

E-cigarettes in Canada

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Facts

What are e-cigarettes or vapes?

- E-cigarettes or vapes are battery-operated devices that mimic the smoking experience using an inhalation and heating process that vaporizes fluid within the device. The liquid solution varies in composition but usually contains nicotine in varying strengths in addition to propylene glycol, vegetable glycerin, water and flavouring agents.
- E-cigarettes continue to evolve drastically since their introduction to the market over a decade ago. The newest generation of these devices (called “pod mods”) resemble sleek USB type sticks and are incredibly popular among youth.¹
- Most pod mods use a chemically altered form of nicotine which allows vapers to vape at higher nicotine concentrations without the harshness associated with inhaling traditional nicotine.² This substance is referred to as “nicotine salts.”
- Devices which use nicotine salt substances can expose users to high levels of nicotine – one nicotine salt cartridge/pod can be equivalent to a pack of 20 cigarettes.²

Patterns of use

- E-cigarettes are appealing to youth with 34% of students in Canada reporting having ever tried an e-cigarette.³ Studies also show that more teens are using e-cigarettes as they see them as “cool” or “fun”.⁴
- E-cigarettes are relatively easy to purchase in-store and online – only 31% of underage youth report they are always asked to prove their age for in-store or online purchases.⁵
- Vaping is most common among younger people in Canada. About two-fifths of those who vape are under the age of 25, and of this group, half are under the age of 20.^{6,7} In numbers, 290,000 vapers are under 20.^{6,7}
- The most common method of e-cigarette use in Canada is dual use – where a person who vapes also smokes combustible cigarettes.⁸ This could be problematic as it might maintain tobacco use and nicotine addiction over complete smoking cessation.⁹
- *The Youth and Young Adult Vaping Project*, a Heart & Stroke funded study, found that of youth and young adults (16–24 years) who smoke and vape, 19% began smoking at the same time they began vaping while 27% began smoking after they began vaping.¹⁰

Health impacts

- Daily use of both combustible cigarettes and e-cigarettes is associated with a compounded risk of heart attack¹¹ and stroke.¹² E-cigarettes are also associated with increased risk of injury to the respiratory airways.¹³

- Research shows that it would be less harmful to quit smoking completely, rather than use both e-cigarettes and tobacco concurrently (known as dual use).^{11,14,15}
- E-cigarettes are addictive, 62% of current users have intentions to quit vaping and 25% of adults reported a quit attempt in the past year.¹⁶
- E-cigarettes are harmful, albeit less harmful than combustible cigarettes.¹⁷
- Emerging evidence indicates that e-liquid aerosols can be toxic and can negatively impact cells that line the mouth, nose, lungs and blood vessels.^{13,18–22}
- Nicotine can damage the developing brain.^{23,24}
- A recent study on Juul nicotine salt e-liquid cartridges found they are toxic to human lung cells, especially the popular mango flavour.²¹
- Evidence has found vaping in young people is associated with an increased odds of subsequent tobacco smoking.^{25,26} Emerging evidence also indicates vapes can lead to nicotine addiction²⁷ and may act as a gateway to cannabis use.²⁸ Experts are worried this could renormalize and undermine tobacco control and smoking cessation efforts.

Industry tactics

- Industry groups are fighting regulations behind the scenes and pushing the narrative that vaping is necessary for a tobacco-free future.^{29,30} The largest tobacco groups in Canada are busy lobbying the federal government.³⁰
- Social media is playing a significant role in vaping product promotions and advertisements, especially to youth and young adults. One study showed that on Instagram, the uptake of pro-vaping posts (measured by likes) increased three-fold from 2017 to 2019.³¹
- Marketing and promotion of e-cigarettes, and especially attractive fruit or candy flavoured e-liquids, is common despite prohibitions on the promotion or labelling of vaping products deemed appealing to young persons by the *Tobacco and Vaping Products Act (TVPA)*.³²
- Flavours play a huge role in inducing youth to vape and sustaining vaping behaviours.³³ A little over 85% of youth reported their first e-cigarette was flavoured,³⁴ and the availability of flavours (especially fruit, sweet and dessert flavours) remains a top reason for e-cigarette use among youth.^{35–37}
- *The Youth and Young Adult Vaping Project* found that 92% of youth and young adults who vape regularly used flavoured vape juice when they first started vaping.¹⁰ There is a preference among 90% of youth and young adults surveyed for flavoured vape juice.¹⁰

Vaping and cessation

- While some clinical studies show e-cigarettes may be effective cessation devices in controlled environments, the majority of larger populations studies find e-cigarettes to be ineffective cessation devices.³⁸

Policies

- Various Canadian and international jurisdictions are addressing e-cigarettes using lessons learned from tobacco control efforts. Promising policies adopted to reduce youth uptake include taxation, increasing the purchase age to 21 years of age, flavour and marketing restrictions, limits on nicotine content, retail reform and health warning labels.

Background

Electronic cigarettes (e-cigarettes), or vapes as they are more commonly known, are a relatively new product category, which first emerged in 2004. These devices are battery operated and mimic the smoking experience through an inhalation process that uses a heating coil to vaporize fluid within the device. These non-combustible products do not contain tobacco; however, the liquid solution (e-liquid) in e-cigarettes usually contains nicotine in varying strengths in addition to propylene glycol, vegetable glycerin, water and flavouring agents.¹⁷

E-cigarettes have been growing in use and are a source of great debate among public health researchers and health professionals. As a recently legalized product in Canada, people are interested in knowing more about the associated implications, including the potential health consequences and benefits. Heart & Stroke believes that people in Canada deserve accurate information to make informed decisions, and government policies to protect them against possible harms and to determine if there are any potential benefits related to e-cigarette use in Canada. All levels of government need to protect people, especially youth in Canada against associated risks of e-cigarette use and commission further research to better understand usage trends, potential harms, product safety and determine cessation benefits.

Patterns of use in Canada

Canada-wide e-cigarette use

Health Canada's 2020 *Canadian Tobacco and Nicotine Survey (CTNS)* found that 13% of the population aged 25 or older have ever tried vaping.⁶ Among young adults (aged 20–24 years), the prevalence of ever vaping is 43%.⁶ Current e-cigarette use (measured as having vaped in the past 30 days) is 3% among people in Canada 25 years and older.⁶ Among young adults (aged 20–24 years), 13% engage in regular vaping.⁶ In numbers, this translates to a little over two-fifths of the population of current vapers in Canada being under 25 years old.^{6,7}

Vapers in Canada have a variety of reasons for using e-cigarettes. While some use e-cigarettes as a means to quit smoking, many others (and especially youth) use e-cigarettes for curiosity and enjoyment of vaping flavours, to avoid stigmatization in smoke free areas, enthusiasm over pursuing a hobby or to socialize with others.^{33,35,39–43}

Youth e-cigarette use

A nation-wide Canadian student survey found e-cigarette use among students (grades 7–12) doubled, rising from 10% in 2016–2017 to 20.2% in 2018–2019.^{3,44} Among grade 10–12 students, e-cigarette use was 29.4% in 2018–2019.³ Ever use of e-cigarettes among students in grades 7–12 was 33.9% in 2018–2019, a 48.7% increase from 22.8% in 2016–17.^{3,44} Among students in grades 10–12, 46.8% reported ever trying an e-cigarette in 2018–2019.³ Students are vaping more frequently; of those reporting past 30-day use, 40% reported daily or almost daily use.³ In comparison, youth smoking rates have been steadily declining, and in 2018–2019, 8.8% of grade 10–12 students had smoked in the previous 30 days, a decrease from 10.1% in 2016–17; for students in grades 7–12, rates declined from 6.2% to 5.4%.^{3,44}

Of those in grades 7–12 who are currently using e-cigarettes, 87.6% are using vapes containing nicotine.³ This number is higher among students in grades 10–12, of which 91.2% report vaping with nicotine.³ Of students who have used both e-cigarettes and combustible cigarettes, 47% report trying e-cigarettes first, while 41% report trying combustible cigarettes first.³ *The Youth and Young Adult Vaping Project*, funded by the Heart & Stroke, found that over 90% of youth and young adults surveyed had used a flavoured vape juice when they first began vaping.¹⁰

Data from three waves of the *International Tobacco Control Policy Evaluation Project (ITC) Youth Tobacco and Vaping Survey*, led by Canadian researchers from the University of Waterloo found similar increases in vaping among Canadian youth. From 2017 to 2019, past 30-day vaping among youth (16–19) increased by 112%, from 8.4% to 17.8%.⁴⁵ Researchers from this study also noted that between the survey period, there was an increase in the proportion of non-smoking youth who reported regular vaping.⁴⁵

Vaping in young people is associated with increased odds of subsequent tobacco smoking,²⁵ nicotine addiction²⁷ and may act as a gateway to cannabis use.²⁸ While youth smoking is currently declining, vaping may be slowing the decline in youth smoking. In the future, a reversal in this declining smoking trend may occur. The ease of access to nicotine vapes in Canada are creating concerns about further increased use by youth.

