by the appropriate governing ethics board prior to collection of data, which allowed public access to the resulting dataset. The Health Research Ethics Board at the University of Manitoba also approved the comparison of these datasets for the present study.

Chapter 3: Results

Lifetime prevalence of suicidal behaviors

Table 1 demonstrates the lifetime prevalence of suicidal behaviors comparing the two American Indian reservation tribes. The lifetime prevalence of suicidal behaviors by sex in the two American Indian tribes ranged from 1.5% for suicide plans in males in the Southwest tribe to 10.7% for suicide attempts in females in the Northern Plains. The tribes did not differ significantly on prevalence of suicidal ideation or suicide plans for either males or females. However, suicide attempts were about twice as likely in both males and females in the Northern Plains tribe.

Table 2 similarly illustrates prevalence of suicidal behaviors; this time comparing the two American Indian tribes to the general population. Both males and females in the general population were more likely to report suicidal thoughts than the American Indians (significant odds ratios [OR] of 2.42 and 2.38, respectively). Males in the general population also demonstrated higher likelihood of suicide plans (OR=1.81, 95% Confidence interval [CI]: 1.12-2.91). Conversely, general population males and females were less likely to endorse suicide attempts when compared with American Indians (significant ORs of 0.56 and 0.72, respectively). In fact, more American Indians attempted suicide than had suicidal thoughts (67 versus 56 males, 135 versus 115 females, respectively).

Sociodemographic correlates of suicidal behavior

Table 3 explores sociodemographic correlates of suicidal ideation comparing American Indians to the general population. In males, younger age tended to be more strongly associated with suicidal ideation in American Indians. In particular, a significant interaction was found for those aged 25-34 years, in that males that had suicidal thoughts in this age group were more likely to be American Indians than in the general population (OR=0.20, 95% CI 0.07-0.63). Education also appeared to be strongly associated with suicidal ideation in American Indians, in that American Indians with lower levels of education were less likely to have suicidal thoughts compared with those with some level of post-high school education. Significant interactions were found echoing these results, noting that lower educated males who had suicidal thoughts were significantly more likely from the NCS than from the American Indian sample. Never married males with suicidal ideation were more likely from the general population sample than the American Indian sample (interaction OR=2.19), illustrating a trend towards single American Indians having less suicidal thoughts than their married counterparts. In contrast, single persons in the general population had more suicidal thoughts than their married counterparts. Poverty status correlated significantly with suicidal ideation in the NCS, however, the interaction was non-significant due to a similar trend in American Indians. Females did not demonstrate any significant differences between the populations.

Sociodemographic correlates of suicide plans are presented in Table 4. Similar to findings on suicidal ideation, a significant interaction was found for those aged 25-34 years, in that males that had made a plan for suicide in this

age group were more likely to be American Indians than in the NCS (OR=0.11, 95% CI 0.01-0.99). As well, lower educated males who had made a suicide plan were significantly more likely from the NCS than from the American Indian sample; this finding was echoed in females. No significant differences were noted for poverty status or marital status.

Table 5 illustrates sociodemographic correlates of suicide attempts. Males aged 25-34 years with suicide attempts were more likely to be from the American Indian sample than the NCS, comparable to results for suicidal ideation and suicide plans (significant interaction OR=0.30, 95% CI: 0.10-0.89). A parallel result was noted in females for the age-by-site interaction (OR=0.38, 95% CI: 0.17-0.83). Educational correlates of suicide attempts also showed similarities to ideation and plans. Both male and female attempters with lower levels of education were significantly more likely to be in the NCS group than the American Indian group. Put another way, American Indians with the lowest level of education were less likely to attempt suicide (ORs=0.53 for males, non-significant for females), whereas respondents from the NCS with the lowest level of education were more likely (ORs=3.93 for males, 2.25 for females) to attempt suicide when compared with those with higher levels of education. This association was noted to be stronger among males than among females. In females, a significant interaction was demonstrated between poverty status and suicide attempts, such that attempters living in poverty were more likely in the American Indian sample than in the NCS. This finding was not noted in males. Compared with their married counterparts, separated/widowed/divorced or never

married male attempters were more likely in the NCS than in the American Indian sample, indicating the highest risk of attempt among separated/widowed/divorced males in the NCS (OR=4.94, 95% CI: 2.70-9.07). Similar findings were not present in females.

Psychiatric disorder correlates of suicidal behavior

Psychiatric disorder correlates of suicidal ideation are explored in Table 6. Although most disorders demonstrated a strong positive association with suicidal ideation, there were few differences between the two groups in the strength or directionality of that association. In fact, no differences were noted for females when comparing the American Indians to the NCS. In males, differences were noted in anxiety disorders in general (adjusted odds ratio [AOR] = 2.18, 95% CI: 1.07-4.45) and in PTSD more specifically (AOR=2.61, 95% CI: 1.20-5.67), in that both were significantly more likely to be associated with suicidal ideation in the NCS than in the American Indian tribes. Substance use disorders demonstrated the opposite relationship, illustrating that substance use disorders were more strongly associated with suicidal ideation in American Indians (AOR=0.40, 95% CI: 0.17-0.91). Increasing psychiatric comorbidity was associated with increased likelihood of suicidal ideation equally in both populations; the site-by-comorbidity interactions were not significant.

Table 7 shows psychiatric disorder correlates of suicide plans among males and females. Similar to suicidal ideation, few differences were noted between the two samples although the majority of the disorders were associated with suicide plans in both. In males, PTSD was more likely to be correlated with

suicide plans in the NCS population than in American Indians (AOR=2.95, 95% CI: 1.01-8.61), whereas alcohol abuse was more likely to be correlated with suicide plans in American Indians (AOR=0.20, 95% CI: 0.06-0.62). Increasing psychiatric comorbidity was again associated with increased likelihood of suicide plans equally in both populations; site-by-comorbidity interactions were non-significant.

Table 8 illustrates psychiatric disorder correlates of suicide attempts. In both samples, psychiatric disorders were highly associated with suicide attempts, and increasing level of psychiatric comorbidity was associated with increased likelihood of attempts. However, some disorders demonstrated differential associations with suicide attempt between the groups. In males, both depressive disorders (AOR=2.79, 95% CI: 1.27-6.13) and PTSD (AOR=2.54, 95% CI: 1.10-5.83) were more highly correlated with suicide attempts in the NCS compared with the American Indian sample. In females, anxiety disorders (AOR=2.00, 95% CI: 1.18-3.40), any depressive or anxiety disorder (AOR=2.11, 95% CI: 1.16-3.85), and drug dependence (AOR=2.75, 95% CI: 1.30-5.79) all demonstrated stronger associations with suicide attempts in the NCS than in American Indians.

Traumatic event correlates of suicidal behavior

Traumatic event correlates of suicidal behavior are displayed in Table 9 (suicidal ideation), Table 10 (suicide plans) and Table 11 (suicide attempt). Across the two samples, nearly all traumatic events demonstrated strong positive associations with suicidal behavior, with AORs ranging from 1.65 for natural disaster and suicidal ideation in NCS females to 11.52 for rape and suicide

attempt in NCS males. Specific traumatic experiences differed in their relationship to suicidal behavior between the samples, although few demonstrated any difference. In terms of suicidal ideation, witnessing a traumatic event, having been involved in a life-threatening accident, and having been involved in a natural disaster all demonstrated significant site-by-traumatic event interactions in males, illustrating stronger associations with suicidal thoughts in American Indians than in the general population. In females, experiencing physical abuse as a child and having been involved in a natural disaster both demonstrated stronger associations with suicidal ideation in American Indians compared with the NCS sample. For suicide plans, no significant interactions were noted. In terms of suicide attempts, however, males who made a suicide attempt and witnessed a traumatic event were more likely in the American Indian sample than in the general population (AOR=0.38, 95% CI: 0.15-0.92).

Chapter 4: Discussion

To the best of my knowledge, this is the first study to systematically examine a wide range of correlates of suicidal behavior comparing a community-based indigenous reserve population to a nationally-representative general population sample. This study adds to the current literature on risk factors for suicidal behavior in indigenous populations by examining the differential role of sociodemographic factors, psychiatric disorders, and traumatic experiences. Although preliminary and exploratory, these findings will provide a framework for future studies in determining whether suicide interventions for American Indians and other indigenous groups require modification based on differential risk factors for suicide when compared with the general population.

The first hypothesis was that the American Indian population would have higher rates of all types of suicidal behavior compared with the general population. This hypothesis was only partially confirmed. Regression analyses demonstrated the likelihood of suicide attempts in the NCS to be half as likely as in the American Indian sample, in line with my hypothesis. However, the likelihood of suicidal ideation was found to be twice as high in the NCS compared to American Indians. These paradoxical findings are in line with results from a Northern Plains community-based American Indian reservation sample which revealed a greater percentage of the sample had attempted suicide in their lifetime than had engaged in suicidal ideation or planning.¹⁸

These findings also illustrated a surprisingly higher prevalence of suicide attempts than ideation in both male and female American Indians. These results

may provide further evidence for conceptualizing suicide attempts more as impulsive acts within American Indians.¹⁸ This is in contrast to the typical theorized suicide risk continuum model proposed in general population samples, wherein ideation is suggested as a precursor to attempts,^{1, 63, 65, 209} Rather than thinking about suicide for extended periods, American Indians may act impulsively and make an attempt. However, these results could be confounded by the fact that American Indians have been noted to be unlikely to disclose their suicidal intentions.¹⁸ It is possible that American Indians with fleeting suicidal thoughts may have not reported these thoughts to interviewers, whereas individuals in the general population may take such thoughts as more serious and therefore report them.

The second hypothesis was that a site-by-age interaction would exist, such that American Indians would differ with respect to the association between age and suicidal behavior from the general population sample. This hypothesis was confirmed in males with respect to ideation, plans and attempts, whereas in females this interaction only appeared in suicide attempts. When compared with those aged 45 to 54 years, 25- to 34-year-old American Indians were significantly more likely to endorse suicidal behaviors than individuals of the same age in the general population. This finding is corroborated by previous work that notes not only higher rates of suicide and suicidal behavior in indigenous populations, but also higher rates particularly in indigenous youth.^{69, 70}

In contrast to the hypothesis of no additional differences between the general population and American Indians on other sociodemographic correlates

of suicidal behavior, some significant differences were found between the groups. The role of level of educational attainment appeared as an important difference between indigenous and non-indigenous groups. In the American Indian sample, lower levels of education were unexpectedly associated with less likelihood of suicidal behavior. In the NCS, the expected direction of the association, wherein lower levels of education were associated with increased likelihood of suicidal behavior, was found. This difference between the groups held for both males and females for all suicidal behaviors, with the exception of suicidal ideation in females, where trend-level findings were noted.

It can be speculated that American Indians from this sample have had to leave their reserve homes to attain post-secondary education. With the higher level of education and a return to their reserve home, these individuals may feel guilty about having left and may be shocked by the reality that they have to return to. In Durkheim's theory of social integration,²¹⁰ a rapid change in a person's societal context or network might lead to a state of anomie (i.e., an absence or diminution of standards or values referred to as normlessness), which may increase the person's likelihood of suicidality. Similarly, Status Integration Theory proposes that the greater the dissonance between a person's social environments, the greater is the person's risk of suicide.²¹¹ More highly educated individuals may realize the unfortunate and disadvantaged state of the reserve and reserve life and experience such dissonance upon their return. Although they may have managed well adapting to life off the reserve, they may feel alienated when they are suddenly among the poorer, unemployed, undereducated that

reside on the reserve. Individuals who have coped well earlier in this environment, so much that they were able to leave the reserve to pursue higher education, might be in a particularly stressful situation caused by fear or risk of losing their socioeconomic position, income, job, or the ability to use their education once returning home. Similar findings have been noted among individuals with a first diagnosis of a mental disorder, wherein more highly educated individuals were at higher risk of suicide following hospital admission for psychiatric reasons.²¹²

Additionally, marital status appeared to confer a differential effect on the two populations in males only. Although this effect was not present in all suicidal behaviors examined, a trend was apparent with statistical significance in those analyses with larger cell sizes. Suicidal males who were never married or were separated/widowed/divorced were more likely in the NCS sample than in the American Indian sample. Previous studies have noted that single persons in the general population are more likely to have suicidality;^{6, 64, 68, 116-118} in American Indians the same relationship has been identified.⁶⁹ In contrast, the present study demonstrates that this association does not appear similar in both populations. It is possible that increased levels of social support via family and kinship networks may be available to individuals on reserves. It may be the case that extended family and friends take the place of a spouse for many American Indian males, due to the degree of cohabitation in these communities. Unfortunately, subjective level of social support was not measured in the current study.

