

# Electronic cigarettes

(also known as vapourisers)

This briefing provides answers to some of the most frequently asked questions about electronic cigarettes and includes references to other sources of information.

## Summary

- Electronic cigarettes deliver nicotine in a vapour rather than in smoke
- Compared to tobacco products, electronic cigarettes are significantly safer<sup>8</sup>
- In the UK, the devices are used primarily as an aid to cutting down or quitting smoking and evidence suggests they compare favourably with other stop smoking aids<sup>13 14 15</sup>
- In the UK there is no evidence that use of electronic cigarettes leads to a take-up of smoking<sup>8</sup>
- Electronic cigarettes in the UK will be regulated by the EU Tobacco Products Directive from 20 May 2016 unless manufacturers opt for products to be licensed by the medicines regulator, the MHRA

For more information see:

[ASH Briefing: The impact of the EU Tobacco Products Directive on e-cigarette regulation in the UK](#)

[ASH Briefing: Will you permit or prohibit e-cigarette use on your premises?](#)

[ASH Fact Sheet: Use of electronic cigarettes among adults in Great Britain](#)

[ASH Fact Sheet: Use of electronic cigarettes among children in Great Britain](#)

[ASH Fact Sheet: Nicotine and addiction](#)

## What are electronic cigarettes and how do they differ from tobacco products?

Electronic cigarettes, also known as vapourisers or electronic nicotine delivery systems (ENDS),<sup>1</sup> are battery-powered devices that deliver nicotine by heating a solution of nicotine, flavouring, additives and propylene glycol and/or vegetable glycerine (glycerol). The devices typically consist of a mouthpiece, battery and cartridge or tank containing the nicotine solution.<sup>2</sup>

When a user sucks on the device, a sensor detects air flow which activates a heating element (the 'atomiser') which heats the liquid in the cartridge so that it evaporates. The vapour delivers the nicotine to the user. Electronic cigarettes were developed to mimic the action of smoking, including nicotine delivery, without the toxic effect of tobacco smoke.<sup>3</sup>

When a person smokes a conventional tobacco cigarette, smoke is inhaled into the lungs and then exhaled. Smoke is also emitted from the burning tip of the cigarette, releasing toxins into the air. By contrast, as there is no combustion involved in the use of electronic cigarettes there is no smoke. Vapour is released into the air only when the user exhales.

There are three main types of electronic cigarettes or vapourisers:

- "Cig-a-like" products - This first generation of electronic cigarettes were designed to resemble tobacco cigarettes. They sometimes have a light at the end that glows when the user draws on the device to resemble a lit cigarette. These consist of either non-rechargeable disposable models or an electronic cigarette kit that is rechargeable and includes replaceable pre-filled cartridges.
- 'Tank' models (also known as vape pens) - An electronic cigarette that is rechargeable and has a tank or reservoir which has to be filled with liquid nicotine. Tank models have now become

more commonplace and allow the user to choose from a broader range of nicotine strengths and flavourings.

- 'Mods' (or advanced personal vaporisers) – A more complex tank model which can be manually customised by, for example, adjusting the voltage on the device.



### How safe are electronic cigarettes?

In 1976 Professor Michael Russell wrote: “People smoke for nicotine but they die from the tar.”<sup>4</sup> The harm from smoking is caused primarily through the toxins produced by the burning of tobacco. By contrast, non-tobacco, non-smoked nicotine products, although addictive, are considerably less harmful. Electronic cigarettes consequently represent a safer alternative to cigarettes for smokers who are unable or unwilling to stop using nicotine. For more information see the [ASH Fact sheet: Nicotine and addiction](#)

A review of the evidence commissioned by Public Health England (PHE) in 2014 found that the hazard associated with electronic cigarette products currently on the market “is likely to be extremely low, and certainly much lower than smoking”.<sup>5</sup> Other reviews have drawn similar conclusions with one putting the risks of vaping at less than 5% of the risks of smoking<sup>6</sup> and another review concluding that “Electronic cigarette [EC] aerosol can contain some of the toxicants present in tobacco smoke but at levels which are much lower. Long term health effects of EC use are unknown but compared with cigarettes, EC are likely to be much less, if at all, harmful to users or bystanders.”<sup>7</sup>

Following the publication of some reports suggesting that electronic cigarettes may pose more of a risk than previously thought, PHE commissioned a further expert independent evidence review. This review also concluded that electronic cigarettes, when used as intended, are significantly less harmful than smoking.<sup>8</sup> The review notes that most of the chemicals causing smoking-related disease are absent in electronic cigarettes and the chemicals that are present pose little danger.

