

# VAPING: *degrees of harm*

E-cigarette and smokeless  
tobacco products

SUMMARY OF EVIDENCE



**Cancer  
Society**

Te Kāhui Matepukupuku  
o Aotearoa

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# Introduction

This paper summarises the findings of an evidence review on e-cigarette and smokeless tobacco products (ECs) undertaken by the Health Promotion Team at Cancer Society Auckland Northland between January and June 2019. The purpose of the review is to inform submissions on proposed Ministry of Health amendments to the Smoke-free Environments Act 1990 (SFEA) for the regulation of these products. While there have been recent international reviews, new evidence relevant to the regulatory review is emerging very quickly in this area, including New Zealand data.

The full narrative review drew mainly from international review studies on ECs, other related systematic reviews and meta-analyses published since 2015, and relevant international studies, together with New Zealand research (quantitative and qualitative) and studies investigating Māori and other priority populations. A total of 121 papers were included for review, of which 19 were review studies (13 systematic reviews with six including meta-analyses); seven were longitudinal studies (including two reviews of a total of eight longitudinal studies); 19 were cross-sectional studies; three were randomised controlled trials (RCTs); eight were qualitative studies, and a further eight were modelling studies.

## The review findings are structured in response to five questions

1. How much is known about the health risks associated with vaping?
2. Is vaping effective in smoking cessation?
3. What is known about vaping among children and young people?
4. What are the risks and benefits of promoting vaping as a harm reduction strategy (at individual and population levels)?
5. How can these findings inform responses to proposed amendments to the Smoke-free Environments Act 1990?

This summary report presents findings, conclusions and implications for regulation.

**The full peer-reviewed report is available on the Cancer Society Auckland Northland website.**

## Context

During the last 20 years, smoking prevalence in New Zealand has been reduced from 20.1 per cent in 2006/7 to 14.9 per cent in 2017/18<sup>1</sup>, but on current projections we are unlikely to meet the Smokefree 2025 goal of reducing tobacco smoking prevalence to minimal levels. Smoking continues to be the major preventable cause of cancer and cardiovascular disease in New Zealand and globally, and is known to exacerbate longstanding inequalities in health outcomes between different population groups – specifically Māori and non-Māori<sup>2</sup>; and low-income and high-income New Zealanders.

While the focus of the current regulatory review of vaping and smokeless tobacco products is on supporting adult smokers to switch to less harmful smokeless tobacco alternatives, it is important to retain a focus on all effective policy options for reducing the great harm caused by tobacco smoking. There is a need to strengthen the Smoke-free Environments Act 1990 by reducing the supply of all tobacco products. Restricting access would send a clear message that tobacco is no ordinary product. Because of its uniquely harmful and addictive nature, it should be subject to rigorous policy and regulatory approaches aiming to minimise its use and support current users to quit.

1 MoH data retrieved from [https://minhealthnz.shinyapps.io/nz-health-survey-2017-18-annual-data-explorer/\\_w\\_fc9a88f6/#/!explore-topics](https://minhealthnz.shinyapps.io/nz-health-survey-2017-18-annual-data-explorer/_w_fc9a88f6/#/!explore-topics) on 5 March, 2019.

2 By comparison to overall prevalence, NZHS data shows that Māori current smoking prevalence reduced from 42.1% to 33.5% between 2006/07 and 2017/08.

The Cancer Society supports strengthening the Smokefree Environments Act and investing in effective strategies to make progress on Smokefree Aotearoa 2025 goals and aspirations. These include:

- A substantial reduction in the number of retail outlets selling tobacco products
- Reductions in nicotine levels in cigarettes and tobacco
- A sinking lid on tobacco supply
- Tobacco-free generation policies
- Extending smokefree areas.

The Ministry's review provides an opportunity to consider the place of a harm reduction approach to achieving the Smokefree 2025 goal, and within that the potential contribution of ECs to supporting smokers to quit or transition to lower-harm nicotine delivery products.

## Proposed principles for vaping and smokeless tobacco product regulation/policy

The following proposed principles have been developed from various sources, including a 2016 background report of the National Smokefree Working Group, and those developed by the Australian Department of Health<sup>3</sup>.

### 1. Regulation/policy should be evidence-based

- Policy and regulation should be informed by interpretations of evidence and conclusions reached by credible health and scientific agencies.
- Decisions should be consistent with good quality research evidence on the potential benefits and harms of ECs and on effective strategies for reducing smoking prevalence.
- Health claims for ECs should be rejected by health authorities in the absence of robust scientific evidence to substantiate these claims.

### 2. Regulation/policy should contribute to achieving Smokefree Aotearoa 2025

- Policy on ECs should support the achievement of the Smokefree 2025 goal of reducing tobacco prevalence to minimal levels for all New Zealanders.
- Priority should be given to reducing smoking in Māori, Pacific, low-income and other high-prevalence groups.
- Policy should aim to maximise the benefits of supporting smokers to quit, while minimising the health risks from their use due to initiation of EC use by non-smokers (particularly children and young people) or possible gateway effects leading to smoking.
- Regulation of ECs should not be more stringent than regulatory measures in place for smoked tobacco products.
- New Zealand's current smokefree strategies and activities should be maintained, continuously improved, and intensified.

<sup>3</sup> Retrieved from <https://beta.health.gov.au/resources/publications/principles-that-underpin-the-current-policy-and-regulatory-approach-to-e-cigarettes-in-australia> on 10 July 2019.

### *3. Precautionary approach*

- The precautionary approach acknowledges the potential risks associated with the long-term use of ECs.
- This approach requires that regulation and policy concerning the sale and marketing of ECs should seek to minimise the risk of their uptake among non-smokers and most importantly among children and young people.

### *4. Protecting public health gains*

- Regulations and policy for ECs should be consistent with the best available evidence for how to maximise the degree to which ECs support smokers to successfully quit or transition to using them as complete substitutes for smoked tobacco products, while minimising use of ECs among non-smokers.
- The Ministry of Health should continue to monitor evidence from New Zealand and internationally on the impacts of ECs and regulatory and policy frameworks on smoking prevalence so that policy and practice can be rapidly updated in light of emerging evidence.

### *5. Protecting public health policy from all commercial and other vested interests related to ECs*

- Parties with a commercial interest in the sale and marketing of ECs ought not to be placed in advisory positions to New Zealand Government policy or programme development in this area.

### *6. Complementary with jurisdictional regulation and existing health and social policy frameworks*

- Any action taken at a national or local government level for ECs supports existing health and social policy frameworks.

## Summary of key findings

Preventing cancer, reducing the harm caused by tobacco smoking, and reducing inequalities in health outcomes are priorities for the Cancer Society in New Zealand. The organisation is very interested in the potential for vaping and associated products to help adult smokers to quit smoking.

While smoking prevalence among Māori and Pacific has been dropping since 2006, it remains unacceptably high, and Māori women in particular are unfairly impacted by tobacco smoking.

The Cancer Society acknowledges the commitment of many individuals and organisations who are exploring the potential of ECs to help Māori to quit, and the anecdotal reports that it can be helpful. This review was unable to find published evidence for effectiveness in this area. Investment is needed in research to enable a better understanding of the potential of ECs as cessation tools for Māori. This knowledge could then be applied to improve all stop smoking services.

