

# Effectiveness of Bans Against Smoking Inside Private Vehicles in Canada

By HAI V. NGUYEN, PhD

## Introduction

There has been growing interest in banning smoking inside private vehicles to protect children. This trend is driven by a number of factors. First, secondhand smoke (SHS) exposure is particularly harmful for children because they have smaller lungs and weaker immune systems than adults. The current level of children's exposure to SHS while being driven in cars is high. In the US, more than 1 in 5 middle- and high-school students reported riding in cars while others are smoking.<sup>1</sup> Further, the car's confined space is particularly dangerous in presence of smoking because the SHS caused by smoking can reach a toxic level quickly, even if one attempts to open the windows or operate the ventilation system.<sup>2,3</sup> Also, the case for government intervention is strong: children cannot defend themselves from SHS exposure inside private vehicles because they are often not aware of the health risks of SHS exposure; even if they are, they cannot communicate or may be too afraid to ask to leave the car.

## Barriers to Adoption of Bans

Although a number of jurisdictions have outlawed smoking inside private vehicles with children present, several other jurisdictions still have not adopted this law. In particular, several US states failed to pass the legislation when it was proposed. Critics of the law raise three arguments against the ban.

First, the ban would further narrow the choice set of smokers who are already restricted by several smoking bans at workplaces and various public places. Many consider a ban against smoking inside private vehicles as an intrusion into private



life and individual rights. Indeed, over the past few years lawmakers in a number of US states (such as New Hampshire, New Jersey, South Carolina, North Dakota, etc.) cited this as the main reason for rejecting the proposed ban.

Another challenge is the issue of enforceability and effectiveness of the policy. As the ban often specifies an age group that it aims to protect, concerns have been raised about the difficulty of verifying the age of vehicle occupants. This was echoed by lawmakers in a number of

TABLE 1 **SMOKE-FREE CAR LAW ADOPTION IN CANADIAN PROVINCES**

Province	Date law in effect	Date law adopted	Applicable age threshold	Noncompliance penalty (\$CAN)
Nova Scotia	Apr 1, 2008	Dec 13, 2007	19	394.50
Ontario	Jan 21, 2009	Jun 18, 2008	16	250.00
British Columbia	Apr 7, 2009	May 29, 2008	16	109.00
Prince Edward Island	Sep 1, 2009	May 15, 2009	19	100.00
New Brunswick	Jan 1, 2010	May 1, 2009	16	570.00
Manitoba	Jul 15, 2010	Jun 11, 2009	16	200.00
Saskatchewan	Oct 1, 2010	Dec 2, 2009	16	Pending
Newfoundland	May 31, 2011	Dec 13, 2010	16	Pending
Alberta	Jan 1, 2013	Mar 20, 2012	18	1,000.00
Quebec	Not yet	Not yet	Not yet	Not yet

Sources: Based on Table 1 in Saltman et al. (2010)<sup>5</sup> and author's own compilation

US states when rejecting the ban.

The third concern is a possible displacement effect of the ban, that is, smokers switch their smoking from inside private vehicles to their home environments, which would negatively affect household members including children.

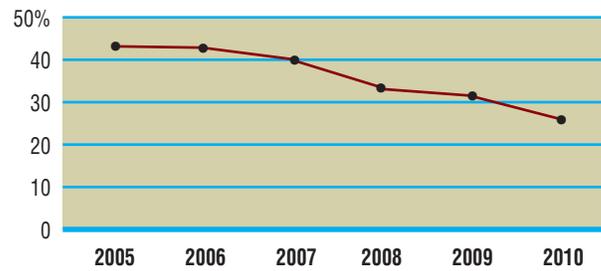
Except for the violation-of-individual-liberty argument which is a value question, the other two concerns (i.e., the effectiveness of the ban and possible vehicle-to-home smoking switching effect) were not based on any empirical evidence. This paper summarizes the findings from my recent research that provides the first empirical evidence on these two issues.<sup>4</sup> Specifically, the research examined whether the ban reduced the level of SHS exposure for children where it was adopted and investigated the possibility that the ban might displace smoking from inside the cars to home environments.