Alongside publication of the review, PHE issued a statement noting that while not risk free, electronic cigarettes carry a fraction of the risk of smoking cigarettes and have the potential to help smokers quit smoking.<sup>9</sup>

The 2015 PHE review also examined reported risks of e-liquid poisonings, fires and battery explosions linked to electronic cigarette use. While there is a risk of fire from the electrical elements of electronic cigarettes and a risk of poisoning from ingestion of e-liquids, these risks appear to be comparable to similar electrical goods and potentially poisonous household substances. These risks can be controlled through standard regulations such as childproof containers and instructions about correct use of the charger which will come into effect through the Tobacco Products Directive. For further information see: [ASH Briefing: The impact of the introduction of the EU Tobacco Products Directive on e-cigarette regulation in the UK](#)

## Is there a risk to bystanders from electronic cigarette vapour?

Most second-hand smoke from cigarettes comes from the burning tip, known as sidestream smoke. By contrast, electronic cigarettes do not generate any sidestream vapour. What is emitted into the air is exhaled by the electronic cigarette user. This comprises nicotine and some other particles, primarily consisting of flavours, aroma transporters, glycerol and propylene glycol.<sup>7</sup>

A recent review of the impact of electronic cigarettes noted that passive exposure to the aerosol can expose non-users to nicotine but at concentrations that are unlikely to have any significant health impact.<sup>7</sup> The 2015 PHE review also reported that the amount of nicotine released into the ambient air poses no identifiable risk to bystanders.<sup>8</sup>

While electronic cigarette vapour can contain some of the toxicants present in tobacco smoke these are at much lower levels.<sup>7</sup> One preliminary study found that the concentration of particles in electronic cigarette vapour was about 100-fold lower than from tobacco smoke.<sup>10</sup>

The fact that some electronic cigarettes look similar to conventional cigarettes has been said to risk confusion as to their use in enclosed public places, such as on public transport.<sup>11</sup> However, given that the most distinctive feature of cigarette smoking is the smell of the smoke, which travels rapidly, it is not clear how any such confusion would be sustained in enclosed places. For further information see: [ASH briefing: Will you permit or prohibit electronic cigarette use on your premises?](#)

## Are electronic cigarettes effective in helping smokers quit?

ASH research shows that the most commonly reported reason for using electronic cigarettes is “to help me stop smoking tobacco entirely”.<sup>12</sup> For more information see: ASH Fact sheet: Use of e-cigarettes among adults in Great Britain. [ASH Fact sheet: Use of e-cigarettes among adults in Great Britain.](#)

The Smoking Toolkit Study, which provides information about smoking prevalence and behaviour in England, found that electronic cigarettes have overtaken over-the-counter (OTC) nicotine replacement therapy (NRT) as the first choice of stop smoking aid<sup>13</sup> and are 60% more effective in helping smokers quit than NRT bought OTC or quitting unaided.<sup>14</sup> The effectiveness was broadly similar to using a prescription medicine (including NRT) with limited professional support but less than using a prescription medicine with specialist behavioural support. The Smoking Toolkit Study estimates that in 2014 electronic cigarettes resulted in 20,000 more people quitting smoking who otherwise would not have done so.

