

Secondhand Marijuana Smoke:

Health effects of exposure

Introduction

Concern about exposure to secondhand marijuana smoke is an emerging issue—the Smoking and Health Action Foundation (SHAF) has noted a steady increase in enquiries and complaints over the past number of years, especially from multi-unit housing residents. This comes as no surprise: 10.6% of Canadians 15+ report past year use.¹ However, marijuana use is generally infrequent. Among Canadians who reported past year use, approximately 2% indicated they use it daily.² It should also be noted that marijuana is not as addictive as nicotine, with an estimated probability



of developing dependence at 9% versus 68% for nicotine.³ Cannabis, which includes marijuana as well as hash, hash oil and a variety of other derivatives, comes from the plants *Cannabis sativa* and *Cannabis indica*. Recreationally, it is consumed primarily for the active ingredient tetrahydrocannabinol (THC) which gives users a “high,” although there are many other cannabinoids and chemicals present in marijuana. Although cannabis can be consumed in a variety of ways, smoking it is the most popular method in Canada.⁴

The federal government has promised to legalize marijuana; however, for the moment, the only legal consumption is for medical purposes by individuals who have been granted authorization. Since January 2016, the number of registrations for medical marijuana has jumped 55% to over 67,000, reflecting a growing interest among Canadians and a growing acceptance among medical practitioners who can provide access to it. Canadian cannabis producers say they are increasing their operations in response to the demand, anticipating that it will only intensify when the drug is legalized. Indeed, one industry insider anticipates the market could exceed \$10 billion, capturing both the illegal market and a portion of the distilled spirits market.⁵ SHAF anticipates that exposure to secondhand marijuana smoke could increase as more Canadians continue to register for medical marijuana, and as people enter the market once it is legalized. This fact sheet provides information on the health effects of exposure to secondhand marijuana smoke, strategies to reduce exposure, and clarification on human rights and the use of medical marijuana.

¹ Health Canada. Canadian Tobacco, Alcohol and Drugs Survey (CTADS) 2013. <http://healthycanadians.gc.ca/science-research-sciences-recherches/data-donnees/ctads-ectad/tables-tableaux-2013-eng.php#t8>

² Rotermann M & Langlois K. (2015). Prevalence and correlates of marijuana use in Canada, 2012. Health reports, 26(4), 10. <http://www.statcan.gc.ca/pub/82-003-x/2015004/article/14158-eng.pdf>

³ Centre for Addiction and Mental Health. Cannabis Policy Framework. October 2014. https://www.camh.ca/en/hospital/about_camh/influencing_public_policy/Documents/CAMHCannabisPolicyFramework.pdf

⁴ Fischer B et al. Lower Risk Cannabis Use Guidelines for Canada (LRCUG): a narrative review of evidence and recommendations. Canadian Journal of Public Health (2011): 324-327. https://www.tni.org/files/publication-downloads/2758-7245-1-pb_1.pdf

⁵ Posadzki A. Producers expand operations to meet growing demand for marijuana. The Globe and Mail. September 10, 2016.

Health effects of exposure to marijuana smoke

Burning marijuana produces smoke that is a complex, dynamic mixture of thousands of chemicals. Scientific studies demonstrate that marijuana smoke is similar to tobacco smoke, containing many of the same fine particles, cancer-causing compounds, volatile organic chemicals (VOCs), carbon monoxide (CO) and heavy metals.⁶ Thirty-three known cancer-causing chemicals found in both tobacco and marijuana smoke are on California's list of chemicals known to cause cancer or birth defects, and marijuana smoke itself was officially added to this list in 2009.⁷ An investigation by the Globe and Mail found that one third of dried marijuana samples purchased from Toronto dispensaries and sent for laboratory analysis contained potentially dangerous compounds such as bacteria, yeast and mould which add to smoke toxicity.⁸ However, some research has found that tobacco and cannabis smoke are not necessarily equally carcinogenic: whereas nicotine can promote tumour growth, cannabinoids in cannabis smoke have been observed to actually kill cancer cells.⁹



Marijuana and tobacco are often smoked together. A marijuana cigar, also known as a blunt, is marijuana wrapped in tobacco leaf (often a hollowed out cigar).