Importantly, the differences noted for the relationship between marital status and suicidal behavior in males did not appear in females. Although support from community may exist in a similar way for American Indian females and males, there may be other factors at play. There is evidence that single parent status is more abundant in American Indian communities.⁷¹ In conjunction with the fact that females are more frequent single heads of household²¹³ and that individuals with young children have been shown to be more suicidal,⁶ American Indian females may appear more at risk and therefore more similar to females in the NCS in terms of likelihood of suicidal behavior. The finding that living in poverty was also more strongly associated with suicide attempts in American Indian females when compared with NCS females, but not in males, could be related to this phenomenon of increased risk among single American Indian females. Perhaps the effect of living in poverty is much greater for single women who are raising children alone on reserve; with high rates of unemployment on the reserve,¹¹⁹ low rates of female participation in the workforce, and with the increased stress of raising a child,⁶ there is little hope for improved living conditions in the future.

The third hypothesis was that a site-by-disorder interaction would be noted, such that American Indians would demonstrate a stronger association between substance use disorders and suicidal behavior than the general population. This hypothesis was partially confirmed. This relationship appeared only in males, whereby the relationship between any substance use disorder and suicidal ideation was significantly stronger in American Indians than in the NCS.

As well, alcohol abuse was associated with suicide plans more so in American Indian males than in general population males. Some researchers suggest that the pattern of alcohol involvement in suicide among American Indians is characteristic of a young population that binge drinks and is prone to impulsively ending their own life.²¹⁴ In fact, American Indian youth are younger when they first become involved with alcohol, the frequency and the amount of drinking is greater, and the negative consequences are more common when compared with other youth in the US.^{105, 215}

Although findings in males echo previous literature stating increased associations between alcohol or drug abuse and suicidal behavior in indigenous populations, the finding in females is surprising. In females, the relationship between drug dependence and suicide attempts demonstrated the opposite effect, with American Indians showing less likelihood of this relationship compared with the NCS. Further research is required to delineate whether drug dependence has a differential effect in females when comparing indigenous and non-indigenous groups.

Additional site-by-disorder differences were noted, particularly in PTSD. In males, PTSD appeared to be more strongly linked with suicidal behavior in the general population compared with the American Indian sample. This is an interesting finding in light of the fact that American Indians have higher levels of traumatic exposure than the general population.^{32, 147-149} It is possible that American Indian males who meet criteria for PTSD are not as affected by the traumatic re-experiencing or hyperarousal symptoms as their general population

counterparts. Further work is necessary to determine whether this difference does in fact exist, and the possible underlying causes of this difference.

In females, any anxiety disorder diagnosis was associated with suicide attempts, with a stronger relationship in the NCS than in the American Indian sample. In line with the literature stating that anxiety disorders are risk factors for incident suicide attempts, these findings illustrate the importance of considering suicide risk associated with anxiety disorders in the general population.⁹⁵⁻⁹⁷ However, the reason for the differential association between anxiety disorders and suicide attempts in these two populations is unclear. This finding has not been noted previously and therefore requires replication in future studies in this area.

Depressive disorders have shown a strong association with suicide and suicidal behaviors in many samples,⁷⁹⁻⁸³ including indigenous populations.^{69, 99, 100} The current findings illustrate that although depressive disorders may increase risk of suicidality in indigenous peoples, this effect is not as noteworthy as in the general population. These results indicate that the association between depressive disorders and suicide attempts in males is much stronger in the general population when compared with American Indians. Previous work has demonstrated that hopelessness, a suggested mediator between depression and suicidality, is reported less frequently in indigenous compared with non-indigenous populations.¹¹⁰ It is possible that American Indian males are either less strongly affected by depressive symptomatology or the effect of lower levels of hopelessness in indigenous peoples reduces the likelihood of suicidal behavior

in this group. This study was unable to measure hopelessness directly; future studies should include hopelessness to fully explore this relationship.

The fourth hypothesis was that a site-by-trauma interaction would be present in the majority of traumatic events. This hypothesis was not confirmed, yet, a few significant differences between the groups did appear. In males, witnessing a traumatic event was more strongly associated with suicidal behaviors in American Indians than in the general population. It appears that the experience of watching someone being injured or killed makes American Indians feel quite distressed, to the point that they have thoughts about ending their own life. It is likely that the interconnectedness characteristic of these small tribal communities may affect a stronger influence on the well-being of the witness. As well, since traumatic exposure is more likely in indigenous communities,³² American Indians may not only have a higher likelihood of witnessing such events occur to others, but may feel that there is a greater probability of this event happening to them.

Being involved in a natural disaster was more strongly associated with suicidal ideation in both male and female American Indians, compared with their counterparts in the NCS. Previous literature has demonstrated that indigenous peoples often feel a close connection with nature and their surroundings. One researcher described her sense of connection to the land as a type of kinship, where animals & plants are as family members.²¹⁶ In fact, maintaining connections with the land as part of indigenous traditional ways has been noted as a protective factor for suicide, within the concept of cultural continuity.^{161, 217,}

²¹⁸ The process of a natural disaster might be such that the destruction of the earth or the environment may bring great sadness to the indigenous individual. Alternatively, the rebellion of nature on the indigenous peoples may signify a process whereby nature is punishing the individual. As such, the individual may feel that they have wronged in some way and need to be punished. However, it is unclear why this relationship was not maintained throughout all suicidal behaviors.

Sexual assault demonstrated a stronger association with suicidal ideation in American Indian females than in NCS females. Unfortunately, similar analyses in males could not be performed due to small cell sizes; therefore we cannot determine whether this same finding would be present in males. This finding is supported by previous findings demonstrating sexual abuse as a risk factor for suicide attempts in American Indian youth.⁶⁶ However, this difference did not carry over into suicide attempts.

It is possible that American Indian female ideators and attempters are different populations, such that differential relationships exist between risk factors for each suicidal behavior. This suggestion has been made previously in the literature, suggesting that suicide completers and suicide attempters are different populations.²¹⁹ This idea is also in conjunction with suggestions presented here, indicating that suicidal behavior may not appear on a continuum in American Indians as it does in the general population. Future research in American Indians may wish to explore this possibility of differential risk factors for different types of suicidal behavior.

Limitations

The present research is subject to a number of limitations. First, the NCS and the AI-SUPERPFP by design are only able to capture suicidal ideation, plans and attempts, but not completed suicides. Therefore the current findings may not be generalizable to individuals who complete suicide. Second, the cross-sectional and retrospective nature of the datasets do not allow for causal inference on the basis of these results. Although particular correlates may be demonstrated to be strongly associated with suicidal behavior in a particular population, it is not necessarily true that this correlate can be considered a risk factor for future suicidal behavior. Future prospective, longitudinal research is necessary to further investigate the relationships outlined by this line of investigation. Third, although the assessment of mental disorders in the AI-SUPERPFP was based on the methods utilized in the NCS, use of the culturally-adapted CIDI does not ensure that the mental disorder assessment was identical. However, the AI-SUPERPFP Team did thoroughly investigate the changes prior to modification of questions and previous analyses have demonstrated increased validity in at least some diagnoses.^{27, 148, 198} More importantly, these culturally driven modifications may allow a better understanding of the construction and meaning of disorder in these communities.²⁷ Fourth, collection of the NCS was conducted between 1990 and 1992 whereas the AI-SUPERPFP was collected between 1997 and 2000. This gap between assessments of the two datasets may have been influenced by time-related events in some biased way. Future studies would ideally be

collected within the same time frame to eliminate this possible source of bias. Fifth, the age range of the datasets utilized were limited to those individuals aged 15-54 years, therefore these findings may not generalize to older individuals or to children and youth. Sixth, the AI-SUPERPFP data includes only American Indians on reserve. As such, the correlates for suicidal behavior noted here may not generalize to urban-based American Indians. Seventh, the two datasets utilized did not assess personality disorders. Since personality disorders have been shown as strong risk factors for suicide and suicidal behavior,^{46, 87} these disorders would be important to include in future investigations of this nature. Finally, due to the exploratory nature of the present study, the risk of Type I error may have increased. Replication of the current findings is needed to ensure that the correlates of suicidal behavior noted were not found to be significant by chance.

Recent evidence from the work of Chandler et al.^{38, 217} suggests that there are wide differences in rates of suicide across different First Nations communities in British Columbia.²¹⁸ Most interestingly, Chandler and Lalonde demonstrated that various community level factors were associated with rates of suicidal behavior.³⁸ Considering the range of distinct tribal variations in the US, the influence of tribal diversity is also of great importance when looking at suicidality. One study explored the heterogeneity of psychological risk factors associated with suicidal ideation in three distinct tribal groups, noting discrete variations in relation to risk factors.²² These findings highlight the importance of community-level variables on individual suicidal behaviors. It becomes evident that every

indigenous community deals with different and specific social, environmental and individual factors that may contribute to suicidal behavior in their particular community. The experience of reconnecting with cultural identity, through development of connections to the land, traditional ways of living, and achieving control over their own present and future lives seems to play an important protective role in suicidal behavior by contributing to the development of personal identity and cultural continuity.^{161, 217, 218} Those communities that have proven successful in preserving ties to their cultural past are characterized by significantly lower youth suicide rates.²¹⁷ By contrast, communities that have failed to maintain cultural continuity typically suffer youth suicide rates much higher than the national average.²¹⁷ Unfortunately this type of community level variability was not included in the current analyses. Future studies need to take into account community and tribal differences when looking at risk factors for suicide.

Along these lines, a sense of community belonging has been shown to exert a protective effect on suicidality,²²⁰ whereas individualism has been shown to increase risk of suicidality.²²¹ It may be that the greater one's sense of personal autonomy, the more likely the individual is to choose to die. Some have suggested that suicide may be thought of as the ultimate expression of individual freedom of choice and control over one's life.²²¹ Others have proposed that perhaps when people in individualistic societies pursue their own goals and things go badly there is no one there to support them and no one else to blame.²²² Barber has suggested a "relative misery hypothesis", which states that

an individual's affective state is influenced by those around them, such that when those around them are perceived to be better off than they are, the predisposition to suicide is increased, particularly in males.²²³ The influence of individualistic Western culture may have a greater influence on particular American Indian communities. Individualistic beliefs should be included in future studies of suicidality in indigenous populations.

Additional confounds arise when looking at the epidemiology of indigenous suicidality, since the majority of investigations within American Indian communities rely upon reservation-based samples. One comparative study of urban-reared versus reservation-reared American Indian adolescents revealed that those having spent two thirds of their life within an urban setting endorsed significantly lower rates of suicidal ideation than those having spent two thirds of their life on a reservation.²²⁴ However, lifetime rates of suicide attempts did not differ. Further differences concerning psychological risk factors for urban versus reservation-based American Indian samples were noted. History of physical abuse, a friend attempting or completing suicide, and family history of suicidality were associated with history of attempted suicide in the urban-reared sample, whereas depression, conduct disorder, cigarette smoking, family history of substance abuse, and perceived discrimination were correlated with history of attempted suicide only within the reservation-reared sample.²²⁴ These findings indicate the importance of including both urban and reserve-based indigenous populations in future comparisons with the general population.

Chapter 5: Conclusion & Implications

Summary of findings

Overall, the current findings indicate that, although indigenous persons appear at higher risk for many mental health problems^{34, 35, 101} and for traumatic exposure,^{32, 147-149} there are few differences in the likelihood of suicidal behavior in conjunction with particular disorders or traumas. The present study did note, however, some variability in the specific sociodemographic characteristics, mental disorders and traumatic events that were more strongly associated with suicidal behavior in American Indians when compared with the general population. It may be that some risk factors are of particular importance in these communities, and it is important to take these into consideration in developing appropriate culturally-grounded suicide prevention strategies for indigenous populations.

Importantly, American Indians appeared more likely to make a suicide attempt but less likely to have suicidal thoughts in their lifetime in comparison with the US general population. This surprising finding points toward the possible role of impulsivity on suicidal behavior in American Indians.

