

The Current Status of Bans on Smoking in Vehicles Carrying Children

A CANADIAN PERSPECTIVE

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In the 25 years since the first scientific studies were conducted, research evidence has demonstrated conclusively that secondhand smoke (SHS) poses a significant threat to health. The U.S. Surgeon General's Report of 2006 concluded that tobacco smoke causes a broad range of diseases and health conditions including a number of cancers, respiratory and cardiovascular effects, and fetal and developmental conditions.¹ In 1992, the U.S. Environmental Protection Agency (EPA) concluded that SHS smoke is a "Group A" carcinogen, that is, a substance that has been established as a definitive cause of cancer in humans.² The International Agency for Research on Cancer (IARC) reached a similar conclusion in its 2002 report, stating that "involuntary smoking (exposure to SHS or 'environmental' tobacco smoke) is carcinogenic to humans."³

An estimated 1,000 Canadians die of SHS smoke per year.⁴ These include deaths from lung cancer, coronary heart disease, ischemic heart disease, infant deaths due to perinatal exposure, and deaths from other cancers and respiratory diseases.⁵⁻⁷

Dangers of secondhand smoke exposure to children

The presence of SHS in enclosed spaces, such as the home and vehicles, can result in significant morbidity for children, with resulting increased healthcare expenditures. Several studies have demonstrated that exposure of children to SHS at home is associated with an increase in the number of hospital emergency visits and admissions for infectious and respiratory illnesses.^{8,9} Children breathe more rapidly and absorb more pollutants than adults due to their small size, and therefore are more vulnerable to the hazards of SHS.¹⁰ Many of the illnesses that afflict adults (asthma and other chronic respiratory diseases, cardiovascular diseases and cancer) may be caused by long-term exposures to causative agents starting at a young age. A recent study suggests childhood exposure to SHS may lead to an increase risk of lung cancer even in adults who have never smoked.¹¹ SHS exposure has also been linked to sudden infant death syndrome (SIDS).¹²

Finally, it should be noted that no level of SHS exposure has been shown to be "safe" for children or adults. Thus, from a public health standpoint, exposure to SHS should be reduced as much as possible.

The argument for legislating smoke-free environments

The scientific evidence on the significant deleterious health impact of SHS has provided the foundation for smoke-free legislation in public places. As a result of the compelling evi-

dence for the harmfulness of SHS, there has been a worldwide movement towards policies and legislation to ban smoking in public places and in workplaces. Article 8 of the WHO's Framework Convention on Tobacco Control, the world's first health treaty, calls for the parties (there are currently 168 countries, including Canada, that have become a party to the FCTC), to take action to provide for protection from exposure to tobacco smoke.¹³

Today in Canada, all provinces have implemented comprehensive smoke-free laws in public places such as government buildings, hospitals, and also in hospitality settings such as restaurants and bars. Beyond Canada, an increasing number of countries have implemented comprehensive smoke-free laws, including Ireland, Norway, United Kingdom, and France.

The restrictions on smoking in outdoor spaces are growing in many Canadian and international jurisdictions. Although bylaws disallowing smoking within private homes and apartments are uncommon, the success of a broad range of anti-smoking initiatives has significantly reduced the numbers of individuals who smoke within residential dwellings.

A study by Edwards et al.¹⁴ examined the impact of New Zealand's Smoke-free Environments Amendment Act that banned smoking in nearly all workplaces in that country starting in 2004. Not only was there a significant reduction in SHS in the workplace but also a decrease in the reported SHS in private homes. Another study by Fong et al.¹⁵ evaluated the national smoke-free legislation implemented in Ireland in a nationally representative longitudinal cohort of smokers. They found that smoke-free legislation led to enormous declines in smoking in public venues (e.g., the prevalence of bars/pubs in which there was any smoking went from 98 per cent before the ban to five per cent after the ban). Moreover, there were other benefits of the smoke-free law in Ireland. For example, among smokers who quit after the implementation of the law, 80 per cent of smokers said it helped them quit, and 88 per cent of smokers said it helped them stay quit. Finally, the near-total elimination of smoking in hospitality settings was not accompanied by an increase in smoking in the homes, as some parties had suggested might happen. In fact, the percentage of smokers' homes with a total indoor smoking bans increased after the hospitality ban, from 15 per cent to 20 per cent. These uniformly positive effects have been found in other countries that have implemented a comprehensive ban, such as Scotland and France.¹⁶⁻¹⁸

TABLE 1
Jurisdictions in Canada that have legislation in force banning smoking in vehicles carrying children.

