

# Analysis of factors related to illegal tobacco sales to young people in Ontario

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## Abstract

**Objective**—To identify and to discuss factors influencing illegal merchant sales of tobacco to underage people in Ontario, Canada.

**Design**—Results were obtained through random retail compliance checks of tobacco merchants. A multivariate analysis specified the relationship between selected independent variables and the willingness of tobacco merchants to sell to minors. The selected independent variables included retail operation type, community population size, the presence of tobacco production, signage, sex and age of volunteers, smoking prevalence rates, and enforcement rates.

**Participants**—A random, stratified sample of 438 tobacco retailers in 186 communities in Ontario.

**Main outcome measure**—Willingness of merchants to sell tobacco to minors.

**Results**—Older youths and girls were more likely to be sold tobacco products. Purchase attempts carried out in tobacco-producing regions were also statistically related to illegal sales.

**Conclusions**—Policy efforts to control youth access to tobacco in Canada may need to invoke legislation requiring merchants to request proper identification from customers who appear to be under the age of 25, and who seek to purchase tobacco products. Further attention could also be directed at tobacco control policies and enforcement strategies that need to consider the unique challenges faced by jurisdictions where the tobacco industry is a powerful presence.

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## Introduction

It is well known that onset of long-term tobacco addiction occurs primarily during the adolescent years, as 90% of all daily smokers begin smoking before the age of 20.<sup>1</sup> Because so few people start smoking after their teenage years, tobacco prevention efforts are working to curtail access to tobacco products for young people. Consequently, international public health initiatives are increasingly enacting minors' access laws to govern youth access to tobacco products.<sup>2</sup>

One of the more recent tobacco control initiatives in Canada has taken place in Ontario. The Ontario Tobacco Control Act,<sup>3</sup> (OTCA) enacted in 1994, enhances tobacco prevention

efforts by establishing 19 as the legal age for tobacco sales. The OTCA also includes a provision for the education of tobacco retailers concerning adolescent smoking, and the provision of signage strictly forbidding tobacco sales to minors under the age of 19. Measures to enforce these provisions were underway immediately following the Act. Moreover, a graduated fine structure was established so that merchants convicted of selling tobacco products to young people face fines ranging from a maximum of C\$2000 for a first offence, to a maximum of \$25 000 for three or more offences.

Despite the law, tobacco products remain relatively accessible for young people within Ontario, as many retailers are willing to sell them to young people.<sup>4</sup> The Canadian Cancer Society,<sup>5</sup> for instance, in 1995 measured the willingness of 499 retailers throughout Canada to sell cigarettes to minors. Overall, 60% of retailers tested were willing to sell. Other research found that 52% of retailers were prepared to sell to minors in Canada.<sup>6</sup> Similarly, findings from the United States noted that minors were able to purchase cigarettes at a success rate ranging from 46-76%.<sup>7-14</sup>

Tobacco control research has identified several factors associated with illegal sales of cigarettes to young people. The age and sex of minors attempting to purchase tobacco has been shown to be significantly related to illegal sales. Girls and young men who are near to the legal limit are usually the most successful in their purchase attempts.<sup>10-11</sup> Other literature has revealed that the level of enforcement activity is inversely related to underage sales.<sup>15-18</sup> For instance, in jurisdictions where the selling of tobacco to minors is met with fines or other penalties, these actions have been shown to impede illegal sales. Educational initiatives, whereby tobacco retailers are informed about the adverse effects of tobacco use generally, and the specific harm to adolescents, have also been shown to reduce illegal sales to young people.<sup>2-19-20</sup> Finally, the likelihood of sales to minors has been found to vary geographically,<sup>6-13</sup> and in terms of the type of retail businesses that are willing to sell tobacco.<sup>1-11</sup>

As important as this research is for identifying factors related to illegal sales, what remains less well understood is how merchant sales to minors are effected simultaneously by several independent variables. What are the relative contributions of these factors in determining illegal tobacco sales? Although recent research on retailer sales to minors has used multivariate techniques,<sup>21-22</sup> these analyses have

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been somewhat restricted in the range of predictor variables used. Although operation type, chronological age, apparent age, age verification (identification, ID), and sex have been included in previous research designs, what remains lacking are factors such as regional smoking prevalence rates, tobacco industry presence, and community population size—all of which may account for variation in sales to minors. Moreover, previous multivariate research has yet to examine the issue using a sample reflecting a large population (an entire state/province)—particularly a jurisdiction outside the United States. Accordingly, our goal was to undertake a statistical analysis of merchant compliance using a random, stratified sample which is representative of Ontario, Canada's largest province, which is populated by over 10 million people. Using this unique sample, the relative impact of nine independent variables on sales of tobacco to young people was assessed.

