

## ENHANCED EPIDEMIOLOGICAL SUMMARY

# Impact of the COVID-19 Pandemic on Youth Smoking, Vaping, and Mental Health

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## Highlights

- In 2021, 19% of students in grades 7 to 12 in Ontario reported using a vaping device (including a few puffs), and 9% reported using a tobacco cigarette in the past year.
- Students who used vaping devices in the past year rated their overall mental or emotional health as “fair” or “poor” at a higher percentage than those who did not use any vaping device (59% vs. 34%).
- Most students who used cigarettes (85%) or vaping device (74%) in the past year expressed desire to discuss mental health or emotional problems with someone, but were uncertain where to seek help. This need was at least twice as prevalent among these students compared to their peers who did not report using cigarettes or vaping devices.
- Psychological distress (symptoms of anxiety and depression) was reported significantly higher among students who vaped in the past year, compared to their non-vaping peers.
- The COVID-19 pandemic was reported to have negatively impacted the mental health of students who had used cigarettes and vaping devices in the past year compared to their peers. In 2021, a significant majority of students who had used cigarettes (84%) and vaping devices (69%) in the past year reported negative impacts on their mental health “very much” or “extremely” due to the pandemic. Both groups also expressed higher prevalence of feeling depressed or sad about the future because of COVID-19.

## Background

- Most people who use cigarettes or vaping devices typically initiate these behaviours during their youth. Youth who smoke cigarettes are at elevated risk of addiction to nicotine, reduced lung growth, reduced lung function, and early cardiovascular damage.<sup>1</sup>
- Most vaping products in Canada contain nicotine.<sup>2</sup> Vaping can also lead to nicotine addiction among youth, which is especially concerning given its potential to harm the developing brain, and increase their susceptibility to start smoking cigarettes.<sup>3,4</sup> In addition, youth who vape are at risk of acute health problems, such as e-cigarette or vaping use-associated lung injury (EVALI), seizures, and bad oral health.<sup>5</sup>
- Both smoking and vaping have been associated with mental health symptoms among youth. Youth cigarette smoking is associated with depression, anxiety, and disruptive behaviour.<sup>6</sup> Review of longitudinal studies of youth showed a bidirectional relationship between smoking and depression, with smoking predicting depression, and depression predicting smoking.<sup>7</sup>

- Vaping among youth is associated with internalizing behaviours (including depression, suicidality, disordered eating), externalizing behaviours (attention-deficit/hyperactivity disorder and conduct disorder), as well as impulsivity, and perceived stress. However, the directionality of these mental health issues among youth who vape remains unclear.<sup>8</sup>
- The impact of the COVID-19 pandemic on youth vaping and smoking varied overtime. In the initial stages of the pandemic, there was a reported reduction in both vaping and smoking among youth.<sup>9,10</sup> However, this reduction did not persist during the later stages of the pandemic.<sup>10</sup>
- The mental health of Canadian youth was a concern before the pandemic, and research conducted during the pandemic has further emphasized this issue.<sup>11,12</sup> These studies have shown a decline in the mental health of youth, with increased rates of depression, anxiety and psychological distress.<sup>13</sup>
- There is lack of empirical evidence regarding the impact of the COVID-19 pandemic on Ontario's youth cigarette and vape users and their mental health. This report aims to address the knowledge gap by examining the mental health status and the prevalence of past-year vaping and cigarette smoking among students in grades 7–12 in Ontario during the pandemic. Furthermore, it explores potential associations between their use of cigarettes and vaping devices and their mental health.