Dual use of tobacco and e-cigarettes

Dual use of combustible tobacco and e-cigarettes is a topic of concern in Canada, as it is the most common pattern of e-cigarette use among smokers.⁸ Of those that had used an e-cigarette in the past 30 days, 64.5% are also current smokers.⁴⁶ A Health Canada survey found that among youth vapers, approximately 45% are dual users.⁵ Additionally, youth are more likely to have vaped before smoking while the opposite is true of adults, who are more likely to have smoked first.⁵ The *Youth and Young Adult Vaping Project* found that 19% of youth and young adult vapers (16–24 years) reported smoking onset at the same time as the onset of vaping while 27% reported smoking onset after the onset of vaping.¹⁰

Health risks

Nicotine

Nicotine is a highly addictive drug, found in tobacco and many e-liquids, which can increase blood pressure and make the heart work harder.⁴⁷ Nicotine negatively affects adolescent brain development, and many adolescents are more vulnerable to nicotine addiction than adults.^{47,48} In high concentrations, nicotine can be toxic.⁴⁹ E-liquid manufacturers are producing reformulated e-liquids with higher and higher levels of nicotine that are smoother and easier to vape.²

Nicotine salt substances, first introduced in Juul pods, are more successful than traditional forms of nicotine in cigarettes and e-liquids at delivering high concentrations of nicotine.² Nicotine salts combine pure nicotine with benzoic acid for a smooth vaping experience. Evidence from an experiment on Juul nicotine salt e-liquids found a link between Juul e-liquids (especially mango) and toxic impacts on human lung cells.²¹ Since the innovation of nicotine salt e-liquids, many retailers have begun selling e-liquids with highly concentrated nicotine salts and compatible vapes to compete with Juul.²

Some youth are using nicotine vapes to get head rushes and are graduating to higher and higher nicotine concentrations as their bodies adapt.⁵⁰ The *Youth and Young Adult Vaping Project* found that of those youth who vape with nicotine, two-thirds are using e-liquid pods at the highest concentrations (50–60 mg/mL) in amounts roughly equivalent to a pack of 20 cigarettes.¹⁰ Vaping with higher concentrated juices often leads to unpleasant side effects including vomiting, headaches, dizziness and nausea.⁵⁰ The manifestation of these side effects is referred to as being “nic-sick.”⁵⁰ In extreme circumstances, “nic-sickness” can lead to fainting and nicotine poisoning.^{50,51} This type of nicotine abuse is worrying especially since the current nicotine threshold of 66 mg/mL in Canada was determined based on criteria for poisoning through ingestion, not inhalation.⁵² Health Canada has introduced regulations to limit nicotine concentrations to 20 mg/mL which would reduce the addictive nature of the products on youth and young people.

Nicotine in e-cigarettes may also increase tobacco smoking by expanding the nicotine market among younger people. There is concern that those who do not smoke tobacco cigarettes but have started to vape e-cigarettes with nicotine could potentially form a lifelong addiction to nicotine. Here, e-cigarettes could serve as a gateway for nicotine addiction and tobacco use. Studies conducted in the US and Canada have suggested that e-cigarette use in youth is associated with youth and adolescents taking up smoking combustible tobacco products in later years.^{53–56}

Aerosol emissions and toxicity

New evidence finds that heating e-liquids to a higher temperature can produce toxic aerosols^{13,18} which can have negative effects on the cells that line the mouth, nose, lung and blood vessels in the human body.^{13,18–22} The compounds produced can vary depending on the composition of the e-liquid and the type of flavouring agents used.

In one study, the addition of sucralose, a sweetener, enhanced the formation of toxic compounds, known as aldehydes, in e-cigarette vapour.⁵⁷ When the chemical composition of flavoured versus unflavoured aerosols were compared, more aldehydes were formed in the aerosols of flavoured e-liquids.¹⁸ Low levels of harmful metals such as lead, nickel and chromium can also be found in the aerosol, deriving from the e-cigarette device and coils.⁵⁸ The long-term health impacts of inhaling these toxic compounds in aerosols is currently unknown.

Heart and lung health risks

The long-term use of e-cigarettes is likely to pose some risks to cardiovascular health, although the precise level of risk is not currently known.^{11,59} An evidence review from the National Academy of Science suggests e-cigarette use is moderately associated with an increase in diastolic blood pressure and heart rate.¹⁷ E-cigarette use can also increase the risk for respiratory injury and disease.^{13,22,60–62} One study finds current e-cigarette users have a 31% increased risk of respiratory diseases compared to never-users, with the increased risk for specific diseases ranging from 33% (chronic bronchitis) to 69% (emphysema).⁶² Recent studies found dual use of both e-cigarettes and combustible cigarettes daily – the most common pattern of use – was associated with a nearly five-fold risk of heart attack¹¹ and nearly three times the risk of stroke¹² compared to those who do not use either product. Similarly, dual use was found to be more harmful than using either product in isolation.^{11,12}

E-cigarette or vaping product use-associated lung injury (EVALI)

In 2019, cases of respiratory injury associated with vaping started spreading across the US and Canada.^{60,61} Referred to as EVALI (e-cigarette or vaping product use-associated lung

injury), the number of recorded cases is over 2,800 in the US and has resulted in over 65 deaths.⁶⁰ An investigation of cases in Illinois and Wisconsin found that those affected are mostly young men using tetrahydrocannabinol (THC) liquids (84%) with their e-cigarette devices.⁶³ The Centers for Disease Control and Prevention (CDC) has recently identified vitamin E acetate (used illicitly to thicken THC e-liquids) as a chemical of concern in this outbreak, and is warning e-cigarette users to avoid using products (especially those containing THC) from illegal sources.⁶⁰ The CDC has not yet ruled out other chemicals of concern. In Canada, over a dozen EVALI cases have been reported from several provinces however investigations are still underway. No specific chemical of concern has been identified yet, and a large proportion of Canadian cases do not report use of THC, rather use of nicotine vapes only.⁶¹ This new outcropping of illness further proves how important regulations and oversight are in this ever-expanding industry. Heart & Stroke supports the [Lower-Risk Cannabis User Guidelines \(LRCUG\)](#) and encourages consumers to consider current advisories from Health Canada with regards to vaping cannabis products.

Are e-cigarettes 95% safer than cigarettes?

Some organizations have endorsed the statement that “e-cigarettes are 95% safer than cigarettes”. This statement is broadly accepted by Public Health England to justify the use of e-cigarettes. However, the evidence underlying the statement is of poor quality and has often been taken out of context.

The main piece of evidence is an article by Nutt et al., published in 2014 which used a panel of twelve tobacco experts to rank the safety of tobacco products (i.e., cigarettes, cigars, pipes, snus, patches, e-cigarettes etc.,) on a scale of 1 to 100, with 100 being assigned to the most harmful product (cigarettes).⁶⁴ E-cigarettes scored a 4 leading to the conclusion that e-cigarettes are 95% less harmful than cigarettes. Most notably, the authors admit that ranking of products was done in the absence of hard evidence and that there was no formal recruitment of the expert panel, leading to the recruitment of some individuals with no specified expertise in tobacco control.⁶⁵

There is an agreement among many from the public health community in Canada, such as the Canadian Cancer Society, Canadian Lung Association, and the Canadian Medical Association, that e-cigarettes are harmful, albeit less harmful than combustible cigarettes. Heart & Stroke supports access to e-cigarettes for adult smokers who wish to use them to help them quit smoking but encourages regulation of vape products to restrict access and limit uptake by youth and non-smokers. Given the lack of research on long-term health effects of vaping products and their addictive nature, e-cigarettes should not be used by youth, by non-smokers, or by ex-smokers who have quit altogether.

