Electronic Cigarette Research Briefing – November 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.

Cancer Grand Challenges: Dare to take on some of the most complex challenges in cancer

In August this year, Cancer Research UK and the US National Cancer Institute united to define a new era in cancer research and discovery: Cancer Grand Challenges.

Cancer Grand Challenges is a global funding platform founded by Cancer Research UK and the National Cancer Institute. Through a series of £20m ($25m) awards, Cancer Grand Challenges is giving international teams of researchers the freedom to think differently, act creatively and explore truly innovative science to take on complex questions in cancer.

We have recently revealed 9 new challenges to the international research community.

This includes an **E-cigarettes challenge – Determine the potential benefits and risks of e-cigarette use** – which will be looking for multinational and multidisciplinary proposals. The call is currently open for applications and will close on 22 April 2021.

If you have any questions, please don't hesitate to get in touch at info@cancergrandchallenges.org.

1. Effect of e-Cigarettes Plus Counseling vs Counseling Alone on Smoking Cessation: A Randomized Clinical Trial

- **Study Aims**

  This study randomised 376 adult (18+) smokers from 17 centres across Canada, to either an e-cigarette and 12-week supply of 15 mg/ml e-liquid, an e-cigarette and 12-week supply of 0 mg/ml e-liquid or control. All groups received smoking cessation counselling at baseline, as well as in telephone and clinic follow-ups. The primary analysis compared biochemically verified 7-day abstinence at 12 weeks in the e-cigarette and control groups. A secondary analysis compared abstinence at other follow-up points (up to 24 weeks), cigarette consumption, adverse events and treatment adherence.

- **Key Findings**

  At 12 weeks, the rate of 7-day abstinence was greater in the nicotine e-cigarette group than in the control group (21.9% vs 9.1%; RD=12.8%, 95% CI= 4.0-21.6).

  At 12 weeks, there was no statistically significant difference in 7-day abstinence between the non-nicotine e-cigarette group and control group (RD=8.2, 95% CI = -0.1-16.6) or between the nicotine and non-nicotine e-cigarette groups (RD=5.6%, 95% CI=-5.2-14.3).

  At 24 weeks, the rate of 7-day abstinence was greater in the non-nicotine e-cigarette group than in the control group (20.5 vs 9.9, RD=10.6, 95% CI=1.8-19.4).

  At 24 weeks, there was no statistically significant difference in 7-day abstinence between the nicotine e-cigarette and control groups (RD=7.3%, 95% CI = -0.1-16.6) or the nicotine and non-nicotine e-cigarette groups (RD=-3.3, 95% CI=-12.9-6.3).

  Reduction in self-reported daily cigarette consumption from baseline was significantly greater in the nicotine and non-nicotine e-cigarette groups compared with the control group at 12 weeks (-12.6 vs -7.0; RD=-5.7, 95% CI=-8.0 - -3.3) (-10.6 vs -7.0; RD, -3.6, 95%CI=-6.3- -1.0) and 24 weeks (-10.7 vs -5.5; RD=-5.2, 95% CI=-7.6- - 2.8), (-9.1 vs -5.5; RD=-3.6, 95%CI=-6.3- -1.0).

  At 12 weeks, 68% of participants in the nicotine e-cigarette group reported using their e-cigarette in the past week, compared with 54% in the non-nicotine e-cigarette group. 50% and 46% of participants correctly guessed their treatment group in the nicotine and non-nicotine e-cigarette groups, respectively.

- **Limitations**

  Trial recruitment was terminated early meaning the sample size was smaller than expected which may limit statistical power. Due to the limited sample size, the primary outcome was cessation at 12 weeks rather than 52 weeks which may be insufficient to determine long term abstinence.

  There were no statistical adjustments for multiple comparisons meaning the results of the secondary analysis can only be considered exploratory.

CO validation can only detect 24-hour abstinence from smoking. Participants may have misreported their smoking status which could bias the results.

There was greater loss to follow up in the control group compared with the e-cigarettes groups which may have biased the results.

Use of non-study cessation aids including e-cigarettes was more common in the control group which may have biased the results.

