A comparison of the prevalence and risk factors of suicidal ideation and suicide attempts in two American Indian and a general population sample

Shay-Lee Bolton, Brenda Elias, Murray W. Enns, Jitender Sareen, Janette Beals, Douglas K. Novins, The Swampy Cree Suicide Prevention Team and The AI-SUPERPFP Team

Transcultural Psychiatry published online 24 September 2013
DOI: 10.1177/1363461513502574

Transcultural Psychiatry 0(0) 1–20 © The Author(s) 2013
Reprints and permissions: sagepub.co.uk/journalsPermissions.nav
DOI: 10.1177/1363461513502574 tps.sagepub.com
SAGE

transcultural psychiatry

Article

A comparison of the prevalence and risk factors of suicidal ideation and suicide attempts in two American Indian and a general population sample

Shay-Lee Bolton
University of Manitoba

Brenda Elias
University of Manitoba

Murray W. Enns
University of Manitoba

Jitender Sareen
University of Manitoba

Janette Beals
University of Colorado Denver

Douglas K. Novins
University of Colorado Denver

The Swampy Cree Suicide Prevention Team[1]

The AI-SUPERPFP Team[2]

Abstract
The current study aimed to examine whether the prevalence and risk factors for suicidal ideation and attempts differ when comparing two American Indian reservation samples to the U.S. general population. Data were from the baseline nationally representative National Comorbidity Survey ($N = 5,877$) and the representative American Indian Service Utilization, Psychiatric Epidemiology, Risk and Protective Factors Project (AI-SUPERPFP; $N = 3,084$). Face-to-face interviews were conducted using the fully

Corresponding author:
Shay-Lee Bolton, PZ430-771 Bannatyne Avenue, Winnipeg, MB R3E 3N4, Canada.
Email: sbolton@hsc.mb.ca.

structured World Health Organization Composite International Diagnostic Interview. American Indians from these Northern Plains and Southwest tribes appeared significantly less likely to have suicidal thoughts in their lifetime when compared with the general population, odds ratio (OR) of 0.49 (99% CI [0.36, 0.66]) and 0.36 (99% CI [0.25, 0.51]), respectively. However, members of the Northern Plains tribe were more likely to have attempted suicide in their lifetime compared with the general population (OR = 1.96, 99% CI [1.45, 2.65]). Suicide attempts without suicidal ideation were more common in the two American Indian samples than in the general population. In contrast, correlates of suicidal behavior appear quite similar when comparing the groups. Increased attention is needed to determine why rates of ideation and attempts may differ in American Indians when compared with the general population.

Keywords
American Indian, comparison, general population, mental disorders, suicide

Recent work using the World Mental Health surveys in 17 countries indicated that risk factors for suicidal behavior are consistent across developed and developing nations, including presence of a mental disorder, younger age, and female sex (Nock, Bromet, et al., 2008; Nock et al., 2009). However, the strongest risk factors differed cross-nationally, with mood disorders presenting the highest risk among high-income countries and impulse-control disorders being most strongly linked in low- and middle-income countries (Nock, Bromet, et al., 2008; Nock et al., 2009). Such findings suggest important sociocultural and ethnic differences in rates of suicidal behaviors.

Of particular interest is the consistently high rate of suicide among diverse indigenous populations, particularly among youth (Kirmayer, Boothroyd, & Hodgins, 1998; LeMaster, Beals, Novins, & Manson, 2004; Malchy, Enns, Young, & Cox, 1997; Sigurdson, Staley, Matas, Hildahl, & Squair, 1994; U.S. Department of Health and Human Services, 2009). With an age-adjusted rate of death by suicide of 17.9 per 100,000 (U.S. Department of Health and Human Services, 2009), nearly twice that of the general U.S. population, the high prevalence of suicide and suicidal behavior in American Indian communities is a major public health concern. Indeed, research indicates that 14% to 30% of American Indian adolescents (15–24 years of age) attempt suicide, and the rate of completed suicide in this group is 3.5 times higher than that of other youth in the U.S. (34.3 and 9.8 per 100,000, respectively; U.S. Department of Health and Human Services, 2009).

Although there has been some work exploring factors associated with suicidal behavior in indigenous groups, to date there have been no systematic evaluations of risk factors in which American Indian and general population-based data could be jointly analyzed. As such, it remains unclear whether those risk factors found to be important in nonindigenous populations are the same in American Indian populations when directly compared. The present study aims to examine whether the

prevalence and correlates of suicidal ideation and suicide attempts differ when directly comparing two American Indian reservation population samples to a U.S. general population sample. To the best of our knowledge, this is the first empirical examination in the world using large population-based samples to examine the correlates of suicidal behavior comparing indigenous to nonindigenous groups.

Materials and methods

Sample

The current study utilizes data collected among enrolled members of two large U.S. tribal groups. The American Indian Service Utilization, Psychiatric Epidemiology, Risk and Protective Factors Project (AI-SUPERPFP) was a population-based examination of prevalence of alcohol, drug, and mental health problems in two well-defined samples of American Indians. This survey was designed to allow for direct comparison with the baseline National Comorbidity Survey (NCS).

AI-SUPERPFP included data from two American Indian reservation populations, two closely related Northern Plains tribes and a Southwest tribe (Beals, Manson, et al., 2005). These communities have different histories of migration, subscribe to difference 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. In the past, a number of American Indian communities have regretted their participation in research efforts, often due to negative publicity (Cochran et al., 2008). Therefore, specific tribal names are not used, nor a detailed cultural history provided, in order to maintain tribal-level confidentiality (Beals, Manson, et al., 2005). Instead, more general cultural descriptors approved by the community oversight committee are used.

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 reservations who were between the ages of 15 and 54 years in 1997 ($N = 3{,}084$). 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 prior to the acquisition of adolescent assent. Face-to-face interviews were computer-assisted and administered by tribal members intensively trained in research and interviewing methods. Stratified random sampling procedures were used, with strata defined by tribe, gender, and age. Sample weights were used to account for differential selection probabilities across all strata and for patterns of nonresponse (Beals, Manson, Mitchell, & Spicer, 2003). Further details

about AI-SUPERPFP may be found at their website (http://www.ucdenver.edu/academics/colleges/PublicHealth/research/centers/CAIANH/NCAIANMHR/ResearchProjects/Pages/AI-SUPERPFP.aspx).

The research design of the AI-SUPERPFP was modeled after the baseline NCS for assessment of DSM-III-R (American Psychiatric Association, 1987) mental disorders based on the Composite International Diagnostic Interview (CIDI), with the goal of enabling the direct comparison of the results of these two studies. The World Health Organization CIDI (Kessler et al., 1994) instrument was subjected to extensive focus group review (Beals et al., 2003), with select modifications made to enhance cultural validity while maintaining comparability to NCS.

