

Trends in vaping and nicotine product use among youth in Canada, England and the USA between 2017 and 2022: evidence to inform policy

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ABSTRACT

Background Preventing uptake of nicotine products among youth remains a central objective of tobacco control policy. Comparing trends in the use of nicotine across countries provides an opportunity to identify emergent product trends and to evaluate ‘natural experiments’ in policies.

Methods Repeat cross-sectional data were analysed from eight waves of the International Tobacco Control Youth Tobacco and Vaping Survey, conducted between 2017 and 2022. Non-probability samples of youth aged 16–19 years in Canada, England and the USA (N=104 473) completed online surveys including measures on vaping, smoking and use of other nicotine products. This paper summarises findings across the 5-year period of the study, as part of a comprehensive report on key indicators of youth vaping in the three countries.

Results The youth nicotine market has rapidly evolved across the three countries, with different patterns of combustible and non-combustible product use in Canada, the USA and England. These changes are primarily attributable to trends in youth vaping: following declines during the initial COVID-19 pandemic period, by 2022, vaping prevalence neared pre-pandemic levels in the USA and Canada, and reached record highs in England. Notable shifts also occurred in the types of vaping products used by youth, including increased use of disposable, nicotine salt-based products. Additional findings are reported on a range of policy-relevant indicators, including for vaping products, promotions and purchasing.

Conclusions Patterns of nicotine use among youth have rapidly evolved in recent years due to the proliferation of nicotine products, the COVID-19 pandemic and the emerging impact of policy measures.

INTRODUCTION

Youth and young adulthood are critical periods for initiation and establishment of tobacco and nicotine use. For most of the past two decades, smoking has steadily declined among young people in Western countries, including the USA, Canada and England.^{1–3} In contrast, the percentage of youth using any nicotine product has increased over the past 5 years, primarily due to the popularity of electronic cigarettes (e-cigarettes) among young people.^{4,5} In Canada and the USA, youth vaping reached its peak in 2019,^{2,3,6} followed by declines in early 2020 (USA)⁷ and after the onset of the COVID-19 pandemic.^{8,9} The most recent data indicate a return of youth vaping prevalence to near

WHAT IS ALREADY KNOWN ON THIS SUBJECT

- ⇒ Preventing uptake of nicotine products among youth remains a central objective of tobacco control policy.
- ⇒ Comparing trends across countries provides an opportunity to identify emergent product trends and to evaluate ‘natural experiments’ in policies.

WHAT IMPORTANT GAPS IN KNOWLEDGE EXIST ON THIS TOPIC

- ⇒ To date, few studies have directly compared trends across countries in youth vaping, and there is a lack of detailed data at the national level on patterns of use and policy-relevant indicators.

WHAT THIS STUDY ADDS

- ⇒ Following declines in vaping prevalence during the initial COVID-19 pandemic period, vaping prevalence has returned to near pre-pandemic levels in the USA and Canada, with substantial increases compared with pre-pandemic levels in England.
- ⇒ The types of vaping products used by youth have shifted towards disposable, nicotine salt-based products, with continued use of sweet, fruit-flavoured e-liquids.
- ⇒ The findings indicate several areas in which both vaping policies and industry trends appear to have impacted patterns of use.

pre-pandemic levels in the USA and Canada, and vaping at record levels in England.^{10,11,12}

Many countries have implemented vaping prevention policies targeting youth. Evaluating these policies is challenging, due to the inherent difficulty of evaluating the impact of national-level policies on prevalence, and the added challenge of overlapping policy initiatives, rapid evolution of the marketplace and the timing of the COVID-19 pandemic, which coincided with the implementation of notable policies in the USA and Canada. Comparing vaping trends across countries provides an opportunity to identify emergent product trends and to evaluate ‘natural experiments’ in policies. To date, few studies have directly compared trends in youth vaping between different countries, due to a scarcity of cross-country research. National monitoring surveys are ill-suited to this task, as they typically use different methodologies, including different sampling and survey measures, such that



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national estimates cannot be directly compared. In addition, the main national monitoring surveys in the USA changed survey modes between 2019 and 2021^{2,7,13} or altered the data collection period in response to the COVID-19 pandemic,⁶ complicating comparisons between the pre-pandemic versus post-pandemic periods.¹⁴

METHODS

Since 2017, the International Tobacco Control (ITC) Youth Tobacco and Vaping Surveys have examined international variation in use of nicotine products among youth in Canada, England and the USA, using the same methodology across countries and over time. To date, eight survey waves have been conducted. The study has used within-country and between-country comparisons over time to evaluate ‘natural experiments’ in national policies, including for menthol bans,¹⁵ vaping marketing,^{16,17} nicotine limits, flavour restrictions¹⁸ and minimum legal age laws.¹⁹ All survey measures and technical reports are publicly available at <https://davidhammond.ca/projects/e-cigarettes/itc-youth-tobacco-ecig/>.

