The role of e-cigarette flavours in product appeal and smoking cessation among adults: findings from a rapid review of the literature

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Introduction

E-cigarettes (ECs) are battery-powered devices that heat a solution of propylene glycol and or glycerol, water, nicotine and flavours (RCP, 2016). Since their invention in China in the early 2000s, they have developed into a range of different types. In the UK they are regulated as consumer products with a medicinal licensing route also available, although to date there are no medicinally licensed ECs on the UK market (McNeill et al, 2020). Product ingredients, nicotine content, packaging, labelling and refill containers are subject to regulatory standards but to date the UK has not, unlike some other jurisdictions, regulated or banned EC flavours. In the USA in particular, concerns have been raised that EC flavours may contribute to product appeal and uptake by youth and non-smokers (NASEM, 2018). This has resulted in a national flavour ban being discussed and some states taking action to restrict flavours. In the EU, Finland permits only tobacco-flavours and unflavoured e-liquids to be sold (WHO Europe, 2020).

These international concerns about EC flavours have prompted discussion in the UK, and in a meeting convened in late 2019 by Action on Smoking and Health (ASH) with the Chief Medical Officer for England, Professor Chris Witty, questions were raised about what is known about EC flavours from the existing literature. There is some evidence that EC flavours may play a role in product appeal and use not just by youth but also adult smokers trying to quit, and that flavours may aid smoking cessation, but this is unclear. Professor Witty requested that consideration be given to conducting a randomised controlled trial of flavoured vs unflavoured ECs for smoking cessation in the UK to explore this issue. Researchers developed a proposal for a UK trial although a recent outline application to NIHR was not considered a priority at the current time (during the Covid-19 pandemic). In the meantime, it is useful to bring together existing evidence on what role, if any, EC flavours may play in smoking cessation from studies to date.

Cancer Research UK agreed to conduct a rapid systematic review of available evidence regarding e-cigarette flavours. Three key research questions were identified:

- What is the evidence of the appeal of flavours to adult smokers?
- What flavours do smokers use to initiate vaping? What do they use following quitting smoking?
- What is the role of flavours in cessation effectiveness and relapse prevention?

This report outlines findings from this review. A complementary rapid review on e-cigarette flavours and use in young people has been recently commissioned by Public Health England and is expected to report later this year.

Methods

This was a rapid systematic review of the literature. The search strategy was developed to address the three research questions for the review that are outlined above. The strategy was informed by the terms used for the UK E-Cigarette Research Forum monthly e-cigarette Research Briefing and relevant literature. A scoping search was conducted in December 2019. Box 1 outlines the search terms used, that were initially employed in a PubMed search and then translated to match the requirements of two other databases - Cochrane and Web of Science.

Box 1: Search Strategy

(e-cigarette*[title/abstract] OR electronic cigarette*[title/abstract] OR e-cig[title/abstract] OR electronic nicotine delivery system OR (nicotine AND (vaporizer OR vapourizer OR vaporiser OR vapouriser OR vaping))

AND (flavor* OR flavour* OR flavoring agent OR flavouring agent)

NOT (youth*[title/abstract] OR teen*[title/abstract]OR adolescent*[title/abstract] OR child*[title/abstract] OR young adult[title/abstract]OR school[title/abstract])

Literature available in the three databases was searched from January 2010 to January 2020. The start date for the search reflected the year when e-cigarettes use emerged as a measurable phenomenon in many countries including the UK.

Inclusion criteria for the review were:

- qualitative research into the appeal of flavours using quotes or thematic analysis,
- survey data on use of e-cigarette flavours
- randomised control trial data on e-cigarette flavours and smoking cessation.

Exclusion criteria were:

- studies funded by the tobacco industry
- studies exclusively looking at children/adolescents (<18 years)
- studies not in humans (for example examining the composition of e-liquid vapour or cell-line or animal studies)

Using this search strategy, 1,124 eligible records were initially identified. After removal of duplicates, two authors (AD and SL) screened the resulting records independently for eligibility by title/abstract. Any discrepancies in review were discussed and resolved. Four authors (AD), (SL), (MB), (EB) then extracted data from the remaining articles. The data extraction table can be found in the supplementary materials. References included in the papers were also screened for any relevant additional literature. The final shortlist of records was determined by AD. 20 articles were included in the final review. The study selection process is illustrated in figure 1.

