Smoking and vaping among Canadian youth and adults in 2017 and 2019

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E-cigarettes remain a contentious topic in public health, with debates focussing on their benefits as a smoking cessation aid[1–3] versus potential increases in nicotine use among non-smoking young people.[4] Accordingly, the public health impact of e-cigarettes will be determined by who is using them and for what purpose.

To date, most studies exploring the prevalence of vaping have been conducted among either youth[5–10] or adults,[11–13] with little evidence on overall populations of vapers. Specifically, evidence is lacking regarding the relative contribution of youth and adults, smokers and never smokers, and how these groups have contributed to overall increases in vaping at the population level.

Evidence is also required to evaluate the impact of e-cigarette policies on patterns of vaping among these different groups. Canada represents an interesting case study given recent shifts in the regulatory framework for e-cigarettes.[14] Prior to May 2018, e-cigarettes containing nicotine could not be sold or marketed without approval; although no products were approved for legal sale, they were widely available.[15] In May 2018, the Tobacco and Vaping Products Act (TVPA) permitted the sale of nicotine-containing e-cigarettes, as well as wider advertising and promotion of e-cigarettes, which increased retail accessibility and the presence of international brands.[14] Studies have highlighted increases in youth vaping following implementation of the TVPA,[5 6] although there are few estimates on changes in vaping at the population level in Canada.

This study uses data from nationally representative surveys to examine how smoking and vaping evolved at the population level in Canada following the implementation of the TVPA.

METHODS

Data are from the 2019 Canadian Tobacco and Nicotine Survey (CTNS),[16] a national monitoring survey in Canada. Briefly, the CTNS is a probability-based sample of the general population of Canada aged 15 years or older (n=8600) and provides the most robust national estimates of e-cigarette prevalence in 2019.[16] The CTNS used methods similar to the previous national monitoring survey, the 2017 Canadian Tobacco, Alcohol and Drugs Survey (CTADS; n=16 349).[17] A summary of the CTNS and CTADS methods, measures and our analyses are provided in the online supplemental table S1. Briefly, we estimated the prevalence of smoking and vaping in Canada in 2017 and 2019 by age group, including vaping among never, current, and former smokers and smoking among vapers. We

also examined reasons for vaping, vaping nicotine and smoking quit attempts/success.

RESULTS

Between 2017 and 2019, the prevalence of current smoking among Canadians aged 15 years or older decreased from 15.1% (95% CI 13.7% to 16.6%) to 11.9% (11.0% to 12.8%), an estimated reduction from 4.56 million (4.12–5.01 million) to 3.67 million (3.38–3.96 million) current smokers. Prevalence of never smoking—defined as smoking fewer than 100 cigarettes in lifetime and not smoking within the past 30 days—increased from 59.2% (57.1% to 61.3%) to 63.7% (62.4% to 64.9%), while former smoking remained comparatively stable from 2017 (25.7%, 24.0% to 27.5%) to 2019 (24.5%, 23.4% to 25.6%). In 2019, current smoking prevalence was highest among adults aged 25 years or older (12.5%, 11.5% to 13.6%) and young adults aged 20–24 years (13.3%, 11.0% to 16.0%), compared with youth aged 15–19 years (5.1%, 3.8% to 6.7%).

The prevalence of past 30-day vaping among Canadians aged 15 years or older increased from 2.8% (an estimated 0.86, 0.681.04, million past 30-day vapers) to 4.7% (1.46,1.30 to 1.63, million) between 2017 and 2019, while daily vaping increased from 1.0% (0.29, 0.20 to 0.38, million daily vapers) to 2.1% (0.65,0.54 to 0.76, million) (table 1). The 2019 CTNS data indicate that the prevalence of vaping was highest among youth and young adults: past 30-day vaping among youth aged 15–19 years (15.1%) and young adults aged 20–24 years (15.2%) was more than five times that of adults aged 25 years or older (2.9%), with similar differences observed for daily vaping among youth (4.7%) and young adults (5.8%) versus adults (1.6%) (table 1).

Young people accounted for most of the increase in the prevalence of vaping between 2017 and 2019 (table 1). Of the estimated 0.60 million additional past 30-day vapers, 15- to 19-year-olds accounted for 49.8% of the increase, compared with 21.6% for 20- to 24-year-olds, and 28.6% for adults aged 25 years or older. Of the estimated 0.36 million additional daily vapers between 2017 and 2019, those aged 25 years or older accounted for 56.2% of the increase. However, these estimates had high variation and must be interpreted with caution. Estimates for increases in daily vaping among youth and young adults were unreportable due to high variation and low sample size.

