

THE UK ELECTRONIC CIGARETTE RESEARCH FORUM

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Electronic Cigarette Research Briefing – April/May 2020

This research briefing is part of a series of monthly updates aiming to provide an overview of new studies on electronic cigarettes. The briefings are intended for researchers, policy makers, health professionals and others who may not have time to keep up to date with new findings and would like to access a summary that goes beyond the study abstract. The text below provides a critical overview of each of the selected studies then puts the study findings in the context of the wider literature and research gaps.

The studies selected and further reading list do not cover every e-cigarette-related study published each month. Instead, they include high profile studies most relevant to key themes identified by the UK Electronic Cigarette Research Forum; including efficacy and safety, smoking cessation, population level impact and marketing. For an explanation of the search strategy used, please see the end of this briefing.

You can find our previous research briefings at www.cruk.org/UKECRF.

If you would prefer not to receive this briefing in future, just let us know.

1. [Associations between dual use of e-cigarettes and smoking cessation: A prospective study of smokers in England](#)

- **Study Aims**

This English study reviewed data collected from 1,498 people (aged 16+). A prospective analysis explored the association between dual use of e-cigarettes, dual use of nicotine replacement therapy (NRT) and exclusive smoking at baseline and quit attempts, quit success and overall quits over 12-months follow up. A cross-sectional analysis examined the above outcomes in participants who began vaping alongside smoking during follow-up compared with those who commenced dual NRT use and those who continued to exclusively smoke. Results were adjusted for sociodemographic and smoking related covariates.

- **Key Findings**

There was no significant difference in the prevalence of quit attempts at follow-up between baseline dual users and exclusive smokers. Dual users of e-cigarettes were less likely than dual users of NRT to have made a quit attempt (OR=0.61, 95% CI=0.38-0.98, p=0.039).

There was no significant difference in success of quit attempts or overall quits in dual users of e-cigarettes compared with exclusive smokers or dual users of NRT.

When restricting the definition of dual use of e-cigarettes or NRT to those who reported using the products to cut down smoking, a similar pattern of results to the primary analysis were observed.

In the cross-sectional analysis, past-year smokers who currently used e-cigarettes were nearly three times as likely to have made a quit attempt in the past 12 months than those who remained exclusive smokers (OR=2.83, 95% CI=1.92-4.17, $p<0.001$). There was no significant difference in quit attempts observed between past-year smokers who currently used e-cigarettes and past-year smokers who currently used NRT.

There was no significant difference in success of quit attempts between past-year smokers who used e-cigarettes compared with those who remained exclusive smokers and those who currently used NRT.

The overall quit rate was nearly 3 times greater in past year smokers who used e-cigarettes compared with those who remained exclusive smokers (OR=2.82, 95% CI=1.78-4.48, $p<0.001$). There was no significant difference observed between past year smokers who used e-cigarettes and those who used NRT.

- **Limitations**

The study design meant the timing of commencing e-cigarette use and attempting to quit smoking could not be determined. This means that trajectories and length of e-cigarette use to cessation could not be examined. Any e-cigarette users who had already successfully quit smoking would be excluded from the prospective analysis – looking at the dual user population may be selecting those who have already failed in their quit attempts.

There was a high rate of drop out between baseline and follow up meaning that the resulting sample size was relatively small, with 292 and 117 participants remaining in the dual e-cigarette and NRT subgroups, respectively. This may result in reduced power to detect an effect on quit attempts, and the results may be subject to bias.

Not all potential covariates were measured, for example health conditions of participants. This may mean the results are subject to residual confounding.

The data on quit attempts and abstinence over the past 12 months were self-reported and may be subject to recall bias, which could have influenced results.

No information was collected on the type of e-cigarette device used. Previous studies have shown this to be related to quitting outcomes.

Jackson S, Shahab L, West R, Brown J. (2020). Associations between dual use of e-cigarettes and smoking cessation: A prospective study of smokers in England. *Addictive Behaviours*. doi: 10.1016/j.addbeh.2019.106230.