NCS sample

The NCS was a congressionally mandated, nationwide survey studying the prevalence and correlates of DSM-III-R mental disorders in the United States (Kessler et al., 1994). The NCS was the first survey to administer a structured psychiatric interview to a nationally representative sample. The survey included 8,098 individuals, based on a stratified multistage area probability sample of the noninstitutionalized civilian U.S. population in the 48 coterminous states. Participants were those aged 15 to 54 years, with data collection taking place between 1990 and 1992. Trained lay interviewers collected the data in face-to-face interviews. The response rate for the survey was 82.6%. Details of the design of the NCS have been reported previously (Kessler et al., 1994). The NCS diagnoses and traumatic events reported here are restricted to those assessed in the AI-SUPERPFP.

Measures

Suicidal behaviors. Suicidal behaviors, which included ideation and attempts, were measured in both datasets in identical ways. Separate questions were asked about the lifetime occurrence of suicidal ideation ("Have you ever seriously thought about committing suicide?") and suicide attempts ("Have you ever attempted suicide?").

Sociodemographic correlates. Sex, 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 or some postsecondary education compared with less than high school), marital status (separated/widowed/divorced or never married [classified as unmarried] compared with married/cohabitating), and poverty status based on household income level, household size, and U.S. federal standards for the specific years when the data were collected (living in poverty compared with not living in poverty) were examined as possible correlates of suicidal behavior.

Psychiatric disorder correlates. Nine lifetime mental disorders were comparable between the two surveys: major depressive episode, dysthymic disorder, generalized

anxiety disorder, panic disorder, posttraumatic stress disorder, alcohol abuse, alcohol dependence, drug abuse, and drug dependence. Due to small cell sizes, 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 (Beals, Manson, et al., 2005). We also included a count variable of the number of disorders present as 0, 1, 2, or 3 or more disorders as a marker of illness complexity.

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 major epidemiological studies. These were designed to include events commonly reported in most populations and to be consistent with traumatic 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 occurring to a loved one, physical attack, sexual assault other than rape, rape, combat exposure, and witnessing a traumatic event. These variables have been used previously (Manson, Beals, Klein, & Croy, 2005) 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. Due to small cell sizes, traumatic events were grouped into two broad traumatic exposure categories: interpersonal traumatic events (physical abuse as a child, physical attack, sexual assault other than rape, rape, combat exposure) and accident or other unexpected events (life-threatening accident, natural disaster, trauma occurred to a loved one, and witnessing a traumatic event). These categories have been used previously (Belik, Stein, Asmundson, & Sareen, 2009; Manson et al., 2005).

Statistical analyses

The two separate datasets were merged and the appropriate statistical weights were employed in all analyses to ensure the representativeness of the data. All analyses were conducted in SUDAAN 10.0.0 (Shah, Barnswell, & Bieler, 1995). Standard errors were calculated using the Taylor series linearization method in the SUDAAN 10.0.0 program based on stratification information from the dataset that is available specifically for this purpose. Our statistical strategy was modeled after previous work using these datasets (Beals, Novins, et al., 2005; Manson et al., 2005).

First, prevalence rates of suicidal ideation and suicide attempts were calculated in the three samples. Bivariate logistic regression analyses investigated differences in these rates between samples. Descriptive cross-tabulations were conducted within each of the three samples to delineate the percent of individuals who endorsed suicidal ideation only, suicide attempt only, or both.

Second, sociodemographic correlates were examined in terms of their association with suicidal behavior. Separate bivariate logistic regression analyses were conducted for each sociodemographic correlate to examine its relationship with either suicidal ideation or suicide attempt within each sample group. To explore possible differences in the relationship between each sociodemographic correlate and suicidal ideation or suicide attempt across the three samples, logistic regression models exploring the interaction of each sociodemographic correlate and sample group were conducted, comparing two of the three samples in each model. Three separate interaction models were conducted for each sociodemographic correlate, exploring the difference between: (a) the Northern Plains tribe and the Southwest tribe, (b) the Northern Plains tribe and the NCS, and (c) the Southwest tribe and the NCS.

Third, the comparable psychiatric disorder aggregate categories were explored in separate analyses to determine whether they were associated with suicidal behavior in the different sample groups using separate multivariate logistic regression analyses. Interaction analyses were conducted to determine whether each psychiatric disorder correlate differed in its relationship to suicidal ideation or suicide attempt when comparing two of the three samples, as noted previously. All analyses exploring psychiatric disorder correlates were adjusted for the sociodemographic factors included above. Lifetime traumatic event categories were examined in an identical fashion.

Due to the substantial number of comparisons being made for these exploratory analyses, an alpha of 0.01 was employed throughout.

Results

Table 1 demonstrates the lifetime prevalence of suicidal behaviors in the Northern Plains tribe, the Southwest tribe, and the NCS. First focusing on tribal differences, the tribes did not differ significantly on prevalence of suicidal ideation; however, both American Indian tribes were less likely to report suicidal ideation than the general population. The Northern Plains tribe was significantly more likely to report suicide attempts when compared to both the Southwest tribe and the general population.

The overlap of suicidal behaviors among the three samples is demonstrated in Figure 1. Among Northern Plains tribe members with any type of suicidal behavior, 22.7% endorsed suicidal ideation only, 37.6% endorsed both suicidal ideation and a suicide attempt, and the remaining 39.8% endorsed a suicide attempt only. Similar trends were noted in the Southwest tribe, although the prevalence rates of suicidal ideation only and suicide attempt only were identical in this sample (32.6%

Table 1. Prevalence of suicidal behaviors in the three samples.

	Suicidal ideation			Suicide attempts		
	Northern Plains ($n = 1,560$) *n* (%)	Southwest ($n = 1,343$) *n* (%)	NCS ($n = 5,872$) *n* (%)	Northern Plains ($n = 1,560$) *n* (%)	Southwest ($n = 1,343$) *n* (%)	NCS ($n = 5,872$) *n* (%)
n (%)	109 (6.8)[a]	62 (5.0)	1,008 (12.9)	140 (8.7)	62 (5.0)	366 (4.6)
OR-1 (99% CI)	0.49 [0.36, 0.66]*	0.36 [0.25, 0.51]*	1.00	1.96 [1.45, 2.65]*	1.08 [0.74, 1.58]	1.00
OR-2 (99% CI)	1.38 [0.89, 2.13]	1.00	–	1.82 [1.20, 2.75]*	1.00	–

Note. All *n*s are unweighted values, all percentages are weighted values.
OR-1 = unadjusted odds ratio, reference group is the NCS sample; OR-2 = unadjusted odds ratio, reference group is the Southwest tribe; NCS = National Comorbidity Survey; CI = confidence interval.
*$p < .01$.
[a]The percentage reported indicates that 6.8% of individuals in the Northern Plains reported suicidal ideation.

of those with any suicidal behavior). In contrast, suicidal ideation only was most commonly endorsed in the NCS (64.5% of those with any suicidal behavior), whereas suicide attempt only was present in merely 2.4% of individuals with any suicidal behavior.

