The UK Electronic Cigarette Research Forum

cruk.org

UNIVERSITY OF OXFORD | CANCER RESEARCH UK

Electronic Cigarette Research Briefing – February 2025

This research briefing is part of a series of quarterly updates aiming to provide an overview of new studies on electronic cigarettes (e-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 do not cover every e-cigarette-related study published each quarter. 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.

Let's talk e-cigarettes – University of Oxford podcasts Jamie Hartmann-Boyce and Nicola Lindson discuss emerging evidence in e-cigarette research. In the latest episode, they summarise new studies on e-cigarettes for smoking cessation and talk about the findings of their newly published Cochrane review of interventions for quitting vaping. This podcast is a companion to the Cochrane living systematic review of e-cigarettes for smoking cessation and shares the evidence from the monthly searches. Subscribe with iTunes or Spotify to listen to regular updates or find all episodes on the University of Oxford Podcasts site. This podcast series is funded by Cancer Research UK (CRUK).

Cochrane Living Systematic Review of E-cigarettes for Smoking Cessation update
The latest update to the CRUK-funded Cochrane Living Systematic Review of E-cigarettes for Smoking Cessation was published in January 2025 and includes two new studies. A further update is currently underway.

New Cochrane Living Systematic Review of Interventions for Quitting Vaping
A new Cochrane Living Systematic Review of interventions for vaping cessation was published in January 2025. It includes 9 studies, with low certainty evidence of effectiveness of a text message-based intervention in young people and of varenicline; there wasn't enough evidence on other interventions to draw any conclusions. Searches for this review will now be undertaken monthly, with the review updated any time new studies emerge that could change, strengthen or weaken the conclusions.

Visit the website (https://www.cebm.ox.ac.uk/research/electronic-cigarettes-for-smoking-cessation-cochrane-living-systematic-review-1) for full information on both living systematic reviews, including briefing documents, and new studies found since the update.

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.

Commentary

This quarter, we cover three studies (two randomized, one observational) related to use of nicotine vapes for smoking cessation. We also cover an observational study of adverse effects of vaping, and analysis of nicotine information on vaping packs in the UK.

Two UK studies tested smoking cessation interventions, with implications for future research. **Kale *et al*** report results from a randomized feasibility study of e-cigarettes for smoking cessation and reduction in people living with mental health conditions treated in the community. The study wasn't powered for effectiveness, but the intervention was well-received with minimal negative effects reported. Findings will be used to inform the design of a larger trial in this population. **Pope *et al*** report a secondary analysis of data from their COSTED trial (a trial of an opportunistic e-cigarette intervention in emergency departments), investigating predictors of successful smoking cessation. Unadjusted analyses found some groups (females, older people, lighter smokers, and more motivated quitters) were more likely to quit than others, but adjusted analyses uncovered no significant differences between groups. The authors conclude that, as no baseline factors could predict successful smoking cessation with e-cigarettes, adoption of a more universal, rather than targeted, approach to e-cigarette based smoking-cessation interventions may be appropriate.

Turning to observational data, **Jackson *et al*** used the English Smoking Toolkit Study to evaluate prevalence and uptake of vaping in people who have quit smoking. They found a significant increase in the proportion of respondents who reported using an e-cigarette in their quit attempt in the last year, as well as an increase in people who had stopped smoking at least a year ago reporting current vaping. They conclude that the substantial increase in vaping prevalence among former smokers in England is likely largely driven by people using e-cigarettes in quit attempts, but there is also evidence of people starting to vape after being abstinent from smoking for many years.

Again using observational data, **Yong *et al*** examined self-reported negative side effects from vaping nicotine, in a cross-sectional analysis from the International Tobacco Control (ITC) survey. Findings are largely consistent with intervention studies of vaping nicotine (including those discussed above) – negative side effects were infrequent and mainly minor. In the approximately 12% of participants who reported at least one side effect, the most common ones were throat and mouth irritation and cough. Participants who had vaped for six months or less were more likely to report side effects than those who had been vaping for over a year; some evidence from intervention studies show side effects from vaping dissipating over time following continued use. Side effects were more commonly reported in people who currently smoked, and those who endorsed beliefs about diseases attributable to vaping.

