RESEARCH ARTICLE

Vaping liquid flavour preferences, oral nicotine pouch and cannabis use: A survey of participants in the 2019 Oceania Vape Expo [version 1; peer review: awaiting peer review]

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Abstract

Background: New Zealand and other countries have introduced or are considering various restrictions on the sale and use of vaping devices and liquids used in vaping and smokeless tobacco products. This research aimed to assess the likely reactions of individuals who vape to proposed restrictions in New Zealand.

Methods: A vape expo, a social and commercial weekend convention, provides convenient access to individuals with a strong interest in and or experience in vaping. A street intercept approach was used to survey attendees at a vape expo for adults aged 18 and over in Auckland, New Zealand in December 2019.

Results: This research suggests restricting the sale of liquid flavours may have negative unintended consequences. 57% of respondents indicated they would circumvent a ban on popular liquid flavours by mixing their own and/or buying liquids from overseas or the black market. Over a third (36%) would likely be restricted in their choice of a low-risk substitute for tobacco smoking if products such as snus and oral nicotine pouches were banned. A further 36% had heard of these options but were currently not using them. Other results are in the areas of smoking behaviour, cannabis use, and responses to cannabis legalisation.

Conclusions: Various legislative or policy initiatives proposed to regulate vaping may have unanticipated negative consequences for public health. The negative impacts are likely to be disproportional for groups with higher smoking prevalence such as Indigenous peoples, rural communities, and lower socioeconomic groups.

Keywords

Vaping, e-cigarettes, flavours, oral nicotine pouches, tobacco harm reduction, cannabis

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Introduction

A vape exposition is both a social and commercial event. A vape expo provides an opportunity for people who vape (use electronic cigarettes (e-cigarettes) primarily with nicotine-containing liquids), and those considering vaping, to socialize over their shared interest, learn from one another and from vendors; sample and buy products. A vape expo is also a business-to-business event, providing manufacturers and distributors an opportunity to introduce their products to retailers who are exhibiting at or attending the expo.

People who attend a vape expo are a useful target population for research about vaping, as they represent an invested cohort with advanced knowledge of vaping. An estimated 98 million people around the world have stopped smoking tobacco by switching to low and reduced-risk alternatives such as vaping, oral nicotine pouches, snus (tobacco pouches for oral use) and tobacco heating products (Knowledge-Action-Change (KAC), 2020). Despite this global trend, many governments have introduced restrictions and bans to limit this evolution (KAC, 2020).

In New Zealand (NZ), e-cigarettes have been sold as a common consumer product, controlled by generic consumer protection laws, since 2010. In 2015/16, daily e-cigarette use amongst New Zealanders aged 15 years and above was 0.9%. By 2019/20 this had increased to 3.5% (Ministry of Health, 2020). Research suggests vaping is concentrated among adults who smoke or who have recently stopped smoking. In 2016/17, among NZ adults aged 18 and above who smoked, the prevalence of daily vaping was 8%. By 2018 this had increased to 11.4% (Edwards *et al.*, 2020).

Following a few years of debate and several iterations of draft legislation, in April 2020, the Smokefree Environments and Regulated Products (Vaping) Amendment (NZ Government, 2020) (hereafter referred to as the Vaping Amendment) introduced regulations to limit and control the import, marketing, sale, and use of herbal smoking products, smokeless tobacco products, and vaping products. The intent of the Vaping Amendment was to prevent the “normalisation” of vaping (clause 9). The Vaping Amendment banned the sale of all vape liquid flavours except tobacco, mint, and menthol-flavoured vape liquids or e-cigarettes in convenience stores, supermarkets and any other store not registered as a “specialist vape retailer”. The Vaping Amendment also banned the importation of all oral and chewing tobacco products including snus and oral nicotine pouches, for sale and distribution.

This study was conducted to inform the debate about the proposed content of the Vaping Amendment. We conducted a brief survey of adults aged 18 and above attending an Oceania region vaping exposition in Auckland, New Zealand in December 2019 with five objectives.

The first objective of our research was to develop a demographic profile of the participants attending the vape expo.

