E-cigarette use and perceptions among current and ex-smokers in New Zealand

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MAIN IMPLICATIONS AND RELATED FINDINGS

Implications for public health messaging or policy	Main related findings (from survey of 1099 current and ex-smokers)
Encourage vaping as a cessation tool more strongly	Many of those quitting or trying to quit who vape regularly are vaping for reasons other than cessation: • Many (47%) regular e-cigarette users (vaping at least once a month) did not have quitting smoking completely or avoiding returning to smoking as their main reason for vaping. Instead, their main reasons were things like cutting down smoking (19%), to use when they could not smoke (6%), curiosity (4%) and enjoyment (3%).
Provide smokers with clearer information about the relative harms of vaping/ e-cigarettes versus cigarettes	Perceptions of the relative harm of e-cigarettes appear to be exaggerated: • 28% of respondents felt that e-cigarettes were as harmful, or more harmful, than tobacco cigarettes • 24% did not know whether or not e-cigarettes were less harmful than tobacco cigarettes.
Consider regulation of flavours to reduce attractiveness to younger non-smokers.	Compared with older adults, young adults much preferred flavours such as fruit, candy, vanilla over tobacco or menthol/mint-based flavours • 71% of those 18-24 years preferred these flavours.

CONTENTS

EXECUTIVE SUMMARY

Background and method

The purpose of this report is to provide an overview of the use and perceptions of e-cigarettes among current and ex-smokers. To this end, we analysed data about e-cigarettes in the 2017/18 New Zealand Smoking Monitor (NZSM) from 1,099 respondents. Subgroup differences were compared by smoking status, age, gender, and ethnicity.

Key findings

Patterns of use

Across all measures of e-cigarette **use**, there were significant differences by smoking status. Rates of e-cigarette use were highest among recent quit attempters, who were most likely to i) have tried an e-cigarette; ii) anticipate doing so in the next 12 months (if they had not yet tried one); and iii) currently use e-cigarettes (see Table 1).

The proportions of respondents who had tried an e-cigarette also varied by age and ethnicity, with the highest rates of ever use among young adults and Māori. There were no other subgroup differences across the measures of use (see Table 1).

Table 1. Subgroup differences in patterns of e-cigarette use

	Ever tried an e-cigarette	Expect to try an e-cigarette in next 12 months	Currently use an e-cigarette	Long-term daily use of e-cigarettes[1]
Base	All respondents	Those who had never tried an e-cigarette	Those who had tried an e-cigarette	Those who had tried an e-cigarette
Age (years)	18 to 24 92%[R] 25 to 44 72%* 45 to 64 62%* 65+ 40%*	No differences	No differences	No differences
Gender	No differences	No differences	No differences	No differences
Ethnicity	Māori 73%[R] Pacific 64%* Asian 60%* European/Other 64%	No differences	No differences	No differences
Smoking status	Non-attempters 62% Recent quitters 72%* Serious quitters 63%[R]	Non-attempters 20%* Recent quitters 24%* Serious quitters 7%[R]	Non-attempters 32% Recent quitters 53%* Serious quitters 32%[R]	Non-attempters 21%* Recent quitters 40% Serious quitters 34%[R]

*Significantly different from the reference group (R), from a logistic regression model including age, gender, ethnicity, and smoking status. [1]Used daily for at least one month.

In terms of current **frequency** of e-cigarette use, the most common pattern among those who had ever tried an e-cigarette was ‘not at all’, followed by ‘daily or almost daily’. Most non-attempters and serious quitters (68% in each group) did not use one at all. Daily or almost daily use was more common among recent quit attempters (32%) and serious quitters (22%) than non-attempters (7%).

Device type

Tank-based e-cigarettes were the most commonly used device type (56% of ever users), followed by replaceable prefilled cartridges (20%).

Device content

The majority of current e-cigarette users indicated they used a device containing **nicotine**, although the level of use varied by smoking status (see Table 2). The use of **flavours** was also very common, with 85% of ever users reporting that they most often used flavoured e-cigarettes. Flavours other than tobacco or menthol/mint (eg, fruit, candy, alcohol, coffee, vanilla, etc.) were the most commonly used (50% of ever users), followed by tobacco flavours (26%). Young adults were more likely to use flavours other than tobacco or menthol/mint, while older adults were more likely to use tobacco flavoured e-cigarettes (see Table 2).

Table 2. Subgroup differences in the use of nicotine and flavours in e-cigarettes

	Nicotine	Tobacco flavour	Menthol/mint-based flavours	Other flavours[1]
Age	No differences	18 to 24 12%[R] 25 to 44 23%* 45 to 64 32%* 65+ 36%*	18 to 24 2%[R] 25 to 44 9% 45 to 64 11% 65+ 13%*	18 to 24 71%[R] 25 to 44 54%* 45 to 64 41%* 65+ 30%*
Gender	No differences	No differences	Females 12%* Males 5%[R]	No differences
Ethnicity	No differences	No differences	Māori 8%[R] Pacific 6% Asian 16%* European/Other 9%	No differences
Smoking status	Non-attempters 88%* Recent quitters 88%* Serious quitters 75%[R]	Non-attempters 31%* Recent quitters 28%* Serious quitters 20%[R]	No differences	No differences

*Significantly different from the reference group (R), from a logistic regression model including age, gender, ethnicity, and smoking status.
[1]Fruit, candy, alcohol, coffee, vanilla, etc.

