

Original quantitative research

Predictors of pod-type e-cigarette device use among Canadian youth and young adults

Safa Ahmad, MPH; Tianru Wang, MPH; Robert Schwartz, PhD; Susan J. Bondy, PhD

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Abstract

Introduction: Changes to federal legislation allowed nicotine-based e-cigarettes legal entry into the Canadian market in 2018. This included pod-type e-cigarettes (pods), such as JUUL, that were later found to be associated with steeply increasing prevalence and greater frequency of e-cigarette use among US and Canadian youth. Multiple studies of risk factors of JUUL use and use initiation have been conducted among various population groups in the US, but little evidence exists pointing to similar risk factors of pod use among Canadian youth and young adults. Understanding these risk factors can inform use prevention and intervention strategies in Canadian and other jurisdictions.

Methods: A total of 668 Canadian youth and young adults recruited by the 2018-19 Youth and Young Adult Panel Study were provided a baseline survey 3 months before and a follow-up survey 9 months after the relaxation of federal nicotine e-cigarette regulations. We used multivariable logistic regression to understand and rank importance of baseline predictors of future pod use among respondents.

Results: Past-month cannabis use (OR [odds ratio] = 2.66, 95% CI: 1.66–4.21, $p < 0.001$), established cigarette use (OR = 3.42, 1.53–7.65, $p < 0.01$), past cigarette experimentation (OR = 2.40, 1.34–4.31, $p < 0.01$), having many friends who vaped (OR = 2.15, 1.37–3.34, $p < 0.001$), age below 18 compared to age over 22 (OR = 5.26, 2.63–10.00, $p < 0.001$) and male sex (OR = 1.69, 1.16–2.50, $p < 0.01$) were significant and the most influential predictors of future pod use.

Conclusion: Similar factors drove pod use among Canadian and US youth and young adults. Appropriate preventive strategies can benefit from considering polysubstance use among high school-aged youth.

Keywords: *vaping, nicotine, electronic nicotine delivery systems, risk factors, Canada, young adult, adolescent, cannabis*

Introduction

In May 2018, the *Tobacco and Vaping Products Act* allowed nicotine-based e-cigarettes legal entry into the Canadian market without requiring premarket approval.¹ Market liberalization was accompanied by increased exposure to e-cigarette promotion among Canadian youth between 2017 and 2019.² It also coincided with the beginning of sharp increases in the prevalence and frequency

of e-cigarette use: in 2019, the proportion of a national sample of Canadian youth aged 16 to 19 who indicated vaping for 20 days or more in the past month was more than three times the proportion in 2017.³ The proportion of Canadians aged 15 to 19, 20 to 24 and 25 and up indicating they vaped in the past month remained roughly constant between 2019 and 2020.^{4,5}

With its lightweight and ultraportable design, the latest-generation e-cigarette

Highlights

- Cannabis use, cigarette smoking or past experimentation, male sex, age below 18 and having friends who vape all significantly increased the likelihood that a Canadian youth or young adult in our sample was to use pod-type nicotine e-cigarettes such as JUUL after the products legally entered the Canadian market in mid-2018.
- These factors have also been identified either as predictors of future pod use or characteristics of current pod users in various US studies.

device, namely the pod-type e-cigarette (“pod”), is engineered for convenient use.⁶ A combined free-nicotine and nicotine salt-based formulation helps increase efficiency of nicotine delivery by reducing its harsh impact on the upper respiratory system, potentially enabling repeated and increased nicotine intake and facilitating dependence.^{7,8} The most well-known pod brand, JUUL, accounted for nearly 80% of the retail e-cigarette market in the United States by the end of 2018.⁹ In a nationally representative longitudinal sample of US youth and young adults, JUUL use and more frequent e-cigarette use both increased significantly between 2018 and 2019.¹⁰ Similar findings resulted from repeat national samples of Canadian adolescents, wherein 17.7% of past-30-day e-cigarette users indicated using JUUL in 2019, compared to 10.3% in 2018.⁷

Upward trends in frequency of vaping add to the severity of the risks e-cigarettes

Author reference:

Ontario Tobacco Research Unit, Dalla Lana School of Public Health, University of Toronto, Toronto, Ontario, Canada