The current paper provides a brief summary of findings for selected measures over the 5-year period of the study, as part of the release of a more comprehensive report on key indicators of youth vaping in the three countries (see online supplemental file 1).²⁰ Repeat cross-sectional data were analysed from non-probability samples of youth aged 16–19 years in Canada, England and the USA (N=104473) who completed online

surveys between 2017 and 2022. Post-stratification survey weights were created using age-by-sex-by-region groups, and calibrated to wave 1 proportions for student status and school grades, as well as the past 30-day smoking trend from national benchmark surveys (in Canada and the USA).

RESULTS

Figure 1 indicates trends in the prevalence of vaping in past 12 months, past 30 days and ≥ 20 days in the past month. Overall, steady increases in vaping prevalence have occurred since 2017, followed by declines during the COVID-19 pandemic in 2020. In Canada and the USA, the prevalence of vaping in the past 30 days and ≥ 20 days in the past month has rebounded to levels just below pre-pandemic peaks in 2019. In the case of England, substantial increases were observed since 2020, establishing new highs in 2022.

A critical consideration for policy—and the potential harm of vaping—is the extent to which vaping promotes dependence and long-term use. The findings indicate that increases in youth vaping prevalence have been accompanied by greater levels of vaping dependence according to various indicators, including perceived addiction, urges to use, times vaping in a day and time to first vape after waking (see online supplemental file 1, pp. 28–31, 36–39). The increase in vaping dependence has occurred in parallel with changes in the types of vaping products used by youth, including the rise of pod/cartridge-based devices and the subsequent rise of disposable vaping products, along with