The 2019 CTNS data also highlight that—while vaping prevalence was substantially higher among

Table 1 Prevalence of ever, past 30-day and daily e-cigarette use among Canadians aged 15 years or older in 2017 (CTADS) and 2019 (CTNS), overall and by smoking status and age group. N$_{2017}$=16 349, N$_{2019}$=8603. Data are weighted % (95% confidence intervals) and unweighted N.

	Ever e-cigarette use		Past 30-day e-cigarette use		Daily e-cigarette use	
	2017 (n=3060)	2019 (n=1600)	2017 (n=820)	2019 (n=509)	2017 (n=270)	2019 (n=220)
Overall	12.2 (11.0–13.5)	16.2 (15.3–17.2)	2.8 (2.3–3.5)	4.7 (4.2–5.3)	1.0 (0.7–1.3)	2.1 (1.8–2.5)
By age group						
15–19 years	21.3 (19.2–23.5)	36.0 (33.0–39.1)	6.3 (5.1–7.6)	15.1 (13.0–17.6)		4.7 (3.5–6.2)
20–24 years	26.1 (23.8–28.6)	48.2 (44.7–51.7)	6.0 (4.8–7.4)	15.2 (13.0–17.8)	–	5.8 (4.4–7.8)
25+ years*	10.2 (8.8–11.7)	11.9 (10.9–13.0)	2.3 (1.7–3.1)	2.9 (2.4–3.5)	–	1.6 (1.2–2.0)
25–34	–	27.1 (23.4–31.1)	–	6.5 (4.5–9.1)†	–	–
35–44	–	13.8 (11.6–16.4)	–	3.5 (2.5–5.1)†	–	–
45–54	–	9.8 (7.9–12.0)	–	2.9 (1.9–4.3)†	–	–
55–64	–	7.9 (6.4–9.8)	–	–	–	–
65+	–	3.5 (2.7–4.6)	–	–	–	–
By smoking status						
Current smoker	44.3 (38.5–50.1)	47.9 (43.9–52)	12.2 (9.3–15.8)	15.4 (12.8–18.5)	3.0 (2.0–4.4)†	6.1 (4.6–8.0)
Former smoker	9.4 (7.0–12.6)	13.0 (11.3–14.8)	2.2 (1.4–3.5)†	4.8 (3.8–6.0)	1.7 (1.0–2.9)†	4.0 (3.1–5.2)
Never smoker	6.7 (5.6–7.9)	11.6 (10.7–12.7)	0.7 (0.6–1.0)	2.7 (2.3–3.2)	0.1 (0.1–0.2)†	0.6 (0.4–0.8)
By age and smoking status						
15–19 years						
Current smoker	71.8 (62.1–79.8)	96.2 (85.9–99.1)	30.4 (23.4–38.5)	59.5 (44.7–72.8)	14.3 (9.8–20.5)†	–
Former smoker	–	–	–	–	–	–
Never smoker	17.8 (15.8–20)	31.9 (28.9–35.0)	4.1 (3.1–5.5)	11.9 (10.0–14.2)	–	3.2 (2.2–4.6)†
20–24 years						
Current smoker	68.4 (60.4–75.5)	85.7 (77–91.4)	21.7 (16.9–27.5)	43.4 (34.1–53.2)	5.2 (3.4–8.0)†	–
Former smoker	50.3 (32.6–68.0)	95 (85.5–98.4)	–	61.3 (45.1–75.3)	–	–
Never smoker	18 (15.9–20.4)	39.1 (35.3–42.9)	2.4 (1.5–3.7)†	7.7 (5.9–10.0)	–	–
25+ years*						
Current smoker	41.1 (34.7–47.8)	43.2 (38.8–47.7)	10.6 (7.5–14.7)†	11.5 (8.7–14.8)	–	6.1 (3.1–6.5)†
Former smoker	8.7 (6.3–12.0)	11.4 (9.8–13.3)	2.0 (1.2–3.4)†	3.8 (2.8–5.0)	1.5 (0.9–2.8)†	4.0 (2.5–4.5)
Never smoker	3.7 (2.5–5.3)†	5.6 (4.7–6.8)	–	–	–	–

