

# Suicide Ideation and Attempts among First Nations Peoples Living On-Reserve in Canada: The Intergenerational and Cumulative Effects of Indian Residential Schools

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**Idéation et tentatives de suicide chez les peuples des Première nations habitant dans des réserves au Canada: les effets intergénérationnels et cumulatifs des pensionnats indiens**

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## Abstract

**Objective:** Suicide rates among Indigenous peoples in Canada are at least twice that of their non-Indigenous counterparts. Although contemporary stressors contribute to this increased risk, historical experiences such as the Indian Residential School (IRS) system may also have continuing links with the risk for suicidal thoughts and behaviors. The current investigation examined the intergenerational and cumulative links between familial IRS attendance in relation to lifetime suicide ideation and attempts among First Nations adults living on-reserve.

**Method:** Data from the 2008-2010 First Nations Regional Health Survey were analyzed, and participants comprised a representative sample of First Nations adults older than 18 years (weighted  $N = 127,338$ ; IRS attendees were excluded). Of those who knew their familial IRS history, 38.0% had no history of attendance, 19.3% had a grandparent who attended, 16.2% had a parent who attended, and 26.5% had a parent and grandparent who attended.

**Results:** Exposure of one previous familial generation to the IRS experience was associated with increased risk for lifetime suicide ideation (odds ratio [OR], 1.46; 95% confidence interval [CI], 1.16 to 1.84;  $P = 0.001$ ) and attempts (OR, 1.44; 95% CI, 1.07 to 1.94;  $P < 0.016$ ) compared with those with no IRS history. Having 2 generations of IRS familial history was associated with greater odds of reporting a suicide attempt compared with having one generation (OR, 1.35; 95% CI, 1.05 to 1.75;  $P = 0.022$ ), which was reduced when current levels of distress and ideation were accounted for.

**Conclusion:** Findings support the existence of linkages between intergenerational exposure to IRS and risk for suicidal ideation and attempts and for a potential cumulative risk in relation to suicide attempts across generations.

## Abrégé

**Objectif :** Les taux de suicide chez les peuples autochtones du Canada sont au moins le double de ceux de leurs homologues non autochtones. Bien que les stressors contemporains contribuent à ce risque accru, les expériences historiques comme le système des pensionnats indiens (PI) peuvent aussi avoir des liens continus avec le risque d'idées et de comportements suicidaires. La présente recherche a examiné les liens intergénérationnels et cumulatifs entre la fréquentation familiale des PI

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relativement à l'idéation et aux tentatives de suicide de durée de vie chez les adultes des Premières nations habitant dans des réserves.

**Méthode :** Les données de l'Enquête régionale sur la santé des Premières nations 2008-2010 ont été analysées, et les participants constituaient un échantillon représentatif des adultes de plus de 18 ans des Premières nations (N pondéré = 127 338) (les pensionnaires des PI étaient exclus). De ceux qui connaissaient leurs antécédents familiaux à l'égard des PI, 38,0% n'avaient pas d'antécédents de fréquentation des PI, 19,3% avaient un grand-parent qui les avait fréquentés, 16,2% avaient un parent qui les avait fréquentés, et 26,5% avaient un parent et un grand-parent qui les avaient fréquentés.

**Résultats :** L'exposition d'une génération familiale précédente à l'expérience des PI était associée à un risque accru d'idéation suicidaire de durée de vie [RC = 1,46; IC à 95% 1,16 à 1,84;  $p = 0,001$ ] et de tentatives de suicide [RC = 1,44; IC à 95% 1,07 à 1,94;  $p < 0,016$ ] comparativement à ceux qui n'ont pas d'antécédents de PI. Avoir deux générations d'antécédents familiaux de PI était associé à de plus fortes probabilités de déclarer une tentative de suicide comparativement à n'avoir qu'une génération [RC = 1,35; IC à 95% 1,05 à 1,75;  $p = 0,022$ ], ce qui était réduit quand les niveaux actuels de détresse et d'idéation étaient pris en compte.

**Conclusion :** Les résultats soutiennent l'existence de liens entre l'exposition intergénérationnelle aux PI et le risque d'idéation et de tentatives de suicide, et d'un risque cumulatif potentiel relativement aux tentatives de suicide dans toutes les générations.

### Keywords

First Nations, Indian Residential School, historical trauma, suicide

Although significant diversity exists across different Indigenous peoples and communities in Canada, substantial inequities related to well-being are faced by many First Nations communities.<sup>1,2</sup> Across all age groups, completed suicide among Indigenous peoples in Canada is double that of the general population.<sup>3</sup> The varied health and social inequities, including high rates of suicide and mental health concerns, have been attributed to the accumulation of negative effects associated with the historical and contemporary collective stressors faced by Indigenous peoples over generations.<sup>4-10</sup> To develop culturally appropriate programming aimed at reducing First Nations suicide, it is necessary to better understand the linkages between the root causes and contemporary mediators of the high levels of suicidal ideation and attempts in this population.<sup>7,10</sup>