Implications

The present study has important implications for preventative interventions that target indigenous populations, particularly in American Indian tribal communities. In thinking about possible primary prevention strategies for suicidal behavior in indigenous communities, previous work has suggested the efficacy of community-wide interventions.^{28, 225} Based on studies examining the importance

of cultural continuity on suicide rates,^{38, 218} culturally-appropriate, community-based primary prevention programs must emphasize factors relating to this concept. Examples would include strengthening of community well-being, families, and cultural values, as well as an increased sense of collective local control over one's community. Mental health promotion programs that focus on community empowerment may also contribute to continued improvements in the mental health status of American Indians and other indigenous populations worldwide. Based on the specific findings of the current study, parenting programs aimed at reducing childhood physical abuse could have a positive effect on reducing suicidal behavior in these communities.

In terms of secondary suicide prevention strategies, the current findings should allow increased identification of those at risk for suicidal behavior in indigenous populations, improving the likelihood that one may intervene prior to onset of suicidal behavior. Improved screening of indigenous patients by primary care physicians may help to reduce high suicide rates in this vulnerable and high-risk population. In fact, education and training aimed at improving general practitioners' diagnosis and treatment of depression has been noted previously as an effective approach to suicide prevention.^{226, 227} Screening programs may need to target indigenous individuals with different risk factors than would normally be targeted in the general population, such as those with substance use disorders or specific traumatic experiences. This methodology may be more appropriate than using blanket prevention programs nationally or otherwise across cultural groups. Since suicidal behavior demonstrated a significant

association with younger age in the present study, school-based screening may be effective in indigenous populations. Studies that have examined the efficacy of screening have shown high sensitivity and moderate specificity,²²⁸ requiring a second-stage assessment to determine who is not actually at risk for suicide. Therefore, screening appears to be quite a promising approach to suicide prevention.

More effective culturally-grounded tertiary interventions may help to reduce the suicide rate in indigenous peoples. Some authors have suggested psychiatric treatments that convey not only traditional biomedical scientific knowledge but also more traditional indigenous practices and beliefs.²³ Incorporating indigenous cultural values into psychiatric treatments may allow increased exchange between healing based on the medical model and healing from a traditional indigenous sense. Although conventional psychiatric practice tends to focus on the isolated individual, it has been suggested that the focus of treatment for suicidal behavior among indigenous peoples should be primarily on the family and community.²³ Non-indigenous mental health professionals usually approach mental health problems as an outsider to the community and face issues that may undermine their credibility and effectiveness.²³ Collaborative approaches that emphasize transfer of knowledge between traditional indigenous practices and biomedical practices offer the greatest hope to transcend such limitations in treatment.

Policymakers should be aware that simply making resources available fails to address the broader societal factors that often underlie issues of access

and use of health services. It is vital that health and social policies recognize the influence that colonization has had on indigenous peoples and how health determinants have been effected by this legacy. In an effort to improve the health of indigenous communities, we must build upon the strength of that particular community. It is not only important to recognize possible differences in risk factors for suicidal behavior in indigenous populations when compared with the general population, but one must be aware of the fact that suicide prevention and screening programs may be difficult to adapt from one tribal group to another. Additional consideration should be given to the diversity of the indigenous populations themselves, underscoring the importance of future work exploring the heterogeneity of suicidal behavior across distinct indigenous groups.

Future directions

Future prospective studies are needed to longitudinally investigate differences between indigenous and non-indigenous groups on a range of suicidal behaviors, including suicide completion. Such investigations should include measures of community-level variables (i.e., level of cultural continuity), social support, feelings of hopelessness, individualistic beliefs. It would also be important to include both urban- and reserve-reared individuals to ensure representation of the range of experiences in this diverse cultural group. Additional research is needed to confirm the generalizability of these findings to other indigenous populations.

Based on the high rate of death by suicide in indigenous populations,¹⁹⁻²¹ it is clear that improvement is needed in our ability to predict and prevent suicide

and suicidal behaviors. For this to happen, future studies are required to further delineate the risk and protective factors that influence such behavior in this vulnerable and high-risk group.

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Table 1. Prevalence of suicidal behaviors comparing the American Indian tribes.

	Males		Females	
	Northern Plains (<i>n</i> =746) <i>n</i> (%)	Southwest (<i>n</i> =573) <i>n</i> (%)	Northern Plains (<i>n</i> =814) <i>n</i> (%)	Southwest (<i>n</i> =770) <i>n</i> (%)
Suicidal ideation	40 (5.3) ^a	16 (3.1)	69 (8.2)	46 (6.5)
OR (95% CI)	1.74 (0.96-3.20)	1.00	1.29 (0.86-1.92)	1.00
Suicide plan	16 (1.7)	8 (1.5)	33 (4.1)	26 (3.6)
OR (95% CI)	1.14 (0.48-2.72)	1.00	1.17 (0.68-2.02)	1.00
Suicide attempts	49 (6.6)	18 (3.2)	91 (10.7)	44 (6.3)
OR (95% CI)	2.10** (1.19-3.71)	1.00	1.78** (1.21-2.62)	1.00

Note. All *n*s are unweighted values, all percentages are weighted values.

^aThe percentage reported indicates that 5.3% of individuals in the Northern Plains reported suicidal ideation.

OR: Unadjusted odds ratio.

p*<.05. *p*<.01. ****p*<.001. *****p*<.00001.

Table 2. Prevalence of suicidal behaviors comparing American Indians to the general population.

	Males		Females	
	American Indians (<i>n</i> =1319) <i>n</i> (%)	NCS (<i>n</i> =2820) <i>n</i> (%)	American Indians (<i>n</i> =1585) <i>n</i> (%)	NCS (<i>n</i> =3052) <i>n</i> (%)
Suicidal ideation	56 (4.3) ^a	392 (9.9)	115 (7.3)	616 (15.8)
OR (95% CI)	1.00	2.42**** (1.77-3.31)	1.00	2.38**** (1.88-3.01)
Suicide plan	24 (1.6)	118 (2.9)	59 (3.8)	195 (4.9)
OR (95% CI)	1.00	1.81* (1.12-2.91)	1.00	1.30 (0.93-1.81)
Suicide attempts	67 (5.1)	112 (2.9)	135 (8.6)	254 (6.3)
OR (95% CI)	1.00	0.56*** (0.39-0.79)	1.00	0.72** (0.56-0.93)

Note. All *n*s are unweighted values, all percentages are weighted values.

^aThe percentage reported indicates that 4.3% of American Indians reported suicidal ideation.

OR: Unadjusted odds ratio.

p*<.05. *p*<.01. ****p*<.001. *****p*<.00001.

Table 3. Comparison of sociodemographic correlates among those who endorsed suicidal ideation.

	Males					Females				
	AI (<i>n</i> =56) <i>n</i> (%)	OR (95% CI)	NCS (<i>n</i> =392) <i>n</i> (%)	OR (95% CI)	Site X Socio interaction ^b OR (95% CI)	AI (<i>n</i> =115) <i>n</i> (%)	OR (95% CI)	NCS (<i>n</i> =616) <i>n</i> (%)	OR (95% CI)	Site X Socio interaction OR (95% CI)
Age										
15-24	13 (3.4) ^a	2.08 (0.70-6.16)	109 (12.3)	1.39 (0.89-2.18)	NS	40 (8.7)	2.76** (1.37-5.56)	175 (18.9)	1.73** (1.19-2.51)	NS
25-34	23 (6.5)	4.10** (1.47-11.41)	107 (7.8)	0.83 (0.52-1.32)	0.20** (0.07-0.63)	34 (8.7)	2.73** (1.33-5.58)	188 (14.0)	1.21 (0.82-1.79)	NS
35-44	15 (4.9)	3.05* (1.05-8.85)	121 (10.4)	1.15 (0.72-1.84)	NS	29 (7.7)	2.39* (1.15-4.94)	152 (17.9)	1.62* (1.07-2.47)	NS
45-54	5 (1.7)	1.00	55 (9.2)	1.00	1.00	12 (3.4)	1.00	101 (11.9)	1.00	1.00
Education										
<12 years	22 (4.1)	0.51* (0.27-0.98)	87 (11.4)	1.37 (0.96-1.95)	2.66** (1.27-5.57)	45 (7.5)	0.87 (0.55-1.39)	134 (17.6)	1.25 (0.91-1.71)	NS
Completed hs	13 (2.8)	0.34** (0.16-0.71)	130 (10.5)	1.24 (0.89-1.72)	3.67** (1.64-8.22)	29 (5.6)	0.64 (0.38-1.07)	209 (16.2)	1.13 (0.83-1.52)	NS
Some post-hs	21 (7.8)	1.00	175 (8.6)	1.00	1.00	39 (8.6)	1.00	273 (14.7)	1.00	1.00
Poverty status										
Living in poverty	31 (5.4)	1.34 (0.75-2.37)	65 (17.8)	2.18*** (1.49-3.18)	NS	65 (8.2)	1.41 (0.91-2.18)	140 (24.9)	1.97**** (1.47-2.65)	NS
Marital status										
Sep/div/wid	6 (4.2)	0.82 (0.33-2.05)	95 (16.0)	2.09*** (1.38-3.16)	NS	16 (7.0)	1.09 (0.59-2.00)	149 (21.7)	1.68** (1.18-2.38)	NS
Never married	16 (3.2)	0.61 (0.32-1.16)	148 (10.9)	1.34 (0.99-1.82)	2.19* (1.08-4.45)	45 (9.5)	1.53 (0.99-2.34)	193 (16.9)	1.23 (0.93-1.63)	NS
Married/common-law	34 (5.1)	1.00	149 (8.4)	1.00	1.00	54 (6.4)	1.00	274 (14.2)	1.00	1.00

Note. All *n*s are unweighted values, all percentages are weighted values.

^aThe percentage reported indicates that 3.4% of American Indians aged 15-24 reported lifetime suicidal ideation.

^bReference group for all interaction analyses is the American Indian sample.

OR: Unadjusted odds ratio.

p*<.05. *p*<.01. ****p*<.001. *****p*<.00001.

Table 4. Comparison of sociodemographic correlates among those who endorsed making a suicide plan.

	Males					Females				
	AI (<i>n</i> =24) <i>n</i> (%)	OR (95% CI)	NCS (<i>n</i> =118) <i>n</i> (%)	OR (95% CI)	Site X Socio interaction ^b OR (95% CI)	AI (<i>n</i> =59) <i>n</i> (%)	OR (95% CI)	NCS (<i>n</i> =195) <i>n</i> (%)	OR (95% CI)	Site X Socio interaction OR (95% CI)
Age										
15-24	8 (2.1) ^a	8.67* (1.07-70.33)	32 (4.0)	1.66 (0.76-3.59)	NS	16 (3.6)	1.25 (0.54-2.91)	58 (7.4)	2.75*** (1.48-5.11)	NS
25-34	11 (2.7)	11.26* (1.43-88.49)	37 (3.0)	1.23 (0.57-2.69)	0.11* (0.01-0.99)	14 (3.6)	1.23 (0.51-2.94)	59 (3.8)	1.37 (0.72-2.59)	NS
35-44	---	---	31 (2.3)	0.93 (0.42-2.06)	NA	19 (5.1)	1.80 (0.79-4.11)	50 (5.5)	2.00* (1.02-3.91)	NS
45-54	---	1.00	18 (2.4)	1.00	1.00	10 (2.9)	1.00	28 (2.8)	1.00	1.00
Education										
<12 years	10 (1.6)	0.60 (0.23-1.58)	32 (4.5)	2.24** (1.27-3.98)	3.75* (1.21-11.63)	21 (3.4)	0.59 (0.32-1.08)	46 (6.7)	1.66* (1.01-2.72)	2.83** (1.29-6.24)
Completed hs	6 (1.1)	0.42 (0.14-1.25)	38 (3.0)	1.50 (0.86-2.62)	3.60* (1.05-12.40)	12 (2.3)	0.39** (0.19-0.80)	60 (4.8)	1.16 (0.73-1.85)	3.02* (1.27-7.19)
Some post-hs	8 (2.7)	1.00	48 (2.0)	1.00	1.00	25 (5.7)	1.00	89 (4.2)	1.00	1.00
Poverty status										
Living in poverty	12 (1.9)	1.06 (0.46-2.45)	22 (5.0)	1.87* (1.02-3.42)	NS	33 (4.2)	1.36 (0.75-2.48)	39 (8.2)	1.92** (1.19-3.10)	NS
Marital status										
Sep/div/wid	---	---	33 (5.0)	2.55** (1.36-4.80)	NA	8 (3.7)	1.02 (0.45-2.34)	48 (6.6)	1.69* (1.03-2.77)	NS
Never married	7 (1.3)	0.74 (0.29-1.89)	48 (4.0)	2.00** (1.18-3.38)	NS	21 (4.4)	1.23 (0.68-2.22)	65 (6.3)	1.61* (1.03-2.52)	NS
Married/common-law	14 (1.7)	1.00	37 (2.0)	1.00	1.00	30 (3.6)	1.00	82 (4.0)	1.00	1.00

Note. All *ns* are unweighted values, all percentages are weighted values.

