Prevalence of Smokeless Tobacco Use Among Canadian Youth Between 2004 and 2008: Findings From the Youth Smoking Survey

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ABSTRACT

Objectives: The current study team sought to understand smokeless tobacco (SLT) usage trends among youth, using nationally representative data collected as part of the Canadian Youth Smoking Survey (YSS) between 2004 and 2008.

Methods: Descriptive analyses of SLT ever use among respondents in grades 6 to 9 were examined according to year of data collection (2008, n=31,249; 2006, n=34,050; and 2004, n=23,362). Using the 2008 data from respondents in grades 6 to 12 (n=51,922), logistic regression models were used to examine characteristics associated with SLT ever use and current use.

Results: Between 2004 and 2008, the prevalence of youth in grades 6 to 9 reporting they have ever tried SLT significantly decreased by 30.8%. In 2008, male students were more likely than females to have tried SLT (OR 4.87, 95% CI 4.34-5.45) or to currently use SLT (OR 4.96, 95% CI 4.12-5.96). There are regional differences in prevalence of SLT use across Canada, with the highest rates in western provinces and the lowest in Quebec. Current smokers were also more likely to use SLT (OR 11.86, 95% CI 10.22-13.76) compared to non-smokers. Older students are more likely to report ever use or current use of SLT.

Conclusion: The findings from this study demonstrate that in Canada, adolescent SLT use is primarily an issue with males and there are significant regional differences. Ongoing monitoring of SLT is encouraged considering the tobacco industry's recent investments and product development and increased use in countries like the United States.

Key words: Smokeless tobacco; Adolescent; Canada

La traduction du résumé se trouve à la fin de l'article.

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Smokeless tobacco (SLT) is a term used to describe a family of non-combusted consumer products that deliver nicotine and are generally placed in the mouth or nasal passage. SLT products are addictive and contain over 3,000 chemicals, of which at least 28 are known carcinogens.^{1,2} It is estimated that less than 1% of Canadians (aged 15+ years) are regular users of SLT; however, SLT use is higher among adolescents and young adults compared to the general population.³ Developing a better understanding of SLT use among at-risk Canadian youth should be a public health priority.

In 2009, value sales of SLT in Canada increased by 1% over the previous year, reaching a value of approximately \$189 million, although net volume of sales decreased.⁴ The majority of SLT sold in Canada is moist snuff and US-style chewing tobacco, although rates of Swedish-style snuff use, also known as snus, have recently become detectable since being introduced to the Canadian market in 2007.⁴⁻⁶ Snuff and chew are collectively called 'spit tobacco' as users tend to prefer to avoid swallowing their saliva when using these forms of SLT,⁷ whereas snus is a spit-less snuff.⁸ In Canada, SLT market-watchers have reported an increase in youth-oriented promotions and product development for SLT, especially with respect to the introduction of a variety of flavoured brands including cherry, raspberry, cotton candy, and chocolate mint.⁹ These flavoured products have been credited with promoting SLT experimentation among youth.⁴ Despite the recent surge in efforts to introduce and promote SLT by the world's largest tobacco transnationals¹⁰ and concerns that SLT may be used by the tobacco

industry as a gateway product to promote nicotine use and eventual cigarette usage,¹¹ little is known about how rates of SLT use among youth have changed over time. The current study team sought to understand SLT usage trends between 2004 and 2008 among Canadian youth.

METHODS

This study used nationally representative data collected as part of the 2008, 2006 and 2004 waves of the Canadian Youth Smoking Survey (YSS).¹² Detailed information on the sample design, methods and survey rates for each wave of the YSS are available: 2008 YSS,¹³ 2006 YSS,¹⁴ 2004 YSS.¹⁵ In brief, the three waves of YSS data used in this manuscript were collected using a similar sampling methodology and research design where the target populations consisted of all young Canadian residents in the appropriate grades attending public and private schools in 10 Canadian provinces; youth residing in the Yukon, Nunavut and the Northwest Territories.

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- Conflict of Interest:** None to declare.