The findings of this review provide cause for reflection, balancing the potential benefits in helping individuals who smoke to switch to vaping, against the potential risk of increasing smoking in the population of children and young people.

Based on the findings of our review, the Cancer Society supports a precautionary approach to legislation and argues against the widespread promotion of, and access to ECs. There is emerging evidence that supports ECs being made available in a controlled manner for smokers wanting to use them for smoking cessation or as a substitute for smoking. But there is also emerging evidence that raises serious concerns about the risks to non-smokers and young people, our rangatahi. These include the potential for nicotine addiction, the impact of nicotine itself on cognitive development, and the need to protect young people's health and wellbeing from the as-yet-unknown long-term impacts of these products.

“*Rather than make e-cigarettes as readily available as smoked tobacco, the Government has a crucial opportunity to reduce the supply of smoked tobacco, an approach that would enable it to proceed cautiously with liberalising nicotine e-cigarette sales.*”

(Hoek et al., 2017)<sup>4</sup>

The Cancer Society has concluded that EC sales should be restricted, for example, to specialist vape shops and pharmacies. The Society supports a planned process to substantially reduce the availability of smoked tobacco products by gradually removing all tobacco products from most retail outlets such as dairies, petrol stations and supermarkets.

It is a priority for the Cancer Society that children and young people are protected from online and other marketing of ECs and smokeless tobacco products. There is strong international evidence that young people who start vaping are more likely to start smoking, although a causal relationship has not yet been established. Minimising access to all tobacco and vaping products for children and young people is a necessary step to protect young people from the harms associated with nicotine addiction, and from becoming smokers.

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4 Retrieved from <https://blogs.otago.ac.nz/pubhealthexpert/2017/04/24/will-liberalising-nicotine-availability-increase-quit/#more-2539> on 31 January, 2019

## How much is known about the health risks associated with vaping?

### KEY FINDINGS

- ECs and smokeless tobacco products are less harmful than tobacco smoking.
- Lack of long-term clinical data, together with rapid commercial development and product variation makes it difficult to assess health risk.
- ECs deliver known carcinogens and other toxic compounds at relatively low levels.
- New research suggests potential for harm to cardiovascular health.
- New research has found strong associations between EC use and respiratory disorders, significant for both asthma and chronic pulmonary diseases.

There is broad agreement within the tobacco control sector in New Zealand and internationally, that vaping is less harmful than smoking tobacco, but disagreement about the potential health risks and social harm associated with ECs and other smokeless tobacco products. Vaping is a recent phenomenon, and there is a lack of long-term clinical data that can be used to accurately assess population health risk.

### The US National Academies of Sciences, Engineering, and Medicine (2018) found that

**Conclusion 5-1.** There is *conclusive evidence* that in addition to nicotine, most e-cigarette products contain and emit numerous potentially toxic substances.

**Conclusion 5-3.** There is *substantial evidence* that except for nicotine, under typical conditions of use, exposure to potentially toxic substances from e-cigarettes is significantly lower compared with combustible tobacco cigarettes.

**Conclusion 7-1.** There is *substantial evidence* that e-cigarette aerosols can induce acute endothelial cell dysfunction, although the long-term consequences and outcomes on these parameters with long-term exposure to e-cigarette aerosol are uncertain.

**Conclusion 7-2.** There is *substantial evidence* that components of e-cigarette aerosols can promote formation of reactive oxygen species/oxidative stress. Although this supports the biological plausibility of tissue injury and disease from long-term exposure to e-cigarette aerosols, generation of reactive oxygen species and oxidative stress induction is generally lower from e-cigarettes than from combustible tobacco cigarette smoke.

Studies investigating health risks are complicated by a wide variation in EC products in terms of delivery mechanisms, constituents and levels of nicotine. New products are rapidly being developed and marketed. In addition, there can be considerable variation in vaping behaviour between individuals, which may increase or decrease the risk that individuals are exposed to (Goniewicz et al., 2014).

Several international review studies have raised concerns about potential health risks associated with vaping (Middlekauff, 2019). The most serious of these are related to the intake of vapour carrying ultrafine particles deep into the lungs (Glanz & Bareham, 2018). Ultrafine particles have been implicated in **cardiovascular disease** (Pope et al., 2009). E-cigarette use has been found to be an independent risk factor for myocardial infarction (Bhatta & Glanz, 2019).

While ECs appear to be much less likely than conventional cigarettes to cause cancer, it may take years to establish whether they increase the risk of cancer. There is evidence that some EC products can deliver low levels of known carcinogens, including nicotine-derived nitrosamine ketone, which may increase risk of **lung cancer** even at low doses, and formaldehyde (Goniewicz et al., 2014), suggesting there may be some risk from their long-term use. E-cigarette users were found to be exposed to “toxicologically significant levels of carbonyl compounds, especially formaldehyde” by EL-Hellani and colleagues (2016).

E-cigarette use in adults has been found to be associated with **respiratory disorders**, independent of cigarette smoking, age and various physical and psychological covariates, in a recent cross-sectional study. The association was described as significant for both **asthma** and **chronic pulmonary disorders** (Wills et al., 2019). Prospective studies are required to investigate this issue further.

## Vaping and smoking cessation

### KEY FINDINGS

- The available evidence base does not definitively answer the question of whether e-cigarettes help smokers to quit.
- A new clinical trial showed that e-cigarettes were more effective than some nicotine replacement products, when provided in comprehensive stop smoking programmes that included face-to-face behavioural counselling.
- No evidence was found that vaping promotes smoking cessation among young people.
- The majority of smokers who use ECs in New Zealand and overseas are dual users (people who both vape and smoke) who may begin vaping to quit smoking.
- Qualitative research indicates that dual use enables smokers to navigate smoking restrictions and manage social norms, providing a disincentive for some smokers to quit.

“Vapers who use ECIGs much like NRTs, primarily as a tool for the purpose of quitting smoking as opposed to an extension of smoking or a hobby, may be more likely to attempt and eventually succeed at smoking cessation.”

Dr Karen Brandon, H Lee Moffit Cancer Centre, USA, 2019

Systematic reviews have found that the available evidence base is insufficient to definitively answer the question of whether e-cigarettes helped smokers to quit. Until recently, only one well-designed RCT had tested the efficacy of e-cigarettes for smoking cessation compared with other nicotine replacement therapy (NRT), and this New Zealand study found no significant difference between the two options (Bullen et al., 2013). A Cochrane review (McRobbie et al., 2014) found evidence from two trials that ECs help smokers to stop smoking long-term compared with placebo ECs, but confidence in the result was rated 'low' by GRADE standards. This review was later updated (Hartmann-Boyce et al., 2016). The authors' confidence in the results was still rated 'low', and they noted that the long-term safety of ECs was unknown.

**The US National Academies of Sciences, Engineering, and Medicine (NASEM, 2018) made the following conclusions.**

**Conclusion 17-1.** Overall, there is *limited evidence* that e-cigarettes may be effective aids to promote smoking cessation.

**Conclusion 17-2.** There is *moderate evidence* from randomized controlled trials that e-cigarettes with nicotine are more effective than e-cigarettes without nicotine for smoking cessation.

**Conclusion 17-3.** There is *insufficient evidence* from randomized controlled trials about the effectiveness of e-cigarettes as cessation aids compared with no treatment or to Food and Drug Administration–approved smoking cessation treatments.