## Results

### Cigarette Use

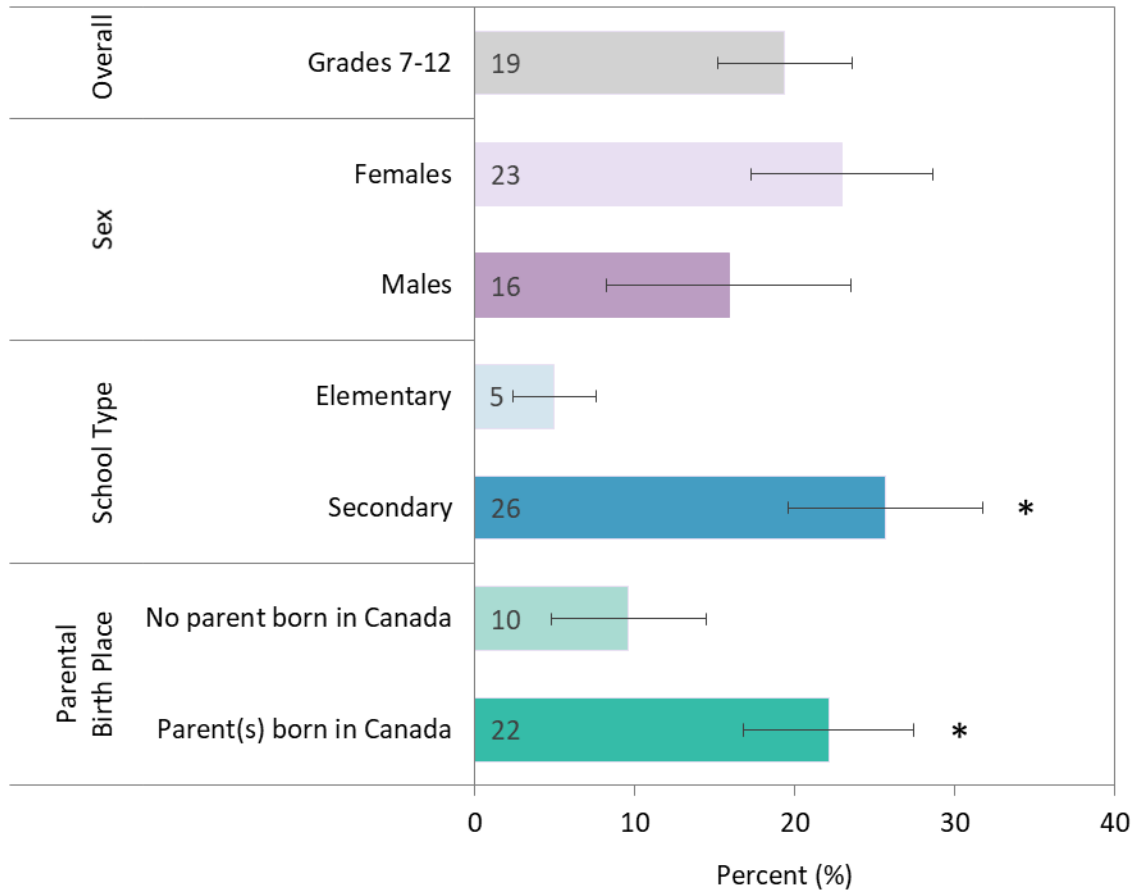
- In 2021, 9% of students in grades 7 to 12 reported smoking a tobacco cigarette in the past year (including only a few puffs).
- Secondary school students in grades 9 to 12 reported a past-year smoking prevalence of 11%.

### Vape Use

#### PAST YEAR USE

- Approximately one in five students in grades 7 to 12 (19%) reported using a vaping device (including a few puffs) in the past year (Figure 1).
- Students attending secondary school (grades 9–12) reported more than five-fold higher rate of past-year vaping (26%) compared to those attending elementary school (grades 7–8) (5%).
- Students with one or both parents born in Canada reported more than twofold higher rate of past-year vaping (22%) compared to students with neither parent born in Canada (10%).

**Figure 1: Vape Use (Past Year), by Demographics, Ontario, Grades 7–12, 2021**



Source: Ontario Student Drug Use and Health Survey

Note: Error bars represent 95% Confidence Intervals. \* Significant difference determined based on non-overlapping 95% confidence intervals.

### PAST MONTH USE

- In 2021, 12% of students in grades 7 to 12 reported using a vaping device (including a few puffs) in the past month.

