An evaluation of a New Zealand “vape to quit smoking” programme

Kelly S Burrowes, Chloe Fuge, Tori Murray, Jonathan Amos, Suzanne Pitama, Lutz Beckert

ABSTRACT

AIM: To compare the use of smoking cessation aids across different ethnic groups and age groups within a large New Zealand cohort and to assess the uptake and effectiveness of e-cigarettes for smoking cessation via a “vape to quit” initiative.

METHODS: Retrospective analysis of Te Hā – Waitaha smoking cessation service, including a telephone interview of a subgroup, who opted into the “vape to quit” programme. The uptake of different smoking cessation aids, including the use of medications and other products, was evaluated and the self-reported quit rate in a “vape to quit” cohort was evaluated.

RESULTS: The final dataset analysed consisted of 1,118 participants: 66.6% NZ European; 28.1% Māori; 3.1% Pacific; and 2.2% Asian. Māori participants were younger on average and had increasing vaping use. Māori were less likely to receive varenicline to assist with smoking cessation. Vaping use increased over time in all groups. Nicotine containing e-cigarettes were the most common smoking cessation products used, with >65% of each ethnic cohort utilising these products. Of the 100 participants in the “vape to quit” cohort 16% were smokefree and vapefree, 31% were smokefree and vaping, 31% were smoking and not vaping, and 22% were smoking and vaping.

CONCLUSIONS: The Te Hā – Waitaha service was successful in engaging Māori in their smoking cessation programme. Nicotine containing e-cigarette products were popular in all cohorts. Nicotine containing e-cigarettes are showing potential in smoking cessation programmes in support of the Smokefree Aotearoa 2025; however, 22% of those in the “vape to quit” programme became dual users.

W orldwide, about 1.1 billion people smoke, and more than 8 million people die per year as a result of tobacco use.1 While the incidence of smoking is declining a significant proportion of the population continue to smoke. The World Health Organization’s (WHO) target for a reduction of tobacco use by 30% between 2010 and 2025 remains off-track.1,2 New Zealand has set the goal of a Smokefree Aotearoa 2025.3 This goal aims to reduce the smoking prevalence to 5% or less by 2025. Smoking rates more than halved over the last 25 years, dropping from 25% in 1996/97 to a current rate of 10.9% (9.4% classed as daily smokers). However, Māori, the Indigenous people of New Zealand, continue to have a substantially higher smoking rate of 25.7% (daily smoking rate 22.3%).4 E-cigarette use is on the rise, with 6.2% of adults being categorised as daily e-cigarette users. Data shows that e-cigarette use was highest in young people aged 18–24 (15.3%) and Māori (12.5%).4 Various tobacco control laws and regulations have been introduced in New Zealand, such as taxation, bans on smoking in public spaces, cessation initiatives, marketing restrictions and campaigns on the negative health effects of smoking,5 in line with the WHO’s Framework Convention on Tobacco Control (WHO FCTC).5 New Zealand’s initiatives aim is to address three core areas: affordability, access, and appeal. These areas are being tackled by increasing tobacco excise tax and establishing a minimum retail price both increasing the cost and making tobacco products less affordable. Access to tobacco products is being made more challenging by removing tobacco retail displays and introducing plain packaging, reducing the number of tobacco retailers, banning the sale of tobacco products in alcohol on-licensed locations, and the introduction of a “tobacco-free generation” policy—effectively banning the younger generations from being able to legally purchase tobacco products. Finally, New Zealand is moving towards the use of tobacco products that are less appealing and less addictive by restricting additives and reducing nicotine levels. The timeline for these objectives is still on-going.3

Most smokers want or intend to quit; however, support is needed to do so, and cessation support more than doubles the chances of successful quitting.1 Typical smoking cessation support includes pharmacotherapies (nicotine replacement therapy, varenicline and bupropion), behavioural support, alternative therapies and, more recently, e-cigarettes.7 The role of e-cigarettes, a type of electronic nicotine delivery system (ENDS), in
smoking cessation is not fully established. Some trials have shown modest improvements in smoking cessation with the use of e-cigarettes in combination with existing approaches (nicotine replacement therapy, NRT, or when accompanied with behavioural support)\(^6\). However, the current evidence is insufficient to assess the effectiveness of e-cigarettes as a smoking cessation aid, and regulatory responses around the world differ.\(^1\) Uncertainty around long-term health effects has led to differences in regulation and incentivisation of e-cigarettes around the world. Countries fall within a range from focussing on health protection on one end, to harm reduction at the other. Analysis by Campus et al. compared variation across 97 countries.\(^2\) They found regulation options including prohibition, component ban, and regulation as medicinal products, poisons, tobacco products, consumer products, and/or unique products. Incentivisation options ranged from taxation, subsidisation, and provision of a financial reward. To consider a few countries of note, New Zealand and the UK take a similar stance (in terms of position and policy statements) and largely consider e-cigarettes as a harm reduction tool. Australia on the other hand, take a health protection approach whereby concerns about the use of e-cigarettes by non-smoking youth, a lack of clear evidence of safety and efficacy and the potential to undermine tobacco control progress.\(^1\)