Are e-cigarettes a potential cessation aid?

There is a lack of consensus on the effectiveness of e-cigarettes as cessation devices. The vast array of e-cigarette products available and the contexts in which people use these devices makes research in this area difficult. These challenges are magnified when investigators attempt to synthesize findings and draw conclusions about e-cigarettes and cessation with studies that vary by participant sizes, intervention methods, modes of delivery, and length of the study period among other variables. While the body of evidence in this area is growing, there is still a need for further peer-reviewed research before definite conclusions can be made.

Studies that support vaping as a smoking cessation tool

A 2020 review of twelve randomized control trials (tightly controlled experiments) which compared the cessation effectiveness of e-cigarettes to other established smoking cessation therapies, found that: 1) nicotine containing e-cigarettes are more effective than non-nicotine containing e-cigarettes for cessation, and 2) e-cigarettes are more effective than other nicotine replacement therapies for cessation between 24 and 52 weeks.⁶⁶ The Cochrane Collaboration researchers came to similar conclusions in their 2020 review which included twelve randomized control trials in the cessation analysis.⁶⁷ The authors found that there is a moderate-certainty level of evidence that quit rates are increased when e-cigarettes are used compared with nicotine replacement therapies (NRTs).⁶⁷ However, in many of these studies, participants had guidance or counselling alongside e-cigarette use.

Studies that do not support vaping as a cessation tool

A 2016 review of several observational studies (studies that investigate trends in “real-world” population settings) found that using e-cigarettes may reduce the likelihood of quitting by 28%.³⁸ An evidence update in 2018, which included seven new studies, reinforced the conclusions in the original 2016 review that smokers using e-cigarettes were less likely to quit.⁶⁸ Longitudinal data from two population level studies using US PATH data found that e-cigarettes were no more effective than other cessation therapies, and in fact e-cigarette users in the PATH study were more likely to be nicotine dependant in the long term.^{69,70} Similarly, the Irish Health Research Board came to similar conclusions based on an analysis of seven clinical trials, stating e-cigarettes are no more effective than approved NRTs.⁷¹ Further clinical trials and large-scale observational studies are needed to examine whether e-cigarettes are effective smoking cessation devices, as recommended by the US Surgeon General in its 2020 report on smoking cessation.⁷²

Research limitations

In general, population level evidence suggests e-cigarettes are as effective or less effective than traditional cessation methods while clinical level evidence suggests e-cigarettes are more effective than traditional cessation methods further contributing to the inconclusiveness of vapes as a viable cessation intervention. However, there are limitations of both population and clinical studies that need to be understood. In population level studies, participant recruitment is often done in a non-random way, which can introduce bias into the study. Population studies which survey a shifting sample of individuals across different points in time (cross-sectional studies) limit the ability of researchers to determine links or associations within the data. Clinical studies also have some limitations. Tightly controlled experiments use specific devices, e-liquids, and methods of nicotine delivery which differ to how e-cigarette products are used on a day-to-day basis by “real world” vapers in Canada. Due to costs, clinical studies usually enroll only a small number of participants and are limited in duration, often running for six months to one year. More studies are needed that look at sustained cessation over a period longer than one year.

Heart & Stroke's conclusions

Heart & Stroke encourages people to strive for complete cessation of nicotine as the best means of reducing the burden of tobacco- and vaping-related illnesses. Heart & Stroke recommends people in Canada use medically approved cessation tools such as nicotine replacement therapy (NRT), quit medications and/or counselling. There is strong evidence to support the notion that the combined use of NRTs (patch, gum, inhaler, lozenges etc.) is effective to aid smokers in quitting. Those adults who have tried medically approved cessation tools without success could try e-cigarettes although further research is needed to conclusively determine whether e-cigarettes are or are not effective cessation devices. If e-cigarettes are to be used as a harm reduction tool or cessation device, accompanying strategies are required to help users quit vaping.

In the meantime, there is a critical need for continued regulation to ensure these products are not getting into the hands of youth. Youth can easily access e-cigarettes and are often drawn in by a range of unique flavours, attractive packaging and high nicotine levels. The rising prevalence of vaping among youth and young people is a significant public health concern. Measures to protect young people are imperative to prevent our youth from becoming the vaping generation. Effective public policy should strike a balance between enabling access to e-cigarettes for adult smokers who want to use them to help quit smoking while ensuring these products are regulated in a way that can help prevent youth addiction, and possible smoking initiation. It is important for governments to adhere to the precautionary principle and create public policy that errs on the side of caution.

Vape devices and other products

Evolution of the e-cigarette

Over the last decade, e-cigarettes have evolved drastically. The National Academy of Science, Engineering and Medicine has categorized e-cigarettes into three generations: cig-a-likes, vape pens and mods.¹⁷ The newest fourth generation of e-cigarette devices are referred to as pods.

Figure 1: Four generations of e-cigarette devices



Image taken from: Smoking Cessation: A Report of the Surgeon General, 2020, page 525

Most e-cigarettes have three basic components: a battery, a fluid tank and an atomizer (the heating element that converts fluid to vapour).⁷³ First generation cig-a-likes imitate the look and feel of cigarettes. Most cig-a-likes have low voltage batteries and fluid tanks that cannot be refilled, making them single-use.⁷³ In comparison, the second generation vape pens contain larger batteries and higher volume e-liquid tanks (clearomizers) that can be refilled with any e-liquid.⁷³ Third generation mods differ from first and second generation in that they are customizable. Mods can be built to user specifications and can have devices of varying wattage, voltage and power.⁷³ The atomizing unit can also be modified and comes in different styles for different purposes. The customizability of mods makes them more expensive to purchase and requires more specialized knowledge about how the different parts work together.

Fourth generation pod systems differ from third generation mods in that pods have fixed battery voltage.⁷³ They can be refillable and have replaceable parts (open systems) but are usually closed systems with click-and-go fluid filled pods. Pods are convenient, cheap, discreet, require no special knowledge for use, and are growing in popularity among young people.¹

Sales of e-cigarettes

Sales of e-cigarettes are growing rapidly across the globe.⁷⁴ Worldwide vape sales are estimated to reach US\$34 billion by 2021.⁷⁵ In 2019, Juul Labs expanded rapidly in the US, leading the surge in e-cigarette sales and peaking at 72.1% of the total market share of e-cigarette and vapour products in August 2019.⁷⁶ Juul Lab's market share in the US has steadily declined to 57.6% in January 2020.⁷⁷ The decline in Juul Lab's market share could be due to a number of reasons including pressure from the US Food and Drug Administration (FDA) to restrict youth appealing marketing and Juul Lab's voluntary removal of their flavoured pods from the US and Canadian markets. However, while Juul Labs has seen a decrease in market share, competitor companies are filling in the gaps. Njoy and Vuse experienced large boosts to their US market shares to 15.3% and 18.2% respectively by January 2020.⁷⁷ This underscores the need for strict regulatory measures rather than voluntary measures that only embolden competitors to forgo responsibilities to public health in light of opportunities for increasing profits.

Analysts predict American e-cigarette and vapor company sales totaled US\$9.0 billion in 2019.⁷⁸ The success of Juul Labs and other vape manufacturers has prompted an increasing number of tobacco manufacturers to purchase e-cigarette companies or to develop their own e-cigarette brands.^{74,79} Tobacco industry diversification into vape products has been seen as both a strategy to ensure ongoing profitability and a public relations exercise to include harm reduction products in their portfolios.⁸⁰

Heated tobacco products

Heated tobacco products (HTP), of which IQOS is the most well known, are growing in popularity in various countries. HTPs differ from e-cigarettes in that instead of containing e-liquid, they contain tobacco which is heated to produce an inhalable aerosol infused with nicotine.⁸¹ The tobacco in HTPs does not undergo combustion, therefore HTPs are promoted as safer alternatives to combustible cigarettes, although HTPs have not been on the market long enough to prove they are safe for long-term use.⁸¹ Because HTPs are a tobacco product, the World Health Organization (WHO) recommends HTPs to be subject to the same policy and regulatory measures applied to all other tobacco products.