Reasons for use

The most common reason for using an e-cigarette or vaping device at least once a month was ‘to quit smoking’ (43%), followed by ‘to cut down smoking’ (18%).

Perceptions of harm

Around one-half (47%) of respondents thought e-cigarettes were less harmful than cigarettes, but one-quarter (28%) felt that e-cigarettes were as harmful or more harmful than tobacco cigarettes and one-quarter (24%) said they did not know.

Conclusion

The current findings provide an overview of the use and perceptions of e-cigarettes among current and ex-smokers in New Zealand. Together, they suggest some important challenges for public health messaging in relation to e-cigarettes, including the need to: i) further encourage their use as a tool to quit smoking completely; and ii) provide smokers with clear and accurate information about the relative harms of e-cigarettes and cigarettes.

INTRODUCTION

Electronic cigarettes (e-cigarettes, also known as vaping devices) are devices that heat a liquid containing vegetable glycerine, propylene glycol, flavours, and often nicotine (referred to as 'e-liquids') to produce a vapour. Although the sale of e-liquid containing nicotine was previously banned in New Zealand, in May 2018 the Ministry of Health announced that it could be legally sold in New Zealand (Ministry of Health, 2018). E-cigarette use is increasing in New Zealand, with 17% of adults reporting e-cigarette trial in 2016, up from 13% in 2014 (Health Promotion Agency, 2018). Current use remains low with very few adults (2%) reporting current use in 2016 (up from 1% in 2014).

While the long-term effects of e-cigarette use are not yet known, it is widely agreed that e-cigarettes are far less harmful to health than smoked tobacco (McNeill, Brose, Calder, Bauld, & Robson, 2018; National Academies of Sciences Engineering and Medicine, 2018). Moreover, there is growing evidence that e-cigarettes can be useful as a smoking cessation aid (Hartmann-Boyce et al., 2016). For the best health outcomes, smokers who use e-cigarettes should aim to switch exclusively to e-cigarettes. However, most e-cigarette users in New Zealand (64%) are also current smokers (Oakly & Martin, 2019). A better understanding of the use and perceptions of e-cigarettes by smokers and recent quitters will lead to better smoking cessation advice and support for e-cigarette users.

The New Zealand Smoking Monitor (NZSM) is an ongoing fortnightly survey of current and ex-smokers. It is designed to provide the Ministry of Health and tobacco control sector with up-to-date data on key tobacco control indicators and areas of interest. The purpose of this report is to use data from the 2017/18 NZSM to provide an overview of the use and perceptions of e-cigarettes or vaping devices among current and ex-smokers.

METHOD

DATA SOURCE

Data were from the 2017/18 year of the New Zealand Smoking Monitor. Nine questions relating to the use and perceptions of e-cigarettes were included in the monitor for most of the 2017/18 survey year (22 fortnights for eight of the questions and 18 fortnights for one of the questions). Interviews were conducted by an external research company (UMR Research) via computer-assisted telephone interviewing (CATI).

RESPONDENTS

The NZSM includes three distinct smoking status groups, who are recruited according to their smoking and cessation behaviour (see Table 3 for the specific recruitment criteria). Non-attempters and recent quit attempters are recruited from UMR Research's nationally-representative telephone-based omnibus survey, while serious quitters are recruited from the Quitline client database. All respondents provide informed consent before taking part.

Table 3. Recruitment criteria for the three smoking status groups in the NZSM

Device type	Recruitment criteria
Current smokers, non-attempters ('non-attempters')	• smoked regularly in the past three months AND • smoked daily in the last 30 days AND • had not made a quit attempt that lasted 24 hours or longer in the past three months.
Recent quit attempters	• smoked regularly in the past three months AND • smoked daily in the last 30 days AND • had made a quit attempt that lasted 24 hours or longer in the past three months (regardless of whether it was a successful or failed quit attempt).
Serious quitters	• smoked regularly in the past three months • did not smoke daily in the last 30 days (ie, smoked less than one cigarette per day or had stopped completely) • intended to stop smoking completely in the next three months

The NZSM method allows respondents to participate in up to six successive interviews (ie, to be interviewed across six fortnights), but this report includes only the responses from each person's first interview.

Table 4 summarises the characteristics of participants included in the analyses for this report.

Table 4. Characteristics of respondents

		Number	Percent (%)
Total		1,099	
Smoking status	**Non-attempters**	330	30
	Recent quit attempters	360	33
	Serious quitters	409	37
Age	**18-24 years**	98	9
	25-44 years	455	41
	45-64 years	394	36
	65+ years	152	14
Gender	**Female**	578	53
	Male	521	47
Prioritised ethnicity[1]	**Māori**	212	19
	Pacific	56	5
	Asian	42	4
	European/Other	789	72

DATA ANALYSIS

Data cleaning and all statistical analyses were undertaken using STATA/IC 14.2. As noted above, only data from each respondent's first interview were included.

Descriptive statistics (proportions) for each question were calculated first. 'Don't know' or 'refused' responses were excluded from analysis, unless 'don't know' represented a legitimate answer (eg, 'Compared with cigarettes, how harmful do you think e-cigarettes are to a person's health?').

