

# **Examining the link between education related outcomes and student health risk behaviours among Canadian youth: Data from the 2006 National Youth Smoking Survey**

Ratsamy Pathammavong  
*University of Waterloo*

Scott T. Leatherdale  
*Cancer Care Ontario*

Rashid Ahmed  
*Canadian Cancer Society*

Jane Griffith  
*Cancer Care Manitoba*

Janet Nowatzki  
*Cancer Care Manitoba*

Steve Manske  
*Canadian Cancer Society*

## **Authors' Note**

The authors would like to thank Health Canada, Cancer Care Ontario, the Interdisciplinary Capacity Enhancement Program at the University of Waterloo, and the Propel Centre for Population Health Impact for providing support for this project. Dr. Leatherdale is a Cancer Care Ontario Research Chair in Population Studies funded by the Ontario Ministry of Health and Long-term Care. The 2006-2007 Youth Smoking Survey is a product of the pan-Canadian capacity building project funded through a contribution agreement between Health Canada and the Propel Centre for Population Health Impact at the University of Waterloo. This pan-Canadian consortium included Canadian tobacco control researchers from all provinces and provided training opportunities for university students at all levels, encouraging their involvement and growth in the field of tobacco control research.

This work was supported by the Ontario Tobacco Research Unit's Ashley Studentship for Research in Tobacco [to R.P.].

## **Abstract**

This study examined whether student tobacco, alcohol, marijuana use, and sedentary behaviour were associated with the educational outcomes of health-related absenteeism, truancy, and academic motivation in a nationally representative sample of Canadian youth. Descriptive analyses indicate a high proportion of students missed school due to health, and skipped class in

the last month. Truancy increased with age, and male students are more likely to skip class and be less academically motivated. Logistic regression models showed significant associations exist between substance use and all three educational outcomes. These findings support the need for coordinated action and funding in student health promotion.

Keywords: Adolescent, Youth, Truancy, Absenteeism, Academic Motivation, Tobacco, Marijuana, Alcohol

### **Résumé**

Cette étude a examiné si le tabac, l'alcool, la consommation de marijuana, et le comportement sédentaire d'étudiants ont été associés à la réussite scolaire de l'absentéisme liés à la santé, l'absentéisme et la motivation scolaire dans un échantillon national représentatif de la jeunesse canadienne. Les analyses descriptives indiquent une forte proportion d'élèves ont manqué l'école pour raison de santé, et ont sauté de classe dans le dernier mois. L'absentéisme augmente avec l'âge, et les étudiants mâle sont plus susceptibles de manquer de classe et d'être moins motivés académiquement. Des modèles de régression logistique ont montré des associations significatives existent entre l'usage des substances et les trois résultats scolaires. Ces résultats confirment la nécessité d'une action coordonnée et de financement dans la promotion de la santé des élèves.

## **Examining the link between education related outcomes and student health risk behaviours among Canadian youth: Data from the 2006 National Youth Smoking Survey**

### **Introduction**

Adolescent educational achievement is a societal concern of parents, educators, and legislators alike. Poor academic achievement is associated with numerous negative outcomes including greater likelihood of dropping out of high school (Jimerson, Egeland, Sroufe, & Carlson, 2000; Kasen, Cohen, & Brook, 1998), future unemployment (Tanner, Davies, & O'Grady, 1999), and lower adult socioeconomic status (Day & Newburger, 2002; Luster & McAdoo, 1996). Two key predictors of adolescent academic achievement are school absenteeism (Bosworth, 1994; Ou & Reynolds, 2008) and academic motivation (Anderson & Keith, 1997; Ou & Reynolds, 2008). School absenteeism is generally defined as any absence, excusable or inexcusable, from school (Kearney, 2008b). School absenteeism covers the spectrum of absences, such as family trips, absences due to health reasons, being late for classes, skipping classes, or missing entire days of school without parental knowledge or approval (Kearney, 2008b). Although the evidence linking academic success to the type of school absence, excused or unexcused, is mixed (Bosworth, 1994; Eaton, Brener, & Kann, 2008; Farrington & Loeber, 2000; Gottfried, 2009; Moonie, Sterling, Figgs, & Castro, 2008), school administrators identify chronic absenteeism as a major obstacle to academic achievement (Mccray, 2006). Further, chronic absenteeism may be an early indication of future school problems (Bryant, Schulenberg, Bachman, O'Malley, & Johnston, 2000) including eventual early drop out of school (Goodall, 2005).

As truancy, commonly defined as any absence without parental knowledge or approval (Kearney, 2008b), has repeatedly been shown to negatively affect academic achievement (Claes, Hooghe, & Reeskens, 2009; Farrington & Loeber, 2000; Henry & Huizinga, 2007b; Hunt & Hopko, 2009; U.S. Department of Education, 2009), most of the focus of absenteeism centres on this stereotype of students skipping classes or days of school. While truancy is considered a common occurrence in high schools around the world (Henry, Thornberry, & Huizinga, 2009; Willms, 2003), a gap in the research literature exists as to student truancy rates in Canada. Standardized rates of truancy or absenteeism may be difficult to attain as tracking absenteeism is resource intensive and different jurisdictions use different definitions of truancy (Henry, 2007). Additionally, any reporting of youth high school attendance may be difficult to ascertain, as highly absent youth may leave school permanently (Kearney, 2008a; Kearney, 2008b). The most recent published Canadian youth truancy data is from a 2003 OECD study (Willms, 2003) of 43 industrialized nations which ranked Canada 5<sup>th</sup> highest in proportion of truant high school students with an estimated 26% of 15 year olds reporting being late, skipping class, or missing school in the two weeks prior to the survey. However, as this data was collected nearly a decade ago, gaining a better understanding of current student truancy in Canada may help guide the development of more effective measures to prevent students from missing school.

Similar to absenteeism, student academic motivation and interest in school is linked to youth educational attainment. Low academic motivation has been associated with a decreased likelihood of completing high school and interest in pursuing post-secondary

studies (Kasen et al., 1998). In addition to negatively influencing a student's academic achievement, truancy, school absence, and academic motivation are associated with a variety of other health risk behaviours that can negatively affect adolescent health and well-being (Brookes, Goodall, & Heady, 2005; Cox et al., 2007; Cox, Zhang, Johnson, & Bender, 2007; Fantuzzo, Grim, & Hazan, 2005; Goodall, 2005; Hawkins, Catalano, & Miller, 1992; Mccray, 2006; Reid, 2008). Specifically, absentee students are more likely to use tobacco (Bryant et al., 2000; Henry & Huizinga, 2007a; McAra, 2004), drink alcohol (Best, Manning, Gossop, Gross, & Strang, 2006; Duarte & Escario, 2006; French & Maclean, 2006; O'Malley, Johnston, Bachman, Schulenberg, & Kumar, 2006), and experiment with or use marijuana (Henry & Huizinga, 2007a; Henry, 2007; Pérez, Ariza, Sánchez-Martínez, & Nebot, 2010). Correspondingly, low academic motivation is associated with youth tobacco use (Webb, Moore, Rhatigan, Stewart, & Getz, 2007; Zimmerman & Schmeelk-Cone, 2003), alcohol (Webb et al., 2007; Zimmerman & Schmeelk-Cone, 2003), marijuana use (Brown, Schulenberg, Bachman, O'Malley, & Johnston, 2001; Bryant & Zimmerman, 2002; Ellickson, Tucker, Klein, & Saner, 2004; Zimmerman & Schmeelk-Cone, 2003), substance use (Cox et al., 2007; Hawkins et al., 1992), decreased physical activity (Kantomaa, Tammelin, Demakakos, Ebeling, & Taanila, 2010), and increased sedentary behaviour (Kristjánsson, Sigfúsdóttir, Allegrante, & Helgason, 2009; Rideout, Foehr, & Roberts, 2010; Sharif & Sargent, 2006; Sharif, Wills, & Sargent, 2010; Weis & Cerankosky, 2010). Considering the clustering of these health and education related behaviours among youth (Kokkevi, Gabhainn, Spyropoulou, & HBSC Risk Behaviour Focus Group, 2006; Leatherdale, Hammond, & Ahmed, 2008) and the