Globally, 10 million individuals are using IQOS, a HTP developed by Phillip Morris International.⁸² Sales of IQOS reached 900 million in 2018.⁸³ In Japan where nicotine containing e-cigarettes are banned, 33% of all adult tobacco users own an IQOS device.⁸² In Canada, the HTP market is relatively new, however interested consumers can still choose from a variety of products including IQOS from Rothman Benson & Hedges, a subsidiary of Phillip Morris International, PAX from PAX Labs and Ploom TECH from Japan Tobacco International. In Canada, 36% of regular vapers are aware of HTPs and about 15% use an HTP.⁵

The US market for HTPs is expected to continue to grow as e-cigarette products come under more scrutiny. As part of the regulatory process for approval in the US, new tobacco products (including e-cigarettes and HTPs) are required to receive approval from the FDA through a Premarket Tobacco Application (PMTA) or will be removed from the market. So far, a vast majority of new tobacco products currently being sold have not received premarket approval, but IQOS received premarket approval on April 30, 2019.^{83,84}

Industry tactics

In response to the spikes in youth use, growing public health concerns, threats of government regulation and backlash related to the associated lung illnesses, Juul Labs voluntarily removed its flavoured pods (except for tobacco and menthol) from the US market. Juul Labs issued a news release pledging to have "no higher priority than combating youth use" which is a contrast to their initial marketing launch which overtly targeted youth.^{85,86} Other e-cigarette manufacturers have also resorted to changing their advertising and messaging under pressure by the FDA.

Critics believe these actions to be a public relations exercise in an effort to avoid regulation and prevent further brand erosion.⁸⁷ Industry groups are fighting regulations behind the scenes and pushing the narrative that vaping is necessary for a tobacco-free future.^{29,30} The largest tobacco groups in Canada are busy lobbying the federal government.³⁰ Between 2018 and 2019 Imperial Tobacco Canada, Rothmans, Benson & Hedges

Inc., Juul Labs Canada and JTI-Macdonald Corp., had over 65 meetings with government officials.³⁰

Angus Reid polling found that in 2019, 62% of people in Canada believed vaping did more harm than good.⁸⁸ As a result of public concern, social media giant Instagram has taken a stand to prevent companies and social media influencers from profiting off vape advertising by banning paid promotions of vaping products.⁸⁹

Mass litigation

Currently, a mass litigation (composed of 758 lawsuits) is occurring against Juul Labs in San Francisco.⁹⁰ The lawsuit claims include marketing directed to minors, failure to warn customers about the potency and addictive nature of Juul products, and that Juul Labs products are defective and unreasonably dangerous.⁹⁰ Injuries claimed in the lawsuits include hemorrhagic strokes, lung diseases, lung injuries, nicotine addiction and seizures.⁹⁰ It is expected that the litigation against Juul Labs will continue to grow.⁹⁰

The regulatory response to e-cigarettes

Current and proposed e-cigarette regulation in Canada

E-cigarettes with or without nicotine are legal in Canada. In May 2018, *Bill S-5: An Act to amend the Tobacco Act and Non-smokers' Health Act* received Royal Assent, which established a new legislative framework to regulate the manufacturing, sale, labelling and promotions of vaping products in Canada. The federal government permits the sale of vaping products containing nicotine to adults 18 years or older, but the legal age of purchase in each province or territory may be higher (19 or 21 years of age). Cannabis vape products became legal in October 2019 following the implementation of Bill C-45 in 2018 and have been available in the market since December 2019.

Current legislation that regulates e-cigarettes in Canada includes the *Tobacco and Vaping Products Act (TVPA)*, the *Non-smokers Health Act*, the *Food and Drugs Act* and the *Canada Consumer Product Safety Act (CCPSA)*. The *TVPA* regulates the promotion of e-cigarette products through packaging and other forms of lifestyle advertising and marketing that could appeal to young persons. This extends to flavoured vape products, which cannot be promoted through advertising or packaging if there are reasonable grounds to believe the promotion could be attractive to youth. However, these restrictions are of little effect.

The *Non-smokers Health Act* restricts vaping in designated federal workspaces and the *Food and Drugs Act* applies restrictions to vaping products that make health claims. Regulations under the *TVPA* and the *CCPSA* set the maximum nicotine concentration in vaping products, which is currently 66 mg/mL.⁵² The European Union (EU) and some Canadian provinces have lowered the maximum content to 20 mg/mL as a means to address the addictive nature of these products.

In 2019 and 2020, Health Canada finalized vaping products labelling and packaging regulations, and vaping products promotion regulations in the *Canada Gazette, Part II*. The finalized regulations are summarized as follows:

- Restrict the display of vaping products and packages at the point of sale.
- Prohibit e-cigarette advertising in any place youth have access, including in-store, in public spaces, in online publications (social media) and on broadcast media.
- Require health warnings on any e-cigarette product advertising and a nicotine warning on e-cigarette product packages.
- Require child-resistant packaging for nicotine containing products.
- Require a standardized ingredient list on e-liquids containers.
- Require poison warnings on nicotine containing products and standardized nicotine content labelling.

In December 2020, Health Canada introduced regulations to address the concentration of nicotine in vaping products. The proposed regulations are summarized as follows:

- Establish a maximum nicotine concentration of 20 mg/mL for vaping products manufactured or imported for sale in Canada.

Despite existing regulations, Canada's federal legislation does not go far enough. Youth in Canada are still being exposed to attractive product packaging and enticing product design, youth-friendly flavours and high nicotine concentrations. Youth are often able to bypass age restrictions when purchasing products in-store and online. Many provinces and territories are in the process of amending their tobacco control legislation to enforce stricter restrictions on e-cigarettes. However, more needs to be done on a federal level to strengthen regulatory measures on a national level and unify the provincial and territorial patchwork of regulations across Canada.

Table 1: A summary of vaping policy by jurisdiction in Canada, April 2021

Region	Total Tax	Age 21	Retail displays and advertising	Other advertising restrictions	Sale restrictions	Flavour restrictions	Nicotine restrictions
Federal	5% GST		Ban on ads available to youth	Ban on ads available to youth			Max. 66 mg/mL
NF	20% vape tax + 15% HST		Specialty stores only				
PE	15% HST	Yes	Specialty stores only	Outdoor signs (i.e. billboards)	Specialty stores only	Flavour ban (except tobacco) effective March 2021	
NS	20% on vape devices, \$0.5/ml/g on e-liquids + 15% HST		Specialty stores only	Broadcast, billboards	Limit on retailers to sell no more than 5 devices and a max of 240ml of liquid to a consumer. Provincial licensing fee.	Flavour ban (except tobacco)	Max. 20 mg/ml
NB	15% HST		Specialty stores only				
QC	14.975% QST		Specialty stores only	Broadcast, billboards	QC retailers cannot sell online	Stated intent to regulate	Stated intent to regulate
ON	13% HST		Specialty stores only	Outdoor Public spaces		Flavours (except tobacco, mint and menthol) sold in specialty stores only	Above 20 mg/ml in specialty stores only
MB	12% (PST, GST)		Specialty stores only	Outdoor signs (i.e. billboards)			
SK	11% (PST, GST) Effective Sept 1, 2021: 20% vape tax + 5% GST		Specialty stores only	Outdoor signs (i.e. billboards)		Effective Sept 1, 2021: all flavours (except tobacco, mint and menthol) sold in specialty stores only	
AB	5% GST		Specialty stores only	Outdoor public spaces		Regulatory authority established	
BC	20% PST + 5% GST		Specialty stores only	All advertising that can be seen or heard by youth		Some flavours banned and flavoured non-nicotine e-liquids banned. All other flavours (excluding tobacco) sold in specialty stores only.	Max. 20 mg/ml
YT	5% GST		Specialty stores only			Regulatory authority established	
NT	5% GST		Specialty stores only	Outdoor signs (i.e. billboards)		Regulatory authority established	
NU	5% GST	NO CURRENT VAPING LEGISLATION – CONSULTATIONS PROPOSED					

An interactive version of this information is available at [Heart & Stroke.ca](https://www.heartandstroke.ca).