Jurisdiction	Applicable age (under the age)	Date law in force	Date law adopted
COMMUNITIES			
Wolfville (NS)	19	June 1, 2008	Nov 19, 2007
Surrey (BC)	19	July 31, 2008	July 14, 2008
Okotoks (AB)	16	Sept 1, 2008	July 15, 2008
White Rock (BC)	16	Nov 1, 2008	Oct 20, 2008
Richmond (BC)	19	Nov 30, 2008	April 28, 2008
PROVINCES/TERRITORIES			
British Columbia	16	April 1, 2009	May 29, 2008
Ontario	16	Jan 21, 2009	June 18, 2008
New Brunswick	16	Jan 1, 2010	May 1, 2009
Nova Scotia	19	April 1, 2008	Dec 13, 2007
Yukon	18	May 15, 2008	April 22, 2008
PEI	19	Sept 15, 2009	May 15, 2009
Manitoba	16	pending	June 11, 2009

Concerns regarding the negative financial impact of smoking bans in public spaces, such as restaurants and bars, have not been realized. In a review article by Scollo et al. (2003), which examined 97 studies from 31 states or provincial areas in eight countries, selecting for inclusion the 21 most scientifically rigorous studies (e.g., using criteria such as the presence of objective measures of impact such as tax receipts, pre-post design, statistical methods to control for secular trends, etc.), the conclusion was that smoke-free laws had no net economic impact.¹⁹ The Scollo et al. review was updated in a 2008 Monograph of the International Agency for Research on Cancer (IARC), which examined 68 additional studies of which 49 met the scientific standards of rigor.²⁰ Out of the 49 studies, 47 showed no overall economic impact.

Dangers of secondhand smoke exposure in cars

There exists one longitudinal cohort study demonstrating that SHS in cars is associated with adverse health effects. In that study by Sly et al. (2007), exposure to SHS in cars was found to be associated with increased incidence of persistent wheeze in 14-year olds.²³

Although there are few studies of the health impact of SHS exposure in cars, it is clear that the smoking in cars leads to an extremely high concentration of smoke, due to the very small volume within the interior of a car. For example, in one study using PM2.5 measurements in cars under varying conditions, in motionless cars with all the windows closed, the level of PM2.5 was equivalent to 100 times the U.S Environmental Protection Agency’s 24-hour standard for fine particle exposure, or, stated otherwise, over 11 times the levels of SHS in the average pub that allows smoking.^{24, 25}

It is important to note that smokers recognizing the potential hazard of their smoking in cars often take measures

that they believe will reduce the hazard. However, in a systematic experiment of the impact of these measures, researchers at the University of Waterloo demonstrated that even with a window open or with the use of the vehicle’s ventilation system in an attempt to clear the smoke, the levels of SHS were still very high.²⁴ For example, in a condition when a single cigarette was smoked in a car with all windows closed but with air conditioning (very common during a Canadian summer and, with heat rather than air conditioning, very common during a Canadian winter), the average PM2.5 level was almost 2.5 times higher than in a smoky bar.^{24, 25} Even with full ventilation and airflow—driving with all four windows down all the way—the average PM2.5 level was more than four times greater than the average outdoor values measured at baseline and at a level considered unhealthy to children and other sensitive groups with prolonged exposure.²⁴ Other studies investigating smoking in vehicles under a variety of conditions have found similar results. In general, these studies have found that SHS levels in cars persist even if compensatory measures are attempted, such as opening a window, increasing speed, or using the vehicle’s ventilation system (air conditioning/vents).^{26–30}

These air quality measurement studies demonstrate that secondhand smoke exposure in cars constitutes a significant health hazard, and one for which measures should be taken to reduce.

Reported smoking and secondhand smoke exposure in cars

A 2007 survey of a representative sample of Canadian smokers showed that 34 per cent of smokers admit to smoking in cars with non-smokers.³¹ Other surveys of Canadian youth have shown that 28 per cent of youth in grades 5–12 report being exposed at least once a week while riding in cars, and

Even with all four windows down, secondhand smoke in a car is higher than in a smoky bar.

that 26 per cent of youth in grades 5–9 report being exposed at least once a week.^{32, 33} It should be noted that these surveys were all conducted before the implementation of laws banning smoking in cars in Canada.

