



# Protecting the public from exposure to secondhand cannabis smoke and vapour following legalization

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## Abstract

The adverse effects of direct cannabis use are well described in the literature; however, researchers are now beginning to expose the health consequences of secondhand exposure. Given the commitment by the federal government to legalize cannabis in Canada by summer 2018, public health officials must build on the successes of existing smoke-free programs and work with provinces and municipalities to develop policies that protect the public from secondhand exposure to cannabis smoke and vapour. While harmonization with existing tobacco laws may offer the simplest approach, other alternatives may allow stricter control of public consumption by different levels of government. Further research will be needed to assess the health implications of secondhand cannabis exposure, as well as the population impacts of legalization.

## Résumé

Les effets indésirables de la consommation directe de cannabis sont bien décrits dans les revues scientifiques, mais les chercheurs commencent à peine à dévoiler les conséquences pour la santé de l'exposition secondaire au cannabis. Puisque le gouvernement fédéral s'est engagé à légaliser le cannabis au Canada d'ici l'été 2018, les autorités de santé publique doivent miser sur l'efficacité des programmes antitabac existants et collaborer avec les provinces et les municipalités à l'élaboration de politiques qui protégeront le public contre l'exposition secondaire à la fumée et aux vapeurs du cannabis. L'approche la plus simple pourrait être l'harmonisation avec les lois antitabac existantes, mais d'autres solutions permettraient un contrôle plus strict de la consommation en public par différents ordres de gouvernement. De nouvelles études seront nécessaires pour évaluer les conséquences pour la santé de l'exposition secondaire au cannabis, ainsi que les incidences de la légalisation sur la population.

**Keywords** Cannabis · Inhalation exposure · Public policy

**Mots-clés** Cannabis · Exposition par inhalation · Politique publique

## Introduction

Cannabis is among the most frequently used illicit substances in Canada, with 12% of adult Canadians and over 20% of youth reporting use within the previous year (Statistics Canada 2017). The prevalence of past-year use remained relatively stable between 2002 and 2015, despite ongoing

criminalization of the sale and possession of cannabis. In order to improve cannabis control strategies, the Government of Canada committed to tabling legislation by summer 2018 to legalize, regulate, and restrict access to cannabis in Canada.

While the current legal context may inadvertently restrict use to private settings so as to avoid detection by law enforcement officers, legalization may normalize smoking and vaping behaviour and reduce barriers to public consumption. Laws and policies restricting the public use of tobacco have been successful in reducing passive exposure to tobacco smoke and improving smoking-related health outcomes (Frazer et al. 2016). Given that the use of cannabis in public may increase following legalization, it is essential to build on the successes of existing smoke-free programs and consider policies that protect the public from secondhand cannabis exposure.

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## Legislative context

Following a period of public and industry consultation, the federal government introduced legislation to fulfill their commitments for legalization. Bill C-45, otherwise known as the *Cannabis Act*, will allow for the production and sale of cannabis to be controlled and regulated (Government of Canada 2017). The Cannabis Act will restrict access to individuals at least 18 years of age and limit possession to 30 g of dried cannabis; however, additional harm reduction strategies could be employed to protect vulnerable populations, such as adolescents, from unintended consequences.

Although the *Non-smokers' Health Act* will be amended to prohibit cannabis smoking and vaping in federally regulated premises, the federal government plans to delegate most of the responsibility for regulating where cannabis is consumed to the provinces and territories. Municipalities will also likely play a role through enforcement of smoking restriction bylaws. The dispersion of responsibility among numerous jurisdictions may create logistical challenges for consistent protection of the public, as policies will vary across Canada. It is therefore imperative that public health officials play a leadership role advocating for consistent messaging and engage officials within their regions on the development of policies to protect the public from secondhand exposure to cannabis smoke and vapour.

## Adverse health effects of cannabis use

Despite the common misconception that cannabis is natural and harmless, multiple detrimental health effects have been associated with both casual and long-term cannabis use (Volkow et al. 2014). These include impaired brain development and addiction, particularly among those who start using cannabis in adolescence. Cannabis-induced psychoses have been linked to cannabis use among individuals with underlying epigenetic susceptibilities. Acute impairment is associated with increased risk of injury secondary to safety-sensitive tasks, such as operation of a motor vehicle. Prenatal exposure in utero can lead to adverse neonatal outcomes, including low birth weight (Gunn et al. 2016). Unlike tobacco, there is not yet enough evidence to assess the association between cannabis smoking and other long-term health effects, such as cancer or lung disease.

Although cannabis may be consumed using electronic devices that produce a vapour, no research is available on the risks related to this method of consumption; however, irrespective of route of consumption, psychoactive constituents of cannabis have been associated with potential harms (Volkow et al. 2014).

## Health effects of secondhand exposure

There is less evidence regarding the acute and long-term effects of passive exposure to secondhand cannabis smoke and

vapour. The majority of studies investigating secondhand exposure have focused on detection of metabolites from pharmacological constituents of cannabis, such as tetrahydrocannabinol (THC). Although limited by sample size and strict environmental controls, these studies demonstrate that passive exposure to cannabis smoke may lead to detectable levels of psychoactive substances and their metabolites in blood, urine, and oral fluids (Cone et al. 2015).