Table 2 explores bivariate sociodemographic correlates of suicidal ideation. Females were more likely to endorse suicidal ideation in both the Southwest tribe and the general population, while no difference was noted between males and females in the Northern Plains. In Northern Plains American Indians, those in the 25–34 years age group were more likely than those aged 45 to 54 years to have suicidal ideation. Similar findings were noted for those aged 25 to 44 years in the Southwest tribe and for 15 - to 24-year-olds in the general population. Logistic regression analyses did not identify any Sample X Sociodemographic interactions, revealing no significant differences in correlates between the tribes or between each tribe and the general population on demographic correlates of suicidal ideation.

Table 3 illustrates bivariate sociodemographic correlates of suicide attempts. In both the Northern Plains tribe and the general population, females were more likely than males to endorse suicide attempts. In terms of age, American Indians aged 25–34 years were over 3 times more likely to make a suicide attempt compared with their older counterparts. No differences were noted in the general population. Higher level of educational attainment was significantly associated with decreased likelihood of suicide attempts in the general population, whereas this association was not present in either American Indian tribe.

Logistic regression analyses revealed significant Site X Sociodemographic interactions between the NCS and the Northern Plains tribe in terms of age, particularly among individuals aged 25–34 years, illustrating higher likelihood of suicide attempts among Northern Plains American Indians compared to the general population. Additionally, a Site X Level of Educational Attainment interaction

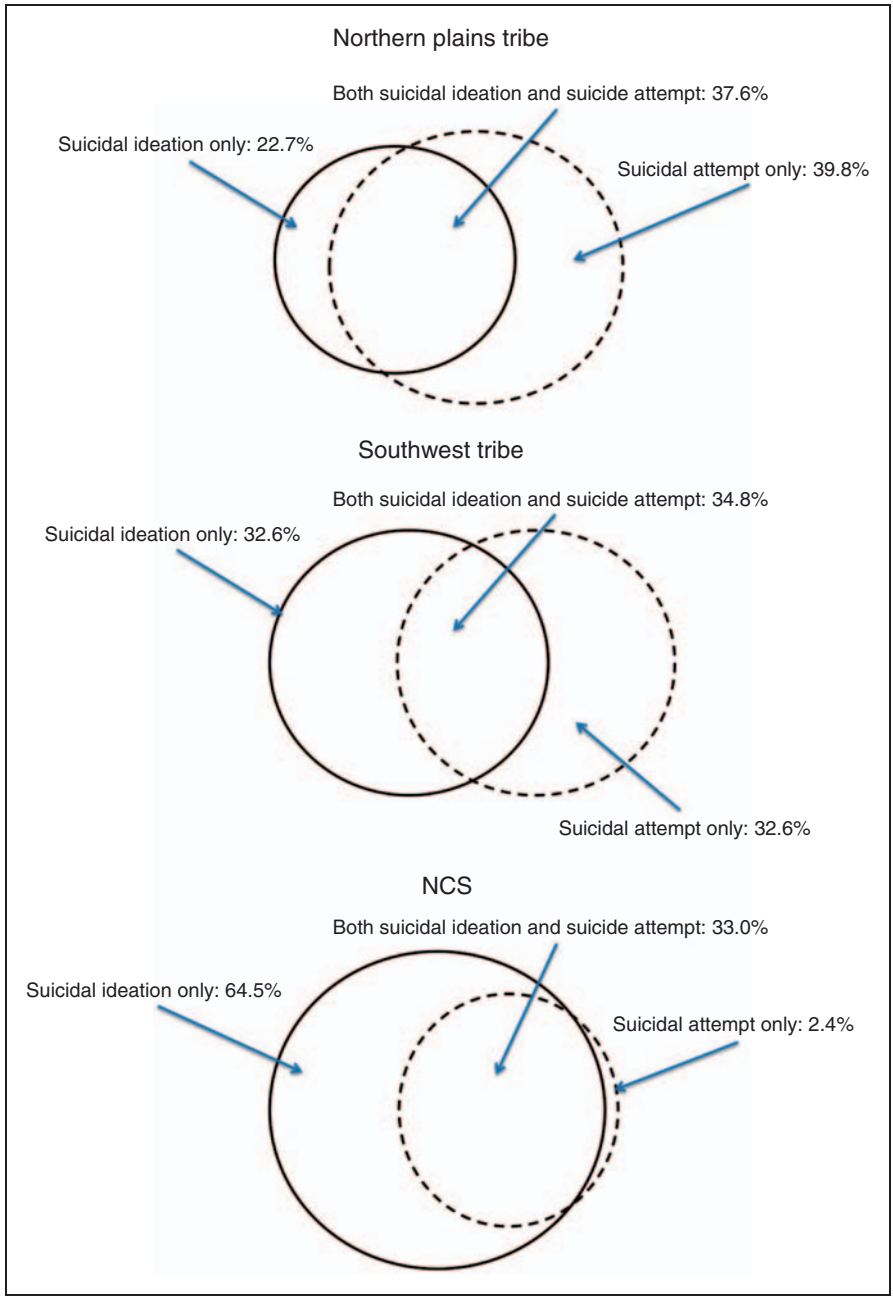

Figure 1. Venn diagram showing overlap of all participants who endorsed lifetime suicidal ideation and/or suicide attempts.

Table 2. Bivariate associations between sociodemographic correlates and suicidal ideation.