Eisenberg MJ, Hébert-Losier A, Windle SB, Greenspoon T, Brandys T, Fülöp T, Nguyen T, Elkouri S, Montigny M, Wilderman I, Bertrand OF, Bostwick JA, Abrahamson J, Lacasse Y, Pakhale S, Cabaussel J, Filion KB; E3 Investigators. (2020). Effect of e-Cigarettes Plus Counseling vs Counseling Alone on Smoking Cessation: A Randomized Clinical Trial. *JAMA*. doi: 10.1001/jama.2020.18889. PMID: 33170240; PMCID: PMC7656286.

2. A cluster feasibility trial to explore the uptake and use of e-cigarettes versus usual care offered to smokers attending homeless centres in Great Britain

- **Study Aims**

  This UK based cluster-controlled trial allocated smokers attending four homeless centres (n=80) in the UK to receive usual care (UC), (which comprises brief advice to quit and recommendation to attend a stop smoking service), or an e-cigarette (EC) with a 4-week supply of e-liquid. Participants were followed up at 4, 12 and 24 weeks. The feasibility of supplying e-cigarette starter kits to smokers attending homeless centres was evaluated by assessing willingness to participate, retention, abstinence rates, dependency measures, feasibility of obtaining healthcare data and intervention costs.

- **Key Findings**

  Of eligible participants, 53% in the EC and 51% in the UC arm agreed to participate in the study. Overall retention rates were 75%, 65% and 59% at 4, 12 and 24 weeks, respectively. Retention was higher in the EC arm at 4 (81.3% vs 75%), 12 (70.8% and 65%) and 24 (72.9% vs 58.8%) weeks.

  Of participants who attended follow ups in the EC arm, 85%, 82% and 63% reported that they still had the e-cigarette provided at 4, 12 and 24 weeks respectively. 95%, 91% and 79% reported that they were still using an e-cigarette at 4, 12 and 24 weeks, respectively.

  CO verified sustained abstinence at 24 weeks was 6.25% in the EC arm vs 0% in the UC arm. The percentage of participants who reported >50% reduction in cigarettes smoked per day from baseline to 24 weeks follow up was 43% in the EC arm and 25% in the UC arm.

  Across the EC and UC arms, survey scores for anxiety, depression and alcohol dependence declined, showing improvement. Scores for severity of substance dependence remained constant.

  Based on visual analogue scales, the mean percentage score for negative effects of e-cigarettes was 18.54%, (SD=12.95) and the mean score for positive effects was 49.1%, (SD=18.39). The highest scoring negative effect was ‘nervous’ (M = 19.97% SD = 29.01) and the highest scoring positive effect was ‘pleasant’ (M = 73.79%, SD = 22.60).

- **Limitations**

  The original recruitment rate target was not reached which increases the uncertainty of observations.

  As the study had a cluster design, participants were not randomised within study sites. Recruitment and follow up rates varied between sites which may have affected outcomes in the two arms.

  The statistical significance of outcomes was not verified. Therefore, the differences between groups cannot be confirmed to be significant.

  There was no adjustment for confounding variables. Therefore, other factors may have influenced the outcomes in each group. For example, participants in the EC arm scored consistently higher in the Health-Related Quality of Life questionnaire which may have affected the outcomes.

  E-cigarette use was reported by some participants in the UC arm of the trial and blinding was not possible for the measure of outcomes.

Dawkins L, Bauld L, Ford A, Robson D, Hajek P, Parrott S, Best C, Li J, Tyler A, Uny I, Cox S.(2020). A cluster feasibility trial to explore the uptake and use of e-cigarettes versus usual care offered to smokers attending homeless centres in Great Britain. *PLoS One*. 2020 Oct 23;15(10):e0240968. doi: 10.1371/journal.pone.0240968.

3. Responsibility, normalisation and negotiations of harm: E-cigarette users' opinions and experiences of vaping around children

- **Study Aims**

  This qualitative UK study revisited data from the ECtra study which explored patterns of vaping in adults (18+) (n=40) who used e-cigarettes to try to stop smoking. Data relating to children and vaping around children at home were generated by 28 and 14 participants, respectively. Findings were framed thematically according to “recreational” (participants who view vaping as a hobby) vs “medicinal” (participants who use e-cigarettes solely for smoking cessation) vapers.

- **Key Findings**

  All participants reported trying to conceal vaping around children in public. Medicinal vapers generally attempted to conceal vaping at home whereas recreational vapers did not.