2. [Association between changes in harm perceptions and e-cigarette use among current tobacco smokers in a time series analysis](#)

- **Study Aims**

This English study reviewed data collected from 16,567 current smokers (aged 16+). A time series analysis was used to explore the relationship between changes in believing that e-cigarettes are less harmful than cigarettes and the prevalence of e-cigarette use. Results were stratified by age, sex and social grade and adjusted for cigarette smoking prevalence, past year quit attempts and changes in anti-tobacco advertising spending.

- **Key Findings**

A 1% decrease in the prevalence of smokers who believed that e-cigarettes are less harmful than cigarettes was associated with a 0.48% decrease in prevalence of e-cigarette use among smokers (95%CI=0.25%-0.71%, $p<0.001$).

Changes in the prevalence of smokers who believed that e-cigarettes are less harmful than cigarettes were associated with a decrease in the prevalence of e-cigarette use among smokers aged 25-64 (0.37% change in vaping per 1% change in smoking, 95%CI=0.13-0.61, $p<0.001$ and 64+ (0.22% change in vaping per 1% in smoking, 95% CI=0.07-0.37, $p<0.001$). There was no significant association between this belief and the use of e-cigarettes in 16-24-year olds.

In men, a 1% decrease in the prevalence of smokers who believed that e-cigarettes are less harmful than cigarettes was associated with a 0.48% decrease in e-cigarette use among smokers (95%CI=0.18-0.66, $p<0.001$). In women, there was no significant association between this belief and the use of e-cigarettes.

Changes in the prevalence of smokers who believed that e-cigarettes were less harmful than cigarettes was associated with a decrease in e-cigarette use in both ABC1 (0.49% change in vaping per 1% change in smoking, 95%CI=0.27-0.71, $p<0.001$) and C2DE (0.37% change in vaping per 1% in smoking, 95%CI=0.12-0.61, $p<0.01$) participants.

- **Limitations**

The study looked at an association between trends rather than a causal link. Associations could have been confounded by other factors such as cuts to Stop Smoking Services which were not considered in the analysis. The results were adjusted for nominal anti-tobacco advertising spending, but this does not account for the effect of inflation meaning the real values may differ. In addition, changes in e-cigarette media representation were not accounted for.

There may be some undetected bi-directionality in the study (i.e. an effect of e-cigarette use trends on harm perception).

Approximately 300 participants were surveyed at each survey wave. This small sample per wave may have impacted the accuracy of estimates.

The study was exclusively in smokers. Therefore, the results may not be generalisable to past-year smokers or long-term ex-smokers.

Perski O, Beard E, Brown J. (2020). Association between changes in harm perceptions and e-cigarette use among current tobacco smokers in a time series analysis. BMC Medicine. doi: 10.1186/s12916-020-01565-2.

3. [European adult smokers' perceptions of the harmfulness of e-cigarettes relative to combustible cigarettes: cohort findings from the 2016 and 2018 EUREST-PLUS ITC Europe Surveys](#)

- **Study Aims**

This study assessed the effects the Tobacco Products Directive (TPD) on harm perceptions of e-cigarettes compared to cigarettes in adult smokers from six European Union member states (Germany, Greece, Hungary, Poland, Romania and Spain). Participants (n=6011) were recruited in 2016 (before the TPD was implemented). Of these, 3195 were followed-up in 2018 along with an additional 2832 new respondents in 2018. Results were adjusted for sociodemographic characteristics, cigarettes per day and the number of times participated in the study.

- **Key Findings**

Overall, in 2018, 28.4% of respondents viewed e-cigarettes as less harmful than cigarettes, 61.8% believed that they were equally or more harmful than cigarettes and 9.8% responded that they did not know whether they were more, less or equally as harmful as cigarettes.

There was no significant overall effect of study wave on e-cigarette harm perceptions. There was also no significant interaction between country and study wave on e-cigarette harm perceptions.

In individual countries, there was no significant difference between the study waves in the proportion of people that perceived e-cigarettes as less harmful than cigarettes. There was also no significant difference in the proportion that perceived e-cigarettes as equally or more harmful than cigarettes.