Logistic regression was then used to compare responses by age, gender, ethnicity, and smoking status. All variables of interest were included in each regression model to enable estimation of the unique relationship between each predictor (eg, smoking status) and outcome (eg, tried an e-cigarette), while holding constant all other predictors (eg, age, gender, and ethnicity). The significance level for all analyses was set at $\alpha = .05$.

[1] Ethnicity was prioritised in the order of: Māori, Pacific, Asian, and European/Other.

Interpreting the results

The text and figures indicate where there were significant differences by age, gender, ethnicity, or smoking status, after adjusting for the other variables included in the model. For example, the mention of a significant difference by age can be interpreted as, ‘a significant difference by age, after adjusting for gender, ethnicity, and smoking status’.

The figures include error bars representing the 95% confidence intervals, and the notes below each figure specify which variables were included in the regression model. They also indicate the sample size for that particular question (‘base’). in some cases, the base may be slightly reduced from the overall total, as respondents were only included in the regression if they had no missing data and no ‘don’t know’ or ‘refused’ responses across any of the variables of interest.

RESULTS

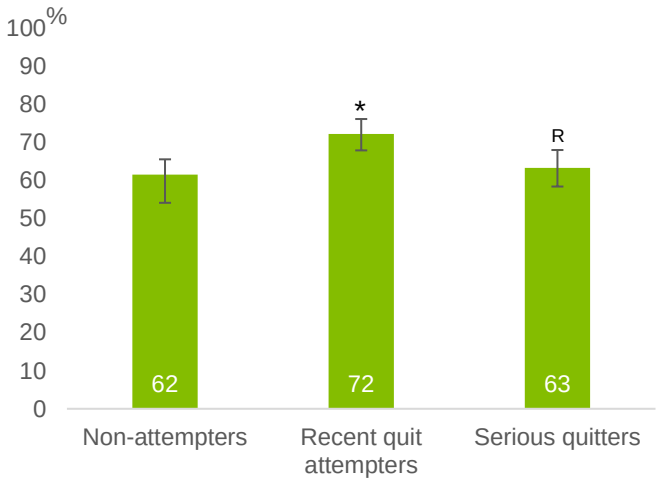
EVER USE

All respondents were asked whether they had ever tried an e-cigarette or vaping device. Ever use varied by smoking status, age, and ethnicity. Specifically, those more likely to have ever tried an e-cigarette or vaping device were:

- recent quit attempters, compared with serious quitters (Figure 1)
- young adults (18 to 24-year-olds), compared with older age groups (Figure 2)
- Māori, compared with Pacific and Asian respondents (Figure 2).

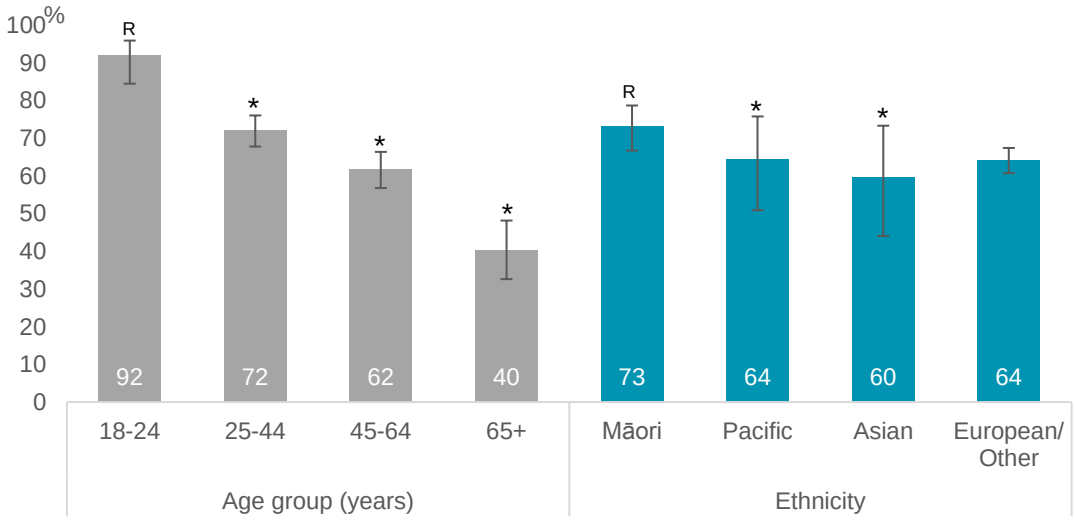
There were no differences by gender.

Figure 1. Ever used an e-cigarette, by smoking status



Base: All respondents, first interview (n = 1,099)
*Significantly different from the reference group (R), from a logistic regression model including age, gender, ethnicity, and smoking status.

Figure 2. Ever used an e-cigarette, by age and ethnicity

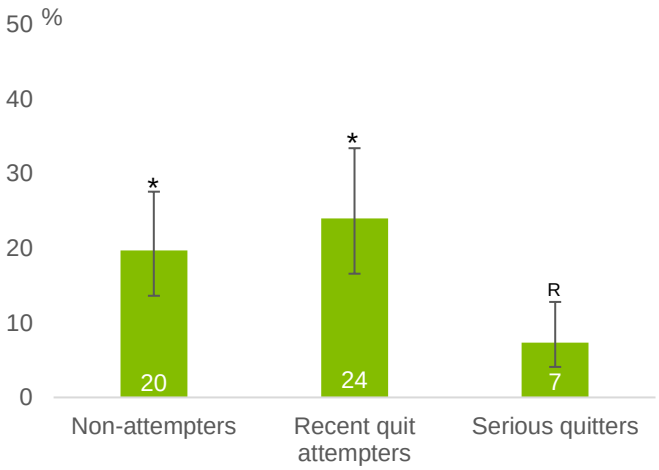


Base: All respondents, first interview (n = 1,099)
*Significantly different from the reference group (R), from a logistic regression model including age, gender, ethnicity, and smoking status.

