

## State of the Evidence on Vaping

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**To:** Chair and Members of the Board of Health

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## Recommendations

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It is recommended that the Board of Health:

1. Receive this report for information.

## Key Points

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- Over recent years, there has been a significant increase in vaping and cigarette use among youth. There are concerns that the rise in youth vaping may be renormalizing smoking behaviour among youth and increasing cigarette use.
- The increase in youth vaping is likely influenced by the recent introduction of vaping policies in Canada that permit vaping products with nicotine to be sold to adults and greater advertising and promotion of these products. This has led to the emergence of pod-based vaping products that have improved nicotine delivery system (i.e. nicotine salt formulations) and novel product designs. Evidence is beginning to show that young people are contributing to the increased popularity of nicotine salt vaping products.

- Recent research suggests that:
  - There is limited evidence that e-cigarettes are effective at helping smokers quit smoking;
  - E-cigarette use is associated with an increased risk of smoking and increased intensity of smoking among youth; and
  - Second-hand aerosol from e-cigarettes emits harmful compounds, including nicotine and particulates that may pose risks to bystanders. Second-hand exposure to these harmful compounds is lower from e-cigarettes compared to cigarettes.
- A regulatory balance is needed to restrict access to appealing vaping products among youth, while also allowing reasonable access to smokers as a less harmful alternative.

## Discussion

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### Background

In May 2018, Canada implemented the *Tobacco and Vaping Products Act* (TVPA). The purpose of the TVPA was to create a framework to regulate the sale, manufacture, labelling, and promotion of tobacco and vaping products sold in Canada.<sup>1</sup> It was introduced to regulate vaping products to protect youth from tobacco use and nicotine addiction, while also allowing a less harmful alternative to smoking for adults.<sup>1</sup>

Before the TVPA was introduced, e-cigarettes containing nicotine could not legally be sold or advertised without premarket approval, although unapproved vaping products containing nicotine were still widely available through vape shops and online.<sup>2</sup> The TVPA officially allows the sale of e-cigarettes containing nicotine, which has greatly increased their retail access. The Act also permits greater advertising and promotion of vaping products in mass media and point-of-sale displays.<sup>1</sup>

The TVPA also allowed the emergence of pod-based vaping systems in the Canadian market, including popular brands such as JUUL and Vype. Pod-based systems are the newest generation of e-cigarettes. They are appealing to users because they contain nicotine salt formulations which allow users to achieve a higher nicotine blood concentration in a shorter period of time.<sup>3</sup> Users also anecdotally state that nicotine salt products create a less harsh throat sensation when using compared to older generation vaping products. News reports and social media analyses show these products are appealing to youth for their discreet product design and marketing.<sup>4</sup> Evidence is beginning to show that young people are contributing to the increased popularity of nicotine salt vaping products.<sup>4</sup>

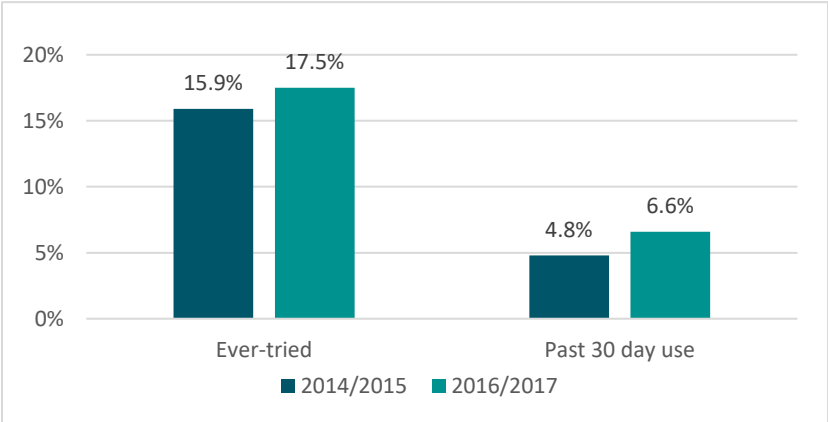
There is evidence to suggest that the increase in e-cigarette availability and the emergence of nicotine salt products on the Canadian market, with a lack of regulatory measures to protect youth, is likely contributing to the dramatic increase in vaping among youth.<sup>4</sup> As such, there is concern among the tobacco control community that high levels of e-cigarette use among youth could lead to a generation of nicotine addicted youth. This has the potential to threaten Canada's hard-earned gains in tobacco control and are thus a public health concern.