Not unlike cancer, where the incidence and outcomes are linked to socioeconomic status, results from observational studies suggest the prevalence of smoking in cars is higher in relatively deprived populations.³⁴

Smoke-free vehicle policies

Given that smoking in cars poses a significant hazard to health, and given its prevalence, what should be done? Research and experience on banning smoking in public places has shown that educational campaigns and voluntary smoking bans are not effective on their own, and that a smoke-free law paired with an educational campaign (before and after implementation of the law) is ideal for increasing its effectiveness.³⁵

There are a growing number of jurisdictions around the world that have instituted smoke-free private vehicle policies or bylaws. The first documented jurisdiction was the state of Arkansas in the United States. The bylaw was enacted in 2006 and prohibits smoking in vehicles carrying children in car seats or under the age of six years old. The fine of \$25 for first offenders can be waived if the offender enrolls in an approved smoking cessation program. In 2008, it was estimated that only 10 per cent of Arkansans opposed the ban on smoking in cars carrying children. Since the landmark decision by Arkansas, a number of other states (Louisiana, California, Michigan, Oregon and Maine) have passed similar laws. Outside of North America, several states in mainland Australia, Tasmania, Cyprus, Puerto Rico and South Africa have prohibited smoking in vehicles with children. The rental car industry has also taken up the initiative with both Avis and Budget banning smoking in their vehicles in the United States and Canada as of October 1, 2009.

Canadian jurisdictions that ban smoking in vehicles carrying children

Laws to ban smoking in cars with children have been quickly adopted by many Canadian municipalities and provinces. However, a few provinces have yet to adopt laws. The first municipality to pass a bylaw to ban smoking in vehicles carrying children was Wolfville, Nova Scotia. This law was adopted in November 2007. By the latter part of 2008, another four municipalities in Canada had bylaws in force. (Table 1).

Measurement of secondhand smoke

One standard method for assessing the concentration of SHS in specific environments is to measure the level of fine respirable particles in the ambient environment. There have been many studies conducted using portable air quality monitoring devices that measure the concentration of PM_{2.5}, that is, particles with a diameter <2.5 microns. PM_{2.5} in air pollution poses a significant risk because their small size allows them to be taken deep into the smallest airways in the lung. Tobacco smoke particles are of this size, and thus PM_{2.5} is a widely accepted measure of tobacco smoke, when appropriate measurements are taken to control for other sources of PM_{2.5} in the ambient air.

PM_{2.5} studies have mostly measured levels of SHS in environments such as bars and restaurants that allow smoking and comparing those levels to various national and world ambient air quality standards for air pollution that have been designed to protect public health.^{21, 22} Such studies demonstrate that SHS in the typical bar that allows smoking reaches levels that are higher than the “very hazardous” levels for air pollution. This is very troubling, given that the high toxicity and carcinogenic properties of tobacco smoke relative to air pollution make SHS more hazardous than typical air pollution and comparisons to ambient air quality standards may underestimate the hazards of exposure to SHS.

One month after the bylaw was passed in Wolfville, the province of Nova Scotia adopted a law, which was in force in April 2008, making that province the first in Canada to legislate against smoking in vehicles carrying children. Since Nova Scotia passed its law in 2008, four other provinces (ON, BC, PEI, and NB) and the Yukon have put laws into force to ban smoking in vehicles carrying children. Laws in Nova Scotia and British Columbia have now superseded municipal bylaws in those provinces. The government of Manitoba adopted a law to ban smoking in vehicles carrying children on June 11, 2009, which will be proclaimed in 2010.