Figure 1: Study selection process

Data from relevant UK grey literature were also included. For example, recent reports from Action on Smoking and Health (ASH), the Smoking Toolkit Study and the Office for National Statistics were searched and relevant findings were included in the review.

Results

Twenty-two articles met the inclusion criteria for this review. Results from the identified literature are outlined here in relation to each of the three review research questions. Where relevant, data from UK surveys reported in the grey literature are also included.

What is the evidence of the appeal of flavours to adults?

The studies identified in this review examined the appeal of e-cigarettes to adult e-cigarette users rather than adult smokers alone. However, almost all studies reported the smoking status of participants, with most participants in all studies being former or current smokers. This is consistent with representative surveys such as the US Population Assessment of Tobacco and Health (PATH) study that found that 92.4% of every day e-cigarette users and 84% of someday users were either current or former smokers (Rodu and Plurphanswat. 2018). We mention the PATH study because most the studies we identified on the appeal of e-cigarette flavours were from the USA. Thus, we can assume that in almost all cases, study participants were current or ex-smokers.

Data on the evidence of the appeal of flavours mainly came from cross-sectional surveys and qualitative studies. Several cross-sectional surveys from the USA included data on reasons for vaping. Flavours were commonly cited as one of several reasons for trying vaping or continuing to vape, often alongside quitting/reducing smoking of tobacco cigarettes and because they viewed them as less harmful as cigarettes. However, the significance of the importance of flavours compared to other reasons for vaping was not tested in the studies we identified (Wong et al. 2019), (Landry et al. 2019) (Patel et al. 2016), (Kapaya et al. 2019) (Luzius et al. 2019), (Rhoades et al. 2019).

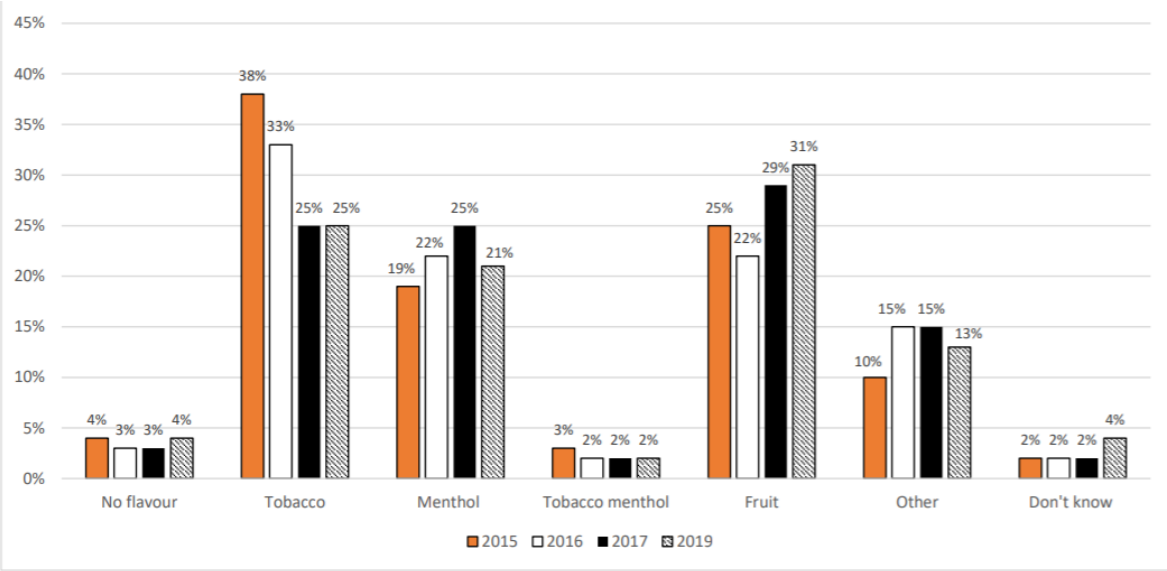
Some of these studies provided further insight on the appeal of flavours to adult smokers. In a study of US college students (Wong and Lin 2019), flavour was rated 4.37 on a 5-point scale of importance, 88% of participants thought that taste was a contributing factor in their use of vaping products, and the majority of participants had mixed their own e-liquids to create particular flavours (63%). Another study investigated the role of flavours in vaping initiation and satisfaction in US adults. It found that those who used flavoured e-cigarettes (excluding tobacco flavoured) were more likely to report high satisfaction with vaping compared with those who did not (OR=2.73, 95% CI=1.91-3.89, $p<0.001$). (Landry et al. 2019).