The second objective was to assess the likely reactions of people who vape to a ban of most flavours of vaping liquid (e-liquid). People who vape largely prefer non-tobacco cigarette flavours (Landry *et al.*, 2019), both because they find one or more of the many options to be more aesthetically pleasing (which they are by design, as opposed to the taste that burning tobacco creates) and because some people actively want to avoid a flavour that reminds them of the taste of the cigarettes they gave up (Russell and McKeganey, 2018). In a 2016 NZ online survey of people who vaped, over 90% reported using a wide variety of flavours (Truman *et al.*, 2018). While 42% had used tobacco or menthol flavours in the past, only 22% were still using these flavours in a follow-up round of the study, indicating that a shift to other flavours was a common transition (Truman *et al.*, 2018).

E-liquid flavour bans actually only ban some flavours since the base e-liquid has very little taste and thus “tobacco flavour” is as much an artificial flavouring as “strawberry”. The bans are therefore actually bans of *flavour descriptors*, since there are no legal definitions of the subjective experience of flavour itself. For example, an e-liquid might be called “pipe tobacco” but taste like fruit. Bans on e-liquid flavours that do not imitate the taste of cigarettes, either the taste of straight tobacco smoke or with menthol added, are intended to undermine the satisfaction and appeal of vaping. The ironic outcome, for governments committed to reducing the harms of smoking tobacco, is that reducing the appeal of vaping could slow the rate at which a population substitutes smoking tobacco with the risk-reduced alternative of vaping.

Our third objective was to explore local awareness of and use of other harm reduction products, such as oral nicotine pouches and snus. Oral nicotine pouches were launched in NZ in early 2019. No data existed on their current use in the population.

A fourth goal was to assess this population’s experience with cannabis use, in reaction to a pending legislative change in NZ. Small amounts of cannabidiol (CBD) and/or tetrahydrocannabinol (THC) were legalised for medicinal use in December 2018. During the general election in October 2020, the Government ran a non-binding referendum for the

Cannabis Legalisation and Control Bill, which proposed to legalise recreational marijuana. The referendum failed by a small margin.

Ten months prior to the referendum, our survey explored if people who currently vaped had an interest in vaping THC, now or in the future, if cannabis was legalised in NZ. This was relevant to the Government's consideration of vaping due to a spate of deaths and hospitalisations of people in the United States with a lung injury incorrectly attributed to nicotine-containing e-cigarettes (Minton and Tanner, 2020). In fact, the injuries were caused by the use of contaminated black-market cannabinoid liquid cartridges containing Vitamin E acetate.

A final objective of the study was to assess potential recruitment for the longitudinal VERITAS Cohort Study (veritascohort.org). The target population of this international study is people who vape and who have a very limited smoking history. Historically there were very few vapers who had not been long-term smokers, but that has changed to a degree that has largely been unmeasured.

Methods

The study population was participants at the Oceania Vape Expo 2019 in Auckland, NZ's largest city, on Saturday 7th December 2019 from 10 am to 5 pm and Sunday 8th December 2019, from 10 am to 4 pm. The Expo was organised by China E-Cigarette Media Online (CECMOL).

We aimed to recruit 200-500 participants, including Expo visitors and staff at commercial and other booths. The exact characteristics of this population were unknown, but it was almost certainly predominantly vaping enthusiasts. People were eligible for the survey if they were at least 18 years old (the Expo itself was restricted to people aged 18 or over), self-identified as vaping "regularly", and gave informed consent.

A street intercept approach was used because it is an efficient and cost-effective way to obtain a high response rate amongst a specific participant group in a public place (Henley and McCoy, 2018). The researchers walked around the Expo hall, lobby, and outside areas, approaching people to invite them to participate. If a person was interested, the interviewer gave them a printed participant information sheet (PIS) along with a brief verbal explanation of the purpose of the study; explaining that the survey was anonymous, as we were not collecting any identifying data, as well as how to complete the survey, how long it would take, that participation was voluntary, and that the participant could stop the survey at any chosen time without giving a reason. Participants were also informed that their data would be published on an online website and made available for other researchers to use. If participants gave verbal consent to the interviewer, they were handed an electronic tablet upon which to complete the survey. The first question of the survey asked participants to confirm that they understood the reason for the survey, had read the PIS, and had been given the opportunity to ask questions about the survey. Only participants who answered affirmatively progressed to the next question. We did not require participants to indicate consent electronically at the beginning of the survey as they had already given verbal consent to participate. It is not uncommon practice in NZ, (for example, see Wamamili *et al.*, (2021)), and it is recognised as satisfactory demonstration of participant consent by the National Ethics Advisory Committee (2019), for anonymous minimal risk surveys like ours to consider return of a completed questionnaire as "implied consent" (p.71).

