

# THE UK ELECTRONIC CIGARETTE RESEARCH FORUM

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## Electronic Cigarette Research Briefing – July 2016

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 briefing also aims to provide a critical overview of individual studies and put them in the context of what we already know from previous research.

The studies selected in these briefings do not form an exhaustive list of every e-cigarette-related study published each month. Instead they include those most relevant to key themes identified by the UK Electronic Cigarette Research Forum. This includes mechanisms and safety, cessation, population level impact, marketing and unintended consequences. For an explanation of the search strategy used, please see the end of this briefing.

The text below provides an overview of the aims, key findings and limitations of each of the highlighted studies. The briefing concludes with a section that puts the study findings in the context of the wider literature and what we know about existing research gaps.

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

### 1. Support for e-cigarette policies: a survey of smokers and ex-smokers in Great Britain.

- **Study aims**

This survey in Great Britain asked smokers and ex-smokers about perceptions of harm of nicotine and e-cigarettes and support for e-cigarette policies, and tracked how this changed over time (n= 1,848 in 2013 and 1,431 in 2014).

- **Key findings**

Only around 1 in 10 respondents rated the proportion of health risk from smoking down to the nicotine as “none or very small” with almost a third believing it was responsible for “much more than half” or “nearly all” of the risk. This did not change over time. The proportion of people who agreed e-cigarettes were less harmful than cigarettes decreased over time from 65% to 59%.

At both time points, overall respondents were supportive of e-cigarettes being as, or more, available as cigarettes (around three quarters of people) and around half agreed e-cigarette

adverts should be allowed but shouldn't appeal to children. Support for use in smoke-free places decreased over time (from 55% in 2013 to 45% in 2014).

Respondents who had more negative perception of nicotine and perceived e-cigarettes as more, or equally, as harmful as cigarettes were less supportive of e-cigarette availability, advertising and use in smoke-free places.

- **Limitations**

The survey was in smokers and ex-smokers so not representative of the population. Some demographic characteristics were accounted for but others might also impact policy support. The questions allowed for some distinction between levels of agreement (for example six options for the question about the risks of nicotine) however these were limited (for example support for use indoors might not be blanket – respondents could agree with use in pubs but not restaurants).

Brose LS, Partos TR, Hitchman SC, McNeill A. Support for e-cigarette policies: a survey of smokers and ex-smokers in Great Britain. *Tob Control*. 2016 Jun 16. pii: tobaccocontrol-2016-052987. doi: 10.1136/tobaccocontrol-2016-052987.

## [2. How and Why Do Smokers Start Using E-Cigarettes? Qualitative Study of Vapers in London, UK.](#)

- **Study aims**

This London study used the COM-B theory of behaviour change to explore reasons for and methods of e-cigarette initiation. (The core six components of this model are (i) physical capability; (ii) psychological capability; (iii) physical opportunity; (iv) social opportunity; (v) automatic motivation; and (vi) reflective motivation.) 30 diverse smokers or ex-smokers who were current or ex-vapers were interviewed.

- **Key findings**

Most people started with cigalike e-cigarette models, facilitated by ready availability in shops, and didn't have problems with getting it to work. Some found more advanced devices "bulky" or "scary". Most recognised e-cigarettes were less harmful than cigarettes and some tried e-cigarettes to improve their health, but some had heard conflicting messages or were aware of the lack of evidence. Only a few participants searched for information online before initiation.

"Curiosity" or "desire" to try an e-cigarette was the main driver for initiation. Some also mentioned they were "cool" or "fun" but others that they were "silly" or "a fad". Most mentioned friend as family as a core motivator however some felt under too much pressure or that the arguments weren't personally appealing. A few participants reported being able to vape in public places or homes as prompting use, although some mentioned uncertainty about social acceptability.

There was a contradiction in whether replication of the action of smoking was a positive or that this mirroring meant they wouldn't break their addiction.

- **Limitations**

This was a small self-selected non-representative sample in one area of the UK so cannot be generalised more broadly. The study did not include people who hadn't vaped so it's not clear whether they experience similar opportunities or not or what the barriers to initiation might be.