**Conclusion 17-4.** While the overall evidence from observational trials is mixed, there is *moderate evidence* from observational studies that more frequent use of e-cigarettes is associated with increased likelihood of cessation.

Public Health England examined 14 systematic reviews of ECs in smoking cessation and/or reduction, all of which concluded that further RCTs are needed. Of those reviews that included a meta-analysis, two found a positive effect, four found an inconclusive effect and one found a negative effect for EC use on cessation (McNeill et al, 2018).

A review of longitudinal studies of young people (Chatterjee et al., 2016) found no evidence that vaping promotes smoking cessation among adolescents. The authors suggest that most adolescents use ECs for experimentation with tobacco rather than as a smoking cessation tool.

A recent RCT from the UK (Hajek et al., 2019) found that when ECs are used by smokers who are motivated to quit (i.e. using smoking cessation services), alongside a programme of behavioural counselling, the one-year abstinence rate was 18%, compared with 9.9% in the NRT group. Hajek and colleagues found that e-cigarette use continued for much longer than NRT in those who had quit smoking (at one year 39.5% of EC users were still vaping, compared with 4.3% of the NRT group still using the NRT product).

Qualitative research undertaken by the Health Promotion Agency<sup>5</sup> investigated young Māori women's attitudes towards vaping, their vaping behaviour, and the relationship between smoking and vaping. Their findings supported other research indicating that switching to vaping can be challenging, it takes time, and requires personal support and better information to overcome barriers.

### *Dual use*

There is good evidence that most dual users (people who vape and smoke) begin vaping to quit smoking. As is the case with smokers attempting to quit using other methods, only a subset who use e-cigarettes succeed in quitting (Brandon et al., 2019). There is emerging evidence that ongoing dual use may not reduce exposure to smoking, or health risk (Wang et al., 2018, Osei et al., 2019).

Recent data from the New Zealand Healthy Lifestyle Survey provides an overall prevalence of current e-cigarette use (defined as those who reported using ECs 'less often than once a month' or more often) of 2.7 per cent, and among smokers or dual users, of 10.6 per cent (Oakly & Martin, 2019). Of those respondents who currently used ECs, 63.9 per cent also currently smoked tobacco.

New Zealand survey data indicate very high rates of dual use (Oakley et al., 2019), and qualitative research investigating dual use found that it enabled smokers to navigate smoking restrictions and manage social norms (Robertson et al., 2019), reducing the incentives for EC users to quit. Monitoring the outcomes among dual users will be an important component of monitoring smoking and vaping behaviours in New Zealand.

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5 Retrieved from <https://www.hpa.org.nz/research-library/research-publications/māori-womens-perspectives-and-experiences-with-smoking-and-vaping> on 20 June 2019.

# What is known about vaping among children and young people?

## KEY FINDINGS

- Young people start vaping because of curiosity, peer endorsement, novelty, flavourings, industry marketing, the perception it is relatively harmless, to manage smoking restrictions and to stop smoking.
- In 2017, 4% of NZ youth aged 15-17 were current smokers, and 20% of young adults aged 18-24 years were regular smokers. Smoking prevalence has declined among all subgroups of Year 10 students since 2006/07, except for the years 2017 and 2018, which show a levelling off.
- 2018 ASH data showed that Māori students were around five times as likely to report daily smoking as non-Māori non-Pacific students, a drop from 2017 when they were six times more likely to report daily smoking.
- Young New Zealanders (14- to 15-year olds) who had ever tried vaping more than tripled between 2012 and 2016, with 27.7% of young people having ever tried vaping in 2016. Just under 2% of Year 10 students reported using e-cigarettes daily in 2018.
- Data from the US and Canada indicates that 'current e-cigarette use' increased very rapidly between 2017 and 2018, associated with the introduction of high-nicotine 'podvapes' (Juil). This coincided with an overall increase in the use of all tobacco products in school children, indicating a reversal of the long-term trend of reducing smoking prevalence.
- There is strong evidence from international longitudinal studies that shows young people who use e-cigarettes are up to four times more likely to smoke tobacco within 12 months.
- Canadian and US longitudinal studies suggest that vaping may be expanding the youth nicotine use market by attracting low-risk youth who would otherwise be unlikely to initiate using cigarettes.

### *Why young people start vaping*

Analysis of New Zealand Youth Insights Survey (YIS) data on e-cigarettes found that in 2014, being a current or ex-smoker was the most important predictor of ever-use of e-cigarettes in adolescents, and that young New Zealanders have been exposed to industry marketing and have responded to it. Almost two-thirds of YIS respondents cited curiosity, and about one-quarter reported peer endorsement as their motivation for first trying an e-cigarette. Among adolescent smokers, 17% cited smoking cessation, and 18% cited reduction in smoking as their motivation for trying vaping (Merry & Bullen, 2018).

International research indicates that both adults and young people are attracted to vaping by industry marketing, the prospect of reducing or quitting smoking, the novelty, the perception that it's relatively harmless and the flavourings. Vaping is used by some youth to reduce the social stigma associated with smoking, and to manage smoking restrictions (Glantz & Bareham, 2018).

### New Zealand smoking prevalence in children and young people

Smoking prevalence has declined among all subgroups of youth since 2006/07, except for the years 2017 and 2018, for which ASH Year 10 data shows a levelling off in overall daily (1.9%) and regular (5%) smoking prevalence.

The Health Promotion Agency reported that in 2017, 4 per cent of youth aged 15-17 years were current smokers, and 20 per cent of young adults aged 18-24 years were regular smokers.

Among male youth, daily smoking prevalence declined over the nine-year period by 8.2 per cent among Māori and 3.6 per cent among non-Māori youth (NZ Health Survey, 2015/16).

The ASH Year 10 snapshot results for 2018 showed that Māori students were around five times as likely to report daily smoking as non-Māori non-Pacific students. This was a reduction since 2017 survey results which showed that Māori students were around six times as likely to report daily smoking.