There was no significant change in "don't know" responses in all countries except Spain. For Spain, participants were less likely to respond that they did not know whether e-cigarettes were less harmful than cigarettes in 2018 than they were in 2016 (% difference = -9.9%, SE=2.7, p=0.008).

Compared with respondents from Hungary, respondents from Spain and Romania were less likely to believe that e-cigarettes are less harmful than cigarettes (OR=0.56, 95% CI=0.40-0.77 and OR=0.45, 95% CI=0.33-0.62, respectively). Respondents from Germany were less likely than respondents from Hungary to believe that e-cigarettes were equally or more harmful than cigarettes (OR=1.43, 95%CI=1.04-1.96). There were no other significant differences observed when comparing countries with Hungary.

Current e-cigarette users and those who had reported having tried but not currently using e-cigarettes were more likely to believe that e-cigarettes are less harmful than cigarettes compared to those who had never tried an e-cigarette (OR=4.03, 95% CI= 3.05-5.33 and OR=1.47, 95% CI = 1.26-1.73, respectively).

- **Limitations**

The study focused on the perceptions of smokers. Therefore, the results are not generalisable to the wider, non-smoking population.

Due to the high rate of attrition, new participants were recruited at wave two of the study. Therefore, the study does not examine the changes in perceptions in the same group of participants.

The analysis did not adjust for previous e-cigarette use or exposure. Therefore, the results may be subject to confounding.

There were very few e-cigarette users in the sample which may have affected the estimates of harm perceptions among e-cigarette users.

The data in the study were self-reported. Therefore, it may have been subject to bias.

The study addressed only one question on the perceptions of e-cigarettes and did not examine participant's intentions to use them, which may differ.

The study only included participants from five EU member states. Therefore, the results may not be generalisable to countries not included in the analysis.

Gravelly S, Driezen P, Kyriakos CN, Thompson ME, et al. (2020). European adult smokers' perceptions of the harmfulness of e-cigarettes relative to combustible cigarettes: cohort findings from the 2016 and 2018 EUREST-PLUS ITC Europe Surveys. *European Journal of Public Health.*; doi: 10.1093/eurpub/ckz215.

4. [Alterations in Vascular Function Associated With the Use of Combustible and Electronic Cigarettes](#)

- **Study Aims**

This cross-sectional US study compared vascular health across young adults (n=467) (21-45 years) who were smokers, non-smokers, e-cigarette users and dual users. Measures of vascular function were compared across the four groups and between groups in post-hoc analyses. Results were adjusted for age, sex and study site. In a subset of participants (n=57), endothelial cell signalling pathways were examined by comparing nitric oxide (NO) and NO synthase (eNOS) production in response to A23187 stimulation across non-smokers, smokers and e-cigarette users.

- **Key Findings**

[Augmentation index](#) (a measure of arterial stiffness) and systolic blood pressure varied significantly across groups (p=0.0008 and p=0.007, respectively).

The augmentation index of smokers was significantly greater than that of non-smokers (129.8±1.5 vs 118.4±2.6, p=0.0014), indicating greater arterial stiffness in smokers. There was no significant difference in augmentation index of smokers and e-cigarette users and smokers and dual users (ps=1).

There were no significant overall effects of tobacco/e-cigarette use status on diastolic blood pressure ($p=0.14$), heart rate ($p=0.1$), brachial diameter ($p=0.63$), baseline mean flow velocity ($p=0.1$), hyperemic mean flow velocity ($p=0.79$), flow mediated dilation (0.68), shear stress ($p=0.73$), carotid-femoral pulse wave velocity (PWV) ($p=0.12$) and carotid-radial PWV ($p=0.2$).

NO and eNOS production varied significantly across groups ($p=0.03$ and $p=0.033$ respectively). Cigarette and e-cigarette users produced less NO compared with non-smokers ($2.8\pm 2.2\%$ and $2.6\pm 3.0\%$ versus $14.1\pm 1.5\%$, $p=0.003$ and $p=0.002$ respectively). E-cigarette users produced less eNOS than smokers (10.7 ± 2.2 vs 22.1 ± 3.6 AU, $p=0.03$), however no difference in eNOS production was observed between non-smokers and smokers ($p=0.122$).