## Trends in Youth Vaping and Cigarette Use

### Vaping use

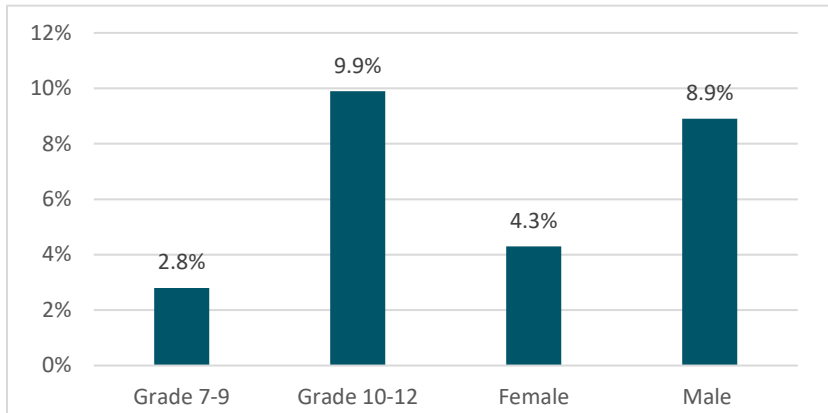
Over recent years there has been a substantial increase in youth vaping. Provincial data show increases in the number of Grade 7 to 12 students that report ever vaping and using a vape in the past month between 2014/15 and 2016/17 (Figure 1).<sup>5</sup>

**Figure 1. Ever-tried and past 30-day e-cigarette use in ON, 2014/15-2016/17**



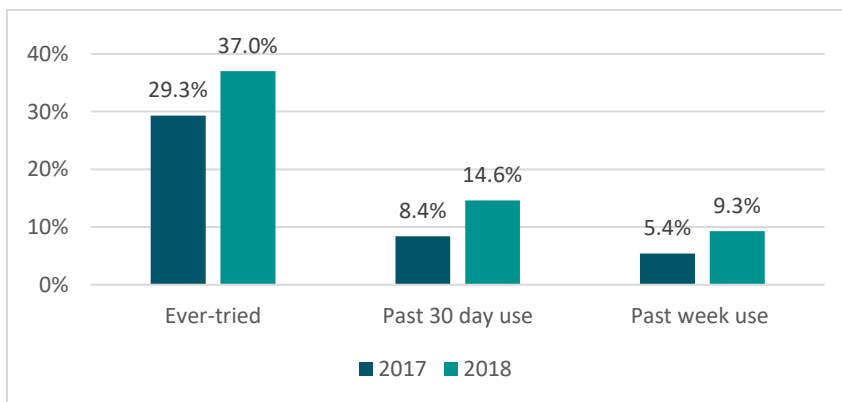
Past 30-day use tends to be higher among Grade 10 to 12 students compared to Grade 7 to 9 students and is higher among males compared to females (Figure 2).<sup>5</sup> These trends are consistent with local data from WDG's Youth Survey. Local data also shows use is higher among gender non-binary youth (youth who do not identify as male or female).

**Figure 2. Past 30 day use of e-cigarettes by grade and by sex in ON, 2016/2017**



Provincial data, which is only available up to 2017, has not yet captured the potential impacts of the introduction of the TVPA and pod-based systems on youth vaping trends. In Canada, more recent evidence shows there has been a substantial increase in vaping among 16 to 19-year-olds between 2017 and 2018 (Figure 3).<sup>4</sup> Similar increases are being observed in the U.S.<sup>4,6</sup>, where U.S health officials are calling vaping among youth an ‘epidemic’.

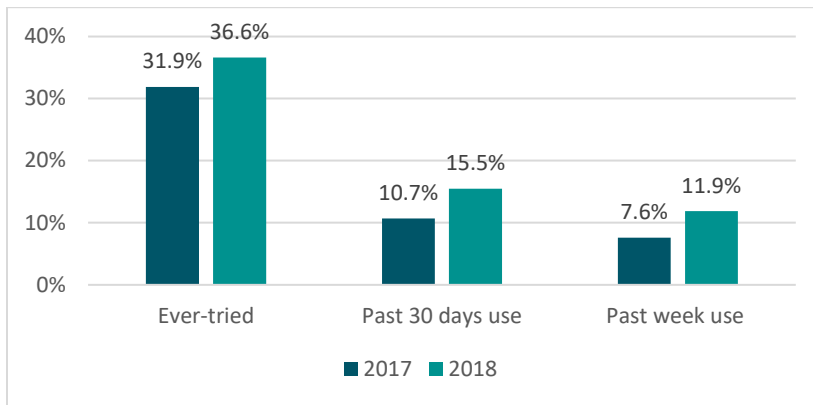
**Figure 3. Changes in the prevalence of vaping among 16-19 years old in Canada between 2017 and 2018**