Correspondence: Safa Ahmad, Ontario Tobacco Research Unit, Dalla Lana School of Public Health, 155 College St., Toronto, ON M5T 3M7; Tel: 647-208-6100; Email: safa.ahmad@mail.utoronto.ca

pose to youth and young adults. Daily use of psychoactive or rewarding substances and use on a high proportion of days are associated with dependence, decreased probability of quitting and increased risk of any adverse health effect due to dose. These links are well demonstrated for cigarette smoking^{11,12} and increasingly demonstrated with e-cigarettes.¹³

Understanding predictors of initiation of pod use can help identify groups of youth at high risk of frequent exposure to nicotine via e-cigarettes. Previous studies of the correlates of JUUL use among US youth and subpopulations have identified cigarette use,^{10,14,15} lower harm perception,^{14,16} sensation seeking,^{10,14} peers' and household members' use,^{10,14,17} flavour appeal,¹⁷ higher socioeconomic status,^{14,15,18} younger age,^{14,15} male sex¹⁵ and White ethnic background.^{14,18} However, cross-sectional studies cannot assess the temporality of risk factor and outcome association where it is relevant and make it difficult to identify risk factors of future use.¹⁹

Peer tobacco use and cannabis use have been identified as predictors of JUUL and other e-cigarette initiation in a 2017/18 cohort of Texas adolescents.²⁰ Exposure to advertisements, cigarette use and lower perception of harm have been identified as predictors of future JUUL use in a 2018 cohort of young adults enrolled in colleges in North Carolina and Virginia.²¹

The Youth and Young Adult Panel Study collected data from Canadian youth and young adult e-cigarette users and non-users in March 2018 and again in a follow-up survey in March 2019. The legislative changes occurred in May 2018, during the period between the administration of the baseline and follow-up surveys.¹ This timing provided us a unique opportunity to identify risk factors of pod use in a population that was relatively naïve to pod-type e-cigarettes, and to compare them with findings about high-risk population groups in the US.

Methods

Setting and participants

The Youth and Young Adult Panel was a longitudinal study aiming to track patterns of e-cigarette use among Canadian residents aged 16 to 25 years during an 18-month period, and has been described elsewhere.²² Most participants were

recruited using social media, including Instagram, Reddit and Google Ads, while 4% were recruited from a recontact list obtained from Leave the Pack Behind, a provincially funded program offering cessation support and services.

Data were collected using purposive sampling to ensure 60%/40% distribution of regular and irregular/never e-cigarette users and an adequate sample of hard-to-reach youth and young adult age ranges. To ensure this quota criterion was met, the following question was asked during screening: "In the past 4 weeks, did you vape e-cigarettes every week?" Those who responded "Yes" were considered part of the regular quota while those who responded "No" were considered part of the irregular quota. Multilingual participants were eligible if they could complete the online survey in English.

The panel enrolled 1048 participants at baseline, of which 578 were regular e-cigarette users. Of the baseline participants, 18 unsubscribed and 65% (668/1030) of the remaining participants responded to the 12-month survey. All eligible participants received a \$10 e-gift card honorarium and a chance to win one of two \$250 gift cards.

Variables

Outcome measures

Respondents to the 12-month follow-up survey were asked if they had "used a pod system or pod vape that uses pods or cartridges and may look like a flash drive (e.g. JUUL, myblu, Vype, Logic, Breeze 2, etc.)" in the last six months. Given the dates of introduction of these devices, pod or cartridge device use at follow-up reflected use of these devices after their legal and widespread introduction to the market in the context of the study.

Potential predictors of pod use considered

Baseline predictors examined were: reported importance of the intention to quit or to reduce smoking in the decision to vape; reported importance of flavours in the decision to vape; sensation seeking; perception of risk of vaping regularly with nicotine; cannabis use in the past month; frequency of e-cigarette use; smoking status; proportion of friends who vape; past-month exposure to billboard, gas station or outdoor vaping advertisement; past-month exposure to TV, radio or online

vaping advertisement; age group; sex; and province or territory of residence.