- **Limitations**

All e-cigarette users were ex-smokers and the analyses did not adjust for pack years smoked or other health conditions (e.g. BMI). Therefore, the effects observed may be confounded by the long-lasting cardiovascular impacts of smoking or other health conditions.

There was considerable variability in the sociodemographic characteristics of participants between groups. For example, sole e-cigarette users were predominantly white men whereas non-smokers were predominantly black women. Results may be subject to confounding by these factors.

The endothelial cell signalling analysis was carried out in a small subset of participants and did not adjust for any confounding variables. This may have affected the power to detect differences and the accuracy of estimates.

The post hoc analysis of differences in augmentation index compared all groups with smokers. Therefore, differences when comparing with non-smokers cannot be gauged.

Urinary cotinine was used to verify abstinence however this measure cannot differentiate between e-cigarette and cigarette use as both products contain nicotine. Therefore, it cannot be confirmed that sole e-cigarette users did not dual use.

Fetterman J, Keith R, Palmisano J et al. (2020). Alterations in Vascular Function Associated With the Use of Combustible and Electronic Cigarettes. *Journal of the American Heart Association.*; doi: 10.1161/JAHA.119.014570.

5. [Cardiovascular autonomic effects of electronic cigarette use: a systematic review](#)

- **Study Aims**

This study aimed to assess the autonomic cardiovascular effects of e-cigarette (EC) use. The systematic review included 19 studies that examined the acute cardiovascular effects of ECs, the acute cardiovascular effects of nicotine versus no nicotine ECs, the chronic cardiovascular effects of ECs and/or the chronic cardiovascular effects of switching from tobacco cigarettes (TC) to ECs. Pooled measures of heart rate, blood pressure were used to estimate these effects.

- **Key Findings**

Eight studies investigated the acute effects of TCs compared with ECs. Overall, TCs had a greater effect than ECs on systolic blood pressure (SBP), diastolic blood pressure (DBP) and heart rate (HR). (Mean difference in SBP = 1.58mmHg, 95%CI=0.20-2.97, p=0.025. Mean difference in DBP = 1.57mmHg, 95%CI=0.37-2.87, p=0.01. Mean difference in HR = 3.06bpm, 95% CI=2.01-4.10, p=0.00001).

Five studies compared the acute effects of nicotine and non-nicotine ECs. Overall, nicotine ECs had a greater effect than non-nicotine ECs on SBP, DBP and HR. (Mean difference in SBP=3.73 mmHg, 95%CI=0.59-6.87, p=0.02. Mean difference in DBP=3.25mmHg, 95%CI=1.21-5.30, p=0.0018. Mean difference in HR=6.44bpm, 95%CI=3.52-9.36, p<0.00001)

Two studies found no effect of long-term EC use on heart rate and blood pressure in non-smokers.

Five studies examined the long-term effects of switching from TCs to ECs. Two studies found a significant decrease in SBP and DBP but not HR. One study found a significant decrease in SBP but not DBP or HR. Two studies found no change in BP or HR.

- **Limitations**

The review did not include a meta-analysis of data on chronic effects. Therefore, common effects of the studies cannot be statistically verified. For the combined data on acute effects, an analysis of heterogeneity was not performed.

In the studies comparing the acute cardiovascular effects of ECs/TCs, the plasma nicotine concentration was not measured or standardised. Therefore, it is unclear whether participants were exposed to comparable nicotine levels or to what extent this drove differences in outcomes.

Heart rate and blood pressure are not optimum measures of cardiovascular health, particularly in the chronic setting. Measures such as flow mediated dilation or risk of cardiac events were not measured in the included studies.

In studies investigating switching from TCs to ECs, there was large variability in the compliance of participants. Therefore, the results may have been influenced by varying compliance.

This review is vulnerable to any limitations of the individual studies included. The extent to which confounding variables (e.g. previous smoking status) were adjusted for in each study is unclear.

All studies examined early generation e-cigarette devices. Therefore, the findings may not be applicable to newer generations of devices.