A Cochrane review which combined the results from two randomised controlled trials involving over 600 people showed that using an electronic cigarette containing nicotine increased the chances of stopping smoking long-term compared to using an electronic cigarette without nicotine. About 9% of smokers using electronic cigarettes were able to stop smoking at up to one year compared with around 4% of smokers who used nicotine-free electronic cigarettes.<sup>15</sup> Using an electronic cigarette with nicotine also helped more smokers reduce the amount they smoked by at least half compared to using a device without nicotine. There was no evidence that using electronic cigarettes at the same time as using tobacco cigarettes made people less likely to quit smoking. The electronic cigarettes used in this study have since been superseded by more sophisticated technology which it is believed delivers more nicotine to users.

The 2015 PHE evidence review concluded that recent studies support the Cochrane Review findings that electronic cigarettes can help people to quit smoking and may in fact be contributing to the decline in smoking. There is also some evidence to suggest that electronic cigarette use leads to abstinence among some smokers who had not intended to quit.<sup>16</sup>

A US review sought to assess the association between electronic cigarette use and smoking cessation irrespective of users' motivation for using the devices.<sup>17</sup> The review found that users of electronic cigarettes were less likely to stop smoking than smokers not using them as an aid to quitting. However, a number of experts have criticised the methodology of the review<sup>18</sup> with one commentator

noting that the studies included were “mostly observational, often with no control group, with tobacco use status assessed in widely disparate ways”.<sup>19</sup>

Public Health England recommends that smokers who have tried other methods of quitting without success be encouraged to try electronic cigarettes and that Stop Smoking Services should support smokers using electronic cigarettes to quit by offering them behavioural support. This is supported by recent data which shows that smokers using the English Stop Smoking Services who quit whilst using electronic cigarettes have reported higher quit rates at 4-weeks than smokers using other quitting aids.<sup>20</sup>

The National Centre for Smoking Cessation and Training (NCSCT) has produced an [e-cigarette briefing](#) summarising the evidence to date, especially in relation to the role of the stop smoking services and how stop smoking practitioners should respond to enquiries about e-cigarettes from smokers.

In 2013, the National Institute for Health and Care Excellence (NICE) published guidance on a harm reduction approach to smoking.<sup>21</sup> NICE’s recommendations aim to inform how best to reduce illness and deaths attributable to smoking through a harm reduction approach. As part of this guidance, NICE supports the use of licensed nicotine containing products (NCPs) to help smokers cut down, for temporary abstinence and as a substitute for smoking, possibly indefinitely. The NICE guidance does not recommend the use of unlicensed nicotine containing products. However, the guidance is clear that using an electronic cigarette is safer than smoking.<sup>21</sup>

### **Why might electronic cigarettes help people to quit smoking?**

One characteristic of electronic cigarettes which appears to make them effective is their ability to provide an approximation to the sensory aspects of the experience of smoking. This has been demonstrated by users exhibiting reduced cravings, withdrawal symptoms and number of cigarettes smoked per day even when given a placebo electronic cigarette.<sup>7</sup> A related factor is the variety of products available which offer users different levels of nicotine and flavourings. Furthermore, electronic cigarettes are considerably cheaper than tobacco products which may motivate smokers to switch to these devices.

### **Who uses electronic cigarettes in the UK?**

ASH estimates that there are 2.6 million current users of electronic cigarettes in the UK.<sup>22</sup> This number consists almost entirely of current and ex-smokers; of these approximately one third are ex-smokers while two thirds continue to use tobacco alongside electronic cigarettes. There is little evidence to suggest that anything more than a negligible proportion of never-smokers regularly use the product.<sup>23</sup> For further information see: [ASH Factsheet: Use of electronic cigarettes among adults in Great Britain](#)

The Smoking Toolkit Study has found a difference in use of electronic cigarettes by social group. Among adult smokers interviewed between 2013 and 2014 23.8% of smokers in social classes AB reported using the devices compared to 16.7% in social class E.<sup>24</sup>