### *Suicide Ideation and Attempts in First Nations Peoples*

While the general population in Canada has experienced decreasing suicides over the past 2 decades, rates of suicide in some Indigenous communities have risen.<sup>2,10</sup> Suicidal behavior not only encompasses completed suicide but also extends from ideas and thoughts about suicide that are never acted on, to suicide attempts of varying degrees, to fatal suicide.<sup>11</sup> Suicidal ideation is a significant predictor of suicide attempts, and attempts are a significant predictor of completed suicide; both are important indicators of extreme psychological distress.<sup>12</sup> In a national representative sample of First Nations adults living on-reserve in 2008 to 2010, 22% reported having had thoughts of suicide at some point in their life, and 13% had made an attempt.<sup>2</sup> In comparison, 9% of non-Indigenous Canadians reported suicidal ideation in their lifetime.<sup>2,13</sup>

Indigenous peoples are also generally more likely to experience risk factors for suicidal thoughts and behaviors, including childhood adversity,<sup>14,15</sup> trauma,<sup>15</sup> mental health issues,<sup>3,16</sup> and substance use.<sup>16,17</sup> Although there are limited data regarding rates of mental health disorders among Indigenous peoples, high rates of psychological distress have been reported in a national samples of First Nations adults living on and off-reserve.<sup>2,18</sup>

### *Indian Residential Schools*

There is increasing evidence that contemporary inequities faced by Indigenous peoples may have originated from the numerous exposures to collective traumas and stressors.<sup>4-9</sup> In this regard, elevated rates of distress experienced by Indigenous peoples appear to be linked to the disproportionate experiences of various types of historical and ongoing stressors<sup>4,8</sup> and could potentially underlie the increased risk for suicidal thoughts and behaviors.<sup>19</sup> A particularly harmful government policy that was enforced in Canada from 1863 to 1996 removed Indigenous children from their homes and forced them to attend Indian Residential Schools (IRSs) with the purpose of assimilation.<sup>20,21</sup> Children were taught to be ashamed of their cultures and were punished for minor transgressions such as speaking in their language, which contributed to Indigenous identities being undermined.<sup>21-23</sup> Mortality rates were high, and chronic neglect and physical, sexual, psychological, and cultural abuse were pervasive.<sup>19,20,23</sup> Available data and testimonies have made it clear that, despite individual variability in experiences and outcomes associated with IRS attendance,<sup>24</sup> survivors are generally at an elevated risk for physical and mental health problems.<sup>19,25-27</sup> Speaking to the large proportion of the First Nations population that was affected, 1 in 5 adults living on-

reserve in 2008 to 2010 reported having attended an IRS, and more than half had a parent and/or grandparent who attended.<sup>28</sup> Relevant to current-day inequities and the continued need for healing,<sup>29</sup> increasing evidence suggests that the effects of the IRS system continue to influence subsequent generations.<sup>4,30</sup>

### *Intergenerational Effects of the IRS Experience*

There are a number of social, psychological, and physiological pathways that have been implicated in the transmission of risk associated with trauma and stressors experienced in one generation to subsequent generations.<sup>4,30-32</sup> In line with increasing evidence documenting the intergenerational effects of collective experiences faced by other groups,<sup>32</sup> psychological distress, suicidal ideation, and suicidal attempts have been reported to be elevated among First Nations adults living on- and off-reserve who had a parent and/or grandparent who attended IRS.<sup>4,33,34</sup> The risk for mental health issues and suicidal behaviors has also been linked to intergenerational factors in an increasing number of non-Indigenous samples.<sup>35-37</sup> A central aspect of historical trauma theory is that the consequences of numerous collectively experienced events can potentially accumulate over generations to influence the risk for certain outcomes,<sup>4,38</sup> but the cumulative nature of such intergenerational effects has hardly been assessed. An exception in this regard came from analyses suggesting that First Nations adults living on-reserve with 2 previous familial generations who attended IRS (i.e., a parent and grandparent attended) displayed elevated psychological distress compared with individuals who had 1 generation of IRS history (i.e., a parent or grandparent attended), both of which exceeded the distress among those with no familial history of IRS attendance.<sup>4</sup>

The current investigation examined the relationship between IRS attendance and suicidal ideation and attempts in a representative population-based sample of First Nations adults living on-reserve and northern communities across Canada in 2008 to 2010. It was hypothesized that a greater proportion of adults who were intergenerationally affected by the IRS system would report a lifetime history of suicidal ideation and attempts compared with those with no familial IRS history. In assessing whether these outcomes were cumulatively linked to intergenerational familial IRS attendance, the odds of reporting ideation or an attempt were expected to be greater among those with two previous familial generations who attended IRS relative to those with one prior generation who attended. The relation between intergenerational IRS exposure and suicide ideation was examined with and without controlling for current levels of psychological distress to assess how its inclusion influenced the strength of the relations with familial IRS history. Likewise, the relation between IRS exposure and lifetime suicide attempts was examined with and without controlling for current levels of psychological distress and suicidal ideation.

## **Methods**

### *Participants*

Data from the 2008-2010 adult-specific First Nations Regional Health Survey (RHS) were used in the current study. Participants comprised First Nations adults older than 18 years (estimated mean = 37.7, standard error [SE] = 0.27) living on-reserve who were randomly sampled and invited to complete the survey (weighted  $N = 127,338$ ; unweighted  $N = 5277$ ). There was a slightly smaller proportion of men (weighted percentage = 47.5%) than women (weighted percentage = 52.5%) represented, but this difference was not significant.