Several qualitative studies explored attitudes towards, and reasons for using, e-cigarettes. Flavours were often described as an appealing factor and an important reason for e-cigarette use in adults (Kim et al. 2017), (Goldberg and Cataldo. 2018) and young adults aged 18-30 (Cheney et al. 2016). In a qualitative study in the USA that assessed the use, behaviour and perceptions of e-cigarettes among adults, most participants thought that flavour was an “exciting” feature. Some participants described trying multiple flavours whereas others preferred to stick to a favourite (Kim et al. 2017).

One mixed methods study explored the reasons for using flavoured e-cigarettes (Soule et al. 2016). Five main reasons for using flavours were identified: increased satisfaction and enjoyment; better taste and feel than cigarettes; food craving suppression; and social impacts (such as improved smell compared with cigarettes and sharing flavours with friends). Overall, statements regarding increased satisfaction and enjoyment were rated more highly compared to statements regarding variety and customisation ($p<0.01$), food cravings and customisation ($p<0.001$) and social impacts ($p<0.05$), but not the better feel and taste than cigarettes. In another mixed-methods study of American college students over the age of 18 representative phrases such as “they taste good”, “they taste of X flavour” and “I wanted to try the flavours” were identified in response to the question “what are some of the reasons you use e-cigarettes” (Luzius et al. 2019).

The 2019 ASH-YouGov survey (a representative survey conducted in Great Britain) examined the use of flavours among adult e-cigarette users. In 2015, tobacco was most popular flavour at 38%, followed by fruit flavour at 25% and menthol at 19%. This has changed over time with fruit flavours the most popular in 2019 at 31%, followed by tobacco and menthol at 25% and 21%. Very few vapers in Great Britain report using products with no flavours.

Figure 2. Flavours used by current vapers in Great Britain



Source: ASH (2019) Use of e-cigarettes among adults in Great Britain

The ASH-You Gov survey also assessed vapers' opinions regarding what they would do if flavours were no longer available. One in four said they would still try to get flavoured vaping products. The most popular option after this was to use unflavoured e-liquids/cartridges. Just under one in five said they would either smoke more or revert to smoking. This indicates that flavours are an important factor in the use of e-cigarettes by adults in Great Britain (ASH 2019).

In the published literature, a key theme identified was the impact of age on attitudes towards and use of e-cigarette flavours, with younger adults reporting a greater affinity towards flavours and more commonly citing them as a reason for using e-cigarettes. Several cross-sectional studies found that the odds of reporting flavour as a primary reason for using e-cigarettes were greater in 18-24 year olds compared with older age groups (Landry et al. 2019, Vu et al. 2019, Patel et al. 2016). Vu and colleagues also found that 18-24-year olds were more likely to use three or more flavours vs 0-1 flavours compared to older age groups. In addition, a qualitative study found that younger participants (18-35) were more likely to be "flavour seeking" whilst older adults (45-65) appreciated flavour options but were less likely to explore different varieties and more likely to stick with tobacco flavours (Kim et al 2017).

Another theme that emerged regarding appeal was vaping for appetite suppression. Goldberg and colleagues reported that many participants, particularly women, preferred flavoured e-cigarettes, with some participants claiming that the flavours helped to avoid weight gain (Goldberg and Cataldo, 2018). In addition, although not published within the time available for our original search, one qualitative UK study was subsequently identified which also highlighted the potential appeal of e-cigarette flavours in weight management. Among 58 interviewees, several described unprompted that e-cigarette flavours helped them to manage their food cravings and weight (Dobbie et al. 2020).

