



## Using student and school factors to differentiate adolescent current smokers from experimental smokers in Canada: A multilevel analysis

Susan C. Kaai<sup>a,\*</sup>, Scott T. Leatherdale<sup>a</sup>, Stephen R. Manske<sup>a,b</sup>, K. Stephen Brown<sup>a,b,c</sup>

<sup>a</sup> School of Public Health and Health Systems, University of Waterloo, 200 University Avenue West, Waterloo, Ontario, N2L 3G1, Canada

<sup>b</sup> Propel Centre for Population Health Impact, University of Waterloo, 200 University Avenue West, Waterloo, Ontario, N2L 3G1, Canada

<sup>c</sup> Department of Statistics and Actuarial Science, University of Waterloo, 200 University Avenue West, Waterloo, Ontario, N2L 3G1, Canada

### ARTICLE INFO

Available online 10 May 2013

#### Keywords:

Adolescence  
Current smoking  
Factors  
Multilevel logistic regression  
Canada

### ABSTRACT

**Objective.** In order to understand the factors that differentiate adolescents who have tried smoking from those who have become established smokers, this study examined which student- and school-level factors differentiated current smokers from experimental smokers among a nationally representative sample of Canadian secondary school students.

**Method.** Student-level secondary data from the 2008–2009 Canadian Youth Smoking Survey was linked with school-level data from the 2006 Census and one built environment characteristic, and examined using multilevel logistic regression analyses.

**Results.** The current smoking rates varied ( $P < 0.001$ ) across schools. The number of tobacco retailers surrounding the schools was associated with current smoking when adjusting for student characteristics. Additionally, students were more likely to be current smokers if they were: male, in higher grades, believed that smoking can help when they are bored, reported low school connectedness, used marijuana, had a sibling or close friend who smoked, and had no smoking bans at home.

**Conclusions.** These study findings suggest that school anti-smoking strategies need to target males, increase students' attachment to their school, address tobacco-related beliefs, and include interventions targeting smoking siblings and friends. The government should consider zoning restrictions to limit sales of tobacco products near schools.

© 2013 Elsevier Inc. All rights reserved.

### Introduction

Undeniably tobacco remains a leading cause of preventable morbidity and mortality in North America and it is estimated that more than 37,000 in Canada and 443,000 people in the United States (U.S.) die annually from tobacco-caused diseases (Health Canada, 2011; U.S. Department of Health and Human Services, 2012). Research supports the concept that adolescent smoking behavior consists of distinct smoking trajectories (Cameron et al., 1999; Chassin et al., 2009; Mayhew et al., 2000). Characterizing adolescent smoking trajectories is important because prevention and intervention programs need to be tailored depending on the risk and protective factors of adolescents in different smoking stages (e.g., susceptible never smoker, experimenter, regular and established/daily smoker).

Researchers have used several theories including the Theory of Triadic Influence (TTI) (Flay and Petraitis, 1994) to try to understand the

complex factors and environment in which adolescents initiate and maintain smoking. TTI posits that youth smoking behaviors are a result of a combination and interaction of individual or intrapersonal, social context, and broader societal influences. Intrapersonal factors that are known to be associated with current smoking include being older (Leatherdale and Burkhalter, 2012), consuming alcohol or illicit drugs (Leatherdale and Burkhalter, 2012; Leatherdale et al., 2008; West et al., 2010), low school connectedness (Sabiston et al., 2009), and low refusal self-efficacy (Ma et al., 2008). The social context influences mainly include exposure to friends (Lipperman-Kreda et al., 2009; Sabiston et al., 2009) or family members who smoke (Leatherdale et al., 2005a; Lipperman-Kreda et al., 2009; Sabiston et al., 2009) and residing in homes without a total ban on smoking (Szabo et al., 2006).