Nicotine content and labelling

Currently, e-liquids in Canada cannot exceed a nicotine concentration threshold of 66 mg/mL. However, this threshold fails to guard against the higher concentrations of many nicotine salt products. For example 5% nicotine strength Juul pods contain 59 mg/mL of nicotine, the equivalent of one pack of 20 cigarettes.² Most youth and young adult respondents (16–24) in *The Youth and Young Adult Vaping Project* study used vape juices with nicotine concentrations of 50–60 mg/mL (64%).¹⁰ This was highest among male youths (16–18 years) at 74%.¹⁰ British Columbia and Nova Scotia have limited nicotine concentrations in e-liquids to 20 mg/mL. Quebec has committed to adopting the 20 mg/mL nicotine concentration limit as well. This limit was adopted by the EU through a *Tobacco Products Directive* in 2014.⁹¹ The EU directive recognized the 20 mg/mL nicotine threshold as sufficient for cessation for a majority of smokers.⁹¹ In December 2020, Health Canada introduced regulations that would establish a maximum nicotine concentration of 20 mg/mL for all vaping products sold in Canada.

Nicotine concentration statements are an area of needed regulation due to the large variance in labelling (by percent, milligrams, or descriptors) on e-liquid containers.⁹² There is also a need to verify that labelled nicotine concentrations accurately reflect nicotine concentrations within e-liquid containers.⁹³ The National Academy of Science concluded that the evidence shows there is a large variance among nicotine content in products, and in some instances, testing has shown that e-cigarette products labelled as nicotine-free do in fact contain nicotine.^{17,93,94} Health Canada should ensure proper enforcement of the vaping products labelling and packaging regulations to minimize risk of improper labelling.

Health warnings

Warning labelling on e-cigarette products are most effective when utilizing colours such as yellow and red in addition to graphic imagery.^{95–97} Health warnings are generally more effective at discouraging vaping than nicotine warnings.⁹⁶ Warning labels that take up more space on the packaging signal greater risks to users.⁹⁸ Other effective measures for warning labels include using capital letters, novel shapes, large font, and short easy-to-read messages.⁹⁹

The federal government requires Health Canada attributed health warnings on vaping advertising of all kinds (print, audio and video). These warnings appear as black text on a white background in print and video advertising and as verbal warnings in audio-only advertising. To further strengthen these regulations, Heart & Stroke recommends that video advertisements should avoid having health warnings at the end of ads where they can be skipped, and instead opt for a scrolling text warning at the bottom of video ads, for the entire duration. Heart & Stroke recommends further strengthening

the health warnings on packages and in advertising by incorporating stronger messaging on health hazards (respiratory etc.) and using cautionary colours alongside graphic images. These improvements can greatly reduce susceptibility to vaping, especially among experimenting youth.^{95–97} In the US all covered tobacco products containing nicotine (including e-liquids) and all vaping advertisements are required to include the following warning: “WARNING: This product contains nicotine. Nicotine is an addictive chemical.” The warning must comprise at least 30% of the surface area of the principle display.¹⁰⁰

Packaging

Health Canada regulations require e-liquids be packaged in child resistant packaging to protect children from accidental ingestion of nicotine. The EU has required child-resistant packaging and opening mechanisms for all e-cigarettes and refill containers since the 2014 *EU Tobacco Products Directive*.¹⁰¹ Prior to regulations, the US observed an increase in the number of emergency department visits from children who had been exposed to nicotine containing e-liquids.¹⁰² E-cigarette product manufacturers must now ensure their products are packaged in child-resistant containers to meet new FDA guidelines.¹⁰³

The government in BC adopted regulations for vaping products, which came into effect on September 15, 2020 to require that e-cigarettes be packaged in a plain manner, without image, and without text (except for text required by law or specifically permitted in the regulations). This is a Canadian first– no other province or territory has proposed plain packaging for vaping products. Globally, Israel is the only country in the world to pass a bill requiring plain packaging for e-cigarettes.¹⁰⁴

Packaging can be a powerful form of advertising that has been used effectively by the tobacco industry to promote tobacco products.¹⁰⁵ In response, Canada has adopted plain packaging regulations on tobacco that are the strongest in the world. Plain packaging could also be required for e-cigarettes, as Israel has done and as several other countries are considering.

Flavour regulations

Flavours play a huge role in inducing youth to vape and sustaining vaping behaviours.³³ Slightly more than 85% of youth reported their first e-cigarette was flavoured,³⁴ and the availability of flavours (especially fruit, sweet and dessert flavours) remains a top reason for e-cigarette use among youth.^{35–37} *The Youth and Young Adult Vaping Project* found that 45% of youth and young adults said they would stop vaping if flavours were banned.¹⁰ This was highest among young adult women at 53%.¹⁰

The industry takes advantage of flavour popularity by promoting eye-catching e-liquid flavours (e.g., minty apple, nutty cocoa, watermelon madness) that target youth despite claims to the contrary.¹⁰⁶ In the US, there are now five states – California, New York, New Jersey, Massachusetts and Rhode

Island that have banned flavours in e-cigarettes except for tobacco flavour.¹⁰⁷

Figure 2: Youth appealing flavoured e-liquids



Juul Labs voluntarily removed most of its flavoured pods from the US market except for menthol and tobacco flavours.¹⁰⁸ However this public relations stunt occurred just prior to the FDA announcement to remove all unauthorized flavoured pods (excluding menthol and tobacco) from the market.¹⁰⁹ The FDA has recognized that pod-based products are immensely popular with youth. While flavoured pod-based products have not been permanently banned, they will require successful pre-market approval from the FDA in order to be re-introduced for sale in the US market. Juul Labs also announced it would remove fruit flavoured pods from the Canadian market temporarily, stating that the pods may return “under the guidance and regulation of Health Canada”.¹¹⁰ Currently, only golden tobacco, Virginia tobacco and mint flavours can be purchased online.

Early research looking at the impact of San Francisco’s comprehensive ban on the sale of flavoured e-cigarette products, menthol cigarettes and other non-tobacco suggests the ban has been effective at reducing consumption of tobacco and vaping products. Nearly 21% of those exclusively using flavoured e-cigarettes reported quitting all tobacco and nicotine use (including vaping) after the ban.¹¹¹ Another study looked at the subjective experience of vaping Juul pods with a preferred flavour versus the tobacco flavour. The researchers found that the motivation to vape was reduced in the group assigned the tobacco flavoured pod compared with a preferred flavour pod.¹¹² Vapers using the tobacco flavour reported less pleasure in vaping, less satisfaction, a lower urge to use, and a lower willingness to use the product in the future.¹¹²

In Canada, many provinces and territories have taken action to restrict or comprehensively ban vaping flavours. Nova Scotia banned flavoured e-cigarettes and e-liquids (except for tobacco) in April 2020, while regulations in PEI came into effect in March 2021. BC and Ontario have adopted regulations that restrict the sale of flavoured products (with some exceptions) to adult only vape shops. In Saskatchewan, effective September 1, 2021, all vape flavours (except for tobacco, mint and menthol) will be sold in specialty stores only. The Quebec Health Minister has stated his intent to introduce

comprehensive flavour restrictions in Quebec.

Heart & Stroke recognizes that certain flavours may have a role to play in tobacco cessation. Dual smokers and former smokers indicate that having a range of flavours is important for smoking cessation.⁵ In order to ensure e-cigarettes maintain their potential for smoking cessation, flavour regulations should ensure that only a very small range of flavours can be accessed.

Marketing restrictions

Marketing has known dire effects on the perception of harm and safety of e-cigarette products, and youth and young adults are especially susceptible to vape marketing and promotions.^{113,114} In Canada, it is illegal for manufacturers to make claims about the health benefits of e-cigarettes including suggesting that they are a safer alternative to smoking traditional combustible tobacco. Federal legislation also prohibits lifestyle advertising as well as advertising depicting a person, animal or character.³² Despite these restrictions, Health Canada compliance monitoring observed high levels of non-compliance at specialty retailers, seizing more than 80,000 units that were in non-compliance with federal vaping legislation.¹¹⁵

Increasing globalization and the growth of digital media, means that people in Canada are more exposed to vape marketing on social media than ever before. Much of the vape messaging on social media is promotional and contains content appealing to youth such as memes, cartoons, stealth vaping and references to musicians or celebrities.^{116–118} A 2018 study found that on Instagram, only 9% of e-cigarette or e-liquid brand ambassadors disclosed their sponsorship in posts.¹¹⁷ This dishonest advertising is concerning and undermines the hard-fought change in social norms related to tobacco use that were achieved through decades of tobacco control efforts.