Scientists are still trying to identify the specific health effects caused by exposure to secondhand marijuana smoke. Marijuana's illegal status in most parts of the world makes it challenging to study: people may not want to admit that they consume cannabis, or may under-report consumption. Further, it is common for people to smoke a mixture of tobacco and marijuana together, which makes it difficult to identify the health effects of exposure to secondhand marijuana smoke alone. There are a few human studies that look at THC in secondhand marijuana smoke and how it affects bystanders. It appears that under normal ventilation conditions, the chances of getting high are low.¹⁰

Health Canada acknowledges that many of the chemicals found in tobacco smoke are also found in marijuana smoke and advises against smoking marijuana.¹¹ This is sound advice. There is no safe level of exposure to secondhand tobacco smoke. Although clear links between smoking cannabis and cancer have not been found, avoiding smoke of any kind is a

⁶ Sparacino, CM, Hyldborg PA & Hughes TJ. Chemical and biological analysis of marijuana smoke condensate. NIDA Res Monogr 99 (1990): 121-40. <http://archives.drugabuse.gov/pdf/monographs/99.pdf#page=128>

⁷ Tomar RS, Beaumont J & Hsieh JCY. Evidence on the Carcinogenicity of Marijuana Smoke. Aug. 2009. California Environmental Protection Agency, Reproductive and Cancer Hazard Assessment Branch, Office of Environmental Health Hazard Assessment. <http://oehha.ca.gov/media/downloads/cnr/finalmjSmokehid.pdf>

⁸ Robertson G & McArthur G. What's in your weed? The Globe and Mail. August 12, 2016.

<http://www.theglobeandmail.com/news/investigations/globe-investigation-whats-in-your-weed-we-tested-dispensary-marijuana-to-findout/article31144496/>

⁹ Melamede R. Cannabis and tobacco smoke are not equally carcinogenic. Harm Reduction Journal 2.1 (2005): 1. <https://harmreductionjournal.biomedcentral.com/articles/10.1186/1477-7517-2-21>

¹⁰ Cone EJ et al. Nonsmoker Exposure to Secondhand Cannabis Smoke. III. Oral Fluid and Blood Drug Concentrations and Corresponding Subjective Effects. Journal of analytical toxicology (2015): bkv070. <http://jat.oxfordjournals.org/content/early/2015/07/01/jat.bkv070.full.pdf+html>

¹¹ Health Canada. Consumer Information - Cannabis (Marihuana, marijuana). <http://www.hc-sc.gc.ca/dhp-mps/marihuana/info/cons-eng.php>

good idea. A recent study that exposed rats to secondhand marijuana smoke demonstrated that the harm to their hearts and blood vessels was comparable to the harm from secondhand tobacco smoke.¹² Fine particles, CO and other by-products of combustion that are known to cause heart disease and respiratory illnesses such as emphysema and COPD are present in cannabis smoke and pose a health risk with exposure.¹³ More and better research is needed, including studies done with humans. SHAF advises that all Canadians, and especially special risk groups including children, pregnant women, older adults and those with pre-existing conditions such as asthma, COPD and heart conditions, avoid exposure.

Strategies to reduce exposure

Smoking marijuana is a dirty delivery system that increases harm to users and to others around them. Canadians' exposure to secondhand marijuana smoke can be reduced by:

Including marijuana in smoke-free bylaws and legislation. Exposure to any kind of smoke is harmful to health and smoke-free public places and workplaces must be protected in the interests of public health.

Including marijuana in no-smoking policies for multi-unit housing. Like tobacco smoke, marijuana smoke can infiltrate private units from elsewhere in a building through cracks and gaps and ventilation systems. Landlords, condominium corporations and housing co-ops can expand the definition of smoking to include marijuana in no-smoking policies, with an exemption for medical marijuana users.

Educating Canadians about alternative delivery systems. In the interest of public health, it is critical that people understand the relative risks of smoking marijuana compared to other delivery options. Mass media public education campaigns are needed, as is more relative risk research to underpin them. Smoke-free delivery methods include:

- Vaporizers heat marijuana at a lower temperature than combustion, which produces an inhalable vapour that still contains the active ingredients but without all the harmful by-products in secondhand smoke. One small study found that vaporizing delivered THC as effectively as smoking, significantly reduced exposure to carbon monoxide compared to smoking and was preferred by the majority of participants.¹⁴ However, more research is needed to determine the chemical composition of secondhand vapour and its possible health effects. Nonetheless, based on current evidence, Lower Risk Cannabis Use Guidelines for Canada (LRCUG) recommend the use of vaporizers over smoking joints, blunts and waterpipes.¹⁵ The LRCUG have been endorsed by the Centre for Addiction and Mental Health as well as the Canadian Public Health Association.
- Edibles, which represent the fastest growing segment in the American legal marijuana market, include cookies and other baked goods, chocolates, candies, drinks and more. Eating or drinking cannabis infused products is a slower drug delivery method than vaping or smoking. However, dosing can be challenging, and edibles carry a higher risk of

¹² Wang X et al. One minute of marijuana secondhand smoke exposure substantially impairs vascular endothelial function. *Journal of the American Heart Association* 5.8 (2016): e003858. <http://jaha.ahajournals.org/content/5/8/e003858.full.pdf+html>

¹³ Moir D et al. A comparison of mainstream and sidestream marijuana and tobacco cigarette smoke produced under two machine smoking conditions. *Chemical research in toxicology* 21.2 (2007): 494-502.