### Research questions

- Are retailers in communities with active enforcement efforts (1995 charge rate) less likely to sell cigarettes to minors than communities with little or no enforcement activity?
- Are retailers in communities where there is a higher percentage of smokers in the population more likely to sell cigarettes to minors than communities where smoking is less prevalent?
- Are merchants from communities where tobacco contributes to the economy (tobacco-producing region) more likely to sell cigarettes to minors than communities in which tobacco does not play a significant economic role?
- What impact does the age and sex composition of minors attempting to purchase tobacco have on the likelihood of illegal sales?

### Methods

It is now well established that the only way to determine the willingness of retailers to sell to minors is through the use of retailer compliance checks.<sup>15</sup> Compliance checks involve the use of minors to test retailers' willingness to sell them cigarettes.

Organised and administered at the health unit level, in October and November 1995, young, trained volunteers ranging in age from 13 to 18 were sent in pairs to a sample of randomly selected retailers across the province of Ontario, and according to a consistent, prepared script, asked to buy cigarettes.

(Merchants selected for the study were drawn using a multistage, random sample stratified on health unit and community size. To determine the communities from which the retailers would be selected, the proportion of the health unit's population residing in settlements of different sizes was calculated. Then, using the 1991 Canadian census, each community within a participating health unit was placed in its respective population category. Once these lists were compiled, com-

munities designated for compliance checks were selected using a computerised random numbering process. For a more detailed discussion of the sample, see ref 23.)

In total, there are 42 health units in Ontario, divided into six regions (Northwest, Northeast, Central West, Central East, Southern, and Eastern). One minor would look for appropriate signage in the store, while the other attempted to purchase cigarettes. Informed consent was obtained from each volunteer, and if they were under the age of 16, the consent of their parents.

The young people were recruited and trained for the local compliance checks, and care was taken to make sure that there would be little doubt that minors were involved in the checks. In other words, all young people looked to be under the age of 19 according to assessments made by local health unit personnel. The young people after training were put in pairs and accompanied to pre-selected sample sites by an adult escort. During the compliance check, one minor asked to buy a packet of cigarettes. If the retailer refused, both minors left the site. If the retailer was willing to make a sale, the volunteer responded that he or she did not have enough money for the purchase, left the site, and returned to the adult escort. Vendors were considered willing to make a sale if they either entered the sale on the cash register or offered tobacco to the young people and then asked for money. If the retailer asked for their age or an ID, they truthfully gave their correct age or said that they had no ID; if not asked they did not volunteer this information. Regardless of retailer willingness to sell, there was no actual purchase by the minors.

After the sales event, the team completed a prepared data form that identified the age and sex of the volunteer team, retailer type (of operation), presence of signage, and results of the purchase attempt.

### RETAILER SAMPLE

The sample was designed so that it would give reliable estimates of sales of tobacco to minors for the province of Ontario. A sample of 475 retailers was required to make estimates for the year (1995) within  $\pm 5\%$  with 95% confidence intervals (95% CIs). Given the fact that not all health units in the province participated in the study, the number of compliance checks carried out totalled 438 in 186 different communities.<sup>23</sup>

Once the communities and number of compliance checks for each were selected, specific outlets were randomly selected using lists of licenced tobacco merchants provided by local health units.

### STATISTICAL METHOD

Logistic regression analysis was used to investigate the likelihood of illegal retailer sales to minors. The selection of this technique is due to the dichotomous nature of the dependent and certain independent variables. Polytomous variables have been recoded into separate and distinct dichotomies.<sup>24</sup> The

following is a list of variables and their measurement.

#### DEPENDENT VARIABLE

The dependent variable for analysis is merchant sales (illegal sales of tobacco by retailers). The unit of analysis is at the level of the independent retailer. Illegal sales events involve the interaction of two main players—the merchant selling tobacco and the young person attempting to purchase it. Merchant sales were dichotomised as either 1 if a sale occurred, or 0 if a sale did not occur.

#### INDEPENDENT VARIABLES

##### *Age*

This variable measured the average age of the young volunteers who participated in each compliance check. Their mean age was 15, and ages ranged from 13 to 18 years.

##### *Sex*

The composition of the team using three dyads was identified: (a) two females; (b) two males; and (c) one male and one female. These dyads were recoded into three distinct dichotomous variables with the male dyad used as the reference.

