

# Prevalence and risk indicators of smoking among on-reserve First Nations youth

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**OBJECTIVE:** To determine the current prevalence of smoking among First Nations youth living on reserve within the Saskatoon Tribal Council, and to determine the independent risk indicators associated with smoking among First Nations youth.

**METHODS:** Students in grades 5 to 8 attending school within the Saskatoon Tribal Council were asked to complete a youth health survey.

**RESULTS:** Of 271 eligible students, 204 completed the consent protocol and the school survey, yielding a response rate of 75.3%; 26.5% of youth were defined as current smokers. Regression analysis indicated that older age, not having a happy home life, suicide ideation and having three or more friends who smoke cigarettes were independent risk indicators of smoking in First Nations youth.

**DISCUSSION:** Smoking prevalence among on-reserve First Nations youth is quite high. The identification of four main risk indicators should assist with the design of youth smoking prevention and cessation programs.

**Key Words:** *Adolescents; Minority groups; Tobacco smoking; Risk factors*

The 2002/2003 First Nations Regional Longitudinal Health Survey (FNRLHS) found that the prevalence of daily smoking in Aboriginal adults was 46.0%, with 53.9% of daily smokers being between 18 to 29 years of age (1). During the same time period, only 19% of Canadian adults were daily smokers (2).

Given the high prevalence of smoking among Aboriginal adults, it is important to review prevalence rates and risk indicators among Aboriginal youth. The prevalence of tobacco smoking in Aboriginal youth, however, is challenging to determine. The most widely used Canadian survey on smoking among youth, Health Canada's Youth Smoking Survey (YSS), collects limited data from Aboriginal youth and does not include First Nations youth living on-reserve (3).

In 1995, a study of First Nations adolescents living on-reserve reviewed 4090 youth, between 10 to 14 years of age and found that 33% were daily or occasional smokers (4). In comparison, only 15% of Canadian youth, between 10 to 19 years of age, were current smokers in 1994 (3). Furthermore, the FNRLHS found that 37.8% of First Nations youth, between 12 to 17 years of age living on-reserve were smokers in 2001 (1).

Risk indicators associated with smoking in Aboriginal populations are complex. The health disparities that exist between

## La prévalence et les indicateurs de risque du tabagisme chez les jeunes des Premières nations qui habitent dans les réserves

**OBJECTIFS :** Déterminer la prévalence actuelle du tabagisme chez les jeunes des Premières nations qui habitent dans une réserve du Conseil tribal de Saskatoon et déterminer les indicateurs indépendants de risque associés au tabagisme chez les jeunes des Premières nations.

**MÉTHODOLOGIE :** Les élèves de cinquième à huitième année qui fréquentent une école du Conseil tribal de Saskatoon ont été invités à remplir un sondage sur la santé des jeunes.

**RÉSULTATS :** Sur 271 élèves admissibles, 204 ont rempli le protocole de consentement et le sondage à l'école, pour un taux de réponse de 75,3 %; 26,5 % des jeunes étaient définis comme des fumeurs. L'analyse de régression a indiqué qu'un âge plus avancé, le fait de ne pas avoir une vie familiale heureuse, l'idéation suicidaire et le fait d'avoir au moins trois amis fumeurs constituaient des indicateurs de risque indépendants du tabagisme chez les jeunes des Premières nations.

**EXPOSÉ :** La prévalence de tabagisme est très élevée chez les jeunes des Premières nations qui habitent dans les réserves. La détermination des quatre principaux indicateurs de risque devrait contribuer à l'élaboration de programmes de prévention et de renonciation au tabagisme chez les jeunes.

Aboriginal and non-Aboriginal Canadians are driven by social, economic and environmental inequities. For example, the household incomes of Aboriginals are considerably lower than non-Aboriginals, and this has been found to affect outcomes such as smoking (5).

Performing multivariate regression analysis, to control for factors such as income, shows that Aboriginal cultural status alone has limited independent association with the increased prevalence of smoking in Aboriginal adults. For example, a study investigating risk indicators of smoking in Saskatoon adults found that Aboriginal adults were 3.43 times more likely to be a daily smoker than Caucasian adults before statistical adjustment; however, after statistical adjustment for family income, neighborhood income, education, suicide ideation and exposure to extreme life stress, Aboriginal adults were only 1.57 times more likely to be daily smokers (6). That being said, it is important to note that this was a study involving off-reserve adults (6).