### *Measures*

Participants were asked their sex (male or female), age (treated as a continuous), and annual household income (coded as 1 for income less than \$19,999 or 2 for income greater than \$20,000). Participants were asked whether they had attended IRS and/or whether their mother/father or any of their grandparents had attended. Four groups were created to assess the cumulative effects of IRS including those who did not have a parent or grandparent attend (no IRS experience), those who had a parent attend (1 previous generation) or a grandparent attend (1 previous generation), and those who had a parent and grandparent attend (2 previous generations). Individuals who themselves had attended IRS were excluded from all analyses, and only individuals who were able to answer all of the required questions regarding their parents' or grandparents' attendance at IRS were included in all analyses. In total, 5277 adults could be categorized into 1 of the 4 groups based on their responses to the questions about their own, their parents, and/or their grandparents IRS attendance. Because there were no significant differences in relation to suicidal ideation and attempts between those who had a parent versus a grandparent who attended IRS (see the Results section), these groups were combined for all multivariate analyses.

Participants responded yes or no to questions asking if they had ever thought about committing suicide and if they had ever attempted suicide in their lifetime. The 10-item Kessler Psychological Distress Scale (K-10)<sup>39</sup> was used to assess psychological distress, in which participants were asked how often they experienced symptoms of anxiety or depression in the past month on a scale ranging from 1 (*none of the time*) to 5 (*all of the time*). Total scores were summed, with higher scores reflecting greater distress. For respondents with missing scores for 1 or 2 items, mean scores from their other items replaced missing values, and those who did not answer 2 or more items were excluded. The K-10 has been deemed as a psychometrically sound measure of psychological distress for First Nations peoples living off-reserve in Canada<sup>40</sup> and Indigenous peoples in Australia.<sup>41</sup>

## Procedure

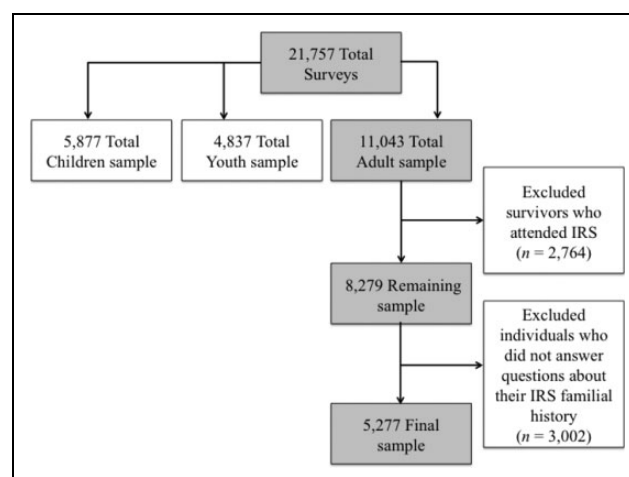
The RHS is a cross-sectional representative survey of First Nations peoples living in reserve and Northern communities (excluding Nunavut) across Canada. A stratified 2-stage sampling design was used. The first stage in the sample design involved the selection of communities at the national level, determined by region, subregion, and community size. The second stage involved the selection of individuals within communities, identified using band membership lists according to gender and age.<sup>2</sup> Data were collected from June 2008 to November 2010.<sup>2</sup> The target sample was 30,000 individuals in 250 First Nations communities, which was designed to represent the entire First Nations population on-reserve. In 216 communities, 21,757 surveys were collected, resulting in a response rate of 72.5%.<sup>2</sup> When considering only the adult version of the survey, 11,043 adults older than 18 years participated.<sup>2</sup> Analyses were carried out using the SPSS Complex samples module that produces estimates based on the weights and specifications of RHS's complex design and sampling. Weights were applied to each case so that the sample and the proportions within the sample reflected the total population being estimated. Analyses assessing whether psychological distress, income, and suicidal ideation met the criteria for potential mediating variables in the relationships between familial IRS attendance and suicide outcomes were conducted in line with Baron and Kenny's steps for testing mediational hypotheses (for detailed information on these steps, please refer to the work by Baron and Kenny<sup>42</sup>), all of which controlled for gender and age.

The RHS meets the First Nations principals of OCAP® (Ownership, Control, Access, and Possession) in relation to these data, and governance is provided by the First Nations Information Governance Centre's (FNIGC's) Board of Directors, who represent the First Nations regions who take part in the survey.<sup>2</sup> FNIGC ensures community participation in all aspects of design, collection, and analysis.<sup>2</sup> The study findings underwent a review process in which FNIGC approved the proposed analyses, and the results were vetted by FNIGC and presented to several national and regional First Nations organizations.

## Results

### Descriptive Statistics

Participants comprised First Nations adults aged 18 or older (unweighted  $N = 5277$ ; weighted  $N = 127,338$ ; note that the sample sizes of each analysis varied slightly according to differences in the number of missing values for each variable; Figure 1). Descriptive statistics in relation to gender, age, income, IRS familial history, psychological distress, suicidal ideation, and suicidal attempts are reported in Table 1. Almost 2 in 5 (38.0%) adults did not have a familial history of IRS attendance (no-IRS), 16.2% had a parent who attended IRS (1 generation), 19.3% had a grandparent who attended IRS attendance (1 generation), and 26.5% had 2 previous