	Northern Plains				Southwest				NCS				Interaction test
	No SI *n* (%)	SI *n* (%)	OR	99% CI	No SI *n* (%)	SI *n* (%)	OR	99% CI	No SI *n* (%)	SI *n* (%)	OR	99% CI	
Sex													
Male	706 (94.7)	40 (5.3)[a]	1.00	–	557 (96.9)	16 (3.1)	1.00	–	2,428 (90.1)	392 (9.9)	1.00	–	–
Female	745 (91.8)	69 (8.2)	1.59	[0.90, 2.80]	724 (93.5)	46 (6.5)	2.16*	[1.00, 4.65]	2,436 (84.2)	616 (15.8)	1.71*	[1.33, 2.20]	ns
Age													
15–24	418 (92.6)	36 (7.4)	2.26	[0.89, 5.74]	320 (94.9)	17 (5.1)	3.16	[0.81, 12.37]	1,473 (84.5)	284 (15.5)	1.55*	[1.06, 2.26]	ns
25–34	365 (91.1)	38 (8.9)	2.75*	[1.08,6.99]	292 (93.9)	19 (6.1)	3.86*	[1.00, 14.95]	1,490 (89.1)	295 (10.9)	1.03	[0.70, 1.53]	ns
35–44	332 (93.6)	23 (6.4)	1.94	[0.71, 5.27]	308 (93.7)	21 (6.3)	3.96*	[1.04, 15.04]	1,187 (86.0)	273 (14.0)	1.37	[0.91, 2.06]	ns
45–54	308 (96.6)	12 (3.4)	1.00	–	341 (98.3)	5 (1.7)	1.00	–	709 (89.4)	156 (10.6)	1.00	–	–
Education													
<12 years	630 (93.4)	48 (6.6)	1.00	–	400 (95.1)	19 (4.9)	1.00	–	989 (85.7)	221 (14.3)	1.00	–	–
Completed high school or more	803 (92.9)	61 (7.1)	1.08	[0.63, 1.88]	861 (95.1)	41 (4.9)	1.00	[0.48, 2.10]	3,875 (87.6)	787 (12.4)	0.85	[0.64, 1.12]	ns
Poverty status													
Not living in poverty	510 (93.9)	34 (6.1)	1.00	–	666 (95.8)	27 (4.2)	1.00	–	4,255 (88.3)	803 (11.7)	1.00	–	–
Living in poverty	771 (92.6)	64 (7.4)	1.24	[0.68, 2.27]	530 (93.8)	32 (6.2)	1.51	[0.76, 3.04]	609 (78.1)	205 (21.9)	2.13*	[1.57, 2.88]	ns
Marital status													
Unmarried	703 (93.3)	56 (6.7)	1.00	—	509 (94.7)	27 (5.3)	1.00	—	2,390 (84.8)	585 (15.2)	1.00	—	—
Married/common-law	737 (93.1)	53 (6.9)	1.04	[0.60, 1.79]	770 (95.2)	35 (4.8)	0.90	[0.45, 1.79]	2,474 (88.7)	423 (11.3)	0.71*	[0.56, 0.91]	ns

Note. All *ns* are unweighted values, all percentages are weighted values.
NCS = National Comorbidity Survey; SI = suicidal ideation; OR = unadjusted odds ratio; CI = confidence interval; ns = not significant.
* $p < .01$.
[a]The percentage reported indicates that 5.3% of Northern Plains men reported lifetime suicidal ideation.

Table 3. Bivariate associations between sociodemographic correlates and suicide attempts.

	Northern Plains				Southwest				NCS				Interaction test
	No SA *n* (%)	SA *n* (%)	OR	99% CI	No SA *n* (%)	SA *n* (%)	OR	99% CI	No SA *n* (%)	SA *n* (%)	OR	99% CI	
Sex													
Male	697 (93.4)	49 (6.6)[a]	1.00	–	555 (96.8)	18 (3.2)	1.00	–	2,708 (97.1)	112 (2.9)	1.00	–	–
Female	724 (89.3)	91 (10.7)	1.70*	[1.03, 2.82]	726 (93.7)	44 (6.3)	2.01	[0.96, 4.24]	2,797 (93.7)	254 (6.3)	2.24*	[1.53, 3.28]	ns
Age													
15–24	415 (91.5)	40 (8.5)	2.08	[0.92, 4.70]	324 (96.0)	13 (4.0)	1.84	[0.57, 5.99]	1,650 (93.9)	106 (6.1)	1.60	[0.94, 2.73]	ns
25–34	349 (87.6)	54 (12.4)	3.15*	[1.43, 6.93]	290 (93.2)	21 (6.8)	3.27*	[1.09, 9.82]	1,673 (95.7)	112 (4.3)	1.09	[0.64, 1.88]	NP > NCS*
35–44	327 (92.1)	28 (7.9)	1.91	[0.80, 4.53]	309 (93.8)	20 (6.2)	2.94	[0.97, 8.85]	1,375 (95.8)	85 (4.2)	1.08	[0.60, 1.94]	ns
45–54	304 (95.7)	16 (4.3)	1.00	–	338 (97.8)	8 (2.2)	1.00	–	802 (96.1)	63 (3.9)	1.00	–	–
Education													
<12 years	612 (90.7)	67 (9.3)	1.00	–	402 (95.6)	17 (4.4)	1.00	–	1,100 (92.6)	110 (7.4)	1.00	–	–
Completed high school or more	792 (91.6)	72 (8.4)	0.89	[0.55, 1.45]	857 (94.6)	45 (5.4)	1.24	[0.58, 2.65]	4,405 (96.1)	256 (3.9)	0.51*	[0.35, 0.74]	SW > NCS*
Poverty status													
Not living in poverty	512 (94.3)	32 (5.7)	1.00	–	667 (96.2)	26 (3.8)	1.00	–	4,785 (96.1)	272 (3.9)	1.00	–	–
Living in poverty	740 (88.9)	96 (11.1)	2.06*	[1.15, 3.67]	531 (93.8)	31 (6.2)	1.68	[0.82, 3.42]	720 (89.6)	94 (10.4)	2.85*	[1.88, 4.33]	ns
Marital status													
Unmarried	696 (91.9)	63 (8.1)	1.00	–	512 (95.1)	24 (4.9)	1.00	–	2,763 (94.3)	212 (5.7)	1.00	–	–
Married/common-law	714 (90.6)	77 (9.4)	1.18	[0.72, 1.92]	767 (95.0)	38 (5.0)	1.03	[0.51, 2.07]	2,742 (96.1)	154 (3.9)	0.67*	[0.47, 0.96]	ns

Note. All *n*s are unweighted values, all percentages are weighted values.
NCS = National Comorbidity Survey; SA = suicide attempts; OR = unadjusted odds ratio; CI = confidence interval; ns = not significant.
* $p < .01$.
[a]The percentage reported indicates that 6.6% of Northern Plains men reported a lifetime suicide attempt.

demonstrated significantly higher likelihood of suicide attempts among Southwest American Indians who had at minimum completed high school in comparison to individuals with an equivalent level of education in the general population.

In an effort to explore whether the significant interaction noted with age could be related to the structure of suicidal behavior shown in Figure 1, the overlap of suicidal behaviors was reanalyzed, stratified by age group. These analyses (available on request) showed patterns of suicidal behavior consistent with those presented in Figure 1 across the four age groupings.