### Effects of Canadian Bans on Second-hand Smoke Exposure and Smoking at Home

Since April 2008, Canadian provinces started to adopt the ban against smoking in private vehicles carrying children. Table 1 displays the dates of adoption, the age groups to be protected and the penalties for noncompliance across Canadian provinces. All provinces except Quebec have adopted this policy.

Not only has Canada led the way in adopting such legislation, it also collected nationally representative survey data to facilitate the monitoring and assessment of the ban's effects. Specifically, Statistics Canada has been conducting the Youth Smoking Surveys (YSS) and the Canadian Tobacco Use Monitoring Survey (CTUMS) over the years to monitor smoking behaviours for children and the general population, respectively. Both surveys contain questions about children's SHS exposure inside private vehicles. The CTUMS asks: "In

FIGURE 1 **TRENDS IN CHILDREN'S EXPOSURE TO SHS IN VEHICLES IN CANADA (%)**



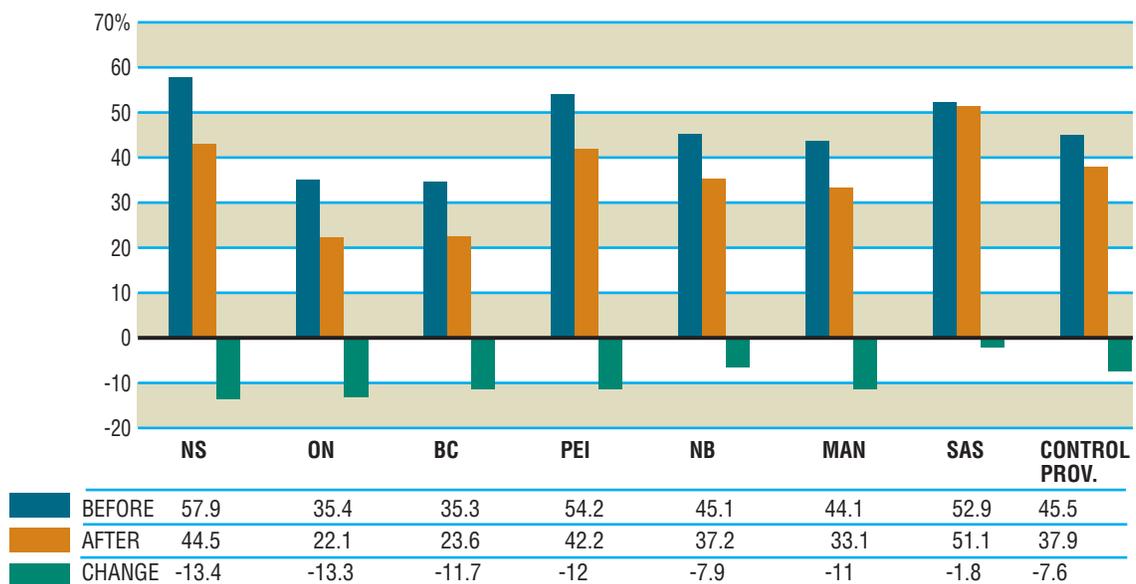
Source: The Canadian Tobacco Use Monitoring Survey (CTUMS) 2005–2010

the past month, (excluding your own smoking), were you exposed to second-hand smoke: ...inside a car or other vehicles?" In the YSS, it was asked: "During the past 7 days, on how many days did you ride in a car with someone who was smoking cigarettes?" Responses to these questions allow researchers to construct and examine changes in children's exposure to SHS inside private vehicles over time.