  Participants were not concerned that vaping could encourage smoking in children. Medicinal vapers were concerned that normalising vaping in the house could lead to future e-cigarette use in their children. For medicinal users who wanted to stop vaping, many expressed shame or despondence around their addiction.

  Recreational vapers were not concerned that vaping normalisation could lead to their children using e-cigarettes in future. They emphasised the benefits of stopping smoking to their family and felt they were a better role model for doing so. In general, they felt no

dissonance around their e-cigarette use, however, they were keen to discourage use in their children.

Most participants felt there was stigma around vaping in front of children. Recreational vapers avoided public e-cigarette use to respect other people's concerns around vaping and to avoid judgement. Medicinal vapers who wanted to give up expressed shame around public use.

Most participants avoided talking about their e-cigarette use with their children. For medicinal vapers, this was due to avoiding normalisation of vaping and feeling uncomfortable. Participants who previously smoked around their older children reported finding it easier to explain, whereas those who had given up some time ago were worried that explaining vaping in the context of smoking cessation could be anxiety inducing for their children.

- **Limitations**

  The sample were predominantly white and had higher socioeconomic status meaning the results may not be generalisable to the wider population. Differences in attitudes across socioeconomic statuses could not be compared.

  Responses around children were not generated for all participants. This meant that the depth of the data was insufficient to perform saturation analysis of potential themes.

  As the study was based on revisited data, specific questions on e-cigarette use were not asked. Therefore, themes such as differences in vaping behaviour depending on children's age and comparisons with smoking could not be explored.

  Most participants were exclusive e-cigarette users. Therefore, the results may not represent the views or experiences of dual users of e-cigarettes and cigarettes.

  The categories of "medicinal" and "recreational" vapers were assigned based on themes identified from previous analysis of the data. However, these categories may not fit all e-cigarette user's identities.

Ward E, Dawkins L, Holland R, Notley C. (2020). Responsibility, normalisation and negotiations of harm: E-cigarette users' opinions and experiences of vaping around children. *Int J Drug Policy.* doi: 10.1016/j.drugpo.2020.103016.

4. Associations between reasons for vaping and current vaping and smoking status: evidence from a UK based cohort

- **Study Aims**

  This longitudinal UK study assessed characteristics, smoking status, e-cigarette use and reasons in a sample of 23-year olds (n=3,994) who were followed up at 24-years old. In participants who were both ever smokers and ever vapers at 23 years (n=668), associations between reasons for vaping reported at baseline and continued vaping at follow up were assessed. In a subset of these participants who were regular smokers at baseline (n=412), associations between reasons for vaping and continued smoking were assessed. Results were adjusted for sociodemographic characteristics.

- **Key Findings**

  Compared with participants who had never vaped, ever vapers were more likely to have lower parental socio-economic position at birth (0.007), report risk taking behaviours such as cannabis use ($p<0.001$), other drug use ($p<0.001$), gambling ($p<0.001$) and report signs of poorer mental health including anxiety ($p<0.001$) and low mood ($p<0.001$).

  Participants who reported vaping to quit smoking at 23-years old were more likely to continue vaping at 24-years old (OR=3.51, 95%CI=2.29-5.38, $p<0.001$), but were less likely to continue smoking (OR=0.5, 95%CI=0.32-0.78, $p<0.002$).

  Participants who reported vaping to cut down smoking at 23-years old were more likely to continue vaping (OR=2.90, 95%CI=1.87-4.50, $p<0.001$) and smoking (OR=1.62, 95%CI=1.02-2.58, $p<0.041$) at 24-years old.

  Participants who reported vaping for pleasure at 23-years old were more likely to continue vaping at 24-years old (OR=3.22, 95%CI=2.01-5.15, $p<0.001$). There was no statistically significant association observed for smoking at follow-up.

  Participants who reported vaping out of curiosity at 23-years were less likely to continue vaping at 24-years old (OR=3.22, 95%CI=2.01-5.15, $p<0.001$), but were more likely to continue smoking (OR1.66, 95%CI=1.04-2.65, $p=0.035$).

- **Limitations**

  Participants self-reported all data meaning results may be subject to recall bias.