Garcia PD, Gornbein JA, Middlekauff HR. (2020). Cardiovascular autonomic effects of electronic cigarette use: a systematic review. *Clinical Autonomic Research*. doi: 10.1007/s10286-020-00683-4.

6. [Benefits of e-cigarettes in smoking reduction and in pulmonary health among chronic smokers undergoing a lung cancer screening program at 6 months.](#)

- **Study Aims**

This Italian study primarily aimed to assess changes in pulmonary health due to smoking reduction, but also assessed the efficacy of e-cigarettes to reduce smoking. Smokers (n=210) aged 55+ who had smoked on average of 10 cigarettes per day for at least 10 years, were recruited from within the COSMOS II trial on lung cancer screening. Participants were assigned to receive nicotine e-cigarettes, nicotine-free e-cigarettes or control. All groups received telephone behavioural support. Outcomes at 6 months included smoking abstinence, daily cigarettes smoked, expired carbon monoxide (CO), nicotine dependence (FTND score), pulmonary health (dry cough, catarrh, breathlessness and bronchitis) and cough-related quality of life (Leicester cough questionnaire).

- **Key Findings**

At six months follow-up, there was a no significant effect of treatment group on symptoms of pulmonary health reported and cough-related quality of life.

There was no significant difference between groups on smoking abstinence at 6 months follow-up ($p=0.691$).

Among participants who were still smoking at 6 months, there was a significant difference in the number of daily cigarettes smoked between groups ($p<0.02$). Participants in the nicotine e-cigarette group smoked on average 11.0 cigarettes per day, compared to 14.0 in the nicotine free e-cigarette group and 13.5 in the control group.

Among participants who were still smoking at 6 months, there was a significant difference in exhaled CO between groups ($p<0.025$). Participants in the nicotine e-cigarette group had a mean exhaled CO of 12.0, vs 15.3 in the nicotine-free e-cigarette group and 16.5 in the control group.

Among participants who were still smoking at 6 months, there was a significant difference in nicotine dependence between groups ($p<0.032$). All participants had low-to moderate dependence at 6 months; smokers in the nicotine e-cigarette group had a mean FTND score of 3.12, compared to 4.32 in the nicotine-free e-cigarette group and 3.59 in the control group.

In the nicotine e-cigarette group, 5.7% and 15.9% of participants reported a burning throat at 3 and 6 months respectively. In the nicotine-free e-cigarette group this was 2.9% and 5.6% respectively.

- **Limitations**

This study did not conduct post-hoc analyses, so significant differences between individual study groups cannot be determined. It was not clear whether smoking abstinence was adjusted for when looking at the effect of treatment group on pulmonary health and cough related quality of life.

26% of participants were lost to follow-up at 6 months. This may have affected the accuracy of estimates and power to detect an effect of e-cigarettes on outcomes.

Randomisation did not consider balance of socioeconomic status (SES) between treatment groups. SES was not adjusted for, which means the results could be subject to confounding.

Participants were recruited from a lung cancer screening trial; they were chronic heavy smokers who may have had increased motivation to quit. Therefore, the results may not be generalisable to the wider smoking population.

CO validation can only detect 24-hour abstinence from smoking. Participants may have misreported their smoking status which could bias the results if they were not truly abstinent for the whole follow-up period.

Lucchiari, C., Masiero, M., Mazzocco, K., Veronesi, G., Maisonneuve, P., Jemos, C., Omodeo Salè, C., Spina, S., Bertolotti, R., Pravettoni, G. (2020). Benefits of e-cigarettes in smoking reduction and in pulmonary health among chronic smokers undergoing a lung cancer screening program at 6 months. *Addictive Behaviors.*;doi: 10.1016/j.addbeh.2019.106222.

Overview

The current edition of the UKECRF bulletin covers articles from both April and May, so six in total. This includes studies conducted by researchers in England, the USA, Italy and one multi-country team.