Psychiatric disorder and traumatic event correlates of suicidal ideation and suicide attempts are shown in Tables 4 and 5, respectively. Although all psychiatric disorder and traumatic event groupings were significantly associated with suicidal behavior in the three sites, few differences in the strength or directionality of that association were noted between them. In fact, no differences were noted when comparing the sites on psychiatric disorders as correlates of suicidal ideation. However, accident and other unexpected trauma exhibited a significantly stronger association in Northern Plains American Indians than in the general population. When looking at correlates of suicide attempts, anxiety disorders demonstrated significantly weaker associations in the Northern Plains tribe than in the NCS.

Discussion

To the best of our knowledge, the present study is the first to systematically examine prevalence and correlates of suicidal behavior comparing community-based indigenous reservation populations 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.

Importantly, American Indians in the Northern Plains tribe appeared more likely to make a suicide attempt but less likely to have suicidal thoughts in their lifetime as compared to the U.S. general population. Additionally, our findings illustrated a higher prevalence of suicide attempts only than ideation only in the Northern Plains tribe and equivalent prevalence rates in the Southwest tribe. This finding stands in contrast to the typical theorized suicide risk continuum model proposed in general population samples, wherein ideation is more common and is expected to be an important precursor of attempts (Borges et al., 2006; Mann, 2002, 2003; Nock, Borges, et al., 2008). Rather than thinking about suicide for extended periods, some American Indians who attempt suicide may act impulsively rather than contemplating the act in advance. This would be in line with our findings and those of others (LeMaster et al., 2004) demonstrating a high rate of suicide attempt only among American Indians in these tribal groups. As well, previous work has noted the key role of impulse-control disorders on development of suicidal behavior in low- and middle-income countries, but not in high-income countries (Nock, Bromet, et al., 2008; Nock et al., 2009),

Table 4. Multivariate associations between lifetime mental disorders and lifetime traumatic events with suicidal ideation.

	Northern Plains				Southwest				NCS				Interaction test
	No SI *n* (%)	SI *n* (%)	OR	99% CI	No SI *n* (%)	SI *n* (%)	OR	99% CI	No SI *n* (%)	SI *n* (%)	OR	99% CI	
Mental disorders													
Depressive disorders	115 (7.7)	41 (39.4)[a]	9.11*	[4.71, 17.59]	166 (12.7)	32 (51.8)	5.78*	[2.78, 12.02]	961 (13.4)	617 (57.2)	8.56*	[6.49, 11.29]	ns
Anxiety disorders	236 (16.4)	42 (37.0)	3.17*	[1.71, 5.87]	245 (19.4)	32 (52.6)	4.48*	[2.19, 9.18]	638 (9.6)	407 (36.7)	5.28*	[3.98, 7.00]	ns
Substance use disorders	518 (36.9)	77 (73.1)	5.40*	[2.79, 10.47]	361 (28.9)	30 (50.8)	3.54*	[1.70, 7.40]	1,703 (23.8)	511 (45.8)	3.35*	[2.59, 4.33]	ns
Any disorder	645 (45.5)	90 (83.9)	7.50*	[3.30, 17.02]	556 (44.1)	52 (85.1)	7.27*	[2.88, 18.36]	2,483 (35.6)	851 (79.3)	7.47*	[5.27, 10.59]	ns
None	806 (55.0)	19 (16.1)	1.00	–	725 (56.2)	10 (14.9)	1.00	–	2,381 (64.4)	157 (20.7)	1.00	–	–
One	372 (25.6)	26 (25.3)	4.26*	[1.65, 11.00]	328 (25.9)	14 (22.3)	3.35*	[1.10, 10.23]	1,371 (20.4)	232 (22.6)	3.77*	[2.51, 5.65]	ns
Two	180 (13.1)	30 (26.7)	7.60*	[2.92, 19.77]	137 (10.7)	20 (33.7)	12.23*	[4.19, 35.68]	747 (10.4)	269 (26.8)	8.72*	[5.83, 13.04]	ns
Three or more	93 (6.2)	34 (31.9)	21.77*	[8.51, 55.67]	91 (7.2)	10 (29.2)	14.91*	[4.90, 45.37]	365 (4.9)	350 (29.9)	20.10*	[13.31, 30.36]	ns
Traumatic events													
Interpersonal trauma	322 (22.1)	52 (47.8)	3.35*	[1.85, 6.06]	251 (20.3)	36(60.6)	6.48*	[3.07, 13.71]	888 (14.9)	449 (41.1)	3.89*	[2.99, 5.07]	ns
Accident/other nexpected trauma	812 (57.1)	89 (83.6)	4.38*	[2.03, 9.48]	650 (51.7)	47 (76.1)	3.01*	[1.32, 6.87]	1,989 (38.4)	547 (51.4)	1.90*	[1.47, 2.46]	NP > NCS*

Note. All *ns* are unweighted values, all percentages are weighted values.
NCS = National Comorbidity Survey; SI = suicidal ideation; CI = confidence interval; OR = odds ratios adjusted for sociodemographics (sex, age, education, poverty status, marital status); ns = not significant.
* $p < .01$.
[a]The percentage reported indicates that 39.4% of Northern Plains American Indians with lifetime suicidal ideation also reported a lifetime depressive disorder.

Table 5. Multivariate associations between lifetime mental disorders and lifetime traumatic events with suicide attempts.

	Northwest Plains				Southwest				NCS				Interaction test
	No SA *n* (%)	SA *n* (%)	OR	99% CI	No SA *n* (%)	SA *n* (%)	OR	99% CI	No SA *n* (%)	SA *n* (%)	OR	99% CI	
Mental disorders													
Depressive disorders	112 (7.8)	44 (30.3)[a]	5.15*	[2.78, 9.56]	170 (13.2)	28 (44.0)	4.63*	[2.19, 9.82]	1,328 (16.8)	250 (63.4)	8.24*	[5.43, 12.50]	ns
Anxiety disorders	221 (15.7)	57 (39.5)	3.86*	[2.20, 6.78]	249 (19.8)	28 (45.0)	3.25*	[1.57, 6.75]	847 (11.3)	198 (50.7)	7.63*	[5.15, 11.30]	NP < NCS*
Substance use disorders	502 (36.6)	93 (67.7)	4.03*	[2.26, 7.18]	355 (28.5)	36 (58.0)	5.11*	[2.36, 11.08]	2,009 (25.3)	205 (54.1)	4.63*	[3.14, 6.85]	ns
Any disorder	626 (45.2)	109 (77.6)	4.60*	[2.43, 8.70]	556 (44.2)	52 (83.8)	7.18*	[2.80, 18.40]	3,005 (39.0)	329 (86.1)	10.67*	[5.69, 20.03]	ns
None	795 (55.3)	31 (22.4)	1.00	–	725 (56.1)	10 (16.2)	1.00	–	2,500 (61.0)	37 (13.9)	1.00	–	–
One	361 (25.4)	37 (28.0)	3.06*	[1.44, 6.50]	324 (25.5)	18 (29.6)	4.58*	[1.57, 13.36]	1,518 (20.7)	85 (21.2)	5.12*	[2.56, 10.27]	ns
Two	182 (13.6)	28 (19.3)	3.46*	[1.51, 7.95]	140 (11.0)	17 (28.2)	9.47*	[3.11, 28.81]	947 (12.2)	69 (19.0)	7.49*	[3.62, 15.52]	ns
Three or more	83 (5.8)	44 (30.4)	14.74*	[6.75, 32.17]	92 (7.4)	17 (26.0)	13.26*	[4.25, 41.37]	540 (6.2)	175 (46.0)	34.22*	[17.29, 67.73]	ns
Traumatic events													
Interpersonal trauma	311 (21.8)	64 (46.1)	3.42*	[1.98, 5.88]	249 (20.2)	38 (60.9)	6.15*	[2.94, 12.85]	1,125 (16.5)	212 (54.8)	5.69*	[3.91, 8.29]	ns
Accident/other unexpected trauma	795 (57.0)	106 (77.4)	3.39*	[1.73, 6.63]	647 (51.4)	50 (81.0)	4.28*	[1.73, 10.60]	2,317 (39.2)	219 (58.0)	2.57*	[1.75, 3.78]	ns