  The reasons for vaping were selected from an exhaustive list meaning other potential reasons may have been omitted. “Flavours” were not an option meaning their role in smoking cessation could not be assessed.

  The age of participants meant that e-cigarettes were not widely available when they were 15-16 (when initiation generally peaks). Therefore, the results may not be generalisable to young adults today.

  Due to small numbers of never smokers who had tried vaping by 23 years, analyses were restricted to ever smokers. Therefore, the study could not explore any associations between reasons for vaping and continued vaping and smoking.

  The study follow-up was only one year meaning changes in reasons for using e-cigarettes and smoking/vaping over longer time periods could not be determined.

Khouja JN, Taylor AE, Munafò MR. Associations between reasons for vaping and current vaping and smoking status: Evidence from a UK based cohort. (2020). *Drug Alcohol Depend*. doi: 10.1016/j.drugalcdep.2020.108362.

Overview

This month we include four articles that report the results of research conducted in Canada and the UK.

The first paper outlines finding from a randomised controlled trial of e-cigarettes for smoking cessation conducted in Canada. The researchers randomised smokers motivated to quit to one of three groups. The first received a second-generation e-cigarette containing 15mg/ml of nicotine, the second an identical e-cigarette without nicotine, and the third group did not receive either product. Participants in both e-cigarette arms were given 21 cartridges and could request more cartridges if they needed them. At 12 weeks they were asked to return their e-cigarette. All three groups received one to one behavioural support which varied in its frequency and format as it was individually tailored, but minimum thresholds were set including 30 minutes at the baseline visits and 15-20 minutes at clinic visits.

The intended primary outcome for the trial was smoking abstinence at 12 months, the same outcome as a recent UK trial of e-cigarettes for smoking cessation. However, this had to be changed because the study stopped recruiting when only 77% of the target number of participants were randomised. This arose because the chosen vaping device became unavailable. This smaller sample would have left the trial underpowered to test the original primary outcome, so this was changed (with approval from the independent trial monitoring committee) to 12 weeks with CO validation. For this revised main outcome, participants who received the nicotine containing e-cigarette were significantly more likely to quit than the group who only received behavioural support (21.9% vs 9.1%). There wasn't a significant difference between the nicotine and non-nicotine containing e-cigarette groups. The higher rate of cessation in the nicotine containing e-cigarette group vs. no e-cigarette group was not sustained at six months (quit rates were still a bit higher, but not significantly). Despite the problems this trial encountered, it is worth noting that this was the first trial of e-cigarettes for smoking cessation conducted in North America, and its results will feed into future Cochrane reviews to bring together a larger body of evidence on vaping for smoking cessation.

Our second study this month is a feasibility study of e-cigarettes for smoking cessation among adults accessing homeless services in England and Scotland. This builds on earlier research by the same team surveying people experiencing homeless in Kent, the Midlands, London and Edinburgh. Smoking rates are particularly high among people experiencing homelessness, so this is an important area of research. The study team aimed to examine whether it was possible to supply e-cigarette starter kits to smokers attending homeless centres, engage them in a preliminary study designed to support smoking cessation, and learn from this process to help design future research.

Four homeless centres were involved and in two of them, clients who were smokers received an e-cigarette starter kit and four weeks supply of e-liquid along with advice to quit and signposting to local stop smoking service (SSS). In two other centres, smokers simply received advice and information about SSS. Because this was a feasibility study, the outcomes focused on recruitment and retention (whether people would stay engaged with the study), how smokers responded to the e-cigarettes and the collection of data on smoking cessation and reduction. As the researchers describe in the paper, this was a challenging research to complete but over half of the smokers approached to participate in the study did take part, and of these 59% remained engaged and completed the final follow up at 6 months. Participants responded positively to the e-cigarettes provided and the vast majority reported that they were still using their e-cigarette at follow up. Retention was higher amongst the smokers who received an e-cigarette starter pack than those who

did not. Quit rates were low - none of the retained participants in the usual care group quit smoking but three participants (among 48 followed up) had quit in the vaping group. The researchers were able to demonstrate that a range of other data could be collected that would be needed in a future trial, and this larger study is now being planned.