##### *Tobacco-producing region*

This variable identified merchants who were located in communities where tobacco contributes to the economy. Tobacco-producing region was coded as a dichotomy, 1 if the retailer was located in a tobacco-producing region of Ontario, and 0 if they were not.

##### *Smoking prevalence*

This continuous variable measured the smoking prevalence rates in Ontario health units. These data were obtained from the 1991 Ontario health survey.<sup>25</sup>

##### *Operation type*

Operation types had five outcomes: restaurants, petrol (gasolene) stations, convenience stores, grocery stores, and other locations (sports arenas and recreation facilities). Each outcome has been dichotomised into its own variable, each with an outcome of either 1 or 0. Grocery stores were used as the reference category, as research has shown these locations have relatively high levels of compliance compared with other locations.

##### *Municipal population*

This variable had five outcomes: 0–999, 1000–4999, 5000–9999, 10 000–99 999, and  $\geq 100\ 000$ . Each outcome has been recoded into its own variable with an outcome of either 1 or 0. Population statistics were obtained from Statistics Canada's 1991 census.<sup>26</sup> The 0–999 category was used as a reference to note an increase or decrease in the likelihood of sales as community size becomes larger.

##### *Signage*

Signage measured the presence of any type of sign in a retail location displaying the legal age for purchasing tobacco in Ontario (age 19). As

a dichotomous variable with two outcomes, signage was coded 1 if a sign was posted in the retail store, and 0 if a sign was not posted in the retail store.

##### *Charge rate*

This was a continuous variable indicating the number of charges laid against tobacco merchants for the illegal sales of tobacco to minors in each health unit (sub-divisions of regions). This variable has been standardised on the basis of a charge "rate" (number of fines per 100 000 population).

##### *Education*

Education was measured by noting whether tobacco merchants were aware of the legal age in which young people are able to purchase cigarettes (19 years old in Ontario). As part of the follow-up telephone survey, merchants were asked whether they were aware of the legal age for selling tobacco to minors. Within Ontario, bylaw enforcement agents are responsible for educating tobacco merchants—this includes the posting of signs and making merchants aware of the legal age for selling tobacco to minors.

(Special mention needs to be given to education. The literature review indicated that merchant knowledge (education) of the law influences retailer willingness to sell to minors. Results from a telephone survey of retailers in Ontario<sup>23</sup> indicated that retailers displayed a high level of awareness of legislation restricting sales to minors. In fact, in 1995 over 92% of retailers in Ontario knew the legal age for purchasing tobacco products. As there was so little variation across this variable, it was decided that it would be inappropriate to include the education variable in this multivariate analysis.)

## Results

The descriptive statistics for this study are contained in the table. Overall, 27.6% of merchants in Ontario were willing to sell tobacco products to minors. However, as the table reveals, many of the independent variables selected for analysis have an impact on illegal sales. The relative independent effects of these variables in the multivariate analysis are also presented in the table.

Consistent with past research, the analysis suggested that the age and gender composition of the volunteer teams strongly predicts illegal sales. The oldest minors were the most successful in their purchase attempts, and the youngest volunteers were the least likely to purchase tobacco. Sex was found to be significantly related to illegal sales. The male dyad was the least successful in their purchase endeavours, followed by female dyads, with mixed dyads being the most successful. Although not as powerful as age and sex, tobacco-producing region is also statistically significant in its ability to predict illegal tobacco sales in Ontario. Merchants from tobacco-producing regions were more likely to sell than merchants from regions that did not produce tobacco. Enforcement, although not

Table Descriptive statistics, and logistic regression determinants of illegal retail sales of tobacco to minors

Variable	Agreeing to sell %	Compliance checks n	Odds ratio	95% CI	
				Low	High
Operation type (reference = grocery stores)	21.4	42			
Petrol stations	33.3	78	1.23	0.50	3.01
Restaurants	18.9	37	0.56	0.18	1.72
Convenience	25.8	236	0.96	0.44	2.09
Other	37.2	43	1.58	0.58	4.30
Population size (reference = <1000)	32.0	25			
1000–4999	20.3	59	0.34	0.11	1.13
5000–9999	27.8	18	0.54	0.13	2.29
10 000–99 999	29.4	109	0.60	0.21	1.73
≥100 000	28.2	227	0.68	0.25	1.90
Region			1.93*	0.97	3.84
Tobacco-producing region	36.1	61			
Non-tobacco-producing region	26.3	377			
Signage			0.79	0.39	1.60
Signs posted	26.7	375			
Signs not posted	29.3	63			
Sex (reference = male dyad)	14.7	124			
Female dyad	28.9	144	2.29**	1.20	4.35
Female-male dyad	38.9	152	3.76**	1.98	7.13
Smoking prevalence			1.00	0.94	1.08
Age (years)			1.54*	1.08	2.22
13	100.0	1			
14	17.6	17			
15	24.0	192			
16	20.6	68			
17	38.1	18			
Charge rate			0.87	0.71	1.06
Total illegal sales	27.6	438			