Note. All *ns* are unweighted values, all percentages are weighted values.
NCS = National Comorbidity Survey; SA = suicide attempts; CI = confidence interval; OR = odds ratios adjusted for sociodemographics (sex, age, education, poverty status, marital status); ns = not significant.
* $p < .01$.
[a]The percentage reported indicates that 30.3% of Northern Plains American Indians with a lifetime suicide attempt also reported a lifetime depressive disorder.

suggesting that American Indian reservation communities may appear more similar to a developing nation in this way.

When compared with those aged 45 to 54 years, younger American Indians in these two tribes 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 (U.S. Department of Health and Human Services, 2009). The age at which suicidal behavior occurs among American Indians could be a key factor in differentiating their suicidal patterns of behavior from those in the general population possibly due to high levels of impulsivity in youth. Impulsivity has been specifically linked to younger age of suicide attempt and suicide death, providing evidence that impulsivity plays less of a role on suicide and suicidal behavior with increasing age (Brent et al., 2003; McGirr et al., 2008). However, additional analyses stratified by age group showed consistency in rates of suicide attempts without suicidal ideation across all age groups, suggesting that impulsivity may play a role in suicidal behavior throughout the life span in American Indian communities. It is important to note that evidence for the relationship between impulsivity and suicidal behavior in American Indians could be confounded by the fact that American Indians have been noted to be unlikely to disclose their suicidal intentions (LeMaster et al., 2004). American Indians with fleeting suicidal thoughts may be less likely to report such thoughts to interviewers, whereas individuals in the general population may have less reluctance to report them. Alternatively, it is possible that the respondent does not recall the suicidal ideation. Our suggestion that many of these attempts may occur outside of the subjective recognition of suicidal thoughts, lending support to the role of impulsivity, must be interpreted with caution. Further research is required to investigate the role of impulsivity and the suicide risk continuum in this population.

The current findings indicate similar correlates of suicidal behavior despite differences in prevalence of such behaviors. Our results are in line with previous work demonstrating that mental disorders were similarly predictive of suicide attempts across both developed and developing countries (Nock et al., 2009). The present research is, however, 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 generalize to individuals who complete suicide. Second, the cross-sectional and retrospective nature of the datasets does not allow for causal inference on the basis of these results. Third, measures of suicidal ideation, suicide attempts, mental disorder diagnoses, and traumatic experiences are all based on lifetime measurements. Therefore, one must interpret the associations with caution, noting that the order of onset of these events may not be such that each specific correlate occurred prior to suicidal behavior. As well, correlates may change over time (e.g., poverty status) and may not have been accurate at the time of the suicidal behavior.

Fourth, 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 some diagnoses (Beals et al., 2003; Manson, 2000). On a related note, it is possible that the measures used in the AI-SUPERPFP to determine information about internalizing disorders specifically, including suicidal ideation, may still underestimate the actual prevalence of these conditions in American Indians. Beals, Manson, et al. (2005) noted that the prevalence of major depression in the AI-SUPERPFP, as measured according to DSM-IV criteria, was lower than the expected rate in this population. Future work would ideally employ a culturally adapted tool to capture suicidal ideation and attempts in this population.

Fifth, only a limited selection of all possible correlates of suicidal ideation and attempts were included in this investigation. Future investigations in this area should include a broader range of factors that are likely to impact indigenous suicide more specifically, including measures of community-level variables (i.e., level of cultural continuity), social support, impulsivity, and feelings of hopelessness, in an effort to elucidate other factors that may impact this relationship.

Sixth, the rate of suicidal ideation and suicide attempt is somewhat lower in the specific American Indian communities that were surveyed in the AI-SUPERPFP, compared with rates in other American Indian communities. Previous work has estimated lifetime rates of 14% to 41% for suicidal ideation (Dinges & Duong-Tran, 1993; Manson, Beals, Dick, & Duclos, 1989) and 13% to 23% for suicide attempt (Blum, Harmon, Harris, Bergeisen, & Resnick, 1992; Manson et al., 1989). However, it is important to mention that many of these studies have focused exclusively on adolescent and other youth populations, who tend to report higher levels of suicidality than American Indian adults. One must keep in mind that the findings noted here may not generalize to communities or populations with higher rates of suicidal behavior.

Finally, while the datasets used in this study are more than a decade old, the AI-SUPERPFP is the only dataset regarding American Indians that was explicitly designed to allow direct comparison with a U.S. nationally representative sample—the specific goal of this study. Indeed, there is no other dataset in the world that allows for the direct comparison of representative samples of Aboriginal people with the general population. These datasets, although somewhat dated, still represent the best and only means to examine a number of important questions about American Indians residing in reservation communities and how they may be different or similar to other groups in the U.S.

Despite these limitations, our work has important implications for preventive interventions that target indigenous populations, particularly in American Indian tribal communities. Based on the high rate of death by suicide in indigenous populations (Malchy et al., 1997; Sigurdson et al., 1994; U.S. Department of Health and Human Services, 2009), it is clear that improvement is needed in our ability to

predict and prevent suicide and suicidal behaviors. Prevention strategies need to take into account the high rate of suicide attempts in this population, focusing special attention on the fact that many of these attempts may occur without subjective recognition of suicidal thoughts. For example, it is not sufficient to target interventions for American Indians who have presented with suicidal thoughts. Such a program would not address the needs of a large portion of those at risk for suicide, since over one third of these tribal populations report a suicide attempt as their initial suicidal behavior. Programs that include a broad range of preventive strategies earlier in the suicidal process may be key in reducing suicide rates in these vulnerable populations. One such program, which included a range of public health-oriented suicide prevention activities such as outreach, gatekeeper training, screening, life-skills development, and other educational programs, demonstrated a reduction in suicidal gestures and attempts in one American Indian reservation community over a 15-year period (May, Serna, Hurt, & DeBruyn, 2005). Additional research is needed to confirm the generalizability of these findings to other indigenous populations.