Overall, a range of qualitative and quantitative data provides evidence of the appeal of flavours in initiating vaping and their role in the continued use of e-cigarettes. Survey data suggests that flavours are a common reason for e-cigarette initiation, continued use and high satisfaction. Qualitative studies suggest that flavours make e-cigarettes more interesting, improve the user satisfaction with the product and may be viewed as a tool by some to prevent weight gain. However,

there are several limitations with the studies included. The data was predominantly collected from US participants meaning the findings may not be relevant to the UK population, particularly as the products available in each country differ. The quantitative data was entirely based on cross sectional surveys that may be subject to recall bias and means appeal cannot be track over time for individuals. These studies also varied in size, study aims and recruitment of participants meaning that it may not have been appropriate to compare these studies or group them together to draw conclusions. The qualitative studies were generally recruited through social media or other forms of advertising for participants, meaning that the samples were self-selecting. One study consisted of predominantly (77%) white participants and another did not report sociodemographic characteristics. Therefore, these findings may not be generalisable to the wider population. Additionally, this review initially attempted to address the question, "What is the evidence of the appeal of flavours to adult smokers?" however, most studies reported on adult e-cigarette users generally and did not differentiate between current or former smokers. Although the studies included were largely from the USA, data from the 2019 ASH You-Gov survey also suggests that flavours are an increasingly important aspect of e-cigarette use in Great Britain. This provides some evidence that these opinions may be shared by adult e-cigarette users in the UK.

What flavours do people use when initiating vaping? What flavours do they use after quitting smoking?

We found some evidence to address these questions although it was limited.

In a large UK based randomised control trial (n=886) that assessed the efficacy of e-cigarettes compared with NRT for smoking cessation when delivered with behavioural support in UK stop smoking services, flavours used at baseline, 4, 26 and 52 weeks were recorded. Some changes in flavours used were observed. Initially, fruit flavours were the most popular flavour (45%) followed by menthol (20%) and tobacco (10%). At 26 weeks, tobacco (32%) slightly overtook fruit (30%) as the most popular flavour. At 52 weeks, 33% used fruit flavours, 25% used tobacco and 16% used menthol. The statistical significance of this shift was not tested (Hajek et al. 2018).

One small (n=71) Italian study examined changes in daily cigarette consumption in smokers making their first purchase at a vape shop at 6 and 12 months. The participant's motivations to quit were not recorded but they were shown how to use the e-cigarette and encouraged to use the product to reduce cigarette smoking. Data was also collected on the flavour category used at each timepoint. The changes observed were minor, with tobacco flavour remaining the most popular throughout (Polosa et al. 2015).

In survey of e-cigarette users (n=230) in New Zealand, the use of tobacco or menthol flavours was frequently reported in response to "what flavours have you used" (42%), but less frequently in response to "what flavours are you using now" (10%) (Truman et al. 2018).

Some studies compared differences in use of flavours between exclusive e-cigarettes users and dual users. A cross-sectional Belgium-based study found no significant difference between dual users and ex-smokers in the e-liquid flavour used at initiation and regularly (Adriaens et al. 2017). Similarly, a cross-sectional international survey of e-cigarette users found no significant difference between current and former smokers in flavours used (Dawkins et al. 2013). Conversely, a cross-sectional study from Holland found that exclusive vapers tended to switch from tobacco to other flavours over time whereas dual users did not. However, the statistical significance in this shift was not tested (Romijnders et al. 2018).

The ASH-YouGov survey also contains some data on flavour preferences for exclusive e-cigarette users (ex smokers) and dual users. In 2019, 31% of dual users used tobacco flavours whereas 30% use fruit and 18% menthol. Among ex-smokers who currently used e-cigarettes, 33% use fruit flavours, 24% use tobacco and 24% menthol (ASH, 2019).