Symbol – shows estimates unreportable due to low sample size and/or high variation (n<30 or coefficient of variance>33.3).
Canadian Tobacco, Alcohol and Drugs Survey (CTADS) 2017. Ever vaper: responded 'yes' to 'have you ever tried an e-cigarette, also known as an electronic cigarette?';
Past 30-day vaper: responded 'yes' to 'in the past 30 days did you use an e-cigarette?' OR responded 'every day' to 'at the present time, do you use an e-cigarette (also known as an electronic cigarette) every day, occasionally or not at all?'; **Daily vaper:** responded 'yes' to 'during the past 30 days, did you use an e-cigarette every day?' OR responded 'every day' to 'at the present time, do you use an e-cigarette (also known as an electronic cigarette) every day, occasionally or not at all?'; **Current smoker:** responded 'every day' or 'occasionally' to 'at the present time do you smoke cigarettes every day, occasionally, or not at all?'; **Former smoker:** responded 'not at all' to 'at the present time do you smoke cigarettes every day, occasionally, or not at all?' AND responded 'yes' to 'have you smoked at least 100 cigarettes in your life?'; **Never smoker:** responded "not at all" to "at the present time do you smoke cigarettes every day, occasionally, or not at all?" AND responded "no" to "have you smoked at least 100 cigarettes in your life?".
Canadian Tobacco and Nicotine Survey (CTNS) 2019. Ever vaper: responded 'yes' to 'have you ever tried vaping?'; **Past 30-day vaper:** responded 'daily', 'less than daily, but at least once a week', OR 'less than once a week, but at least once in the past month' to 'during the past 30 days, how often did you vape?'; **Daily vaper:** responded 'daily' to 'during the past 30 days, how often did you vape?' Ever vaper: responded 'yes' to 'have you ever tried vaping?'; **Current smoker:** responded 'daily' OR 'less than daily, but at least once in the past month' to 'during the past 30 days, how often did you smoke cigarettes?'; **Former smoker:** responded 'yes' to 'have you smoked at least 100 cigarettes (about four packs) in your life?' AND responded 'not at all' to 'during the past 30 days, how often did you smoke cigarettes?'; **Never smoker:** responded 'no' to 'have you ever smoked a whole cigarette?' OR responded 'yes' to 'have you ever smoked a whole cigarette?' AND responded 'no' to 'have you smoked at least 100 cigarettes (about four packs) in your life?' AND responded 'not at all' to 'during the past 30 days, how often did you smoke cigarettes?'.
*Age categories grouped due to low cell sizes and/or the large number of unreportable estimates.
†Caution, high variation for estimate (coefficient of variance 16.6%–33.3%).

current and former smokers—never smokers accounted for a considerable proportion of the vaping population in Canada. The prevalence of past 30-day vaping was 15.4% among current smokers and 4.8% among former smokers, compared with 2.7% among never smokers, with a similar pattern for daily vaping (6.1%, 4.0%, 0.6%, respectively). However, never smokers accounted for more than one-third of all past 30-day vapers (36.7%; 0.54, 0.45 to 0.62, million) and approximately one-fifth of daily vapers (18.7%; 0.12, 0.08 to 0.16, million) (online supplemental table S2). Among youth and young adults, who had the highest vaping prevalence, never smokers accounted for 73.9% of 15- to 19-year-old past 30-day vapers, 63.4% of 15- to

19-year-old daily vapers and 41.1% of 20- to 24-year-old past 30-day vapers (online supplemental table S2).

In addition, never smokers accounted for most (67.2%) of the increase in past 30-day vaping between 2017 and 2019, compared with 0.5% for current smokers. In terms of daily vapers, current smokers accounted for 24.4% of the increase between 2017 and 2019. However, as above, there was high variation for these estimates, and estimates for increases in daily vaping among never smokers and former smokers were unreportable.

The prevalence of never smokers who vape is reflected in the self-reported reasons for vaping. In 2019, 27.9% of past 30-day and 49.0% of daily vapers reported that their main reason for

vaping was quitting or avoiding returning to smoking, while an additional 9.3% of past 30-day vapers and 7.3% of daily vapers used e-cigarettes to reduce smoking(online supplemental table S3). In other words, more than half of all past 30-day vapers and almost half of daily vapers in Canada reported using e-cigarettes for reasons other than smoking abstinence or reduction (online supplemental table S3). However, the majority of current smokers (54.4%) and former smokers (64.2%) reported using e-cigarettes to quit smoking, stay quit or reduce their smoking.

Data also indicate the wide availability of nicotine-containing e-cigarettes before they could legally be sold. In 2017, 78.1% (70.0% to 84.5%) of past 30-day vapers reported that the last e-cigarette they vaped contained nicotine. In 2019, 84.1% (79.1% to 88.1%) of Canadian vapers had vaped an e-cigarette containing nicotine in the past 30 days.