impact they can have on future health and social outcomes, there is a need to better understand how these adolescent behaviours are related in order to target future initiatives to have the most impact on, or to tailor initiatives to the needs of, the students who are at the greatest risk.

The purpose of the present study is to use nationally representative data from the 2006 Canadian Youth Smoking Survey to examine the association between education-related outcomes (health-related school absences, truancy) and an education related proxy measure (academic motivation), and student health risk behaviours (tobacco, alcohol and marijuana use, and sedentary behaviour measures of screen time and reading).

## **Methodology**

### **Data Collection**

This study used nationally representative data collected from 41,886 grade 9 to 12 students as part of the 2006-07 Canadian Youth Smoking Survey (YSS) (Health Canada, 2008). In brief, the target population for the secondary school component of the YSS consisted of all young Canadian residents in grades 9 to 12 attending public and private secondary schools in 10 Canadian provinces. Youth residing in the Yukon, Nunavut, and the Northwest Territories were excluded from the target population, as were youth living in institutions, on First Nation Reserves, attending special schools, or attending schools on military bases. The sample design consisted of a stratified clustered design with schools as primary sampling units. The sample of schools was selected systematically with probability proportional to school size (73.7% school response rate). The survey design and sample weights allow us to produce population-based estimates within this manuscript. Detailed

information on the sample design, methods, and survey rates for the 2006-07 YSS is available in print (National Youth Smoking Survey Research Consortium, 2008) and online ([www.yss.uwaterloo.ca](http://www.yss.uwaterloo.ca)).

### **Measures**

The YSS collected demographic information and data on youth smoking behaviour. Smoking status was defined based on how the respondents answered, “Have you ever smoked a whole cigarette?” (yes, no). They were then asked, “Have you ever smoked at least 100 cigarettes in your life?” (yes, no), and “On how many of the last 30 days did you smoke one or more cigarettes” (none, 1 day, 2 to 3 days, 4 to 5 days, 6 to 10 days, 11 to 20 days, 21 to 29 days, 30 days). Consistent with the derived variables for classifying smoking using YSS data [56,57], current smokers were defined as those who have smoked at least 100 cigarettes in their lifetime and have smoked in the 30 days preceding the survey. Former smokers have smoked at least 100 cigarettes in their lifetime and have not smoked at all during the past 30 days, and never smokers have never smoked a whole cigarette.

Respondents were also asked whether they “have every used or tried marijuana or cannabis [a joint, pot, weed, hash]” (yes, no). Those who answered “no” were asked if they have ever seriously thought about trying marijuana or cannabis? (yes, no). Alcohol use was assessed by asking respondents, “Have you ever had a drink of alcohol; that is, more than just a sip?” (yes, no). Screen time and reading time were assessed by asking respondents “On average, how many hours a day do you watch TV or videos? (I do not watch TV or videos, < 1 hour per day, 1 to 2 hours per day, 3 to 4 hours per day, 5 to 6 hours per day, 7 or more hours per day)”, and “How often do you read for fun (not at school)?” (every day,

a few times per week, once per week, a few times per month, less than once a month, almost never).

Data on students' education-related behaviours—health-related absenteeism, truancy, and academic motivation—were also collected. Respondents were asked to report how many days of school they missed in the past four weeks due to health (0 days, 1 or 2 days, 3 to 5 days, 6 to 10 days, 11 or more days), the number of classes they skipped in the last four weeks (0 classes, 1 or 2 classes, 3 to 5 classes, 6 to 10 classes, 11 to 20 classes,  $\geq$  20 classes), and how important they think it is to get good grades (very important, important, not very important, not at all important).

### **Data Analysis**

Descriptive analyses examining sex and education-related factors were performed according to demographic characteristics, substance use and screen time and reading-based sedentary behaviour. Based on the response distributions, the health-related absenteeism measure of number of days of school they missed in the past four weeks due to health was collapsed into three categories (0 days, 1 to 5 days, and 6 or more days); the truancy measure of number of classes skipped in the last four weeks was collapsed into three categories (0 classes, 1 to 5 classes, and 6 or more classes); and the academic motivation measure of importance of getting good grades was collapsed into two categories [important (very important/important), and not important (not very important/not at all important)].

In order to examine the number of days of school missed in the past four weeks due to health, we performed two logistic regression analyses to differentiate factors associated with (a) missing 1 to 5 days versus missing 0 days (Model 1), and (b) missing 6 or more



days versus 0 days (Model 2). In order to examine the number of classes skipped in the past four weeks, we performed two logistic regression analyses to differentiate factors associated with (a) skipping 1 to 5 classes versus skipping 0 classes (Model 3), and (b) skipping 6 or more classes versus skipping 0 classes (Model 4). In order to examine the importance of getting good grades, we performed a logistic regression analysis to differentiate factors associated with respondents reporting it is not important versus important (Model 5). All five of the logistic regression analyses controlled for substance use, sedentary behaviour and demographic characteristics. 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 groups. The statistical package SAS 8.02 was used for all analyses.

### **Findings**

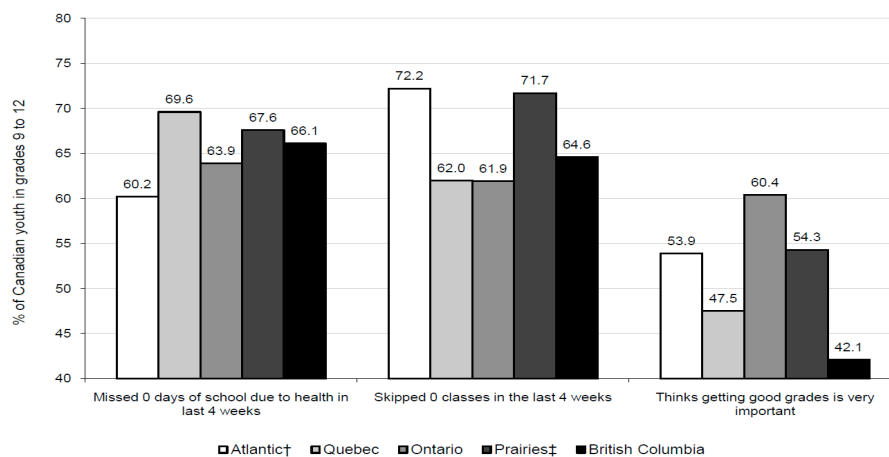
In 2006, 10.2% (167,921) of Canadian youth surveyed in grades 9 to 12 were current smokers, 1.6% (26,300) were former smokers, and 88.2% (1,452,041) were never smokers. The prevalence of current smoking was higher for males (11.5%) compared to females (8.7%) ( $\chi^2=71.6$ ,  $df=2$ ,  $p<0.001$ ). The prevalence of current smoking increased as the grade increased; 6.7% in grade 9 to 14.0% in grade 12 ( $\chi^2=497.1$ ,  $df=6$ ,  $p<.001$ ). Among the youth in this sample, 34.4% report missing at least one day of school because of their health in the past four weeks, 35.1% report skipping class at least once in the past four weeks, and only 54.4% reported that it is very important to get good grades. Descriptive statistics by sex are presented in Table 1.