Table 1. Descriptive Statistics for Youth in Grades 6 to 9 by Year of Data Collection (2004, 2006, 2008), Canada

		2004 n=1,622,910	2006 n=1,662,322	2008 n=1,610,254		% Change 2006-2008	2004-2008
		(%)†	(%)†	(%)†	2004-2006 (%)	(%)	(%)
Ever tried smokeless tobacco (SLT)	Yes	2.6	3.1	1.8	19.2*	-41.9*	-30.8*
	No	97.4	96.9	98.2			
Among those who have ever tried SLT		n=41,848	n=52,132	n=28,353			
Sex	Male	3.8	4.4	2.6	15.8*	-40.9*	-31.6*
	Female	1.3	1.8	0.9	38.5*	-50.0*	-30.8*
Smoking status	Never-smoker	2.1	2.4	1.1	14.3*	-54.2*	-47.6*
	Current smoker	22.2	25.8	18.6	16.2	-27.9*	-16.2
	Former smoker	—	23.5	—	—	—	—
Weekly spending money	\$0	1.3	1.8	1.3	38.5*	-27.8*	
	\$1-\$20	2.1	2.6	1.1	23.8*	-57.7*	-47.6*
	\$21-\$100	4.7	4.7	2.7		-42.6*	-42.6*
	>\$100	11.5	10.2	9.7	-11.3	-4.9	-15.7
Grade	6	0.6	0.8	0.3	33.3	-62.5*	-50.0*
	7	1.6	1.3	0.7	-18.8	-46.2*	-56.3*
	8	2.6	3.3	2.2	26.9*	-33.3*	-15.4
	9	5.4	6.9	3.7	27.8*	-46.4*	-31.5*

* Statistically significant difference, $p < 0.05$.

† Weighted population estimate.

— Unreportable due to small sample size.

Table 2. Descriptive Statistics for the Sample of Youth (Grades 6 to 12) by Sex, 2008, Canada

		Male (n=1,460,341)	Female (n=1,388,139)	Total (n=2,848,480)
		%†	%†	%†
Grade	6	13.1	13.6	13.3
	7	13.8	14.2	14.0
	8	14.3	14.5	14.4
	9	14.9	14.8	14.8
	10	15.5	14.9	15.2
	11	14.9	14.7	14.8
	12	13.6	13.4	13.5
Smoking status	Never-smoker	90.1	92.5	91.3
	Current smoker	8.9	6.4	7.7
	Former smoker	1.0	1.1	1.0
Weekly spending money	\$0	22.0	19.0	20.5
	\$1-\$20	38.4	41.4	39.8
	\$21-\$100	24.1	27.1	25.5
	>\$100	15.6	12.5	14.1
Region	Atlantic Canada‡	6.7	7.2	6.9
	Quebec	19.3	19.4	19.4
	Ontario	41.4	40.5	40.9
	Prairies§	18.8	19.1	18.9
	British Columbia	13.8	13.9	13.9
Ever tried smokeless tobacco	Yes	8.3	2.1	5.3
	No	91.7	97.9	94.7
Current smokeless tobacco use	Yes	3.5	0.6	2.1
	No	96.5	99.4	97.9

† Weighted population estimate.

‡ New Brunswick, Prince Edward Island, Nova Scotia, Newfoundland & Labrador.

§ Alberta, Saskatchewan, Manitoba.

ries were excluded from the target populations, as were youth living in institutions or on First Nation Reserves, and youth attending special schools or schools on military bases. The main design difference across the three waves of YSS is in relation to the grades sampled. The 2008 YSS sampled students in grades 6 to 12, the 2006 YSS sampled students in grades 5 to 12, and the 2004 YSS sampled students in grades 5 to 9. Within this manuscript, we used data from respondents in grades 6 to 9 for the analyses, examining changes in the prevalence of SLT ever use over time to make relative comparisons (2008, $n=31,249$; 2006, $n=34,050$; 2004, $n=23,362$), and data from the 2008 YSS respondents in grades 6 to 12 ($n=51,922$) for the predictive modeling.