EXPECTATIONS OF FUTURE USE

Respondents who said they had never tried an e-cigarette or vaping device were asked if they think they will try one in the next 12 months. Expectations of future e-cigarette use varied by smoking status: non-attempters and recent quit attempters were more likely than serious quitters to say they will try one in the next 12 months (see Figure 3). There were no differences by age, gender, or ethnicity.

Figure 3. Expect to try an e-cigarette in the next 12 months, by smoking status

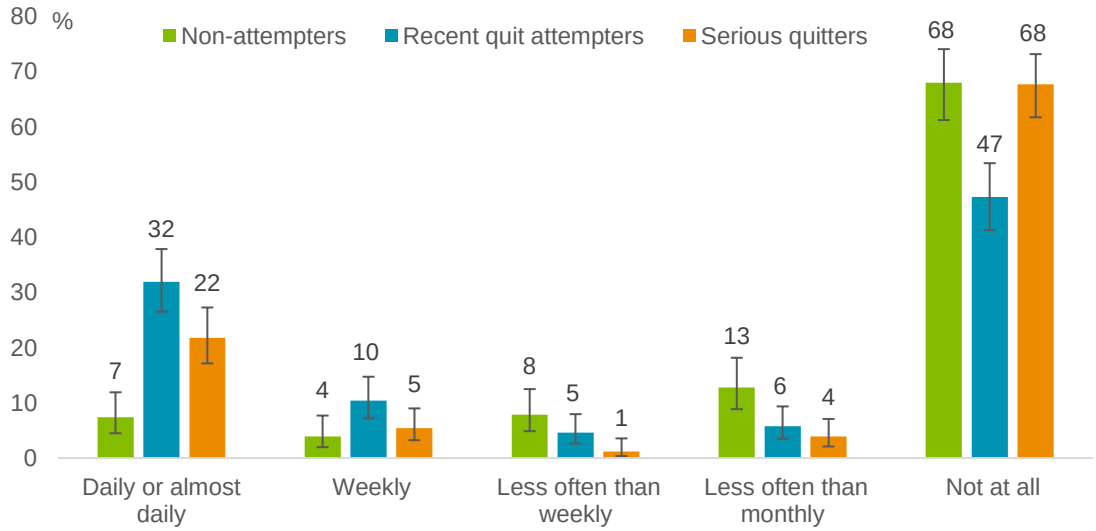


Base: Those who had never tried an e-cigarette or vaping device, first interview (n = 377)
*Significantly different from the reference group (R), from a logistic regression model including age, gender, ethnicity, and smoking status.

FREQUENCY OF USE

Those who had tried an e-cigarette or vaping device were asked how often they currently use one. Most respondents did not currently use e-cigarettes at all, although daily or almost daily use was relatively common among recent quit attempters and serious quitters (see Figure 4).

Figure 4. Frequency of e-cigarette use, by smoking status

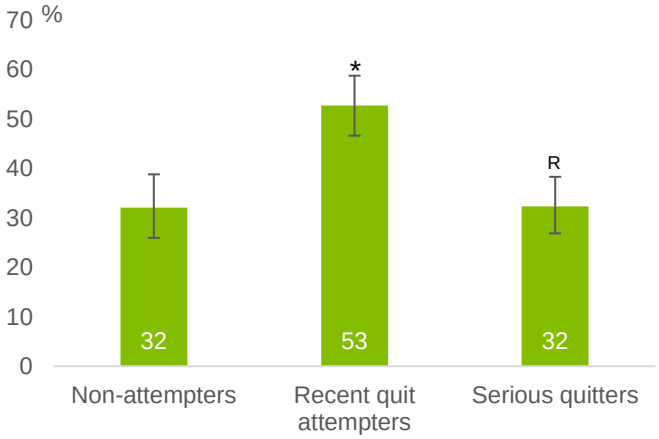


Base: Those who have tried an e-cigarette or vaping device, first interview (n = 720)

CURRENT USE

Current e-cigarette use, defined as currently using an e-cigarette or vaping device more often than ‘not at all’, varied by smoking status: recent quit attempters were more likely than serious quitters to be current users (see Figure 5). There were no differences by age, gender, or ethnicity.