Broader societal factors that influence adolescent current smoking include school-based policies and/or programs (Dobbins et al., 2008; Lipperman-Kreda et al., 2009; Lovato et al., 2007; Lovato et al., 2010; Murnaghan et al., 2008; Murnaghan et al., 2009; Park et al., 2010; Sabiston et al., 2009), media (Dalton et al., 2003), the number of tobacco retailers that surround secondary schools (Chuang et al., 2005; Henriksen et al., 2008; Kline, 2004; Leatherdale and Strath, 2007; McCarthy et al., 2009; Pearce et al., 2009; West et al., 2010), neighborhood socioeconomic

\* Corresponding author. Fax: +1 519 746 8631.

E-mail addresses: [skaai@uwaterloo.ca](mailto:skaai@uwaterloo.ca) (S.C. Kaai), [sleather@uwaterloo.ca](mailto:sleather@uwaterloo.ca) (S.T. Leatherdale), [manske@uwaterloo.ca](mailto:manske@uwaterloo.ca) (S.R. Manske), [ksbrown@uwaterloo.ca](mailto:ksbrown@uwaterloo.ca) (K.S. Brown).

status (Chuang et al., 2009; Doku et al., 2010; Pearce et al., 2009) and whether schools were located in rural or urban areas (Chuang et al., 2009; Sellstrom and Bremberg, 2006).

However, fewer studies (McCarthy et al., 2009) have concurrently examined the student and school-level factors that differentiate current smokers from *experimental* smokers (not *never smokers* as is done by most studies). The purpose of this study was to contribute and expand on previous research by examining which school- and student-level characteristics differentiated current smokers from *experimental* smokers. Understanding these factors will provide new insight for stakeholders interested in developing effective tobacco control strategies that will deter students who are still trying smoking from progressing to established (or advanced) smoking.

## Methods

### Design

The 2008–2009 Youth Smoking Survey (2008 YSS) is a valid and reliable machine-readable, pencil and paper nationally representative school-based survey that is used to measure the determinants of youth smoking behavior (University of Waterloo, 2009). See Elton-Marshall et al. (2011) and refer to [www.yss.uwaterloo.ca](http://www.yss.uwaterloo.ca) for detailed information on the survey development, design, survey weights, response rates and data collection protocol for the 2008 YSS.

### Participants

The secondary school portion of 2008 YSS was administered to 29,296 grades 9 to 12 students attending 133 schools from all 10 Canadian provinces. The present study used only the subset of 5440 who were current and experimental smokers.

### Measures and data sources

This study used data only from students who reported current (occasional or daily smokers) or experimental smoking. Consistent with previous research (Cameron et al., 2007; Lovato et al., 2007; Lovato et al., 2010; McCarthy et al., 2009) “occasional smokers” were defined as those students who had smoked at least 100 cigarettes in his/her lifetime and had smoked at least 1 cigarette during the 30 days preceding the survey. “Daily smokers” were defined as those students who had smoked at least 100 cigarettes in his/her lifetime and had smoked at least 1 cigarette per day for each of the 30 days preceding the survey. This group was compared with students who were “experimental smokers” defined as any students who had smoked in the last 30 days preceding the survey but had not smoked 100 cigarettes in their lifetime (McCarthy et al., 2009).

All variable selection was guided by existing literature and TTI (Floy and Petraitis, 1994). The intrapersonal (gender, grade, alcohol and marijuana use, school connectedness, tobacco-related knowledge and attitudes) and social context measures (parents, siblings and friends smoking status, and smoking rules in the house) were coded as listed in Table 1. Two school neighborhood characteristics (location and median household income) were linked with the 2008 YSS dataset. Consistent with previous research (Chuang et al., 2005; Wen et al., 2009), school location and the median household income data (proxy measure for school neighborhood socioeconomic status [SES]) was derived from the school postal codes using the Postal Code Conversion File which provided a link between the postal code and Statistics Canada's standard 2006 census geographical areas (Statistics Canada, 2010) as described in Table 1. The 2008/2009 Enhanced Points of Interest [EPOI] data file from Desktop Mapping Technologies Inc. [DMTI] (ESRI, 2002) provided numeric data regarding the number of tobacco retailers located within a 1-km radius of each school (Table 1).