Public support for banning smoking in vehicles carrying children

There is strong support among the public, including smokers, in several countries for a ban on smoking in vehicles carrying children. A review published in 2009 looked at survey findings from North America, Australia, and New Zealand and found considerable support for bans on smoking in cars carrying children, with 90 per cent support in California and two states in Australia.³⁶ In five of the surveys, 77 per cent or more

Given the widespread public support in Canada for a ban on smoking in vehicles carrying children, and the lack of strong opposition even among smokers, more jurisdictions around the country need to enact smoking bans in vehicles. More provinces and territories should follow the leadership shown by Nova Scotia, the Yukon, Ontario, British Columbia, Prince Edward Island, Manitoba and New Brunswick and pass laws to ban smoking in vehicles carrying children.

of active smokers supported a ban.³⁶ Results of a 2008 poll by the Canadian Cancer Society revealed that 82 per cent of Canadians supported a ban on smoking in cars carrying children. In this same poll, 69 per cent of smokers supported a ban.³⁷ The ITC Canada Survey—a longitudinal cohort survey of a nationally representative sample of smokers in Canada—found that 75 per cent of smokers supported such a ban.³⁸

Discussion

Although the interval between the passing of legislation in Nova Scotia banning smoking in vehicles carrying children and the enactment of laws in other Canadian jurisdictions was relatively short, it is not clear why the remaining provinces have been slow to follow their lead. All Canadian provinces and territories regulate the use of seatbelts and car seats for children based on safety, but the concerns about the health hazards of SHS in vehicles have not caught the public's attention. Vehicles may still be considered by many to be a private space, not unlike one's own home, although as Chapman (2007) points out, "while the interior of cars is considered by many to be a 'private' space, the law has long regarded cars as effectively public space."³⁹

It is clear that SHS is a cause of a number of acute and chronic ailments in children and adults. Governments need to take preventive measures to reduce the incidence and prevalence of these illnesses, and in the long run, reduce healthcare expenditures. Banning smoking in vehicles carrying children will be an important component in the long-term strategy to reduce smoking in our society. As Canada adopted some of the world's strongest tobacco control laws over the past two decades, smoking rates in Canada dropped from 32 per cent in 1989 to 18 per cent in 2008.⁴⁰

The issue of enforcement is always raised during argu-

ments against smoking bans. We know that even without strict enforcement, compliance with smoking bans in public places is high in Canada. Determining whether a child is 19 or 15 years old may be challenging, especially in a moving vehicle. However, the appropriateness of implementing a law banning smoking in cars with children should not be hinged on enforceability. There are many laws with enforcement challenges, for example, seatbelt laws, and laws banning the use of cell phones and other electronic communication devices in cars in Ontario. Such laws, whether or not highly enforceable, are intended to define behaviours that have been shown to pose a significant hazard. They are designed to set the norms of what should be considered by society to be unacceptable. Thus, the goal is that laws banning smoking in vehicles carrying children will build social norms, and thus will become largely self-enforcing, as we have seen in the case of smoke-free laws in indoor public places.

Finally, it should be acknowledged that exposure to SHS in vehicles is a health threat to everyone, including adults. Canadian provinces could consider a comprehensive ban on smoking in cars with all non-smoking passengers to protect the health of all. Just as smoking restrictions in public places have evolved over time—from allowing smoking everywhere, to designated smoking rooms, to the full adoption of comprehensive smoke-free bans in all indoor public places (and some outdoor places)—smoking bans in cars should also evolve to reflect the current scientific evidence, and there is sufficient evidence that smoking in cars constitutes a health hazard that should be reduced/eliminated through legislation, accompanied by public education.

In fact, the Article 8 Guidelines of the WHO Framework Convention on Tobacco Control encourage the Parties to expand the scope of smoke-free legislation to encompass other locations where the evidence warrants protection.⁴¹ Thus, because there is strong evidence demonstrating the dangers of SHS exposure in cars, banning smoking in cars with all passengers, not just children, is justified.

Conclusions and Recommendations

- Research has demonstrated that smoking in cars produces dangerous levels of secondhand smoke.
- Six provinces and one territory have already adopted laws to ban smoking in cars with children.
- There is widespread public support across Canada, even among smokers, for prohibiting smoking in vehicles carrying children.
- Canadian jurisdictions that have not enacted by-laws governing smoking in vehicles should do so given the concerns regarding the acute and chronic effects of secondhand smoke exposure on the health of children.
- It is recommended that the implementation of a law banning smoking in cars with children be accompanied by media campaigns publicizing the new law and the need for them, both before and after implementation.
- Provinces could also consider going a step further and ban smoking in cars with all non-smoking passengers—this step is clearly supported by the WHO Framework Convention on Tobacco Control and the scientific evidence on the dangers of secondhand smoke exposure in cars.

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