Our first and second articles this month draw on the Smoking Toolkit study in England. The first paper aimed to examine the relationship between dual use (of e-cigarettes or NRT with smoking), quit attempts and success at stopping smoking. [Previous research has suggested](#) that using e-cigarettes while continuing to smoke undermines smoking cessation and exploring this was the main rationale for the analysis. Just under 1,500 smokers were involved and they fell into three groups at baseline - those who were vaping and smoking (n=292), using NRT and smoking (n=117) or exclusively smoking (n=1089) and all three groups were followed up at one year to examine changes.

Overall the study found that dual use in this sample didn't undermine overall quit rates at one year. However, there were differences between the three groups in terms of quit attempts and success at stopping smoking. Participants who were smoking and using NRT were more likely to make a quit attempt than both exclusive smokers and dual users of e-cigarettes and tobacco, which is consistent with [previous research](#) on NRT use for smoking reduction and cessation. However, findings regarding any differences between dual use of NRT or vaping were inconclusive in relation to other outcomes of interest in the study, including quit success and overall quit rates at one year.

The second Toolkit article focuses on harm perceptions. As regular readers will know, there have been a number of surveys from the UK and USA in particular that show a rise in the number of smokers in recent years who believe e-cigarettes are as harmful as smoking. Although we do not know the long-term impact of e-cigarette use, so far there is little research evidence to support the view that this is the case, and a range of studies suggesting the contrary. In this analysis, the team at UCL aimed to examine whether there was a relationship between changes in harm perceptions and the prevalence of e-cigarette use in England. Data were from just over 16,500 smokers who participated in the Toolkit between 2014 and 2019.

Overall, the authors found that harm perceptions do appear to influence whether smokers choose to use e-cigarettes after adjusting for a range of relevant variables. The study suggested that the prevalence of e-cigarette use decreased by just under half a percentage point for every 1% decrease in the prevalence of current smokers who agreed with the statement that e-cigarettes were less harmful than smoking. This was particularly the case in older people and among males.

This month's third article also examines harm perceptions, but explored this in a sample of smokers from six European countries who participated in the [EUREST-PLUS ITC Europe surveys](#). Smokers were surveyed in Germany, Greece, Hungary, Poland, Romania and Spain prior to the introduction of the European Tobacco Products Directive (TPD) in 2016 and subsequently two years later. Just over half of the sample completed both waves of data collection and further participants were recruited in 2016. The authors compared the extent to which smokers thought e-cigarettes were less harmful, equally harmful, more harmful (or didn't know) pre and post TPD, adjusting for relevant variables.

The extent to which smokers believed that e-cigarettes were less harmful than smoking varied between countries at both time points. This was 27% in 2016, with smokers in Hungary and Greece being most positive and Romania and Spain most negative. At follow up, there was very little change overall (28%) and the same applied for the proportion who thought they were more harmful, which was the majority of respondents at both time points. The one interesting shift was that the proportion who responded 'don't know' significantly decreased between 2016 and 2018, perhaps indicating higher levels of public awareness as time went on. Overall, this study highlights that as in the UK and USA, smokers in several European countries have misperceptions about the relative risks of vaping vs smoking and this appears to have been neither helped nor hindered by the introduction of the EU TPD.

Our fourth and fifth articles focus on the cardiovascular health and vaping. The study by Fetterman et al compared key measures of vascular function between four groups of younger adults (aged 21-45) - smokers, non smokers, vapers and dual users. This paper did receive some [media attention](#), with the headline that vaping could be just as bad for the heart as smoking.

The study looked at a number of measures of vascular function in the volunteers, using a range of established tests. They found that arterial stiffness (an early marker of potential harm to the heart) differed between the groups in the study. For arterial stiffness as measured by the 'augmentation index', smokers had stiffer arteries than non smokers, as previous studies have found. In addition, the arterial stiffness of vapers and dual users was similar to that of smokers. No significant differences for blood pressure and some other markers were found. In a sub-sample (n=57) the researchers also examined cells taken from the interior surface of the blood vessels (endothelial cells) of participants. In this experiment, the researchers found that the cells taken from smokers and vapers produced less nitric oxide (which protects the heart) and more reactive oxygen species (which can damage cells) compared with non-smokers. On the basis of these findings the authors argued that there was no evidence that vaping (even among those that have completely switched from smoking) reduces the harm from tobacco to the cardiovascular system, but did acknowledge that more research was needed.