### Overall never, regular and daily smoking rates relatively unchanged since 2017

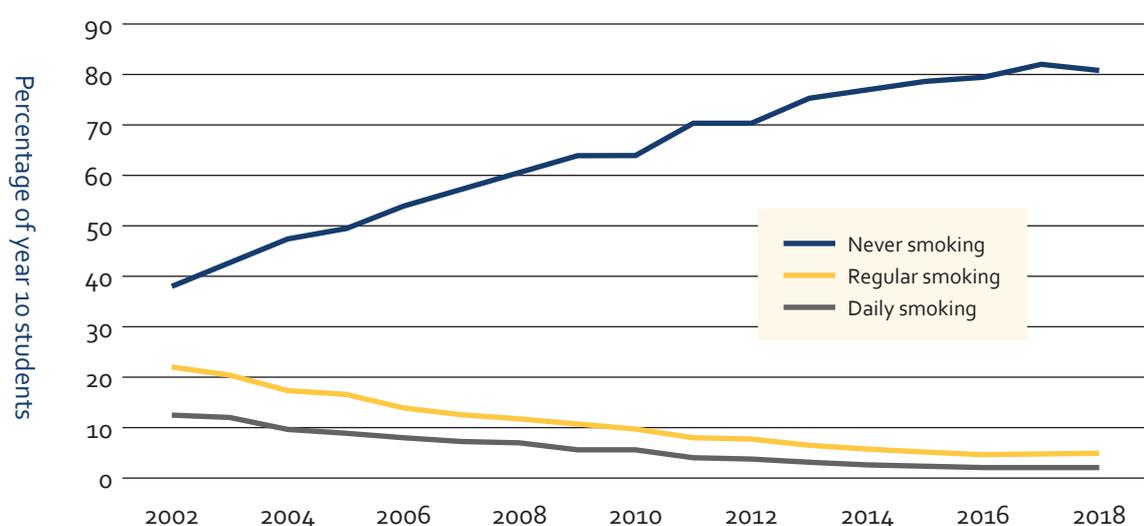


Figure 1: From ASH Year 10 Snapshot Topline Results for 2018<sup>6</sup>

### New Zealand data on e-cigarette use in children and young people

The Ministry of Health (2018) reported that the number of young people (14- to 15-year olds) who had ever tried vaping more than tripled between 2012 and 2016, with 27.7 per cent of young people having ever tried vaping in 2016. Among young Māori, 45.8 per cent had ever tried vaping in 2016, compared with 22.2 per cent of non-Māori. In 2016, 33.4 per cent of young males, and 21.8 per cent of young females had ever tried vaping.

In the 2018 ASH Year 10 Survey one-third of the students reported having tried an EC, but fewer than one per cent of Year 10 students who never smoked reported using ECs daily. Just under two per cent of Year 10 students reported using ECs daily.

6 Retrieved on 10 April 2019 from [https://d3n8a8pro7vhmx.cloudfront.net/ashnz/pages/70/attachments/original/1554281096/2018\\_ASH\\_Y10\\_Snapshot\\_Topline\\_FINAL.pdf?1554281096](https://d3n8a8pro7vhmx.cloudfront.net/ashnz/pages/70/attachments/original/1554281096/2018_ASH_Y10_Snapshot_Topline_FINAL.pdf?1554281096)

### *Possible harms from children and adolescents using e-cigarettes and smokeless tobacco.*

Three main potential harms have been identified: (i) the potential for nicotine addiction occurs, resulting in possible long-term use of nicotine products with potential adverse effects (ii) the potential for prolonged duration use of vaping products and smokeless tobacco resulting in possible long-term health effects and (iii) gateway effect to smoking.

“*The last thing we want to happen is for our young generation of New Zealanders to pick up e-cigarettes thinking they are not harmful and inadvertently becoming an entry to a smoking habit.*”

Dr Stuart Jones, Medical Director, Asthma and Respiratory Foundation NZ

### *Vaping as a gateway to tobacco smoking*

The evidence from longitudinal studies indicates that young people who start vaping are more likely to start smoking. This has two main proposed explanations. The first is that it may be due to a ‘gateway effect’ – the theory that initiation with one substance/product (in this case e-cigarettes) can increase the subsequent use of another substance/product (in this case smoked tobacco). Such an effect could occur through initial nicotine addiction with vaping progressing to smoking through positive relationships with smoking peers, reducing the perceived harm of smoking, and prompting smoking behaviours. The alternative explanation is the ‘common liability’ theory, whereby young people transition from vaping to tobacco smoking due to other factors that make them susceptible to both behaviours (Siddiqi et al., 2019).

#### **The US National Academies of Sciences, Engineering, and Medicine review (2018) found that**

**Conclusion 16-1.** There is *substantial evidence* that e-cigarette use increases risk of ever using combustible tobacco cigarettes among youth and young adults.

**Conclusion 16-2.** Among youth and young adult e-cigarette users who ever use combustible tobacco cigarettes, there is *moderate evidence* that e-cigarette use increases the frequency and intensity of subsequent combustible tobacco cigarette smoking.

Data from the US indicates that ‘current e-cigarette use’ increased very rapidly between 2017 and 2018 in middle- and high-school children from 11.7 per cent to 20.8 per cent (Cullen et al., 2018). A similar rapid increase in EC use appears to have occurred in Canada where teenage vaping rates were reported in the press<sup>7</sup> as having increased substantially alongside an increase in youth smoking rates (Hammond et al., 2019).

“*EC use is associated with higher rates of smoking initiation amongst adolescents, even among those who would otherwise have no inclination to smoke. There is a huge need to design policies that address the rising prevalence of EC use and re-normalization of smoking behaviour to protect our future generations. The absence of data on long-term safety should not be equated with safety; such was the case with cigarettes in the last century.*”

(Chatterjee et al., 2016)

7 Press article titled Teen vaping in Canada has taken a ‘worrisome’ turn – New data suggests teen smoking rates in Canada are also rising, retrieved on 16 April 2019 from <https://www.cbc.ca/news/health/health-canada-youth-teenage-vaping-smoking-hammond-1.4937593>

## Percentage of middle and high school students who currently use e-cigarettes\* and any tobacco product†

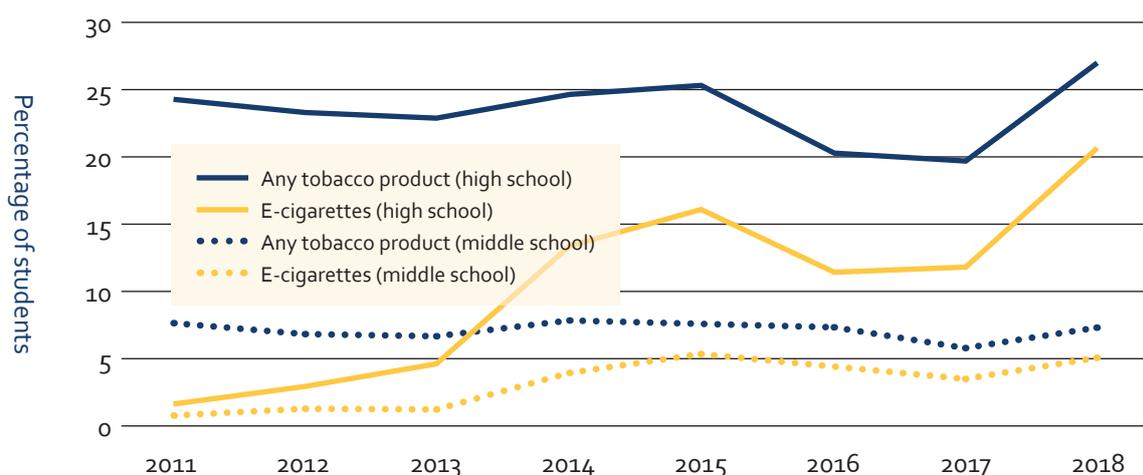


Figure 2: National Youth Tobacco Survey, United States, 2011–2018 (from Cullen et al., 2018)

\* Current e-cigarette use was assessed by responses to these questions during the indicated survey years: “In the past 30 days, which of the following products have you used on at least one day?” and the response option, “Electronic cigarettes or e-cigarettes such as Ruyan or NJOY” (2011–2013); “During the past 30 days, on how many days did you use e-cigarettes such as Blu, 21st Century Smoke, or NJOY?” (2014); “During the past 30 days, on how many days did you use electronic cigarettes or e-cigarettes?” (2015); and “During the past 30 days, on how many days did you use e-cigarettes?” (2016–2018). During 2015–2018, e-cigarette questions were preceded by an introductory paragraph defining the product.