^aThe percentage reported indicates that 2.1% of American Indians aged 15-24 reported making a suicide plan in their lifetime.

^bReference group for all interaction analyses is the American Indian sample.

OR: Unadjusted odds ratio. ---: cell size *n* < 5.

p*<.05. *p*<.01. ****p*<.001. *****p*<.00001.

Table 5. Comparison of sociodemographic correlates among those who endorsed making a suicide attempt.

	Males					Females				
	AI (<i>n</i> =67) <i>n</i> (%)	OR (95% CI)	NCS (<i>n</i> =112) <i>n</i> (%)	OR (95% CI)	Site X Socio interaction ^b OR (95% CI)	AI (<i>n</i> =135) <i>n</i> (%)	OR (95% CI)	NCS (<i>n</i> =254) <i>n</i> (%)	OR (95% CI)	Site X Socio interaction OR (95% CI)
Age										
15-24	13 (3.5) ^a	1.54 (0.62-3.85)	31 (3.7)	1.47 (0.71-3.05)	NS	40 (8.8)	2.26** (1.22-4.17)	75 (8.6)	1.75* (1.07-2.88)	NS
25-34	32 (9.2)	4.26*** (1.89-9.58)	38 (3.2)	1.28 (0.62-2.64)	0.30* (0.10-0.89)	43 (10.5)	2.74*** (1.49-5.05)	74 (5.2)	1.03 (0.62-1.72)	0.38* (0.17-0.83)
35-44	14 (4.5)	1.96 (0.79-4.85)	25 (2.2)	0.88 (0.41-1.89)	NS	34 (9.4)	2.44** (1.30-4.58)	60 (6.4)	1.27 (0.73-2.21)	NS
45-54	8 (2.3)	1.00	18 (2.5)	1.00	1.00	16 (4.1)	1.00	45 (5.1)	1.00	1.00
Education										
<12 years	24 (4.4)	0.53* (0.28-0.99)	42 (5.7)	3.93**** (2.16-7.17)	7.45**** (3.12-17.81)	60 (10.1)	1.14 (0.74-1.75)	68 (9.2)	2.25*** (1.44-3.51)	1.97* (1.06-3.67)
Completed hs	22 (4.5)	0.53 (0.28-1.02)	39 (2.9)	1.91* (1.04-3.53)	3.58** (1.47-8.72)	31 (6.5)	0.70 (0.42-1.16)	99 (7.2)	1.71** (1.12-2.60)	2.44** (1.27-4.70)
Some post-hs	21 (8.0)	1.00	31 (1.5)	1.00	1.00	43 (9.0)	1.00	87 (4.3)	1.00	1.00
Poverty status										
Living in poverty	40 (6.7)	1.81* (1.04-3.17)	26 (7.6)	3.32*** (1.88-5.86)	NS	87 (11.0)	2.15*** (1.41-3.27)	68 (12.3)	2.46**** (1.67-3.61)	0.82* (0.68-0.98)
Marital status										
Sep/div/wid	12 (8.7)	1.65 (0.81-3.37)	36 (8.5)	4.94**** (2.70-9.07)	3.00* (1.18-7.66)	21 (9.8)	1.16 (0.68-1.97)	72 (9.4)	1.66* (1.10-2.50)	NS
Never married	17 (3.7)	0.66 (0.36-1.22)	39 (3.3)	1.83* (1.06-3.17)	2.78* (1.22-6.34)	37 (8.0)	0.92 (0.60-1.41)	65 (5.8)	0.98 (0.65-1.47)	NS
Married/common-law	38 (5.4)	1.00	37 (1.8)	1.00	1.00	77 (8.6)	1.00	117 (5.9)	1.00	1.00

Note. All *n*s are unweighted values, all percentages are weighted values.

^aThe percentage reported indicates that 3.5% of American Indians aged 15-24 reported a lifetime suicide attempt.

^bReference group for all interaction analyses is the American Indian sample.

OR: Unadjusted odds ratio.

p*<.05. *p*<.01. ****p*<.001. *****p*<.00001.

Table 6. Comparison of mental disorder correlates among those who endorsed suicidal ideation.

	Males					Females				
	AI (<i>n</i> =56) <i>n</i> (%)	AOR (95% CI)	NCS (<i>n</i> =392) <i>n</i> (%)	AOR (95% CI)	Site X Dx interaction ^b AOR (95% CI)	AI (<i>n</i> =115) <i>n</i> (%)	AOR (95% CI)	NCS (<i>n</i> =616) <i>n</i> (%)	AOR (95% CI)	Site X Dx interaction AOR (95% CI)
Depressive disorders	22 (17.7) ^a	6.82**** (3.66-12.72)	216 (38.9)	11.48**** (8.44-15.62)	NS	51 (24.2)	6.75**** (4.27-10.68)	401 (13.9)	7.05**** (5.35-9.29)	NS
Major depressive episode	22 (20.7)	8.46**** (4.50-15.91)	189 (39.5)	10.51**** (7.68-14.38)	NS	48 (26.9)	8.11**** (5.09-12.93)	371 (13.8)	6.77**** (5.15-8.92)	NS
Dysthymic disorder	8 (13.9)	3.67** (1.52-8.89)	97 (41.1)	7.87**** (5.31-11.66)	NS	21 (22.6)	4.22**** (2.30-7.74)	147 (16.5)	4.32**** (3.13-5.96)	NS
Anxiety disorders	17 (8.6)	2.38** (1.23-4.60)	121 (31.2)	5.39**** (3.82-7.62)	2.18* (1.07-4.45)	57 (15.8)	4.06**** (2.59-6.36)	286 (38.3)	5.06**** (3.86-6.63)	NS
Generalized anxiety disorder	---	---	48 (34.9)	5.35**** (3.23-8.86)	NA	8 (19.0)	3.78** (1.61-8.87)	106 (32.8)	3.03**** (2.12-4.32)	NS
Panic disorder	---	---	32 (37.1)	5.65**** (3.07-10.39)	NA	6 (10.0)	1.54 (0.62-3.83)	78 (37.5)	3.47**** (2.33-5.16)	NS
Posttraumatic stress disorder	15 (9.4)	2.48** (1.24-4.94)	75 (36.7)	6.52**** (4.23-10.06)	2.61* (1.20-5.67)	55 (17.8)	4.89**** (3.08-7.75)	191 (46.3)	5.79**** (4.24-7.92)	NS
Any depressive/anxiety disorder	31 (12.1)	5.36**** (2.99-9.62)	244 (32.8)	9.49**** (7.00-12.87)	NS	78 (16.7)	6.29**** (3.95-10.04)	460 (34.6)	7.13**** (5.29-9.62)	NS
Substance use disorders	47 (8.2)	7.90**** (3.60-17.37)	251 (16.9)	3.21**** (2.40-4.31)	0.40* (0.17-0.91)	60 (15.1)	3.54**** (2.27-5.53)	260 (31.8)	3.40**** (2.61-4.42)	NS
Alcohol abuse	10 (6.6)	1.56 (0.75-3.25)	49 (9.2)	0.96 (0.64-1.45)	NS	15 (11.1)	1.74 (0.90-3.38)	65 (21.4)	1.45* (1.01-2.09)	NS
Alcohol dependence	34 (8.9)	3.97**** (2.23-7.09)	176 (21.3)	3.47**** (2.61-4.61)	NS	39 (18.1)	3.54**** (2.20-5.69)	149 (38.1)	3.94**** (2.91-5.32)	NS
Drug abuse	9 (13.1)	3.44** (1.51-7.81)	33 (13.8)	1.56 (0.95-2.56)	NS	8 (13.9)	2.34* (1.03-5.34)	46 (33.4)	2.85**** (1.81-4.50)	NS
Drug dependence	16 (12.8)	4.03**** (2.01-8.08)	117 (31.5)	5.79**** (4.12-8.12)	NS	19 (22.4)	2.93**** (1.51-5.66)	113 (45.6)	5.04**** (3.53-7.18)	NS
Any disorder	50 (7.7)	10.80**** (4.10-28.40)	334 (19.1)	7.81**** (5.29-11.53)	NS	92 (13.8)	6.27**** (3.63-10.83)	517 (30.6)	7.21**** (5.09-10.22)	NS

None	6 (0.8)	1.00	58 (3.1)	1.00	1.00	23 (2.4)	1.00	99 (5.9)	1.00	1.00
One	12 (3.3)	4.66** (1.57-13.78)	93 (10.5)	3.95**** (2.54-6.15)	NS	28 (8.1)	3.73*** (1.96-7.10)	139 (18.0)	3.62**** (2.39-5.49)	NS
Two	21 (12.2)	17.55**** (6.21-49.64)	104 (20.3)	8.26**** (5.22-13.07)	NS	29 (14.5)	6.59**** (3.36-12.89)	165 (36.2)	9.41**** (6.28-14.09)	NS
Three or more	17 (15.6)	23.80**** (7.88-71.88)	137 (44.8)	27.61**** (17.25-44.20)	NS	35 (29.0)	16.50**** (8.55-31.85)	213 (49.5)	16.22**** (10.82-24.33)	NS

Note. All *ns* are unweighted values, all percentages are weighted values.

^aThe percentage reported indicates that 17.7% of American Indians with a depressive disorder reported lifetime suicidal ideation.

^bReference group for all interaction analyses is the American Indian sample.

---: cell size $n < 5$. AOR: Odds ratios adjusted for sociodemographics (age, education, poverty status, marital status).

* $p < .05$. ** $p < .01$. *** $p < .001$. **** $p < .00001$.

Table 7. Comparison of mental disorder correlates among those who endorsed making a suicide plan.

	Males					Females				
	AI (n=24) n (%)	AOR (95% CI)	NCS (n=118) n (%)	AOR (95% CI)	Site X Dx interaction ^b AOR (95% CI)	AI (n=59) n (%)	AOR (95% CI)	NCS (n=195) n (%)	AOR (95% CI)	Site X Dx interaction AOR (95% CI)
Depressive disorders	12 (7.7) ^a	8.44**** (3.45-20.63)	77 (13.9)	13.64**** (8.29-22.44)	NS	33 (15.6)	8.87**** (4.74-16.63)	143 (12.9)	6.48**** (4.13-10.15)	NS
Major depressive episode	12 (8.9)	9.66**** (4.02-23.22)	66 (13.8)	11.05**** (6.76-18.06)	NS	30 (16.7)	10.40**** (5.53-19.53)	131 (13.5)	6.21**** (4.05-9.55)	NS
Dysthymic disorder	5 (7.4)	7.68*** (2.20-26.79)	39 (16.5)	8.69**** (4.95-15.22)	NS	14 (15.4)	5.05*** (2.41-10.59)	58 (15.9)	5.03**** (3.21-7.88)	NS
Anxiety disorders	9 (4.1)	4.16*** (1.81-9.58)	48 (13.7)	8.78**** (5.25-14.70)	NS	32 (9.0)	4.58**** (2.45-8.58)	112 (14.9)	6.40**** (4.29-9.55)	NS
Generalized anxiety disorder	---	---	18 (12.1)	5.04*** (2.40-10.57)	NA	5 (11.8)	3.78** (1.37-10.43)	44 (15.8)	5.10**** (3.09-8.43)	NS
Panic disorder	---	---	15 (18.0)	7.99**** (3.50-18.23)	NA	---	---	24 (13.5)	3.41*** (1.89-6.14)	NA
Posttraumatic stress disorder	8 (4.7)	4.28** (1.65-11.11)	32 (18.5)	12.43**** (7.02-22.01)	2.95* (1.01-8.61)	32 (10.5)	6.42**** (3.32-12.43)	87 (20.2)	7.38**** (4.89-11.14)	NS
Any depressive/anxiety disorder	15 (5.0)	7.36**** (3.10-17.47)	86 (11.3)	12.08**** (7.19-20.30)	NS	46 (9.9)	8.60**** (4.14-17.85)	165 (12.2)	9.47**** (5.35-16.78)	NS
Substance use disorders	22 (3.4)	16.54*** (3.76-72.70)	86 (5.8)	4.61**** (2.69-7.90)	NS	33 (8.3)	3.51*** (1.91-6.46)	103 (13.5)	5.30**** (3.53-7.95)	NS
Alcohol abuse	7 (4.2)	2.85* (1.12-7.22)	14 (2.0)	0.73 (0.37-1.41)	0.20** (0.06-0.62)	6 (3.9)	1.06 (0.38-2.96)	21 (8.2)	1.77* (1.00-3.13)	NS
Alcohol dependence	14 (3.1)	3.43** (1.52-7.74)	66 (8.4)	5.74**** (3.57-9.24)	NS	24 (11.2)	3.92*** (2.09-7.39)	63 (16.1)	4.87**** (3.16-7.50)	NS
Drug abuse	---	---	7 (2.5)	0.93 (0.37-2.29)	NA	---	---	15 (12.6)	3.10*** (1.57-6.12)	NA
Drug dependence	8 (5.1)	3.55** (1.50-8.37)	44 (10.6)	5.38**** (3.15-9.17)	NS	13 (15.6)	4.63*** (2.11-10.12)	53 (23.2)	7.62**** (4.81-12.07)	NS
Any disorder	23 (3.1)	31.72*** (4.26-236.45)	106 (6.0)	10.26**** (5.05-20.86)	NS	51 (7.7)	8.22**** (3.45-19.59)	178 (10.5)	10.64**** (5.10-22.18)	NS

