

## Second-Hand and Third-Hand Smoke

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### What new legislation exists for second hand smoke from e-cigarettes and cannabis?

Legislation to protect against second-hand smoke from e-cigarettes (vaping) is an emerging area (Hemsing & Greaves, 2018).

The Tobacco and Vaping Products Act (TVPA) that became law in Canada in May 2018 provides a framework for the manufacture, sale, labelling and promotion of tobacco and vaping products (Government of Canada, TVPA, 2018).

Further provincial, territorial, and municipal laws restrict smoking and Electronic Nicotine Delivery Systems (ENDS) use in public places. In Canada, restrictions on the use of e-cigarettes and vaping products tend to align with smoke-free by-laws. However, there is evidence that vaping products are commonly used in smoke-free locations (Hemsing & Greaves, 2018)

The federal Non-Smoker's Health Act restricts smoking and the use of ENDS a.k.a e-cigarettes in workplaces and on public transportation (Hemsing & Greaves, 2018). The Non-smokers' Health Act addresses the issue of second-hand smoke and vapor. This Act applies to federally regulated workplaces, such as banks, ferries, commercial aircraft and federal government offices (Government of Canada, NSHA, 2018)

Currently in Alberta, municipalities can choose to create their own by-laws however they are required to be at least as strong as the Provincial Government legislation.

### Health effects

#### Health impacts from second hand vaping exposure

##### *Inconclusive:*

It remains unclear whether exposure to low levels of nicotine indoors causes any harm to bystanders, including children, pregnant women, and person with cardiovascular conditions. Besides nicotine, e-cigarette vapor contains significant amounts of propylene glycol and vegetable glycerin. Although both compounds are considered to be safe, there is lack of data on health risk associated with prolonged exposure to their vapors. More research is needed about the health risk associated with exposure to toxic constituents of the vapors (Czogala et al, 2014). It is theoretically possible that enduring exposure to second-hand nicotine might have some harmful effects, but this remains to be determined. Compared to ambient air, vapor devices do have emissions, and further studies are needed to assess their potential risks (O'Leary et al, 2017).

##### *Some effects:*

Thorough comparison to emissions from conventional Tobacco Cigarette (TC) shows that Electronic Cigarette (EC) vapor and consequent passive vaping is safer than TC smoke and subsequent second hand smoke emissions. Everything from 1,2-propanediol to benzene to formaldehyde was detected in EC vapor, however despite being close to the limit of detection (LOD), the levels were not significantly high enough to be reliably detected. Some studies show that the presence of those particles is no different than what would be produced simply from the physiological metabolism and exhalation of an individual who does not use TC or EC products. (Oh & Kacker, 2014).

Data from all available studies showed that second hand vapor did produce a measurable absorption of nicotine in bystanders. There is no evidence as of yet that nicotine present in vapor (in very low and transient exposures) poses significant second-hand health risks (Renee O'Leary, 2017).

March 2019

Vapor from electronic cigarettes exposes non-smokers to contaminants, including nicotine, particulates and hydrocarbons. However, the health risks appear to be lower than from second hand smoke (SHS) exposure caused by other tobacco products (Czogala et al, 2014)

ECs receive the greatest criticism for the unknown effects on health and potential disease burden. Given ECs are a new technology there has been an inability to study the long-term effects and therefore is difficult to measure the health risks associated with using ECs over conventional TCs. Current research is concerned with the excessive propylene glycol content in the vapor, and also the potential of accidental poisoning from liquid cartridge contents (Oh & Kacker, 2014).

**Health impacts on pregnant women/ reproductive health:** Whilst tobacco SHS has been long known to have negative outcomes on pregnant women and infants there is limited evidence regarding the effects of exposure to second hand vaping smoke on these population groups. Reproductive aged and pregnant women have been identified as potentially vulnerable to the health effects of being exposed to toxicants from both ENDS and SHS from cannabis (Hemsing & Greaves, 2018). More research is needed to find out the health effects of second-hand exposure to e-cigarette vapor, especially for children and pregnant women (AHS, 2018), (Hess, Lachireddy & Capon, 2016).

### **Health impacts of third hand tobacco cigarette smoke exposure**

The health effects of human exposure to third hand smoke (THS) residues have not been thoroughly studied to date. One study has reported the presence of NNK, a tobacco-specific lung carcinogen, on surfaces in homes. The results of the study clearly demonstrated the presence of NNK on surfaces in almost all the smokers' homes tested whereas it was found only occasionally in nonsmokers' homes. NNK is a member of the nitrosamine class of carcinogens. Depending on

their structure, most nitrosamines tend to affect a particular tissue or organ, independent of the route of administration. For NNK, that organ is the lung. Previous studies have shown that the lung is a major target tissue of NNK in mice, rats and hamsters and that lung tumours have been observed in rats after administration of NNK. Whilst these studies have been conducted on animals it indicates the potential of harm that NNK might pose to human health (Thomas et al, 2014).

Although the risk is significant for all the age groups, children between 1 and 6 years old are especially vulnerable to THS exposure, through accidental ingestion of settled house dust and through contact with exposed surfaces followed by hand to mouth transfer (Ramirez et al, 2014).

### **Health impacts from second hand cannabis exposure**

Cannabis vaping products are available that heat oil or liquid containing cannabis extracts or raw plant material to release aerosolized water vapor. There is a lack of research examining the health effects of exposure to vapor from cannabis products (Hemsing & Greaves, 2018).

A systematic review looking at the health effects of second and third hand cannabis smoke reviewed 15 experimental studies on the immediate effects of marijuana smoke exposure in humans in a controlled environment. The review concluded that "second-hand exposure to marijuana smoke can lead to cannabinoid metabolites in bodily fluids sufficient for positive results on testing of oral fluids, blood and urine, and can lead to psychoactive effects". These effects are in relation to environmental factors, "including whether the air space is ventilated, volume of air, number of marijuana cigarettes lit at one time, potency of the marijuana and number of smokers". The systematic review did not identify any studies reporting the long-term effects of exposure to second-hand marijuana smoke or the effects of exposure to third-hand smoke (Holitzki et al, 2017).

March 2019

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