There are a limited number of studies addressing the prevalence and risk indicators of smoking in First Nations on-reserve youth. The first objective of the present study was to determine the prevalence of current smoking status in First Nations youth living on-reserve within the Saskatoon Tribal Council (STC).

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The second objective was to determine the independent risk indicators for smoking among First Nations youth, to aid in the design of smoking prevention and cessation programs.

## METHODS

The Saskatoon Tribal Council (STC) consists of seven on-reserve First Nations communities, within a 250 km radius of the city of Saskatoon, Saskatchewan. Based on the 2006 census, the median income per household was \$8,572, the percentage of adults who receive all of their income from government transfers was 37.1%, the percentage of lone parent families was 26.3%, the high school graduation rate among adults was 50.7% and the male adult unemployment rate was 27.5%, while the female adult unemployment rate was 20.7% (7).

Within the STC, students in grades 5 through 8 (10 to 16 years of age) were asked to complete a youth health survey in May, 2010. Of the seven schools, only four had grade 8 students; within these grades, among the seven schools, 271 students were eligible to participate in the survey.

Before the study could begin, the Chiefs, Band Councilors and Health Directors from each of the seven First Nation communities, as well as the Education Director, were required to give written consent to proceed. The principal of each school and the teacher of each class, also had to give verbal consent. Additionally, each parent and each youth participant were required to give written, informed consent before the youth's participation in the survey. Ethics approval was obtained from the University of Saskatchewan Behavioral Research Ethics Board (BEH#10-14) (Saskatoon, Saskatchewan).

In the present study, current smoking status was defined as someone who has smoked one or more whole cigarettes within the past 30 days. Specifically, the question was: "On how many of the last 30 days did you smoke one or more cigarettes?" Potential answers included: "None", "1 day", "2-3 days", "4-5 days", "6-10 days", "11-20 days", "21-29 days" or "30 days (everyday)". Our definition of smoking status comes from Health Canada criteria on the phases of smoking uptake (8).

Questions addressing smoking prevalence, behaviours, knowledge and attitudes came from Statistics Canada's YSS. The YSS, developed by Health Canada, is now the largest and most comprehensive smoking survey for youth. It was initially designed for individuals 10 to 14 years of age, but has been expanded to include youth 15 to 18 year of age. Although this survey has been in use since 1994, it does not include First Nations youth living on-reserve (9). The validity and reliability of the survey have not been formally tested; however, the YSS has been evaluated for external validity with the National Population Health Survey, as well as the Canadian Tobacco Use Monitoring Survey (CTUMS); the YSS was found to have similar results, despite differences in methodology and the wording of questions (10).

Questions regarding demographics and socioeconomic status were taken from Statistics Canada's National Longitudinal Survey of Children and Youth (NLSCY) (11). This comprehensive health survey was designed to collect information about factors that influence a youth's social, emotional and behavioural development. The NLSCY has been validated for youth 10 to 13 years of age.

Parenting questions were taken from the Parenting Relationship Scale, which was used in the Health Behavior in School-Aged Children (HBSC) study. Although its validity and reliability have never been published, this scale has been used in an international project that was facilitated by the WHO (12).

Self-esteem was measured using questions from the NLSCY (2). Questions for the self-esteem scale used in the NLSCY are taken from the Marsh Self Description Questionnaire, which has a

coefficient alpha reliability range of 0.80 to 0.94 (13,14).

The instrument used to measure depressed mood was the Center for Epidemiological Studies Depression scale (CES-D 12) (15). This scale was used on youth in the NLSCY and has good internal consistency and content validity, with a Cronbach's alpha of 0.85 (16,17). A cut-off score of 16 or higher was used to determine depressed mood.

The questions on suicide ideation, self-report health and mental health were also taken from the NLSCY. (11).

Questions on alcohol and marijuana use were taken from the YSS (10).