Sensation seeking was assessed by asking participants whether they agreed or disagreed with the statement, "I like new and exciting experiences, even if I have to break the rules." Responses were divided in two categories for analysis (Strongly agree/Somewhat agree, Strongly disagree/Somewhat disagree/Neither). Participants' responses about perception of risk of regularly vaping with nicotine were divided into two categories (Great risk/Moderate risk, No risk/Slight risk/Unknown risk). Smoking status was divided into five categories. Current smokers were self-reported current smokers and had smoked at least 100 cigarettes during their lifetime, while current experimenters were smokers who had smoked fewer than 100 cigarettes. Past experimenters and former smokers were nonsmokers who had smoked fewer or more than 100 cigarettes, respectively, in the past. Never smokers had never tried cigarettes.

Responses to "How often do you vape?" were divided into three categories (Daily/Almost daily, At least weekly/At least monthly, Less than monthly/Never). Responses to "proportion of friends who vape" were divided into two categories (None/Some, Many).

Age was categorized for analysis into three categories based on typical age brackets for high school-aged, postsecondary-aged and older individuals (15–17, 18–21, 22–26). Provinces and territories of residence were categorized into three separate provinces (Ontario, Alberta, British Columbia) while a fourth category included the remaining provinces and territories (Other).

Analysis

We fitted a predictive multivariable model to identify the most influential predictors of future pod use among participants in our sample. Steps were guided by Harrell's generic predictive model-building strategy.²³ We considered all a priori predictors, obtained standard effect size estimates for the predictor variables and validated the rank position of influence of each predictor.

The response indicating frequency of vaping was missing in 21% (140/668) of observations, proportion of friends who

vape was missing in 13%, smoking status in 7%, sensation seeking in 2% and risk perception in 1%. We used multiple imputation to obtain less biased and valid estimates despite missing predictor data.²⁴ We did this by applying the semiparametric predictive mean matching approach and bootstrapping to create a set of imputations as described by Harrell.^{25,26} We used all the variables in the final model to create 23 imputations, given that 22.8% (152/668) of observations had one or more missing values.²⁵ Five logistic regression models were created using completed datasets and all five sets of coefficients averaged to produce effect estimates.²⁵

Age was treated as a categorical variable due to interest in nonarbitrary cutoff points that divided participants into typically high school-aged, postsecondary-aged and older individuals with narrow age ranges within categories. The number of predictors included was maintained below $m/15$ where $m = \min(N_{\text{outcome}=1}, N_{\text{outcome}=0})$.²³ Variance inflation factors were used to assess multicollinearity. Predictor influence was ranked based on the difference between Wald chi-square values and predictor degrees of freedom (df). The ranking process was bootstrapped to obtain 95% confidence intervals (CIs) containing the true rank measure.²⁷ Model validation was performed with 1000 bootstrap resamples with replacement to assess overfitting.²⁸

The magnitudes of association between predictors remaining in the model and the likelihood of participants using a pod within six months before filling out the follow-up survey were reported as odds ratios (ORs) with 95% CIs. All analyses were conducted in R version 4.0.3 (R Foundation for Statistical Computing, Vienna, Austria).

Results

Sample characteristics

Table 1 presents the demographic characteristics of the sample, baseline measures of vaping and other substance use characteristics, and remaining potential predictive factors considered in the analysis. Of the 668 respondents who provided baseline and 12-month survey data, 59.3% (396/668) indicated that they used a pod at some point within six months before responding to the follow-up survey. The composition of sex ($\chi^2 = 9.42, p < 0.01$,

TABLE 1
Participant characteristics of 2018-19 Youth and Young Adult Panel Study participants