Social media is playing a significant role in vaping product promotions and advertisements, especially to youth and young adults. Before making changes to their social media platforms, 44.9% of @JUULvapor Twitter followers were between 13 to 17 years old, under the legal age of purchase.¹¹⁹ One study showed that on Instagram, the uptake of pro-vaping posts (measured by likes) increased three-fold from 2017 to 2019.³¹ On YouTube, the act of stealth vaping (hidden from view of parents, teachers, and others) is the subject of thousands of videos where youth creatively attempt vaping in prohibited areas without being caught.¹²⁰ More recently, the FDA in the US has warned retailers against using social media influencers to attract youth to vaping.¹²¹ Social media giant, Instagram, has also restricted paid promotions of vaping products by social media influencers and celebrities on its platform.⁸⁹

In Canada, exposure to e-cigarette advertising has also occurred within retail stores, on broadcast media and on billboards or posters^{122,123} (although federal regulations adopted in June 2020 now prohibit e-cigarette advertising in any place that youth can

be exposed). Canadian research shows that a majority of youth (74%) in Canada report exposure to e-cigarette advertising, and of those exposed, 47% report that advertising is targeted to non-smokers.¹²³ In comparison, fewer youth in the UK (which has stricter advertising policies) report that advertising is targeted to non-smokers (36%).¹²³ Exposure to these types of advertising is associated with an increase in the intention to vape, and an increase in vaping among youth.^{113,114,124–126} Some studies suggest the effects of advertising is compounded: the greater the ad exposure, the higher the odds of e-cigarette use.^{114,127} Advertising can also influence youth perception on the safety of e-cigarettes. The more ads an individual is exposed to, the more likely they are to engage in vaping.^{114,127}

Currently, several provinces have regulations restricting advertising in some public spaces and in retail environments, but these measures are not comprehensive. Health Canada has recently finalized strong federal regulations that restrict advertising of vaping products in-stores (including online), public spaces, broadcast media and publications (including social media) where youth have access. However, young adults (20–24 years) have among the highest rates of trying vaping, past 30-day use, and daily vaping.⁴⁶ Aspects of the final regulations should be extended to protect young, non-smoking adults from exposure to vape advertising in bars, casinos, nightclubs and other adult only areas.

While the final federal regulations strengthen national promotion restrictions, more can be done, and indeed some provinces have gone further than the federal regulations.

Retail access

In Canada, federal legislation makes it illegal to sell vaping products to those under 18 years and most provinces and territories amended legislation to require vendors to verify age with government issued identification. Despite these restrictions, a majority of Canadian students indicate it is “fairly easy” or “very easy” to obtain e-cigarette products.³ A Health Canada survey found only 31% of underage youth vapers were always asked to prove their age when making purchases in-stores and online.⁵ A US study found that a third of underage youth were able to bypass age verification methods and purchase a device from a store or online.¹²⁸ E-cigarettes are also frequently accessed from family, friends and others in social circles.³

PEI is the only Canadian jurisdiction in which the sale of e-cigarette products is restricted to specialty shops only. Ontario has introduced regulations that restrict e-cigarette products with nicotine levels higher than 20 mg/mL to specialty stores only. All flavoured products (except for mint, menthol and tobacco) are also restricted to specialty stores only. The BC government has also introduced regulations that restrict all flavoured products to age-restricted shops as well. In provinces and territories elsewhere, vaping products are available at

various retail locations including convenience stores, gas stations, vape shops and tobacconist shops.

American research found that students were exposed to an average of 2.7 e-cigarette retailers within a half mile radius from schools and the density of retailers was positively associated with ever and past-month use of e-cigarettes among youth, especially if advertising in or around retail spaces was observed.¹²⁹ Strong policies to prevent retailers from selling e-cigarette products within close vicinity of schools can strengthen efforts to reduce vaping among youth. In Canada, Vancouver city councillors have been pushing for regulations that would limit the proximity of vape retailers to schools and youth-oriented facilities. A private member’s bill introduced in Nova Scotia (*Bill 219*) proposes to restrict tobacco retailers from operating within 3 kilometres from schools. Another private member’s bill introduced in Ontario (*Bill 151*) would require vape stores wishing to operate in specific areas, to obtain a license approved by the Board of Health.

In addition to restricting the location of vape retailers, restrictions put on the number of retailers allowed to operate in a province or territory can help improve monitoring and enforcement of legal age and other policies. Mandatory licensing, and limiting the licenses available, can help control the number of vape retailers in each province and territory. Cannabis licensing regulations in the provinces and territories can be used as a model for vape licensing regulations. Vape vendor licenses are required in 28 US states¹⁰⁷ and a small number of municipalities in Canada (including Toronto, Hamilton and London) require licensing and fees.^{107,130} Provincially, only BC, Quebec, Nova Scotia and Newfoundland and Labrador require e-cigarette retailers to be licensed, while Ontario requires specialty vape shops to be licensed.

Age restrictions

The National Academies in the US studied the result of raising the minimum legal age of purchase for tobacco products to 21. They found that a legal age of 21 would prevent or delay the initiation of tobacco use by youth.¹³¹ It would also limit the access of tobacco products from social sources, as youth who are 21 are less likely to be in the same social circles as high school youth.¹³¹ These observations are further supported by US research which found that youth (18–20 years) living in areas where the tobacco purchase age was 21, were 39% less likely to have recently or regularly smoked compared with youth living in jurisdictions with a purchase age below 21.¹³²

Federal legislation in Canada has set the legal age of e-cigarette purchase to 18. Many provinces have increased the legal age to 19 with the exception of Quebec, Manitoba, Saskatchewan and Alberta. PEI is the first province to increase the legal age of purchase to 21 – and this extends to tobacco. A private member’s bill introduced in the Nova Scotia legislature proposes to hold consultations on increase the legal age to 21 as well, although this bill is in First Reading only.

In the US, multiple states raised the legal age of purchase to 21.¹⁰⁷ On December 20, 2019, the US President signed off on legislation that raised the federal minimum age of sale of tobacco and vaping products to 21.¹³³ While Heart & Stroke is in support of increasing the age of legal purchase of tobacco and vaping products, doing so in a phased approach would better serve nicotine addicted youth who are 18 – 20 years and had previous legal access to tobacco and vaping products and who would now be under the legal age.

School policy

Schools play an important role in socializing youth and are, therefore, important targets for policy efforts aiming to prevent and dissuade youth from vaping. Due to the sudden eruption in youth vaping, educators and school boards were forced to quickly address wide-spread illegal vaping in schools, resulting in policies such as fines of up to \$490.00 and suspensions. Some high schools in the US and Canada are installing bathroom sensors and removing exterior bathroom doors to dissuade students from vaping in washrooms. Unfortunately, fines can disproportionately impact students living in low-income households and changes to bathroom setup are unacceptable encroachments on privacy.

These policies fail to realize that youth are often victims of glamorous and deceptive marketing, lack the necessary resources and supports to make informed choices and become quickly addicted to nicotine. Any school policy should recognize that nicotine use is an addiction, and youth are victims not culprits. Some e-cigarette companies are using these vulnerabilities to their advantage. Juul Labs paid schools up to US\$10,000 to access youth in schools and conduct health education presentations where students were misled about the safety of Juul products.¹³⁴ There are also accounts of e-cigarette retailers offering scholarships to students who wrote pro-vaping essays.¹³⁵

Effective vape control measures in schools should include both education and policy restrictions based on compelling evidence. The Ontario Tobacco Research Unit (OTRU) suggests policy measures to ban e-cigarettes on and around school property and educate youth on the health risks of e-cigarettes.¹³⁶ Many post-secondary institutions are becoming smoke- and vape-free and many provinces have acts that restrict smoking and vaping in and around elementary schools and high schools. Some school boards and public health units have developed educational resources for teachers, parents and students that are freely available online. It is recommended that educators use these and other resources to incorporate vaping education into health curricula. The Government of Canada has a [free toolkit](#) that also includes images for social media, and poster and mirror stickers for use in and around school bathrooms or other areas youth congregate to vape.