This month's third article is also from the UK and was a qualitative study examining vaping around children. Participants were 40 adult vapers who were taking part in a wider study on tobacco harm reduction and smoking relapse prevention. Transcripts from interviews conducted as part of this study were analysed to explore the theme of vaping in the presence of children. Twenty eight of the 40 participants in the original study mentioned this topic during their interviews and thus provided the sample for the current analysis. The researchers were interested to explore whether e-cigarettes users apply the same or similar behavioural norms as smokers in relation to vaping around children and what vapers' views and experiences of using e-cigarettes around children are.

Findings were organised into several main themes including: concealment vs. visibility; replication of smoking behaviour; second hand vapour concerns; harm reduction or potential for youth harm; concepts of being a 'responsible caregiver'; vaping in public; vaping socialisation; role modelling; and communication (discussing vaping with children). As with all qualitative studies it is challenging to summarise the key findings into a few lines. For those interested it is well worth reading the article for more details. Findings made clear that vaping around children was more complex than views around smoking with children present where harms were clearly understood and accepted. The researchers point to the need for more attention to this topic in public health guidance taking into account differing perspectives amongst vapers, particularly between those whose continued e-cigarette use was linked to their self-identity, and those who used e-cigarettes primarily as a tool to stop smoking.

Our final article examined vaping behaviour amongst a group of just under 4,000 young adults in England. These young adults are enrolled in ALSPAC which is a longitudinal cohort study of parents and children. Questions on vaping and smoking were added to ALSPAC questionnaire, and the current analysis examined the association between reasons for vaping at 23 years (data from 2015/2016) with vaping and/or smoking status the following year, at age 24. The researchers were particularly interested in any links between vaping behaviour among vapers who had ever smoked, and with smoking behaviour among young adults who had been regular smokers before starting vaping.

The study found that those who were vaping with the expressed intention of quitting smoking at age 23 were more likely to no longer be smoking at aged 24. In contrast, among those who were vaping to cut down their smoking at aged 23, both continued vaping and smoking were more common at follow up. Those who reporting vaping mostly because they were just curious were less likely to be vaping at aged 24, but more likely to be smoking. These findings are consistent with other studies that suggest intention or motivation to stop smoking is important when considering reasons for vaping and the relationship between vaping and smoking behaviour.

Other studies from November you might find of interest:

Patterns of use

Risk Factors and Perceptions of E-Cigarette Use Among Selected Users in Johannesburg, South Africa

Smoking Intention and Progression From E-Cigarette Use to Cigarette Smoking.

Examining electronic nicotine delivery system use and perception of use among college students with and without asthma across the South.

E-cigarette use is associated with subsequent cigarette use among young adult nonsmokers, over and above a range of antecedent risk factors: A propensity score analysis.

Accessing vaping products when underage: A qualitative study of young adults in Southern California.

Tobacco and e-cigarette smoking habits among Italian healthcare students.

Dependence and Use Characteristics of Adult JUUL Electronic Cigarette Users.

Does having one or more smoking friends mediate the transition from e-cigarette use to cigarette smoking: a longitudinal study of Canadian youth.

Nicotine Dependence in Dual Users of Cigarettes and E-Cigarettes: Common and Distinct Elements.

Using Peer Crowd Affiliation to Address Dual Use of Cigarettes and E-Cigarettes among San Francisco Bay Area Young Adults: A Cross Sectional Study.

Electronic cigarette use among 14- to 17-year-olds in Europe.

Associations between reasons for vaping and current vaping and smoking status: Evidence from a UK based cohort.

Temporal Trends in the Prevalence of Current E-Cigarette and Cigarette Use by Annual Household Income from 2016 to 2018 (From the Behavioral Risk Factor Surveillance System [BRFSS] Survey).

Motivations for use, identity and the vaper subculture: a qualitative study of the experiences of Western Australian vapers.

Serum cotinine levels and nicotine addiction potential of e-cigarettes: an NHANES analysis.

Patterns of tobacco use and nicotine dependence among youth, United States, 2017-2018.

E-Cigarette Advocates on Twitter: Content Analysis of Vaping-Related Tweets.

Association between e-cigarette use and future combustible cigarette use: Evidence from a prospective cohort of youth and young adults, 2017-2019.

Perception

Responsibility, normalisation and negotiations of harm: E-cigarette users' opinions and experiences of vaping around children.

