

## **Ask the expert: Electronic Cigarettes**

Dr Laura Heath<sup>1</sup> and Dr Helen F Ashdown<sup>1</sup>

1. Nuffield Department of Primary Care Health Sciences  
University of Oxford  
Radcliffe Observatory Quarter  
Woodstock Road  
Oxford  
OX2 6GG

### **Corresponding author**

Dr Helen F Ashdown

[helen.ashdown@phc.ox.ac.uk](mailto:helen.ashdown@phc.ox.ac.uk)

(01865) 289261

### **Biography**

Laura Heath is an Academic Foundation Programme doctor and Helen Ashdown is an academic GP.

### **Acknowledgements**

Jamie Hartmann-Boyce from the Cochrane Tobacco Addiction Review Group provided input and editorial comment on drafts of this article.

### 1. What are e-cigarettes?

Electronic cigarettes (ECs) are an alternative to traditional tobacco based cigarettes. They hold a battery, which heats a solution containing nicotine to form a vapour, which is inhaled. These vapours can be flavoured and contain varying quantities of nicotine, including some that are nicotine free.

ECs are used in different forms:

- a) Fully disposable, single use ECs
- b) ECs with replacement cartridges
- c) 'Tank systems' that contain a reservoir which the user fills with liquid
- d) Variable power ECs or 'mods' - usually tank systems where the user can adjust the delivery of vapour

### 2. How much do they cost and where can they be purchased?

A single, disposable EC costs around £6 whereas a starter kit also containing a charger, battery and replacement cartridges, can retail from between £15 to £90. These are widely available online as well as on the UK high street in supermarkets, newsagents and some pharmacies. In comparison, smoking 20 cigarettes per day can cost the user around £250 per month. It is difficult to estimate the savings associated with switching to ECs, but Professor Robert West, director of tobacco studies at University College London, has estimated it to be around 20% (NHS Choices, 2015).

### 3. How common are they?

Current estimates in 2015 suggest that 2.6 million adults in the UK use ECs. Of these, 1.1 million are ex-smokers, while 1.4 million use ECs concurrently with tobacco products. Initially, there were concerns that e-cigarettes might encourage non-smokers to start using tobacco products. However, the evidence so far has shown that the number of non-smokers regularly using e-cigarettes has remained stable at 0.2% of the UK adult population from 2013-2015 (ASH, 2015).

Similarly, concern that young people would be attracted to EC use has not been the case to date with only 1% of 16-18 year old never-smokers using ECs regularly (ASH, 2015). It is also becoming increasingly difficult for young people to access these devices: from October 2015, selling or supplying ECs to individuals under 18 in the UK was made illegal.

### 4. How do they differ from traditional cigarettes in terms of risk?

ECs generally contain the following ingredients in their solutions:

- a) Propylene glycol/glycerine
- b) Nicotine
- c) Flavoursings
- d) Water

Notably, they do not contain tobacco, tar or the many additional carcinogenic substances found in traditional cigarettes. The exhaled air also contains the above ingredients but importantly, the degree of nicotine released into the surrounding air poses no identifiable risk to passive bystanders (PHE, 2015).

Despite this, there are still risks associated with use. Formaldehyde and acetaldehyde, formed from the reaction of propylene glycol with glycerine in the EC solution, are carcinogens. The quantity released is less than in tobacco products but estimating the degree of risk in such a new product is difficult.

Public Health England has recently quoted that ECs are '95% less harmful' than smoking (PHE, 2015). This figure is controversial as it was derived from a panel of experts estimating harm and not from collected data (Nutt et al., 2014). However, a collaboration of public health bodies have recently released a statement to clarify that the message to convey to the public is that they are significantly less harmful than smoking (PHE, 2015), a message that has been reiterated this year by the Royal College of Physicians (RCP, 2016).

#### 5. How are regulations changing?

Due to the varying strengths of the EC solution, different delivery systems and availability of unregulated products online, there is concern that the amount of nicotine being delivered to the user is variable and unknown. This has been addressed with increased legislation from May 2016, although it is possible users may have stockpiled. Nicotine containing products, including ECs not already registered as medicines, will have to comply with the EU Tobacco Products Directive. Amongst other measures, products will have to list all ingredients; contain a maximum nicotine concentration of 20mg/ml; provide a comprehensive information leaflet with safety profile; and clearly state the risk of addiction on the packet.

#### 6. Do they have a role in smoking cessation?

A 2014 Cochrane systematic review assessed the current evidence available as to whether ECs could be used as a smoking cessation tool and whether they are safe for this purpose. They included two randomised controlled trials with over 600 patients and found that compared to a placebo EC, patients using nicotine containing ECs were more likely to have abstained from smoking for 6 months. There is currently insufficient data to draw conclusions about how ECs compare to other stop smoking methods, though there is some evidence to suggest that ECs may help those unable to quit completely to reduce their cigarette consumption, when compared with placebo ECs and nicotine patches. (McRobbie, Bullen, Hartmann-Boyce & Hajek, 2014). In contrast, a recent meta-analysis found that EC use was not associated with a reduction in the use of tobacco smoking (Kalkhoran and Glantz, 2016). However, the methods used in this study have been widely questioned.