Table 1  
*Descriptive Statistics for the Sample of Youth in Grades 9 to 12 by Sex, Canada 2006.*

Demographics		Male [n=848,713] <sup>a</sup> %	Female [n=792,606] <sup>a</sup> %
Grade	9	26.1	26.4
	10	26.3	25.7
	11	24.9	25.2
	12	22.7	22.7
<i>Substance Use</i>			
Smoking Status	Current smoker	11.5	8.7
	Former smoker	1.8	1.3
	Never smoker	86.7	90.0
Ever tried marijuana	Yes	42.2	35.9
	No	57.8	64.1
Ever tried alcohol	Yes	80.1	78.7
	No	19.9	21.3
<i>Education Related Factors</i>			
Days of school missed in last 4 weeks due to health	0 days	70.2	60.7
	1 or 2 days	20.1	28.3
	3 to 5 days	6.4	7.8
	6 to 10 days	1.9	2.1
	11 or more days	1.4	1.1
Number of classes skipped in the last 4 weeks	0 classes	63.4	66.5
	1 or 2 classes	19.5	19.3
	3 to 5 classes	9.3	9.0
	6 to 10 classes	4.1	3.4
	11 to 20 classes	1.8	1.1
	> 20 classes	1.9	0.7
Importance of getting good grades	Very important	48.7	60.1
	Important	42.1	36.0
	Not very important	7.9	3.1
	Not at all important	1.3	0.8
<i>Sedentary Behaviours</i>			
Screen time per day	I do not watch TV or videos	2.3	2.3
	< 1 hour /day	17.9	20.0
	1 to 2 hours /day	38.9	41.3
	3 to 4 hours /day	29.7	28.6
	5 to 6 hours /day	7.4	5.8
	7 or more hours /day	3.8	2.0
Reading for fun [not for school]	Every day	14.0	18.5
	A few times per week	20.5	27.1
	Once per week	6.7	7.3
	A few times a month	12.5	16.2
	Less than once a month	10.1	10.9
	Almost never	36.2	20.0
<sup>a</sup> Population estimate			

Males were more likely than females to have tried marijuana ( $\chi^2=76.0$ ,  $df=2$ ,  $p<.001$ ); there were no sex differences in ever trying alcohol. Females were more likely than

males to report missing school in the past four weeks due to health ( $\chi^2=489.1$ ,  $df=4$ ,  $p<.001$ ), although males were more likely to skip classes ( $\chi^2=137.2$ ,  $df=5$ ,  $p<.001$ ). Females were substantially more likely to report that it is very important to get good grades compared to males ( $\chi^2=502.3$ ,  $df=3$ ,  $p<.001$ ). Males were more likely than females to report high levels of screen time behaviour ( $\chi^2=320.9$ ,  $df=5$ ,  $p<.001$ ) and females were more likely than males to report reading more frequently for fun ( $\chi^2=1729.3$ ,  $df=5$ ,  $p<.001$ ). As illustrated in Figure 1, youth in Atlantic Canada and Ontario were most likely to report missing classes due to health, youth in Quebec and Ontario were most likely to report skipping classes, and youth in British Columbia and Quebec were least likely to report that getting good grades is very important.



Source: 2006-2007 Canadian Youth Smoking Survey

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

‡ Alberta, Saskatchewan, Manitoba

*Figure 1.* Distribution of education related factors among students in grades 9 to 12 by region of Canada (2006-2007)

As displayed in Table 2, current smokers were more likely to miss more days of school due to health ( $\chi^2=1065.11$ ,  $df=8$ ,  $p<.001$ ), skip more classes ( $\chi^2=3404.5$ ,  $df=10$ ,  $p<.001$ ), and report getting good grades is not at all important ( $\chi^2=754.7$ ,  $df=6$ ,  $p<.001$ ) relative to never smokers. Similar trends are also evident for youth who have ever tried marijuana or alcohol. The trends in these education-related factors are not as consistent when examined by screen time or the frequency of reading for fun. The adjusted odds ratios for the models examining characteristics associated with the number of school days missed in the past four weeks due to health are presented in Table 3, characteristics associated with the number of skipped classes in the past four weeks are presented in Table 4, and characteristics associated with the importance of getting good grades are presented in Table 5.

Table 2

*Descriptive Statistics for the Sample of Youth in Grades 9 to 12 by Education Related Factors, Canada 2006.*

		Number of school days missed due to health in last 4 weeks				
		0 days [n=1,061,753] <sup>a</sup> %	1 or 2 days [n=389,913] <sup>a</sup> %	3 to 5 days [n=115,135] <sup>a</sup> %	6 to 10 days [n=32,398] <sup>a</sup> %	≥ 11 days [n=19,822] <sup>a</sup> %
Smoking Status	Current smoker	8.4	11.0	13.9	23.1	40.6
	Former smoker	1.3	1.8	2.3	3.0	1.9
	Never smoker	90.3	87.2	83.8	73.9	57.5
Ever tried marijuana	Yes	34.9	43.7	51.5	55.5	71.4
	No	65.1	56.3	48.5	44.5	28.6
Ever tried alcohol	Yes	76.7	84.4	82.7	90.0	89.9
	No	23.3	15.6	17.3	10.0	10.1
Screen time per day	< 1 hour/day	22.2	18.7	16.7	25.1	27.4
	1 to 2 hours/day	40.5	41.4	37.3	35.6	27.9
	≥ 3 hours/day	37.3	39.9	46.0	39.3	44.7
Reading for fun [not for school]	Every day	16.6	15.4	16.4	16.0	17.2
	Weekly	30.6	31.9	30.0	29.3	18.4
	Monthly or less	52.8	52.7	53.6	54.7	64.4
		<b>Number of classes skipped in the last 4 weeks</b>				