Finally, the 2019 CTNS data suggest that the proportion of smokers in Canada that attempted to quit and were successful in their quit attempt changed very little over the previous 2 years. Overall, 44.7% of current and recent former smokers had attempted to quit smoking at least once in the past year, of whom 11.5% were still abstinent at the time of survey. These estimates were largely unchanged from 2017 (43.9% and 12.3%, respectively).

DISCUSSION

Findings indicate an overall decline in smoking and increase in vaping among the general population in Canada following implementation of the TVPA in 2018, consistent with anecdotal reports, sales data[18] and historical estimates.[5 19] Smoking was most prevalent among adults aged 25 years or older, while much of the increase in vaping between 2017 and 2019 in Canada was due to increasing use among never smokers, youth and young adults. These findings are similar to patterns of vaping in the USA, in which current vaping[13] and the greatest increases in vaping were observed among young adults, more than half of whom were never smokers.[20]

While e-cigarettes can serve as an effective smoking cessation aid,[1–3] many smokers in CTNS reported using e-cigarettes to quit or reduce their smoking, and smoking declined overall between 2017 and 2019, there was limited evidence at the population level in Canada that quit attempts or quit success have changed alongside increased vaping prevalence. In fact, population-level cessation patterns, in regard to the proportion of smokers who attempt to quit and their cessation success, have remained remarkably constant in Canada over the past 20 years, including the years before the emergence of e-cigarettes.[19] The current evidence cannot speak to potential substitution/displacement effects among youth given that smoking prevalence has been declining among Canadian youth for several decades and at a similar rate in the 'pre' and 'post' vaping periods.[19]

It is important to note that the 2019 CTNS and the 2017 CTADS used different data collection methods (predominantly online vs telephone), were conducted in different months (November to December vs February to December) and had different sample sizes (n=8600 vs n=16 349). These methodological differences may affect direct comparisons across years; however, both surveys were designed to produce nationally representative estimates and provide the best available indictors of smoking and vaping prevalence in Canada. Neither survey included individuals younger than the age of 15 years, which would have resulted in an estimated additional 120 000 past 30-day vapers.[10] Specific age groups over 24 years also could not be compared due to low sample size and/or high variation.

Neither survey included residents of the three Canadian territories, so these results may not generalise throughout all of Canada.

Findings demonstrate that never smokers, youth and young adults accounted for most of the increase in vaping in Canada between 2017 and 2019, suggesting that e-cigarettes must be better targeted toward adult smokers for the purpose of quitting smoking. In Canada, a range of new regulatory measures are being implemented, including restrictions on flavour, nicotine concentration, marketing and retail access. There is an urgent need to evaluate the impact of these policy measures on vaping and smoking among young people and smokers/former smokers for the purpose of quitting smoking. Finally, future research should examine population-level trends across countries with different regulatory environments, to better understand the use of e-cigarettes across age groups and by smoking status.

What this paper adds

⇒ In May 2018, Canada changed their regulatory framework for e-cigarettes and permitted the sale of nicotine-containing e-cigarettes and e-cigarette advertising/promotion.
⇒ Studies have highlighted increases in youth vaping following Canada's new framework, but there is little research at the population level. This study is therefore the first to examine how smoking and vaping evolved between 2017 and 2019, using data from two nationally representative surveys.
⇒ Between 2017 and 2019, the prevalence of current smoking among Canadians decreased (15.1%–11.9%) and, in 2019, current smoking was higher among adults than youth.
⇒ Between 2017 and 2019, the prevalence of vaping doubled in Canada (past 30-day: 2.8%–4.7%, daily: 1.0%–2.1%). Never smokers, youth, and young adults accounted for most of this increase.
⇒ In 2019, over half of all past 30-day vapers and almost half of daily vapers reported using e-cigarettes for reasons other than smoking cessation, abstinence or reduction.
⇒ Findings suggest that e-cigarettes should be better targeted toward adult smokers for the purpose of smoking cessation in Canada.

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REFERENCES
1 Brown J, Beard E, Kotz D, *et al*. Real-World effectiveness of e-cigarettes when used to aid smoking cessation: a cross-sectional population study. *Addiction* 2014;109:1531–40.
2 Hajek P, Phillips-Waller A, Przulj D. A randomized trial of e-cigarettes versus nicotine-replacement therapy. *N Engl J Med* 2019.

3   Eisenberg MJ, Hébert-Losier A, Windle SB, *et al*. Effect of e-cigarettes plus counseling vs counseling alone on smoking cessation: a randomized clinical trial. *JAMA* 2020;324:1844–54.