\*p = 0.05; \*\*p = 0.01.

significant at p = 0.05, was nevertheless associated with illegal sales; as charge rate increased, the likelihood of retailers illegally selling to minors decreased. Operation type, population size, signage, and smoking prevalence rates were not associated with sales.

### Discussion and conclusion

We examined the factors associated with illegal sales of tobacco to minors in Ontario, Canada. The analysis revealed that the age and sex of volunteers had the strongest independent effect upon access. The oldest in the sample generally were the most successful in their purchase attempts, and female involvement also increased the likelihood of illegal sales. These findings indicate that it may be useful for policymakers to impose restrictions so that merchants who suspect that an individual wanting to buy tobacco is under 25, for example, must require identification. This recommendation has also been made in past research where similar findings have been reported.<sup>21</sup>

Interestingly, in regions of the province where tobacco production occurred, the ability to illegally purchase tobacco was increased. Perhaps when tobacco production is so strongly tied to a local economy, merchant's choices to sell need to be understood within the context of economic power and control. If retailers in a community are regularly patronised by local industry—and that industry is the tobacco industry—this could affect decisions to sell tobacco to minors. In such an environment, merchants who routinely turned down minors' attempts to purchase tobacco could be interpreted as posing a challenge to the economic and cultural hegemony

of a tobacco-producing region. Although not a simple policy concern to address, more research is needed better to understand the politics involved in invoking enforcement procedures and strategies in communities where there is a strong presence of a “culture of tobacco” (tobacco production). Indeed, how can public policy advance in environments where there is little, if any, public support for the social disapproval of tobacco use? Further pursuit of this interpretation would be an ideal focus for future research.

Although the charge rate variable did not meet statistical significance, a marginal level of association was evident within the data (p = 0.15). Given the explanatory power of sex and age in this analysis, it would be unwise to assume that enforcement is simply unrelated to illegal sales. More to the point, merchants who are confronted by young women or men seeking to buy tobacco, and who appear to be of legal age, are not likely influenced immediately by the level of perceived or actual enforcement activity within his or her community—especially if the retail location in question has never been charged for illegally providing cigarettes to minors. Future research on the topic would be in a better position to deal with the deterrent effect of enforcement, if data on charges were to be collected at the level of the retail outlet, as opposed to using aggregate community charge rates—a limitation of this study. Nevertheless, overall findings do lend support to research suggesting that the passage of “strict law” by an official body is not sufficient on its own to ensure compliance with that law.<sup>18–27</sup> Indeed, previous research has confirmed that an effective method to control illegal retailer sales of tobacco to minors includes an enforcement component.<sup>15–28</sup> Enforcement efforts work to increase the deterrent effect achieved through education and the law.<sup>19</sup>

In conclusion, the results of this study are noteworthy given that the multivariate analysis used a wide range of variables, some of which have not appeared previously in literature addressing factors related to illegal tobacco sales to minors. This research is also the first attempt to focus on the problem in a Canadian context, using a large, stratified sample. In addition, and perhaps most importantly, it is hoped that this paper will not only stimulate additional cross-cultural research, but that it offers a challenge for the development of a comparative study of youth access to tobacco. Even though more information is amassing on this subject on a worldwide scale, the study of young people and tobacco control remains predominantly connected with the national settings in which it is undertaken. However, the problems of the health risks caused by tobacco use in young people clearly have international dimensions. Although this may be well known, the research community has yet to implement designs and imperatives that aim to understand international differences, as well as similarities, in the factors relating to youth access to tobacco. New research initiatives are invited that involve international cooperation in achieving more knowledge and better

understanding of youth access, and ultimately how regulatory policy might affect patterns of youthful tobacco use.