		0 classes [n=1,049,285] <sup>a</sup> %	1 or 2 classes [n=313,298] <sup>a</sup> %	3 to 5 classes [n=148,434] <sup>a</sup> %	6 to 10 classes [n=60,703] <sup>a</sup> %	11 to 20 classes [n=22,895] <sup>a</sup> %	> 20 classes [n=22,085] <sup>a</sup> %
Smoking Status	Current smoker	5.5	13.5	19.3	25.6	32.3	49.1
	Former smoker	1.3	1.7	1.5	2.4	5.3	4.6
	Never smoker	93.2	84.8	79.2	72.0	62.4	46.3
Ever tried marijuana	Yes	27.6	53.4	64.0	76.7	72.2	81.2
	No	72.4	46.6	36.0	23.3	27.8	18.8
Ever tried alcohol	Yes	72.7	90.5	92.6	95.8	91.3	92.4
	No	27.3	9.5	7.4	4.2	8.7	7.6
Screen time per day	< 1 hour/day	20.7	23.0	21.8	19.9	13.1	16.9
	1 to 2 hours/day	40.2	41.3	40.4	37.9	44.5	27.9
	≥ 3 hours/day	39.1	35.7	37.8	42.2	42.4	55.2
Reading for fun [not for school]	Every day	17.8	15.0	12.4	10.3	9.6	15.0
	Weekly	32.4	31.2	25.1	20.6	17.7	17.3
	Monthly or less	49.8	53.8	62.5	69.1	72.7	67.7
<b>Importance of getting good grades</b>							
			Very important [n=875,896] <sup>a</sup> %	Important [n=631,852] <sup>a</sup> %	Not very important [n=90,295] <sup>a</sup> %	Not at all important [n=17,401] <sup>a</sup> %	
Smoking Status	Current smoker		6.9	11.9	24.3	39.0	
	Former smoker		1.0	1.8	3.4	0.4	
	Never smoker		92.1	86.3	72.3	60.6	
Ever tried marijuana	Yes		31.5	48.1	65.3	59.7	
	No		68.5	51.9	34.7	40.3	
Ever tried alcohol	Yes		74.2	86.5	91.5	92.1	
	No		25.8	13.5	8.5	7.9	
Screen time per day	< 1 hour/day		22.2	19.5	23.7	17.7	
	1 to 2 hours/day		41.4	40.9	35.6	40.2	
	≥ 3 hours/day		36.4	39.6	40.7	42.1	
Reading for fun [not for school]	Every day		17.7	13.8	13.5	12.2	
	Weekly		35.5	28.5	17.9	10.7	
	Monthly or less		46.7	57.7	68.6	77.2	
<sup>a</sup> Population estimate							

### Factors Associated with Missing 1 to 5 Days of School due to Health (Model 1)

Male students were less likely to miss 1 to 5 days of school than female students (OR 0.59, 95%CI 0.54 to 0.65). Compared to students in grade 9, students in grade 11 (OR 0.86, 95%CI 0.75 to 0.98) and grade 12 (OR 0.79, 95%CI 0.68 to 0.93) were less likely to miss 1 to 5 days of school. Students who have ever tried marijuana [OR 1.34, 95%CI 1.16

to 1.55) or alcohol (OR 1.50, 95%CI 1.33 to 1.70) were more likely to miss 1 to 5 days of school compared to students who have not tried these substances. Compared to students who report less than 1 hour of screen time per day, those who reported 1 to 2 hours (OR 1.20, 95%CI 1.03 to 1.40) or 3 or more hours (OR 1.30, 95%CI 1.10 to 1.54) of screen time per day were more likely to miss 1 to 5 days of school.

Table 3

*Logistic Regression Analyses Examining Characteristics Associated with the Number of School Days Missed in the Past Four Weeks Due to Health Among Youth in Grades 9 to 12, Canada 2006.*

		Adjusted Odds Ratio <sup>§</sup> [95% CI]	
		Days of School Missed Model 1 1 to 5 days vs. 0 days	Days of School Missed Model 2 6 or more days vs. 0 days
Sex	Female Male	1.00 0.59 [0.54, 0.65]***	1.00 0.70 [0.57, 0.85]***
Grade	9 10 11 12	1.00 0.92 [0.80, 1.05] 0.86 [0.75, 0.98]* 0.79 [0.68, 0.93]**	1.00 0.95 [0.70, 1.30] 0.90 [0.73, 1.11] 1.06 [0.81, 1.40]
Smoking Status	Never smoker Current smoker Former smoker	1.00 1.15 [0.91, 1.46] 1.31 [0.75, 2.27]	1.00 1.77 [1.39, 2.26]*** 1.53 [0.92, 2.54]
Ever tried marijuana	No Yes	1.00 1.34 [1.16, 1.55]***	1.00 1.89 [1.56, 2.29]***
Ever tried alcohol	No Yes	1.00 1.50 [1.33, 1.70]***	1.00 1.18 [0.96, 1.46]
Screen time per day	< 1 hour/ day 1 to 2 hours/ day ≥ 3 hours/ day	1.00 1.20 [1.03, 1.40]* 1.30 [1.10, 1.54]**	1.00 1.01 [0.77, 1.33] 1.39 [1.06, 1.82]*
Reading for fun [not for school]	Every day Weekly Monthly or less	1.00 1.10 [0.95, 1.28] 1.03 [0.90, 1.18]	1.00 0.92 [0.75, 1.13] 0.94 [0.77, 1.15]
Note: <sup>§</sup> Odds ratios adjusted for all other variables in the table. Model 1: 1 = 1 to 5 days [n=4,294], 0 = 0 days [n=25,249] Model 2: 1 = 6 or more days [n=10,532], 0 = days [n=25,249] * p<.05 **p<.01 ***p<.001			

**Factors Associated with Missing 6 or More Days of School Due to Health (Model 2)**

Male students were less likely to miss 6 or more days of school than female students (OR 0.70, 95%CI 0.57 to 0.85). Current smokers were more likely to miss 6 or more days of school than never smokers (OR 1.77, 95%CI 1.39 to 2.26). Students who have tried marijuana were more likely to miss 6 or more days of school compared to students who have not tried marijuana (OR 1.89, 95%CI 1.56 to 2.29). Students who reported 3 or more hours of screen time per day were more likely to miss 6 or more days of school than student who reported less than 1 hour of screen time (OR 1.39, 95%CI 1.06 to 1.82).

**Factors Associated with Skipping 1 to 5 Classes (Model 3)**

Compared to students in grade 9, students in grade 10 (OR 1.32, 95%CI 1.13 to 1.54), grade 11 (OR 1.82, 95%CI 1.60 to 2.01) and grade 12 (OR 2.29, 95%CI 1.86 to 2.83) were more likely to skip 1 to 5 classes. Current smokers were more likely than never smokers to skip 1 to 5 classes (OR 1.53, 95%CI 1.15 to 2.05). Students who have tried marijuana (OR 2.38, 95%CI 2.06 to 2.75) or alcohol (OR 2.24, 95%CI 1.93 to 2.61) were also more likely to skip 1 to 5 classes compared to students who have not tried these substances.

**Factors Associated with Skipping 6 or More Classes (Model 4)**

Compared to students in grade 9, students in grade 10 (OR 1.49, 95%CI 1.12 to 2.02), grade 11 (OR 2.13, 95%CI 1.67 to 2.71) and grade 12 (OR 2.48, 95%CI 1.77 to 3.47) were more likely to skip 6 or more classes. Compared to never smokers, both current smokers (OR 2.81, 95%CI 2.10 to 3.76) and former smokers (OR 1.84, 95%CI 1.13 to

3.01) were more likely to skip 6 or more classes. Students who have tried marijuana were over four times more likely to skip 6 or more classes than students who have never tried marijuana (OR 4.70, 95%CI 3.46 to 6.40). Students who have tried alcohol were also more likely to have skipped 6 or more classes than students have never tried alcohol (OR 1.84, 95%CI 1.22 to 2.76). Students who read for fun monthly or less were more likely to skip 6 or more classes than student who read for fun every day (OR 1.59, 95%CI 1.21 to 2.09).