There remains to be debate over the role of ENDS in terms of harm/harm reduction, with those opposed focusing on the risk to young people and the unknown long-term effects. In contrast, supporters emphasise harm reduction for smokers switching to ENDS products.\(^3\) These disparate opinions are exemplified by Public Health England on the one hand, publicising the assumption that e-cigarettes are 95% safer than conventional cigarettes\(^3\) (a quantification that is in fact unfounded and currently unknown\(^4\)) and supporting the use of e-cigarettes for harm reduction. On the other hand, the 2021 WHO report suggests to strictly regulate ENDS for maximum protection of public health.\(^5\) The large respiratory societies, including the Thoracic Society of Australia and New Zealand\(^6\) and the European Respiratory Society,\(^7\) do not endorse the “risk reduction” strategies, with the bottom line that “lungs are created to breathe clean air, not reduced levels of toxins and carcinogens”.\(^8\)

New Zealand is focussing on a harm reduction approach in addressing the role of e-cigarette products on its smokefree journey.\(^9\) The Wellbeing Index for the Canterbury Region in New Zealand showed that 15.2% of people older than 15 years smoked. By ethnicity, 39.4% of Māori, 36.5% of Pacific people, and 7.7% of Asians were regular smokers.\(^10\) Te Hā – Waitaha, the smoking cessation service in Canterbury, New Zealand has been designed as pro-equity. Te Hā – Waitaha was formed in 2017 under one public health umbrella embracing Māori values to engage the Māori population. It prioritises recruitment of Māori, Pacific and pregnant woman into the programme, and offers a number of quitting strategies including “vape to quit”. The “vape to quit” programme entails the use of an e-cigarette (with or without nicotine) as a smoking cessation aid. This article audits data collected from Te Hā – Waitaha and provides a six-month update of a subgroup of the “vape to quit” participants. We hypothesised that the use of e-cigarettes to support smoking cessation is increasing, but that even with the use of vaping as a tool to quit smoking cessation is not guaranteed. This study consisted of two main aims: (1) to assess the uptake of various smoking cessation tools and analyse the preference of these tools as a function of age and ethnicity, plus to assess whether this has changed over a two-year period; and (2) to assess the uptake and effectiveness of the “vape to quit” programme utilised by Te Hā – Waitaha. Our study was designed to recruit a high proportion of Māori, by both utilising a database with a high proportion of Māori and increasing the proportion of Māori participants followed up through the “vape to quit” programme.

**Methods**

This study consisted of two main parts. The first was an analysis of smoking cessation aids used by all participants enrolled at Te Hā – Waitaha over a period of just over two years. The second part consisted of a telephone interview using a subset of 100 participants who selected the “vape to quit” strategy for smoking cessation.

**Data sources**

Te Hā – Waitaha is the smoking cessation service for about 500,000 people in Canterbury, New Zealand. Free support is offered, including an individualised service with the Stop Smoking Practitioners Programme based across Canterbury. One-on-one or group counselling, phone support and smoking cessation aids are avail-
able. Te Hā – Waitaha offers a “vape to quit” strategy using e-cigarettes to promote smoking cessation. Referrals are received from primary care, hospital, lead maternity care, pharmacy, or self-referral. Clients are enrolled, are provided with support, and are set a quit date. All participants in the telephone interview provided informed consent before taking part in this study. Ethics approvals were obtained for the use of data within this database for the research presented here through the University of Otago Human Research Ethics Committee (HD19/032, H19/088).