4   U.S, Health Dof, Services H. *E-Cigarette use among youth and young adults: a report of the surgeon General*, 2016.

5   Hammond D, Rynard VL, Reid JL. Changes in prevalence of Vaping among Youths in the United States, Canada, and England from 2017 to 2019. *JAMA Pediatr* 2020;174:797–800.

6   Cole AG, Aleyan S, Battista K, *et al*. Trends in youth e-cigarette and cigarette use between 2013 and 2019: insights from repeat cross-sectional data from the COMPASS study. *Can J Public Health* 2021;112:60–9.

7   Bauld L, MacKintosh AM, Eastwood B, *et al*. Young people's use of e-cigarettes across the United Kingdom: findings from five surveys 2015-2017. *Int J Environ Res Public Health* 2017;14. doi:10.3390/ijerph14090973. [Epub ahead of print: 29 Aug 2017].

8   Yoong SL, Stockings E, Chai LK, *et al*. Prevalence of electronic nicotine delivery systems (ends) use among youth globally: a systematic review and meta-analysis of country level data. *Aust N Z J Public Health* 2018;42:303–8.

9   Wang TW, Neff LJ, Park-Lee E, *et al*. E-cigarette Use Among Middle and High School Students - United States, 2020. *MMWR Morb Mortal Wkly Rep* 2020;69:1310–2.

10 Health Canada. Canadian student tobacco, alcohol and drugs survey (CSTADS), 2019. Available: https://www.canada.ca/en/health-canada/services/canadian-student-tobacco-alcohol-drugs-survey.html

11 West R, Beard E, Kale D. *Trends in electronic cigarette use in England (smoking toolkit study)*, 2020.

12 Dai H, Leventhal AM. Prevalence of e-cigarette use among adults in the United States, 2014-2018. *JAMA* 2019;322:1824–7.

13 Cornelius ME, Wang TW, Jamal A, *et al*. Tobacco Product Use Among Adults - United States, 2019. *MMWR Morb Mortal Wkly Rep* 2020;69:1736–42.

14 Government of Canada. Tobacco and vaping products act, 2018. Available: https://laws-lois.justice.gc.ca/eng/acts/T-11.5/

15 Hammond D, White CM, Czoli CD, *et al*. Retail availability and marketing of electronic cigarettes in Canada. *Can J Public Health* 2015;106:e408–12.

16 Statistics Canada. Canadian tobacco and nicotine survey (CTNS), 2020. Available: https://www23.statcan.gc.ca/imdb/p2SV.pl?Function=getSurvey&SDDS=53052019

17 Statistics Canada. Canadian tobacco, alcohol and drugs survey (CTADS), 2018. Available: https://www23.statcan.gc.ca/imdb/p2SV.pl?Function=getSurvey&SDDS=4440

18 The vaping market in Canada, 2019. *CPHA tobacco and vaping control forum; 2020 Sept 23*. Canada, 2020.

19 Reid JL, Hammond D, Tariq U. *Tobacco use in Canada: patterns and trends*. 2019 ed. Waterloo, ON: Propel Centre for Population Health Impact, University of Waterloo, 2019.

20 Bandi P, Cahn Z, Goding Sauer A, *et al*. Trends in e-cigarette use by age group and Combustible cigarette smoking histories, U.S. adults, 2014-2018. *Am J Prev Med* 2021;60:151–8.

Supplemental material

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METHODS

Survey designs and samples

Data for 2019 are from the Canadian Tobacco and Nicotine Survey (CTNS), a survey of the general population of Canada age 15+ years (n=8,600) conducted by Statistics Canada. CTNS used probability-based sampling methods. Data were collected in November and December 2019, primarily via online surveys, with telephone surveys for those who did not respond online. Further information about the 2019 CTNS is available online via Statistics Canada (https://www23.statcan.gc.ca/imdb/p2SV.pl?Function=getSurvey&SDDS=5305).

Data for 2017 are from the 2017 Canadian Tobacco, Alcohol and Drugs Survey (CTADS), a now-defunct survey of the general population of Canada age 15+ years (n=16,349) conducted by Statistics Canada. CTADS also used probability-based sampling methods. Data were collected between February and December 2017 via telephone interviews. Further information about the 2017 CTADS is available online via Statistics Canada (https://www23.statcan.gc.ca/imdb/p2SV.pl?Function=getSurvey&SDDS=4440).

Both CTADS and CTNS excluded residents of the three Canadian territories (Yukon, Northwest Territories and Nunavut), as well as full-time residents of institutions.