† Any tobacco product was defined as use of one or more of the following tobacco products on  $\geq 1$  day in the past 30 days: cigarettes, cigars (defined as cigars, cigarillos, or little cigars), smokeless tobacco (defined as chewing tobacco, snuff, or dip), e-cigarettes, hookahs, tobacco pipes, snus, dissolvable tobacco, and bidis.

Longitudinal studies can contribute to the understanding of causal pathways, and these studies show consistent, strong associations between vaping and tobacco smoking uptake in young people. Chatterjee and colleagues (2016) reviewed four longitudinal studies that investigated the effects of e-cigarette use on the onset of tobacco smoking among adolescents and young adults (total sample  $n=10,690$ ) and concluded that e-cigarette use in young people leads to a higher incidence of combustible cigarette smoking.

A Canadian longitudinal study (Hammond et al., 2017) investigated e-cigarette use and smoking initiation among Canadian youth using survey data from secondary school students aged 14–18 years ( $n=19,130$ ) at baseline (2013/4) and one-year follow-up (2014/15). Youth who reported e-cigarette use in the previous 30 days at baseline were found to be more likely to initiate cigarette smoking and more likely to report having smoked daily at follow-up, even after adjustment for a range of other factors at baseline.

Another Canadian longitudinal study examined whether baseline use of e-cigarettes among a sample of never-smoking high school students ( $n=9501$ ) predicted cigarette smoking initiation over a two-year period (Aleyan et al., 2018). The authors concluded that vaping may contribute to a new population of cigarette smokers, and is expanding the tobacco market by attracting low-risk youth who would otherwise be unlikely to initiate using cigarettes.

In their systematic review and meta-analysis of nine longitudinal studies Soneji et al., (2017) found strong and consistent evidence of an association between initial e-cigarette use and subsequent cigarette smoking initiation, as well as between past 30-day e-cigarette use and subsequent past 30-day cigarette smoking. The odds of subsequent cigarette smoking within 12 months were found to be quadrupled among e-cigarette users, after adjusting for demographic, psychosocial, and behavioural risk factors for cigarette smoking.

Serious concerns regarding the potential for non-smoking children and young people to become addicted to nicotine through vaping, and transition to smoking cigarettes, were raised by the US Surgeon General (US Department of Health and Human Services, 2018). The US Centre for Disease Control and Prevention (CDC) reported that e-cigarette use had increased exponentially in the US over the seven years to 2018 from 1.5% (220,000 students) in 2011 to 20.8% (3.05 million students) in 2018. A particularly large increase in e-cigarette use occurred in 2018, coinciding with the introduction of the pod vape JUUL to the market. This increase in 2018 occurred alongside the first increase in overall tobacco product use among young people for many years, possibly representing a reversal of the decline observed in recent years (Cullen et al., 2018).

A more regulated tobacco environment and differences in how EC prevalence is reported between countries may explain why vaping in children and young people appears to be much lower in the UK (less than 2%) than in North America. Public Health England (2018) reported that e-cigarettes were attracting very few young people who had never smoked into regular use, and that they did not appear to be undermining the long-term decline in cigarette smoking among young people (McNeill et al., 2018).

This conclusion is similar to the ASH interpretation of 2017 and 2018 Year 10 survey findings. However, evidence presented in this report suggests that it may be premature to equate low daily use in Year 10 students with the absence of a gateway effect. Data from these two Year 10 surveys show a levelling off of the long-term decline in youth smoking prevalence between 2017 and 2018. The research was not able to take into account the impact of mid-2018 liberalisation of sales and point-of-sale and online marketing of EC products containing nicotine (prior to this it was not legal to sell these products if they contained nicotine), or the introduction of high-nicotine podvapes into the New Zealand market in late 2018.

## What are the risks and benefits of promoting vaping as a harm reduction strategy?

### KEY FINDINGS

- Risks and benefits can occur at both individual and population levels. At an individual level, smokers who fully switch to ECs or quit will undoubtedly benefit.
- At a population level, increasing access to ECs may be positive or negative on smoking prevalence, reducing inequalities in health outcomes, and on population health, depending on the degree of their direct adverse health impacts and the extent to which they result in increased quitting/substitution among smokers and increased smoking uptake among young people and non-smokers.
- Modelling studies that find net benefit from ECs assume that they have positive benefits on quitting and that high levels of substitution from smoking to ECs occurs, and this outweighs the potential risks of any health effects in non-smokers who use ECs and increased smoking prevalence in young people due to gateway effects.

### ***Modelling studies investigating benefits and harms of e-cigarettes***

There is a body of research investigating the benefits and harms of introducing ECs through modelling different scenarios. However, the assumptions underpinning current modelling scenarios, and conclusions reached, can quickly become outdated. For example, none of the modelling studies discussed in this section have accounted for the impact of relatively new, user-friendly podvapes. These and other product developments, new information about health impact, policy and other contextual changes need to be considered in reading the research.

A key New Zealand study (Petrovic-van der Deen et al., 2019) used a computer simulation model to estimate the likely net health impact of liberalising access to e-cigarettes in New Zealand. Note, the authors used the term 'liberalising access' to mean a scenario where ECs could be purchased only from pharmacies and specialist shops, because the study began before it became legal to sell nicotine-containing ECs in NZ. It did not consider the impact of a public education campaign promoting the use of ECs for smoking cessation or the advent of podvapes. The study did take into account various known benefits of vaping as well as the known risks and based on this information concluded that the NZ population alive in 2011 was estimated to gain 236,000 extra years of healthy life over the remainder of the population's lifespan through making e-cigarettes available in specialist stores and pharmacies. The authors noted that ECs were modelled to have a much greater impact than some interventions, but that some other tobacco control interventions were likely to reduce smoking prevalence more than improving access to ECs.

Key to all the modelling papers that find net benefit from e-cigarettes is the assumption that they have positive benefits on quitting and that ECs are substantially less harmful to health than smoking and that high levels of substitution from smoking to ECs occurs.

#### *What did this review find about assumptions underpinning harm reduction?*

Little evidence was found that adult tobacco smokers in New Zealand are using vaping effectively as a smoking cessation tool or as a substitute for smoking, although many smokers state they intend to use vaping to quit and many vapers report that they have quit smoking successfully through vaping. Population survey data show that the great majority of vapers are dual users both in New Zealand (Oakley & Martin, 2019) and elsewhere (Lee et al., 2018). However, it is not yet clear whether dual users subsequently quit, relapse to smoking or continue to dual use long-term.

Systematic reviews of observational studies have reported mixed results on whether e-cigarette use increases quitting among smokers in the general population. There are only a small number of randomised controlled trials, but a recent UK study indicated that ECs would be more effective than NRT in the context of structured, comprehensive smoking cessation services (Hajek et al., 2019).