Anonymised data were accessed over the period of enrolment consisting of nine quarters from 2017 to 2019 (a period of two and one quarter years; Figure 1). Of the 4,551 initial records, all incomplete datasets were removed (3,300). Ethnicity and age were analysed for the final 1,118 participants for smoking cessation aid analysis and the 100 participants who were contacted for the “vape to quit” programme.

Data measures and analysis of smoking cessation aids

The following variables were recorded in data collection: referral date, date enrolled in Te Hā – Waitaha, gender, age at time of enrolment, ethnicity, medicines and/or other products used for smoking cessation plan, set quit date, and smoking history. Pivot tables were used to manipulate and assess the data. “Other ethnic groups” were excluded in the data (25 participants) to focus on the main New Zealand ethnicity populations (Māori, NZ European, Pacific, and Asian).

The smoking cessation aids were classed either as prescribed medicines—including varenicline, bupropion, nortripyline; and NRT, as patches, nicotine gum, and nicotine lozenges—or over the counter products—including nicotine spray, nicotine inhalator, non-nicotine-containing e-cigarette, and nicotine e-cigarettes. These were analysed as a function of age and ethnicity.

Figure 1: (a) Flow chart of data collection and processing; (b) interview questions used to follow-up the “vape to quit” participants.
The interview: “vape to quit” follow-up

We aimed to interview a total of 100 participants who had used the “vape to quit” programme between 6–12 months prior to the sampling time. A total of 203 participants were found to have engaged with Te Hā – Waitaha between 6–12 months prior, had used vape to quit, and had consented to participate in this follow-up study. Priority was given to record the responses of Māori participants, so these participants were contacted first in the list of 203 potential candidates. To reach the total of 100 participants, a total of 125 participants were contacted, with 25 either stating they did not want to participate or with the recorded phone number no longer being active. Short, structured telephone interviews of 3–10 minutes were conducted in November and December 2019.

The interview consisted of primary questions about current smoking/vaping status and whether the participant would recommend vaping as a way to stop smoking. Depending on these answers, the interview had one of four possible scripts for the following criteria (Figure 1b). Qualtrics (Qualtrics, Provo, UT) was used to record responses and themes related to why participants liked, or disliked vaping were collected. Information on whether the participants were smokefree and vapefree, or still using one or both products, was also collected.

Results

A total of 4,551 clients engaged with Te Hā – Waitaha for smoking cessation over the assessment period of nine quarters (2017–2019). The final dataset for analysis of smoking cessation aids was 1,118 clients. These participants identified their ethnicity as NZ European (745, 66.6%), Māori (314, 28.1%), from a Pacific nation (35, 3.1%), and from an Asian nation (24, 2.2%). In this sample, 28% of the clients of Te Hā – Waitaha were Māori.

Table 1 displays the distribution of age in the participants enrolled in the Te Hā – Waitaha within each ethnicity (including all 1,118 participants). It reveals a greater proportion of younger clients (<30 years) in the Māori and Pacific cohorts. Table 2 displays the age and ethnicity information for those who used nicotine containing e-cigarettes as a smoking cessation aid.

Exclusion of participants

Of the original 4,551 clients, 75% were excluded. The main reason for this was due to incomplete datasets. Table 3 provides a breakdown of the proportions of participant data that was discarded for each reason. In addition to these reasons, some participants changed their mind and continued smoking, were not contactable by the service for follow-up, or attempted to quit smoking without Te Hā – Waitaha support. In these instances, quit data could not be entered, which was needed to ensure completeness of the data. The breakdown of ethnicities in the discarded data was NZ European 60.7%, Māori 29.1%, Pacific 4.2%, and Asian 2.4%. The remaining 3.6% participants fell under other ethnic categories. These proportions were similar to those of the cohort as a whole. For the large proportion of clients that were excluded due to unknown product use, the medicines used were: bupropion 0.8%; nortriptyline 0.2%; NRT – combination 57.8%; NRT – single product 24.2%; varenicline 7.4%; other 0.1%; none 6.4%; blank 3%; and unknown 0.3%.

Ethnic and age-specific choices in smoking cessation aids used

Participants who enrolled in the Te Hā – Waitaha programme could choose medicine or products to assist with smoking cessation. Medicines included varenicline, bupropion, nortriptyline, and NRT—as patches, nicotine gum and nicotine lozenges. The products available to aid smoking cessation were nicotine spray, nicotine inhalators, non-nicotine-containing e-cigarettes, and nicotine-containing e-cigarettes.