**Figure 1.** A flow diagram depicting the sample criteria and exclusions.

**Table 1.** Characteristics of First Nations adults living on-reserve in Canada.

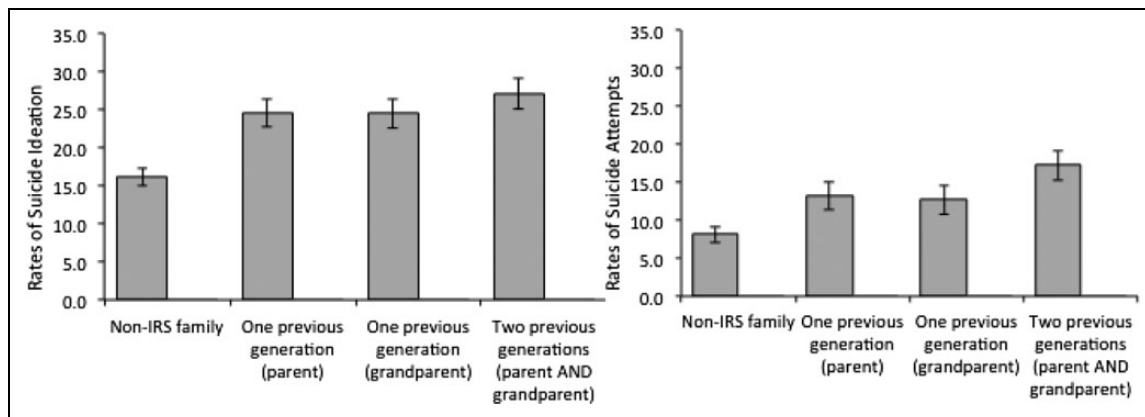
Characteristic	Proportion <sup>a</sup>	95% CI
Age, years (mean)	37.7	37.2 to 38.3
Income (%)		
<19,999	23.8	21.9 to 25.9
>20,000	76.2	74.1 to 78.1
IRS experience (%)		
No IRS	38.0	35.5 to 40.6
Grandparent (1 generation)	19.3	17.6 to 21.1
Parent (1 generation)	16.2	14.6 to 17.9
Parent and grandparent (2 generations)	26.5	23.9 to 29.3
Suicidal ideation (%)	22.0	20.2 to 23.9
Suicide attempts (%)	12.2	10.9 to 13.7
Psychological distress (mean)	17.2	16.9 to 17.5

<sup>a</sup>Values for age, income, suicide ideation, suicide attempts, and psychological distress did not significantly differ from the reported values when survivors of Indian Residential School (IRS) were included and/or when all individuals who could not answer questions regarding their IRS history were included.

familial generations who attended (a parent and grandparent). Almost one-quarter (22.0%) reported thoughts about suicide in their lifetime, and 12.2% reported a suicide attempt.

### Bivariate Analyses Predicting Suicidal Ideation and Attempts

Bivariate analyses revealed that 21.2% (95% confidence interval [CI], 18.7% to 24.0%) of men and 22.7% (95% CI, 20.5% to 25.1%) of women reported suicidal ideation, which did not differ significantly. Gender differences were also not found in relation to suicide attempts, as 11.0% (95% CI, 9.3% to 13.0%) of men and 13.3% (95% CI, 11.6% to 15.3%) of women reported an attempt. Age was a significant predictor of suicidal ideation (odds ratio [OR], 0.98; 95% CI, 0.97 to 0.99;  $P < 0.001$ ) and attempts (OR, 0.98; 95% CI, 0.97 to 0.99;  $P < 0.001$ ).



**Figure 2.** Rates of suicide ideation  $\pm$  SE (left panel) and suicide attempts  $\pm$  SE (right panel) among participants with no familial history of Indian Residential School attendance, those with 1 generation (parent or grandparent) or 2 generations of attendance.

0.98;  $P < 0.001$ ), revealing that increasing age was associated with reduced suicide ideation and attempts.

Just under one-quarter (23.3%; 95% CI, 20.0% to 26.9%) of adults who reported a household income of \$19,999 or less reported thoughts of suicide, which did not significantly differ from the 21.6% (95% CI, 19.6% to 23.7%) who reported a household income of \$20,000 or greater. When considering attempts, 15.9% of those in a household with less than \$19,999 in income reported an attempt (95% CI, 13.7% to 18.5%), which was significantly more compared with the 11.0% (95% CI, 9.6% to 12.7%) who lived in a household with an income of \$20,000 or more. Psychological distress was a significant predictor of both suicidal ideation (OR, 1.13; 95% CI, 1.02 to 1.03;  $P < 0.001$ ) and attempts (OR, 1.14; 95% CI, 1.12 to 1.15;  $P < 0.001$ ).

The proportion of adults who reported suicidal ideation were compared across the 4 IRS groups including those with no familial IRS history (16.1%; 95% CI, 14.0% to 18.5%), having a parent who attended (24.6%; 95% CI, 20.9% to 28.6%), having a grandparent who attended (24.5%; 95% CI, 21.0% to 28.4%), and having 2 previous generations of IRS history (27.1%; 95% CI, 23.3% to 31.3%; Figure 2). The proportion of adults who reported suicidal attempts were also compared between those with no familial IRS history (8.1%; 95% CI, 6.7% to 9.7%), a parent who attended (13.2%; 95% CI, 10.4% to 16.5%), a grandparent who attended (12.7%; 95% CI, 10.2% to 15.8%), and 2 generations (17.2%; 95% CI, 14.2% to 20.6%; Figure 2). Because the proportion of those with a parent versus a grandparent who attended IRS and reported suicide ideation and attempt did not differ, these 2 groups representing having 1 previous familial generation who attended IRS were combined for the remaining analyses.