¹⁴ Abrams DI, Vizoso HP, Shade SB et al. Vaporization as a smokeless cannabis delivery system: a pilot study. *Clin Pharmacol Ther.* 2007 Nov;82(5):572-8. Epub 2007 Apr 11.

¹⁵ Fischer B et al. Lower Risk Cannabis Use Guidelines for Canada (LRCUG): a narrative review of evidence and recommendations. *Canadian Journal of Public Health* (2011): 324-327. https://www.tni.org/files/publication-downloads/2758-7245-1-pb_1.pdf

overconsumption because people may take multiple “doses” before the effects of the first one are felt.¹⁶ Concerns have also been voiced about accidental poisonings in children who can’t tell the difference between regular goodies and those that are drug-laced.

- Tinctures are solutions of liquid cannabis extracts dissolved in alcohol or other fat-soluble liquids such as vinegar or glycerol. Administered as drops under the tongue, tinctures are absorbed quickly into the arterial system and offer better dosing control than edibles.
- Topical preparations including lotions, balms and oils allow active ingredients to be absorbed through the skin without the psychoactive effects. These are reportedly best used for localized pain relief.



Medical marijuana and human rights

Among other things, Canada’s new *Access to Cannabis for Medical Purposes Regulations (ACMPR)* enable eligible Canadians to possess marijuana for medical purposes. This does not mean that such individuals have an *absolute right* to smoke medical marijuana wherever they choose. Complaints of discrimination based on disability adjudicated at the Human Rights Tribunal of Ontario confirm this.¹⁷ Health Canada advises that people who smoke it publicly should do so discreetly unless it has been prohibited by smoke-free policy, municipal bylaw or provincial/territorial legislation.¹⁸

In June 2015 a Supreme Court of Canada ruling expanded Health Canada’s definition of medical marijuana beyond the dried form, which is typically smoked, to include fresh marijuana and cannabis oil.¹⁹ This means that medical marijuana can now be legally consumed in the variety of ways described above that do not pollute the air and cause harm. Further, there are vaporizers that are approved as medical devices in Canada.²⁰

Conclusion

Smoke is smoke and all smoke is harmful to health. Secondhand marijuana smoke contains many of the same toxic chemicals as those found in tobacco smoke and which are known to cause cancer and heart and respiratory diseases. SHAF anticipates that exposure could increase due to both mounting medical marijuana registrations and a legalized market. Mass media public education campaigns are needed to provide relative risk information on alternative delivery options that mitigate harm and don’t pollute the air. Regardless of whether marijuana is consumed medically or recreationally, Canadians must be protected through a combination of public education and smoke-free policy.

¹⁶ Hancock-Allen, JB et al. Notes from the Field: Death Following Ingestion of an Edible Marijuana Product-Colorado, March 2014. *MMWR Morb Mortal Wkly Rep* 64.28 (2015): 771-2. <http://www.cdc.gov/MMWR/preview/mmwrhtml/mm6428a6.htm>

¹⁷ For example, *Francisco v. Ontario (Community Safety and Correctional Services)*, 2015 HRTO 1028. <https://www.canlii.org/en/on/onhrt/doc/2015/2015hrto1028/2015hrto1028.pdf> & *Gibson v. Ridgeview Restaurant Limited*, 2013 HRTO 1163. <https://www.canlii.org/en/on/onhrt/doc/2013/2013hrto1163/2013hrto1163.pdf>

¹⁸ Health Canada. Cannabis for Medical Purposes. Personal communication. 27 September 2016.

¹⁹ *R. v. Smith*, 2015 Supreme Court of Canada 34; File No.: 36059. 2015: March 20; 2015: June 11. <https://www.canlii.org/en/ca/scc/doc/2015/2015scc34/2015scc34.pdf>

²⁰ Government of Canada. Medical Devices Active Licence Listing. https://health-products.canada.ca/mdall-limh/information.do?companyId_idCompanie=131505&lang=eng