Māori were less likely to receive medications to assist their smoking cessation (10.5%, 33 out of 313). It is not known whether Māori were less likely to be offered medication or were less likely to choose and use them. All medications and products offered on this programme were fully funded. Pacific peoples were more likely to use NRT combination to assist smoking cessation (64.9%, 24 out of 37). NZ Europeans were less likely to use NRT combination with just over 43.4% (322 out of 742) but more likely to use varenicline medication 2.7% (21 out of 786) (see Table 4).

The most common product used by all groups were e-cigarettes containing nicotine with at least 65% uptake across all ethnic groups (Table 5). Māori had the lowest percentage using e-cigarettes containing nicotine and were more likely to use nicotine sprays (25%, 79 out of 313). The uptake of e-cigarettes across ethnic groups largely mirrored the age distribution across the cohort as a whole. The greatest uptake of e-cigarettes amongst Māori and Pacific were the 19–29-year-olds; in the Asian group it was the 30–39-year-olds; in the Asian group it was the 30–39-year-olds; in the Asian group it was the 30–39-year-old.
Table 1: Distribution of participants by ethnicity and age in total cohort (total 1,118) attempting to quit smoking through Te Hā – Waitaha. Percent (%) values are based on number in the age bracket over total in the cohort of that ethnicity.

<table>
<thead>
<tr>
<th>Ethnicity</th>
<th>&lt;19 years old</th>
<th>19–29 years old</th>
<th>30–39 years old</th>
<th>40–49 years old</th>
<th>50–59 years old</th>
<th>&gt;60 years old</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>%</td>
<td>N</td>
<td>%</td>
<td>N</td>
<td>%</td>
</tr>
<tr>
<td>NZ European</td>
<td>12</td>
<td>1.6</td>
<td>190</td>
<td>25.5</td>
<td>159</td>
<td>21.3</td>
</tr>
<tr>
<td>Māori</td>
<td>19</td>
<td>6.1</td>
<td>106</td>
<td>33.8</td>
<td>78</td>
<td>24.8</td>
</tr>
<tr>
<td>Pacific</td>
<td>2</td>
<td>5.7</td>
<td>14</td>
<td>40.0</td>
<td>6</td>
<td>17.1</td>
</tr>
<tr>
<td>Asian</td>
<td>0</td>
<td>0.0</td>
<td>2</td>
<td>8.3</td>
<td>12</td>
<td>50.0</td>
</tr>
<tr>
<td>Total</td>
<td>33</td>
<td>3.0</td>
<td>312</td>
<td>27.9</td>
<td>255</td>
<td>22.8</td>
</tr>
</tbody>
</table>

Table 2: Distribution of participants by ethnicity and age for those (total 841) using e-cigarettes containing nicotine to aid their smoking cessation. Percent (%) values are based on number in the age bracket over total in the cohort of that ethnicity.

<table>
<thead>
<tr>
<th>Ethnicity</th>
<th>&lt;19 years old</th>
<th>19–29 years old</th>
<th>30–39 years old</th>
<th>40–49 years old</th>
<th>50–59 years old</th>
<th>&gt;60 years old</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>%</td>
<td>N</td>
<td>%</td>
<td>N</td>
<td>%</td>
</tr>
<tr>
<td>NZ European</td>
<td>10</td>
<td>1.7</td>
<td>112</td>
<td>19.3</td>
<td>115</td>
<td>19.9</td>
</tr>
<tr>
<td>Māori</td>
<td>7</td>
<td>3.3</td>
<td>69</td>
<td>32.4</td>
<td>52</td>
<td>24.4</td>
</tr>
<tr>
<td>Pacific</td>
<td>2</td>
<td>7.4</td>
<td>10</td>
<td>37.0</td>
<td>5</td>
<td>18.5</td>
</tr>
<tr>
<td>Asian</td>
<td>0</td>
<td>0.0</td>
<td>2</td>
<td>9.1</td>
<td>10</td>
<td>45.5</td>
</tr>
<tr>
<td>Total</td>
<td>19</td>
<td>2.3</td>
<td>193</td>
<td>22.9</td>
<td>182</td>
<td>21.6</td>
</tr>
</tbody>
</table>

Table 3: Breakdown of reasons for and ethnicities excluded in final analysed dataset.