During each wave, the YSS included questions about SLT use, smoking behaviour, demographic characteristics, and spending money. The measures of SLT ever use varied across each wave of the YSS due to changes in product availability at the time of the survey. In 2004, ever use of SLT was measured by asking respondents if they have ever tried chewing tobacco or snuff. In 2006,

ever use of SLT was measured by asking respondents if they have ever tried chewing tobacco or if they have ever tried oral snuff or nasal snuff. In 2008, ever use of SLT was measured by asking respondents to report if they have ever tried smokeless tobacco (chewing tobacco, pinch, snuff, or snus). In 2008, current use of SLT was measured by asking respondents if they have used smokeless tobacco (chewing tobacco, pinch, snuff, or snus) in the last 30 days.

Analyses

Descriptive analyses of SLT ever use among respondents in grades 6 to 9 were examined according to year of data collection and sex. Using the 2008 data from respondents in grades 6 to 12, descriptive analyses of SLT ever use and current use, smoking status, and demographic characteristics were examined by sex. For the descriptive statistics, survey weights were used to adjust for non-response between provinces and groups, thereby minimizing any bias in the analyses caused by differential response rates across regions or

Figure 1. Prevalence of ever use of smokeless tobacco over time among grade 6 to 9 students by region of Canada
Canada, 2004-05, 2006-07, 2008-09

Source: 2004-05, 2006-07, 2008-09 Canadian Youth Smoking Surveys.
† New Brunswick, Prince Edward Island, Nova Scotia, Newfoundland & Labrador.
‡ Alberta, Saskatchewan, Manitoba.

groups. Using the 2008 data, we conducted two logistic regression analyses to examine characteristics associated with SLT ever use and SLT current use. The statistical package SAS 9.2 was used for all analyses.¹⁶

RESULTS

Prevalence of SLT ever use for grades 6-9 – 2004-2008

Table 1 presents the descriptive statistics for SLT ever use and demographic characteristics for SLT ever users in grades 6 to 9 by year of data collection (2004, 2006, 2008). In 2004, 2.6% (41,848) of Canadian youth in grades 6 to 9 reported having ever tried SLT. Among those who report ever use, rates were highest among males (3.8%), current smokers (22.2%), respondents with more than \$100 of weekly spending money (11.5%), and those in grade 9 (5.4%). Rates of SLT ever use in 2004 were highest in the Prairies (5.6%) and lowest in Quebec (1.4%) and Ontario (2.0%). In 2006, 3.1% (52,132) of Canadian youth in grades 6 to 9 reported having ever tried SLT. Among those who report ever use, rates were highest among males (4.4%), current (25.8%) and former (23.5%) smokers, respondents with more than \$100 of weekly spending money (10.2%), and those in grade 9 (6.9%). As shown in Figure 1, rates of SLT ever use in 2006 were highest in the Prairies (6.0%) and British Columbia (5.5%), and lowest in Quebec (1.8%) and Ontario (1.9%). In 2008, 1.8% (28,353) of Canadian youth in grades 6 to 9 reported having ever tried SLT. Among those who report ever use, rates were highest among males (2.6%), among current smokers (18.6%), respondents with more than \$100 of weekly spending money (9.7%), and those in grade 9 (3.7%). As shown in Figure 1, rates of SLT ever use in 2008 were highest in British Columbia (3.0%), the Prairies (2.8%), and lowest in Quebec (1.2%) and Ontario (1.2%).

Factors associated with SLT ever use in grades 6 to 12 – 2008

Table 2 presents the descriptive statistics for respondents in grades 6 to 12 in 2008 by sex. The study sample was 48.7% (n=1,388,139)

Figure 2. Prevalence of smokeless tobacco use among males by region of Canada
Canada, 2008-09

Source: 2008-09 Canadian Youth Smoking Survey.
† New Brunswick, Prince Edward Island, Nova Scotia, Newfoundland & Labrador.
‡ Alberta, Saskatchewan, Manitoba.
§ Unable to report current use due to small cell size in Quebec.

female and 51.3% (n=1,460,341) male. With respect to cigarette usage, the majority of the respondents were never smokers (91.3%) and 7.7% (n=219,884) were current smokers; the prevalence of current smoking was higher for males (8.9%) than females (6.4%) ($\chi^2=113.82$, $df=2$, $p<0.001$). Among all respondents, 5.3% (n=150,616) reported ever use of SLT and 2.1% (n=59,074) reported current use of SLT. Males were more likely than females to ever use SLT ($\chi^2=987.53$, $df=1$, $p<0.001$) and currently use SLT ($\chi^2=524.19$, $df=1$, $p<0.001$).