The published research on the health impacts of vaping is largely restricted to studies of constituents of EC vs smoked tobacco emissions and some biomarker and short-term health impact studies. These suggest that ECs will not be completely safe, but the harms of exclusive vaping are likely to be much less than continued smoking. There is no evidence available on the long-term health effects of EC use, though these are likely to be much less than for smoking tobacco products. Some recent evidence has caused concerns about long-term harms, particularly to respiratory health, especially studies suggesting ECs can adversely affect human airway cells and lungs.<sup>8</sup>

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8 Radio NZ interview with Dr Stuart Jones of 11 December 2018 retrieved on 19 December 2018 from <https://www.radionz.co.nz/national/programmes/ninetonoon/audio/2018675067/too-many-young-people-vaping-respiratory-specialist>

## How can these findings inform responses to proposed amendments to the SFEA?

### KEY FINDINGS

- Current evidence on the long-term health impacts of vaping is insufficient to properly inform regulation in this area, and many countries are taking a more precautionary approach to regulation than is currently being proposed in New Zealand.
- The Ministry of Health proposed approach has identified, but not yet addressed concerns about the need to protect children and young people from the promotion of and access to e-cigarettes and smokeless tobacco products. Specifically:
  1. The proposed approach allows for the products to be sold in dairies, supermarkets, petrol stations and other places where tobacco products are sold. Many of these venues have a poor record of restricting sales of tobacco products to under 18-year-olds.
  2. E-cigarettes and smokeless tobacco products are being successfully marketed and sold online, and are easily accessed by minors. There appear to be no proposed restrictions or monitoring of online advertising and sales, and minimal obligations placed on vaping and tobacco industries to demonstrate compliance with age restrictions.
  3. Realistic investment is needed to provide for ongoing monitoring and compliance with regulations to protect young people.
- The evidence in this report supports a very targeted approach to public information provision encouraging smokers to consider using e-cigarettes to support quitting smoking. Public campaign messages need to be assessed to ensure that they do not promote use among non-smokers, particularly children and young people.

### *Regulating e-cigarettes in other countries*

A review of e-cigarette regulations in 68 countries (Kennedy et al., 2017) found that the most common forms of regulation were:

- complete sale bans
- place of use restrictions (eg. vape-free public places)
- age-of-purchase requirements
- warning labels
- regulation of constituents of ECs/e-liquids
- advertising and promotion bans.

E-cigarette use is banned in enclosed public spaces such as bars, restaurants and other workplaces in 25 countries; 14 countries required health warning labels; and 13 regulate e-cigarette constituents and flavours. Six countries, including the UK, apply a tax to e-cigarettes. Safety standards are required in 26 countries.

Of the above components, many will be considered when the SFEA 1990 is amended to extend current coverage to vaping and smokeless tobacco products (advertising and promotion, vape-free public places, and age-of-purchase requirements). The proposed changes include the establishment of minimum safety requirements under the Hazardous Substances and New Organisms Act (HSNO).

### *Protections for young people*

At a public forum in early April 2019, Associate Minister of Health Jenny Salesa stated that Government was taking a precautionary approach with regulation, and particularly wanted to ensure children and non-smokers did not start vaping – while supporting a switch to vaping for current smokers. Key components announced regarding the proposed legislation and approved by Cabinet at this stage were:

- Regulate like tobacco
- No sales to under 18-year-olds
- No vaping in legislated smoke-free areas
- No promotion, advertising at point of sale
- Will require annual sales data reporting
- Product safety requirements
- Regulate flavours and colours.

At the time of writing this report, no further detail was available. There seems to be very little in the Ministry's Regulatory Impact Statement (2019) that addresses the issue of protecting children and young people from the risk of becoming addicted to nicotine through experimenting with vaping. Extending coverage of the SFEA to include all vaping and smokeless tobacco products will make it illegal to sell these products to young people under the age of 18 years, but the products can easily be accessed online or in other retail outlets such as dairies, which have a poor record of restricting tobacco product sales to minors and are difficult to monitor.

A key issue relating to the promotion of ECs and smokeless tobacco products to children and young people is that of online marketing. It is clear that many New Zealanders are both impacted by online advertising, and purchase products online. Monitoring and regulation in this area does not yet appear to have been addressed.

The US Food and Drug Administration (FDA)<sup>9</sup> has taken the following steps to protect children and young people from vaping. Similar measures could be considered for New Zealand.

- Measures were taken to foreclose the sale of products to minors online by working with online distributors
- Warning letters were issued to manufacturers, distributors and retailers for selling kid-friendly vape products
- Nationwide undercover investigations were carried out on vaping shops and online stores resulting in over 1300 warning letters to retailers who illegally sold products to minors
- Required manufacturers and retailers to submit plans describing how they would address the issue of minors' access to their products
- Provided guidance to the industry signalling a move to strengthen regulations and enforcement on the sale of flavoured vaping products to minors.

### *Improving publicly available information on vaping and smokeless tobacco*

Improving publicly available information is the second of the two key aims in the Ministry's Cabinet paper on vaping and smokeless tobacco (2018), and progress has been made in this area during the time of writing this report. The Health Promotion Agency is undertaking a public campaign to provide information about vaping to quit smoking.

The evidence in this report supports a very targeted approach to public information provision, in recognition of the two very different audiences for such messages – adult smokers, and young people. Public campaign messages conveying that a product is 'relatively harmless' are important for communicating to smokers, but can easily be interpreted as 'harmless' by both young people and non-smoking adults (including parents).

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<sup>9</sup> US Food and Drug Administration (2019). Modifications to Compliance Policy for Certain Deemed Tobacco Products. Retrieved on 28 March 2019 from <https://www.fda.gov/downloads/TobaccoProducts/Labeling/RulesRegulationsGuidance/UCM633281.pdf>

### *Issues that are not addressed in the Ministry's preferred approach*

The Ministry's preferred approach as summarised on page 35 of the 2019 Regulatory Impact Statement does not include the following measures that have been adopted in other countries:

**Restrictions on sale** The Ministry's preferred approach will enable vaping and other smokeless tobacco products to be sold in any retail store; that will include dairies, service stations, and supermarkets. This approach would maximise access to vaping products for smokers and may encourage their use for quitting. However, this approach could also be problematic for several reasons, most notably because:

- Qualitative research indicates that many smokers find vaping unsatisfying (Robertson et al., 2019, Hoek et al., 2017) or difficult to master and hence require advice, support and encouragement – particularly when they first start to vape. Specialist vape stores and pharmacies could provide smokers with advice and support on how to use vaping more effectively to quit or reduce smoking.
- A qualitative study<sup>10</sup> investigating Māori women's perspectives and experiences with smoking and vaping identified a number of barriers to vaping with this group. Those who tried vaping and returned to smoking tended to do so within two weeks.
- It is not consistent with limited evidence in this area, which suggests that vaping is most effective when used with support in the context of structured quit programmes (as are most NRT products).
- The liberalisation of access to smokeless tobacco products may normalise these products and increase use among non-smokers and young people by making them more accessible and appealing to both non-smokers and young people.

Hence, there is a strong case that to maximise the benefits of making ECs more widely available they should be sold in places which are more able to support smokers and are less likely to sell to minors. A complementary measure which could encourage smokers to switch to vaping would be to greatly restrict the places allowed to sell smoked tobacco products so that ECs are relatively more easily available to smokers than cigarettes.

**Promotion and advertising** The Ministry's preference is to allow R18 stores to give away free samples, rewards and the co-packaging of products (presumably existing SFEA restrictions on marketing and sponsorship will also apply to vaping and smokeless tobacco products). Allowing product giveaways is discussed by some researchers, who argue that free sampling should be prohibited (Bhatnagar, 2017) as it could be used to promote vaping among non-smokers.