<table>
<thead>
<tr>
<th>Reason for excluding participants</th>
<th>No. of participants</th>
</tr>
</thead>
<tbody>
<tr>
<td>(i) Excluded due to unknown or “blank” incomplete datasets in “products used”.</td>
<td>3349</td>
</tr>
<tr>
<td>(ii) Excluded due to unknown or “blank” incomplete data for “medicines used”.</td>
<td>53</td>
</tr>
<tr>
<td>(iii) Excluded due to being categorised as “Other” ethnicity.</td>
<td>31</td>
</tr>
</tbody>
</table>

NB: Participants could occur in more than one of the three categories above.
Table 4: Medicines used across ethnic groups (2017–2019).

<table>
<thead>
<tr>
<th>Ethnicity</th>
<th>Bupropion</th>
<th>None</th>
<th>NRT – combination</th>
<th>NRT – single product</th>
<th>Other</th>
<th>Varenicline</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>%</td>
<td>N</td>
<td>%</td>
<td>N</td>
<td>%</td>
</tr>
<tr>
<td>NZ European</td>
<td>3</td>
<td>0.4</td>
<td>53</td>
<td>7.1</td>
<td>323</td>
<td>43.4</td>
</tr>
<tr>
<td>Māori</td>
<td>1</td>
<td>0.3</td>
<td>33</td>
<td>10.5</td>
<td>133</td>
<td>42.4</td>
</tr>
<tr>
<td>Pacific</td>
<td>0</td>
<td>0.0</td>
<td>3</td>
<td>8.6</td>
<td>24</td>
<td>68.6</td>
</tr>
<tr>
<td>Asian</td>
<td>0</td>
<td>0.0</td>
<td>0</td>
<td>0.0</td>
<td>14</td>
<td>58.3</td>
</tr>
<tr>
<td>Total</td>
<td>4</td>
<td>0.4</td>
<td>89</td>
<td>8.0</td>
<td>494</td>
<td>44.2</td>
</tr>
</tbody>
</table>

NB/ Total (%) values are % of total cohort within each medicine category.

Table 5: Products used across ethnic groups (2017–2019).

<table>
<thead>
<tr>
<th>Ethnicity</th>
<th>E-cigarette (nicotine)</th>
<th>E-cigarette (non-nicotine)</th>
<th>Inhalator</th>
<th>None</th>
<th>Other</th>
<th>Spray</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>%</td>
<td>N</td>
<td>%</td>
<td>N</td>
<td>%</td>
</tr>
<tr>
<td>NZ European</td>
<td>546</td>
<td>73.3</td>
<td>27</td>
<td>3.6</td>
<td>12</td>
<td>1.6</td>
</tr>
<tr>
<td>Māori</td>
<td>208</td>
<td>66.2</td>
<td>11</td>
<td>3.5</td>
<td>2</td>
<td>0.6</td>
</tr>
<tr>
<td>Pacific</td>
<td>27</td>
<td>77.1</td>
<td>0</td>
<td>0.0</td>
<td>0</td>
<td>0.0</td>
</tr>
<tr>
<td>Asian</td>
<td>22</td>
<td>91.7</td>
<td>0</td>
<td>0.0</td>
<td>0</td>
<td>0.0</td>
</tr>
<tr>
<td>Total</td>
<td>803</td>
<td>71.8</td>
<td>38</td>
<td>3.4</td>
<td>14</td>
<td>1.3</td>
</tr>
</tbody>
</table>

NB/ Total (%) values are % of total cohort within each product category. Note, “other” includes alternative forms of therapy, such as acupuncture.

Figure 2: Products used by all ethnic groups over a period of nine quarters from 2017–2019. This shows a large increase in the number of people using e-cigarettes containing nicotine over time.
olds and 40–49-year-olds. For NZ Europeans, the highest e-cigarette uptake was observed in the 50–59-year-olds (Table 2).

Over the last two years the use of inhalators, nicotine and non-nicotine e-cigarettes has significantly increased across all ethnic groups (see Figure 2). This trend is particularly prominent in the last quarter of data.

“Vape to quit” follow-up

Of the 100 participants contacted 35% (n=35) identified as Māori, and 65% (n=65) as NZ European. At the time of follow-up, 16% (n=16) were smokefree and not vaping, 31% (n=31) were smokefree and vaping, 31% (n=31) were smoking and not vaping and 22% (n=22) were smoking and vaping. Of those who were vaping (n=53), 88.6% used vape products containing nicotine. Of the 53 vaping participants, 20 said that they intended to stop vaping, 10 said they did not intend to stop vaping, and the remainder were uncertain.