Variable	Incomplete respondents (N = 380) (%) ^a	Complete respondents (N = 668) (%) ^a
Pod use within 6 months before follow-up		
No	—	272 (41)
Yes	—	396 (59)
Baseline sociodemographic characteristics		
Sex		
Male	281 (74)	417 (62)
Female	99 (26)	251 (38)
Province/territory		
Ontario	171 (45)	335 (50)
Alberta	63 (17)	115 (17)
British Columbia	67 (18)	111 (17)
Other ^b	79 (21)	107 (16)
Age group		
15–17	161 (42)	286 (43)
18–21	186 (49)	289 (43)
22–26	33 (9)	93 (14)
Baseline substance use		
Smoking status		
Current smoker	62 (16)	90 (13)
Current experimenter	36 (9)	42 (6)
Former smoker	42 (11)	72 (11)
Past experimenter	68 (18)	104 (16)
Never smoker	171 (45)	353 (53)
Missing	1 (0.3)	7 (1)
Past-month cannabis use		
No	204 (54)	452 (68)
Yes	176 (46)	216 (32)
Vaping frequency		
Daily or almost daily	162 (43)	244 (37)
Weekly or monthly	120 (32)	165 (25)
Less than monthly or never	59 (16)	119 (18)
Missing	39 (10)	140 (21)
Other baseline vaping-related characteristics		
Importance to decision to vape		
Flavours		
No	191 (50)	357 (53)
Yes	189 (50)	311 (47)
Attempt to quit/reduce smoking		
No	294 (77)	554 (83)
Yes	86 (23)	114 (17)

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TABLE 1 (continued)
Participant characteristics of 2018-19 Youth and Young Adult Panel Study participants

Variable	Incomplete respondents (N = 380) (%) ^a	Complete respondents (N = 668) (%) ^a
Perceived risk of regular vaping with nicotine		
Moderate risk/great risk	223 (59)	438 (66)
No risk/slight risk/do not know	156 (41)	229 (34)
Missing	1 (0.3)	1 (0.1)
Baseline psychosocial/environmental factors		
Proportion of friends who vape		
None/some	180 (47)	414 (62)
Many	196 (52)	241 (36)
Missing	4 (1)	13 (2)
Past-month outdoor exposure to advertisements		
No	175 (46)	273 (41)
Yes	205 (54)	395 (59)
Past-month media exposure to advertisements		
No	185 (49)	293 (44)
Yes	195 (51)	375 (56)
Like new and exciting experiences, even if have to break rules		
Strongly agree/somewhat agree	249 (66)	417 (62)
Do not agree/strongly disagree/ somewhat disagree	129 (34)	249 (37)
Missing	2 (0.5)	2 (0.3)

Notes: Similar predictors have been grouped for easier understanding. In total, 668 youth and young adults responded to both the baseline survey and the 12-month survey, while 380 youth and young adults responded only to the baseline survey.

^a Percentages may not total 100, due to rounding.

^b This category includes all remaining provinces and territories, including 5.8% of 668 follow-up respondents from the Atlantic provinces, 4.2% from Saskatchewan, 3.0% from Quebec, 2.7% from Manitoba and 0.3% from Yukon.

$df = 1$), past-month cannabis use ($\chi^2 = 14.07, p < 0.001, df = 1$) and proportion of participants' friends who vaped ($\chi^2 = 12.83, p < 0.001, df = 1$) differed significantly among the 668 follow-up respondents compared to the total 1048 respondents at baseline.

Full model

Table 2 presents results from the multi-variable logistic regression model fit to predict likelihood of using a pod between 6 and 12 months after filling out the baseline survey. All variance inflation factors were below 10 and did not indicate multicollinearity. With a concordance statistic of 0.81 and, after correcting for overfitting, 0.79, the model's predictive discrimination suggests some utility in predicting individual subject responses²⁷ and only a small degree of overfitting (corrected C-index 95% CI: 0.76–0.83).

Respondents who, in the baseline survey, indicated using cannabis in the past

month had significantly greater odds of using a pod in the future than those who did not; those who indicated vaping daily or almost daily had significantly greater odds of using a pod in the future than those who indicated not vaping or vaping less than monthly; those who indicated that “many” of their friends vaped had greater odds than those who indicated “none” or “some” of their friends vaped; those who agreed they liked new experiences even if they had to break the rules had greater odds than those who did not. Typically postsecondary-aged and older participants both had lower odds of using a pod in the future compared with those under 18.

Male sex predicted significantly greater odds of future pod use. Current established smokers and past experimenters each had greater odds of using a pod in the future than respondents who had never smoked.