None	---	1.00	12 (0.7)	1.00	1.00	8 (0.9)	1.00	17 (1.2)	1.00	1.00
One	6 (1.5)	15.40** (1.85-128.14)	20 (2.3)	3.93** (1.68-9.22)	NS	15 (4.4)	5.11*** (1.91-13.62)	43 (5.9)	5.75*** (2.54-13.02)	NS
Two	8 (4.5)	45.40*** (5.50-375.14)	27 (4.9)	8.41**** (3.62-19.52)	NS	16 (7.9)	8.26*** (3.02-22.56)	45 (8.6)	8.50**** (3.83-18.84)	NS
Three or more	9 (6.5)	71.48*** (8.67-588.97)	59 (20.1)	42.25**** (19.59-91.14)	NS	20 (17.0)	18.80**** (7.14-49.46)	90 (22.4)	26.59**** (12.28-57.58)	NS

Note. All *n*s are unweighted values, all percentages are weighted values.

^aThe percentage reported indicates that 7.7% of American Indians with a depressive disorder reported making a suicide plan in their lifetime.

^bReference group for all interaction analyses is the American Indian sample.

---: cell size *n* < 5. AOR: Odds ratios adjusted for sociodemographics (age, education, poverty status, marital status).

p*<.05. *p*<.01. ****p*<.001. *****p*<.00001.

Table 8. Comparison of mental disorder correlates among those who endorsed making a suicide attempt.

	Males					Females				
	AI (<i>n</i> =67) <i>n</i> (%)	AOR (95% CI)	NCS (<i>n</i> =112) <i>n</i> (%)	AOR (95% CI)	Site X Dx interaction ^b AOR (95% CI)	AI (<i>n</i> =135) <i>n</i> (%)	AOR (95% CI)	NCS (<i>n</i> =254) <i>n</i> (%)	AOR (95% CI)	Site X Dx interaction AOR (95% CI)
Depressive disorders	22 (15.3) ^a	4.25**** (2.29-7.87)	72 (13.8)	12.78**** (7.62-21.41)	2.79** (1.27-6.13)	50 (23.1)	4.48**** (2.90-6.93)	178 (16.4)	6.60**** (4.47-9.72)	NS
Major depressive episode	21 (17.2)	4.95**** (2.63-9.32)	62 (14.0)	11.26**** (6.79-18.68)	NS	48 (26.0)	5.43**** (3.48-8.47)	165 (17.2)	6.51**** (4.47-9.48)	NS
Dysthymic disorder	9 (13.4)	3.06** (1.26-7.47)	32 (16.4)	7.57**** (4.17-13.72)	NS	21 (22.4)	3.28*** (1.79-6.00)	71 (20.1)	4.81**** (3.20-7.25)	NS
Anxiety disorders	24 (12.5)	3.97**** (2.20-7.17)	50 (13.9)	8.39**** (5.06-13.90)	NS	61 (16.3)	3.20**** (2.14-4.79)	148 (19.8)	6.75**** (4.74-9.62)	2.00** (1.18-3.40)
Generalized anxiety disorder	---	---	20 (14.9)	5.85**** (2.87-11.93)	NA	8 (20.4)	3.60** (1.52-8.54)	58 (22.1)	5.38**** (3.50-8.27)	NS
Panic disorder	8 (17.4)	7.64*** (3.03-19.28)	14 (17.7)	7.45**** (3.08-18.01)	NS	---	---	34 (16.0)	3.04*** (1.81-5.10)	NA
Posttraumatic stress disorder	20 (14.1)	4.03*** (2.11-7.73)	33 (18.7)	11.87**** (6.69-21.06)	2.54* (1.10-5.83)	61 (19.0)	4.20**** (2.77-6.36)	101 (22.7)	5.71**** (3.93-8.29)	NS
Any depressive/anxiety disorder	34 (12.7)	4.78**** (2.75-8.29)	80 (11.1)	10.53**** (6.19-17.90)	NS	80 (16.5)	3.77**** (2.52-5.65)	208 (15.4)	8.50**** (5.34-13.54)	2.11* (1.16-3.85)
Substance use disorders	53 (8.9)	4.34*** (2.21-8.51)	81 (6.1)	5.44**** (3.15-9.39)	NS	76 (19.2)	4.47**** (2.97-6.73)	124 (15.6)	4.27**** (2.98-6.13)	NS
Alcohol abuse	11 (7.3)	1.17 (0.53-2.58)	11 (1.7)	0.63 (0.29-1.34)	NS	23 (17.1)	2.19** (1.24-3.86)	27 (9.5)	1.55 (0.91-2.62)	NS
Alcohol dependence	39 (9.7)	3.73*** (2.04-6.81)	65 (9.1)	6.61**** (4.05-10.81)	NS	46 (21.4)	4.13**** (2.65-6.42)	74 (19.6)	4.70**** (3.16-6.99)	NS
Drug abuse	11 (12.7)	2.87** (1.32-6.27)	7 (3.5)	1.44 (0.61-3.43)	NS	10 (17.3)	2.40* (1.07-5.38)	13 (9.8)	1.72 (0.82-3.60)	NS
Drug dependence	15 (11.8)	3.25*** (1.64-6.44)	40 (11.3)	5.79**** (3.32-10.08)	NS	20 (23.5)	2.61** (1.39-4.90)	68 (28.7)	7.52**** (4.97-11.38)	2.75** (1.30-5.79)
Any disorder	58 (8.7)	6.55**** (2.94-14.63)	102 (6.3)	15.03**** (7.08-31.91)	NS	103 (15.2)	4.76**** (2.99-7.59)	227 (13.3)	9.17**** (5.15-16.32)	NS

None	9 (1.4)	1.00	10 (0.5)	1.00	1.00	32 (3.6)	1.00	27 (1.7)	1.00	1.00
One	22 (6.4)	4.61*** (1.91-11.14)	27 (2.9)	7.51**** (3.24-17.43)	NS	33 (9.2)	2.92*** (1.67-5.10)	58 (6.9)	4.45**** (2.34-8.45)	NS
Two	14 (7.6)	5.72*** (2.20-14.86)	20 (4.7)	10.24**** (4.11-25.53)	NS	31 (16.0)	4.88**** (2.68-8.89)	49 (9.8)	6.46**** (3.34-12.49)	NS
Three or more	22 (18.2)	17.67**** (6.89-45.31)	55 (20.3)	51.15**** (22.58-115.87)	NS	39 (31.0)	12.62**** (7.02-22.69)	120 (30.7)	27.31**** (14.67-50.81)	NS

Note. All *ns* are unweighted values, all percentages are weighted values.

^aThe percentage reported indicates that 15.3% of American Indians with a depressive disorder reported a lifetime suicide attempt.

^bReference group for all interaction analyses is the American Indian sample.

---: cell size $n < 5$. AOR: Odds ratios adjusted for sociodemographics (age, education, poverty status, marital status).

* $p < .05$. ** $p < .01$. *** $p < .001$. **** $p < .00001$.

Table 9. Comparison of traumatic event correlates among those who endorsed suicidal ideation.

	Males					Females				
	AI (<i>n</i> =56) <i>n</i> (%)	AOR (95% CI)	NCS (<i>n</i> =392) <i>n</i> (%)	AOR (95% CI)	Site X Dx interaction ^b AOR (95% CI)	AI (<i>n</i> =115) <i>n</i> (%)	AOR (95% CI)	NCS (<i>n</i> =615) <i>n</i> (%)	AOR (95% CI)	Site X Dx interaction AOR (95% CI)
Physical abuse as a child	15 (14.1) ^a	4.08*** (2.04-8.16)	56 (35.4)	5.74**** (3.53-9.31)	NS	33 (20.1)	4.20**** (2.59-6.82)	98 (45.5)	4.86**** (3.24-7.30)	NS
Physical attack	15 (7.4)	1.79 (0.91-3.52)	89 (18.4)	2.32**** (1.62-3.31)	NS	15 (18.6)	3.86*** (2.01-7.44)	106 (40.9)	4.21**** (2.80-6.34)	NS
Sexual assault other than rape	---	---	31 (26.4)	3.85*** (2.07-7.16)	NA	31 (27.9)	6.59**** (3.92-11.07)	178 (35.3)	3.75**** (2.80-5.01)	0.55* (0.31-0.99)
Rape	---	---	10 (27.9)	3.29* (1.24-8.70)	NA	43 (21.3)	5.30**** (3.28-8.57)	149 (43.5)	4.73**** (3.32-6.76)	NS
Witnessing a traumatic event	48 (7.6)	5.49*** (2.41-12.51)	180 (13.4)	1.86*** (1.39-2.49)	0.29** (0.12-0.68)	77 (10.2)	2.38*** (1.51-3.76)	165 (24.9)	2.02**** (1.50-2.73)	NS
Life-threatening accident	31 (10.9)	4.34**** (2.45-7.69)	153 (15.8)	2.25**** (1.66-3.04)	0.45* (0.23-0.86)	23 (12.1)	2.33** (1.35-4.01)	125 (24.3)	1.97*** (1.39-2.79)	NS
Natural disaster	18 (10.5)	3.21*** (1.66-6.23)	92 (14.6)	1.77** (1.24-2.53)	0.48* (0.24-0.99)	26 (15.9)	3.46**** (2.07-5.77)	127 (21.8)	1.65** (1.20-2.26)	0.48* (0.26-0.88)
Combat exposure in war	---	---	---	---	NA	---	---	---	---	NA
Trauma occurred to loved one	22 (7.5)	2.07* (1.08-3.96)	72 (16.7)	1.90** (1.24-2.90)	NS	54 (14.3)	3.18**** (2.05-4.93)	153 (27.1)	2.25**** (1.66-3.06)	NS
Any type of trauma	53 (6.3)	6.79** (2.01-22.90)	289 (12.8)	2.47**** (1.81-3.36)	NS	100 (10.0)	4.84**** (2.58-9.07)	451 (22.9)	2.94**** (2.18-3.96)	NS

Note. All *n*s are unweighted values, all percentages are weighted values.

^aThe percentage reported indicates that 14.1% of American Indians who experienced physical abuse as a child reported lifetime suicidal ideation.

^bReference group for all interaction analyses is the American Indian sample.

---: cell size *n* < 5. AOR: Odds ratios adjusted for sociodemographics (age, education, poverty status, marital status).

p*<.05. *p*<.01. ****p*<.001. *****p*<.00001.

Table 10. Comparison of traumatic event correlates among those who endorsed making a suicide plan.