#### **Mediation Step 1: IRS History (Independent Variable [IV]) Predicting Suicide Ideation and Attempts (Dependent Variables [DVs])**

A logistic regression analysis controlling for gender and age revealed that having a parent or grandparent (1 previous

generation) who attended IRS was accompanied by increased odds of suicide ideation compared with those who had no familial IRS history (OR, 1.46; 95% CI, 1.16 to 1.84;  $P = 0.001$ ), whereas having 2 previous generations compared with 1 generation did not increase the odds of suicidal thoughts (OR, 1.10; 95% CI, 0.87 to 1.39;  $P = 0.41$ ).

In predicting suicide attempts, a logistic regression controlling for age and gender revealed that having a parent or grandparent who attended IRS was associated with increased odds of an attempt compared with those with no IRS familial history (OR, 1.44; 95% CI, 1.07 to 1.94;  $P = 0.016$ ). Having 2 generations of IRS history was linked with increased odds of reporting an attempt compared with those with 1 generation (OR, 1.35; 95% CI, 1.05 to 1.75;  $P = 0.02$ ).

#### **Mediation Step 2: IRS History (IV) in Predicting Income and Distress (Mediators)**

A logistic regression controlling for gender and age revealed that having a parent or grandparent who attended IRS was not accompanied by increased odds of having an income below \$20,000 compared with those who had no IRS history (OR, 0.87; 95% CI, 0.68 to 1.10;  $P = 0.41$ ). As well, there were no significant differences between those with 2 previous generations of IRS history compared with 1 generation in predicting income category (OR, 1.21; 95% CI, 1.04 to 1.40;  $P = 0.24$ ). Thus, income was no longer considered a mediator in further analyses.

An ANOVA controlling for gender and age was conducted to explore the link between IRS familial history and psychological distress, which revealed a significant difference in mean levels of distress between those with a parent or grandparent versus the non-IRS group ( $b = 0.78$ ,  $SE = 0.29$ ,  $P = 0.008$ ) and a significant difference between those with 2 previous generations versus 1 previous generation who attended ( $b = 1.53$ ,  $SE = 0.29$ ,  $P < 0.001$ ).

Suicidal ideation was considered as a potential mediator in the relationship between IRS family history and suicide attempts, and as described previously, those with 1 or 2

generations who attended IRS were at greater odds of ideation compared with those with no previous generations who attended. However, there was no significant difference between those who had 1 versus 2 previous generations of IRS experience in relation to ideation.

### ***Mediation Step 3: Psychological Distress (Mediator) in Predicting Suicide Ideation and Attempts (DVs) and Suicidal Ideation (Mediator) in Predicting Attempts (DV)***

A logistic regression analysis controlling for gender and age revealed that psychological distress was linked with increased odds of suicidal ideation (OR, 1.13; 95% CI, 1.11 to 1.15;  $P < 0.001$ ). In predicting suicide attempts, a logistic regression analysis controlling for age and gender revealed that psychological distress was associated with increased odds of suicide attempts (OR, 1.10; 95% CI, 1.06 to 1.10;  $P < 0.001$ ) as was suicidal ideation (OR, 21.13; 95% CI, 15.74 to 28.35;  $P < 0.001$ ).

### ***Mediation Step 4: IRS History (IV) in Predicting Suicidal Ideation and Attempts (DVs) with Psychological Distress (Mediator) and Ideation (Mediator for Attempts) in the Model***

A logistic regression assessed the link between familial IRS history and suicidal ideation with age, gender, and psychological distress included in the model. Having a parent or grandparent who attended IRS was associated with increased odds of reporting ideation compared with those with no IRS history (OR, 1.45; 95% CI, 1.12 to 1.87;  $P = 0.005$ ), but 2 generations of IRS attendance was not accompanied by greater odds of ideation (OR, 1.05; 95% CI, 0.80 to 1.36;  $P = 0.73$ ). In both cases, the ORs were reduced compared with when psychological distress was not included, suggesting that distress may serve as a mediating variable in the relation between IRS exposure and ideation. Increasing age was associated with reduced odds of ideation (OR, 0.98; 95% CI, 0.98 to 0.99;  $P < 0.001$ ), and greater psychological distress was linked with increased odds (OR, 1.12; 95% CI, 1.10 to 1.14;  $P < 0.001$ ). Gender was not significantly associated with ideation (OR, 1.20; 95% CI, 0.95 to 1.52;  $P = 0.13$ ).

A logistic regression assessed the link between IRS family history and suicidal attempts with age, gender, psychological distress, and suicidal ideation in the model. Having a parent or grandparent who attended IRS was associated with increased odds of attempts compared with those with no IRS history (OR, 1.36; 95% CI, 0.96 to 1.93;  $P = 0.08$ ), but unlike the model in which potential mediators were not accounted for, this only approached significance. Similarly, the significant difference between those with 2 versus 1 previous generation who attended IRS was no longer significant with distress and ideation in the model (OR, 1.26; 95%

CI, 0.86 to 1.84;  $P = 0.24$ ). This may suggest that both psychological distress and suicide ideation serve as mediating variables in the relation between IRS exposure and suicide attempts. Higher levels of both distress and ideation were accompanied by increased odds of attempts (OR, 1.08; 95% CI, 1.05 to 1.10;  $P < 0.001$ ; and OR, 20.98; 95% CI, 15.60 to 28.21;  $P < 0.001$ , respectively). Age (OR, 0.99; 95% CI, 0.98 to 1.00;  $P = 0.12$ ) and gender (OR, 1.06; 95% CI, 0.76 to 1.46;  $P = 0.73$ ) were not associated with attempts in this model.