Overall, the evidence on flavours used at initiation (i.e. as part of a quit attempt) versus following smoking cessation is very limited. The evidence suggests there may be some tendency to switch flavour use over time, however findings are mixed. Although no data was available on flavour changes following smoking cessation, some studies examined differences in use of flavours between exclusive e-cigarette users and dual users. The vast majority of e-cigarette users have some history of smoking, so it may be reasonable to assume that exclusive e-cigarette users have quit smoking (although they may not have used e-cigarettes to initially do so). Dual users may include e-cigarette users who are in the process of quitting and those who have failed to quit but may also include people who have no immediate intention to stop smoking.

What is the role of flavours in smoking cessation and relapse prevention?

Five studies were identified within the search dates for the review that contained information on e-cigarette flavours and smoking cessation (see Table 1). We did not identify any studies that specifically examined flavours and any potential role in relapse prevention.

Three longitudinal studies that examined the role of e-cigarettes in smoking cessation reported relevant findings relating to flavours. Collectively, they found limited evidence of their role in smoking cessation.

A secondary analysis of Waves 1-2 (2013-2015) of the US Population Assessment of Tobacco and Health (PATH) study examined e-cigarette use characteristics at Wave 2 in adults who were exclusive combustible cigarette users at Wave 1. After controlling for sociodemographic variables and cigarette use at wave 1, those who used non-tobacco flavoured e-cigarettes at wave 2 smoked fewer cigarettes compared with the rest of the sample ($p=0.001$). There was no significant difference observed for number of days smoked or dependence symptoms (Buu et al 2018). In another analysis of waves 1-2 of the PATH study, after adjustment for sociodemographic variables at wave 1, young adults (18-34 year olds) were more likely to quit or reduce smoking if they used one (OR=2.5, 95% CI=1.6-3.8, $p<0.001$) or more than one (OR=3, 95%=2.1-4.3, $p<0.001$) non-tobacco or non-menthol flavour compared with young adults who did not use e-cigarettes. No significant difference was observed for young adults who used tobacco or menthol e-cigarettes compared with those who did not use e-cigarettes (Chen. 2018).

A different longitudinal study in the USA examined the association between use of e-cigarettes and past 30-day smoking abstinence in the Tobacco Products and Risk Perceptions Survey (2015-2016). Users of tobacco/unflavoured e-cigarettes and all other flavours (e.g. fruit, desert) were less likely than the rest of the sample to report past 30-day abstinence from smoking (AOR=0.11, 95%CI= 0.02-0.50, AOR=0.22, 95%CI=0.08-0.59, respectively). No significant difference was found for users of menthol flavoured e-cigarettes (Weaver et al. 2018).

These studies present conflicting findings, and each has limitations. Notably, Buu et al and Weaver et al compared those who used flavoured e-cigarettes to all other participants (i.e. users of non-flavoured e-cigarettes and non-e-cigarette users inclusive) rather than comparing users of different flavours/flavour categories. Chen compared users of different flavour categories to non-users of e-

cigarettes rather than comparing between flavour categories. In addition, studies of this nature are vulnerable to selection bias as they follow up existing smokers who have not necessarily successfully stopped smoking using an e-cigarette. Buu and colleagues attempted to adjust for this bias using a Heckman two step procedure, however no adjustment for selection bias was undertaken in the Weaver et al or Chen study.

The role of flavours in smoking cessation was also examined in a small US study of adult smokers (n=88) who were not intending to quit smoking but agreed to substitute cigarettes for an e-cigarette. Participants were randomised to receive either high or no nicotine with their flavour of choice, or tobacco flavour. After taking account of the effects of nicotine concentration and being a menthol cigarette smoker, some flavours were associated with a greater reduction in cigarettes smoked than others. However, as participants were either randomised to receive a tobacco flavoured e-cigarette or an e-cigarette with their flavour of choice, it is difficult to unpick the extent to which receiving their flavour of choice or the designated flavour specifically played a role in smoking cessation. The results were also not adjusted for sociodemographic characteristics so are likely to be subject to confounding (Litt et al. 2016). Overall, this study presents some limited evidence of the role of flavours in smoking cessation.