Figure 5. Current e-cigarette use, by smoking status



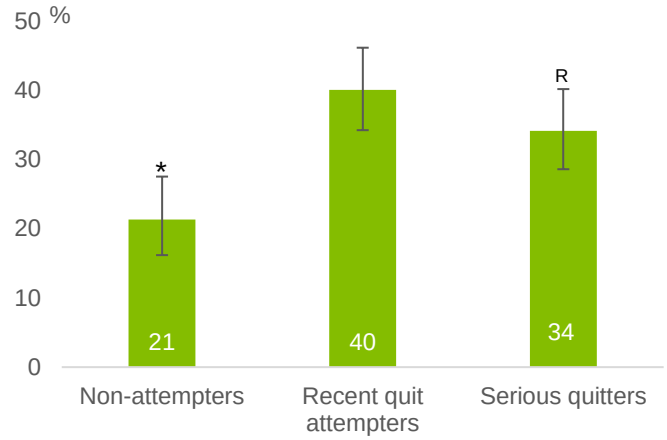
Base: Those who have tried an e-cigarette or vaping device, first interview (n = 720)
*Significantly different from the reference group (R), from a logistic regression model including age, gender, ethnicity, and smoking status.

Current e-cigarette use did not change over the period August 2017 to June 2018. There was a small amount of month-to-month variation in the observed prevalence of current use, but those differences were not statistically significant.

LONG-TERM USE

Those who had tried an e-cigarette or vaping device were asked if they had ever used one daily for a month or more. Long-term daily use varied by smoking status: non-attempters were less likely than serious quitters to have used e-cigarettes long-term (see Figure 6). There were no differences by age, gender, or ethnicity.

Figure 6. Long-term daily use of e-cigarettes, by smoking status



Base: Those who have tried an e-cigarette or vaping device, first interview (n = 720)
*Significantly different from the reference group (R), from a logistic regression model including age, gender, ethnicity, and smoking status.

DEVICE TYPE

Those who had tried an e-cigarette or vaping device were asked which device they use/used the most. Tanks that you refill with liquids were the most common device type, followed by replaceable prefilled cartridges (see Table 5).

Table 5. Common device types

Device type	% [95% confidence interval]
One with a tank that you refill with liquids (rechargeable)	56 [52, 60]
One that uses replaceable prefilled cartridges (rechargeable)	20 [17, 24]
A modular system that you refill with liquids (ie, you use your own combination of separate devices: batteries, atomisers, etc) (rechargeable)	10 [8, 12]
Don't know	10 [8, 13]
A disposable one (non-rechargeable)	4 [2, 5]

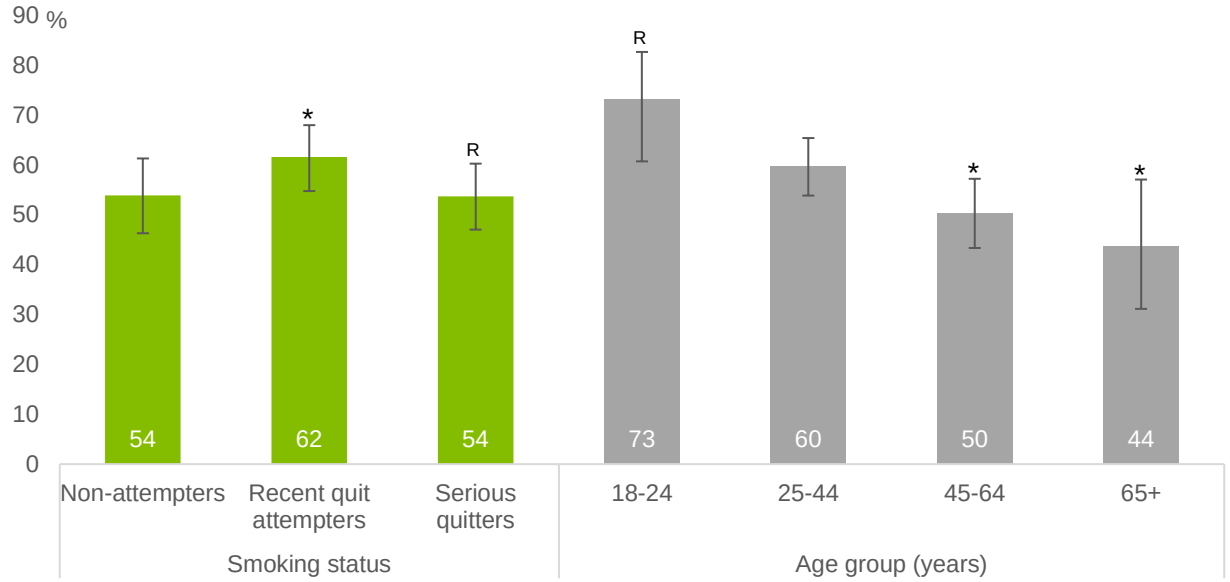
Base: Those who have tried an e-cigarette or vaping device, first interview (n = 595). Note that this question has a smaller sample of ever users because it was only asked across 18 fortnights (cf 22 fortnights for the other questions).

Patterns of use across subgroups were examined for the two most common device types. Those more likely to say they used a **tank-based** device (see Figure 7) were:

- recent quit attempters, compared with serious quitters
- young adults (18 to 24-year-olds), compared with those aged 45 years and over.

There were no differences by gender or ethnicity.