**Regulation of constituents and flavours** The Ministry suggests providing for "flavours and/or colours to be prohibited in future should evidence come to light that they are being used to attract young people to vaping..." (MoH 2019, p. 35). While it could be argued that flavours are important to make the products attractive to adult smokers, there is good evidence that children and young people are attracted by flavourings such as fruit, chocolate, and bubble gum (Glantz & Bareham, 2018, Patel et al., 2016). A regulatory framework is needed to ensure that the appeal of ECs and e-liquids to children is minimised.

Restrictions on some smokeless tobacco constituents known to be toxic may be covered by HSNO requirements.

Restricting nicotine levels will be necessary in light of evidence about both the addictiveness of nicotine, data on the high levels of nicotine in some e-cigarettes and smokeless tobacco products, and evidence on its impact on cognitive development in children and young people (US Surgeon General, 2019). The European Union's Tobacco Products Directive states that nicotine-containing liquid can only be sold if the nicotine concentration does not exceed 20mg/mL.

10 Retrieved from <https://www.hpa.org.nz/research-library/research-publications/māori-womens-perspectives-and-experiences-with-smoking-and-vaping> on 11 June 2019.

**Smoke-free environments** The SFEA allows for smoking restrictions in some public places, but there are many outdoor public places that are not yet covered. The Ministry has suggested that vaping not be allowed in legislated smokefree areas, and that guidelines will be developed for business owners, employers and local authorities to develop and implement their own policies in relation to vaping in those areas not yet covered by the Act. Placing the onus on these parties to be proactive about vaping will create public confusion. There is an opportunity to extend the coverage of the SFEA to additional public places, which will further reduce the social acceptability of tobacco smoking, and the risk that addiction to vaping becomes normalised amongst children and young people.

The Cancer Society supports making all areas that are designated smoke-free, vape-free, for the following reasons:

1. Allowing vaping in indoor smokefree environments will expose non-users to possible health risks from exposure to vaping-related emissions. Non-users may also dislike being exposed to vapour, creating a nuisance effect.
2. Allowing vaping in these areas contributes to the 'normalisation' of nicotine product use at a societal level.
3. Allowing vaping to take place in smokefree areas may reinforce the notion that alternative nicotine product use is both acceptable and 'safe', rather than less harmful than tobacco.
4. Individuals (children, young people and non-smokers) who are curious about vaping may have their interest reinforced by seeing people vaping more frequently than at present.
5. Finally, smokers may be able to manage their nicotine addiction more easily if they are able to vape in smokefree areas, and this could undermine their motivation to quit smoking.

**Health Warning Labelling** Health warning labelling does not seem to be included in the proposed approach, but it is a feature of the e-cigarette regulation in many OECD countries including the European Union, the UK, and the US. Careful consideration of appropriate warnings and messaging on packaging is needed, consistent with messaging in public education campaigns, messaging from health professionals, Quitline and other smoking cessation services. This needs to strike a balance between educating smokers/public about the relative harms of ECs compared to smoking, the addictiveness of nicotine and the need to keep products out of the hands of children.

Consideration ought to be given to health warnings/advice about vaping in pregnancy. There is evidence from animal studies that vaping during pregnancy may be harmful to the foetus. It has been suggested that if the mother uses vaping as a way of reducing smoking during pregnancy and mistakenly increases her intake of nicotine this could be very damaging to the child (Spindel & McEvoy 2015).

**Marketing of vaping as a smoking cessation aid** The Ministry notes that the Medicines Act 1981 regulates products that make a therapeutic claim (eg to support smoking cessation) and also the importation of nicotine (MoH 2019, p. 13). It is unclear how/whether this Act is being used or considered as a vehicle for placing the onus on the vaping/tobacco industry to restrict nicotine levels or meet requirements for demonstrating cessation effectiveness.

# Conclusions

## Health risk

The lack of long-term clinical data to enable clarity on the risks to human health caused by vaping is contributing to divided opinions about its potential harm, both in New Zealand and internationally. It is a concern that in the absence of a solid research base, we may be inadvertently exposing New Zealanders to health risk.

There is new evidence that vaping is associated with respiratory problems and can damage the lungs, and may contribute to cardiovascular disease. E-cigarettes contain low levels of carcinogens, including formaldehyde and nicotine-derived nitrosamine ketone which may increase the risk of lung cancer even at low doses and especially with long-term EC use.

Nicotine itself is not harmless; it is highly addictive and has been found to have detrimental impacts on cognitive development in children and young people (US Surgeon General, 2018). Cardiovascular tissue is very sensitive to nicotine and it has been found to cause an increase in blood pressure and heart rate (Bhatnagar, 2019).

There is sufficient emerging evidence of harm presented in this review to justify a precautionary approach in making these products available.

## Smoking cessation

There is reason for optimism about the potential role of e-cigarettes in helping smokers to quit and reducing smoking prevalence, and hence contributing to achieving the Smokefree 2025 goal.

There is some randomised controlled trial evidence that e-cigarettes support smokers to quit, and one good-quality randomised controlled trial has demonstrated vaping to be more effective than nicotine replacement therapies in the context of supported smoking cessation (Hajek et al., 2019). Population evidence of impact on quitting is less clear.

There are anecdotal reports that ECs are more acceptable to and effective for Māori smokers than other cessation tools. However, vaping is not supported by all providers of Māori smoking cessation services, and this review was unable to find evidence supporting the anecdotal reports. These claims underline the need for investment in well-designed studies that investigate the potential of vaping for reducing smoking prevalence among Māori and other priority populations, and to inform the design of cessation services.

The research brought together in this report suggests that vaping is likely to be most effective in smoking cessation when it is made available in the context of smoking cessation services or when smokers are supported by trained professionals. However, most smokers wanting to quit do not receive support from such services. The evidence that many smokers have difficulties with using ECs suggests that the most effective approach may be to make e-cigarettes available through specialised shops, pharmacies and smoking cessation services, where training can be provided to staff on advising smokers how to best use the products for smoking cessation. This may result in more effective use of EC products among smokers than making them widely available in dairies, supermarkets and petrol stations. It should also help minimise the use of these product by children.

Population surveys indicate that most smokers who vape continue to smoke ('dual use'). Qualitative research indicates that vaping is often used to manage nicotine addiction and navigate smoke-free restrictions. Recent research raises concerns about the potential for 're-normalising' nicotine addiction, thus creating a social environment that is not conducive to quitting smoking and may actually provide disincentives for smokers to quit. These findings support the need to restrict vaping in all smokefree areas.

## Children and young people

While ECs have potential to help existing smokers to quit, there also needs to be a balance in regulation and legislation to ensure that children and non-smokers are protected.

There is widespread agreement within the tobacco control sector that e-cigarettes are not harmless, and that regulation is needed to protect children and young people from becoming addicted to nicotine through 'playing around' with these and other smokeless tobacco products. The US Surgeon General warns that nicotine exposure can disrupt the growth of brain circuits that control attention, learning and susceptibility to addiction during periods of significant brain development, such as adolescence. There is evidence that managing vaping behaviour and addiction in school children has become problematic for schools in New Zealand (Kidd, 2019) and overseas.