It is interesting to note that during the period of the ban's sequential adoption across the provinces in Canada, the reported SHS exposure inside private vehicles by children has declined. Figure 1 shows a decrease from 43 per cent in 2005 to 28 per cent in 2010. As far as the effect of the policy on children's SHS exposure is concerned, the challenge is to establish whether this declining trend in SHS exposure is caused by the ban or by other factors. In other words, one wants to obtain an effect that can be attributed fully to the ban, not to any other factors.

The variation in the dates of ban adoption across the provinces provides a unique quasi-experiment that allows researchers to separate the effect of the policy from that of

FIGURE 2 **PREVALENCE OF CHILDREN'S SHS EXPOSURE BEFORE AND AFTER THE BAN (%)**



Source: The Canadian Tobacco Use Monitoring Survey (CTUMS) 2005–2010

## Canadian bans on smoking in cars have reduced children's exposure to second hand smoke by 33%

confounding factors. One useful way to achieve this is to compare the change in children SHS exposure inside vehicles after the ban's introduction in the provinces where the ban was adopted with the similar change in the provinces where the ban was not adopted. The latter change will capture and control for a possible confounding background trend.

Figure 2 shows the change in children's SHS exposure before and after the introduction of bans, for the provinces where the ban was in effect. It also does so for the provinces where the ban had not been adopted (or was adopted but not yet implemented) between 2005 and 2010. Data from both the YYS and the CTUMS indicate that those provinces that passed the law appear to have lower levels of SHS exposure after implementing the policy. Meanwhile, although the rate of overall SHS exposure in all settings also declines, the magnitude of the overall decline is lower than the specific decline in cars.

One can formalize the comparisons in Figure 2 by using regression techniques that allow us to link the outcome of interest (i.e., children's SHS exposure) to the ban variable and at the same time, control for observable confounding variables (such as the differences across provinces, possible shocks that occur in any year and individual characteristics such as age, education, gender, languages spoken at home, etc.). One can further exploit the fact that the law only targets to protect children under a certain age (i.e., age 16 in most provinces, except 19 in Nova Scotia and PEI and 18 in Alberta). If the law only protects children under certain age thresholds, there is no reason to expect to see the effect for the upper age group, and thus, we expect to see the effect for the protected age group to be larger than that for the unprotected age group.

For this research, regression analyses confirmed the effect of the policy.<sup>4</sup> Specifically, the YYS data confirm that the legislation reduced SHS exposure by about 10 percentage points. Compared with children's average SHS exposure rate of 30 per cent at the baseline, this represents an approximate 33% reduction in the incidence of children's SHS exposure.

To address the concern that banning smoking inside cars would simply displace smoking into homes, a similar regres-

sion replaced the outcome of children's SHS exposure by the level of smoking at home. There was no relationship between the policy's introduction and the level of smoking at home. While there may be several explanations for this finding, the main reason could be the increasing constraints against smoking at home, imposed by non-smoking partners, or by other family members, that would limit the smoker's home behaviour. CTUMS data show that the proportion of homes with smoking restrictions (either a complete ban or a partial one) has increased consistently over the past ten years, from 72 per cent in 2000 to 91 per cent in 2010.

### Conclusion and Recommendations

Jurisdictions are increasingly interested in banning smoking inside private vehicles with children present, but there are still doubts over its effectiveness. My analysis showed that the bans adopted across the provinces in Canada were actually successful in reducing SHS exposure. Importantly, the ban led to lower SHS exposure inside private vehicles without causing smokers to light more cigarettes at home. These empirical evidences should alleviate the concerns about the effectiveness of this law or any unintended effect of increasing smoking at home. Given that SHS exposure is very harmful to children, who are unable to protect themselves and that this policy has proved effective, it might be the right time for other jurisdictions to adopt this law to eliminate a channel through which children are often exposed to SHS. Future research can further contribute evidence to inform policy-making by determining whether the legislation's effect of reducing children's SHS exposure is sustained over time and how much this reduced exposure to SHS in cars can translate into health benefits such as reduced asthma burden.

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