Finally, **Ford *et al*** analysed nicotine descriptors on the front of vape packs sold in the UK in 2022. In the UK, the Tobacco and Related Products Regulations require consumers to be informed about nicotine in vaping products. The authors found that 81% of packs contained at least one front-of-pack nicotine descriptor, with many (69%) also including an indicator of nicotine amount/strength, in addition to the legally-required health warning. The way in which nicotine was indicated varied across packs and the authors recommend future research examine how best to display nicotine content messages to promote understanding and informed decision making. As it stands, inconsistent presentation of nicotine content could contribute to misperceptions about nicotine product strength.

Kale *et al*: Providing an e-cigarette starter kit for smoking cessation and reduction as adjunct to usual care to smokers with a mental health condition: findings from the ESCAPE feasibility study

Study aims

This UK randomised controlled trial explored the feasibility of offering an e-cigarette starter kit for smoking cessation to adults receiving treatment in the community for a diagnosed mental health condition alongside their usual care. Adults (18+) who reported cigarette smoking within the past seven days and were willing to attempt to quit or cut down were randomised to receive an e-cigarette starter kit and very brief advice or to the control group (usual stop smoking care from their clinician). Rates of biochemically verified abstinence, 24-hour self-reported point prevalence abstinence and 50% reduction in cigarette consumption one month after randomisation were also compared between the arms and qualitative interviews were conducted to explore acceptability of the intervention.

Key findings

- In intention-to-treat analysis, in which missing participants were considered to be smoking, biochemically verified sustained abstinence at five weeks was reported in 9.5% of participants in the intervention group and 0% in the control group.

- In intention-to-treat analysis, 28.6% of participants in the intervention group and 4.6% of participants in the control group reported 24-hour point prevalence abstinence.

- In intention-to-treat analysis, in which missing participants were considered not to have changed their cigarette consumption, 61.9% of participants in the experimental group and 13.6% of participants in the control group reported at least a 50% reduction in their cigarette consumption.

- Of participants followed up, 93.3% in the experimental group and 25% in the control group reported using an e-cigarette at one month.

- There were no differences between the groups in changes in scores on the Generalised Anxiety Disorder scale. On the Patient Health Questionnaire, participants in the experimental group and not the control reported a reduction in thoughts 'that you would be better off dead or hurting yourself in some way.' More participants in the experimental group than the control group reported adverse events such as nausea and dry mouth and throat.

Limitations

- Target recruitment was not reached, and event numbers were low, limiting ability to draw conclusions about potential efficacy.

- Attrition was higher in the control group than in the intervention group.

- As the follow-up period was relatively short and participants may have been experiencing withdrawal symptoms, findings regarding severity of mental health symptoms may be unreliable.

- There may have been variation in the care received by the control group, as four Mental Health Trusts were involved and 'usual care' may have differed between them.

Kale D, Beard E, Marshall AM, Pervin J, Wu Q, Ratschen E, Shahab L. Providing an e-cigarette starter kit for smoking cessation and reduction as adjunct to usual care to smokers with a mental health condition: findings from the ESCAPE feasibility study. BMC Psychiatry. 2025 Jan 3;25(1):13. doi: 10.1186/s12888-024-06387-7. PMID: 39754165; PMCID: PMC11699696.

Pope *et al:* Predictors of Successful Tobacco Cessation After Receiving an E-Cigarette Based Smoking Cessation Intervention

Study aims

This secondary analysis of data collected through the 'COSTED' trial explored any baseline predictive factors associated with quit success rates. Participants (n=505) were adults (18+) who had been provided with an e-cigarette starter kit during an opportunistic smoking cessation intervention whilst waiting in one of six UK emergency departments. The study investigated whether gender, ethnicity, age, employment status, deprivation, partner smoking status, cigarettes per day, motivation to quit, cigarette dependence or previous e-cigarette use were associated with self-reported abstinence after six months. The analysis of each variable was adjusted for the other variables.

Key findings

- In the unadjusted analysis, the highest abstinence rates were observed in participants who were female, of 'Other' ethnic background, aged over 50, unemployed, in the second most deprived quintile, smoked 10 or fewer cigarettes per day, had high motivation to quit and had previously used an e-cigarette.

- In the adjusted analysis, no significant differences were found in rates of abstinence between the different groups.

Limitations

- Any participants not responding to follow-up were assumed to be smoking, which may underestimate abstinence rates.