One high school in BC is taking a unique approach by offering to buy vapes from students in return for cafeteria credits.¹³⁷ This approach enables educators to begin the vaping conversation with students in a blame-free environment. It is important for educators to work with students to come up with solutions that avoid shifting the burden of responsibility onto students, but rather empower students to be agents of change. For example, Toronto Public Health is providing funding (as part of their Investment in Youth Engagement initiatives) to support youth engagement work in local communities with a focus on tobacco, vaping and hookah health.¹³⁸ Hookahs are water pipes with a mouthpiece through which users inhale flavoured tobacco smoke.¹³⁹ Schools should partner with or support the initiatives of local organizations by providing these engagement opportunities to their students. These extracurricular activities could contribute towards much needed community service hours for students.

Tax

It is well established that rates of tobacco use decline as price increases.¹⁴⁰ According to the World Health Organization, the taxation of tobacco products is the most cost-effective policy at reducing tobacco consumption.¹⁴¹ This is especially true for youth, who are especially sensitive to price increases on cigarettes making price an important determinant of youth smoking behavior.¹⁴² Specifically, higher cigarette prices can deter some students from smoking¹⁴³ and can impact the smoking behaviour of youth who are further along the smoking uptake continuum.¹⁴⁴

Evidence from economic studies performed on US and European sales data indicate that increases in e-cigarette pricing can lead to a decrease in the volume of sales.^{145,146} US data found that a 10% increase in prices led to a 12% reduction in sales of disposable devices and a 19% reduction in sales of reusable devices.¹⁴⁵ In Europe, a 10% increase in price was associated with an 11.5% decrease in sales of all device types in the long run.¹⁴⁶

In Canada, the BC government increased the sales tax on vaping products from 7% to 20%. Recently, Nova Scotia introduced a 20% tax on vaping products and a tax on e-liquids of 50 cents per millilitre, effective from September 2020 onwards. Newfoundland and Labrador implemented a vape tax of 20% on January 1, 2021. Saskatchewan has committed to a 20% vape products tax which would come into effect on September 1, 2021. This would replace the 6% PST that is currently applied to vaping products. In the most recent federal budget, the government proposed the introduction of a new taxation framework for the application of excise duties on vaping products in 2022. The federal government indicated that they are willing to work with interested provinces and territories in a federally coordinated approach to taxation. In the US, at least 20 states are currently taxing e-cigarettes.

Table 2: Federal and provincial/territorial (P/T) vape tax rates, April 2021

	Federal Excise Duty	P/T Excise or Other Tax	P/T. HST or PST	Federal GST	Total Vape Tax (%)	Total cost of a \$50.00 device
NS	-	20% on devices, \$0.5/ml/g on e-liquids	15% HST	See HST	38% ¹	\$69.00 (\$19.00 tax)
BC	-	-	20% PST ²	5%	26% ³	\$63.00 (\$13.00 tax)
AB	-	-	-	5%	5%	\$52.50 (\$2.50 tax)
MB	-	-	7% PST	5%	12%	\$56.00 (\$6.00 tax)
SK	-	20% vapour products tax (Sept 1, 2021)	6% PST (Not applicable to vaping products after Sept 1, 2021)	5%	11%	\$55.50 (\$5.50 tax)
ON	-	-	13% HST	See HST	13%	\$56.50 (\$6.50 tax)
QC	-	-	9.975% QST	5%	14.975%	\$57.49 (\$7.49 tax)
NB	-	-	15% HST	See HST	15%	\$57.50 (\$7.50 tax)
PEI	-	-	15% HST	See HST	15%	\$57.50 (\$7.50 tax)
NL	-	20%	15% HST	See HST	38% ¹	\$69.00 (\$19.00 tax)
YT	-	-	-	5%	5%	\$52.50 (\$2.50 tax)
NT	-	-	-	5%	5%	\$52.50 (\$2.50 tax)
NU	-	-	-	5%	5%	\$52.50 (\$2.50 tax)

An interactive version of this information is available at [Heart & Stroke.ca](https://heartandstroke.ca).

¹ HST is applied on top of original product cost plus 20% vape tax

² PST increased to 20% on vaping products

³ GST is applied on top of original product cost plus PST

The prices of e-cigarettes with taxes should not exceed the prices of cigarettes or other more dangerous tobacco products. This will help to prevent e-cigarettes from being priced out of the market by tobacco products. Heart & Stroke recommends the federal government consider a value-added tax (VAT) of 20% to 30%, as a starting point, that would co-exist with existing provincial and territorial sales taxes on vaping products. Provincial governments should also leverage taxation as a means to increase purchase price and deter youth uptake either through sales or excise taxes.

The international regulatory response to e-cigarettes

The US

Data from the *National Youth Tobacco Survey* in the US shows a large increase in past 30-day e-cigarette use among high school students from 1.5% in 2011 to 19.6% in 2020.¹⁴⁷ As a result, many states are taking action to introduce more restrictive policies to reduce youth uptake of e-cigarettes. These include increasing the legal age of purchase, taxing

vaping products, requiring licenses for retailers and restricting the sale of flavoured e-liquids.¹⁰⁷ A few states banned flavoured vaping products (with some exceptions) including California, New York, Massachusetts, Rhode Island and New Jersey.

Federally, the FDA has had jurisdictional authority to regulate e-cigarettes since May 10th, 2016.¹⁴⁸ As part of its regulation over e-cigarettes, the FDA required e-cigarette products that have been on the market since February 15th, 2007 to submit a Premarket Tobacco Application (PMTA) by September 9, 2020.¹⁴⁹ The purpose of the PMTA is to have e-cigarette manufacturers prove their products meet FDA standards for public health and safety through testing (including toxicological testing).¹⁰³ This means that all unapproved e-cigarette products currently on the US market are considered illegally marketed and are subject to enforcement by the FDA. It is expected that thousands of e-cigarette products will leave the US market unless applications have been successfully approved.

On January 2nd, 2020, the FDA announced its intention to prioritize enforcements against flavoured pod-based e-cigarette products.¹⁰⁹ As a result, all flavoured pod-based products (other than tobacco and menthol) have been removed from the US market. Considering youth are especially attracted to fourth generation pod-based vapes,¹ this regulation attempts to reduce youth access to these products.

Global

In light of the concerns among the public and health community, the need to maintain tobacco control efforts and given the many unknowns around e-cigarette use, there has been growing demand for regulation internationally. Municipal, regional, provincial, and national governments around the world have proposed and implemented policies to regulate e-cigarettes with or without nicotine in a similar fashion as tobacco products. Some countries have proposed complete bans on e-cigarette products including Cambodia, Singapore, Qatar and Jordan.¹⁵⁰ In other countries, e-cigarettes are legal to use but illegal to sell (Brazil, Mauritius, Nepal, Thailand, Turkey and Uruguay among others).¹⁵⁰ Many other countries have restrictions on marketing and promotions or health warnings and other labelling requirements including Argentina, Belgium, Germany, Norway, New Zealand, Portugal, the United Kingdom, Austria, Denmark, Finland, Ireland and Italy among others.¹⁵⁰

The need for government action

While there may be potential cessation and harm-reduction benefits of e-cigarettes for adult smokers, there are many unknowns about the products' long-term safety and there are concerns about the products' gateway potential for a new generation of tobacco and nicotine users. There is also concern among experts that e-cigarettes could renormalize smoking, and those products with nicotine could promote dual

use and perpetuate nicotine addiction instead of encouraging full cessation, thus undermining tobacco control efforts.