## **Discussion**

Analyses of the 2008-2010 RHS revealed that having a familial history of IRS attendance was associated with an increased risk for lifetime suicidal ideation and attempts compared with First Nations adults living on-reserve with no such IRS history. These findings are in keeping with increasing evidence documenting the intergenerational consequences of the IRS experience in relation to mental health outcomes.<sup>4,19,23,30,33</sup> The previously reported cumulative effect of IRS familial history in relation to levels of psychological distress<sup>4</sup> was observed in the current study, and a similar cumulative effect was found in relation to suicide attempts. Although the same cumulative trend was observed in relation to IRS familial attendance in predicting ideation, the difference between those with 1 versus 2 previous generations who attended was not significant. The reasons why the cumulative generational effects of familial IRS attendance were not evident in predicting ideation are not immediately apparent but highlight the possibility that processes governing psychological distress, suicidal ideation, and actual attempts are not identical. For instance, suicide attempts might involve factors such as impulsivity that are not predictors of ideation, and although ideation may be a frequent feature among depressed or distressed individuals,<sup>43</sup> actual attempts may occur more broadly in relation to factors such as substance use, socioeconomic status, and cultural stressors.<sup>44,45</sup> This is also in line with research suggesting that the familial transmission of suicidal behavior cannot be completely explained by the transmission of psychiatric disorders or distress levels, although they are overlapping.<sup>35,36</sup> Likewise, accounting for current levels of psychological distress in the current study reduced the strength of the relationship between intergenerational IRS exposure and ideation, but this did not render the link between IRS exposure and ideation nonsignificant, suggesting other variables not considered likely play such mediating roles.

In contrast to suicide ideation, the links between IRS exposure and suicide attempts became nonsignificant when distress and ideation were included in the model, suggesting that these factors may be playing important mediating roles in the apparent cumulative risk in predicting suicide attempts. Also of interest was that both distress and ideation remained significant unique predictors of attempts when

both were included in the model, suggesting that both may be involved in accounting for the increased risk for attempts associated with IRS exposure through potentially overlapping but independent pathways. Not unexpectedly, suicidal ideation was an exceptionally strong predictor of attempts, which is consistent with the view that ideation is generally a precursor of most suicide attempts<sup>43,46</sup> but that only some ideators proceed to an attempt.<sup>47</sup> Parenthetically, in 2 samples of American Indians, suicide attempts without ideation were more common than that evident in a non-Indigenous population, indicating that the relation between ideation and attempts may depend on important ethnic and/or sociocultural differences and should be further explored.<sup>48</sup>

Although the same finding has been reported in non-Indigenous population-based samples,<sup>49,50</sup> it was counterintuitive to find that the odds of reporting lifetime suicidal ideation and attempts were inversely related to age. This might be suggestive of a possible cohort effect whereby suicide outcomes vary according to age at different levels of IRS familial history. While out of the scope of the research questions, this should be explored further. Alternatively, it is also possible this effect could be a result of recall bias. It is important to note that many of the odds ratios in the current study were not especially large, most ranging from 1.05 to 1.46 (with the exception of the very large odds ratios in predicting suicide attempts from ideation). As a comparison, a recent study among First Nations living on-reserve in Manitoba that examined suicide ideation and attempts in relation to multigenerational IRS exposure displayed odds ratios ranging from 1.50 to 2.84.<sup>19</sup> While this points to the relatively smaller odds ratios in the current study, it does not mean that these effects are not meaningful. Moreover, while the odds ratios for psychological distress and age appeared relatively small, these variables are continuous, and thus, interpretations of these odds ratios are actually quite large. In this regard, these odds ratios are cumulative for every point change on the psychological distress scale or year increase in age.

A notable limitation was the cross-sectional and retrospective nature of the RHS, which limits the ability to make assertions regarding causal mechanisms and carries the possibility that respondents' affective state at the time of the survey influenced their responses. It is also important to acknowledge that not all First Nations communities were affected by residential schools and that First Nations communities differ from one another in many respects. Because these groups were combined in the present analyses to report national estimates, we are ignoring important variations across communities that also deserve further exploration.<sup>51</sup>

Despite this complex history, it should be emphasized that many First Nations peoples have maintained their cultural knowledge and ways of living in relation to the land and each other, which is grounded in and contributes to their extreme strength, resilience, and capacity for healing and renewal.<sup>52</sup> In this regard, it was recently suggested that cultural continuity may be integral to understanding suicide

among First Nations peoples.<sup>53</sup> These findings emphasize that the increased risk for suicidal ideation and attempts is not inherent to First Nations peoples but is at least in part associated with the intergenerational effects of the IRS system and potentially by other aspects of colonization. Having a more accurate understanding of the linkages between the root causes of suicidal thoughts and behaviors is important for the development of culturally safe programming aimed at reducing suicide in First Nations communities.