Students were asked questions about the frequency with which they were bullied. These questions were taken from the Safe School Survey, which was developed by the Canadian Public Health Association and the National Crime Prevention Strategy (18). The Safe School Survey was drawn from a survey used by the WHO (19).

Cross tabulations were performed initially between current smoking status and demographics, socioeconomic status, relationship with parents, self-esteem, depressed mood, suicide ideation, self-report health, alcohol use, marijuana use and social influence. After these initial cross tabulations, binary logistic regression was used to determine the independent association between the outcome variable of being a smoker (in comparison to not) and the potential explanatory variables. Due to the smaller sample size of the present study, the unadjusted effect of each covariate was determined and then entered, one step at a time, based on changes in the  $-2$  log likelihood and the Wald test (20). The final results, from the present study, are presented as adjusted ORs with 95% CIs.

## RESULTS

Of the 271 grade 5 through 8 students eligible to participate, 204 youth completed the eight-stage consent protocol and the school survey, yielding a response rate of 75.3%. A census conducted by the STC in 2008 reported that there were 239 youth between 10 to 17 years of age; given that our sample size exceeds the known population size, it is unlikely that any children were not attending school (21).

With regard to age and sex: 10.3% were 10 years of age, 48% were between 11 and 12 years of age, and 40.2% were between 13 and 16 years of age; 44.1% were male (55.9% female). With regard to socioeconomic status; 36.3% had an unemployed father, with 92.6% of the employed fathers working in a nonprofessional occupation (nonmanagement or an occupation not requiring a post secondary degree). Additionally, 44.6% had an unemployed mother, with 73.6% of those employed working in a nonprofessional occupation. By comparison, according to the 2006 Census, Saskatchewan's unemployment rate was 5.6% (22). Only 43.6% of youth lived in a household with both their mother and father, while living with a guardian (21.6%) and living with the mother alone (20.1%) were the next most common responses.

Within the STC, 26.5% of the youth were defined as current smokers, with the majority (69.8%) reporting age of initiation between nine and 12 years of age. Among smoking youth, most smoked an average of two to five cigarettes each day (51.8%), while 9.3% smoked 10 or more cigarettes per day. Almost one-half of the youth that smoked (47.6%) reported smoking inside of their own homes. Many (24.4%) acquired their cigarettes by asking someone to purchase cigarettes for them, and 22.2% bought them from a friend or someone else, while 11.1% reported buying their cigarettes directly from the store (Table 1).

After cross tabulating smoking prevalence with socio-demographic variables; higher grade, older age, female sex and having

**TABLE 1**  
**Prevalence of smoking in STC youth**

Grade distribution	n (%)
Grade 5	68 (33.3)
Grade 6	54 (26.5)
Grade 7	44 (21.6)
Grade 8	36 (17.6)
Missing	2 (1.0)
<b>Current smoker*</b>	
Yes	54 (26.5)
No	139 (68.1)
Missing	11 (5.4)
<b>On how many of the past 30 days did you smoke one or more cigarettes?</b>	
None	139 (68.1)
1 to 10 days	32 (15.7)
11 to 20 days	6 (2.9)
21 to 29 days	3 (1.5)
30 days (everyday)	13 (6.4)
Missing	11 (5.4)
<b>If meets definition for current smoker:</b>	
<b>How old were you when you first tried cigarettes, even just a few puffs?</b>	
8 years or younger	17.0%
9 to 12 years	69.8%
13 to 15 years	13.2%
<b>In the past 30 days, on the days you smoked, how many cigarettes did you usually smoke each day?</b>	
A few puffs to a whole cigarette	22.2%
2 to 5 cigarettes	51.8%
6 to 10 cigarettes	9.3%
11 to 20 cigarettes	3.7%
30 or more whole cigarettes	5.6%
Missing	7.4%
<b>Do you ever smoke inside your home?</b>	
Yes	47.6%
No	52.4%
<b>When you smoke, how often do you share cigarettes with others?</b>	
Never	0
Sometimes	31.9%
Usually	23.4%
Always	44.7%
<b>Where do you usually get your cigarettes?</b>	
I ask someone to buy them for me	24.4%
I buy them from a friend or someone else	22.2%
A friend or someone else gives them to me	15.6%
I buy them myself at a store	11.1%
My mother or father gives them to me	4.4%
I take them from my mother, father, sibling	4.4%
My brother or sister gives them to me	4.4%
Other	13.3%

\*Current smoking status, for this study, was defined as someone who has smoked one or more whole cigarettes within the past 30 days

a mother who worked a nonprofessional job, were significantly associated with youth smoking. As an example, 54.3% of grade 8 students were current smokers, in comparison with 14.9% of grade 5 students (Table 2).