Table 3 presents the results of the logistic regression analyses examining SLT ever and current use among respondents in grades 6 to 12 in 2008. Male students were more likely than female students to have ever used SLT (OR 4.87, 95% CI 4.34-5.45). Nationally, 2.1% of adolescent females report ever use of SLT; ever use is highest in British Columbia (5.6%) and the Prairies (2.6%) among females. Compared to never smokers, current smokers (OR 9.49, 95% CI 8.55-10.53) and former smokers (OR 4.73, 95% CI 3.54-6.34) were more likely to have ever used SLT. Compared to students in grades 6 to 8, students were more likely to have ever used SLT if they were in grade 9 (OR 2.59, 95% CI 2.13-3.14), grade 10 (OR 4.37, 95% CI 3.67-5.20), grade 11 (OR 5.12, 95% CI 4.31-6.09) or grade 12 (OR 5.32, 95% CI 4.47-6.33). Compared to students with no weekly spending money, students were more likely to have ever used SLT if they had \$21 to \$100 (OR 1.27, 95% CI 1.09-1.48) or more than \$100 (OR 1.60, 95% CI 1.37-1.88) of weekly spending money.

Factors associated with SLT current use in grades 6 to 12 – 2008

Male students were more likely than female students to currently use SLT (OR 4.96, 95% CI 4.12-5.96). Female current use of SLT was highest in western Canada including BC and the Prairies (1.0%). Compared to never smokers, current smokers (OR 11.86, 95% CI 10.22-13.76) and former smokers (OR 3.19, 95% CI 1.85-5.51) were more likely to currently use SLT. Compared to students in grades 6 to 8, students were more likely to currently use SLT if they were in grade 9 (OR 2.01, 95% CI 1.51-2.68), grade 10 (OR 3.29, 95% CI 2.56-4.23), grade 11 (OR 2.22, 95% CI

Table 3. Logistic Regression Analyses Examining Factors Associated With Smokeless Tobacco Ever Use and Current Use Among Youth (Grades 6 to 12) in 2008, Canada

Factors		Adjusted Odds Ratio§ (95% CI)	
		Model 1 Ever tried smokeless tobacco vs. Never tried smokeless tobacco	Model 2 Current smokeless tobacco user vs. Non-user of smokeless tobacco
Sex	Female	1.00	1.00
	Male	4.87 (4.34, 5.45)***	4.96 (4.12, 5.96)***
Smoking status	Never-smoker	1.00	1.00
	Current smoker	9.49 (8.55, 10.53)***	11.86 (10.22, 13.76)***
	Former smoker	4.73 (3.54, 6.34)***	3.19 (1.85, 5.51)***
Grade	6 to 8	1.00	1.00
	9	2.59 (2.13, 3.14)***	2.01 (1.51, 2.68)***
	10	4.37 (3.67, 5.20)***	3.29 (2.56, 4.23)***
	11	5.12 (4.31, 6.09)***	2.22 (1.71, 2.89)***
	12	5.32 (4.47, 6.33)***	1.88 (1.44, 2.45)***
Region	British Columbia	1.00	1.00
	Atlantic Canada†	0.45 (0.37, 0.54)***	0.31 (0.23, 0.42)***
	Quebec	0.14 (0.12, 0.17)***	0.06 (0.05, 0.09)***
	Ontario	0.42 (0.37, 0.47)***	0.34 (0.29, 0.41)***
	Prairies‡	0.79 (0.69, 0.90)***	0.43 (0.35, 0.52)***
	c statistic	0.858	0.868
Weekly spending money	\$0	1.00	1.00
	\$1-\$20	0.97 (0.83, 1.13)	0.78 (0.61, 1.00)
	\$21-\$100	1.27 (1.09, 1.48)**	1.35 (1.06, 1.71)*
	>\$100	1.60 (1.37, 1.88)***	2.36 (1.86, 3.00)***

* p<0.05, ** p<0.01, *** p<0.001.