- All participants were recruited in the emergency department through a specific study, so the findings may not be generalisable to other settings, approaches or devices.

- The study was underpowered to detect associations in this secondary analysis, so there may be some differences not identified.

- There may be additional confounding factors not adjusted for.

Pope I, Clark A, Clark L, Ward E, Stirling S, Belderson P, Notley C. Predictors of Successful Tobacco Cessation After Receiving an E-Cigarette Based Smoking Cessation Intervention. Tob Use Insights. 2024 Oct 30;17:1179173X241283470. doi: 10.1177/1179173X241283470. PMID: 39494129; PMCID: PMC11528681.

Jackson *et al*: Prevalence and uptake of vaping among people who have quit smoking: a population study in England, 2013-2024

Study aims

This study used data from 54,251 adult (18+) respondents to the Smoking Toolkit Study in England to investigate changes in vaping prevalence among adults who previously smoked and the timing of

uptake of vaping relative to smoking cessation. It examined 1. prevalence of e-cigarette use in a past-year attempt to quit smoking; 2. current vaping prevalence among respondents who had stopped smoking at least a year ago; 3. recent uptake of vaping after smoking cessation (defined as respondents who had stopped smoking within the previous year, did not use an e-cigarette in their most recent quit attempt and currently vaped); and 4. late uptake of vaping (defined as respondents who currently vaped and had stopped smoking before 2011, when vaping became popular).

Key findings

- There was a non-linear increase in the proportion of respondents who had attempted to stop smoking in the past year reporting using an e-cigarette in their quit attempt, from 26.9% (95% CI 24.0–30.0%) in October 2013 to 41.4% (95% CI 37.7–45.2%) in May 2024, including an increase from 30.2% (95% CI 28.4–32.1%) in June 2021.

- Among people who had stopped smoking a year or more previously, there was also a non-linear increase in the proportion reporting current vaping from 1.9% (95% CI 1.5–2.5%) in October 2013 to 20.4% (95% CI 18.7–22.2%) in May 2024, including an increase from 11.2% (95% CI 10.6–11.9%) in June 2021.

- There was no significant change in the proportion of respondents who had stopped smoking less than a year ago without using an e-cigarette who reported current vaping between 2013-14 and 2023-24.

- The proportion of respondents who had stopped smoking before 2011 and reported current vaping increased non-linearly from 0.4% (95% CI 0.2–0.8%) in October 2013 to 1.9% (95% CI 1.6–2.3%) in June 2021 then to 3.7% (95% CI 2.8–4.9%) in May 2024.

Limitations

- Information was not collected on the timing of vaping uptake or on use of e-cigarettes in quit attempts more than a year previously, so the definitions used would not capture all participants. In other words, respondents who stopped smoking more than a year previously but after 2011 and currently vaped would not fall within the definition of late or recent uptake.

- The survey relied on self-reported data, introducing risk of inaccurate recall.

- Some subgroup sizes were small, for example those who had stopped smoking less than a year ago, which limits precision of estimated prevalence.

- The data are only from England and so may not generalised to the wider UK population.

Jackson SE, Brown J, Kock L, Shahab L. Prevalence and uptake of vaping among people who have quit smoking: a population study in England, 2013-2024. BMC Med. 2024 Nov 21;22(1):503. doi: 10.1186/s12916-024-03723-2. PMID: 39567975; PMCID: PMC11580220

Yong *et al:* Prevalence and correlates of negative side effects from vaping nicotine: Findings from the 2020 ITC four country smoking and vaping survey

Study aims

This cross-sectional study investigated the prevalence of self-reported negative side effects from vaping and any association with characteristics including sociodemographic variables, smoking and vaping history and harm perceptions of vaping. It used 2020 data from the International Tobacco Control Four Country Smoking and Vaping survey. Participants (n=3,906) were adults (18+) in England, Canada, the US and Australia who currently smoked or had stopped within the preceding two years and reported vaping in the past 30 days. Those who reported side effects in the past 30 days selected any they had experienced from a list. Potential confounders adjusted for were country, age group, sex, income, education, smoking status, vaping frequency, vaping duration, vaping device type, device nicotine content, flavour type, device purchase location, and beliefs about vaping causing diseases.