There were no statistically significant differences related to smoking knowledge and attitudes toward smoking, between smoking and nonsmoking youth. There were, however, three statistically significant differences between smoking and nonsmoking youth with regard to why they believed youth their age started smoking. Smoking youth were more likely to report stress and

**TABLE 2**  
**Smoking prevalence according to demographics and socioeconomic status**

	Smoking prevalence, %	P
Grade in school		0.000
Grade 5	14.9	
Grade 6	25.5	
Grade 7	30.8	
Grade 8	54.3	
Age, years		0.000
10	4.8	
11–12	17.2	
13–16	56.7	
Sex		0.004
Male	17.7	
Female	35.5	
Father is employed		0.604
Yes	25.5	
No	29.0	
If employed, father's occupation		0.478
Professional	14.3	
Nonprofessional	26.4	
Mother is employed		0.681
Yes	29.2	
No	25.6	
If employed, mother's occupation		0.035
Professional	4.8	
Non-professional	36.0	
Parental employment		0.665
One or both parents are employed	24.6	
Neither parent is employed	21.6	
Who do you live with?		0.780
Both mother and father	22.9	
Mother only	31.6	
Father only	18.2	
Half with mother, half with father	30.0	
Guardian or other	33.7	

curiosity as reasons to start smoking, while nonsmoking youth were more likely to cite popularity as a reason to start smoking. Information on smoking knowledge and attitudes are presented in Table 3.

With regard to parental relationships, having understanding parents, a happy home life and having parents who show trust in their child, were significantly associated with being a nonsmoker. On the other hand, engaging in frequent arguments with parents and wanting to leave home were significantly associated with being a smoker (Table 4). For example, of youth who smoked, 42.6% strongly agreed that there were times they would like to leave home, in comparison with only 19.2% of nonsmoking youth.

Low self-reported health and mental health were both significantly associated with smoking among youth, along with depressed mood, suicide ideation within the past 12 months, alcohol use and marijuana use. For example, of youth who smoked, 43.2% had suicide ideation compared with 15.2% of nonsmoking youth. Low self-esteem was not significantly associated with smoking cigarettes in the present study (Table 5).

Parent and sibling smoking were not associated with youth smoking; however, having many friends that smoked and having easy access to cigarettes were both significantly associated with