In a cross-sectional US study of vape-shop customers (n=215), those who reported using non-tobacco or non-menthol flavours were more likely to have quit smoking than those who used tobacco or menthol flavours, after adjusting for age and sex (OR=2.4, 95% CI=1.07-5.53, p=0.035) (Tackett et al. 2015).

Overall, the balance of evidence suggests that e-cigarette flavours may increase the success of smoking cessation, but the data are limited and of low quality.

Table 1: Identified studies on the impact of flavours on the effectiveness of smoking cessation

Title	Authors/Date	Study Size	Country	Methods	Key findings	Limitations
The association between e-cigarette use characteristics and combustible cigarette consumption and dependence symptoms: Results from a national longitudinal study.	Buu A, Hu YH et al. 2018.	2,727	US	Secondary analysis of waves 1-2 (2013-2015) of the Population Assessment of Tobacco and Health Study. E-cigarette use patterns (including use of flavours) and smoking cessation outcomes at wave 2 were assessed in adults who were exclusive cigarette users at Wave 1. Heckman two step procedure used to account for selection bias that arose from only selecting smokers who did not use e-cigarettes at Wave 1. Results were adjusted for sociodemographic variables.	Participants who used non-tobacco flavoured e-cigarettes cigarettes at wave 2 smoked fewer cigarettes compared with the rest of the sample. There was no significant difference observed for number of days smoked or dependence symptoms.	- The analysis compared those who used flavoured e-cigarettes to all other participants (i.e. users of non-flavoured e-cigarettes and non-e-cigarette users inclusive) rather than comparing users of different flavours/flavour categories. - The quantity, nicotine concentration and duration of e-cigarette use was not accounted for and may have confounded results - Data was collected in 2013-2015 so may not capture newer generations of e-cigarettes/flavours
Flavored E-cigarette Use and Cigarette Smoking Reduction and Cessation – A Large National Study among Young Adult Smokers	Chen, J.C. 2018.	844	US	Secondary analysis of waves 1-2 (2013-2015) of the Population Assessment of Tobacco and Health Study, examining young adult (18-34) cigarette smokers at wave 1 and current e-cigarette users at wave 2.	Participants were more likely to quit or reduce smoking if they used one (OR=2.5, 95% CI=1.6-3.8, p<0.001) or more than one (OR=3, 95%=2.1-4.3, p<0.001) non-tobacco or non-	- Small sample of 18-34-year olds who used e-cigarettes at wave 2 of the study. Therefore, the analysis may lack statistical power

				The association between smoking reduction and cessation and e-cigarette flavour use were examined.	menthol flavour compared with participants who did not use e-cigarettes. No significant difference was observed for participants who used tobacco or menthol e-cigarettes compared with those who did not use e-cigarettes	- As the baseline sample consisted of only smokers, ex-smokers who had successfully quit using an e-cigarette would be excluded. Therefore, the sample is subject to selection bias - The analysis compared participants who used specific flavours to participants who did not use e-cigarettes rather than comparing users of different flavours. - Data was collected in 2013-2015 so may not capture newer generations of e-cigarettes/flavours
Are electronic nicotine delivery systems helping cigarette smokers quit? Evidence from a prospective cohort study of U.S. adult smokers, 2015-2016.	Weaver SR, Huang J, Pechacek, et al. 2018	858	US	Analysis of data from the 2015 Tobacco Products and Risk Perceptions Survey. Assessed the relationship between baseline ENDS use (including flavours) and past 30-day abstinence, making a quit attempt and number of cigarettes smoked at follow up. Results were adjusted for sociodemographic variables, smoking history and intensity, quit intentions and history.	Users of tobacco/unflavoured e-cigarettes and all other flavours (e.g. fruit desert) were less likely than the rest of the sample to report past 30-day abstinence from smoking (AOR=0.11, 95%CI= 0.02-0.50, AOR=0.22, 95%CI=0.08-0.59, respectively). No significant difference was found for users of menthol e-cigarettes.	- The analysis compared those who used flavoured e-cigarettes to all other participants (i.e. users of non-flavoured e-cigarettes and non-e-cigarette users inclusive) rather than comparing users of different flavours/flavour categories