### SUBSTANCES VAPED

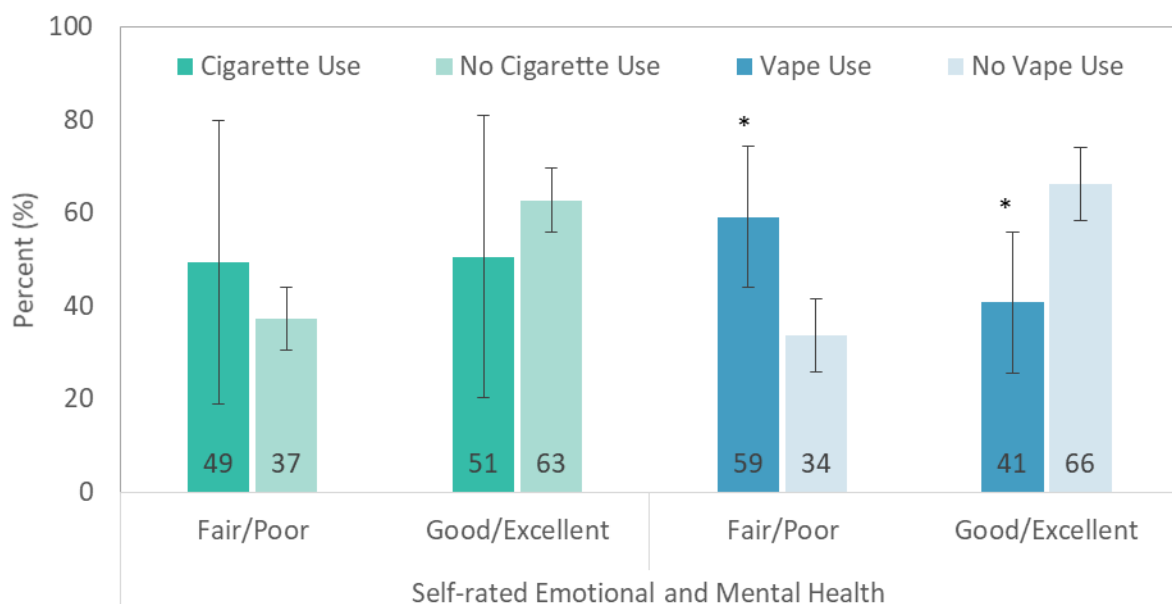
- The majority of students (57%) who used vaping devices in the past year reported vaping nicotine always (42%) or very often (16%). A less frequent (rarely or sometimes) pattern of nicotine usage was reported by 27%, while only 10% reported no use of nicotine.
- Among secondary students who vaped in the past year, 45% of students reported using cannabis in a vaping device during that same period.

### Self-rated Mental or Emotional Health

- The majority (59%) of students who used vaping devices in the past year rated their mental or emotional health as “fair” or “poor” compared to those who did not use any vaping device (34%) (Figure 2).

- Approximately three-fourths (74%) of the students who vaped in the past year reported that there was a time in the past year they wanted to talk to someone about a mental health or emotional problem, but did not know where to turn. This prevalence was twice as high as that reported by students who did not use vaping devices in the past year (37%).
- There was no significant difference in self-rated mental or emotional health among students who smoked cigarettes in the past year compared to those who did not use cigarettes (Figure 2). However, students who used cigarettes in the past year reported a prevalence of over two times that of their non-smoking peers in wanting to talk to someone about a mental health or emotional problem, but did not know where to turn (85% vs. 40%).

**Figure 2: Self-rated Mental and Emotional Health among Students who Used Cigarettes or Vaping Device (Past Year), Ontario, Grades 7–12, 2021**