§ Odds ratios are adjusted for all other variables in the table.

† New Brunswick, Prince Edward Island, Nova Scotia, Newfoundland & Labrador.

‡ Alberta, Saskatchewan, Manitoba.

Model 1: 1 = Ever tried smokeless tobacco (n=2,159), 0 = Never tried smokeless tobacco (n=42,641).

Model 2: 1 = Current smokeless tobacco user (n=861), 0 = Non-user of smokeless tobacco (n=43,939).

1.71-2.89) or grade 12 (OR 1.88, 95% CI 1.44-2.45). Compared to students with no weekly spending money, students were more likely to currently use SLT if they had \$21 to \$100 (OR 1.35, 95% CI 1.06-1.71) or more than \$100 (OR 2.36, 95% CI 1.86-3.00) of weekly spending money.

Prevalence of SLT current and ever use in grades 6 to 12 – 2008

Prevalence of SLT use for males, grades 6-12, is presented by region (Figure 2) and grade (Figure 3). In Figure 2, the prevalence of male SLT ever use was highest in British Columbia (13.9%) and the Prairies (13.1%), and lowest in Quebec (2.3%). The prevalence of SLT current use was highest in British Columbia (8.3%) and lowest in Quebec. As shown in Figure 3, the prevalence of SLT ever use increased with each grade, with 19.0% of grade 12 Canadian males reporting ever use. The greatest increase in percentage of SLT current use among adolescent males is between grades 9 and 10. Current use of SLT among males in grades 10, 11 and 12 were fairly similar, ranging from 5.7-7.3%.

A further analysis was conducted to identify rates of ever and current use of SLT for senior male students by province. Senior students included grade 11 in Quebec, and grades 11 and 12 in the rest of Canada. SLT ever-use rates with this group are highest in the Prairies (25.6%) and BC (23.6%), followed by Atlantic Canada (16.3%), Ontario (14.2%) and Quebec (6%). SLT current use rates with this group are highest in the Prairies (7.8%), followed by Atlantic Canada (5.5%) and Ontario (4.8%). British Columbia and Quebec had unreportable data due to small sample size.

DISCUSSION

Self-reported ever use of SLT decreased by 30.8% between 2004-2008 for Canadian students in grades 6-9; however, the proportion of male youth reporting ever and current use of SLT in 2008 increased

Figure 3. Prevalence of smokeless tobacco use in males by grade Canada, 2008-09

Source: 2008-09 Canadian Youth Smoking Survey.

from grade 6 to 12, with the greatest increases between grades 9 and 10. Nearly 1 in 5 grade 12 males in Canada have tried SLT and 7.3% are current users. Therefore this trend should be interpreted cautiously as the findings from the most recent wave of the YSS suggest that SLT experimentation is taking place largely after grade 9.

Across Canada, male youth are consistently more likely to report trying SLT compared to female youth. It is important to note that female adolescent experimentation with SLT is highest in British Columbia and the Prairie provinces – where male adolescent ever and current use is highest.

Co-use of cigarettes and SLT is high; however, it is unclear if youth are initiating tobacco use with cigarettes or SLT. Ongoing

surveillance would make it possible to understand the temporal sequence underlying the onset of use of different tobacco products.

In each wave of the survey, there is an interesting association with weekly spending money and reported ever use of SLT by youth in grades 6-9. In 2008, youth with greater than \$100 of weekly spending money were significantly more likely to currently use SLT, compared to students with no weekly spending money. This finding is consistent with research identifying that youth with more weekly spending money are more likely to participate in risk behaviours such as smoking cigarettes, consuming alcohol and smoking marijuana.¹⁷

Historically, SLT usage has been higher among Aboriginal youth and in the northern parts of Canada.^{18,19} This study is limited in that youth from the 3 territories were not included in the sample nor were youth living on reserves. As such, the estimates of SLT prevalence presented are likely underestimating the actual prevalence of SLT use among Canadian youth. Future surveillance of SLT use should include youth respondents from these subpopulations who would be considered at high risk for use.