Funding

Preparation of this manuscript was supported by (a) a CIHR Canada Graduate Scholarship – Master's award (Ms. Bolton), (b) a Manitoba Health Research Council Graduate Studentship (Ms. Bolton), and (c) a Western Regional Training Centre Studentship funded by Canadian Health Services Research Foundation, Alberta Heritage Foundation for Medical Research, and Canadian Institutes of Health Research (Ms. Bolton). The Swampy Cree Suicide Prevention Team is funded by an operating grant (#166720) from the Canadian Institutes of Health Research (Dr. Sareen and Dr. Elias, PIs). AI-SUPERPFP was supported by the following NIH grants: R01 MH48174 (S. M. Manson and J. Beals, PIs), P01 MH42473 (S. M. Manson, PI), and R01 MH073965 (J. Beals, PI). The authors have no conflicts of interest to report.

Acknowledgements

AI-SUPERPFP (American Indian Service Utilization, Psychiatric Epidemiology, Risk and Protective Factors Project) would not have been possible without the significant contributions of many people. The following interviewers, computer/data management and administrative staff supplied energy and enthusiasm for an often difficult job: Anna E. Barón, Antonita Begay, Amelia T. Begay, Cathy A. E. Bell, Phyllis Brewer, Nelson Chee, Mary Cook, Helen J. Curley, Mary C. Davenport, Rhonda Wiegman Dick, Marvine D. Douville, Pearl Dull Knife, Geneva Emhoolah, Fay Flame, Roslyn Green, Billie K. Greene, Jack Herman, Tamara Holmes, Shelly Hubing, Cameron R. Joe, Louise F. Joe, Cheryl L. Martin, Jeff Miller, Robert H. Moran Jr., Natalie K. Murphy, Melissa Nixon, Ralph L. Roanhorse, Margo Schwab, Jennifer Settlemire, Donna M. Shangreaux, Matilda J. Shorty, Selena S. S. Simmons, Wileen Smith, Tina Standing Soldier, Jennifer Truel, Lori Trullinger, Arnold Tsinajinnie, Jennifer M. Warren, Intriga Wounded Head, Theresa (Dawn) Wright, Jenny J. Yazzie, and Sheila A. Young. We would also like to acknowledge the contributions of the Methods Advisory Group: Margarita Alegria, Evelyn J. Bromet, Dedra Buchwald, Peter Guarnaccia, Steven G. Heeringa, Ronald Kessler, R. Jay Turner, and

William A. Vega. Finally, we thank the tribal members who so generously answered all the questions asked of them.

Notes

1. The Swampy Cree Suicide Prevention Team includes Jitender Sareen, Brenda Elias, Shay-Lee Bolton, Murray W. Enns, Garry Munro, Laurence Y. Katz, Brian J. Cox, John O'Neil, Catherine Cook, Natalie Mota, and Corinne Isaak.
2. The AI-SUPERPFP Team includes Janette Beals, Douglas Novins, Cecelia K. Big Crow, Dedra Buchwald, Buck Chambers, Michelle L. Christensen, Denise A. Dillard, Karen DuBray, Paula A. Espinoza, Candace M. Fleming, Ann Wilson Frederick, Joseph Gone, Diana Gurley, Lori L. Jervis, Shirlene M. Jim, Carol E. Kaufman, Ellen M. Keane, Suzell A. Klein, Denise Lee, Spero Manson, Monica C. McNulty, Denise L. Middlebrook, Laurie A. Moore, Tilda D. Nez, Ilena M. Norton, Theresa O'Nell, Heather D. Orton, Carlette J. Randall, Angela Sam, James H. Shore, Sylvia G. Simpson, and Lorette L. Yazzie.

References

American Psychiatric Association. (1987). *Diagnostic and statistical manual of mental disorders* (3rd ed., revised.). Washington, DC: Author.

Beals, J., Manson, S. M., Mitchell, C. M., & Spicer, P. (2003). Cultural specificity and comparison in psychiatric epidemiology: Walking the tightrope in American Indian research. *Culture, Medicine and Psychiatry*, *27*(3), 259–289.

Beals, J., Manson, S. M., Whitesell, N. R., Spicer, P., Novins, D. K., & Mitchell, C. M. (2005). Prevalence of DSM-IV disorders and attendant help-seeking in two American Indian reservation populations. *Archives of General Psychiatry*, *62*(1), 99–108.

Beals, J., Novins, D. K., Whitesell, N. R., Spicer, P., Mitchell, C. M., & Manson, S. M. (2005). Prevalence of mental disorders and utilization of mental health services in two American Indian reservation populations: Mental health disparities in a national context. *American Journal of Psychiatry*, *162*, 1723–1732.

Belik, S. L., Stein, M. B., Asmundson, G. J., & Sareen, J. (2009). Relation between traumatic events and suicide attempts in Canadian military personnel. *Canadian Journal of Psychiatry*, *54*(2), 93–104.

Blum, R. W., Harmon, B., Harris, L., Bergeisen, L., & Resnick, M. D. (1992). American Indian-Alaska Native youth health. *Journal of the American Medical Association*, *267*, 1637–3644.

Borges, G., Angst, J., Nock, M. K., Ruscio, A. M., Walters, E. E., & Kessler, R. C. (2006). A risk index for 12-month suicide attempts in the National Comorbidity Survey Replication (NCS-R). *Psychological Medicine*, *36*(12), 1747–1757.

Brent, D. A., Oquendo, M., Birmaher, B., Greenhill, L., Kolko, D., Stanley, B., & Mann, J. J. (2003). Peripubertal suicide attempts in offspring of suicide attempters with siblings concordant for suicidal behavior. *American Journal of Psychiatry*, *160*(8), 1486–1493.

Cochran, P. A. L., Marshall, C. A., Garcia-Downing, C., Kendall, E., Cook, D., McCubbin, L., & Gover, R. M. (2008). Indigenous ways of knowing: Implications for participatory research and community. *American Journal of Public Health*, *98*, 8–13.

Dinges, N. G., & Duong-Tran, Q. (1993). Stressful life events and co-occurring depression, substance abuse and suicidality among American Indian and Alaska Native adolescents. *Culture, Medicine, and Psychiatry*, *16*, 487–502.