Source: Ontario Student Drug Use and Health Survey

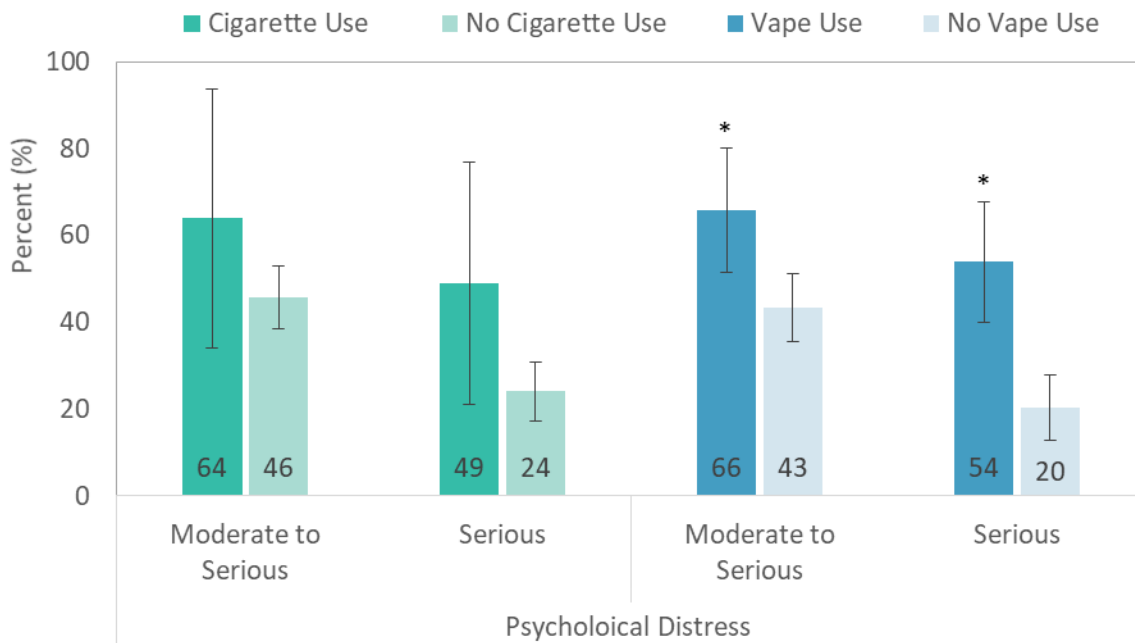
Note: Error bars represent 95% Confidence Intervals.

\* Significant difference determined based on non-overlapping 95% confidence intervals.

## Psychological Distress

- Students who used a vaping device in the past year reported higher psychological distress (symptoms of anxiety and depression) compared to those who did not use a vaping device (Figure 3).
- Two thirds of the students (66%) who used a vaping device in the past year indicated moderate to serious psychological distress in the past month. Over half of them (54%) reported serious psychological distress.
- Similar levels of psychological distress were reported among students who used cigarettes in the past year, with 64% experiencing moderate to serious distress and 49% reporting serious distress. However, these percentages did not differ significantly when compared to students who did not smoke cigarettes in the past year.

**Figure 3: Psychological Distress among Students who Used Cigarettes or Vaping Device (Past Year), Ontario, Grades 7–12, 2021**



Source: Ontario Student Drug Use and Health Survey

Note: Error bars represent 95% Confidence Intervals.

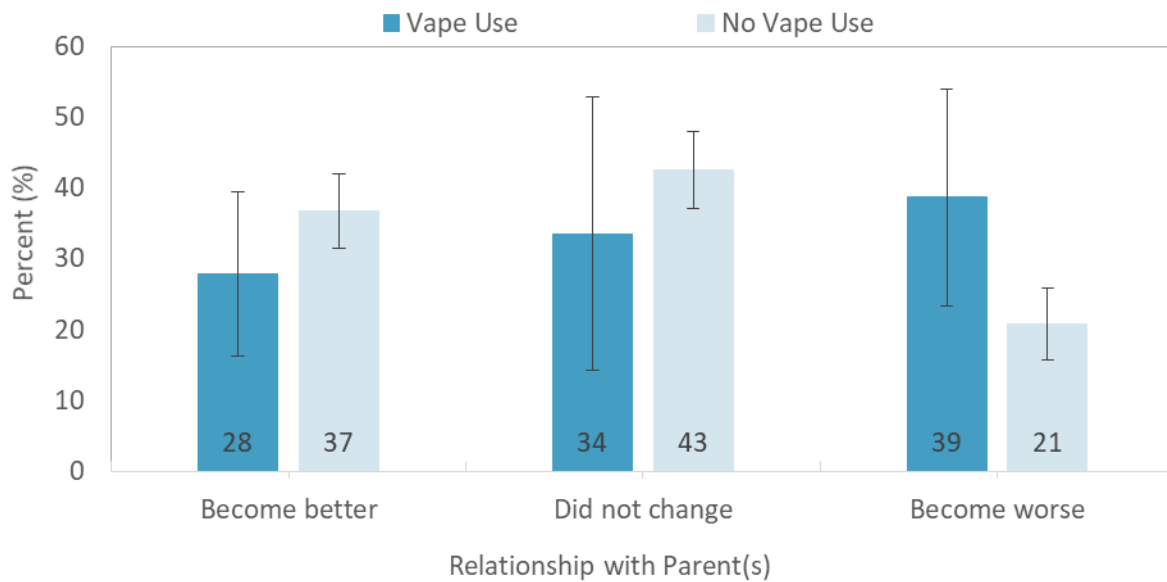
\* Significant difference determined based on non-overlapping 95% confidence intervals.