While ASH NZ Year 10 data shows that 'daily' e-cigarette use in 2018 was below two per cent, it is concerning that four per cent were already using e-cigarettes 'daily or weekly' at a time when the sale of nicotine-containing e-cigarettes was illegal, and high-nicotine JUUL had not yet been introduced into the New Zealand market. Furthermore, smoking prevalence in 14- to 15-year-old students actually levelled off during 2017 and 2018 after declining for many years. The Year 10 data will not have picked up any effect of the recent liberalisation of sales and point-of-sale promotion in dairies and petrol stations. Without effective regulation, monitoring and enforcement, the trend of declining smoking prevalence in young New Zealanders could be reversed, as appears to be happening in the US and Canada.

There is evidence that young people are being targeted globally with online marketing of vaping and smokeless tobacco products, which has been shown to be effective with young people even in countries where there are advertising and marketing bans. Many vaping flavourings are known to appeal to children and young people. Since the ban on sales of nicotine-containing ECs was lifted in mid-2018, there are documented instances of vaping products being given away at youth music concerts<sup>11</sup>, and reports that youth radio stations in Auckland are providing vaping products as competition prizes<sup>12</sup>. JUUL and other nicotine-containing EC products are easily available now from New Zealand outlets, and being aggressively promoted online and by specialist shops, in dairies, liquor outlets and petrol stations, while regulation of the products is still being developed.

There is growing evidence from many large, longitudinal cohort studies in North America and Europe that indicate young non-smokers who vape are three to four times more likely to go on to smoke tobacco within 12 months. Longitudinal studies are providing strong, consistent associations between e-cigarette use and subsequent smoking, though whether this is a causal link or represents 'common liability' is uncertain.

It took decades to prove causality for tobacco smoking, so inability to prove causality at this early stage is not a reason to risk a generation of young people starting smoking as a result of vaping. The potential for children and young people to become addicted to nicotine through vaping – whether or not they go on to become smokers – provides a key argument for restricting access to e-cigarettes and non-combustible tobacco products to specialist outlets, pharmacies and smoking cessation programmes. This would enable the monitoring and enforcement of regulations to protect children and young people.

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11 Interview with Professor Janet Hoek's on RNZ 20 Dec 2018, discussing vape giveaways at youth music concerts: <https://www.radionz.co.nz/national/programmes/ninetoon/audio/2018676434/vape-giveaways-despicable-public-health-academic>

12 Personal communication with Health Promoter Leitu Tufuga, who has heard the promotions on youth radio (Flavour and Mai FM).

## Harm reduction

There are obvious benefits for individual smokers in reducing the health risks associated with tobacco smoking. Vaping may be more appealing than nicotine replacement therapy (NRT) products and could be a more effective way of helping adult smokers to quit than other options. But the risks associated with promoting these products (as a less harmful alternative to smoking) to the whole population are likely to outweigh the benefits at a population level.

There is sufficient emerging evidence of potential long-term health risks to justify caution and a very targeted approach to promoting vaping to smokers.

The main risk is that the message of ECs being much less harmful than smoking intended for adult smokers, could be interpreted by children, young people and non-smokers as 'harmless'. Their curiosity about vaping will be reinforced, further encouraging experimentation among these groups. Global tobacco and vaping industry marketing of EC products has been very effective in reaching school children through multiple platforms including social media for many years. Strong regulation, monitoring and enforcement of restrictions on marketing ECs is required to maximise protection of children and adolescents, while acknowledging the limitations of what can be achieved. The recent experience of rapid increases in JUUL use among school children following extensive marketing in the US and Canada provides a cautionary tale.

Research shows that many people who had never thought about smoking are curious about trying vaping and there is a risk that many children and non-smoking young people in New Zealand could become addicted to nicotine in a liberalised sales environment. Making ECs widely available with largely unrestricted access (allowing sales in retail settings including dairies, petrol stations and supermarkets) would improve access for smokers as an aid to quitting. However, it would also maximise youth access to ECs, risking the prospect of a new cohort of children and young people becoming addicted to nicotine, and potentially starting to smoke.

An alternative approach would be to make e-cigarettes available, but with some restrictions. This would allow sales only in specialist vape shops and pharmacies, as both stores have (or could have) staff trained in using e-cigarettes and smoking cessation. This approach could enhance the successful use of e-cigarettes by ensuring that smokers buy them at locations where they will receive expert advice about their use (which device, which strength of e-liquid etc) and support for quitting smoking. This option would greatly reduce the risk of children and young people experimenting with, becoming regular users of e-cigarettes or going on to smoke conventional cigarettes.

While the findings of this review support more restricted access to EC and smokeless tobacco products, it must be acknowledged that the New Zealand tobacco control sector is divided on these matters. There are many who believe that ECs ought to be made as widely available as possible and marketed comprehensively. They argue that ECs save lives, that youth uptake is not a problem here, and that EC use in young people has not been proven to lead to tobacco smoking. Arguments are made that ECs have the potential to reduce health inequalities, based largely on anecdotal reports that Māori smokers prefer vaping to other smoking cessation approaches, and that it is more effective for them.

These claims and reports are deserving of investment in well-designed research – to test their validity and to inform the design and improve the effectiveness of stop smoking services for Māori and other priority groups.

Meanwhile, serious consideration must be given to how New Zealand protects children and young people from the risk of exposure to nicotine addiction, in any form.

## E-cigarette regulation and the context of Smokefree 2025

E-cigarette regulation should not be seen as an issue in isolation. It is potentially part of the means to help achieve the Smokefree 2025 goal. As such, it is important that measures to make ECs more available for smokers to help them quit or transition away from smoking are supported by comprehensive measures to make smoked tobacco products less affordable, appealing and addictive, as was laid out in the Achieving Smokefree Aotearoa Action Plan<sup>13</sup> developed by the tobacco control sector in 2017. Such an approach will maximise the positive impacts of e-cigarettes and accelerate progress towards achieving the Smokefree 2025 goal.

The Ministry's regulatory review provides an opportunity to strengthen the Smokefree Environments Act 1990 (SFEA), based on sound evidence. The time has come to seriously consider 'endgame strategies' such as a substantial reduction in tobacco sales outlets over time, reducing levels of nicotine in cigarettes, a sinking lid on tobacco supply, and tobacco-free generation policies to be included in amendments to the Smokefree Environments Act 1990.

Further restricting the sale of all tobacco products would enable a more supportive environment for helping smokers to switch to vaping. Specialist vape stores, pharmacies and smoking cessation services could provide smokers with advice on how to use vaping to quit or reduce smoking.

The debate on the pros and cons of vaping needs to be seen in the context of interventions known to be effective in reducing smoking prevalence, and especially among Māori. In this respect, tobacco taxation appears to be the most effective tool we have at present, as confirmed by Ernst and Young (2018) findings.

More emphasis on protecting children and young people is needed in New Zealand regulation. There is an urgent need for regulating, monitoring and enforcing restrictions on online marketing and sales that encourage children and young people to try vaping and purchase products online. This will require additional investment.

Findings from ASH Year 10 and other New Zealand surveys show low levels of current vaping in young people, but this could change very quickly unless we get the regulation and messaging right.

“Widespread acceptance of these devices could re-normalize the use of tobacco products and recruit a new generation of users to nicotine addiction. Therefore, further toxicological, clinical, economic, and marketing research is required to chart a clear, evidence-based pathway for alleviating the cardiovascular disease burden of tobacco products.”

Aruni Bhatnagar, Professor of Medicine, University of Louisville

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<sup>13</sup> <https://aspire2025.org.nz/hot-topics/smokefree-action-plan/>

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