	Males					Females				
	AI (<i>n</i> =24) <i>n</i> (%)	AOR (95% CI)	NCS (<i>n</i> =118) <i>n</i> (%)	AOR (95% CI)	Site X Dx interaction ^b AOR (95% CI)	AI (<i>n</i> =59) <i>n</i> (%)	AOR (95% CI)	NCS (<i>n</i> =194) <i>n</i> (%)	AOR (95% CI)	Site X Dx interaction AOR (95% CI)
Physical abuse as a child	8 (6.6) ^a	5.80*** (2.28-14.80)	23 (16.9)	8.20**** (4.43-15.16)	NS	20 (12.3)	5.45**** (2.88-10.31)	39 (20.0)	5.71**** (3.34-9.77)	NS
Physical attack	8 (3.5)	2.47* (1.02-5.99)	38 (8.0)	3.71**** (2.17-6.35)	NS	10 (12.7)	4.87*** (2.24-10.60)	46 (16.4)	4.73**** (2.85-7.87)	NS
Sexual assault other than rape	---	---	13 (11.1)	5.39*** (2.41-12.03)	NA	20 (17.9)	7.52**** (3.94-14.34)	68 (13.6)	4.34**** (2.86-6.56)	NS
Rape	---	---	6 (10.8)	3.27* (1.07-9.96)	NA	25 (12.8)	5.92**** (3.16-11.09)	71 (21.5)	7.49**** (4.82-11.66)	NS
Witnessing a traumatic event	19 (2.7)	3.24* (1.19-8.81)	65 (4.5)	2.48*** (1.49-4.13)	NS	42 (5.8)	2.89** (1.48-5.61)	68 (10.5)	2.97**** (1.93-4.56)	NS
Life-threatening accident	13 (4.2)	4.36*** (1.96-9.72)	52 (5.2)	2.79*** (1.74-4.46)	NS	16 (9.1)	3.38*** (1.76-6.51)	51 (8.6)	2.24*** (1.40-3.57)	NS
Natural disaster	7 (3.1)	2.23 (0.83-6.02)	27 (3.9)	1.58 (0.88-2.84)	NS	19 (11.8)	5.06**** (2.75-9.30)	52 (9.9)	2.77**** (1.75-4.37)	NS
Combat exposure in war	---	---	---	---	NA	---	---	---	---	NA
Trauma occurred to loved one	11 (3.3)	2.82* (1.17-6.79)	24 (4.5)	1.67 (0.93-3.01)	NS	35 (9.7)	5.48**** (3.01-9.98)	68 (13.7)	4.19**** (2.75-6.38)	NS
Any type of trauma	22 (2.3)	4.00 (0.95-16.87)	92 (3.9)	2.66*** (1.51-4.69)	NS	54 (5.5)	7.77*** (2.70-22.39)	165 (8.3)	5.37**** (2.89-9.98)	NS

Note. All *n*s are unweighted values, all percentages are weighted values.

^aThe percentage reported indicates that 6.6% of American Indians who experienced physical abuse as a child reported a suicide plan in their lifetime.

^bReference group for all interaction analyses is the American Indian sample.

---: cell size *n* < 5. AOR: Odds ratios adjusted for sociodemographics (age, education, poverty status, marital status).

p*<.05. *p*<.01. ****p*<.001. *****p*<.00001.

Table 11. Comparison of traumatic event correlates among those who endorsed making a suicide attempt.

	Males					Females				
	AI (<i>n</i> =67) <i>n</i> (%)	AOR (95% CI)	NCS (<i>n</i> =112) <i>n</i> (%)	AOR (95% CI)	Site X Dx interaction ^b AOR (95% CI)	AI (<i>n</i> =135) <i>n</i> (%)	AOR (95% CI)	NCS (<i>n</i> =253) <i>n</i> (%)	AOR (95% CI)	Site X Dx interaction AOR (95% CI)
Physical abuse as a child	20 (17.9) ^a	5.62**** (3.05-10.36)	26 (17.8)	8.23**** (4.35-15.55)	NS	39 (23.2)	3.67**** (2.34-5.76)	60 (27.8)	6.65**** (4.21-10.51)	NS
Physical attack	24 (11.5)	3.32*** (1.89-5.85)	36 (9.6)	4.53**** (2.64-7.78)	NS	17 (20.3)	3.27*** (1.70-6.27)	61 (23.7)	5.60**** (3.58-8.77)	NS
Sexual assault other than rape	7 (32.0)	12.59*** (3.69-42.96)	18 (15.5)	9.36**** (4.53-19.34)	NS	27 (24.2)	4.07**** (2.44-6.79)	82 (15.4)	3.38**** (2.34-4.89)	NS
Rape	5 (26.5)	6.02** (1.78-20.31)	10 (28.3)	11.52**** (4.01-33.04)	NS	44 (21.5)	4.19**** (2.69-6.52)	89 (24.6)	6.21**** (4.13-9.32)	NS
Witnessing a traumatic event	54 (8.4)	4.82*** (2.21-10.48)	58 (4.2)	2.18** (1.32-3.61)	0.38* (0.15-0.92)	94 (12.7)	3.28**** (2.13-5.03)	79 (12.1)	2.65**** (1.79-3.92)	NS
Life-threatening accident	30 (9.7)	2.46** (1.40-4.32)	45 (5.3)	2.96*** (1.81-4.84)	NS	28 (14.6)	2.28*** (1.38-3.76)	52 (8.9)	1.68* (1.08-2.63)	NS
Natural disaster	21 (10.1)	2.50** (1.32-4.73)	35 (5.9)	3.01*** (1.78-5.11)	NS	24 (13.9)	2.54*** (1.50-4.29)	56 (11.1)	2.21**** (1.44-3.39)	NS
Combat exposure in war	---	---	---	---	NA	---	---	---	---	NA
Trauma occurred to loved one	28 (9.3)	2.52** (1.38-4.60)	27 (6.0)	2.38** (1.29-4.38)	NS	55 (14.5)	2.70**** (1.77-4.11)	70 (12.4)	2.48**** (1.67-3.68)	NS
Any type of trauma	60 (7.0)	4.68** (1.68-13.02)	88 (4.1)	3.50*** (1.94-6.34)	NS	111 (11.2)	3.70**** (2.17-6.33)	204 (9.9)	3.64**** (2.31-5.74)	NS

Note. All *n*s are unweighted values, all percentages are weighted values.

^aThe percentage reported indicates that 17.9% of American Indians who experienced physical abuse as a child reported a lifetime suicide attempt.

^bReference group for all interaction analyses is the American Indian sample.

---: cell size *n* < 5. AOR: Odds ratios adjusted for sociodemographics (age, education, poverty status, marital status).

p*<.05. *p*<.01. ****p*<.001. *****p*<.00001.

Appendix A. Supplemental comparison analyses of tribal differences on sociodemographic correlates of suicidal ideation.

	Males					Females				
	NP (n=40) n (%)	OR (95% CI)	SW (n=16) n (%)	OR (95% CI)	Site X Socio interaction ^b OR (95% CI)	NP (n=69) n (%)	OR (95% CI)	SW (n=46) n (%)	OR (95% CI)	Site X Socio interaction OR (95% CI)
Age										
15-24	9 (4.0) ^a	2.94 (0.78-11.06)	---	---	NA	27 (10.2)	2.00 (0.87-4.62)	13 (7.1)	5.25** (1.45-18.98)	NS
25-34	18 (8.4)	6.41** (1.85-22.26)	5 (3.8)	1.98 (0.38-10.42)	NS	20 (9.4)	1.82 (0.76-4.38)	14 (7.9)	5.93** (1.65-21.27)	NS
35-44	10 (5.7)	4.25* (1.14-15.89)	5 (3.7)	1.95 (0.37-10.19)	NS	13 (7.2)	1.37 (0.54-3.50)	16 (8.0)	6.05** (1.71-21.42)	NS
45-54	---	1.00	---	1.00	1.00	9 (5.4)	1.00	---	1.00	1.00
Education										
<12 years	18 (5.4)	0.62 (0.28-1.38)	---	---	NA	30 (7.7)	0.65 (0.36-1.17)	15 (7.3)	1.26 (0.59-2.70)	NS
Completed hs	9 (3.6)	0.41 (0.28-1.03)	---	---	NA	14 (5.6)	0.46* (0.22-0.96)	15 (5.6)	0.96 (0.45-2.06)	NS
Some post-hs	13 (8.3)	1.00	8 (7.1)	1.00	1.00	25 (11.4)	1.00	14 (5.8)	1.00	
Poverty status										
Living in poverty	23 (6.1)	1.14 (0.56-2.31)	8 (4.1)	1.43 (0.53-3.89)	NS	41 (8.6)	1.29 (0.70-2.38)	24 (7.6)	1.47 (0.77-2.76)	NS
Marital status										
Sep/div/wid	5 (5.2)	0.83 (0.29-2.35)	---	---	NA	11 (7.3)	0.96 (0.45-2.05)	5 (6.4)	1.20 (0.43-3.34)	NS
Never married	13 (4.2)	0.67 (0.31-1.41)	---	---	NA	27 (10.0)	1.36 (0.77-2.40)	18 (8.9)	1.71 (0.89-3.28)	NS
Married/common-law	22 (6.2)	1.00	12 (4.0)	1.00	1.00	31 (7.6)	1.00	23 (5.4)	1.00	1.00

Note. All *n*s are unweighted values, all percentages are weighted values. ^aThe percentage reported indicates that 4.0% of Northern Plains American Indians aged 15-24 reported lifetime suicidal ideation. ^bReference group for all interaction analyses is the Northern Plains tribe. OR: Unadjusted odds ratio. **p*<.05. ***p*<.01. ****p*<.001. *****p*<.00001.

Appendix B. Supplemental comparison analyses of tribal differences on sociodemographic correlates of suicide plans.

	Males					Females				
	NP (<i>n</i> =16) <i>n</i> (%)	OR (95% CI)	SW (<i>n</i> =8) <i>n</i> (%)	OR (95% CI)	Site X Socio interaction ^b OR (95% CI)	NP (<i>n</i> =33) <i>n</i> (%)	OR (95% CI)	SW (<i>n</i> =26) <i>n</i> (%)	OR (95% CI)	Site X Socio interaction OR (95% CI)
Age										
15-24	5 (2.2) ^a	4.79 (0.55-41.98)	---	---	NA	10 (3.9)	0.87 (0.30-2.48)	6 (3.3)	2.35 (0.57-9.67)	NS
25-34	9 (3.6)	7.89 (0.98-63.70)	---	---	NA	8 (3.8)	0.84 (0.28-2.56)	6 (3.3)	2.37 (0.57-9.79)	NS
35-44	---	---	---	---	NA	8 (4.8)	1.07 (0.36-3.23)	11 (5.5)	4.01* (1.08-14.83)	NS
45-54	---	1.00	---	---	NA	7 (4.5)	1.00	---	1.00	1.00
Education										
<12 years	8 (2.0)	0.69 (0.21-2.26)	---	---	NA	12 (2.8)	0.34** (0.16-0.76)	9 (4.3)	1.16 (0.44-3.03)	NS
Completed hs	---	---	---	---	NA	5 (2.1)	0.26* (0.09-0.76)	7 (2.4)	0.64 (0.23-1.79)	NS
Some post-hs	5 (2.8)	1.00	---	---	NA	16 (7.8)	1.00	9 (3.7)	1.00	1.00
Poverty status										
Living in poverty	8 (1.8)	0.83 (0.30-2.30)	---	---	NA	20 (4.3)	1.21 (0.51-2.83)	13 (4.0)	1.48 (0.63-3.48)	NS
Marital status										
Sep/div/wid	---	---	---	---	NA	5 (3.7)	0.95 (0.32-2.81)	---	---	NA
Never married	6 (1.7)	1.12 (0.38-3.32)	---	---	NA	13 (4.9)	1.27 (0.57-2.82)	8 (3.9)	1.16 (0.47-2.82)	NS
Married/common-law	8 (1.6)	1.00	6 (1.9)	1.00	NA	15 (3.9)	1.00	15 (3.4)	1.00	1.00

Note. All *n*s are unweighted values, all percentages are weighted values.^aThe percentage reported indicates that 2.2% of Northern Plains American Indians aged 15-24 reported making a suicide plan in their lifetime. ^bReference group for all interaction analyses is the Northern Plains tribe. OR: Unadjusted odds ratio. **p*<.05. ***p*<.01. ****p*<.001. *****p*<.00001.

Appendix C. Supplemental comparison analyses of tribal differences on sociodemographic correlates of suicide attempts.