## COVID-19 Pandemic Experiences

### RELATIONSHIP WITH PARENTS

- During the COVID-19 pandemic, 39% of students who used a vaping device in the past year reported that their relationship with their parent(s) or guardian(s) became worse when they spent extra time at home, compared to those who did not use a vaping device in the past year (21%) (Figure 4).
- The estimates were unreliable to publish by past-year cigarette use.

**Figure 4: Relationship with Parent(s) during the COVID-19 Pandemic, by Vape Use, Ontario, Grades 7–12, 2021**



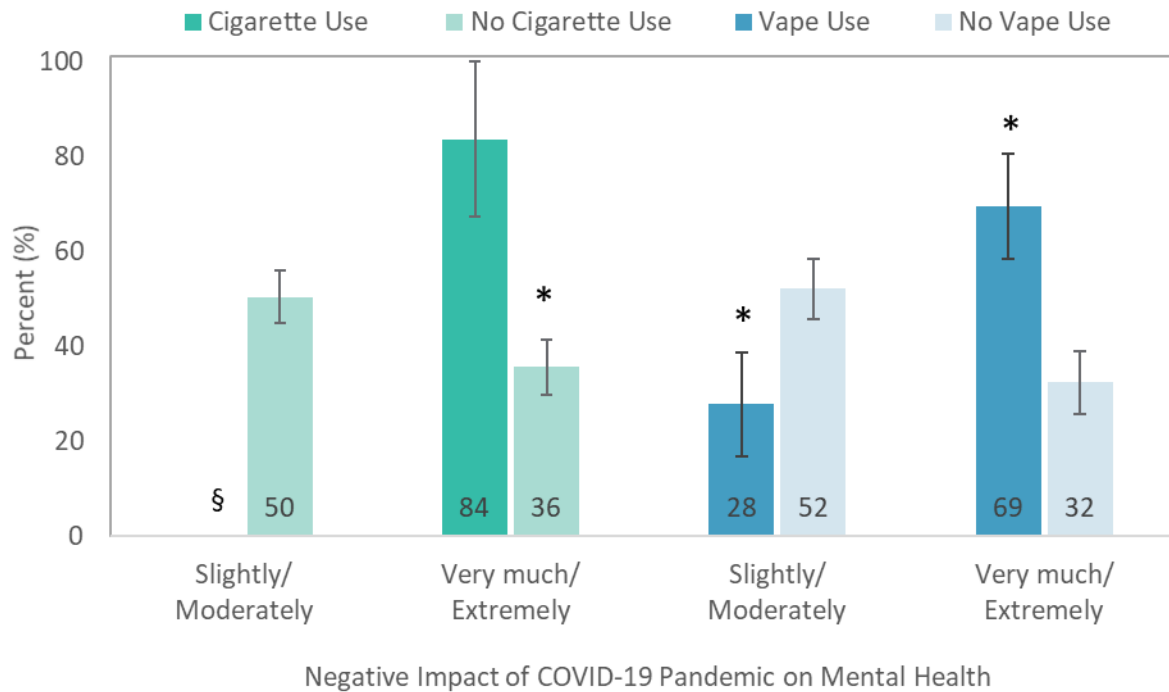
Source: Ontario Student Drug Use and Health Survey

Note: Error bars represent 95% Confidence Intervals.