## Cigarette use

There are widespread concerns that increases in youth vaping will lead to an increased use of cigarettes among youth.<sup>7</sup> Cigarette use among youth has been steadily declining for the past several decades; however, this progress has slowed in recent years.<sup>8</sup> In Canada, recent evidence shows significant increases in youth cigarette use between 2017 and 2018 (Figure 4). Past 30-day cigarette use increased by 45% (10.7% to 15.5%) among 16 to 19-year-old Canadians between 2017 and 2018.<sup>4</sup>

**Figure 4. Changes in the prevalence of cigarette smoking among 16-19 years old in Canada between 2017 and 2018**

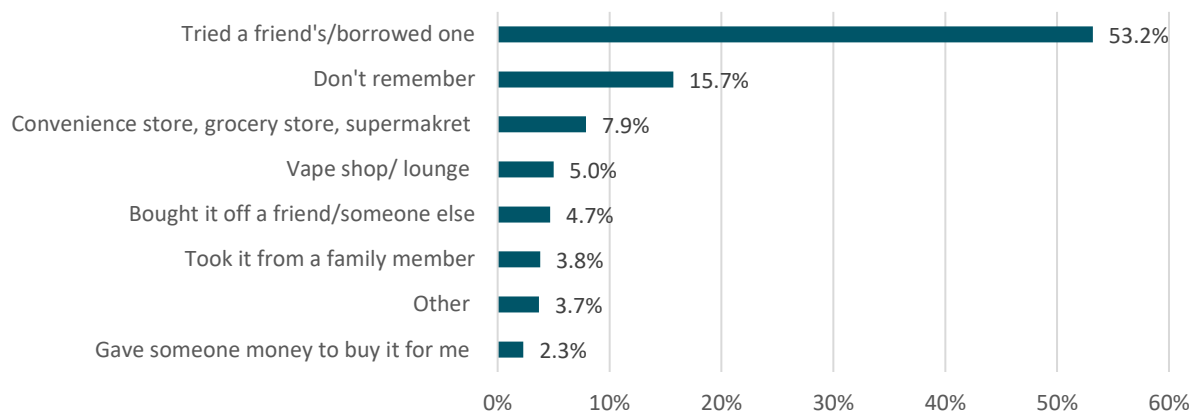


## Reasons for Increases in Youth Vaping

### Increased access to vaping products

Before the introduction of the TVPA, over half (53%) of Grade 7 to 12 students reported that it was easy to access an e-cigarette if they wanted one<sup>5</sup> and the over half (53%) reported accessing their last e-cigarette from a friend (Figure 5).<sup>9</sup> While you must be 19 years of age or older to purchase e-cigarette and vaping supplies in Ontario, almost 13 percent of Grade 7 to 12 students reported obtaining products through retail sources.<sup>9</sup> It is reasonable to assume that the legalization of e-cigarettes containing nicotine and the emergence of pod-based systems has only further increased youth’s access to appealing vaping products.

**Figure 5. Source of previous e-cigarette among Grade 7-12 smokers in ON, 2017**



Note: Responses for gas station, pharmacy, internet and gift/sample too low to report.

Although in 2017 there was only a small proportion of youth accessing vaping products online, it will be important to monitor the potential impacts the TVPA has on this trend.<sup>9</sup> In 2016, less than one quarter of all vaping product sales in Canada were online.<sup>10</sup> Currently, there are no restrictions on the delivery of vaping products by couriers, Canada Post or other delivery mechanisms despite the many online e-cigarette retailers that exist. This makes vaping products easily accessible to youth online as no age verification is required for delivery.

## **Advertising and promotion targeting youth**

Since the implementation of the TVPA there has been a dramatic increase in advertising and promotion of vaping products online, in magazines, on television, and in physical retail locations such as gas stations and convenience stores. The TVPA prohibits promotion of a vaping product through lifestyle advertising if there are reasonable grounds to believe it is appealing to youth.<sup>1</sup> However, Health Canada does not define what “appealing to youth” means, allowing this to be open to interpretation. Consequently, brands such as JUUL continue to attract youth to use their vaping products by conveying a fun, trendy and attractive lifestyle through their advertising and promotion. Research shows that just under half (48%) of youth and young adults have been exposed to marketing and promotion of vaping products.<sup>11</sup> This is a concern, as youth who are exposed to high levels of vaping advertisements may be more open to e-cigarette use.<sup>12</sup>

## **Appealing flavours and product designs**

### **Flavours**

Vaping products are available in a wide variety of flavours.<sup>13</sup> The TVPA prohibits the sale of certain flavours, including confectionary, dessert, soft drink, energy drink and cannabis; however, it is easy to find many examples of youth-friendly flavour promotions online.<sup>14</sup> Additionally, research shows that youth prefer fruit flavours over the flavours that have been restricted under the TVPA.<sup>15,16</sup> Research on the flavours used in tobacco products provides evidence that flavours encourage tobacco product initiation and sustained use by reducing the harsh taste and toxicity.<sup>17</sup>