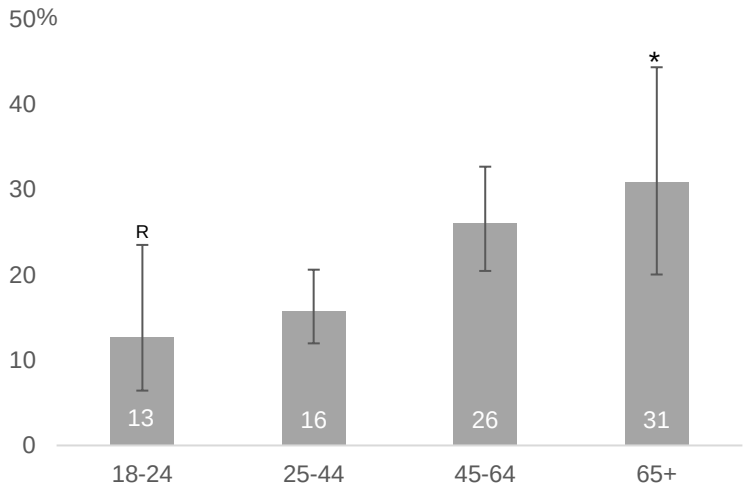
Figure 7. Use of tank-based e-cigarette devices, by smoking status and age group



Base: Those who have tried an e-cigarette or vaping device, first interview (n = 595). Note that this question has a smaller sample of ever users because it was only asked across 18 fortnights (cf 22 fortnights for the other questions).
*Significantly different from the reference group (R), from a logistic regression model including age, gender, ethnicity, and smoking status.

The use of replaceable prefilled cartridges was more common among older adults (aged 65 years and over), compared with 18 to 24-year-olds (see Figure 8). There were no differences by gender, ethnicity, or smoking status.

Figure 8. Use of replaceable prefilled cartridges, by age group



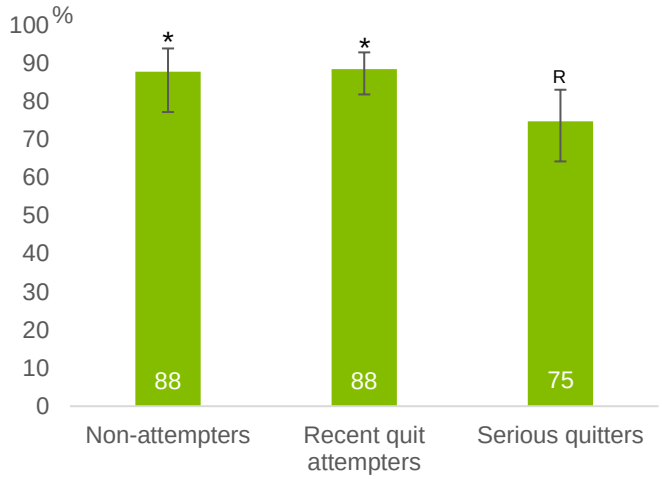
Base: Those who have tried an e-cigarette or vaping device, first interview (n = 595). Note that this question has a smaller sample of ever users because it was only asked across 18 fortnights (cf 22 fortnights for the other questions).
*Significantly different from the reference group (R), from a logistic regression model including age, gender, ethnicity, and smoking status.

DEVICE CONTENT

Nicotine

Current e-cigarette users were asked whether the e-cigarette or vaping device they use most often contains nicotine. The majority of respondents indicated they used a device containing nicotine, although the likelihood varied by smoking status: non-attempters and recent quit attempters were more likely than serious quitters to say they used a device that contained nicotine (see Figure 9). There were no differences by age, gender, or ethnicity.

Figure 9. Percentage of current users whose e-cigarette contains nicotine



Base: Current e-cigarette users, first interview (n = 285).
*Significantly different from the reference group (R), from a logistic regression model including age, gender, ethnicity, and smoking status.

Flavours

Those who had tried an e-cigarette or vaping device were asked what flavour they used most. The most common flavours were those other than tobacco or menthol/mint-based flavours (such as fruit, candy, alcohol, coffee, vanilla, etc.) and tobacco (see Table 6).

Table 6. E-cigarette flavours used most

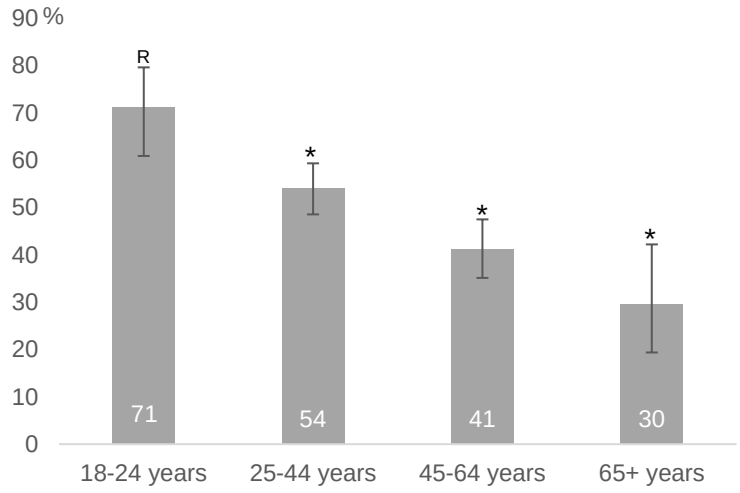
E-cigarette flavour	% [95% confidence interval]
A flavour other than tobacco or menthol/mint-based flavours (eg, fruit, candy, alcohol, coffee, vanilla, etc)	50 [46, 53]
Tobacco	26 [23, 29]
Don't know	13 [10, 15]
Menthol/mint-based (tobacco menthol, menthol, or mint)	9 [7, 12]
No flavour	2 [1, 4]

Base: Those who have tried an e-cigarette or vaping device, first interview (n = 722)

Different subgroups showed different flavour preferences (see Figures 10 to 12).