### **Are electronic cigarettes a gateway to smoking?**

It has been hypothesised that electronic cigarettes could act as a ‘gateway’ to smoking tobacco among children and to the ‘renormalisation’ of smoking. However, current evidence suggests this phenomenon is not occurring, at least in Great Britain. In fact, since electronic cigarettes have been on the market, smoking prevalence has declined among children. Whilst some never-smokers are experimenting with electronic cigarettes, regular use is rare among children and current electronic cigarette use is confined almost entirely to those who have already tried smoking.<sup>23 25</sup> For further information see: [ASH Fact Sheet: Use of electronic cigarettes among children in Great Britain](#)

### **How are electronic cigarettes regulated?**

Currently electronic cigarettes are regulated as general consumer products. Once the EU Tobacco Products Directive (TPD)<sup>26</sup> comes into effect in Member States from May 2016, electronic cigarettes containing up to 20 mg/ml of nicotine will be regulated by the TPD. (Levels of 18mg/ml have been



reported on user websites as suitable for typical smokers.<sup>27</sup>) Above that level, or if manufacturers and importers decide to opt into medicines regulation, such products will require authorisation by the Medicines and Healthcare Products Regulatory Agency (MHRA) as over the counter medicines in the same way as nicotine replacement therapy (NRT).<sup>28</sup>

The advertising of electronic cigarettes is currently governed by rules drawn up by the Committee on Advertising Practice which will cover the period until the TPD comes into effect.<sup>29</sup> From May 2016 nearly all advertising will be prohibited.

### **What is the involvement of the tobacco industry?**

The electronic cigarette market is emerging and there are a multitude of small to medium independent manufacturers that have no links with the tobacco industry. However, as with any new industry, these companies are consolidating over time.

With conventional tobacco sales in decline in established markets and electronic cigarette sales growing, the tobacco industry has begun to launch its own products as well as taking over existing manufacturers. To date, the following companies have launched their own electronic cigarettes or acquired existing electronic cigarette companies:<sup>30</sup>

Altria / Philip Morris USA – launched its own version of electronic cigarettes in August 2013 with its MarkTen brand. It also owns the Green Smoke brand.

BAT – BAT established the start-up company, Nicovations (originally Nicoventures Ltd) in 2011, with the focus of “development and commercialisation of innovative regulatory approved nicotine products”. In September 2014 the company announced that its development partner Kind Consumer had been granted a medicines licence for its nicotine inhaler, Voke. Since then it has also been granted a medicines licence for e-Voke, an electronic cigarette.<sup>31</sup> To date, neither product has yet been released on the market.

BAT’s Vype brand of electronic cigarettes went on sale in the UK in late July 2013.

Imperial Tobacco – established Fontem Ventures to explore non-tobacco initiatives, including electronic cigarettes. It launched Puritane in February 2014 and also owns the Dragonite brand. In July 2014 Imperial acquired the Blu brand from the American tobacco company Lorillard.

Japan Tobacco International – has a stake in the US company Ploom. The JTI Ploom was recently launched in the UK. JTI has also recently acquired the E-Lites brand.

Philip Morris International – has acquired the UK firm Nicocigs which produces the Nicolites brand.

Reynolds American – The second largest tobacco company in the United States, Reynolds American entered the market in 2013 with its Vuse brand of electronic cigarettes.