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- 1 US Department of Health and Human Services. *Preventing tobacco use among young people. A report of the Surgeon General, 1994*. Atlanta, Georgia: Public Health Service, Centers for Disease Control and Prevention, Office on Smoking and Health, 1994. (US Government Printing Office Publication No S/N 017-001-00491-0.)
- 2 Keya K, Wooduff S, Wildey M, et al. Effect of a retailer intervention on cigarette sales to minors in San Diego County, California. *Tobacco Control* 1993;3:145-51.
- 3 Legislative Assembly of Ontario. *The Ontario Tobacco Control Act (OTCA)—an act to prevent the provision of tobacco to young persons and to regulate its sale and use by others*. Toronto, Ontario, 1993.
- 4 Schofield M, Gulliver S, Samson-Fisher R. Retailer attitudes on tobacco sales to minors in New South Wales, Australia. *Tobacco Control* 1995;4:362-6.
- 5 Canadian Cancer Society. Sixty percent of retailers sell cigarettes to kids. Press release, 25 September 1995.
- 6 Marino T, for A C Neilson. *Measure of retailer compliance with respect to tobacco sales- to-minors legislation and restrictions on advertising*. Prepared for Health Canada, Office of Tobacco Control. Toronto: Ontario Ministry of Health, December 1995.
- 7 Altman D, Foster V, Rasenick-Douss L, et al. Reducing the illegal sale of cigarettes to minors. *JAMA* 1989;261:80-83.
- 8 Altman D, Rasenick-Douss L, Foster V, et al. Sustained effects of an education program to reduce sales of cigarettes to minors. *Am J Public Health* 1991;81:891-3.
- 9 Cohen J, Stanley L, Martin J, et al. Illegal sales of cigarettes to minors in North Carolina. *NC Med J* 1995;56:59-63.
- 10 DiFranza J, Norwood B, Garner D, et al. Legislative efforts to protect children from tobacco. *JAMA* 1987;257:3387-9.
- 11 Forster J, Hourigan M, McGovern P. Accessibility of cigarettes to underage youth in three communities. *Prev Med* 1992;21:320-8.
- 12 Jason L, Ji P, Anes M, et al. Active enforcement of cigarette control laws in the prevention of cigarette sales to minors. *JAMA* 1991;266:3159-61.
- 13 Roeseler, A, Caopra, A, Quinn V. A special campaign to generate support for state legislation to decrease youth access to tobacco: a case study. Tobacco Control Section, California Department of Health Services. American Public Health Association Meeting, Washington, DC, 2 November 1994.
- 14 Wakefield M, Carrangis J, Wilson D, et al. Illegal cigarette sales to children in South Australia. *Tobacco Control* 1992; 1:114-17.
- 15 DiFranza J. Active enforcement of minors' access laws: a moral and ethical imperative. *Tobacco Control* 1996;4:361.
- 16 Feighery E, Altman D, G Shaffer D. The effects of combining education and enforcement to reduce tobacco sales to minors. A study of four Northern California communities. *JAMA* 1991;266:3168-71.
- 17 Forster, J, Komro, K, Wolfson M. Survey of city ordinances and local enforcement regarding commercial availability of tobacco minors in Minnesota, United States. *Tobacco Control* 1996;5:46-51.
- 18 Rigotti N, Stoto M, Bierer M, et al. Retail stores' compliance with a city no-smoking law. *Am J Public Health* 1993;83:227-32.
- 19 Biglan A, Henderson J, Humphrey D, et al. Mobilising positive reinforcement to reduce youth access to tobacco. *Tobacco Control* 1995;4:42-8.
- 20 Woodruff, S, Wildey, R, Conway, T, et al. Effect of a brief retailer intervention to reduce the sale of single cigarettes. *Am J Health Prom* 1995;9:172-4.
- 21 Rigotti N, DiFranza, L, Chang Y, et al. The effect of enforcing tobacco-sales laws on adolescents' access to tobacco and smoking behaviour. *N Engl J Med* 1997;337:1044-51.
- 22 DiFranza J, Savageau JA, Aisquith B. Youth access to tobacco: the effects of age, gender, vending machine locks, and "It's the law" programs. *Am J Public Health* 1996;86:221-4.
- 23 Abernathy T. *A study to measure the impact of the Tobacco Control Act*. Toronto: Ontario Ministry of Health, 1996.
- 24 Hardy M. Regression with dummy variables. *Quantitative Applications in the Social Sciences Series*, vol 93. Newbury Park, California: Sage, 1993.
- 25 Statistics Canada. *Census of the population*. Ottawa: Queens' Printer, 1991.
- 26 Ontario Ministry of Health. *Ontario Health Survey*. Toronto: Ontario Ministry of Health, 1991.
- 27 Kidder R. *Connecting law and society*. New Jersey: Prentice-Hall, 1983.
- 28 Radecki T, Zdunich D. Tobacco sales to minors in 97 US and Canadian communities. *Tobacco Control* 1993;2:300-5.



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