Of our cohort, 56% recommended that vaping should be used as an aid for smoking cessation compared to 44% who did not support this. Those who were vaping were more likely to recommend its use as a smoking cessation aid, with 84% of those smokefree and vaping recommending it, and 68% of those smoking and vaping recommending it. This contrasted with levels of 50% and 22.5% in the groups “smokefree and not vaping” and “smoking and not vaping”, respectively. Table 6 summarises the key themes in response to the questions “What do you/did you like about vaping?” and “What do you/did you dislike about vaping?”. The most popular reasons for liking vaping were around improvement of finances and to support smoking cessation. The greatest reason around dislike was that vaping was not satisfying enough.

Of our cohort, 56% recommended that vaping should be used as an aid for smoking cessation compared to 44% who did not support this. Those who were vaping were more likely to recommend its use as a smoking cessation aid, with 84% of those smokefree and vaping recommending it, and 68% of those smoking and vaping recommending it. This contrasted with levels of 50% and 22.5% in the groups “smokefree and not vaping” and “smoking and not vaping”, respectively. Table 6 summarises the key themes in response to the questions “What do you/did you like about vaping?” and “What do you/did you dislike about vaping?”. The most popular reasons for liking vaping were around improvement of finances and to support smoking cessation. The greatest reason around dislike was that vaping was not satisfying enough.
Discussion
This study has quantified the use of various smoking cessation aids in a large New Zealand cohort via Te Hā – Waitaha in Canterbury. The use of e-cigarettes as a smoking cessation aid was shown to increase substantially and to have become the most popular smoking cessation aid over the period assessed (2017–2019). A subset of 100 participants using e-cigarettes in their smoking cessation journey were followed up 6–12 months post quit attempt. Of these, 16% presented as smokefree and vapefree; 31% as smokefree and vaping; 31% were smoking and not vaping; and 22% were smoking and vaping. Overall, 47% were smokefree; however, 22% of this follow-up cohort became dual users (smoking and vaping).

Our research identified that the Te Hā – Waitaha service was successful in the active recruitment of Māori participants, at about three times the rate of the general population. A total of 9% of Canterbury’s population identify as Māori; however, 28% of the people who engaged Te Hā – Waitaha identified as Māori. The proportion of Pacific people recruited was lower than expected, with recruitment around 3.1% compared to constituting ~5% of Canterbury’s population. A typical report presenting the national smoking rate, does not necessarily apply for all ethnic groups within a country. For example, although the smoking rate in New Zealand for all adults was 10.9% in 2020–2021, it was more than double that in Māori at a rate of 25.7%. Māori participants enrolling in the Te Hā – Waitaha were younger than non-Māori participants. This may be due to how Māori smokers are the youngest group to start smoking, at just over 14 years of age. However, the fact that Māori have been found to, on average, start smoking at a younger age, does not necessarily mean that more would want to quit while young. Therefore, it is encouraging that quit attempts are being established while these smokers are still young.

Analysis of smoking cessation aids over time
The data collected over nine quarters demonstrated an increase in the update of the use of nicotine containing e-cigarettes over time. This is in line with the general population information as demonstrated in the New Zealand Health Survey data. This data also showed an increase in the usage of e-cigarettes with a rate of 6.2% of adults being daily e-cigarette users in 2020–2021, up from 3.5% in 2019–2020 and 0.9% in 2015–2016. The increasing use of e-cigarettes in smoking cessation is consistent with that seen overseas in countries that support their use, for example in the UK e-cigarettes are the most popular aid used by people trying to quit smoking. In 2020, 27.2% of people used a vaping product in a quit attempt in the previous 12 months. This compares with 15.5% who used NRT over the counter or on prescription (2.7%), and 4.4% who used varenicline.

The sampling period was from 2017–2019. In 2018, the prior ban on the sale of nicotine-containing e-cigarettes was lifted after a successful court case of Philip Morris. The fact that at this time point, e-cigarettes (containing nicotine, which are the most popular) were much easier to purchase is likely linked to the increase in uptake we have seen over this time. In addition, the Government and, consequently, smoking cessation support services began to support the use of e-cigarettes for smoking cessation.