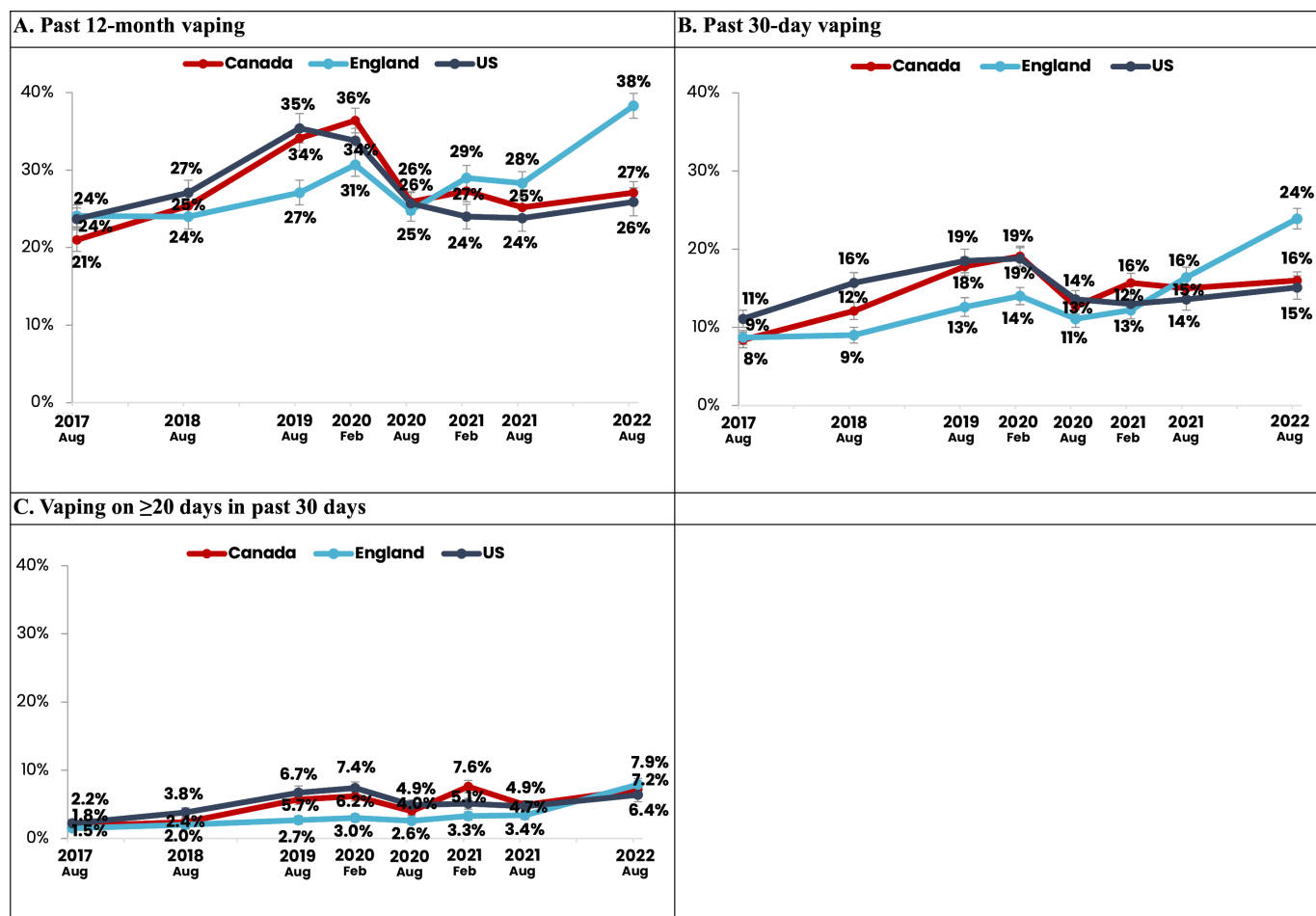


Figure 1 Prevalence of vaping in the past 12 months (A), past 30 days (B), and ≥ 20 days in the past month (C) among youth aged 16–19 years in Canada, England and the USA, 2017–2022, % (weighted).

a market-wide shift towards nicotine salt-based e-liquids, first popularised by JUUL²¹ (see online supplemental file 1, pp. 47–56). The data depict different trajectories across countries: in contrast to the rise in pod/cartridge-based products in Canada and the USA, refillable ‘tank’ devices remained the most widely used product among youth in England until a dramatic shift towards disposable e-cigarettes occurred during 2022, primarily due to the rise of Elf Bar products. The emergence of Elf Bar as a dominant youth brand in the UK market echoes the trajectory of JUUL in the US market between 2017 and 2019. A critical question is whether the appeal of Elf Bar is brand specific or whether it reflects a combination of product attributes that appeal to youth more generally, including low-cost, widespread retail availability, attractive brand imagery, appealing flavour and salt-based e-liquid that facilitates nicotine inhalation. As UK policymakers consider measures for addressing the impact of Elf Bar on youth vaping, the US market offers a cautionary tale about narrowly targeted regulations that focus on a single brand or product category: as illustrated in the ITC report, federal flavour restrictions that applied only to pod-based e-cigarettes succeeded merely in shifting youth preference from JUUL to disposable brands that offered comparable flavours and salt-based nicotine formulations.¹²

The ITC report also characterises trends in other types of tobacco products, including newer oral nicotine pouches and heated tobacco products (see online supplemental file 1, pp. 15–17). Despite different regulatory frameworks, the findings indicate little uptake to date of heated tobacco products or nicotine pouches among young people in Canada, the USA and England. However, the tobacco industry is using new regulatory loopholes in both Canada and the UK to market nicotine pouches that are exempt from advertising restrictions and can be legally sold to minors on the basis that they fall outside of the regulatory criteria for tobacco products.^{22–23} Future monitoring will be critical to examining any changes in youth uptake of these products.

The report examines a range of other policy-related indicators that are important for assessing the impact of policy measures being implemented in the USA, Canada and England, including sources and purchasing of e-cigarettes, exposure to e-cigarette advertising and promotion, exposure to anti-vaping campaigns and education, vaping product flavours, and perceptions and beliefs about vaping products.

DISCUSSION

Over the past 5 years, trends in nicotine product use among youth in Canada, England and the USA differed, both in terms of the specific types of products used, as well as changes in combustible versus non-combustible products. Most notably, although the COVID-19 pandemic led to decreases in vaping, prevalence of daily/near daily vaping is now approaching or exceeds pre-pandemic levels in Canada and the USA, with dramatic increases observed in England, as reported in other national surveys.⁸ The UK government has launched a consultation on regulatory measures for reducing vaping among young people, including a ban on disposable products, higher taxes, and restrictions on the design and appeal of packaging.²⁴ As countries seek a balance between preventing youth vaping and providing access to e-cigarettes for adults trying to stop smoking, detailed data and cross-country comparisons will continue to be important to determine the efficacy of policy measures, and not simply whether vaping prevalence is changing, but why.

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Contributors DH conceived of the study and design. JLR coordinated data collection. DH and JLR supervised analysis, interpreted results and drafted the manuscript.

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Competing interests DH has testified as a paid expert witness on behalf of public health authorities in response to legal challenges from tobacco, vaping and cannabis companies.

Patient consent for publication Not required.

Ethics approval This study involves human participants and has been reviewed by and received ethics clearance through the University of Waterloo Research Ethics Board (ORE#21847/31017) and the King’s College London Psychiatry, Nursing & Midwifery Research Ethics Subcommittee. Participants gave informed consent to participate in the study before taking part.

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