There were no subject selection limitations or preferences, and recruiters attempted to recruit the first person they noticed after the previous participant finished completing the survey. This was often a companion of the previous participant who was waiting for them. At any given time, there were two to four recruiters operating.

Postcard advertisements about the survey were placed on stall countertops and announcements encouraging attendees to complete the survey were broadcast over the Vape Expo's public address system. Survey staff wore an identification tag that showed their name, photo, and the name of the Research Centre conducting the study. Survey staff also wore vests marked with the wording "Vaper's Survey", "Spot Prize \$30 Voucher" and the Centre's website address. Because women are typically under-represented in surveys of people who vape (for example see Truman *et al.*, 2018), female researchers were available for the whole period of the Expo to facilitate recruitment of women.

The voucher referred to a \$30 grocery voucher that was randomly awarded to a participant after being interviewed, and this incentive for participation was noted in the recruiting materials and pitches. Depending on how many researchers were conducting the survey (two at quiet times and four when busy), every half hour per two researchers, the supervisor ran a random number generator on a mobile phone to determine which of the one to two or one to four researchers would hand out the voucher to the participant currently completing the survey. Researchers were notified by text. To ensure anonymity, recipients of the voucher were asked to sign their initials only, on a voucher receipt form.

Successful recruits completed the survey (*Extended data* (Glover *et al.*, 2021b)) in real time on an iPad supplied by the researcher, who stood nearby, but did not observe the screen during survey completion. The first three questions determined eligibility – they were informed about the survey, age, regular vaping, and an assurance that the participant could read English – and the survey was terminated for those who were not eligible.

There has been a history of enigmatic (Soule *et al.*, 2017) and unethical (see Chen *et al.*, 2017) research (e.g., a paper by Bhatta and Glantz (2019), which was published and then withdrawn from the *Journal of the American Heart Association*), which has misrepresented the significance of research at vape conventions (Phillips, 2016), and on vapers more generally (Siegel, 2015; McCausland *et al.*, 2020). To ensure integrity of this research, a typical informed consent statement was used, and respondents had to affirm consent to participate in the survey. Participants were told that the survey was anonymous and that they could stop answering the survey questions at any time without having to give a reason. They were also advised that all legitimate data entered into the survey form would be used. Most importantly, several members of the target population (NZ vaping enthusiasts) and the Expo organisers were given the opportunity to express any concerns they had about the research plan in advance.

To prevent any misperception that the research was in any way connected with any vendor or the conference organiser, the researchers did not position themselves at any stand associated with any organisation, company, or brand in attendance at the Expo. We attempted to pay entry fees for all researchers for both days, but the conference organisers declined the payment. Some recruits reportedly expressed scepticism about the ethics of the survey, but they were reassured after being given the informed consent information and the name of the principal investigator, who is widely respected in the NZ vape community.

All survey questions are summarised in the univariate results reporting with the exception of two questions about nicotine content of e-liquid, which due to an error in the survey coding, produced data that could not be interpreted.

The survey was created using the Zoho: Survey Pro online app (version current at November 2019). Data were analysed using simple R (R Core Team, 2017) (version 3.3.3) code, using only default settings, run within R-studio (version 1.1) (a programming environment that runs R; RStudio Team, 2015). The code is available upon request. Every question asked is noted in the univariate results reporting. The reported multivariate results were pre-specified. Ethnicity shown represents single ethnicity selected using a common method used by NZ Statistics that prioritises Māori, then Pacific, then Asian, other, and European. All results that were calculated are reported.