### IMPACT ON MENTAL HEALTH

- A significantly higher percentage of students who used cigarettes or vaping device in the past year reported that the COVID-19 pandemic had negatively affected their mental health “very much” or “extremely” compared to their peers who did not report using cigarettes or vaping devices. The difference was more than twofold higher among students who used cigarettes (84% vs. 36%) and among those who used vaping devices in the past year (69% vs. 32%). (Figure 5).
- The majority of students who did not smoke cigarettes (50%) and did not use a vaping device (52%) in the past year reported that the pandemic had a slightly to moderately negative impact on their mental health.

**Figure 5: Negative Impact of COVID-19 Pandemic on Mental Health, by Cigarette and Vape Use, Ontario, Grades 7–12, 2021**



Source: Ontario Student Drug Use and Health Survey

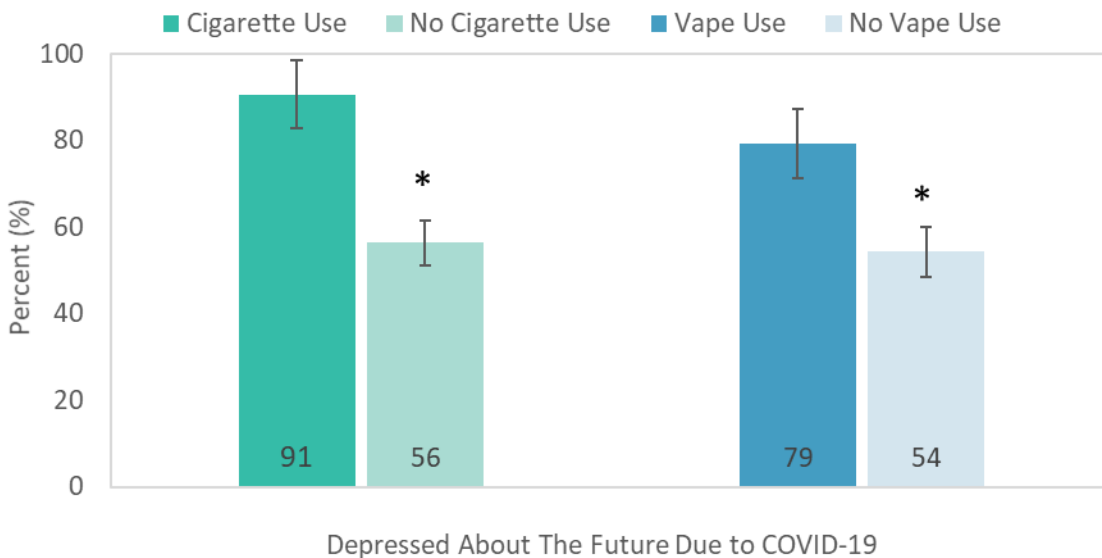
Note: Error bars represent 95% Confidence Intervals. §= Suppressed due to extreme sampling variability.

\* Significant difference determined based on non-overlapping 95% confidence intervals.

### EMOTIONS ABOUT THE FUTURE OF COVID-19 PANDEMIC

- Students who used cigarettes or vaping device in the past year reported higher rate of agreement with the statement “I feel depressed (sad) about the future because of COVID-19” compared to their peers who did not use cigarettes or vaping devices (Figure 6).
- The majority of students (91%) who smoked cigarettes in the past year agreed with the statement compared to students who did not smoke cigarettes (56%).
- Among students who used vaping device in the past year, 79% agreed that they felt depressed about the future because of COVID-19 compared to students who did not use a vaping device (54%).

**Figure 6: Depressed About the Future Because of COVID-19, by Cigarette and Vape Use, Ontario, Grades 7–12, 2021**



Source: Ontario Student Drug Use and Health Survey

Note: Error bars represent 95% Confidence Intervals..