Measures

The vaping and smoking measures from each survey are shown in Table S1 below. There were some differences in wording between surveys. For example, past 30-day and daily vaping and smoking status were based on a measure of past 30-day use in the 2019 CTNS, but based on a measure of use 'at the present time' in the 2017 CTADS.

We did not explore reasons for e-cigarette use in the 2017 CTADS sample because the measures were not comparable with the 2019 CTNS. In the 2017 CTADS, reasons for use consisted of "select all that apply" response options, whereas the 2019 CTNS data were mutually exclusive (see measures below).

Analyses

First, we report (in the manuscript text) prevalence estimates for smoking (never, former, current) for each survey year, overall and by age group. Second, we report prevalence estimates for vaping (ever, past 30-day, daily) for each survey year, overall and by age group and smoking status (Table 1). Third, we report prevalence estimates for smoking status (current, former, never smoker) among vapers (ever, past 30-day, daily) in the 2019 CTNS sample only, split by age group (Table S2). Fourth, among past 30-day vapers in the 2019 CTNS sample only, we report prevalence estimates for reasons for e-cigarette use, split by age group, smoking status, and daily vaping (Table S3). Fifth, we report (in the manuscript text) use of nicotine-containing e-cigarettes among past 30-day vapers. Sixth, we report (in the manuscript text) quit attempts and success among current smokers and former smokers who quit in the past year, by survey year.

Analyses were conducted in Stata v16. All estimates are reported with 95% confidence intervals. Stata's svy command with bootstrap survey weights (provided by Statistics Canada) was used to calculate nationally representative population estimates (% and n). The contributions of different age and smoking status groups to changes in vaping between 2017 and 2019 were calculated in two steps: 1) subtracting the number of vapers in 2017 from the number of vapers in 2019 overall and per age and smoking status group; 2) dividing the change

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in number of vapers per group by the change in number of vapers overall. The coefficients of variance (CVs) for each estimate were also explored using Stata's svy command. Estimates were suppressed where CVs were >33.3%. Estimates were accompanied with a warning where CVs were 16.6%-33.3% inclusive, consistent with Statistics Canada's recommendations. Due to low cell sizes (n<30) and/or large CVs (>33.3%), we grouped all age groups for adults 25 and older (25-34, 35-44, 45-54, 55-64, 65+) together for analyses.

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Table S1. Measures used in the 2019 CTNS and the 2017 CTADS surveys.

	CTNS 2019	CTADS 2017
VAPING		
Ever vaped	Responded "Yes" to "Have you ever tried vaping?" (other response option: "No")	Responded "Yes" to "Have you ever tried an e-cigarette, also known as an electronic cigarette?" (other response option: "No")
Past 30-day vaping	Responded "Yes" to "Have you ever tried vaping?" (other response option: "No") AND responded "Daily", "Less than daily, but at least once a week", or "Less than once a week, but at least once in the past month" to "During the past 30 days, how often did you vape?" (other response option: "Not at all")	Responded "Yes" to "Have you ever tried an e-cigarette, also known as an electronic cigarette?" (other response option: "No") AND responded "Yes" to "In the past 30 days did you use an e-cigarette?" (other response option: "No") OR responded "Every day" to "At the present time, do you use an e-cigarette (also known as an electronic cigarette) every day, occasionally or not at all?" (other response options: "occasionally", "not at all")
Daily vaping	Responded "Yes" to "Have you ever tried vaping?" (other response option: "No") AND responded "Daily" to "During the past 30 days, how often did you vape?" (other response option: "Not at all")	Responded "Yes" to "Have you ever tried an e-cigarette, also known as an electronic cigarette?" (other response option: "No") AND responded "Yes" to "During the past 30 days, did you use an e-cigarette every day?" (other response option: "No") OR responded "Every day" to "At the present time, do you use an e-cigarette (also known as an electronic cigarette) every day, occasionally or not at all?" (other response options: "occasionally", "not at all")
Reasons for vaping (among past 30-day vapers only)	Currently, what is your main reason for vaping? • To quit smoking cigarettes • To avoid returning to smoking cigarettes • To cut down on smoking cigarettes • By curiosity, you just wanted to try it • Because you enjoy it • To reduce stress or calm you down • To use when you cannot/are not allowed to smoke cigarettes • cigarettes • Other	Not included as not comparable.
Vaped nicotine-containing e-cigarettes (among past 30-day vapers only)	Responded "1-30" when asked "During the past 30 days, on how many days did you vape the following products? An e-liquid with nicotine" (other response option: "0")	Responded "Yes" to "The last time you used an e-cigarette, did it contain nicotine?" (other response options: "no", "uncertain", "refused")

Table S1 continued below.