## References

- 1 Draft Abbreviated Advisory of the WHO Study Group on tobacco product regulation (WHO TobReg) concerning Electronic Nicotine Delivery Systems (ENDS), 2009
- 2 Goniewicz ML, Kuma T, Gawron M, Knysak J, Kosmider L. Nicotine levels in electronic cigarettes. *Nicotine Tob Res* 2013;15:158-66
- 3 Goniewicz ML, Lingas EO, Hajek P. Patterns of electronic cigarette use and user beliefs about their safety and benefits: An internet study. *Drug Alcohol Rev.* 2013; 32(2): 133-140
- 4 Russell M. Low-tar medium-nicotine cigarettes: a new approach to safer smoking. *British Medical Journal* 1976;1:1430-1433
- 5 Britton, J. and I. Bogdanovica, Electronic cigarettes: A report commissioned by Public Health England. London: Public Health England, 2014.
- 6 Nutt, D.J., et al. Estimating the harms of nicotine-containing products using the MCDA approach. *European Addiction Research*, 2014; 20(5): 218-225.
- 7 Hajek. P et al. Electronic cigarettes: review of use, content, safety, effects on smokers and potential for harm and benefit. *Addiction* 2014; 109(11): 1801-1810.
- 8 McNeill A et al. [E-cigarettes: an evidence update. A report commissioned by Public Health England](#). PHE, 2015
- 9 [E-cigarettes: a new foundation for evidence-based policy and practice](#). Public Health England, 2015
- 10 McFiggans, G & Harrison R. [A chamber study of second-hand E-cigarette “smoke” – preliminary results](#). Presentation at E-cigarette Summit, 2014.
- 11 Wirral pensioner kicked off public transport because of his electronic cigarette. *Wirral News*. 20 July 2012
- 12 YouGov survey. Fieldwork undertaken March 2015. Sample size: 12,055 adults. The figures have been weighted and are representative of all GB adults (aged 18+).
- 13 West, R. Electronic cigarettes in England: latest trends. *Smoking Toolkit Study*. 8 April 2014. <http://www.smokinginengland.info/latest-statistics/> accessed 13th April 2014
- 14 Brown J, Beard E, Kotz D, Michie S & West R. [Real-world effectiveness of e-cigarettes when used to aid smoking cessation: a cross-sectional population study](#). Published online 20 May 2014. <http://onlinelibrary.wiley.com/doi/10.1111/add.12623/abstract>
- 15 McRobbie H, Bullen C, Hartmann-Boyce J, Hajek P. Electronic cigarettes for smoking cessation and reduction. *The Cochrane Library*, Dec. 2014. DOI: 10.1002/14651858.CD010216.pub2
- 16 Polosa R, et al. [Success rates with nicotine personal vaporizers: a prospective 6-month pilot study of smokers not intending to quit](#). *BMC Public Health* 2014 14: 1159
- 17 Kalkhoran S & Glantz S. [E-cigarettes and smoking cessation in real-world and clinical settings: a systematic review and meta-analysis](#). *Lancet Respir. Med.* Published online 14 Jan. 2016
- 18 [Cessation: beneath the startling numbers, a study in scientific doubt](#). *E-cig Intelligence*. 21 Jan. 2016
- 19 Bernstein, S. [Electronic cigarettes: more light, less heat needed](#). *Lancet Respir Med.* Published online 14 Jan. 2016
- 20 [Statistics on NHS Stop Smoking Services in England - April 2014 to March 2015](#). HSCIC, Aug. 2015
- 21 Tobacco Harm Reduction NICE, 2013
- 22 Calculations were done by ASH applying the proportions of electronic cigarette use by smoking status in the 2015 YouGov survey to the most recent available ONS mid-year GB population estimates (2013).
- 23 Eastwood B et al. Electronic cigarette use in young people in Great Britain. *Public Health* 2015; 129 (9): 1150–1156
- 24 West R, Beard E & Brown J. Trends in e-cigarette use in England. *Smoking Toolkit Study*. Updated June 2015.
- 25 [ASH Fact sheet: Use of electronic cigarettes among children in Great Britain](#). ASH, 2015
- 26 [Revision of the Tobacco Products Directive](#). European Commission, March 2014
- 27 See for example:  
[www.learn.eversmoke.com/nicotine-strength.html](http://www.learn.eversmoke.com/nicotine-strength.html)  
[www.vapertrain.com/page/hdics](http://www.vapertrain.com/page/hdics)  
[www.vapehit.co.uk/info.php?articles&articles\\_id=22](http://www.vapehit.co.uk/info.php?articles&articles_id=22)
- 28 [Legal framework governing medicinal products for human use in the EU](#). European Commission
- 29 Committee on Advertising Practice. *Electronic cigarettes*, 2014
- 30 [Tobacco Companies Investing in E-cigarettes](#). *Tobaccotactics*.
- 31 Tennent, J. [First licensed e-cigarettes to become available on NHS](#). *Int Business Times*, 3 Jan. 2016

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