\* Significant difference determined based on non-overlapping 95% confidence intervals.

## Perceived Ease of Access

- In 2021, 56% of students in grades 7 to 12 reported it was fairly easy or easy to obtain a vaping device, while 45% reported a similar ease to obtain a cigarette.
- Almost all students who smoked cigarettes in the past year (99%) and students who used vaping device in the past year (91%) reported that it was fairly easy or very easy to access the products they had used (Table 1).
- Approximately half of the students (46%) who did not use a vaping device in the past year believed it was fairly easy or easy to obtain a vaping device, while 40% of non-cigarette users reported a similar perceived ease to obtain cigarettes.

**Table 1: Perceived Ease of Access to Products, by Cigarette and Vape Use, Ontario, Grades 7-12, 2021**

Products	Very or Fairly Easy	Very or Fairly Difficult	Probably Impossible	Don't Know
<b>Access to cigarette</b>				
Cigarette user (Past Year)	99.3	§	§	§
Non-cigarette user	39.6	21.9	18	20.5



Products	Very or Fairly Easy	Very or Fairly Difficult	Probably Impossible	Don't Know
<b>Access to vaping device</b>				
Vape user (Past Year)	91.1	§	§	§
Non-vape user	46.4	21.1	15.9	16.6

Source: Ontario Student Drug Use and Health Survey

Note: §= Suppressed due to extreme sampling variability.

## Perceived Risk of Harm

- The majority of students who did not use cigarettes in the past year believed that individuals who smoke one or two tobacco cigarettes a day have a great risk (44%) or slight to medium risk (48%) for harming themselves physically or in other ways.
- Among students who did not use vaping devices in the past year, 55% believed that individuals who vape regularly have a great risk for harming themselves physically or in other ways. Additionally, 37% of these non-vape users perceived a slight to medium risk associated with regular vaping.
- Among students who vaped in the past year, 49% perceived a great risk associated with vaping regularly, while 45% believed in a slight to medium risk.

## Limitations

- The report's findings may not be representative of the population of Ontario students in the public school system. The 2021 OSDUHS cycle had a reduced response rate and a smaller sample size compared to previous cycles, likely due to changes in survey design, the shift to online surveys, and other changes made in response to the pandemic.<sup>15</sup> Although the report's findings have been weighted to match the Ontario population, it is advisable to exercise caution when asserting full representativeness.
- The report excludes students outside of the OSDUHS sampling frame (e.g., those in private schools or in institutionalized settings), who make up a small proportion (approximately 5%) of Ontario's student population in grades 7 to 12.<sup>15</sup>
- The self-reported and voluntary nature of the OSDUHS survey can lead to potential underestimation of cigarette and vape use, as well as other mental health issues. The underreporting may be attributed to social stigma and sensitivity around these topics. Furthermore, it is important to highlight that a substantial portion of the data collection took place after elementary and secondary schools in the province moved to remote learning on April 19, 2021.<sup>16</sup> This may have also led to potential underestimation, as surveys conducted in the homes among youth often show a lower prevalence of reported substance use and other behaviours associated with social stigma.<sup>15</sup>
- The cross-sectional nature of this report offers indications of association between cigarette or vape use and mental health problems, but does not allow us to establish causality.

# Technical Notes

## Data Source

- The data for this report were based on the 2021 cycle of the Ontario Student Drug Use and Health Survey (OSDUHS). It is a biennial survey of tobacco use, substance use, mental health, physical health, gambling, bullying, and other risk behaviours among grade 7–12 students in Ontario.<sup>14</sup>
- Due to the COVID-19 pandemic, the 2021 OSDUHS cycle was administered using online anonymous questionnaires from March to June 2021. A total of 2,225 students from 122 schools in 31 school boards participated in the survey.<sup>15</sup>
- Students enrolled in publically funded schools in Ontario were eligible to participate in the survey. Those in private schools, home-schooled, institutionalized for correctional or health reasons, schooled in First Nations communities, on military bases, or in the remote northern region of Ontario were excluded from the survey’s target population.<sup>15</sup>