Table 4

*Logistic Regression Analyses Examining Characteristics Associated with the Number of Skipped Classes in the Past Four Weeks Among Youth in Grades 9 to 12, Canada 2006.*

		Adjusted Odds Ratio § [95% CI]	
		Skipped Classes Model 3 1 to 5 classes vs. 0 classes	Skipped Classes Model 4 6 or more classes vs. 0 classes
Sex	Female Male	1.00 0.99 [0.88, 1.12]	1.00 1.29 [1.03, 1.61]*
Grade	9 10 11 12	1.00 1.32 [1.13, 1.54]*** 1.82 [1.60, 2.01]*** 2.29 [1.86, 2.83]***	1.00 1.49 [1.11, 2.02]** 2.13 [1.67, 2.71]*** 2.48 [1.77, 3.47]***
Smoking Status	Never smoker Current smoker Former smoker	1.00 1.53 [1.15, 2.05]** 0.79 [0.47, 1.31]	1.00 2.81 [2.10, 3.76]*** 1.84 [1.13, 3.01]*
Ever tried marijuana	No Yes	1.00 2.38 [2.06, 2.75]***	1.00 4.70 [3.46, 6.40]***
Ever tried alcohol	No Yes	1.00 2.24 [1.93, 2.61]***	1.00 1.84 [1.22, 2.76]**
Screen time per day	< 1 hour/ day 1 to 2 hours/ day ≥ 3 hours/ day	1.00 0.99 [0.79, 1.24] 0.96 [0.72, 1.27]	1.00 1.20 [0.80, 1.78] 1.46 [0.96, 2.20]
Reading for fun [not for school]	Every day Weekly Monthly or less	1.00 1.02 [0.89, 1.16] 1.16 [0.97, 1.40]	1.00 0.88 [0.66, 1.17] 1.59 [1.21, 2.09]***
Note: § Odds ratios adjusted for all other variables in the table. Model 3: 1 = 1 to 5 classes [n=2,303], 0 = 0 classes [n=27,458] Model 4: 1 = 6 or more classes [n=10,306], 0 = classes [n=27,458] * p<.05 **p<.01 ***p<.001			



### Factors Associated with the Importance of Getting Good Grades (Model 5)

Male students were more likely than female students to report that getting good grades was not important (OR 2.17, 95%CI 1.50 to 3.13). Current smokers were more likely than never smokers to report that getting good grades was not important (OR 2.26, 95%CI 1.56 to 3.26). Students who have tried marijuana (OR 1.75, 95%CI 1.26 to 2.43) or alcohol (OR 1.61 95%CI 1.02 to 2.55) were also more likely to report that getting good grades was not important, compared to students who have not tried these substances. Interestingly, students who reported that they read for fun weekly were less likely than students who read for fun everyday to report that getting good grades was not important (OR 0.57, 95%CI 0.42 to 0.77).

Table 5

*Logistic Regression Analyses Examining Characteristics Associated With the Importance of Getting Good Grades Among Youth in Grades 9 to 12, Canada 2006.*

Parameters		Adjusted Odds Ratio § [95% CI]
		Importance of Getting Good Grades Model 5 Not Important vs. Important
Sex	Female Male	1.00 2.17 [1.50, 3.13]**
Grade	9 10 11 12	1.00 1.42 [0.92, 2.18] 1.36 [0.92, 2.02] 1.31 [0.90, 1.89]
Smoking Status	Never smoker Current smoker Former smoker	1.00 2.26 [1.56, 3.26]** 2.12 [0.89, 5.04]
Ever tried marijuana	No Yes	1.00 1.75 [1.26, 2.43]**
Ever tried alcohol	No Yes	1.00 1.61 [1.02, 2.55]*
Screen time per day	< 1 hour/ day 1 to 2 hours/ day ≥ 3 hours/ day	1.00 0.87 [0.56, 1.33] 1.04 [0.73, 1.48]

Reading for fun [not for school]	Every day	1.00
	Weekly	0.57 [0.42, 0.77]**
	Monthly or less	1.27 [0.92, 1.76]
Note: § Odds ratios adjusted for all other variables in the table Model 5: 1 = Not Important [n=1,231], 0 = Important [n=18,203] * p<.05 **p<.001		

## Discussion

The findings reported in this paper clearly demonstrate significant associations between Canadian students' health risk behaviours and education-related outcomes. Rates of health risk behaviours are high (tobacco, alcohol, marijuana use, screen time), and strongly associated with poor education-related proxy measure (academic motivation) and education-related outcomes (health-related absences and skipping classes). Poor education related outcomes, especially truancy, are considered a precursor to many other detrimental outcomes including: delinquency (Ellickson, Tucker, & Klein, 2001; U.S. Department of Education, 2009), youth violence (Ellickson et al., 2001; U.S. Department of Education, 2009), criminal activity, (Ellickson et al., 2001; Farrington & Loeber, 2000; Stevens & Gladstone, 2002), and future unemployment (Goodall, 2005; Hibbett, Fogelman, & Manor, 1990). As such, the findings of this paper indicate youth health and well-being is an issue that affects a broad cross-section of society including education, public health, law enforcement, and business sectors. The new evidence presented here bolsters the urgency and importance of coordinated action and funding in youth and student health promotion as strong associations exist between student health risk behaviours and education-related outcomes. This evidence also reinforces the need to develop initiatives appropriately tailored to the needs of the students most at risk.

The strongest and most consistent associations identified were between student

marijuana use and all three education-related factors. Our findings seem to support Henry, Smith, and Caldwell's (2007) suggested dose response relationship between truancy and adolescent marijuana use, as students who have ever tried marijuana are nearly 5 times more likely to report high levels of truancy by skipping 6 or more classes in the last month. Recent data point to increased Canadian youth and young adult marijuana use (Leatherdale, Hammond, Kaiserman, & Ahmed, 2007). Our study suggests educators and public health need to coordinate action to stem the tide of marijuana use to address both health and education priorities.

Consistent with previous research (Bryant, Schulenberg, O'Malley, Bachman, & Johnston, 2003; McAra, 2004; Mccray, 2006; Webb et al., 2007; Zimmerman & Schmeelk-Cone, 2003), current student smokers were more likely to have lower education-related expectations and behaviours. We identified that current smokers are more likely to skip class, miss 6 or more days of school in the last month due to health reasons, and be less academically motivated. Quitting smoking weakened the association between smoking and education-related factors, although former smokers were also likely to be truant. These results suggest youth cessation may positively contribute to educational outcomes, and reinforces the necessity of preventing youth from ever starting to smoke in the first place. Although Canadian youth tobacco use rates are declining (Health Canada, 2009; Paglia-Boak, Mann, Adlaf, & Rehm, 2009), the prevalence of contraband tobacco use by youth is increasing (Callaghan, Veldhuizen, Leatherdale, Murnaghan, & Manske, 2009; Ontario Tobacco Research Unit, 2009) at the same time as government investment in tobacco control is waning (Ontario Tobacco Research Unit, 2010). Schools are also showing less

interest in tobacco. Among schools that declined participation in the 2006-07 National Youth Smoking Survey, 20% of school administrators cited lack of interest in tobacco control as their primary reason to refuse participation, whereas only 11% cited the same reason for their refusal to participate in 2004-05 (Bredin, Wong, & Manske, 2009). Since smoking continues to be the top preventable cause of premature death, we need to find new ways of framing its importance and value to educators. This link to academic variables may facilitate this framing and renewed action.