Effectiveness of the “vape to quit” strategy for smoking cessation
The “vape to quit” strategy achieved a self-reported smoking cessation rate in almost half (47%) of the participants. A total of 16 of those were both smokefree and vapefree >6 months after their quit date. It also created 53 new vapers, of which 22 were engaging in both vaping and smoking (dual users). This has been demonstrated both within New Zealand and internationally. Dual use may increase tobacco harm by exposing individuals to a broader range of inhaled chemicals. Dual use has been shown to be associated with a higher risk of cardiovascular risk factors. More work is needed to fully understand the impacts of dual use or e-cigarette use alone. People who vape continue to be exposed to carcinogenic and toxic substances albeit at lower levels than tobacco smoking. The evidence of damage to the airways is ever increasing, for example see Tsai et al. From a public health perspective, it would be preferable that e-cigarettes are used as an interim measure to an eventual smokefree/vapefree state. Of the 53 vaping participants in the follow-up cohort, 20 (38%) stated that their intention was to stop vaping eventually, the remainder either planned to continue vaping (19%) or were undecided (43%).

Strengths and limitations of the dataset
The strength of this study is that our data provide insight into the breadth of the Smokefree services provided, and they also dig deeper into the outcomes of participants at least six months fol-
lowing a “vape to quit” approach. Data was analysed from a large diverse population, including a high proportion of Māori participants. One limitation in extrapolating this analysis is that these data are from a single geographic region in New Zealand and cannot necessarily be extrapolated to New Zealand as a whole.

The exclusion of a large subgroup with incomplete data may have introduced bias. A total of 75% of clients, and their data, were excluded from the final analysis due to a lack of completeness. Table 3 shows that the main reasons were unknown or “blank” entries in the categories of “products used” and “medicines used”. This was frequently due to incomplete data entered into the system by external health services. It was unclear whether incomplete or “blank” entries represented that nothing was used by the client in these cases or that this detail had not been manually entered. Therefore, it was deemed more accurate to remove these entries from the analysis. Many entries for products and medicines did contain “none” where nothing was used, if this was the case the data were included. Analysis of the breakdown of ethnicities in the excluded data showed a similar distribution to the cohort as a whole and the final dataset used. The largest proportion of data was removed due to unknown product(s) used. However, the medicines used by these clients was found to be distributed in a similar way with NRT – combination being the highest used medicine followed by NRT – single product. The excluded participants showed an elevated proportion using varenicline (7.4% compared to 2.1% in the remaining dataset, Table 4). There is no reason to believe that the excluded data would show different trends to those presented here; however, this is unknown and is a limitation of the study. One bias this may potentially have introduced is an under-representation of people either not using any medicines or any products, because if these entries were blank (and did not contain the clear definition of “none”) the client’s information was excluded. Future care of data collection will enable improved analysis in moving forward.

Other limitations related to the follow up interviews were that the follow-up data were not long enough to support a “vape to quit” programme as yet; however, it provides some real life information on the impact of such a programme. In addition, only self-reported smokefree rates were used, these were not confirmed by any other method. “Smoking” and “vaping” of the individual was defined based on their verbal response with no accounting or exploration of potential lapses.

**Conclusion**

Over the period of 2017–2019, the use of e-cigarettes as smoking cessation aids increased rapidly. Based on our data the use of e-cigarettes in a “vape to quit” strategy is attractive to smokers, based on the high uptake of their selected use as a smoking cessation aid (75%). In total, 16% of those in the follow up “vape to quit” cohort were both smokefree and vapefree. More long-term research into the effectiveness of e-cigarettes as part of smoking cessation strategies and its long-term outcomes is needed.
COMPETING INTERESTS
The authors have no commercial, financial, or non-financial associations related to this work.

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AUTHOR INFORMATION
Kelly S Burrowes: Auckland Bioengineering Institute, University of Auckland, New Zealand.
Chloe Fuge: Medical students, University of Otago, Christchurch, New Zealand.
Tori Murray: Medical students, University of Otago, Christchurch, New Zealand.
Jonathan Amos: Service Development Manager, Planning and Founding, Canterbury District Health Board, New Zealand.
Suzanne Pitama: Māori Indigenous Health Institute (MIHI), University of Otago, Christchurch, New Zealand.
Lutz Beckert: Department of Medicine, University of Otago, Christchurch, New Zealand.

CORRESPONDING AUTHOR
Kelly Burrowes: Auckland Bioengineering Institute, Level 6, 70 Symonds Street, Auckland, 1010 New Zealand.
Ph: +64 9 923 2748. E: k.burrowes@auckland.ac.nz

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