**TABLE 3**  
**Knowledge, attitudes and behaviours according to smoking status**

	Smoker	Nonsmoker	P
Do people have to smoke for many years before it hurts their health?			0.290
Yes	21.6	31.0	
No	29.4	31.8	
I don't know	49.0	37.2	
Is there any danger to your health from the occasional cigarette?			0.484
Yes	56.0	46.2	
No	22.0	25.4	
I don't know	22.0	28.5	
Can smoking help people when they are bored?			0.733
Yes	17.0	13.1	
No	57.4	56.9	
I don't know	25.5	30.0	
Does smoking help people relax?			0.149
Yes	43.8	28.2	
No	27.1	35.5	
I don't know	29.2	36.3	
Does quitting smoking reduce health damage even after many years of smoking?			0.243
Yes	29.2	31.5	
No	12.5	22.3	
I don't know	58.3	46.2	
Does smoking help people stay slim?			0.544
Yes	13.0	17.2	
No	34.8	39.8	
I don't know	52.2	43.0	
Can people become addicted to tobacco?			0.101
Yes	74.5	64.6	
No	12.8	7.9	
I don't know	12.8	27.6	
Can tobacco smoke be harmful to the health of non-smokers?			0.159
Yes	66.7	51.9	
No	13.3	13.2	
I don't know	20.0	34.9	
Do people who smoke become more popular?			0.239
Yes	10.9	20.9	
No	60.9	48.8	
I don't know	28.3	30.2	
Can smokers quit any time they want?			0.151
Yes	34.0	23.2	
No	46.8	44.0	
I don't know	19.1	32.8	
Do you think smoking is cool?			0.309
Yes	10.6	5.5	
No	72.3	69.3	
I don't know	17.0	25.2	
Should smoking be allowed around kids at home?			0.919
Yes	4.3	3.1	
No	72.3	71.7	
I don't know	23.4	25.2	
Should smoking be allowed around kids in cars?			0.405
Yes	8.5	3.9	
No	66.0	73.4	
I don't know	25.5	22.7	
Why do you think people your age start to smoke?			
To escape from or deal with stress, yes	49.0	24.6	0.001
The popular kids smoke, yes	21.6	40.3	0.017
Curiosity - they just want to try it, yes	45.1	29.1	0.039
Their friends smoke, yes	37.3	50.0	0.120
Their brother or sister smokes, yes	23.5	33.6	0.186
They think it is cool, yes	41.2	48.5	0.372
For something to do, yes	31.4	25.4	0.412
To lose weight or stay slim, yes	11.8	15.7	0.501
Their mother or father smokes, yes	27.5	30.6	0.676
They think it is relaxing, yes	29.4	26.9	0.729
Because it is not allowed, yes	19.6	20.1	0.934
I do not know	29.4	20.1	0.179
Other	17.6	10.4	0.185

Data presented as %, unless otherwise indicated

**TABLE 4**  
**Parental relationship according to smoking status**

Parental Relationship	Smoker	Non-Smoker	P-value
My parents understand me			0.003
Strongly agree	13.0%	42.3%	
Agree	50.0%	34.6%	
Neither agree nor disagree	22.2%	16.9%	
Disagree	9.3%	4.6%	
Strongly disagree	5.6%	1.5%	
I have a happy home life			0.000
Strongly agree	20.4%	46.6%	
Agree	31.5%	35.1%	
Neither agree nor disagree	24.1%	16.7%	
Disagree	11.5%	4.6%	
Strongly disagree	7.4%	2.3%	
My parents expect too much of me			0.233
Strongly agree	13.0%	14.5%	
Agree	40.7%	25.0%	
Neither agree nor disagree	22.2%	27.4%	
Disagree	16.7%	27.4%	
Strongly disagree	7.4%	5.6%	
My parents trust me			0.002
Strongly agree	24.1%	43.9%	
Agree	31.5%	34.8%	
Neither agree nor disagree	31.5%	9.1%	
Disagree	11.1%	9.1%	
Strongly disagree	1.9%	3.0%	
I have a lot of arguments with my parents			0.007
Strongly agree	16.7%	7.8%	
Agree	24.1%	17.1%	
Neither agree nor disagree	31.5%	17.8%	
Disagree	18.5%	38.0%	
Strongly disagree	9.3%	19.4%	
There are times when I would like to leave home			0.001
Strongly agree	42.6%	19.2%	
Agree	31.5%	26.9%	
Neither agree nor disagree	11.1%	13.1%	
Disagree	13.0%	21.5%	
Strongly disagree	1.9%	19.2%	
What my parents think of me is important			0.064
Strongly agree	29.6%	51.5%	
Agree	35.2%	29.2%	
Neither agree nor disagree	22.2%	10.8%	
Disagree	11.1%	6.9%	
Strongly disagree	1.9%	1.5%	

smoking (Table 6). For example, of youth with five or more friends who smoked, 57.1% were also smokers themselves.

We did not find any association between being physically, verbally, socially or electronically bullied and youth smoking (data not shown).

After the initial cross tabulations, binary logistic regression analysis was used to determine four independent risk indicators associated with current smoking in First Nations youth. The covariates included the following: 13-16 years of age (compared with 10-12 years of age); disagreeing or strongly disagreeing that they have a happy home life; seriously considering suicide in the previous 12 months and; having at least three close friends who smoke cigarettes.