Kessler, R. C., McGonagle, K. A., Zhao, S., Nelson, C. B., Hughes, M., Eshleman, S., & Kendler, K. S. (1994). Lifetime and 12-month prevalence of psychiatric disorders in the United States: Results from the National Comorbidity Survey. *Archives of General Psychiatry*, *51*, 8–19.

Kirmayer, L. J., Boothroyd, L. J., & Hodgins, S. (1998). Attempted suicide among Inuit youth: Psychosocial correlates and implications for prevention. *Canadian Journal of Psychiatry*, *43*(8), 816–822.

LeMaster, P. L., Beals, J., Novins, D. K., & Manson, S. M. (2004). The prevalence of suicidal behaviors among Northern Plains American Indians. *Suicide and Life Threatening Behavior*, *34*(3), 242–254.

Malchy, B., Enns, M. W., Young, T. K., & Cox, B. J. (1997). Suicide among Manitoba's Aboriginal people, 1988 to 1994. *Canadian Medical Association Journal*, *156*(8), 1133–1138.

Mann, J. J. (2002). A current perspective of suicide and attempted suicide. *Annals of Internal Medicine*, *136*, 302–311.

Mann, J. J. (2003). Neurobiology of suicidal behaviour. *Nature Reviews Neuroscience*, *4*, 819–828.

Manson, S. M. (2000). Mental health services for American Indians and Alaska Natives: Need, use, and barriers to effective care. *Canadian Journal of Psychiatry*, *45*, 617–626.

Manson, S. M., Beals, J., Dick, R. W., & Duclos, C. (1989). Risk factors for suicide among Indian adolescents at a boarding school. *Public Health Reports*, *104*, 609–614.

Manson, S. M., Beals, J., Klein, S. A., & Croy, C. D. (2005). Social epidemiology of trauma among two American Indian reservation populations. *American Journal of Public Health*, *95*(5), 851–859.

May, P. A., Serna, P., Hurt, L., & DeBruyn, L. M. (2005). Outcome evaluation of a public health approach to suicide prevention in an American Indian tribal nation. *American Journal of Public Health*, *95*, 1238–1244.

McGirr, A., Renaud, J., Bureau, A., Seguin, M., Lesage, A., & Turecki, G. (2008). Impulsive–aggressive behaviours and completed suicide across the life cycle: A predisposition for younger age of suicide. *Psychological Medicine*, *38*(3), 407–417.

Nock, M. K., Borges, G., Bromet, E. J., Cha, C. B., Kessler, R. C., & Lee, S. (2008). Suicide and suicidal behavior. *Epidemiological Review*, *30*, 133–154.

Nock, M. K., Bromet, E. J., Alonso, J., Angermeyer, M., Beautrais, A., Bruffaerts, R., & Williams, D. (2008). Cross–national prevalence and risk factors for suicidal ideation, plans and attempts. *British Journal of Psychiatry*, *192*, 98–105.

Nock, M. K., Hwang, I., Sampson, N., Kessler, R. C., Angermeyer, M., Beautrais, A., & Williams, D. R. (2009). Cross–national analysis of the associations among mental disorders and suicidal behavior: Findings from the WHO World Mental Health Surveys. *PLoS Medicine*, *6*(8), e1000123. Retrieved from http://www.plosmedicine.org/article/info%3Adoi%2F10.1371%2Fjournal.pmed.1000123

Shah, B. V., Barnswell, B. G., & Bieler, G. S. (1995). *SUDAAN user's manual: Software for analysis of correlated data*. Research Triangle Park, NC: Research Triangle Institute.

Sigurdson, E., Staley, D., Matas, M., Hildahl, K., & Squair, K. (1994). A five year review of youth suicide in Manitoba. *Canadian Journal of Psychiatry*, *39*(8), 397–403.

U.S. Department of Health and Human Services. (2009). *Indian health service. Trends in Indian health* 2002–2003 ed.). Washington, DC: Government Printing Office.

Shay-Lee Bolton, MSc, is a PhD candidate in the Departments of Community Health Sciences and Psychiatry at the University of Manitoba. Her research interests lie in the areas of mental health, psychiatric epidemiology, suicidal behaviors, traumatic life events, at-risk populations, military mental health, and Aboriginal populations. Address: PZ430-771 Bannatyne Avenue, Winnipeg, Manitoba R3E 3N4, Canada.

Brenda Elias, PhD, is CIHR New Investigator, Co-Director of the Manitoba First Nations Centre for Aboriginal Health Research and an assistant professor in the Department of Community Health Sciences in the Faculty of Medicine at the University of Manitoba. Her research interests include (a) developing comprehensive and theoretically informed approaches to health administrative data and applying mixed methods to understand the health of indigenous populations; (b) developing research and knowledge translation networks and partnerships to bridge individuals, families, and communities across multijurisdictional health care systems; and (c) bridging population–public health, health services, and clinical-community intervention research, as well as linking molecules to communities to address health inequalities.

Murray W. Enns, MD, FRCPC, is Professor and Head of the Department of Psychiatry and Professor of Community Health Sciences at the University of Manitoba. He is also the Medical Director of the Adult Mental Health Program of the Winnipeg Regional Health Authority. His clinical and research interests are in the area of mood disorders, suicide, and personality.

Janette Beals, PhD, is the Director of Research at the Centers for American Indian and Alaska Native Health (CAIANH) and a professor at the Colorado School of Public Health, University of Colorado Denver. A social psychologist by training, she directed the American Indian Service Utilization, Psychiatric Epidemiology, Risk and Protective Factors Projects. With over 90 publications, she has written extensively about topics including methodological issues, measure development, epidemiological descriptions of American Indian mental health/substance use, and descriptions of service use patterns in American Indian communities.

Douglas K. Novins, MD, is Professor of Psychiatry and Public Health at the Centers for American Indian and Alaska Native Health at the University of Colorado's Anschutz Medical Campus. A child, adolescent, and adult psychiatrist, Dr. Novins conducts research that is critical for improving the mental health of American Indian and Alaska Native children, adolescents, and adults. These include ongoing and completed studies in the areas of psychiatric epidemiology, developmental psychopathology, and mental health services research.

Jitender Sareen, MD, FRCPC, is a professor in the Departments of Psychiatry, Psychology and Community Health Sciences at the University of Manitoba. He currently serves as the Director of Research and Anxiety Services in the Department of Psychiatry at the Health Sciences Centre in Winnipeg, Manitoba. He is also a consulting psychiatrist for the Veterans Affairs Canada Operational Stress Injury Clinic at Deer Lodge Hospital in Winnipeg. His clinical and research specialties include anxiety disorders, suicidal behaviors, military mental health, and psychiatric epidemiology.