Several studies have gone further and investigated the acute subjective and objective effects of secondhand exposure to cannabis smoke. Herrmann et al. demonstrated absorption of cannabinoids, as well as mild subjective and cognitive effects among a small number of non-smokers exposed to cannabis smoke; however, these effects differed depending on the degree of room ventilation (Herrmann et al. 2015). Aside from subjective and cognitive effects, Wang et al. reported evidence of similar adverse cardiovascular effects between tobacco and cannabis smoke (Wang et al. 2016). The authors demonstrated that rats exposed for 1 minute to secondhand cannabis smoke exhibited impairment of endothelial function for 90 minutes, which is considerably longer than the effects of tobacco smoke.

While there is a lack of research into the long-term outcomes of secondhand exposure to cannabis smoke, experimental analyses have identified carcinogenic and other hazardous chemicals, similar to those present in tobacco smoke. Although analysis was done under controlled conditions, Moir et al. identified multiple carcinogenic compounds in mainstream and sidestream cannabis smoke, as well as other chemicals implicated in respiratory diseases (Moir et al. 2008). Similar studies are not yet available for cannabis vapour, nor are cannabis grown with pesticides or other contaminants.

## Other consequences of public use

Aside from the direct health effects of exposure to secondhand smoke, visibility of cannabis use may also lead to normalization and promote use by youth, as well as other vulnerable individuals. Although the literature is sparse, visibility of cannabis use in schools has been associated with increased frequency of use among youth (Kuntsche 2010). Similar concerns underpin many of the arguments for greater restriction of public use of other legal substances, such as tobacco and e-cigarettes.

## Policy solutions

Given the unacceptable health risks associated with the use of cannabis in public spaces, it is important to consider policy options to restrict use and protect the public, which will likely require health promotion and enforcement elements in order to maximize effectiveness. Despite a limited role in enforcement, public health officials can be strong advocates for non-smoking policies. While existing tobacco laws offer useful

templates for successful policy, government and health officials may consider additional options for cannabis.

Under the proposed legislation, provinces would have the power to control where cannabis may be consumed. Ontario was the first Canadian province to announce plans to regulate cannabis (Ministry of the Attorney General 2017). As part of the province's plan, the Ontario Ministry of the Attorney General declared that recreational use would only be permitted in private residences, thus prohibiting use in public places, workplaces, or inside motor vehicles. Several American states that legalized recreational cannabis have also restricted use in public (Pardo 2014). While these broad restrictions effectively prohibit public exposure to cannabis, the Task Force on Cannabis Legalization and Regulation recommended harmonization with existing tobacco and vaping laws, which could simplify enforcement of smoking bans (McLellan et al. 2016).

Irrespective of the provincial and territorial responsibilities for regulating use of cannabis, some municipalities have already taken initiative and included cannabis within smoking-related bylaws. Vancouver developed bylaws that prohibit smoking of any substance in public spaces, including parks, beaches, and within a 7-m buffer zone outside building entrances (City of Vancouver 2016). Toronto's bylaws define smoking as "the carrying of a lighted cigar or cigarette, pipe or any other lighted material" (City of Toronto 2013). These may serve as models for other municipalities to develop similar broad definitions of smoking to cover a variety of substances.

Many of the existing strategies focus on recreational use of cannabis; however, secondhand exposure to medical cannabis carries similar health risks. While it is important to acknowledge that some individuals consume cannabis to manage underlying health conditions, this may be accomplished with limited secondhand exposure. Under the proposed policies, medical cannabis may still be consumed in private residences or other areas not included in smoking restrictions; however, the risk of secondhand exposure in these settings should also be considered. Other cannabis formulations are also available that may be taken orally without the production of smoke or vapour.

In addition to legal avenues to restrict smoking and vaping in public spaces, public education programs will be necessary to increase awareness of restrictions, as well as the potential health effects of secondhand exposure to cannabis. These may be integrated into other education campaigns and would optimally be initiated prior to implementation of the proposed legislation.

## Moving forward

Although evidence suggests that secondhand exposure to cannabis smoke likely poses a risk to non-smokers, there remain considerable gaps in the literature. Environmental studies are required to further examine the chemical hazards produced by cannabis smoke and vapour, as well as the risk of exposure

under different conditions. Many of the studies to date examined acute effects of cannabis smoke under controlled or unventilated conditions, limiting the applicability of these findings for the majority of public spaces. Further evaluation of the population health effects of legalization will also be necessary and may be facilitated through the implementation of robust research and surveillance systems.

While the federal government proceeds with legislation to legalize cannabis, public health officials must work with provinces and municipalities to develop policies that protect the public from secondhand exposure to cannabis smoke and vapour. Canada has an opportunity to build on the experiences of other jurisdictions and employ a strategy for cannabis regulation that minimizes the social and health consequences and maximizes policy and practices that will protect all populations.

## Compliance with ethical standards

**Conflict of interest** The authors declare that they have no conflict of interest.

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