There was no confounding or effect modification in the final regression model. The  $R^2$  for the final model was 0.440, suggesting

**TABLE 5**  
Smoking status by self-esteem, self-reported health, depressed mood, suicide ideation and alcohol/substance use

	Smoker	Non-Smoker	P
Self-esteem			0.534
Low self-esteem	17.0	13.4	
Normal self-esteem	83.0	86.6	
Self-report Health			
In general would you say that your health is... ?			0.039
Excellent, very good	37.7	54.4	
Good, fair or poor	62.3	45.6	
In general would you say that your mental health is... ?			0.016
Excellent, very good	23.5	42.7	
Good, fair or poor	76.5	57.3	
Depressed mood			0.016
Depressed mood	39.6	22.1	
No depressed mood	60.4	77.9	
Suicide ideation			
In the past 12 months, did you seriously consider suicide?			0.000
Yes	43.2	15.2	
No	56.8	84.8	
Other risk behaviors			
Which of the following best describes your experience with drinking alcohol?			0.000
I have never had a drink of alcohol	13.7	72.0	
I have only had a few sips, I do not drink alcohol anymore	68.6	24.8	
I drink alcohol	17.6	3.2	
Which of the following best describes using your experience marijuana or cannabis products?			0.000
I have never done this	32.7	86.1	
I have used marijuana, but not in the past 12 months	20.4	8.2	
I have used marijuana in the past 12 months	46.9	5.7	

Data presented as %, unless otherwise noted

a reasonable explanation of the proportion of variance in the outcome variable by the explanatory variables. The goodness of fit test result ( $P=0.497$ ), suggests that the final model is appropriate and that the predicted values are accurate representations of the observed values.

## DISCUSSION

There has been a great deal of literature published on smoking in adolescence. One literature review found associations between smoking in adolescence with age, race, parental socioeconomic status, family structure, parent/child relationship, parental smoking and attitudes, sibling smoking, peer smoking and attitudes, school factors, risk behaviours, lifestyle, stress, depression and self-esteem; however, only one of the studies reviewed specifically investigated Aboriginal youth smoking (23).

Our results showed that 26.5% of First Nations youth in grades 5 through 8 were current smokers. This result is consistent with previous studies of on-reserve First Nations youth that found between 33% and 37.8% of similarly aged youth were smokers (4,6).

By comparison, in a study of youth 10 to 15 years of age, from the city of Saskatoon, only 3.7% had smoked within the past 30 days; with 2.0% of Caucasian youth and 19.9% of Aboriginal youth (First Nations, Métis or Inuit) being smokers (24).

Not only are on-reserve First Nations youth smoking more, but they also start smoking earlier. According to a study from Statistics

**TABLE 6**  
Social influence by smoking status

	Smoker	Nonsmoker	P
Do any of your parents, step-parents or guardians smoke cigarettes?			0.958
Yes	81.6	83.1	
No	10.2	10.0	
I don't know	8.2	6.9	
Do any of your brothers or sisters smoke cigarettes?			0.064
Yes	75.0	56.2	
No	20.8	39.2	
I don't know	4.2	4.6	
What are the rules about smoking in your home?			0.088
No one is allowed to smoke in my home	29.8	50.8	
Only special guests are allowed to smoke in my home	8.5	4.8	
People are allowed to smoke in certain areas of my home	27.7	22.6	
People are allowed to smoke anywhere in my home	34.0	21.8	
How many of your close friends smoke cigarettes?			0.000
None	4.1	52.3	
1 or 2 friends	18.4	22.8	
3 or 4 friends	20.4	9.0	
5 or more friends	57.1	15.9	
Do you think it would be difficult or easy for you to get cigarettes if you wanted to smoke?			0.000
Difficult	17.6	23.5	
Easy	49.0	11.0	
I do not know	33.3	65.4	

Data presented as %, unless otherwise noted

**TABLE 7**  
Independent risk indicators associated with youth smoking

Independent variable	OR	95% CI	P
Age 13-16 years	1.672	1.185–1.868	0.016
I have a happy home life			
Neither agree nor disagree/Disagree/Strongly disagree	1.559	1.063–1.792	0.033
Suicide ideation in the past 12 months			
Yes	3.472	1.151–10.480	0.027
Close friends who smoke cigarettes			
3 or more	1.393	1.214–1.531	0.000
Relevance categories: age - 10 to 12 years of age			
I have a happy home life – Agree/strongly agree			
Suicide ideation in the past 12 months - No			
Close friends who smoke cigarettes - 2 or less friends who smoke cigarettes			

Canada, the majority of young adults (21 to 39 years of age) reported starting to smoke between 14 and 17 years of age (25). Younger age of initiation within on-reserve First Nations youth (between 9 and 12 years of age), suggests that smoking prevention programs should be targeted toward younger students in these communities. This may also help address the low level of smoking harm-related knowledge of First Nations youth in these communities (26).