The use of flavours other than tobacco or menthol/mint-based flavours (eg, fruit, candy, alcohol, coffee, vanilla, etc.) varied by age: 18 to 24-year-olds were more likely than older age groups (25 years and over) to report using those flavours (see Figure 10). Recently the United States has proposed restricting sales of such flavours to age-restricted, in-person locations (US Food & Drug Administration, 2018).

Figure 10. Use of e-cigarette flavours other than tobacco or menthol/mint-based flavours (eg, fruit, candy, alcohol, coffee, vanilla, etc)

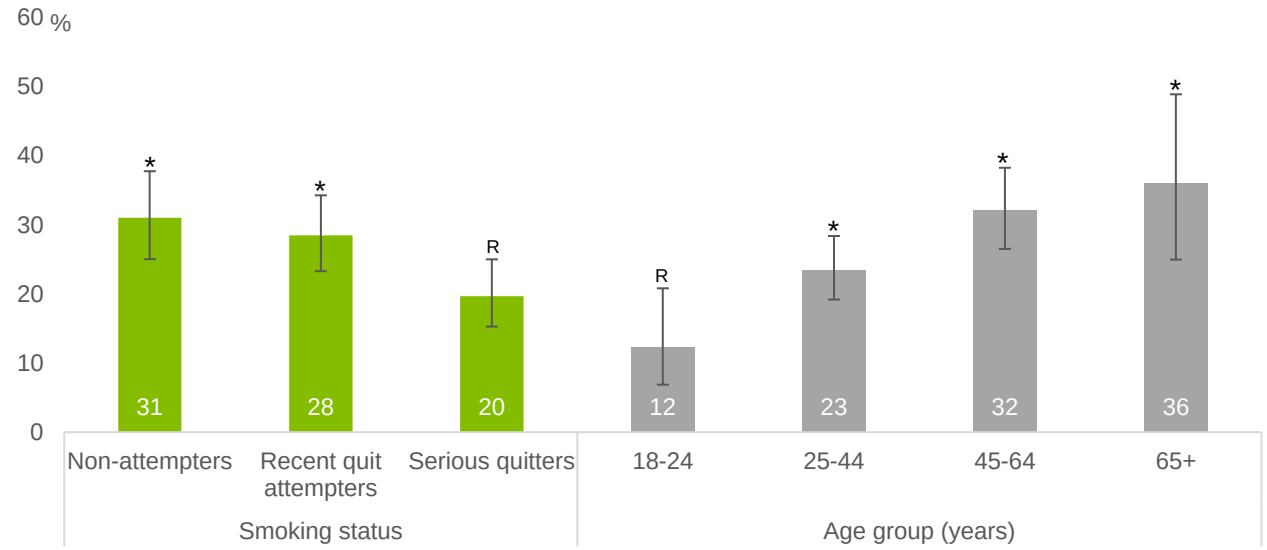


Base: Those who have tried an e-cigarette or vaping device, first interview (n = 722)
*Significantly different from the reference group (R), from a logistic regression model including age, gender, ethnicity, and smoking status.

The use of tobacco flavoured e-cigarettes varied by smoking status and age group (see Figure 11). It was most common among:

- non-attempters and recent quit attempters, compared with serious quitters
- those aged 25 years and older, compared with 18 to 24-year-olds.

Figure 11. Use of tobacco flavoured e-cigarettes, by smoking status and age group

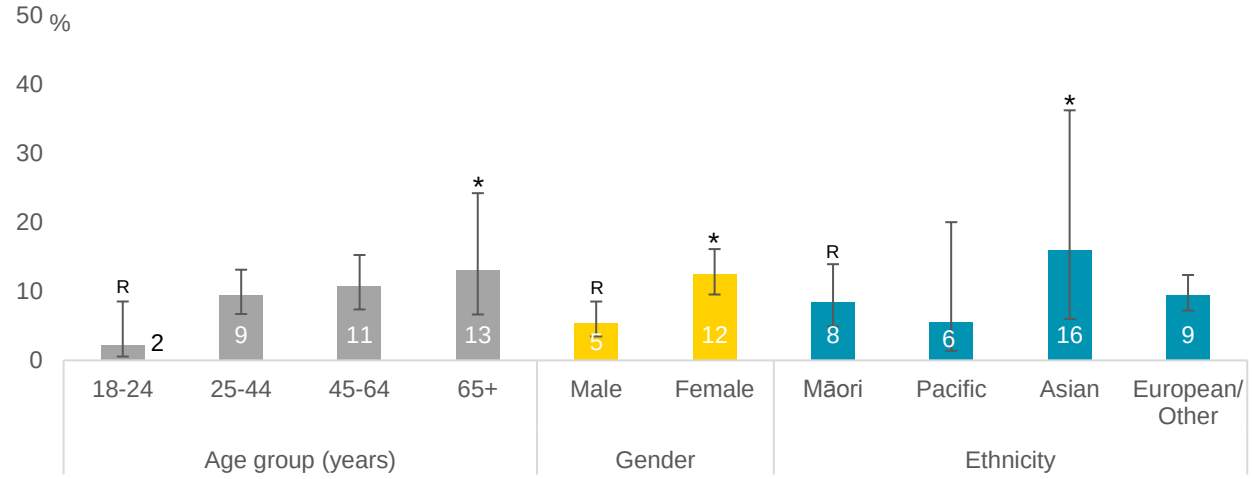


Base: Those who have tried an e-cigarette or vaping device, first interview (n = 722)
*Significantly different from the reference group (R), from a logistic regression model including age, gender, ethnicity, and smoking status.