The fifth article is a systematic review of the literature focusing on acute and chronic cardiovascular effects of vaping. The authors were particularly interested in studies that examined nicotine vs non nicotine e-cigarette emissions and the cardiovascular effects of switching from smoking to vaping. The authors found nineteen studies that examined outcomes of interest. Overall, they found that vaping had less of an effect on blood pressure and heart rate than smoking. In addition, studies that compared e-cigarettes with nicotine to those without found that use of nicotine containing e-liquids increased blood pressure and heart rate compared with non-nicotine products (which is not surprising as nicotine acts initially as a stimulant and is known to affect both blood pressure and heart rate). Finally, amongst a small number of studies (n=5) that examined the cardiovascular effects of completely switching from smoking to vaping, results varied in terms of effects on blood pressure and heart rate. One of these was a [randomised controlled trial from the UK](#) that we included in a previous bulletin, from Jacob George and colleagues and funded by the British Heart

Foundation. This trial found that complete switching from smoking to vaping improved key markers of cardiovascular health in the short term.

Finally, we include a randomised controlled trial from Italy that aimed to assess the effects of vaping on cutting down smoking amongst a group of older (aged 55+) daily smokers (who had smoked daily for at least a decade) who were recruited via a [lung cancer screening programme in Milan](#). It also involved (as the main outcome) assessing changes in pulmonary health (coughing and shortness of breath, for example) during the trial. Just over 200 participants were recruited. All received modest behavioural support over the phone on four occasions over three months. The focus of behavioural support was raising awareness about the harms of smoking and increasing motivation to quit. The group were then randomised to receive a) a free vaping started pack and 12 low strength (8mg/ml) e-liquid cartridges b) a free vaping starter pack but with nicotine free cartridges c) behavioural support alone. Participants were then followed up at the end of treatment (12 weeks) and at 6 months. The main outcome was changes in pulmonary health and the secondary outcome was the effectiveness of e-cigarettes to cut down smoking.

Key measures of pulmonary health improved among the participants who switched completely to vaping. However, as most involved in the trial (80% of participants overall) did not quit, no overall differences in the lung health symptoms assessed (cough, shortness of breath, catarrh) were found between the trial groups. Perhaps unsurprisingly, cutting down on smoking was more common in the nicotine e-cigarette group and this group had the lowest carbon monoxide levels and lowest level of smoking dependence at follow up. This trial is a useful addition to the literature on e-cigarette use for smoking reduction and improvements in lung health. It suggests, however, that minimal behavioural support and low nicotine e-cigarettes provided to regular long term older smokers may be insufficient to achieve substantial improvements in pulmonary health.

Other studies from April and May you might find of interest:

Patterns of use

[Cigarette use, e-cigarette use, and dual product use is higher among adults with serious psychological distress in the United States: 2014-2017.](#)

[Use of Electronic Nicotine Delivery Systems \(ENDS\) in China: Evidence from Citywide Representative Surveys from Five Chinese Cities in 2018.](#)

[Validation of an E-cigarette Purchase Task in Advanced Generation Device Users.](#)

[E-cigarette Product Characteristics and Subsequent Frequency of Cigarette Smoking.](#)

[Tobacco use and E-cigarette regulation: Perspectives of University Students in the Asia-Pacific.](#)

[Patterns of tobacco and e-cigarette use status in India: a cross-sectional survey of 3000 vapers in eight Indian cities.](#)

[Addiction vs. dependence: A mixed methods analysis of young adult JUUL users.](#)

[Dripping and vape tricks: Alternative e-cigarette use behaviors among adolescents.](#)

[The influence of neuroticism in terms of E-cigarette dependence and beliefs about use and quitting among dual users of combustible and electronic cigarettes.](#)

[Dependence on e-cigarettes and cigarettes in a cross-sectional study of US adults.](#)

[Use of Electronic Cigarettes in European Populations: A Narrative Review.](#)