In order, the most important baseline predictors in the top five highest ranks, where 1 is the most important predictor, are age group, smoking status, past-month cannabis use, proportion of friends who vaped and male sex (Figure 1). The 95% CIs of the ranks of smoking status and age group do not overlap with the CIs of the rank of outdoor advertisement exposure nor of the rank of vaping to quit or reduce smoking. The 95% CIs of all five important predictors overlap with all remaining predictors (Figure 1).

Discussion

We found cannabis use, peer influence on vaping, age, sex and smoking status to be among the more important predictors of future pod use among the respondents in our sample. This is in line with previous research on correlates of pod use, which included male sex, co-use of cigarettes, younger age and peers' use, and previous research on predictors of future pod use, including co-use of cigarettes, peers' use, and cannabis use.

Although this study did not assess the prevalence of polysubstance use in its panel of participants, it is important to note that the prevalence of the phenomenon has been increasing among Canadian youth. The proportion of substance-using students indicating use of multiple substances rose from 40% in 2013 to over 50% between 2017 and 2018.²⁹ E-cigarette use drove much of this increase between 2017 and 2018,²⁹ and, in a sample of over 74 000 Canadian high school students, e-cigarettes were the substance most often combined with others.³⁰ These results are significant, considering evidence linking polysubstance use among adolescents with a myriad of poor health and education outcomes,³⁰ and in the aftermath of cannabis legalization for Canadian adults in 2018.³¹

Cannabis was legalized during the study period, and this may have affected the association between cannabis use and future pod use. However, studies in various legal environments across multiple Western countries have found an association between cannabis and e-cigarette use.³² Although many of these longitudinal studies have found an association in the opposite direction, with e-cigarette use predicting future cannabis use, bidirectional effects have also been found in a US college sample.³³

TABLE 2
Full multivariable logistic regression model predicting pod-type e-cigarette device use, 2018-19 Youth and Young Adult Panel Study

Predictors	Odds ratio (95% CI)	p-value
Intercept	0.75 (0.55–1.02)	0.3782
Age group (years)		
15–17	1.00 (ref)	—
18–21	0.63 (0.41–0.98)*	0.0391
22–26	0.19 (0.10–0.38)***	< 0.0001
Sex		
Male	1.00 (ref)	—
Female	0.59 (0.40–0.86)**	0.0061
Province/territory		
Ontario	1.00 (ref)	—
Alberta	1.42 (0.85–2.39)	0.1813
British Columbia	0.86 (0.51–1.45)	0.5833
Others ^a	0.85 (0.50–1.46)	0.5633
Vaping-related characteristics		
Importance to vaping of flavours		
No	1.00 (ref)	—
Yes	1.38 (0.90–2.10)	0.1407
Importance to vaping of attempt to quit/reduce smoking		
No	1.00 (ref)	—
Yes	1.05 (0.52–2.09)	0.8969
Regular nicotine vaping risk perception		
No risk/slight risk/do not know	1.00 (ref)	—
Moderate risk/great risk	0.80 (0.51–1.24)	0.3114
Vaping frequency at baseline		
Less than monthly or never	1.00 (ref)	—
Weekly or monthly	1.47 (0.83–2.60)	0.1823
Daily or almost daily	2.25 (1.14–4.44)*	0.0189
Polysubstance use		
Past-month cannabis use		
No	1.00 (ref)	—
Yes	2.66 (1.66–4.21)***	< 0.0001
Smoking status		
Never smoker	1.00 (ref)	—
Current experimenter	2.20 (0.86–5.57)	0.0983
Former smoker	0.83 (0.37–1.86)	0.6479
Past experimenter	2.40 (1.34–4.31)**	0.0034
Current smoker	3.42 (1.53–7.65)**	0.0027
Psychosocial and environmental factors		
Past-month outdoor exposure to advertisements		
No	1.00 (ref)	—
Yes	1.35 (0.88–2.00)	0.1706

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Our results are also significant because they favour a holistic approach to substance use problems among youth over singling out a particular substance for control and prevention efforts. Preventive approaches involving school support and good quality parental connection have been implicated in the literature as worthwhile interventions for polysubstance use.³⁰ High school-aged youth had greater odds of pod use than older individuals, revealing the appeal of these devices in this demographic.⁷ Consistent with previous US findings,²⁰ we found that peer use also predicted future pod use, underscoring the need for substance use interventions that target communities, such as those found in schools.