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## References

1. First Nations Centre. First Nations Regional Longitudinal Health Survey (RHS) 2002/03: Results for adults, youth and children living in First Nations communities. Ottawa (ON): First Nations Centre; 2005.
2. First Nations Information Governance Centre. First Nations Regional Health Survey (RHS) phase 2 (2008/10) national report on adults, youth and children living in First Nations communities. Ottawa (ON): The First Nations Information Governance Centre; 2012.
3. Government of Canada. Aboriginal mental health and well-being. In: The human face of mental health and mental illness in Canada (Chapter 12). Ottawa (ON): Minister of Public Works and Government Services Canada; 2006.
4. Bombay A, Matheson K, Anisman H. The intergenerational effects of Indian Residential Schools: implications for the concept of historical trauma. *Transcult Psychiatry*. 2014;51(3): 320-338.
5. Brave Heart MY. Oyate Ptayela: rebuilding the Lakota Nation through addressing historical trauma among Lakota parents. *J Hum Behav Soc Environ*. 1999;2(1-2):109-126.
6. Brave Heart MYH, DeBruyn LM. The American Indian holocaust: healing historical unresolved grief. *Am Indian Alask Native Ment Health Res*. 1998;8(2):56-78.
7. Walters KL, Mohammed SA, Evans-Campbell T, et al. Bodies don't just tell stories, they tell histories. *Du Bois Rev Soc Sci Res Race*. 2011;8(1):179-189.
8. Walls ML, Whitbeck LB. The intergenerational effects of relocation policies on indigenous families. *J Fam Issues*. 2012; 33(9):1272-1293.

9. Lawson-Te Aho K, Liu JH. Indigenous suicide and colonization: the legacy of violence and the necessity of self determination. *Int J Conf Violence*. 2010;4(1):124-133.
10. Kirmayer L, Brass G, Holton T, et al. Suicide among Aboriginal peoples in Canada. Ottawa (ON): The Aboriginal Healing Foundation; 2007.
11. Runeson BS, Beskow J, Waern M. The suicidal process in suicides among young people. *Acta Psychiatrica Scandinavica*. 1996;93(1):35-42.
12. Kessler RC, Berglund P, Borges G, et al. Trends in suicide ideation, plans, gestures, and attempts in the United States, 1990-1992 to 2001-2003. *JAMA*. 2005;293(20):2487-2495.
13. Statistics Canada. (n.d.). Canadian community health survey, cycle 4.1 (2007/2007): public use microdata file. Ottawa (ON): Statistics Canada.
14. Hull J. Aboriginal women: a profile from the 2001 Census. Ottawa (ON): Indian and Northern Affairs Canada; 2006.
15. Karmali S, Laupland K, Harrop AR, et al. Epidemiology of severe trauma among status Aboriginal Canadians: a population-based study. *CMAJ*. 2005;172(8):1007-1011.
16. MacMillan HL, Jamieson E, Walsh CA, et al. Technical Advisory Committee of the Chiefs of Ontario. First Nations women's mental health: results from an Ontario survey. *Arch Womens Ment Health*. 2008;11(2):109-115.
17. Smith SM, Stinson FS, Dawson DA, et al. Race/ethnic differences in the prevalence and co-occurrence of substance use disorders and independent mood and anxiety disorders: results from the National Epidemiologic Survey on Alcohol and Related Conditions. *Psychol Med*. 2006;36(7):987-998.
18. Caron J, Liu A. A descriptive study of the prevalence of psychological distress and mental disorders in the Canadian population: comparison between low-income and non-low-income populations. *Chronic Dis Can*. 2010;30(3):84-94.
19. Elias B, Mignone J, Hall M, et al. Trauma and suicide behaviour histories among a Canadian indigenous population: an empirical exploration of the potential role of Canada's residential school system. *Soc Sci Med*. 2012;74(10):1560-1569.
20. Royal Commission on Aboriginal Peoples (RCAP). Looking forward, looking back: report of the Royal Commission on Aboriginal Peoples (Vol. 1). Ottawa (ON): Communication Group; 1996.
21. Truth and Reconciliation Commission of Canada. Honouring the truth, reconciling for the future summary of the Final Report of the Truth and Reconciliation Commission of Canada. 2015. Available from: [http://www.trc.ca/websites/trcinstitution/File/2015/Honouring\\_the\\_Truth\\_Reconciling\\_for\\_the\\_Future\\_July\\_23\\_2015.pdf](http://www.trc.ca/websites/trcinstitution/File/2015/Honouring_the_Truth_Reconciling_for_the_Future_July_23_2015.pdf).
22. Deiter C. From our mothers' arms: the intergenerational impact of residential schools in Saskatchewan. Toronto (ON): United Church Publishing House; 1999.
23. Bombay A, Matheson K, Anisman H. Origins of lateral violence in Aboriginal communities: a preliminary study of student-to-student abuse in Indian Residential Schools. Ottawa (ON): Aboriginal Healing Foundation; 2014.
24. Smith D, Varcoe C, Edwards N. Turning around the intergenerational impact of residential schools on Aboriginal people: implications for health policy and practice. *Can J Nurs Res*. 2005;37(4):38-60.
25. Corrado RR, Cohen IM. Mental health profiles for a sample of British Columbia's Aboriginal survivors of the Canadian residential school system. Ottawa (ON): Aboriginal Healing Foundation; 2003.
26. RHS National Team. First Nations Regional Longitudinal Health Survey (RHS) 2002/03: results for adults, youth, and children living in First Nations communities, revised second edition. Ottawa (ON): Assembly of First Nations/First Nations Information Governance Committee; 2007.
27. Nuu-Chah-Nulth Tribal Council. Indian residential schools: the nuu-chah nulth experience. Port Alberni (BC): Nuu-Chah-Nulth Tribal Council; 1996.
28. Bombay A, Young J, Matheson K, et al. Estimates of the proportions of Inuit, Metis, and First Nations adults living on and off reserve who were directly and intergenerationally affected by residential schools and changes across time. *Int J Indigenous Health*. 2016.
29. Tait CL, Bombay A, Mushquash C, et al.; the First Peoples First Person Canadian Depression Research and Intervention Network. Powerful communities, healthy communities: a twenty year journey of healing and wellness. Invited paper for RCAP 20th Anniversary Event. 2017; Winnipeg, Manitoba.
30. Bombay A, Matheson K, Anisman H. The impact of stressors on second generation Indian residential school survivors. *Transcult Psychiatry*. 2011;48(4):367-391.
31. Bombay A, Matheson K, Anisman H. Intergenerational trauma: convergence of multiple processes among First Nations peoples in Canada. *J Aborig Health*. 2009;5(3):6-47.
32. Bowers ME, Yehuda R. Intergenerational transmission of stress in humans. *Neuropsychopharmacol Rev*. 2017;41(1):232-244.
33. Hackett C, Feeny D, Tompa E. Canada's residential school system: measuring the intergenerational impact of familial attendance on health and mental health outcomes. *J Epidemiol Community Health*. 2016;70(11):1096-1105.
34. Assembly of First Nations (AFN)/First Nations Information Governance Committee (FNIGC). First Nations Regional Longitudinal Health Survey (RHS) 2002/03: The peoples' report (Rev. 2nd ed.). Ottawa (ON): Assembly of First Nations (AFN)/First Nations Information Governance Committee (FNIGC); 2007.
35. Brent D. What family studies teach us about suicidal behavior: implications for research, treatment, and prevention. *Eur Psychiatry*. 2010;25(5):260-263.
36. Gureje O, Oladeji B, Hwang I, et al. Parental psychopathology and the risk of suicidal behavior in their offspring: results from the World Mental Health surveys. *Mol Psychiatry*. 2011;16(12):1221-1233.
37. Tidemalm D, Runeson B, Waern M, et al. Familial clustering of suicide risk: a total population study of 11.4 million individuals. *Psychol Med*. 2011;41(12):2527-2534.
38. Evans-Campbell T. Historical trauma in American Indian/Native Alaska communities: a multilevel framework for exploring impacts on individuals, families, and communities. *J Interpers Violence*. 2008;23(3):316-338.