The YSS was conducted with different grades in each wave and therefore it is not possible to track changes or trends in SLT experimentation and use across all ages for each wave of the survey. The measure used to assess current SLT use is limited in that it asked students to report use of SLT in the last 30 days and did not include, as is commonly done with cigarette smoking in public health surveys, a minimum number of portions, such as "100 uses in a lifetime". Improving these measures could make it easier to understand SLT use patterns with youth. The current measures also do not ask youth to differentiate what kind of SLT product they have used or currently use. Ongoing monitoring of SLT is encouraged in light of the tobacco industry's recent investments and product development in SLT, and increased use in countries like the United States that have experienced a 33% increase in sales between 2000 and 2007.²⁰

There have been calls in Canada for regulations banning flavourings in SLT,^{21,22} and for improved health promotion and education strategies.¹⁹ Health Canada recommends caution when health educators address SLT given that use is quite low in some regions, reminding teachers and others that discussions about the products could make students curious about SLT and possibly encourage experimentation.¹⁹

CONCLUSION

The findings from this study demonstrate that adolescent SLT use is primarily an issue with males and there are significant regional differences across the country, with higher rates in western provinces and very low use in Quebec. Although reported 'ever use' has decreased approximately 30% for students in grades 6-9 between 2004 and 2008, SLT experimentation appears to occur more in grades 10-12. In 2008, female adolescent use of SLT was low across the country, although it was highest in British Columbia and the Prairies.

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RÉSUMÉ

Objectifs : Le groupe d'étude actuel de l'Enquête sur le tabagisme chez les jeunes (ETJ) a cherché à comprendre les tendances de l'usage du tabac sans fumée (TSF) chez les jeunes au moyen de données représentatives nationales recueillies dans le cadre de l'ETJ menée au Canada entre 2004 et 2008.

Méthode : Des analyses descriptives de l'usage du TSF chez les répondants de la 6^e à la 9^e année ont été examinées selon l'année de collecte des données (2008, n=31 249; 2006, n=34 050; et 2004, n=23 362). À l'aide des données de 2008 obtenues auprès des répondants de la 6^e à la 12^e année (n=51 922), nous avons utilisé des modèles de régression logistique pour étudier les caractéristiques associées au fait d'avoir déjà utilisé du TSF et au fait d'en utiliser actuellement.

Résultats : Entre 2004 et 2008, la prévalence de jeunes de la 6^e à la 9^e année ayant déjà essayé du TSF a présenté une baisse significative de 30,8 %. En 2008, les garçons étaient plus susceptibles que les filles d'avoir essayé le TSF (RC=4,87, IC de 95 % = 4,34-5,45) ou d'en utiliser actuellement (RC=4,96, IC de 95 % = 4,12-5,96). Il y a des écarts régionaux dans la prévalence de l'usage du TSF au Canada, les taux les plus élevés étant observés dans les provinces de l'Ouest, et le taux le plus faible au Québec. Les fumeurs actuels étaient aussi plus susceptibles d'utiliser du TSF (RC=11,86, IC de 95 % = 10,22-13,76) que les non-fumeurs. Les élèves plus âgés étaient plus susceptibles de déclarer avoir déjà utilisé ou utiliser actuellement du TSF.

Conclusion : Ces constatations montrent qu'au Canada, l'usage du TSF chez les adolescents concerne principalement les garçons, et qu'il existe des écarts régionaux importants. La surveillance continue de l'usage du TSF est à encourager, étant donné les investissements récents et le développement de nouveaux produits par l'industrie du tabac et l'usage accru du TSF dans des pays comme les États-Unis.

Mots clés : tabac sans fumée; adolescent; Canada

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