Key findings

- One or more negative side effects from vaping were reported by 12.9% (95% CI 11.3–14.6) of respondents. Of these, the most common side effect was throat irritation (5.8% (95% CI 4.8–7.0)) followed by cough (5.5 % (95% CI4.5–6.8)) and mouth irritation (4.1 % (95% CI 3.3–5.2)).

- Participants aged 40-54 (aOR=0.54, 95 %CI=0.41–0.73, p < .001) and 55+ (aOR=0.21, 95 % CI=0.14–0.33, p > .001) were significantly less likely than those aged 18-24 to report negative side effects. Male participants were significantly more likely to than female participants (aOR = 1.45, 95 % CI = 1.20–1.76, p > .001).

- Compared to participants who had been vaping for 13 months or longer, those who had been vaping for less than a month (aOR 3.78, 95% CI 2.78-5.15, p < .001) or 1-6 months (aOR 2.07, 95% CI 1.61-2.65, p < .001) were significantly more likely to report negative side effects.

- Compared to participants who had stopped smoking, those who smoked daily (aOR 1.56, 95% CI 1.07-2.25, p = 0.02) and non-daily (aOR 1.62, 95% CI 1.10, 2.40, p = 0.02) were significantly more likely to report negative side effects.

- Compared to participants who did not endorse any beliefs about vaping causing diseases, those who reported believing that vaping could cause one or more of lung damage, heart disease or cancer were significantly more likely to report side effects (aOR 3.81, 95% CI 3.03-4.78, p < .001).

Limitations

- As a cross-sectional study, it cannot establish causality.

- As an observational study with no control group, the study is unable to control for inaccurate causal attribution.

- The sample only includes people who had vaped in the past 30 days and so cannot explore side effects experienced by people who had stopped vaping because of them.

- The data were collected early in the Covid-19 pandemic, which may have affected people's smoking and vaping behaviour.

- The comparison between age groups may have been affected by oversampling of the 18-24 age group in England, Canada and the US, which was done in anticipation of higher attrition.

Yong HH, Hughes L, Borland R, Gravely S, Cummings KM, Brose LS, Taylor E, Bansal-Travers M, Hyland A. Prevalence and correlates of negative side effects from vaping nicotine: Findings from the 2020 ITC four country smoking and vaping survey. Drug Alcohol Depend. 2025 Jan 1;266:112503. doi: 10.1016/j.drugalcdep.2024.112503. Epub 2024 Nov 20. PMID: 39608290.

Ford *et* al: A Content Analysis of Nicotine Descriptors on the Front of Vape Packaging in the United Kingdom

Study aims

This study analysed nicotine descriptors on the packaging of a random sample of vaping products from a stratified list purchased from land-based and online retailers in the UK. 156 vapes and refill packs were analysed between August and December 2022 and the prevalence of nicotine indicators (in addition to the legally-required health warning) including metric (e.g. mg/ml), percentage and graphic/text representation of strength on the front of the pack were coded by one (90%) or two (10%) researchers.

Key findings

- 81% of the products sampled included at least one nicotine descriptor on the front of the pack.

- 69% of products included a metric, comprising 24% which mentioned nicotine and 45% with no mention of nicotine.

- 23% of products included a percentage, comprising 18% mentioning nicotine and 5% not mentioning it.

- 15% of products included a graphic representation and 3% a text representation of product strength.

- 1% of products gave a total nicotine quantity 'per dose' and 1% an equivalent number of cigarettes.

Limitations

- Most products were single-coded by one researcher, although checks were made and 10% were double- or triple-coded and disagreements were resolved through discussion.

- The study did not include analysis beyond the front of the pack and so would not capture elements elsewhere on or inside the package.

- The analysis was conducted in 2022 and so may no longer be representative of the range of products available, for example those introduced following the announcement of the ban on disposable devices.

Ford A, MacKintosh AM, Morgan A, Jones D, Moodie C, Hunt K, Angus K. A Content Analysis of Nicotine Descriptors on the Front of Vape Packaging in the United Kingdom. Nicotine Tob Res. 2024 Dec 23;27(1):152-156. doi: 10.1093/ntr/ntae168. PMID: 39051935; PMCID: PMC11663797.

Search strategy

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

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 are not included. Please note studies funded by the tobacco industry are also excluded.

This briefing is produced by Julia Cotterill from Cancer Research UK with assistance from Associate Professor Jamie Hartmann-Boyce at the University of Oxford, primarily for the benefit of attendees of the CRUK 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.