	Males					Females				
	NP (n=49) n (%)	OR (95% CI)	SW (n=18) n (%)	OR (95% CI)	Site X Socio interaction ^b OR (95% CI)	NP (n=91) n (%)	OR (95% CI)	SW (n=44) n (%)	OR (95% CI)	Site X Socio interaction OR (95% CI)
Age										
15-24	10 (4.9) ^a	2.33 (0.69-7.86)	---	---	NA	30 (11.5)	1.92 (0.93-3.98)	10 (5.6)	3.01 (0.92-9.82)	NS
25-34	26 (12.4)	6.42 ^{***} (2.11-19.54)	6 (4.6)	1.87 (0.51-6.83)	NS	28 (12.3)	2.07 (0.99-4.34)	15 (8.5)	4.72 ^{**} (1.52-14.64)	NS
35-44	9 (4.9)	2.33 (0.67-8.09)	5 (3.8)	1.54 (0.40-5.89)	NS	19 (11.2)	1.86 (0.84-4.10)	15 (7.8)	4.30 ^{**} (1.39-13.31)	NS
45-54	---	1.00	---	1.00	1.00	12 (6.3)	1.00	---	1.00	1.00
Education										
<12 years	20 (5.7)	0.59 (0.28-1.27)	---	---	NA	47 (12.8)	1.28 (0.74-2.22)	13 (6.3)	0.79 (0.37-1.67)	NS
Completed hs	16 (6.2)	0.64 (0.29-1.43)	6 (2.5)	0.37 (0.12-1.14)	NS	18 (8.2)	0.78 (0.39-1.53)	13 (5.2)	0.65 (0.31-1.37)	NS
Some post-hs	13 (9.3)	1.00	8 (6.4)	1.00	1.00	25 (10.3)	1.00	18 (7.8)	1.00	1.00
Poverty status										
Living in poverty	31 (8.1)	1.72 (0.85-3.47)	9 (4.4)	1.55 (0.59-4.03)	NS	65 (13.7)	2.24 ^{**} (1.27-3.95)	22 (7.4)	1.67 (0.86-3.23)	NS
Marital status										
Sep/div/wid	7 (8.4)	1.14 (0.46-2.84)	5 (9.2)	3.06 (0.97-9.66)	NS	15 (10.5)	0.93 (0.48-1.80)	6 (8.7)	1.40 (0.56-3.50)	NS
Never married	14 (4.9)	0.64 (0.32-1.30)	---	---	NA	27 (10.4)	0.93 (0.55-1.56)	10 (5.3)	0.83 (0.39-1.74)	NS
Married/common-law	28 (7.5)	1.00	10 (3.2)	1.00	1.00	49 (11.2)	1.00	28 (6.4)	1.00	1.00

Note. All *n*s are unweighted values, all percentages are weighted values. ^aThe percentage reported indicates that 4.9% of Northern Plains American Indians aged 15-24 reported a lifetime suicide attempt. ^bReference group for all interaction analyses is the Northern Plains tribe. OR: Unadjusted odds ratio. **p*<.05. ***p*<.01. ****p*<.001. *****p*<.00001.

Appendix D. Supplemental comparison analyses of tribal differences on psychiatric disorder correlates of suicidal ideation.

	Males					Females				
	NP (<i>n</i> =40) <i>n</i> (%)	AOR (95% CI)	SW (<i>n</i> =16) <i>n</i> (%)	AOR (95% CI)	Site X Dx interaction ^b AOR (95% CI)	NP (<i>n</i> =69) <i>n</i> (%)	AOR (95% CI)	SW (<i>n</i> =46) <i>n</i> (%)	AOR (95% CI)	Site X Dx interaction AOR (95% CI)
Depressive disorders	16 (26.2) ^a	11.04**** (4.89-24.97)	6 (9.9)	4.28* (1.38-13.30)	NS	25 (28.2)	7.54**** (3.96-14.35)	26 (21.5)	6.84**** (3.46-13.53)	NS
Anxiety disorders	10 (8.8)	1.95 (0.80-4.79)	7 (8.4)	3.78** (1.38-10.35)	NS	32 (17.0)	3.52*** (1.95-6.37)	25 (14.6)	5.42**** (2.77-10.59)	NS
Any depressive/anxiety disorder	19 (13.6)	4.73*** (2.25-9.93)	12 (10.5)	10.33**** (3.27-32.64)	NS	42 (18.0)	5.29**** (2.93-9.57)	36 (15.6)	9.23**** (4.21-20.20)	NS
Substance use disorders	33 (10.1)	8.01**** (3.13-20.52)	14 (5.9)	8.37** (1.91-36.60)	NS	44 (15.7)	4.13**** (2.19-7.78)	16 (13.9)	2.94** (1.45-6.00)	NS
Any disorder	35 (9.5)	10.66**** (3.53-32.21)	15 (5.4)	12.72* (1.58-102.54)	NS	55 (14.4)	5.65**** (2.61-12.25)	37 (13.2)	7.39**** (3.38-16.15)	NS

Note. All *ns* are unweighted values, all percentages are weighted values.

^aThe percentage reported indicates that 26.2% of Northern Plains American Indians with a depressive disorder reported lifetime suicidal ideation.

^bReference group for all interaction analyses is the Northern Plains tribe.

AOR: Odds ratios adjusted for sociodemographics (age, education, poverty status, marital status). **p*<.05. ***p*<.01. ****p*<.001. *****p*<.00001.

Appendix E. Supplemental comparison analyses of tribal differences on psychiatric disorder correlates of suicide plans.

	Males					Females				
	NP (n=16) n (%)	AOR (95% CI)	SW (n=8) n (%)	AOR (95% CI)	Site X Dx interaction ^b AOR (95% CI)	NP (n=33) n (%)	AOR (95% CI)	SW (n=26) n (%)	AOR (95% CI)	Site X Dx interaction AOR (95% CI)
Depressive disorders	10 (12.7) ^a	35.74**** (9.48-134.78)	---	---	NA	14 (16.0)	7.11**** (3.06-16.54)	19 (15.4)	13.39**** (5.08-35.26)	NS
Anxiety disorders	6 (4.6)	5.58** (1.84-16.93)	---	---	NA	19 (10.9)	5.08*** (2.21-11.70)	13 (7.3)	4.42*** (1.80-10.86)	NS
Any depressive/anxiety disorder	10 (5.8)	12.20*** (3.58-41.56)	5 (3.7)	5.56* (1.28-24.18)	NS	24 (10.6)	7.16*** (2.80-18.30)	22 (9.3)	12.56*** (3.88-40.64)	NS
Substance use disorders	14 (3.4)	8.97** (1.86-43.26)	8 (3.3)	---	---	24 (8.6)	5.03*** (2.00-12.67)	9 (7.8)	2.49 (0.91-6.82)	NS
Any disorder	15 (3.3)	19.70** (2.50-155.28)	8 (2.9)	---	---	28 (7.5)	5.56** (1.80-17.21)	23 (8.0)	14.78*** (4.18-52.34)	NS

Note. All *ns* are unweighted values, all percentages are weighted values.

^aThe percentage reported indicates that 12.7% of Northern Plains American Indians with a depressive disorder reported making a suicide plan in their lifetime.

^bReference group for all interaction analyses is the Northern Plains tribe.

AOR: Odds ratios adjusted for sociodemographics (age, education, poverty status, marital status). *p<.05. **p<.01. ***p<.001. ****p<.00001.

Appendix F. Supplemental comparison analyses of tribal differences on psychiatric disorder correlates of suicide attempts.

	Males					Females				
	NP (n=49) n (%)	AOR (95% CI)	SW (n=18) n (%)	AOR (95% CI)	Site X Dx interaction ^b AOR (95% CI)	NP (n=91) n (%)	AOR (95% CI)	SW (n=44) n (%)	AOR (95% CI)	Site X Dx interaction AOR (95% CI)
Depressive disorders	14 (19.2) ^a	4.04*** (1.81-9.04)	8 (11.7)	5.56** (1.92-16.05)	NS	30 (32.6)	6.04**** (3.32-10.98)	20 (16.6)	4.14*** (2.07-8.29)	NS
Anxiety disorders	16.0 (16.0)	4.57*** (2.17-9.63)	8 (8.9)	4.22** (1.54-11.55)	NS	41 (21.4)	3.63**** (2.20-6.00)	20 (11.6)	2.94*** (1.51-5.72)	NS
Any depressive/anxiety disorder	21 (14.8)	4.25*** (2.15-8.41)	13 (10.6)	9.11*** (3.00-27.69)	NS	54 (22.3)	4.84**** (2.94-7.99)	26 (11.3)	3.04*** (1.54-6.00)	NS
Substance use disorders	37 (11.0)	3.57** (1.61-7.93)	16 (6.2)	8.51** (2.11-34.31)	NS	56 (20.3)	4.16**** (2.48-6.97)	20 (16.9)	4.66**** (2.33-9.35)	NS
Any disorder	40 (10.8)	4.82*** (2.02-11.53)	18 (6.1)	---	---	69 (17.8)	4.46**** (2.51-7.91)	34 (12.2)	5.31*** (2.47-11.40)	NS

Note. All *ns* are unweighted values, all percentages are weighted values.

^aThe percentage reported indicates that 19.2% of Northern Plains American Indians with a depressive disorder reported a lifetime suicide attempt.

^bReference group for all interaction analyses is the Northern Plains tribe.

AOR: Odds ratios adjusted for sociodemographics (age, education, poverty status, marital status). **p*<.05. ***p*<.01. ****p*<.001. *****p*<.00001.

Appendix G. Supplemental comparison analyses of tribal differences on traumatic event correlates of suicidal ideation.

	Males					Females				
	NP (<i>n</i> =39) <i>n</i> (%)	AOR (95% CI)	SW (<i>n</i> =16) <i>n</i> (%)	AOR (95% CI)	Site X Dx interaction ^b AOR (95% CI)	NP (<i>n</i> =69) <i>n</i> (%)	AOR (95% CI)	SW (<i>n</i> =46) <i>n</i> (%)	AOR (95% CI)	Site X Dx interaction AOR (95% CI)
Physical abuse as a child	10 (14.8) ^a	3.30* (1.30-8.40)	5 (13.0)	5.90** (1.84-18.92)	NS	18 (18.2)	3.27*** (1.71-6.25)	15 (22.7)	5.78**** (2.77-12.08)	NS
Physical attack	10 (25.1)	1.54 (0.66-3.63)	5 (6.4)	2.34 (0.71-7.78)	NS	11 (21.0)	4.04*** (1.83-8.88)	---	---	NA
Sexual assault other than rape	---	---	---	---	NA	19 (33.1)	6.98**** (3.40-14.33)	12 (22.8)	6.32**** (2.83-14.11)	NS
Rape	---	---	---	---	NA	25 (21.6)	4.31**** (2.31-8.05)	18 (21.1)	8.07**** (3.87-16.83)	NS
Witnessing a traumatic event	34 (8.8)	4.99** (1.84-13.57)	14 (5.8)	7.24* (1.56-33.55)	NS	47 (11.1)	2.34** (1.26-4.36)	30 (9.2)	2.43** (1.22-4.86)	NS
Life-threatening accident	20 (10.5)	2.95** (1.45-5.98)	11 (11.8)	9.21*** (3.24-26.22)	NS	19 (15.4)	2.85** (1.48-5.47)	---	---	NA
Natural disaster	13 (4.7)	3.01** (1.41-6.47)	5 (8.7)	3.05 (0.94-9.88)	NS	18 (18.0)	3.73*** (1.95-7.13)	8 (12.4)	3.09** (1.31-7.29)	NS
Combat exposure in war	---	---	---	---	NA	---	---	---	---	NA
Trauma occurred to loved one	16 (9.3)	2.44* (1.12-5.33)	6 (5.2)	1.39 (0.44-4.39)	2.05* (1.05-3.99)	36 (15.9)	3.14*** (1.79-5.51)	18 (12.2)	3.36*** (1.63-6.92)	1.80* (1.14-2.85)
Any type of trauma	39 (7.7)	12.13* (1.54-95.48)	14 (4.4)	3.43 (0.76-15.42)	NS	60 (10.7)	4.29*** (1.87-9.84)	40 (9.2)	5.60*** (2.15-14.58)	NS

Note. All *n*s are unweighted values, all percentages are weighted values.

^aThe percentage reported indicates that 14.8% of Northern Plains American Indians who experienced physical abuse as a child reported lifetime suicidal ideation.

^bReference group for all interaction analyses is the Northern Plains tribe.

AOR: Odds ratios adjusted for sociodemographics (age, education, poverty status, marital status). **p*<.05. ***p*<.01. ****p*<.001. *****p*<.00001.