As expected, student alcohol use was negatively associated with education-related factors (Leatherdale et al., 2008; O'Malley et al., 2006; Piko & Kovács, 2010). This is cause for concern as, similar to the high prevalence of Canadian student alcohol use identified in other studies (Leatherdale et al., 2008; Paglia-Boak et al., 2009; Smith et al., 2010), the vast majority of students in this study have tried alcohol. This high prevalence of alcohol use may explain the association between alcohol use and less desirable education-related outcomes evident in this study through the motivational deficit model, which posits that substance use precedes school disengagement (Leatherdale et al., 2008; Paglia-Boak et al., 2009; Smith et al., 2010). Overall, these strong associations suggest that future policies and programs aimed at reducing tobacco, alcohol, and marijuana use should move away from interventions that address health risk behaviours individually, and instead investigate integrating programming aimed at increasing school attendance and academic motivation with initiatives that prevent health risk behaviours .

There does not appear to be a consistent link between screen and reading time, and education-related outcomes. The amount of student screen time per day is not related to

truancy behaviour nor students' academic motivation. However, a modest significant association between screen time per day and days of school missed due to health was evident. This result seems to suggest that students may have increased screen time due to their health-related absences as opposed to skipping school to watch TV or videos. It may also be possible that their health is affected by staying up late playing video games, but this cannot be determined with these data. Overall, these results are conservative estimates of the potential associations between screen time sedentary behaviour and education-related outcomes, as this measure did not capture time youth spent on the internet or playing video games. Similarly, reading for fun was not associated with health-related absenteeism, but was significantly and positively linked to truancy. Contrary to our expectations, reading for fun on a weekly basis was associated with low academic motivation. As the reading for fun measure did not differentiate what type of reading material youth read, interpretation of this association is challenging and presents a topic for further investigation.

Similar to other studies, truancy increases with age (Attwood & Croll, 2006; Hunt & Hopko, 2009; McAra, 2004; O'Malley et al., 2006; Smith et al., 2010); male students are more likely to skip school (van der Aa, Rebollo-Mesa, Willemsen, Boomsma, & Bartels, 2009), and be less academically motivated (Chouinard & Roy, 2008; Cox et al., 2007; Lightbody, Siann, Stocks, & Walsh, 1996). Conversely, female students are more likely to report health-related absenteeism. As female and male students manifest school absenteeism differently, these results indicate a tailored prevention approach based on gender could be investigated. Additionally, as provinces report varying levels of health-related absenteeism, truancy and academic motivation (Figure 1), different provinces and

regions of the country may need to prioritize their focus to particular education-related factors. Future research should explore the differences between student experiences and behaviours at the beginning of high school compared to later in their adolescent development. However, our results support the necessity for prevention programs to start early and be sustained throughout high school.

### **Limitations**

The limitations of the study are those common to self-report cross-sectional studies. While studies have suggested adolescent school disengagement model (Bryant et al., 2003; Zimmerman & Schmeelk-Cone, 2003) as an explanation for school absenteeism, with low academic motivation and poor educational achievement preceding youth substance use (Hallfors, Cho, Brodish, Flewelling, & Khatpoush, 2006; Henry et al., 2009), this cross-sectional study cannot attribute directionality to these adolescent problem behaviours or speculate on the underlying mechanism for their occurrence. Further longitudinal studies with Canadian students are needed to address attribution and directionality.

As this national survey is completed by the students themselves, the results may under-report school absenteeism via two mechanisms. First, youth who exhibit higher rates of school absenteeism are less likely to be in school on the day of the survey implementation (Bovet, Viswanathan, Faeh, & Warren, 2006; Eaton et al., 2008; Michaud M.D, Delbos-Piot M.Sc, & Narring M.D., 1998; Pirie, Murray, & Luepker, 1998). Moreover, youth serving suspensions from school or who have dropped out of high school would also be excluded from the data collection (Kearney, 2008b). However, this potential non-response bias likely under-estimates the strength of the association between tobacco,

alcohol, and marijuana use and education-related outcomes. Second, these self-report data may be affected by social desirability bias and thereby under-report school absenteeism, low academic motivation, substance use or sedentary behaviour. However, the student substance use rates reported are comparable to other Canadian surveys (Leatherdale et al., 2008; Paglia-Boak et al., 2009; Smith et al., 2010). School administrator reports would be needed to substantiate quantity and potentially type of school absences as debate exists as to whether the legitimacy of school absences affects student risk behaviour (Eaton et al., 2008). Lastly, this study measured academic motivation and school absenteeism instead of measuring academic achievement directly, and thus can not substantiate reported links between academic achievement and tobacco use (Jeynes, 2002; Leatherdale et al., 2008; Piko & Kovács, 2010) alcohol use (D'Amico et al., 2001; Donovan, 2004; Engberg & Morral, 2006; Piko & Kovács, 2010) or marijuana use (Engberg & Morral, 2006; Jeynes, 2002; Leatherdale et al., 2008; Lynskey & Hall, 2000; Piko & Kovács, 2010).

In using school days missed due to health, skipped classes, and academic motivation as indicators for educational outcome instead of academic achievement, this study begins to address some of the gaps in Canadian data on education-related indicators and student health risk behaviours. The strong association between student health risk behaviours and education-related outcomes demonstrated in this study suggest several outstanding areas of research needed. Lastly, this study reinforces the importance of continued collaboration between educators, public health practitioners, and policy-makers to work with youth to address their academic and health outcomes.

### References

- Anderson, E. S., & Keith, T. Z. (1997). A longitudinal test of a model of academic success for at-risk high school students. *Journal of Educational Research, 90*(5), 259-267.
- Attwood, G., & Croll, P. (2006). Truancy in secondary school pupils: Prevalence, trajectories, and pupil perspectives. *Research Papers in Education, 21*(4), 467-484.
- Best, D., Manning, V., Gossop, M., Gross, S., & Strang, J. (2006). Excessive drinking and other problem behaviours among 14-16 year old schoolchildren. *Addictive Behaviors, 31*(8), 1424-1435.
- Bosworth, D. (1994). Truancy and pupil performance. *Education Economics, 2*(3), 243-264.
- Bovet, P., Viswanathan, B., Faeh, D., & Warren, W. (2006). Comparison of smoking, drinking, and marijuana use between students present or absent on the day of a school-based survey. *Journal of School Health, 76*(4), 133-137.
- Bredin, B., Wong, K., & Manske, S. (2009). *Canada's youth smoking survey: Explaining changes in school response rates* (Unpublished manuscript). Propel Centre for Population Health Impact, University of Waterloo.
- Brookes, M., Goodall, E., & Heady, L. (2005). *Misspent youth: The costs of truancy and exclusion*. London, England: New Philanthropy Capital.
- Brown, T. N., Schulenberg, J. E., Bachman, J. G., O'Malley, P. M., & Johnston, L. D. (2001). Are risk and protective factors for substance use consistent across historical time?: National data from the high school classes of 1976 through 1997. *Prevention*



*Science*, 2(1), 29-43.