An error in the skip patterns in the survey, in which participants who smoked were asked when they quit smoking, was corrected part way through the survey administration. Answers from those who should not have been asked that question were removed in data cleaning.

Ethics approval

Health and Disability Ethics Committee review in NZ is guided by the Government *Standard Operating Procedures for Health and Disability Ethics Committees*. The Health and Disability Ethics Committee (HDEC) assessed the study application for ethics review (19/STH/194) and deemed it out of scope because it was an observational study representing minimal risk to participants. As they explained, HDEC review is required “only if the study involves more than minimal risk (that is, potential participants could reasonably be expected to regard the probability and magnitude of possible harms resulting from their participation in the study to be greater than those encountered in those aspects of their everyday life that relate to the study).”

Results

391 recruits started the survey, and all gave informed consent. 48 recruits were eliminated when they indicated they did not vape regularly or refused to answer the age question (which required them to be 18+). Another three recruits were removed from the analysis because they abandoned the survey without providing tobacco use information (one participant who exited without providing cannabis use information was included in the rest of the analysis). This left 340 respondents for the tobacco products portion of the analysis, 291 of whom indicated their primary residence was in NZ.

There were no substantial differences between responses for non-NZ residents ($n = 49$) and NZ residents ($n = 291$). Our analysis focuses on the NZ residents, but extrapolates to the rest of the study population when relevant. The exception to their being no substantial differences was the ethnicity responses, where we included a “NZ European” category, which described a few of the white people who did not live in NZ.

Demographic profile

The age, gender, and ethnic distributions of participants are shown in [Table 1](#). A third (31%) of the respondents were women. Almost a quarter (22%) of the participants from NZ self-identified as Māori (Indigenous people of NZ). Other ethnic groups were NZ European (61%), Chinese (7%), and Pacific Island people (6%). Of the respondents from NZ, almost three-quarters (71%) were from the Auckland area.

Flavour preferences

Six percent of the NZ respondents reported using standard cigarette flavours exclusively, although 37% used them (tobacco (15%); menthol/mint (22%)) amongst the other flavours they used regularly (see [Table 2](#)).

Ban on flavoured e-liquid

In the event of a ban on other flavours, 20% of the NZ residents said they would probably go back to smoking (see [Table 3](#)). A majority (57%) indicated they intended to circumvent the ban, by mixing their own liquids and/or buying from overseas or the black market. Only 29% indicated they would change their vaping consumption to comply with the

Table 1. Demographic Profile of Participants.

	N = 291	%
Age		
18-24	81	28%
25-35	131	45%
36-50	61	21%
50+	18	6%
Gender		
Female	89	31%
Male	201	69%
Other	1	0%
Ethnicity		
NZ European	150	51.5%
Māori	63	22%
Pacific Island	15	5%
Asian	26	9%
Other	37	13%

Table 2. Flavour Preferences.

E-liquid flavour used regularly	N	%
All tobacco (with or without other flavours)	45	15%
All menthol/mint (with or without other flavours but not tobacco)	63	22%
Just tobacco and menthol/mint	2	1%
Just tobacco	10	3%
Just menthol/mint	6	2%
Fruit	233	80%
Chocolate/sweets/dessert	154	53%
Coffee	46	16%
Unflavoured	6	2%
Other	32	11%

Note: multiple responses allowed (n = 291).

Table 3. Intentions if flavours were banned.

If non-tobacco/mint flavours were banned I would ...	N	%
Buy overseas or on the black market	122	42%
Mix my own e-liquid	105	36%
Buy what will be legal	103	35%
Probably go back to smoking	58	20%
Try to stop vaping	27	9%
Other	14	5%
Don't know	33	11%
Circumvent the ban (e.g., mix own and/or look to black market)	166	57%
Comply as intended	83	29%

Note: multiple responses allowed (n = 291).

ban, as is typically implicitly assumed will happen. Nine percent would try to stop vaping and 35% would buy only the legal products (which includes the 18% who were *already* buying only products that would not be banned).

Smoking behaviour

About two-thirds (65%) of the participants currently did not smoke and about one-third (35%) currently smoked at least occasionally (see Table 4). 70% reported having smoked at least every day for a year at some point in their lives, and almost all (86%) of them responded that they had smoked at least 1,000 cigarettes total.