39. Kessler R, Mroczek D. Final versions of our non-specific psychological distress scale. Ann Arbor (MI): Ann Arbor Mi. Survey Research Center for Social Research, University of Michigan; 1994.
40. Bougie E, Arim RG, Kohen DE, Findlay LC. Validation of the 10-item Kessler Psychological Distress Scale (K10) in the 2012 Aboriginal Peoples Survey. *Health Rep.* 2016;27(1):3-10.
41. Jorm SJ, Bourchier SJ, Cvetkovski S, Stewart G. Mental health of Indigenous Australians: a review of findings from community surveys. *Med J Aust.* 2012;196:118-121.
42. Baron RM, Kenny DA. The moderator–mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. *J Pers Soc Psychol.* 1986;51(6):1173.
43. Mann JJ. Neurobiology of suicidal behaviour. *Nat Rev Neurosci.* 2003;4(10):819-828.
44. Borges G, Nock MK, Abad JMH, et al. Twelve month prevalence of and risk factors for suicide attempts in the WHO World Mental Health Surveys. *J Clin Psychiatry.* 2010;71(12):1617.
45. Laliberte A, Tousignant M. Alcohol and other contextual factors of suicide in four Aboriginal communities of Quebec, Canada. *Crisis.* 2009;30:215-221.
46. Borges G, Angst J, Nock MK, et al. A risk index for 12-month suicide attempts in the National Comorbidity Survey Replication (NCS-R). *Psychol Med.* 2006;36(12):1747-1757.
47. McAuliffe CM. Suicidal ideation as an articulation of intent: a focus for suicide prevention? *Arch Suicide Res.* 2002;6(4):325-338.
48. Bolton SL, Elias B, Enns MW, et al. A comparison of the prevalence and risk factors of suicidal ideation and suicide attempts in two American Indian population samples and in a general population sample. *Transcul Psychiatry.* 2014;51(1):3.
49. Public Health Agency of Canada. The human face of mental health and mental illness in Canada. Ottawa (ON): Public Health Agency of Canada; 2006.
50. De Leo D, Cerin E, Spathonis K, Burgis S. Lifetime risk of suicide ideation and attempts in an Australian community: prevalence, suicidal process, and help-seeking behavior. *J Affect Disord.* 2005;86(2-3):215-224.
51. Fraser SL, Geoffroy D, Chachamovich E, et al. Changing rates of suicide ideation and attempts among Inuit youth: a gender-based analysis of risk and protective factors. *Suicide Life Threat Behav.* 2015;45(2):141-156.
52. Health Canada and Assembly of First Nations. First Nations Mental Wellness Continuum Framework. Ottawa (ON): Health Canada; 2015.
53. Mehl-Madrona L. Indigenous knowledge approach to successful psychotherapies with Aboriginal suicide attempters. *Can J Psychiatry.* 2016;61(11):696-699.