Bryant, A. L., Schulenberg, J. E., Bachman, J. G., O'Malley, P. M., & Johnston, L. D.

(2000). Understanding the links among school misbehavior, academic achievement, and cigarette use: A national panel study of adolescents. *Prevention Science*, 1(2), 71-87.

Bryant, A. L., Schulenberg, J. E., O'Malley, P. M., Bachman, J. G., & Johnston, L. D.

(2003). How academic achievement, attitudes, and behaviors relate to the course of substance use during adolescence: A 6-year, multi-wave national longitudinal study. *Journal of Research on Adolescence*, 13(3), 361-397.

Bryant, A. L., & Zimmerman, M. A. (2002). Examining the effects of academic beliefs and

behaviors on changes in substance use among urban adolescents. *Journal of Educational Psychology*, 94(3), 621-637.

Callaghan, R. C., Veldhuizen, S., Leatherdale, S., Murnaghan, D., & Manske, S. (2009).

Use of contraband cigarettes among adolescent daily smokers in Canada. *Canadian Medical Association Journal*, 181(6-7), 384-386.

Chouinard, R., & Roy, N. (2008). Changes in high-school students' competence beliefs,

utility value and achievement goals in mathematics. *British Journal of Educational Psychology*, 78(1), 31-50.

Claes, E., Hooghe, M., & Reeskens, T. (2009). Truancy as a contextual and school-related

problem: A comparative multilevel analysis of country and school characteristics on civic knowledge among 14 year olds. *Educational Studies*, 35(2), 123-142.

- Cox, R. G., Zhang, L. e., Johnson, W. i. D., & Bender, D. R. (2007). Academic performance and substance use: Findings from a state survey of public high school students. *Journal of School Health, 77*(3), 109-115.
- D'Amico, E. J., Metrik, J., McCarthy, D. M., Frissell, K. C., Appelbaum, M., & Brown, S. A. (2001). Progression into and out of binge drinking among high school students. *Psychology of Addictive Behaviors, 15*(4), 341-349.
- Day, J. C., & Newburger, E. C. (2002). *The big payoff: Educational attainment and synthetic estimates of work-life earnings*. US Bureau of the Census, Current Population Reports, (pp.23- 210). Washington, DC: US Government Printing Office.
- Donovan, J. E. (2004). Adolescent alcohol initiation: A review of psychosocial risk factors. *Journal of Adolescent Health, 35*(6), e7-e18.
- Duarte, R., & Escario, J. J. (2006). Alcohol abuse and truancy among Spanish adolescents: A count-data approach. *Economics of Education Review, 25*(2), 179-187.
- Eaton, D. K., Brener, N., & Kann, L. K. (2008). Associations of health risk behaviors with school absenteeism: Does having permission for the absence make a difference? *Journal of School Health, 78*(4), 223-229.
- Ellickson, P. L., Tucker, J. S., & Klein, D. J. (2001). High-risk behaviors associated with early smoking: Results from a 5-year follow-up. *Journal of Adolescent Health, 28*(6), 465-473.
- Ellickson, P. L., Tucker, J. S., Klein, D. J., & Saner, H. (2004). Antecedents and outcomes of marijuana use initiation during adolescence. *Preventive Medicine, 39*(5), 976-984.

- Engberg, J., & Morral, A. R. (2006). Reducing substance use improves adolescents' school attendance. *Addiction, 101*(12), 1741-1751.
- Fantuzzo, J., Grim, S., & Hazan, H. (2005). Project start: An evaluation of a community-wide school-based intervention to reduce truancy. *Psychology in the Schools, 42*(6), 657-667.
- Farrington, D. P., & Loeber, R. (2000). Epidemiology of juvenile violence. *Child and Adolescent Psychiatric Clinics of North America, 9*(4), 733-748.
- French, M. T., & Maclean, J. C. (2006). Underage alcohol use, delinquency, and criminal activity. *Health Economics, 15*(12), 1261-1281.
- Goodall, E. (2005). *School's out? Truancy and exclusion*. London, England: New Philanthropy Capital.
- Gottfried, M. A. (2009). Excused versus unexcused: How student absences in elementary school affect academic achievement. *Educational Evaluation and Policy Analysis, 31*(4), 392-415.
- Hallfors, D., Cho, H., Brodish, P. H., Flewelling, R., & Khatpoush, S. (2006). Identifying high school students "at risk" for substance use and other behavioral problems: Implications for prevention. *Substance Use & Misuse, 41*(1), 1-15.
- Hawkins, J. D., Catalano, R. F., & Miller, J. Y. (1992). Risk and protective factors for alcohol and other drug problems in adolescence and early adulthood: Implications for substance abuse prevention. *Psychological Bulletin, 112*(1), 64-105.
- Health Canada. (2008). *2006-07 youth smoking survey*. Ottawa, Ontario: Ministry of

Supply and Services Canada.

Health Canada. (2009). *Canadian tobacco use monitoring survey (CTUMS): Annual results 2008*. Ottawa, Ontario: Tobacco Control Program.

Henry, K. L. (2007). Who's skipping school: Characteristics of truants in 8th and 10th grade. *Journal of School Health, 77*(1), 29-35.

Henry, K. L., & Huizinga, D. H. (2007a). Truancy's effect on the onset of drug use among urban adolescents placed at risk. *Journal of Adolescent Health, 40*(4), e9-e17.

Henry, K. L., & Huizinga, D. H. (2007b). School-related risk and protective factors associated with truancy among urban youth placed at risk. *The Journal of Primary Prevention, 28*(6), 505-519.

Henry, K. L., Smith, E. A., & Caldwell, L. L. (2007). Deterioration of academic achievement and marijuana use onset among rural adolescents. *Health Education Research, 22*(3), 372-384.

Henry, K. L., Thornberry, T. P., & Huizinga, D. H. (2009). A discrete-time survival analysis of the relationship between truancy and the onset of marijuana use. *Journal of Studies on Alcohol and Drugs, 70*(1), 5-15.

Hibbett, A., Fogelman, K., & Manor, O. (1990). Occupational outcomes of truancy. *The British Journal of Educational Psychology, 60*, Pt 1.

Hunt, M., & Hopko, D. (2009). Predicting high school truancy among students in the appalachian south. *The Journal of Primary Prevention, 30*(5), 549-567.

Jeynes, W. H. (2002). The relationship between the consumption of various drugs by

adolescents and their academic achievement. *American Journal of Drug and Alcohol Abuse*, 28(1), 15-35.

Jimerson, S., Egeland, B., Sroufe, L. A., & Carlson, B. (2000). A prospective longitudinal study of high school dropouts examining multiple predictors across development. *Journal of School Psychology*, 38(6), 525.

Kantomaa, M. T., Tammelin, T. H., Demakakos, P., Ebeling, H. E., & Taanila, A. M. (2010). Physical activity, emotional and behavioural problems, maternal education and self-reported educational performance of adolescents. *Health Education Research*, 25(2), 368-379.