Slightly more than half (55%) of the respondents had smoked in the past but no longer smoked. Almost half (47%) of those had quit more than three years ago and the other half (53%) had quit more recently (Table 4).

Table 4. Smoking behaviours of participants.

	N	%
Current smoking status		
No	189	65%
Less than once a week	56	19%
At least once a week	22	8%
Daily	24	8%
Total	291	100%
Smoking history		
Have ever smoked every day for a year	205	70%
... and have smoked 1,000 cigarettes (N=205)	177	86%
Time since stopped smoking	N = 161	
Quit < one year ago	26	16%
Quit 1-3 years ago	60	37%
Quit > 3 years ago	75	47%
Total	161	100%
Limited past smoking eligibility for VERITAS study	N = 69	
Age 18-24	21	30%
Age 25-35	25	36%
Age 36-50	16	24%
Age 50+	7	10%
Total	69	100%

About one quarter of participants (n = 69, 24%) were in the intersection of having not smoked every day for a year in their life and having not smoked in a year or more suggesting they could be eligible for inclusion in the VERITAS study.

Other low-risk substitutes for tobacco smoking

As shown in Table 5, more than a third (41%) of the 270 NZ residents who answered the question (and 40% of all respondents) indicated they had tried other low-risk substitutes for smoking – snus (smokeless tobacco) or oral (non-tobacco) nicotine pouches. However, very few (6%) participants currently used snus or pouches. An additional 36% had heard of these substitutes but had never tried them.

Cannabis use

Over half (57%) of those who responded to this question (one person did not, so n=290) said they smoked cannabis, and half (52%) of those who currently smoked cannabis did so at least once per week (see Table 6).

Almost everyone who said they currently smoked cannabis said they would almost certainly (57%) or maybe would (30%) vape cannabinoid liquids if they were legalised in NZ (Table 7). Even of those who did not currently smoke

Table 5. Use of snus and oral nicotine pouches.

Snus and oral nicotine pouch use	N	%
Currently use	16	6%
Tried, do not currently use	96	36%
Heard of, never tried	98	36%
Never heard of it	60	22%
Total	270	

Table 6. Cannabis smoking behaviour and experience of vaping cannabinoids

	N	%
Currently smoke cannabis?		
No	124	43%
Yes	166	57%
Total	290	100%
Among yes, frequency of use:		
Daily	54	33%
At least once a week, but not daily	32	19%
Less than once a week, but not never	80	48%
Among yes, ever vaped cannabinoid liquids?		
No	82	49%
Yes, in New Zealand	76	46%
Yes, only in other countries	8	5%
Total	166	100%

Table 7. Intention to vape cannabinoids if legalised by current cannabis smoking status.

Intention to vape cannabinoid liquids if legalised ...	Currently smoke N = 166		Do not currently smoke N = 124	
Would not vape cannabinoids if legalised	22	13%	60	48%
Would maybe vape cannabinoids if legalised	50	30%	50	40%
Would almost certainly vape cannabinoids if legalised	94	57%	14	11%

cannabis, 51% said they would almost certainly (11%) or maybe would (40%) vape cannabinoids if legalised. Half (51%) of those who currently smoked cannabis had already tried cannabinoid liquids (those who did not smoke cannabis were not asked this question) (Table 6).

Discussion

Consistent with other studies on the role of flavours in vaping (Truman *et al.*, 2018; Edwards *et al.*, 2020) many participants used a variety of flavours and very few used only the tobacco or menthol/mint flavours. A recent USA study of people who both smoked and vaped found that about half used only non-tobacco, non-menthol/mint flavours (Kasza *et al.*, 2020). Previous research in NZ found that people who smoked and vaped tended to be newer to vaping, and that with time people progressively moved from tobacco and menthol flavoured vape liquids to other flavours (Truman *et al.*, 2018) suggesting that the availability of a range of non-tobacco smoke flavours are important to the success of vaping as a substitute for smoking. That flavours increase the appeal and enjoyment of vaping is a consistent finding as reported in a review of the impact of non-menthol flavours that looked at 51 articles (Meernik *et al.*, 2019).