						- As the baseline sample consisted of only smokers, ex-smokers who had successfully quit using an e-cigarette would be excluded. Therefore, the sample is subject to selection bias - Sample size may not be large enough to detect statistical power
Cigarette smoking and electronic cigarette vaping patterns as a function of e-cigarette flavourings.	Litt M.D., Duffy V et al. 2016	88	US	Smokers not initially intending to quit were recruited and agreed to substitute their cigarettes for an e-cigarette. Participants recorded their favourite flavour and were randomised into one of four groups: 1) No nicotine e-cigarette, tobacco flavour 2) High nicotine e-cigarette, tobacco flavour 3) No nicotine e-cigarette, preferred flavour 4) High nicotine e-cigarette, preferred flavour Multilevel modelling was used to predict mean cigarette smoking/e-cigarette vaping patterns by assigned flavour over six weeks	After taking account of the effects of nicotine concentration and being a menthol cigarette smoker, some flavours (e.g. menthol) were associated with a greater reduction in cigarette smoking than others (e.g chocolate). Some flavours were associated with greater e-cigarette use than others.	- Small sample size - Statistical analysis did not adjust for confounding variables - Original randomised groups not compared in analysis
Biochemically verified smoking cessation and vaping beliefs among vape store customers.	Tackett A,P., Lechner, W et al. 2015	215	US	Cross sectional survey of adult (18+) vape store customers. Logistic regression was used to assess the associations between ENDS use	- The number of flavours regularly used was positively associated with	- Results were only adjusted for age and sex so may be subject to confounding

				characteristics (including flavours) and biochemically verified smoking abstinence. Results were adjusted for age and sex.	smoking abstinence (p=0.038)	- Smoking abstinence was self-reported so may have been subject to recall bias

Limitations

In the sections above, we have highlighted the limitations of specific studies that met the inclusion criteria for our review. Here we also highlight limitations of the review itself. Due to time constraints, we were only able to search three databases for relevant literature meaning that relevant studies may have been excluded. Our search terms were designed to find terms exclusively in the title or abstract of studies. As many of the papers were not primarily focused on e-cigarette flavours but included useful secondary information, it is possible that further studies which included information on flavours beyond the title and abstract, were excluded. In addition, in excluding words such as "youth" and "children" from the search terms, we may have unintentionally excluded a small number of papers which contained information on both adults (18+) and children (<18). Four separate reviewers were involved in data extraction meaning that inconsistencies in highlighted data may exist.

Conclusion

There is some evidence that flavours play a role in the appeal of e-cigarettes to adult smokers. In studies that have explored why smokers or current vapers use e-cigarettes, flavours do emerge as a reason for use. Their role in smoking cessation is less clear. Surveys that report on flavour preferences, including as part of smoking cessation studies, illustrate that tobacco is not (in most cases) the main flavour choice and that menthol, fruit or sweet flavours are more popular. In addition, a very recent study from the USA, published after our review was completed, found that adults who began vaping non tobacco-flavoured e-cigarettes were more likely to quit smoking than those who vaped tobacco flavours (Friedman and Xu, 2020).

But further evidence is needed (ideally as part of a randomised controlled trial that tested either no flavour or tobacco flavour vs other flavours) to determine to what extent flavours play a role in the effectiveness of vaping for smoking cessation. We found no studies that examined the use of e-cigarette flavours for relapse prevention and this is an area for further research. In addition, more evidence is needed on whether flavoured vaping may be relevant to weight control by reducing snacking or the consumption of particular foods by smokers trying to quit or ex-smokers.

Finally, we did not identify any published studies that independently assessed producer or retail data on the sale or popularity of different e-cigarette flavour categories. This is despite the fact that manufacturers have argued that e-cigarette flavours are important to their adult customers who are primarily smokers or ex-smokers (Cision, 2018). These data exist but are not in the public domain. They should be provided to researchers to allow a more comprehensive assessment of any role of e-cigarette flavours for smoking cessation or relapse prevention.

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