### Statistical analyses

Multilevel logistic regression (Snijders and Bosker, 1999) was used to analyze the data because it allows for an understanding of the separate and joint effects of student-level (level-1) and school-level (level-2) characteristics on current smoking. Consistent with previous research (Leatherdale et al., 2005a), a four-step modeling procedure was used. Model 1 entailed

computing a null model to assess whether there was significant within-cluster interdependence to warrant the use of a multilevel approach. Model 2 was developed to determine the school-level variables that would have a direct effect on the likelihood of a student being a current smoker versus an experimental smoker. In Model 3, the strength of the direct effects of both the school- and student-level predictors was assessed using a random coefficient regression model. The main purpose of the final model (Model 4) was to assess the contextual interactions between the school-level and student-level predictor variables. Predictor variables that were not significant at  $P < .05$  were removed until the final model contained only predictor variables that were significant at  $P < .05$ . All analyses used SAS 9.2 statistical package (SAS Institute Inc., 2001).

## Results

Of the full sample of grade 9 to 12 students, 3412 were classified as *current smokers* and 2028 were classified as *experimental smokers*. Table 2 shows descriptive statistics comparing adolescents who were current smokers with those who were experimental smokers. Fifty-six percent of the sample was male. The prevalence of current smoking was significantly higher among males (66.2%) than females (58.4%) ( $\chi^2 = 35.31$ ,  $df = 1$ ,  $P < .0001$ ). Overall, the proportion of students who were current smokers increased from grade 9 to 12 and also as the number of smoking friends increased from 1 to 5 friends. The ever use of alcohol and marijuana was high (97.3% and 87.8% respectively). Sixty-nine out of 133 secondary schools were located in urban areas. The average current smoking rate among grade 9–12 students in the 133 secondary schools was 11.1% (range, 0%–39.1%). The mean number of tobacco retailers within a 1-km radius of the schools was 5.8 (range, 0–49). The mean of the household income was \$56,424 (range, \$30,784–\$97,706).

### Multilevel results

Table 3 presents results of the multilevel logistic regression analyses. The results from the null model (Model 1) showed a significant between-school random variation in the likelihood of current smoking among grade 9 to 12 students [ $(\sigma^2_u = 0.13 [0.04]$ ,  $P < .001$ ], where the estimates suggest that the school a student attended accounted for 3.9% of the variability in their likelihood of being a current smoker versus an experimental smoker. Model 2 results showed that the number of tobacco retailers within a 1-km radius surrounding a school was positively associated ( $P = 0.044$ ) with current smoking. This neighborhood characteristic explained 5.8% of the between-school variability in the likelihood of a student being a current smoker versus an experimental smoker.

The median household income that was used as a proxy measure for neighborhood SES where a secondary school was located was not associated ( $P = 0.220$ ) with the likelihood of a student being a current smoker versus an experimental smoker. School location in terms of whether the school was in an urban or rural area was not significantly associated ( $P = 0.925$ ) with odds of a student being a current smoker versus an experimental smoker.

Model 3 identified the student-level characteristics that were significantly associated with the odds of a student being a current smoker versus an experimental smoker when adjusting for one school-level variable (i.e., the number of tobacco retailers). This model also showed that the number of tobacco retailers surrounding a school remained significantly (AOR 1.03, 95% CI 1.01–1.05) associated with the odds of a student being a current smoker even after controlling for student-level individual characteristics. None of the two-way contextual interactions between the school-level and student-level predictor variables (including gender) in Model 4 (results not shown) were associated with the outcome variable.

The final model suggests that male students were more likely to be current smokers (versus experimental smokers) than female students (AOR 1.30, 95% CI 1.13–1.50). The odds of a student being a

Download English Version:

<https://daneshyari.com/en/article/6047887>

Download Persian Version:

<https://daneshyari.com/article/6047887>

[Daneshyari.com](https://daneshyari.com)