It is not clear to what extent participants' predicted response to a ban on e-liquid flavours extrapolates to the average person who vapes, but who is not invested enough to attend a convention. However, it is a strong indicator that a flavour ban would not have the intended results, as previously suggested by others (e.g., Siegel, 2019). This is consistent with attitudinal research in other populations, as well as the demonstrated behaviour of people living under ban regimes. In particular, over a third of respondents indicated that they would mix their own e-liquid, a practice that is relatively easy, but which increases the risk of harmful mishaps, such as children inadvertently consuming high concentration nicotine solutions that are used in crafting.

Consistent with other research (e.g., Bentley, 2020; Shahab *et al.*, 2017), almost half of respondents said they would avail themselves of illicit markets. Such markets, once established, tend to increase their customer base over time and tend not to disappear if legal markets are reopened. For example, black market cannabis continues in legalised markets, especially if the legal domestic supply is unable to meet demand (Sen and Wyonch, 2018).

We observed that over half of respondents had recently stopped smoking and thus the results should not be extrapolated to the average NZ person who smoked in the distant past. However, this is what we would expect among those who quit by switching to vaping, because vaping has become a popular quitting strategy only recently (see, for example, Edwards *et al.*, 2020).

The low awareness and trial of snus or oral nicotine pouches likely reflects the Ministry of Health's historic claimed ban on the sale of snus in NZ and the very recent launch of the oral nicotine pouches. It could also be that people who used snus/oral nicotine pouch who do not vape would be less likely to attend a vape expo. We found that over a third of people, enthusiastic about vaping enough to attend a vape expo, had shown interest in other risk-reduced alternatives to smoking. Interest would likely be higher if the products were more accessible and their existence was communicated to people who smoke or vape. Limiting access to risk-reduced alternatives to smoking, for example, by allowing people access to only one type, reduces the opportunity for people who smoke to find a satisfactory substitute for smoking. The risk is that reduction of smoking-related mortality and morbidity will be delayed if vaping or tobacco heating products (legally for sale in NZ) are ineffective substitutes for smoking.

Our study suggests that recruiting a cohort of people who currently vaped who had a limited history of smoking, difficult to imagine only a few years ago, is practical in Auckland and probably elsewhere. As might be expected, this would be a youthful cohort, with two-thirds (66%) under the age of 35.

Interestingly, almost all (90%) of the respondents who had vaped cannabinoids had done so in NZ, where smoking cannabis is not legal. These results suggest that, for NZ residents who are familiar with vaping, (a) quite a few would become new users if vaping cannabinoid liquids was legal and (b) some could have been exposed to lung injury had the NZ black market been infiltrated by the harmful products that caused the USA outbreak.

The percentage of participants who said that they already had used cannabinoid vaping products indicated the existence of a black market for cannabinoid liquids in NZ also. Resort to black market product could be ongoing as cannabis for medicinal use only, and available on prescription only, is all that is legal given that insufficient votes were received during the October 2020 referendum to support legalisation of recreational cannabis use.

Strengths and limitations

Survey personnel believed that a greater proportion of women attended the Expo than are represented by the proportion of women who participated in this survey. They attributed this to women being more likely to decline to take the survey.

However, among NZ adults aged 15 and over, males were 1.74 times more likely to vape at least once a month than women (Ministry of Health, 2019) so it is possible that women were well-represented in our study which would be a strength. It is also a strength that Māori and Pacific Island expo participants were well represented. Māori and Pacific Island people in NZ have disproportionately high rates of smoking. In 2019, 34% of Māori adults aged 15 and over, and 24% of Pacific Island adults smoked compared with 12% of NZ European/Others (Ministry of Health, 2019). It is promising for reducing this inequity in smoking prevalence that Māori were 1.65 times more likely to vape than non-Māori (Ministry of Health, 2019). Better promotion of risk-reduced alternatives is required to encourage Pacific Island people who smoke to switch. Though Pacific Island men and women are 1.68 times more likely to smoke than non-Pacific Island, Pacific Island men were only about half as likely to vape as non-Pacific Island men (Ministry of Health, 2019).