Attitudes towards the New Zealand Government's Smokefree 2025 goal associated with smoking and vaping in university students aged 18 to 24 years: results of a 2018 national cross-sectional survey.

Electronic Cigarette-Related Contents on Instagram: Observational Study and Exploratory Analysis.

A Content Analysis of U.S. Adults' Open-Ended Responses to E-Cigarette Risk Messages.

A Toxic Blend: Assessing the Effects of Cross-Source Media Coverage of Flavored E-Cigarettes on Youth and Young Adult Perceptions.

An experimental study of messages communicating potential harms of electronic cigarettes.

Public Opinion About E-Cigarettes on Chinese Social Media: A Combined Study of Text Mining Analysis and Correspondence Analysis.

Cessation

Effect of e-Cigarettes Plus Counseling vs Counseling Alone on Smoking Cessation: A Randomized Clinical Trial.

A cluster feasibility trial to explore the uptake and use of e-cigarettes versus usual care offered to smokers attending homeless centres in Great Britain.

Vape Shop Employees: Do They Act as Smoking Cessation Counselors?

Sensory experiences and cues among E-cigarette users.

Youth

Adolescent Susceptibility to E-Cigarettes: An Update From the 2018 National Youth Tobacco Survey.

Adolescent E-Cigarette Onset and Escalation: Associations With Internalizing and Externalizing Symptoms.

Associations Between Peer Use, Costs and Benefits, Self-Efficacy, and Adolescent E-cigarette Use.

E-cigarette use and concurrent risk behaviors among adolescents.

Associated factors for depression, suicidal ideation and suicide attempt among asthmatic adolescents with experience of electronic cigarette use.

E-cigarette use perceptions that differentiate e-cigarette susceptibility and use among high school students.

Harms and harm reduction

Attitudes towards a hypothetical 'clean nicotine' product and harm reduction among smokers.

Acute effects of electronic cigarettes on arterial pressure and peripheral sympathetic activity in young non-smokers.

Vaping Disrupts Ventilation-Perfusion Matching in Asymptomatic Users.

Electronic cigarette aerosols induce oxidative stress-dependent cell death and NF-kappaB mediated acute lung inflammation in mice

Electronic Cigarettes and Head and Neck Cancer Risk-Current State of Art.

E-cigarette Use and Respiratory Disorder: An Integrative Review of Converging Evidence from Epidemiological and Laboratory Studies.

Association of Electronic Cigarette Use With Incident Respiratory Conditions Among US Adults From 2013 to 2018.

Electronic cigarette use and subjective cognitive complaints in adults.

Impacts of electronic cigarettes usage on air quality of vape shops and their nearby areas.

Effects of 3-Month Exposure to E-Cigarette Aerosols on Glutamatergic Receptors and Transporters in Mesolimbic Brain Regions of Female C57BL/6 Mice.

E-cigarette Use Alters Nasal Mucosal Immune Response to Live-Attenuated Influenza Virus (LAIV).

Cell-specific toxicity of short-term JUUL aerosol exposure to human bronchial epithelial cells and murine macrophages exposed at the air-liquid interface.

Cigarette Smoke and Nicotine-Containing E-cigarette Vapor Downregulate Lung WWOX Expression Which is Associated with Increased Severity of Murine ARDS.

Differences in Exposure to Nicotine, Tobacco-Specific Nitrosamines, and Volatile Organic Compounds among Electronic Cigarette Users, Tobacco Smokers, and Dual Users from Three Countries.

Marketing

E-Cigarette Promotion on Twitter in Australia: Content Analysis of Tweets.

Perceptions of E-cigarettes and Flavor Restrictions among Tobacco Retailers in Los Angeles.

Misc

Characterization of E-cigarette coil temperature and toxic metal analysis by infrared temperature sensing and scanning electron microscopy - energy-dispersive X-ray.

Method for Quantifying Variation in the Resistance of Electronic Cigarette Coils.

Informing the development of adolescent e-cigarette cessation interventions: A qualitative study.

Optimization of aqueous aerosol extract (AqE) generation from e-cigarettes and tobacco heating products for in vitro cytotoxicity testing.

Vape shop and consumer activity during COVID-19 non-essential business closures in the USA.

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 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.