Appendix H. Supplemental comparison analyses of tribal differences on traumatic event correlates of suicide plans.

	Males					Females				
	NP (n=15) n (%)	AOR (95% CI)	SW (n=8) n (%)	AOR (95% CI)	Site X Dx interaction ^b AOR (95% CI)	NP (n=33) n (%)	AOR (95% CI)	SW (n=26) n (%)	AOR (95% CI)	Site X Dx interaction AOR (95% CI)
Physical abuse as a child	5 (28.8) ^a	5.31** (1.66-17.02)	---	---	NA	11 (11.1)	4.73*** (2.03-11.01)	9 (13.8)	7.25*** (2.74-19.19)	NS
Physical attack	---	---	---	---	NA	8 (15.5)	5.98*** (2.27-15.71)	---	---	NA
Sexual assault other than rape	---	---	---	---	NA	14 (24.3)	9.63**** (4.08-22.71)	6 (11.7)	5.52** (1.87-16.27)	NS
Rape	---	---	---	---	NA	14 (12.8)	4.33*** (1.86-10.07)	11 (12.8)	10.32**** (4.22-25.23)	NS
Witnessing a traumatic event	13 (2.8)	4.56* (1.22-17.09)	6 (2.4)	2.68 (0.53-13.54)	NS	25 (6.3)	3.56** (1.36-9.30)	17 (5.2)	2.49 (0.91-6.81)	NS
Life-threatening accident	8 (3.6)	3.43* (1.23-9.60)	5 (5.3)	6.66** (1.66-26.77)	NS	13 (11.6)	4.74*** (2.13-10.54)	---	---	NA
Natural disaster	---	---	---	---	NA	12 (12.3)	4.75*** (2.10-10.71)	7 (10.9)	6.04*** (2.32-15.75)	NS
Combat exposure in war	---	---	---	---	NA	---	---	---	---	NA
Trauma occurred to loved one	7 (3.2)	3.36* (1.14-9.85)	---	---	NA	23 (11.1)	7.69*** (3.53-16.72)	12 (7.9)	4.51** (1.72-11.78)	NS
Any type of trauma	16 (2.6)	---	6 (1.8)	1.25 (0.27-5.82)	---	31 (5.9)	8.86 (2.01-39.15)	23 (5.2)	7.43** (1.71-32.28)	NS

Note. All *ns* are unweighted values, all percentages are weighted values.

^aThe percentage reported indicates that 28.8% of Northern Plains American Indians who experienced physical abuse as a child reported making a suicide plan in their lifetime.

^bReference group for all interaction analyses is the Northern Plains tribe.

AOR: Odds ratios adjusted for sociodemographics (age, education, poverty status, marital status). **p*<.05. ***p*<.01. ****p*<.001. *****p*<.00001.

Appendix I. Supplemental comparison analyses of tribal differences on traumatic event correlates of suicide attempts.

	Males					Females				
	NP (<i>n</i> =48) <i>n</i> (%)	AOR (95% CI)	SW (<i>n</i> =18) <i>n</i> (%)	AOR (95% CI)	Site X Dx interaction ^b AOR (95% CI)	NP (<i>n</i> =91) <i>n</i> (%)	AOR (95% CI)	SW (<i>n</i> =44) <i>n</i> (%)	AOR (95% CI)	Site X Dx interaction AOR (95% CI)
Physical abuse as a child	13 (18.9) ^a	4.55*** (2.12-9.77)	7 (16.4)	9.07*** (2.93-28.04)	NS	24 (23.1)	2.75*** (1.55-4.88)	15 (23.2)	5.77*** (2.70-12.32)	NS
Physical attack	17 (13.9)	3.26*** (1.61-6.59)	7 (8.2)	3.55* (1.32-9.52)	NS	12 (22.8)	2.87** (1.32-6.22)	5 (15.5)	4.01* (1.19-13.49)	NS
Sexual assault other than rape	---	---	---	---	NA	19 (32.6)	5.22**** (2.69-10.12)	8 (16.0)	3.06* (1.25-7.50)	NS
Rape	---	---	---	---	NA	27 (23.6)	3.54**** (2.01-6.25)	17 (19.1)	5.83**** (2.83-12.01)	NS
Witnessing a traumatic event	346 (15.1)	5.18** (1.86-14.44)	15 (5.7)	4.62* (1.31-16.33)	NS	63 (15.1)	3.06*** (1.78-5.25)	31 (9.9)	3.23** (1.54-6.76)	NS
Life-threatening accident	21 (9.9)	1.86 (0.92-3.74)	9 (9.3)	4.35** (1.60-11.82)	NS	21 (16.6)	1.98* (1.09-3.60)	7 (11.2)	2.56* (1.02-6.44)	NS
Natural disaster	15 (10.1)	1.91 (0.89-4.11)	6 (10.0)	3.79* (1.14-12.57)	NS	17 (15.5)	2.42** (1.25-4.69)	7 (11.4)	2.63* (1.12-6.21)	NS
Combat exposure in war	---	---	---	---	NA	---	---	---	---	NA
Trauma occurred to loved one	19 (10.7)	2.43** (1.20-4.91)	12 (7.4)	2.81 (0.85-9.32)	2.23** (1.21-4.09)	38 (16.9)	2.47*** (1.48-4.12)	17 (11.4)	2.81** (1.35-5.87)	1.59* (1.05-2.43)
Any type of trauma	44 (8.8)	5.47* (1.37-21.88)	16 (4.6)	3.78 (0.83-17.24)	NS	71 (12.7)	2.35** (1.26-4.37)	40 (9.4)	9.74*** (2.85-33.33)	4.38* (1.13-17.03)

Note. All *n*s are unweighted values, all percentages are weighted values.

^aThe percentage reported indicates that 18.9% of Northern Plains American Indians who experienced physical abuse as a child reported a lifetime suicide attempt.

^bReference group for all interaction analyses is the Northern Plains tribe.

AOR: Odds ratios adjusted for sociodemographics (age, education, poverty status, marital status). **p*<.05. ***p*<.01. ****p*<.001. *****p*<.00001.

Appendix J. List of variables used as measured by the NCS and AI-SUPERPFP.

	NCS	AI-SUPERPFP
Sociodemographics		
Age	What is the month, day, and year of your birth?	[Note person's date of birth from the tribal rolls.] Are you currently [insert calculated age] years old?
Educational attainment	What is the highest grade of school or year of college you completed? 0-17+	What is the highest grade in school you attended? 00 = none 01-11 = some school 12 = senior year 13 = 1 year of college 14 = 2 years of college 15 = 3 years of college 16 = college graduate 17+ = graduate/professional 31 = 1 year vocational school 32 = 2 years vocational school 33 = 3 years vocational school 34 = 4 years vocational school 88 = other (specify)
Poverty status	Please look at this page and tell me which letter represents your (family's) total income before taxes last year, including salaries, wages, social security, welfare, and any other income? A. NO INCOME B. LESS THAN \$1,000 C. \$1,000-1,999 D. \$2,000-2,999 E. \$3,000-3,999 F. \$4,000-4,999 G. \$5,000-5,999 H. \$6,000-6,999 J. \$7,000-7,999 K. \$8,000-8,999 L. \$9,000-9,999 M. \$10,000-10,999	Tell me which number best represents the total income before taxes of all persons living in your household in the calendar year of 1996. What was the total income for all your family combined that year? By family, I mean, those who share your house or camp. NOTHING, OR LOSS LESS THAN 1,000 \$1,000 - 4,999 \$5,000 - 9,999 \$10,000 - 14,999 \$15,000 - 19,999 \$20,000 - 29,999 \$30,000 - 39,999 \$40,000 - 49,999 \$50,000 - OR MORE DON'T KNOW

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	N. \$11,000-12,499 P. \$12,500-14,999 Q. \$15,000-17,499 R. \$17,500-19,999 S. \$20,000-24,999 T. \$25,000-34,999 U. \$35,000-49,999 V. \$50,000-69,999 W. \$70,000-99,999 X. \$100,000-149,999 Y. \$150,000 AND OVER	
Marital status	Are you currently married, separated, divorced, widowed or never married? Are you currently living with someone in a steady marriage-like relationship?	Are you currently married, separated, divorced, widowed or never married? Are you currently living with someone in a steady marriage-like relationship?
Psychiatric disorders		
Major depressive episode Dysthymic disorder Generalized anxiety disorder Panic disorder Posttraumatic stress disorder Alcohol abuse Alcohol dependence Drug abuse Drug dependence	DSM-III-R mental disorder diagnoses were based on a modified version of the Composite International Diagnostic Interview (the UM-CIDI), which was developed at the University of Michigan for the NCS.	The diagnostic interview used to generate these diagnoses is the modified version of the Composite International Diagnostic Interview (UM-CIDI; Version 1) used in the National Comorbidity Study (NCS). The UM-CIDI was modified in 3 ways: (1) addition of culturally specific phrases around feelings of distress, (2) culturally appropriate queries after standardized CIDI questions, and (3) wording was simplified.
Traumatic events		
Physical abuse as a child	(Aside from any event you have already reported, did) Event #8 (ever happen to you)? [YOU WERE PHYSICALLY ABUSED AS A CHILD]	Were you ever physically abused or hurt by your parent or a caregiver? Were you ever physically abused or hurt by a spouse or

	NCS	AI-SUPERPPF
		a [boyfriend/girlfriend]?
		Were you ever physically abused or hurt by someone else you knew?
		How old were you when this happened? [only if 16 years or younger]
Physical attack	(Aside from any event you have already reported, did) Event #7 (ever happen to you)? [YOU WERE SERIOUSLY PHYSICALLY ATTACKED OR ASSAULTED]	Other than the kinds of situations I just mentioned, were you ever robbed, mugged, or physically attacked? [<i>This would not include sexual attacks.</i>]
Sexual assault other than rape	Aside from Event 5, did Event #6 ever happen to you? [YOU WERE SEXUALLY MOLESTED]	Were you ever touched or made to touch someone else in a sexual way because they forced you in some way, or threatened to harm you if you didn't?
Rape	(Did) Event #5 (ever happen to you)? [YOU WERE RAPED]	Were you ever raped, or did you ever have sex when you didn't want to because someone forced you in some way, or threatened to harm you if you didn't? [If this happened at a time when you were growing up, it could be just because you thought you had to.]
Witnessing a traumatic event	[YOU WITNESSED SOMEONE BEING BADLY INJURED OR KILLED]	Have you ever witnessed a serious accident or disaster where someone else was hurt very badly or killed? Have you ever seen violence between other members of your family? <i>This would include your family when you were growing up, and your family now.</i>
Life-threatening accident	Did Event #2 ever happen to you [YOU WERE INVOLVED IN A LIFE THREATENING ACCIDENT]?	Have you ever witnessed someone else being raped, or badly injured or killed? [<i>Other than the situations you've just described.</i>] Were you ever in a life-threatening accident?
Natural disaster	(How about) Event #3, [YOU WERE INVOLVED IN A FIRE, FLOOD, OR NATURAL	Were you ever in a disaster -- for example, a flood or flash flood, tornado, fire, drought, or explosion?

	NCS	AI-SUPERPPF
	DISASTER]? (Did this ever happen to you?)	
Combat exposure in war	Did Event #1 ever happen to you [YOU HAD DIRECT COMBAT EXPERIENCE IN A WAR]?	Have you ever had direct combat experience in a war?
		Was someone close to you ever in a life-threatening situation other than illness?
Trauma occurred to loved one	Did Event #12 ever happen to you? [YOU SUFFERED A GREAT SHOCK BECAUSE ONE OF THE EVENTS ON THIS LIST HAPPENED TO SOMEONE CLOSE TO YOU]	Was someone close to you ever raped or sexually abused?
		Did a family member or someone close to you ever commit suicide?
Suicidal behaviors		
Suicidal ideation	Now looking at Page 45 in your Yellow Booklet, did Event #13 ever happen to you? [YOU SERIOUSLY THOUGHT ABOUT COMMITTING SUICIDE]	Have you ever seriously thought about committing suicide?
Suicide plans	Did Event #14 ever happen to you? [YOU MADE A PLAN FOR COMMITTING SUICIDE]	Have you ever planned how you would commit suicide?
Suicide attempts	Did Event #15 ever happen to you? [YOU ATTEMPTED SUICIDE]	Have you ever attempted suicide?