Before regression analysis, we found that school grade and age were associated with First Nations youth smoking. This is consistent with results previously reported in the literature. For example, the FNRLHS reported that 10.9% of 12 year olds were smokers, but that the prevalence increased to 60.7% for 17 year olds (4). In our study, 4.8% of 10 year olds were current smokers, compared

with 56.7% of those 13 to 16 years of age. The finding that female sex is associated with smoking is consistent with results from the FNRLHS(1).

Additionally, our finding that mother's occupation (nonprofessional versus professional), parental relationship factors, self-reported health and mental health, depressed mood, alcohol and drug use and peer smoking were all associated with First Nations youth smoking, is consistent with previous findings in non-Aboriginal youth (19). Suicide ideation was also associated with smoking in First Nations youth. One previous study found that early tobacco smoking was associated with suicide ideation, along with high levels of stress, depression and poor family relationships (27).

We did not find statistically significant associations between smoking among First Nations youth and sex, maternal or paternal employment status, family structure, self-esteem or parental and sibling smoking behaviour. These findings are inconsistent with the literature and might be due to the fact that most studies are based on non-First Nations youth.

After regression analysis, four variables were found, to be independently associated with smoking in on-reserve First Nations youth (Table 7). Older age, namely being between 13 and 16 years of age, was an independent risk indicator for First Nations youth smoking. Additionally, disagreeing or strongly disagreeing that one had a happy home life was an independent risk factor for smoking. A previous study had found that perceptions of home life and family support have an effect on smoking behaviour, namely, that perceptions of an unsupportive family were associated with smoking among adolescents (28). Furthermore having suicide ideation in the past 12 months is also an independent risk indicator of smoking. The association between tobacco smoking and suicide may be especially important for this cultural group because Aboriginal suicide is one of the leading causes of death among Aboriginals, 10 to 19 years of age in Canada (5). There is extensive literature that ties high suicide rates among Aboriginal youth to intergenerational trauma caused by the disruption of culture, racism, and demoralization (29). Finally, having more than three friends who smoked cigarettes made it more likely that a youth would be a current smoker. Peer influence on smoking has been well documented in the literature, but there have been varying results depending on the definition of peers used (best friends, friends, classmates, etc), and the aspect of smoking studied (initiation versus persistence) (23). One study, investigating ethnic differences, found that peer influence was weaker in youth from collectivist cultures when compared with youth from more individualistic cultures; however, the study did not include Aboriginal youth (30). Although previous studies have shown that these four factors were associated with youth smoking, there has not been a study that demonstrated these variables to be independently associated with smoking in on-reserve First Nations youth after multivariate adjustment.

A limitation to the present study was that it was cross-sectional and, therefore, could not determine causation. There was also no ability to compare children in foster care with those living with a family member.

Preventing and reducing smoking among First Nations youth should be a priority. One potential method to reduce smoking is through taxation. In Canadian youth, it has been shown that for every one dollar increase per carton of cigarettes, there is a 15% reduction in smoking initiation (31). One potential idea would be to encourage First Nations to bring their cigarette prices on par with other retailers, provided they could keep the extra money for health programs including smoking prevention and cessation strategies.

Based on the results from the present study, school-based prevention and cessation programs should be targeted toward younger students. Happy home life can be addressed by including school-based mental health promotion programs (32-35). Suicide ideation can also be addressed by these mental health promotion programs, but should also include individual and group-based counselling in school while promoting smoking cessation (36,37). School-based programming should include friends and peers with social influence and social competence development (38).

In summary, smoking prevalence within on-reserve First Nations youth is quite high. The identification of four main risk indicators should assist with the design of youth smoking prevention and cessation programs.

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