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Table S1 (continued). Measures used in the 2019 CTNS and the 2017 CTADS surveys

	CTNS 2019	CTADS 2017
SMOKING		
Current smoker	Responded "Yes" to "Have you ever smoked a whole cigarette?" (other response option: "No") AND responded "Daily" or "Less than daily, but at least once in the past month" to "During the past 30 days, how often did you smoke cigarettes?" (other response options: "not at all")	Responded "Every day" or "Occasionally" to "At the present time do you smoke cigarettes every day, occasionally, or not at all?" (other response options: "not at all")
Former smoker	Responded "Yes" to "Have you ever smoked a whole cigarette?" (other response option: "No") AND responded "Yes" to "Have you smoked at least 100 cigarettes (about 4 packs) in your life?" (other response option: "No") AND responded "Not at all" to "During the past 30 days, how often did you smoke cigarettes?" (other response options: "daily", "Less than daily, but at least once in the past month")	Responded "Yes" to "Have you smoked at least 100 cigarettes in your life?" 9other response option: "No") AND Responded "Not at all" to "At the present time do you smoke cigarettes every day, occasionally, or not at all?" (other response options: "every day", "occasionally")
Never smoker	Responded "No" to "Have you ever smoked a whole cigarette?" (other response option: "No") -- OR Responded "Yes" to "Have you ever smoked a whole cigarette?" (other response option: "No") AND responded "No" to "Have you smoked at least 100 cigarettes (about 4 packs) in your life?" (other response option: "Yes") AND responded "Not at all" to "During the past 30 days, how often did you smoke cigarettes?" (other response options: "daily", "Less than daily, but at least once in the past month")	Responded "No" to "Have you smoked at least 100 cigarettes in your life?" (other response option: "yes") AND Responded "Not at all" to "At the present time do you smoke cigarettes every day, occasionally, or not at all?" (other response options: "every day", "occasionally")
Quit attempts (among former smokers who quit <1 year ago and all current smokers)	Responded "1 time", "2 or 3 times", or "4 or more times" to" During the past 12 months, how many times have you stopped smoking cigarettes for one day or longer because you were trying to quit smoking?" (other response option: "0 times")	Responded "1 time", "2 or 3 times", or "4 or more times" to" In the past year, how many times did you stop smoking for at least 24 hours because you were trying to quit?" (other response option: "0 times")
Quit success (among those who had made a quit attempt)	Had made a quit attempt (see above) and were former smokers at the time of the survey.	Had made a quit attempt (see above) and were former smokers at the time of the survey.

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Supplemental material

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SUPPLEMENTARY MATERIAL
Prevalence of e-cigarette use and reasons for use among Canadian youth and adults | East, K., Reid, J., Hammond, D.

Table S2. <u>Smoking status of ever vapers, past 30-day vapers, and daily vapers overall and by age group</u> among Canadians age 15+ in 2019 (CTNS). Data are % (95% confidence intervals). All data except n (unweighted sample size) are weighted.

	Ever vapers (n=1,598)			Past 30-day vapers (n=508)			Daily vapers (n=220)		
	Never smoker (n=804)	Former smoker (n=294)	Current smoker (n=500)	Never smoker (n=217)	Former smoker (n=116)	Current smoker (n=175)	Never smoker (n=51)	Former smoker (n=94)	Current smoker (n=75)
ALL	45.7 (42.5-49.0)	19.6 (17.2-22.3)	34.7 (31.4-38.1)	36.7 (31.6-42.1)	25.0 (20.3-30.3)	38.3 (32.8-44.2)	18.7 (13.8-24.7)	47.0 (38.5-55.6)	34.4 (27.0-42.7)
15-19 years	83.0 (78.7-86.6)	-	12.8 (9.6-16.9)	73.9 (66.5-80.1)	-	19.6 (14.1-26.6)	63.4 (48.9-75.8)	-	-
20-24 years	66.2 (61.2-70.9)	10.3 (7.5-14)	23.5 (19.4-28.1)	41.1 (32.6-50.3)	ᵃ 21.0 (14.4-29.4)	37.9 (29.7-46.9)	-	-	-
25+ years*	28.1 (23.8-32.8)	27.1 (23.4-31.2)	44.8 (39.9-49.8)	-	36.8 (28.6-45.7)	48.9 (39.5-58.4)	-	60.5 (48.5-71.3)	35.9 (25.5-47.9)