It was a strength that members of the research team were members of the local and international vaping community, and that vaping advocacy organisations or advocates were consulted about the survey questions and involved in conducting the survey at the expo. The study method respected the call from the vaping community for their expertise in vaping to be valued as a lay epidemiology and for studies to attend to questions of importance to them (Fraser *et al.*, 2018).

The method also had to compensate for the understandable scepticism that the vaping community has towards researchers due to previous unethical and biased practices by researchers. For example, Spence and Stanbrook (2016) extracted quotes from social media posts by people who vape and displayed a selection of these with identifying information including the person's profile picture (mostly real headshots) without permission at a conference. That our survey was conducted at an Expo with such transparency is a strength because previous researchers have malevolently collected data at expos without the organisers' or any vaping community consent (for example see Soule *et al.*, 2016; Bates, 2016).

Limitations

The respondents in this study represent a younger population than those reported in the majority of previous research studies on people who have tried or who currently vape. This is likely a function of the specific venue for recruitment. It may be that younger people are more likely to work at, or spend part of their weekend at, a vape expo.

Because expo booth staff were present at the venue for longer than expo attendees a larger proportion of them could have completed the survey. The survey personnel perceived that between them most booth staff were likely invited to participate. Booth staff were a mixture of business owners, their regular staff, and casual retail staff likely recruited just for the expo. Several of the exhibitors were from overseas. Responses from booth staff cannot be identified from the data collected. This probably means that highly dedicated and experienced vapers were overrepresented in the sample, even compared to the average vape expo attendee.

Conclusion

If governments are committed to reducing smoking-related harm, they would encourage smoking cessation by providing a wider range of risk-reduced alternatives such as vaping, snus, and oral nicotine pouches. The Smokefree Environments and Regulated Products (Vaping) Amendment Act came into force in November 2020. From November 25 snus and oral nicotine could no longer be sold. Nine months was allowed for non "specialist vape retailers", that is, convenience stores, petrol stations and supermarkets to stop selling vaping products containing other than mint, menthol, and tobacco flavours – the least used flavoured e-liquids among people who vape, according to our survey. A 2018 survey found that about 10% of vapers last purchased vaping consumables at a tobacconist and a further 5.4% had purchased consumables at a local convenience store (Edwards *et al.*, 2020). Limiting convenience stores and supermarkets to just three of the tobacco cigarette-like flavours, could undermine access to, and thus impede transition to, vaping or quitting smoking.

Smoking is inequitably distributed in New Zealand by ethnicity and socioeconomic level. The decline in smoking prevalence between 2018/19 and 2019/20 was very small (not even statistically significantly different from zero) and neither was any change in the prevalence of vaping detected (Ministry of Health, 2020). We have little idea how the Vaping Amendment's limitations will affect the prevalence of vaping among the groups with disproportionately high smoking rates (Māori, Pacific Island people, and lower socioeconomic groups), and only focused research will be able to determine that. A quarter of the NZ population lives in rural areas and small towns (Ministry of Health, 2019a). Māori, who have the highest smoking rates, are also over-represented in rural areas. People who smoke who live in rural areas or small towns may be disproportionately deterred from switching to vaping as the Vaping Amendment banned mobile vape vendors and various new regulations may make it prohibitive for small volume retailers to maintain a 'bricks-and-mortar' store.

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Data availability

Underlying data

Zenodo: Glover *et al.*, 2021 Vape Expo Data. <https://doi.org/10.5281/zenodo.5016186> (Glover *et al.*, 2021a).

This project contains the following underlying data:

- Data file 1. (Complete survey responses, CSV format).

Extended data

Zenodo: Vaping liquid flavour preferences, oral nicotine pouch and cannabis use among participants in the 2019 Oceania Vape Expo: Copy of the online survey. <https://doi.org/10.5281/zenodo.5034910> (Glover *et al.*, 2021b).

This project contains the following extended data:

- Copy of online survey used in vape expo survey 2019.

Data are available under the terms of the [Creative Commons Zero “No rights reserved” data waiver](#) (CC0 1.0 Public domain dedication).

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