[Timing of vape use among adolescents: Differences by family structure.](#)

[Tobacco Retail Density and Initiation of Alternative Tobacco Product Use Among Teens.](#)

[Differences in nicotine intake and effects from electronic and combustible cigarettes among dual users.](#)

[Abuse liability of electronic cigarettes in men who are experienced electronic cigarette users.](#)

[Electronic Cigarette Use and Associated Risk Factors in U.S.-Dwelling Pacific Islander Young Adults.](#)

[E-cigarette use and associated factors among smokers with severe mental illness.](#)

[Longitudinal trends in e-cigarette devices used by Californian youth, 2014-2018.](#)

[Comparing Factors Related to Any Conventional Cigarette Smokers, Exclusive New Alternative Product Users, and Non-Users among Japanese Youth: A Nationwide Survey.](#)

[Electronic cigarette use among Italian smokers: patterns, settings, and adverse events.](#)

[Longitudinal transitions of exclusive and polytobacco electronic nicotine delivery systems \(ENDS\) use among youth, young adults and adults in the USA: findings from the PATH Study Waves 1-3 \(2013-2016\).](#)

[Increases in the Prevalence of Frequent E-Cigarette Use Among Adolescents.](#)

[Daily exposure to formaldehyde and acetaldehyde and potential health risk associated with use of high and low nicotine e-liquid concentrations.](#)

[Do JUUL and e-cigarette flavours change risk perceptions of adolescents? Evidence from a national survey.](#)

[Electronic cigarette dependence and demand among pod mod users as a function of smoking status.](#)

[Behavioral heterogeneity among cigarette and e-cigarette dual-users and associations with future tobacco use: Findings from the Population Assessment of Tobacco and Health Study.](#)

[Changes in Flavor Preference in a Cohort of Long-Term Electronic Cigarette Users.](#)

[Behavioral heterogeneity among cigarette and e-cigarette dual-users and associations with future tobacco use: Findings from the Population Assessment of Tobacco and Health Study.](#)

[Changes in Use Patterns Over 1 Year Among Smokers and Dual Users of Combustible and Electronic Cigarettes.](#)

[How Does Smoking and Nicotine Dependence Change After Onset of Vaping? A Retrospective Analysis of Dual Users.](#)

[E-cigarette Dependence Measures in Dual Users: Reliability and Relations With Dependence Criteria and E-cigarette Cessation.](#)

[Young Adult Tobacco and E-cigarette Use Transitions: Examining Stability Using Multistate Modeling.](#)

[Measurement of Electronic Cigarette Frequency of Use Among Smokers Participating in a Randomized Controlled Trial.](#)

Perception

[An online survey of Malaysian long-term e-cigarette user perceptions.](#)

[Comparison of Message and Effects Perceptions for The Real Cost E-Cigarette Prevention Ads.](#)

[European adult smokers' perceptions of the harmfulness of e-cigarettes relative to combustible cigarettes: cohort findings from the 2016 and 2018 EUREST-PLUS ITC Europe Surveys.](#)

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Search strategy

The Pubmed database is searched in the middle of each month, for the previous month using the following search terms: e-cigarette*[title/abstract] OR electronic cigarette*[title/abstract] OR ecig[title/abstract] OR (nicotine AND (vaporizer OR vaping OR vapourizer OR vaporiser OR vapouriser))

Based on the titles and abstracts new studies on e-cigarettes that may be relevant to health, the UK and the UKECRF key questions are identified. Only peer-reviewed primary studies and systematic reviews are included – commentaries will not be included. Please note studies funded by the tobacco industry will be excluded.

This briefing is produced by Alice Davies and Sophia Lowes from Cancer Research UK with assistance from Professor Linda Bauld at the University of Edinburgh and the UK Centre for Tobacco and Alcohol Studies, primarily for the benefit of attendees of the CRUK & PHE UK E-Cigarette Research Forum. If you wish to circulate to external parties, do not make any alterations to the contents and provide a full acknowledgement. Kindly note Cancer Research UK cannot be responsible for the contents once externally circulated.