- Estimate unreportable due to high variation (N<30 or coefficient of variance >33.3)
ᵃ Caution, variation for estimate (coefficient of variance 16.6-33.3%).
*Age categories grouped due to low cell sizes and/or the large number of unreportable estimates
CTNS 2019. **Ever vaper:** responded "yes" to "have you ever tried vaping?"
     Past-30-day vaper: responded "daily", "less than daily, but at least once a week", OR "less than once a week, but at least once in the past month" to "during the past 30 days, how often did you vape?"
     Daily vaper: responded "daily" to "during the past 30 days, how often did you vape?"
     Current smoker: responded "daily" OR "less than daily, but at least once in the past month" to "during the past 30 days, how often did you smoke cigarettes?"
     Former smoker: responded "yes" to "have you smoked at least 100 cigarettes (about 4 packs) in your life?" AND responded "not at all" to "during the past 30 days, how often did you smoke cigarettes?
     Never smoker: responded "no" to "have you ever smoked a whole cigarette?" – OR responded "yes" to "have you ever smoked a whole cigarette?" AND responded "no" to ""have you smoked at least 100 cigarettes (about 4 packs) in your life?" AND responded "not at all" to "during the past 30 days, how often did you smoke cigarettes?"

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SUPPLEMENTARY MATERIAL
Prevalence of e-cigarette use and reasons for use among Canadian youth and adults | East, K., Reid, J., Hammond, D.

Table S3. <u>Reasons for e-cigarette use</u> among Canadians age 15+ in 2019 (CTNS) who vaped in the past 30 days, overall and by smoking status and age group, and among daily users. Data are % (95% confidence intervals). All data except n (unweighted sample size) are weighted. N=580.

	*To quit/avoid returning to/reduce smoking	*To quit/avoid returning to smoking	Curiosity	Because you enjoy it	Reduce stress or calm down	To use when cannot smoke	Other
Overall	37.1 (31.7-42.9)	27.9 (22.8-33.5)	19.6 (15.6-24.3)	19.5 (14.8-25.3)	13.3 (10.2-17.2)	-	9.1 (6.6-12.4)
By age group							
15-19 years	-	-	29.5 (22.9-37.0)	29.0 (22.4-36.6)	21.2 (15.4-28.4)	-	-
20-24 years	28.5 (20.7-37.7)	ᵃ 21.9 (15.1-30.8)	27.1 (19.8-35.8)	-	-	-	-
25+ years	56.3 (46.6-65.5)	41.7 (32.6-51.3)	-	-	-	-	-
By smoking status							
Current smoker	54.4 (44.1-64.3)	30.9 (22.3-41.1)	-	ᵃ 18.1 (10.3-29.8)	-	-	-
Former smoker	64.2 (52.2-74.6)	63.0 (51.2-73.4)	-	-	-	-	-
Never smoker	-	-	39.2 (31.2-47.8)	25.4 (18.4-33.9)	22.8 (16.8-30.1)	-	-
Daily vapers only	ᵃ 56.4 (48.1-64.3)	ᵃ 49.0 (40.8-57.4)	-	ᵃ 17.7 (12.4-24.5)	ᵃ 16.2 (11.2-22.8)	-	-

- Estimate unreportable due to high variation (N<30 or coefficient of variance >33.3)
ᵃ Caution, variation for estimate (coefficient of variance 16.6-33.3%).
*Grouped reasons
CTNS 2019. **Reasons for vaping:** "currently, what is your main reason for vaping?" with response options: "To quit smoking cigarettes," "To avoid returning to smoking cigarettes," "To cut down on smoking cigarettes," "By curiosity, you just wanted to try it," "Because you enjoy it," "To reduce stress or calm you down," "To use when you cannot/are not allowed to smoke cigarettes," "Other"
Daily vaper: responded "daily" to "during the past 30 days, how often did you vape?"
Current smoker: responded "daily" OR "less than daily, but at least once in the past month" to "during the past 30 days, how often did you smoke cigarettes?"
Former smoker: responded "yes" to "have you smoked at least 100 cigarettes (about 4 packs) in your life?" AND responded "not at all" to "during the past 30 days, how often did you smoke cigarettes?
Never smoker: responded "no" to "have you ever smoked a whole cigarette?" – OR responded "yes" to "have you ever smoked a whole cigarette?" AND responded "no" to ""have you smoked at least 100 cigarettes (about 4 packs) in your life?" AND responded "not at all" to "during the past 30 days, how often did you smoke cigarettes?"