We found that current, established smokers and past experimenters were more likely to initiate pod use once they appeared prominently in the market than those who had never smoked. Whether or not respondents were attempting to quit or reduce smoking was a significantly less influential predictor, supporting research that found that pods appealed significantly to Canadian youth, who are not likely to be trying to quit smoking.^{3,7}

A previous longitudinal cohort study discovered a 655% growth in prevalence of dual cigarette and e-cigarette users in a sample of Alberta and Ontario secondary school students.³⁴ This result is important, considering the greater risk of higher frequency cigarette and e-cigarette use among dual users compared to exclusive e-cigarette or cigarette users, and adds to concerns about nicotine dependence among youth.³⁴ The finding is also important because dual cigarette and e-cigarette users in another sample of Canadian secondary students were more likely to use cannabis, alcohol and other drugs with greater frequency,³⁵ adding to earlier concerns about potential polysubstance use.³⁰

Contrary to other research findings, however, future pod use was not predicted by low or unknown perceived risk of nicotine vaping,^{14,16} nor by exposure to advertisements.^{2,21} The latter may be because respondents' exposure to marketing was assessed in the baseline survey three months before nicotine e-cigarette marketing regulations were relaxed by a change in the *Tobacco and Vaping Products Act*.^{1,2} Indeed, though our study did not find an effect of advertising exposure, prior findings about the likely effect of e-cigarette

TABLE 2 (continued)
Full multivariable logistic regression model predicting pod-type e-cigarette device use, 2018-19 Youth and Young Adult Panel Study

Predictors	Odds ratio (95% CI)	p-value
Past-month media exposure to advertisements		
No	1.00 (ref)	—
Yes	0.93 (0.61–1.43)	0.7319
Proportion of friends who vape		
None/some	1.00 (ref)	—
Many	2.15 (1.37–3.34)**	0.0009
Sensation seeking (like new and exciting experiences, even if have to break rules)		
Do not agree/strongly disagree/somewhat disagree	1.00 (ref)	—
Strongly agree/somewhat agree	1.47 (1.00–2.17)	0.0527

Abbreviation: CI, confidence interval.

Note: Model based on the 668 participants who responded to both the baseline survey and the 12-month survey.

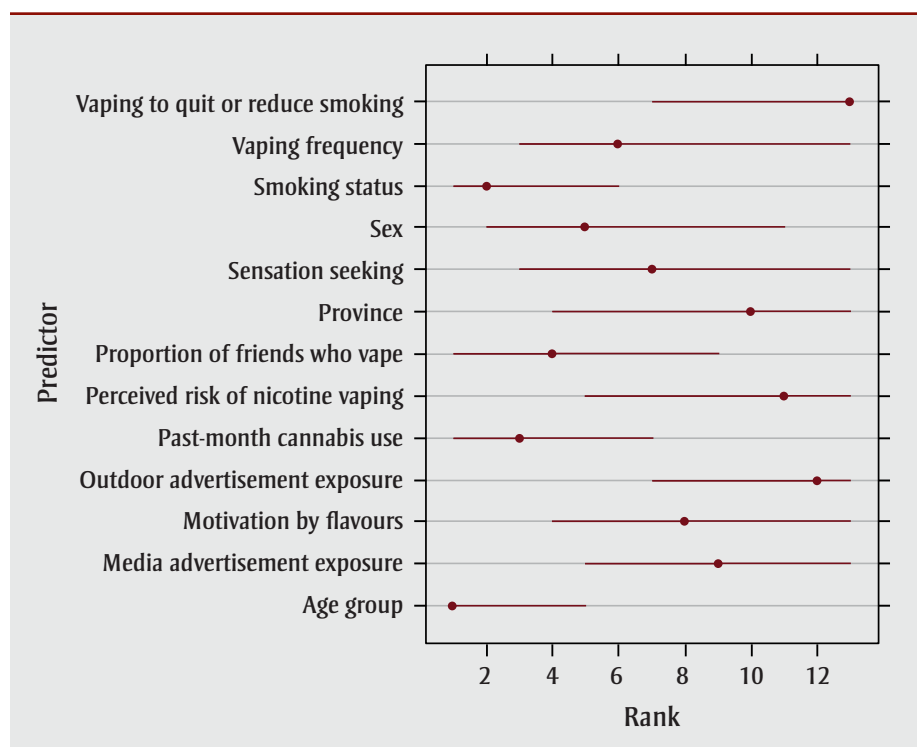
^a This category includes all remaining provinces and territories, including 5.8% of 668 follow-up respondents from the Atlantic provinces, 4.2% from Saskatchewan, 3.0% from Quebec, 2.7% from Manitoba and 0.3% from Yukon.