In April 2016, the Royal College of Physicians released their report, 'Nicotine without smoke: Tobacco harm reduction'. This report reviewed the above evidence and concluded, '...in the interests

of public health it is important to promote the use of e-cigarettes... as widely as possible as a substitute for smoking' (RCP, 2016).

#### 7. What are the long-term risks?

ECs have not been used for enough time for the long-term safety profile to be analysed. However, their safety profile is likely to be better than tobacco smoking. Research here is ongoing and an update of the 2014 Cochrane review should be coming out this year.

#### 8. What relevant audits could GPs do to improve care for patients using ECs?

There are plenty of opportunities to audit the uptake and success of smoking cessation in General Practice. Current NICE guidelines recommend that 5% of the smoking cohort be treated during any one year and that practices should aim for a minimum of 35% of these to have abstained from smoking at 4 weeks (NICE, 2008). If required, interventions could be made to improve the accessibility of smoking cessation advice, including information about ECs.

#### 9. The bottom line: What advice should we be giving to patients?

ECs should be discussed in an open and positive manner, especially in those who have tried other methods of smoking cessation. Points to consider during the consultation include the following:

1. Currently no significant adverse events from short term use observed in trials
2. No evidence available to analyse the long-term safety profile of ECs so there may be unknown harms.
3. Current best evidence strongly suggests that ECs are safer than tobacco products
4. Guidance from PHE and RCP suggests ECs have a role in smoking cessation in combination with behavioural support

Guidance specifically aimed at primary care physicians, with smoking cessation resources from the Primary Care Respiratory Society, can be found here: <https://www.pcrs-uk.org/smoking-cessation>.

#### 10. Are there any useful resources for patients?

The NHS has an abundance of resources to support patients with smoking cessation. These can be accessed at [http://www.nhs.uk/conditions/smoking-\(quitting\)/Pages/Treatment.aspx](http://www.nhs.uk/conditions/smoking-(quitting)/Pages/Treatment.aspx). This site outlines the role of supportive, psychological and pharmacological treatments, as well as a link dedicated to the most recent advice about ECs. A good summary leaflet to print at the end of a smoking cessation consultation, 'Tips To Help You Stop Smoking', can be found on patient.co.uk (<http://patient.info/health/tips-to-help-you-stop-smoking>) .

## References

ASH fact sheet. (2015). Use of electronic cigarettes (vapourisers) among adults in Great Britain. Retrieved from: [http://www.ash.org.uk/files/documents/ASH\\_891.pdf](http://www.ash.org.uk/files/documents/ASH_891.pdf)

ASH fact sheet. (2015). Use of electronic cigarettes among children in Great Britain. Retrieved from: [http://www.ash.org.uk/files/documents/ASH\\_959.pdf](http://www.ash.org.uk/files/documents/ASH_959.pdf)

Kalkhoran, S., & Glantz, S. A. (2016). E-cigarettes and smoking cessation in real-world and clinical settings: a systematic review and meta-analysis. *Lancet Respir Med*, 4(2), 116-128.  
doi:10.1016/S2213-2600(15)00521-4

McRobbie, H., Bullen, C., Hartmann-Boyce, J., & Hajek, P. (2014). Electronic cigarettes for smoking cessation and reduction. *Cochrane Database Syst Rev*, 12, Cd010216.

NHS Choices (2015): Some types of e-cigarettes to be regulated as medicines. Retrieved from: <http://www.nhs.uk/news/2013/06June/Pages/e-cigarettes-and-vaping.aspx>

NICE. (2008). Stop smoking services. Retrieved from: <https://www.nice.org.uk/guidance/ph10/chapter/recommendations>

Nutt, D. J., Phillips, L. D., Balfour, D., Curran, H. V., Dockrell, M., Foulds, J., et al. (2014). Estimating the harms of nicotine-containing products using the MCDA approach. *Eur Addict Res*, 20(5), 218-225.

Public Health England. (2015). E-cigarettes: An evidence update. Retrieved from [https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/457102/E-cigarettes\\_an\\_evidence\\_update\\_A\\_report\\_commissioned\\_by\\_Public\\_Health\\_England\\_FINAL.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/457102/E-cigarettes_an_evidence_update_A_report_commissioned_by_Public_Health_England_FINAL.pdf)

Public Health England. (2015). E-cigarettes: An emerging public health consensus. Retrieved from <https://www.gov.uk/government/news/e-cigarettes-an-emerging-public-health-consensus>

Royal College of Physicians (2016): Nicotine without smoke: Tobacco harm reduction. Retrieved from <https://www.rcplondon.ac.uk/projects/outputs/nicotine-without-smoke-tobacco-harm-reduction>