All responses were self-report and the interview was guided by open questions generated by the researchers so it's possible that other factors, possibly even subconscious ones, also play a role.

Wadsworth E, Neale J, McNeill A, Hitchman SC. How and Why Do Smokers Start Using E-Cigarettes? Qualitative Study of Vapers in London, UK. *Int J Environ Res Public Health*. 2016 Jun 30;13(7). pii: E661. doi: 10.3390/ijerph13070661.

### 3. Changes in breathomics from a 1-year randomized smoking cessation trial of electronic cigarettes.

- **Study aims**

This study examines data from the Italian ECLAT study (where smokers not looking to quit were asked to switch to cigalike e-cigarettes containing no nicotine or two different levels) for long-term changes in respiratory biomarkers – exhaled breath measurements of CO levels and fractional nitric oxide concentration (FeNO). Of the original 300 smokers, 134 were successfully followed up to a year.

- **Key findings**

FeNO and CO measurements significantly improved over time in successful quitters but there was no significant difference in those who reduced cigarette consumption or continued to smoke. These improved measurements in quitters correlated with improved symptom scores.

No significant difference was seen between those who had stopped smoking and continued to use e-cigarettes and those who stopped using both.

- **Limitations**

Participants were a self-selected non-representative sample and a first-generation e-cigarette was used. It's also not clear how often the e-cigarettes were used. At the 1 year follow-up there were only small numbers of reducers and quitters so groups were combined and not separated by those who used the non-nicotine e-cigarettes or the different nicotine concentrations.

The symptom scores were short-term, limited measures. Other possible confounders could have influenced FeNO levels.

Campagna D, Cibella F, Caponnetto P, Amaradio MD, Caruso M, Morjaria JB, Malerba M, Polosa R. Changes in breathomics from a 1-year randomized smoking cessation trial of electronic cigarettes. *Eur J Clin Invest*. 2016 Jun 20. doi: 10.1111/eci.12651.

### 4. Electronic cigarette use in the European Union: analysis of a representative sample of 27 460 Europeans from 28 countries.

- **Study aims**

Secondary analysis was conducted on the 2014 Eurobarometer nationally-representative cross-sectional survey data from 28 EU states, exploring e-cigarette use and changes in smoking status due to e-cigarettes.

- **Key findings**

Overall ever e-cigarette use was reported in 2.3% of never smokers but daily use of nicotine-containing e-cigarettes by never smokers was only 0.09%. Past experimentation was the most common e-cigarette experience. Daily use was reported in 55% of current nicotine-containing e-cigarette users. 77% of ever e-cigarette users had used nicotine-containing e-cigarettes. Living in a large town, marital status, seeing e-cigarette advertising in the past 12 months and lower perception of harmfulness of e-cigarettes were correlated with both ever and current e-cigarette use.

Quitting with no aid was the most common method (65%), followed by NRT (12%) and “other” (11%) then e-cigarettes (10%). 14% of ever e-cigarette users reported smoking cessation but this was 30% in daily nicotine-containing e-cigarette users and 6.4% in experimenters.

- **Limitations**

These results are self-report and limited by the prescribed questions. The survey is cross-sectional so we cannot claim causality for any of the measures such as seeing e-cigarette advertising.

Quit success using other methods was not included as comparator for the sample or use of other nicotine products (such as NRT).

Farsalinos KE, Poulas K, Voudris V, Le Houezec J. Electronic cigarette use in the European Union: analysis of a representative sample of 27 460 Europeans from 28 countries. *Addiction*. 2016 Jun 24. doi: 10.1111/add.13506.

## Overview

This month we include four papers, two from the UK, one from Italy and one from a survey across Europe.

The first paper is from Ann McNeill's team at King's College London who included questions on support for e-cigarette policies in their CRUK funded longitudinal web-based survey of smokers and ex-smokers in the UK. The paper examines data from 2013 and 2014. They found that both experience of using e-cigarettes, perceptions of the harm from e-cigarettes relative to smoking, and understanding of the relative risks of nicotine and smoking all influenced policy support.