^{*} $p \leq 0.05$

^{**} $p \leq 0.01$

^{***} $p \leq 0.001$

FIGURE 1
Rank measures^a and associated bootstrapped 95% rank CIs for model predictors of pod use, 2018-19 Youth and Young Adult Panel Study



Abbreviation: CI, confidence interval.

Note: Model based on the 668 participants who responded to both the baseline survey and the 12-month survey.

^a Rank measures are calculated based on the difference between the Wald chi-square statistic and predictor degrees of freedom. They are shown in descending order, with 1 being the highest rank and 13 the lowest.

marketing on prevalence of e-cigarette use among Canadian youth were credible enough to have resulted in a federal ban on promotion that may be viewed by youth as of July 2020.^{2,36}

Numerous other bans have been put into effect in various provinces, including bans on flavours,^{37,38} retail sales other than in specialty vape stores,^{39,40} liquids with nicotine concentrations exceeding 20 mg/mL^{37,40} and point-of-sale advertising. Other regulatory changes include higher taxes,⁴¹⁻⁴³ higher minimum sales age,⁴⁴ and packaging restrictions.⁴⁰ It is expected that these changes contributed to plateauing national rates of e-cigarette use in 2020⁴ and will likely continue to have an impact in the future. However, there is significant variation in provincial regulation, with only some changes implemented in each jurisdiction, making it important for public health to continue health promotion efforts to curb use among youth.

Strengths and limitations

Our panel study and its timing allowed us to draw more robust conclusions about differences in youth who did and did not choose to use pods after changes in federal legislation. Our study drew from a large sample of Canadian youth and young adults from across Canada and from comprehensive surveys that allowed multiple potential risk factors to be studied. These surveys addressed various psychosocial, motivational and substance use-related risk factors, and, unlike most large, population-based surveys, were engineered specifically to study e-cigarette use.

Limitations included the use of a sample of youth and young adults that was not representative of the national population, limiting generalization of results across the country. Over 35% of baseline survey respondents did not respond to the 12-month survey, possibly introducing selection bias and further limiting generalization beyond our sample. Obtaining participants from a smoking cessation service recontact list might have resulted in oversampling from the subgroup of youth who are current or former smokers and could potentially have introduced bias. However, only 4% of all respondents at baseline were recruited using this list.

Conclusion

Like previous studies, ours supports the assertion that pod-type e-cigarette devices

with high nicotine concentration are popular among adolescents who have used cannabis and who are not primarily attempting to quit or reduce cigarette use. Our findings support previous recommendations that prevention efforts be targeted at communities, especially schools, and at polysubstance and cannabis use among youth and young adults. Because our findings parallel those in some US populations, public health in other jurisdictions may benefit from these considerations, especially those where youth polysubstance or cannabis use is significant, and where high-nicotine e-cigarettes are either currently legal or will soon enter the marketplace.

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Conflicts of interest

None to be declared.

Authors' contributions, declaration and statement

SA and SB conceptualized the study. SA and TW conducted formal analysis with software and wrote the original draft. SB provided supervision and resources and was involved with project administration, software, and writing, review and editing. RS provided supervision and was involved in funding acquisition, investigation and with review and editing.

All relevant ethical guidelines have been followed, and any necessary IRB and/or ethics committee approvals have been obtained. Ethics approval was obtained from the University of Toronto Research Ethics Board; RIS Human Protocol Number 34887.

The content and views expressed in this article are those of the authors and do not necessarily reflect those of the Government of Canada.

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