## Indicators

### PRODUCT USE

- **Cigarette use:** Respondent smoked a few puffs or more in the last 12 months.
- **Vape use:** Respondent used a vaping device (e.g., electronic cigarette, vape pen, mod, tank, e-hookah, or vaporizer) to inhale a mist into the lungs at least once (including a few puffs) in the last 12 months (past year) or at least once in the past month.
- **Use of nicotine:** The frequency at which the respondent used nicotine in the past 12 months was measured through the following categories: did not vape nicotine when I vaped; rarely; sometimes; very often; always; and not sure if I vaped nicotine.
- **Use of cannabis in vaping device:** Respondent used cannabis in a vaping device (vaporizer, e-cigarette, vape pen, mod) in the past 12 months.

### MENTAL HEALTH

- **Self-rated mental or emotional health:** Respondents rated their mental and emotional health on a five-point scale: excellent; very good; good; fair; and poor.
- **Psychological Distress:** The *Kessler 6-Item Psychological Distress Scale (K6)* was used to measure unspecified psychological distress experienced during the past month.<sup>17</sup> Respondents reported how frequently they experienced the following six symptoms: felt nervous; hopeless; restless or fidgety; depressed; worthless; and felt that everything was an effort. Each item was scored from 0 (None of the time) to 4 (All of the time). A score of at least 8 of 24 was used to indicate a moderate-to-serious level of distress. A score of 13 or higher was classified as serious psychological distress. Those who did not respond to all six symptoms were excluded from the analysis.<sup>15</sup>

### COVID-19 PANDEMIC EXPERIENCES

- **Relationship with parents:** This indicator measured the impact of spending additional time at home during the COVID-19 pandemic on the relationship between the respondent and their

parent(s) or guardian(s). Respondents were asked to evaluate whether this experience resulted in their relationship becoming a lot better, a bit better, a bit worse, a lot worse, or remaining unchanged.

- **Impact on mental health:** Respondents reported their self-perceived negative impact of the COVID-19 pandemic on their mental health using a five-point scale: not affected my mental health at all; slightly; moderately; very much; and extremely.
- **Emotions about the future of the pandemic:** Assesses respondents level of agreement with the statement: "I feel depressed (sad) about the future due to COVID-19," using a four-point scale from "strongly agree" (1) to "strongly disagree" (4).

### PERCEIVED EASE OF ACCESS

- **Perceived Ease of Access to Products (Cigarette or Vaping Device):** Respondents reported their perceived ease of access to obtaining cigarettes or vaping devices if they wanted to using a four-point scale: very or fairly easy; very or fairly difficult; probably impossible; and don't know.

### PERCEIVED RISK OF HARM

- **Perceived Risk of Harm from Products (Cigarette or Vaping Device):** Respondents reported their perceived risk of harm to themselves (physically or in other ways) from smoking one or two tobacco cigarettes a day or vaping regularly using a five-point scale: great risk; medium risk; slight risk; no risk; and don't know.

### DEMOGRAPHICS

- **Sex:** Respondent's sex at birth reported as either male or female.
- **School type:** Respondent's grade level was categorized as either elementary (grades 7 and 8) or secondary school (grades 9–12).
- **Parental Birthplace:** The birth place of respondent's parents, reported as either two (or more) parents born in Canada, one parent born in Canada, or no parent born in Canada). Parents can be defined as anyone who the respondent considers to be a "parent", "mother" or "father". This could be their birth parents, adoptive parents, stepparents or foster parents.

## Data Analysis

- All analyses were conducted in SAS Enterprise Guide (version 8.2).
- All survey estimates were weighted to be representative of the target population and variance estimates and statistical tests were corrected for the complex sampling design.
- Significance tests between two estimates, including any directional statement (e.g., increase, decrease, higher, lower, etc.), were based on non-overlapping 95% confidence intervals.
- Estimates with values less than 0.5%, a base sample size of fewer than 50 students; or a coefficient of variation greater than 33.3 were suppressed due to their unreliability.<sup>15</sup>

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