The first policy examined was availability. Non-daily and daily e-cigarette users and those who perceived e-cigarettes to be less harmful than cigarettes were more likely to support e-cigarettes being equally or more available than tobacco, after demographic and other relevant respondent characteristics were adjusted for. They then asked about advertising. Most of those who supported advertising agreed it should be allowed in a way that wouldn't attract children. Respondents who had used e-cigarettes, agreed they were less harmful than smoking and those who thought none or only a very small part (or well under half the risk) of smoking came from nicotine were more likely to think that e-cigarette advertising should be permitted. Similar results between groups of respondents were found in terms of support for use of e-cigarettes in smokefree public places, which was the final policy issue the surveys asked about. The results suggest that people whose views are more closely aligned to the available evidence about e-cigarettes' risks relative to tobacco support less restrictive policies.

Between 2013 and 2014 respondents were more likely to rate e-cigarette as being equally harmful to health as tobacco cigarettes. Overall support for the availability, advertising and use of e-cigarettes in public places also tended towards a decline, suggesting a more negative attitude towards e-cigarettes amongst smokers and ex-smokers. In addition, as described before in this bulletin, the increasing misperceptions of harm relative to tobacco are a cause for concern.

The second paper is from members of the same research team. This was a small study of 30 vapers in London but explored their views in depth through semi-structured interviews. The participants ranged in age from 18 to over 60 and fell into four categories: ex-smoker ex-vaper; ex-smoker current vaper; current smoker ex-vaper; and current smoker-current vaper. The paper used the COM-B theory of behaviour change (originally developed by Prof Susan Michie and colleagues at UCL) and applied this for the first time to data on vaping. This theory argues that three elements are necessary for behaviour change: capability, opportunity and motivation.

The paper is quite long and detailed and well worth reading for those interested in the experience of smokers using or who have used e-cigarettes. There are some really interesting direct quotes from participants and things that interested this paper's authors in particular were the value of support and advice from the friends and family of smokers to try vaping as a safer alternative and the importance of point of sale displays to encourage trying and switching. Cig-a-likes were the most common first product used for ease of access and use.

The findings on capability, opportunity and motivation could be perceived as falling into 'barriers' and 'facilitators' to vaping amongst those who smoke.

Barriers included:

- inadequate evidence about the safety and effectiveness of e-cigarettes relative to smoking tobacco (capability)
- uncertainty about the social acceptability of vaping in public places and negative social pressures to vape (opportunity)
- and beliefs that e-cigarettes are a fad, deep enjoyment of smoking, belief that e-cigarettes could not replace smoking and concern that the hand to mouth action of e-cigarettes was too similar to smoking (motivation).

Facilitators included:

- participants having the physical skills and knowledge (from the internet, family, friends and vendors) to initiate use (capability)
- access to environments (e-cigarette shops, areas where vaping is permitted) and social situations that allow e-cigarette use (opportunity)
- and impulses, feelings and conscious decision-making that support initiation or continued use of e-cigarettes (motivation).

In addition to advice, seeing e-cigarettes promoted in shops, being able to vape where smoking is not permitted and the cheaper price of e-cigarettes relative to continued smoking was also highlighted. The price of e-cigarettes in the UK and elsewhere and its role in supporting behaviour change amongst smokers is an important area for future research.

The third paper is part of ongoing work by Ricardo Polosa's team at the University of Catania who conducted the first RCT of e-cigarettes, the ECLAT trial. Longer term follow up data on participants is now available and this paper looked at changes in respiratory health amongst a sub-sample (n=134) of the original trial participants. Outcomes were changes in exhaled breath measurements and respiratory symptoms, including CO levels and FeNO, as described in our summary above.

Participants who had managed to stop smoking and maintain abstinence at one year follow up had lower CO and improved FeNO levels and also reported other respiratory health outcomes that were positive. These improvements were seen in both groups of non-smoking participants at one year – those who had quit but were still using e-cigarettes, and those who had quit but were no longer using e-cigarettes. Although this is a small sample and there are a number of limitations to the study the results suggest that for these biomarkers at least, continued vaping doesn't undermine the benefits of smoking cessation. These improvements were not seen for participants who continued to smoke at one year follow up, even with reduced tobacco consumption.