Kasen, S., Cohen, P., & Brook, J. S. (1998). Adolescent school experiences and dropout, adolescent pregnancy, and young adult deviant behavior. *Journal of Adolescent Research*, 13(1), 49-72.

Kearney, C. A. (2008a). An interdisciplinary model of school absenteeism in youth to inform professional practice and public policy. *Educational Psychology Review*, 20(3), 257-282.

Kearney, C. A. (2008b). School absenteeism and school refusal behavior in youth: A contemporary review. *Clinical Psychology Review*, 28, 451-471.

Kokkevi, A., Gabhainn, S. N., Spyropoulou, M., & HBSC Risk Behaviour Focus Group. (2006). Early initiation of cannabis use: A cross-national European perspective. *Journal of Adolescent Health*, 39, 712-719.

Kristjánsson, A. L., Sigfúsdóttir, I. D., Allegrante, J. P., & Helgason, A. R. (2009).

Adolescent health behavior, contentment in school, and academic achievement.

*American Journal of Health Behavior*, 33(1), 69-79.

Leatherdale, S. T., Hammond, D. G., & Ahmed, R. (2008). Alcohol, marijuana, and tobacco use patterns among youth in Canada. *Cancer Causes & Control*, 19, 361-369.

Leatherdale, S. T., Hammond, D. G., Kaiserman, M., & Ahmed, R. (2007). Marijuana and tobacco use among youth adults in Canada: Are they smoking what we think they are smoking? *Cancer Causes & Control*, 18, 391-397.

Lightbody, P., Siann, G., Stocks, R., & Walsh, D. (1996). Motivation and attribution at secondary school: The role of gender. *Educational Studies*, 22(1), 13-25.

Luster, T., & McAdoo, H. (1996). Family and child influences on educational attainment: A secondary analysis of the High/Scope perry preschool data. *Developmental Psychology*, 32(1), 26-39.

Lynskey, M., & Hall, W. (2000). The effects of adolescent cannabis use on educational attainment: A review. *Addiction*, 95(11), 1621-1630.

McAra, L. (2004). *The Edinburgh study of youth transitions and crime: Number 4 - Truancy, school exclusion and substance misuse*. Edinburgh: Centre for Law and Society, the University of Edinburgh.

Mccray, E. D. (2006). It's 10 a.m.: Do you know where your children are?: The persisting issue of school truancy. *Intervention in School and Clinic*, 42(1), 30-33.

Michaud M.D, P., Delbos-Piot M.Sc, I., & Narring M.D., M. P. H., Françoise. (1998). Silent dropouts in health surveys. *Journal of Adolescent Health*, 22(4), 326-333.

- Moonie, S., Sterling, D. A., Figgs, L. W., & Castro, M. (2008). The relationship between school absence, academic performance, and asthma status. *Journal of School Health, 78*(3), 140-148. doi:10.1111/j.1746-1561.2007.00276.x
- National Youth Smoking Survey Research Consortium. (2008). *2006-2007 youth smoking survey summary*. Waterloo, ON: University of Waterloo.
- O'Malley, P. M., Johnston, L. D., Bachman, J. G., Schulenberg, J. E., & Kumar, R. (2006). How substance use differs among American secondary schools. *Prevention Science, 7*, 409-420.
- Ontario Tobacco Research Unit. (2009). *Contraband use among youth: Monitoring update*. Toronto, ON: Ontario Tobacco Research Unit, December 31, 2009.
- Ontario Tobacco Research Unit. (2010). *Tobacco control funding commitments: Monitoring update*. No. Vol. 15. Toronto, ON: Ontario Tobacco Research Unit.
- Ou, S. -, & Reynolds, A. J. (2008). Predictors of educational attainment in the Chicago longitudinal study. *School Psychology Quarterly, 23*(2), 199-229.
- Paglia-Boak, A., Mann, R. E., Adlaf, E. M., & Rehm, J. (2009). *Drug use among Ontario students, 1977-2009: Detailed OSDUHS* No. CAMH Research Document Series No. 27). Toronto, ON: Centre for Addiction and Mental Health.
- Pérez, A., Ariza, C., Sánchez-Martínez, F., & Nebot, M. (2010). Cannabis consumption initiation among adolescents: A longitudinal study. *Addictive Behaviors, 35*(2), 129-134.
- Piko, B. F., & Kovács, E. (2010). Do parents and school matter? Protective factors for

adolescent substance use. *Addictive Behaviors*, 35(1), 53-56.

Pirie, P. L., Murray, D. M., & Luepker, R. V. (1998). Smoking prevalence in a cohort of adolescents, including absentees, dropouts, and transfers. *American Journal of Public Health*, 78(2), 176-178.

Reid, K. (2008). The causes of non-attendance: An empirical study. *Educational Review*, 60(4), 345-357.

Rideout, V. J., Foehr, U. G., & Roberts, D. F. (2010). *Generation M2: Media in the lives of 8- to 18-year-olds*. Menlo Park, California: Henry J. Kaiser Family Foundation.

Sharif, I., & Sargent, J. D. (2006). Association between television, movie, and video game exposure and school performance. *Pediatrics*, 118(4), e1061-e1070.

Sharif, I., Wills, T. A., & Sargent, J. D. (2010). Effect of visual media use on school performance: A prospective study. *Journal of Adolescent Health*, 46(1), 52-61.

Smith, A., Stewart, D., Peled, M., Poon, C., Saewyc, E., & McCreary Centre Society. (2010). *A picture of health: Highlights from the 2008 BC adolescent health survey*. Vancouver, B.C.: McCreary Centre Society.

Stevens, A. W., & Gladstone, B. M. (2002). *Learning, not offending: Effective interventions to tackle youth transition to crime in Europe*. Westerham, Kent: RPS Rainer.

Tanner, J., Davies, S., & O'Grady, B. (1999). Whatever happened to yesterday's rebels? longitudinal effects of youth delinquency on education and employment. *Social Problems*, 46(2), 250-274.

U.S. Department of Education. (2009). *Truancy rates and related problems*. Retrieved



from [http://www2.ed.gov/admins/lead/safety/training/truancy/problem\\_pg17.html](http://www2.ed.gov/admins/lead/safety/training/truancy/problem_pg17.html)

van der Aa, N., Rebollo-Mesa, I., Willemsen, G., Boomsma, D. I., & Bartels, M. (2009).

Frequency of truancy at high school: Evidence for genetic and twin specific shared environmental influences. *The Journal of Adolescent Health, 45*, 579-586.

Webb, J. A., Moore, T., Rhatigan, D., Stewart, C., & Getz, J. G. (2007). Gender differences

in the mediated relationship between alcohol use and academic motivation among late adolescents. *American Journal of Orthopsychiatry, 77*(3), 478-488.

Weis, R., & Cerankosky, B. C. (2010). Effects of video-game ownership on young boys'

academic and behavioral functioning: A randomized, controlled study. *Psychological Science, 21*(4), 463-470.

Willms, J. D. (2003). *Student engagement at school: A sense of belonging and*

*participation*. Paris: Organisation for Economic Co-operation and Development.

Zimmerman, M. A., & Schmeelk-Cone, K. H. (2003). A longitudinal analysis of adolescent

substance use and school motivation among African American youth. *Journal of Research on Adolescence, 13*(2), 185-210.