The use of menthol/mint-based (tobacco menthol, menthol, or mint) flavours varied by age, gender, and ethnicity (see Figure 12). It was most common among:

- older adults (65 years and over), compared with 18 to 24-year-olds
- females, compared with males
- Asian respondents, compared with Māori.

Figure 12. Use of menthol/mint-based e-cigarettes (tobacco menthol, menthol, or mint flavoured)



Base: Those who have tried an e-cigarette or vaping device, first interview (n = 722)
*Significantly different from the reference group (R), from a logistic regression model including age, gender, ethnicity, and smoking status.

Serious quitters (17%) were also more likely than recent quit attempters (6%) to say they did not know what flavour e-cigarette they used most.

REASONS FOR USE

Those who reported using an e-cigarette or vaping device at least once a month were asked what their main reason for use was. The most common reason was ‘to quit smoking’, followed by ‘to cut down smoking’ and ‘some other reason’ (see Table 7).

Table 7. Reasons for e-cigarette use

Reason for use	% [95% confidence interval]
To quit smoking	40 [33, 46]
To cut down smoking	19 [14, 24]
Some other reason	15 [11, 20]
To avoid returning to smoking	13 [9, 18]
To use when I cannot smoke	6 [4, 10]
Curiosity	4 [2, 8]
Because I enjoy(ed) it	3 [2, 8]

Base: Those who said they used an e-cigarette or vaping device at least once a month, first interview (n = 233).

Responses were similar across recent quit attempters and serious quitters, although serious quitters (25%) were significantly more likely than recent quit attempters (10%) to say that they used an e-cigarette or vaping device to avoid returning to smoking. There appeared to be some numerical differences in the responses given by non-attempters, but the sample size for that subgroup (n = 39) was too small to enable accurate tests of the differences.

PERCEPTIONS OF HARM

All respondents were asked to indicate how harmful, compared with cigarettes, they thought e-cigarettes were to a person's health. Around one-half thought e-cigarettes were less harmful than cigarettes, while one-quarter said they did not know (see Table 8).

Table 8. Perceptions of harm from e-cigarettes, compared with cigarettes

Reason for use	% [95% confidence interval]
Less harmful	47 [44, 50]
About the same	18 [16, 21]
More harmful	10 [8, 12]
Don't know	24 [22, 27]

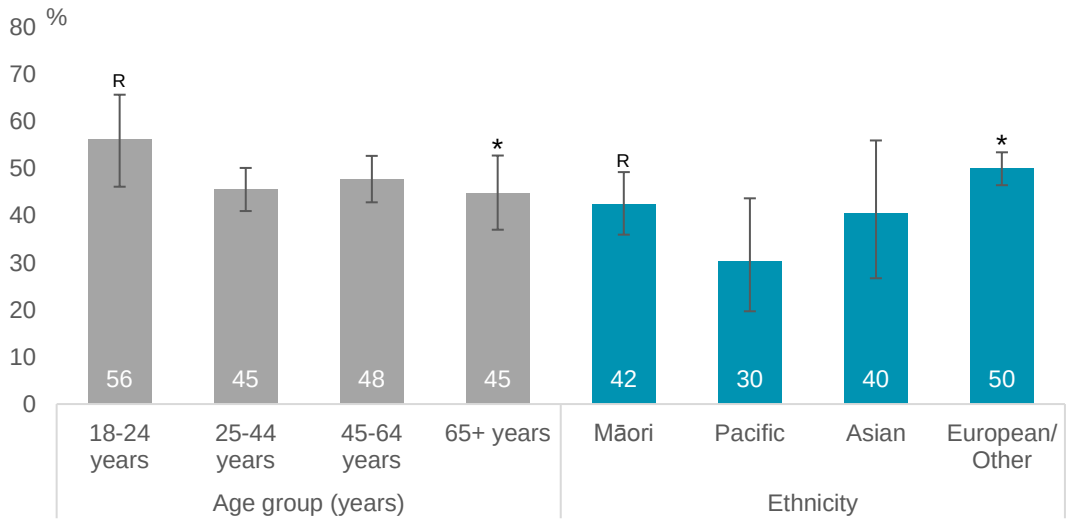
Base: All respondents, first interview (n = 1,099).

Perceptions of harm associated with e-cigarettes varied by age and ethnicity (see Figure 13). Those more likely to think e-cigarettes were less harmful than cigarettes were:

- Young adults (18 to 24-year-olds), compared with those aged 65 years and over
- European/Other respondents, compared with Māori

There were no differences by gender or smoking status.

Figure 13. Perception that e-cigarettes are less harmful than cigarettes, by age



Base: All respondents, first interview (n = 1,099).
*Significantly different from the reference group (R), from a logistic regression model including age, gender, ethnicity, and smoking status.

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