### **Product Design**

E-cigarettes that youth prefer to use have substantially evolved overtime. The newest generation of e-cigarettes, pod-based systems, are attractive as they offer improved nicotine delivery (i.e. nicotine salt-formulations) and have appealing product designs (e.g. aesthetically similar to personal electronics, discrete, etc.).<sup>18</sup> Youth have cited the

attractiveness of e-cigarettes as a perceived benefit, although there is limited evidence on what specific vaping product design features they find appealing.<sup>19</sup>

## Current Evidence on E-cigarettes

In August 2018, Public Health Ontario published an updated literature review on the most-up-to-date evidence on e-cigarettes, largely based off the comprehensive review conducted by the National Academics of Sciences and Engineering and Medicine (NASEM). The literature review addresses the following questions:

- Is the use of e-cigarettes an effective cessation aid?
- Does the use of e-cigarettes in non-smoking youth and young people increase the likelihood of smoking imitation?
- Are there health risks associated with exposure to second-hand aerosol from e-cigarettes?

### E-cigarettes as a cessation aid

The NASEM report considered recent evidence on e-cigarettes as a cessation aid and concluded there is not enough evidence that e-cigarettes may be an effective aid to promote smoking cessation.<sup>7</sup> More recent evidence from both randomized control trials and observational studies also does not show support for e-cigarettes as a cessation aid.<sup>20</sup> Research in this area is challenging due to the rapid evolution and diversity of types of vaping products.<sup>22</sup>

### Vaping as a gateway to smoking

The NASEM report concluded that e-cigarette use is associated with an increased risk of smoking and an increased intensity of smoking among youth.<sup>6</sup> This is also supported by more recent research.<sup>22</sup> There are challenges in interpreting this association as there are common risk factors that influence e-cigarette use and subsequent cigarette smoking (e.g. age, ethnicity, having at least one parent who smokes, sensation seeking, etc.).<sup>22</sup> More research is needed to understand how different vaping product characteristics (i.e. flavouring, product design, nicotine levels) are linked with different risks for e-cigarette and smoking initiation and progression.<sup>22</sup>

### Health risks of second-hand e-cigarette aerosol exposure

The NASEM report reported conclusive evidence that e-cigarette use increases airborne concentrations of nicotine and particulate matter in indoor environments compared with background levels.<sup>7</sup> Furthermore, there is moderate evidence that second-hand exposure to nicotine and particulates is lower from e-cigarettes compared

with combustible tobacco products.<sup>7</sup> To date, no research has looked at e-cigarette aerosol in outdoor environments.<sup>22</sup>

## Conclusion

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Overall, there is a need to find a regulatory balance between restricting access to appealing vaping products among youth while also providing smokers with options to potentially reduce harms from smoking. Health Canada recognizes the need for increased regulation to protect youth and is exploring measures to restrict advertising and promotion, flavours, and retail access to e-cigarettes.<sup>3</sup>

To help prevent vaping among youth, Wellington-Dufferin-Guelph Public Health (WDGPH) has been providing evidence-based feedback on Health Canada's vaping policy consultations. WDGPH has also distributed e-cigarette resources to teachers and parents to support classroom teaching and conversations with youth and is developing a youth vaping awareness campaign. Increased measures to protect youth are essential to prevent vaping uptake among youth, to deter a generation of youth who are addicted to nicotine, and to decrease the threat vaping has on Canada's hard-earned gains in tobacco control.

## Ontario Public Health Standard

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### Chronic Disease Prevention and Well-Being

Goal: To reduce the burden of chronic diseases of public health importance and improve well-being.

### Substance Use and Injury Prevention

Goal: To reduce the burden of preventable injuries and substance use.

## WDGPH Strategic Direction(s)

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**Health Equity:** We will provide programs and services that integrate health equity principles to reduce or eliminate health differences between population groups.

**Organizational Capacity:** We will improve our capacity to effectively deliver public health programs and services.



**Service Centred Approach:** We are committed to providing excellent service to anyone interacting with WDG Public Health.

**Building Healthy Communities:** We will work with communities to support the health and well-being of everyone.

## Health Equity

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Since the long-term health effects of vaping remain unknown, it is difficult to determine which groups are most vulnerable to the health risks of vaping. However, it is well established that youth are at risk to the harmful effects nicotine as their brains are still developing.<sup>21</sup> Compared to adults, youth can become dependent on nicotine with lower levels of exposure.<sup>22</sup> Nicotine in youth can affect memory and concentration and is known to alter brain development.<sup>21</sup> Furthermore, nicotine exposure in youth can reduce impulse control and lead to cognitive and behavioural problems.<sup>23,24</sup>

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## Appendices

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None.