On September 19, 2019, eight leading health organizations, including Heart & Stroke, Canadian Cancer Society, Canadian Lung Association and Canadian Medical Association, called for the use of an Interim Order to immediately address the youth vaping crisis. All major political parties also indicated support for vaping restrictions when surveyed during the 2019 federal election period.¹⁵¹ The Council of Chief Medical Officers of Health in Canada also issued three public statements, between April 2019 to January 2020, on vaping calling for immediate policy action to protect youth.¹⁵²⁻¹⁵⁴

People in Canada are eager to see governments take action as well. Public opinion polling conducted by Heart & Stroke together with Pollara Strategic Insights in 2020 found that 80% of respondents and 69% of respondents who vape are concerned about the levels of youth vaping.¹⁵⁵ A large majority of people polled support new government policies to restrict marketing and sales to youth under 21 years (85%), cap nicotine to 20 mg/mL (83%), raise the legal age to 21 years (81%) and comprehensively restrict flavours (75%).¹⁵⁵ Finally, a majority of respondents want the government to adopt these measures quickly, underscoring the need for urgent action.¹⁵⁵

Policy Options

Heart & Stroke recommends a multi-sectoral and whole-of-society approach to address the youth vaping crisis. It is recommended that a variety of sectors in Canada, including the federal, provincial/territorial and municipal governments immediately adopt the following policies, where jurisdictionally appropriate:

People in Canada

1. If you are a never smoker, remain e-cigarette free.
2. If you are currently using e-cigarettes but are not a former smoker or current smoker, plan to stop using e-cigarettes.
3. If you are currently smoking and vaping, consider using only e-cigarettes to protect yourself from the increased risks of dual use. Eventually quitting both e-cigarettes and cigarettes is optimal for health.
4. Ask your health provider about the specific risks of e-cigarette use based on your status of being a former smoker, current smoker or never smoker.
5. If you currently use cigarettes and are planning to quit, speak to your healthcare provider about the best tobacco cessation options for you.
6. Talk to your loved ones about e-cigarette use. Create, maintain and support vapour-free spaces to protect family and friends from exposure.

7. Learn about and call attention to the marketing tactics used by e-cigarette and tobacco industries.
8. Raise your voice: work with organizations such as Heart & Stroke to influence all levels of government to take action.
9. Promote and encourage the adoption of e-cigarette control policies to create healthier environments for places we live, work and gather.

Governments

Legend F: Federal P/T: Provincial/Territorial M: Municipal

1. Prohibit the use of e-cigarettes in public spaces and workplaces where smoking is banned by law. (F, P/T, M)
2. Increase enforcement against manufacturers and retailers creating and selling products in non-compliance with the *Tobacco and Vaping Products Act*. (F)
3. Increase the minimum age of purchase for tobacco, cannabis and e-cigarettes to 21 years of age:
 - a. Use a stepwise implementation approach to ensure people between 18 and 20 years using e-cigarettes who might have a nicotine addiction are not negatively impacted during the transition period. (F, P/T)
4. Regulate the manufacturing and design of e-cigarette products:
 - a. Standardize colours, shapes, and other features/modifications of e-cigarette devices that are attractive to youth. (F)
 - b. Standardize labelling of ingredients and nicotine concentration to avoid customer confusion. (F)
 - c. Require standardized plain packaging for all e-cigarette products. This should be similar to tobacco plain packaging legislation. (F, P/T)
 - d. Require warning labels on e-cigarette packages that cover a variety of risks. Incorporate cautionary colours and graphic images alongside text warnings. (F)
 - e. Require vape product manufacturers to disclose all ingredients in e-liquids. (F)
 - f. Regulate the constituents in e-liquids based on harm when inhaled. (F)
 - g. Impose maximum nicotine concentration for all nicotine vaping products, of 20 mg/mL, as BC, Nova Scotia and the EU have done. (F, P/T)
5. Support and strengthen tobacco cessation through:
 - a. Improved access to best practice cessation services. (F, P/T)
6. Subsidized programs and aids that help people become tobacco-free (e.g., nicotine replacement therapy products and other pharmaceutical products). (F, P/T)
7. Universal access to services and therapeutics. These should be covered under public health care plans without restrictions. (F, P/T)
8. Targeted services for high-risk populations (Indigenous people, blue collar workers, those with mental health conditions and low-income peoples) and those having difficulty with quit rates. (F, P/T)
9. Mandating that interior messages become a permanent fixture on tobacco packages, such as on the slide of mandatory slide and shell packages. (F)
10. Require that messages be printed directly on cigarettes to promote quit attempts and dissuade use. (F)
11. Address the connection between mental health and tobacco use through collaboration with departments and organizations that work in mental health such as the Centre for Addiction and Mental Health (CAMH), and the mental health community. (F, P/T)
12. Restrict e-cigarette advertising in all mediums except in specialty vape stores. (F, P/T)
13. Adopt comprehensive restrictions on flavours in vaping products. (F, P/T)
14. Require that the sale of e-cigarettes and related products only take place in age enforced specialty vape shops where the sale of any other product is not allowed:
 - a. Ban internet sales, as Quebec has done. (P/T)
 - b. Mandate that all e-cigarette retailers obtain a seller's license from the government as a means to monitor and enforce compliance with public health regulations. (P/T)
 - c. Consider limiting the number of licenses available in each province and territory to reduce access. (P/T)
 - d. Use the money collected from license fees towards enforcement. (P/T)
 - e. Restrict the close proximity of vape shops to areas children and youth congregate (including schools, day care centers and recreational facilities) by at least 250 to 300 metres. (P/T, M)
15. Implement a sales tax or value-added tax (VAT) on vaping products of 20% to 30% as a starting point. (F, P/T)
16. Make school environments supportive of vape prevention:
 - a. Increase awareness on the risks of e-cigarette use in schools by educating teachers, students and parents. (P/T, M)

- b. Integrate information about the risks of e-cigarette use into health education curricula. (P/T)
 - c. Ban the use of e-cigarettes on school property. (M)
 - d. Ensure smoke-free ordinances are in place for areas surrounding school property including sidewalks, parking lots and fields. (M)
 - e. Restrict the proximity of vape shops to elementary schools, high schools, colleges and universities by at least 250 to 300 metres. (P/T, M)
11. If Internet sales are not yet banned, implement multi-step age verification and utilize third-party age verification services for online retailing. This could include requiring proof of age before purchase and checking government issued photo ID upon package collection. (F, P/T)
 12. Increase surveillance, collection, monitoring and research of vaping product use and resulting health impacts. (F, P/T)
Raise awareness on the harms of e-cigarette use through public awareness campaigns to better inform people in Canada. (F, P/T)

Educators, school boards and educational institutions

1. Ensure schools and surrounding areas (parking lots, fields, sidewalks etc.) are smoke- and vape-free.
2. Incorporate vaping education into school's health curricula.
3. Work with students to develop creative solutions to discourage vaping in schools. Use this opportunity to empower students to be agents of change.
4. Consider buy-back programs that positively reinforce quitting among youth.
5. Build partnerships with local organizations that can provide engagement opportunities for youth with lived experience of vaping.

Employers, corporations and institutions

1. Offer protection from e-cigarette vapour:
 - a. Establish policies for e-cigarette use in the workplace.
 - b. Ban vaping in outdoor areas that are near places people work.
 - c. Prohibit e-cigarette use in places where smoking is banned.
 - d. Mandate that all healthcare facilities become vapour-free (including on the grounds of healthcare facilities, such as parking lots and green spaces).
2. Offer cessation support for e-cigarette users wanting to quit including access to counselling, pharmacological aids and nicotine replacement therapy through workplace benefits.

Healthcare leaders and providers

1. Keep up to date on the latest developments in vaping.
 - a. [Health Canada "About Vaping" resources](#).
2. Continue to support smokers who wish to quit with medically proven cessation therapies including NRTs and counselling.
 - a. If patients are interested in using vapes as a quit aid, discuss the benefits and harms of e-cigarettes as a smoking cessation option for patients who have not been able to quit tobacco using other means. Encourage patients to establish a quit date and plan for all nicotine products.
3. Establish best practices for vaping cessation therapies for people who want to quit vaping.
4. Direct patients seeking more information to other educational resources:
 - a. [Health Canada quit resources](#).
 - b. [Health Canada smoking, vaping and tobacco](#).
 - c. [Heart & Stroke smoking and tobacco](#).

Researcher funding agencies/ organizations

1. Dedicate research funding to enable a deeper understanding of the usage and potential benefits of e-cigarettes as a cessation device as well as their possible health risks, including safety, gateway to addiction potential and tobacco renormalization.
2. Dedicate research funding to determine the effectiveness of e-cigarettes as a cessation device in clinical and population settings.
3. Dedicate research funding on e-cigarette price elasticity for youth to support taxation policies.

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