Finally, we include another paper focussing on results from the Eurobarometer survey, following on from our summary in last month's bulletin of [Filippidis et al. 2016](#) which also drew on data from the 2012 and 2014 versions of the survey. This month's paper is different in some of the analyses conducted and focuses just on 2014.

The paper focuses the prevalence of ever and current e-cigarette use amongst different groups and the reporting of smoking cessation and smoking reduction among users. The survey asked questions of citizens in 28 EU member states. Excluding those who responded 'don't know' to the questions on smoking and e-cigarette use, the final sample was 27,460.

Amongst ever users of e-cigarettes, 71% were current smokers, 18 % former smokers and 11% never smokers. Most of this ever use involved past experimentation rather than current use – particularly among never smokers where 77% reported only past experimentation. Thus current use of any type of e-cigarettes amongst never smoker was very rare.

More detailed questions on frequency of current use were only asked of respondents who reported having ever tried a *nicotine-containing e-cigarette*, and this distinction does make comparisons with other (national) surveys difficult where questions on nicotine containing (or not) tend to be rare. However the most relevant finding here was that just 0.09% of never smokers reported daily use of a nicotine containing e-cigarette, which is reassuring given concerns that e-cigarettes might attract never smokers to nicotine use.

Self-reported results on smoking cessation are also interesting. Ever or occasional users of e-cigarettes were far less likely to report stopping smoking or cutting down, which is consistent with a [recent prospective study in the UK](#) that followed up users and found those who vape daily are more likely to successfully stop smoking using e-cigarettes. Amongst daily users of nicotine containing e-cigarettes the reported smoking cessation rate was 31% with an additional 28.5% reporting reduction. The authors also found that after adjusting for age and gender, respondents who reported current or past e-cigarette use were more likely to have stopped smoking than those who had simply experimented with e-cigarettes, which again is consistent with [UK studies](#).

Other studies from the last month that you may find of interest:

- [Geographic density and proximity of vape shops to colleges in the USA.](#)
- [Up in Vapor: Exploring the Health Messages of E-Cigarette Advertisements.](#)
- [Comparing young adults to older adults in e-cigarette perceptions and motivations for use: implications for health communication.](#)
- [Short-term effects of a nicotine-free e-cigarette compared to a traditional cigarette in smokers and non-smokers.](#)
- [Electronic cigarette aerosols and copper nanoparticles induce mitochondrial stress and promote DNA fragmentation in lung fibroblasts.](#)
- [Vaporous Marketing: Uncovering Pervasive Electronic Cigarette Advertisements on Twitter.](#)
- [Characteristics of e-cigarette users and their perceptions of the benefits, harms and risks of e-cigarette use: survey results from a convenience sample in Ottawa, Canada.](#)
- [E-cigarettes, Cigarettes, and the Prevalence of Adolescent Tobacco Use.](#)
- [Preference for gain- or loss-framed electronic cigarette prevention messages.](#)
- [Vapours of US and EU Market Leader Electronic Cigarette Brands and Liquids Are Cytotoxic for Human Vascular Endothelial Cells.](#)
- [Exposure Calls to U. S. Poison Centers Involving Electronic Cigarettes and Conventional Cigarettes-September 2010-December 2014.](#)
- [What is included with your online e-cigarette order? An analysis of e-cigarette shipping, product and packaging features.](#)
- [Electronic cigarettes in the media.](#)
- [Smokers' and E-Cigarette Users' Perceptions about E-Cigarette Warning Statements.](#)
- [Electronic-cigarette use by individuals in treatment for substance abuse: A survey of 24 treatment centers in the United States.](#)
- [Potential health effects of electronic cigarettes: A systematic review of case reports.](#)

### **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 e-cig\*[title/abstract] OR (nicotine AND (vaporizer 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 UKERCRC 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 Nicola Smith from Cancer Research UK with assistance from Professor Linda Bauld and Kathryn Angus at the University of Stirling and the UK Centre for Tobacco and Alcohol Studies, primarily for the benefit of members 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.*