



Facts and fiction on e-cigs

What are they?

Electronic cigarettes, also known as e-cigarettes, e-cigs or, most accurately, Electronic nicotine delivery systems (ENDS), are devices that deliver an aerosol (incorrectly called ‘vapour’), inhaled by the users and created by heating a solution, usually composed of propylene glycol or glycerol (glycerin) and flavourings, generally with nicotine. While they both contain nicotine, e-cigarettes and traditional cigarettes are entirely different products. Thus, while the vapour from e-cigarettes does not contain some of the harmful substances in traditional cigarettes, it does contain different harmful substances not found in traditional cigarettes, so the health effects of using both can be expected to be greater than either alone. ENDS have been heavily marketed in some countries in recent years. In 2017, about 15% of the European population had tried e-cigs at least once in their life.¹

The WHO view on e-cigs

In 2016, the World Health Organization (WHO)² noted that, while e-cigarettes *might* be less harmful than conventional cigarettes, e-cigarettes still pose important risks to health, and that ENDS regulation should:

- Deter e-cigarette promotion to non-smokers and young people;
- Minimise potential health risks to e-cigarette users and nonusers;
- Prohibit unproven health claims about e-cigarettes;
- Prevent/Bar/Ban involvement of the tobacco industry in the marketing and promoting of e-cigarettes.

The legislative situation in Europe

As of May 2016 all European Union (EU) countries must comply with the EU Tobacco Products Directive that includes regulations for ENDS. The Directive³ states that their packaging should provide information on toxicity and addictiveness, health warnings, and a list of all the substances contained in the product, including the exact level of nicotine (that should be in a concentration level of no more than 20 mg/mL). The Directive also requires that advertising and promotion rules for tobacco products also apply to electronic cigarettes.

Answering key-questions about e-cigs

Are e-cigs safe?

- E-cigs have only recently been used widely so there are limited long term data. Consequently, as noted by the WHO, it is impossible to say if and by how much they are safer or more dangerous than traditional cigarettes. The widely cited figure of 95% safer⁴ emerged from a discussion among individuals, most of whom had previously advocated for these products,⁵ who conceded the lack of evidence on which to base their conclusion.⁶
- E-cigs do not produce the tar produced by traditional cigarettes that is the main cause of lung cancer. However, they do produce formaldehyde, a known carcinogen at levels above recommended levels.⁷ In addition, nicotine acts in ways that may encourage spread of established tumours⁸ and reduce the effects of cancer chemotherapy.⁹ Overall, however, the risk of cancer is unknown, though likely to be lower.
- E-cig use has been tied to lung disease, with a growing body of research, including laboratory studies, case reports and population epidemiology, reporting adverse effects of e-cig vapour, potentially linked to flavourings not found in traditional cigarettes that have been tested.^{10,11,12}
- E-cig use adversely affects the cardiovascular system, with a number of studies linking them to impaired functioning of blood vessels. A recent cross-sectional study found that daily e-cigarette use is associated with increased risk of heart attacks, with an additional effect in those also smoking, and while the authors were careful not to claim a causal relationship, they noted that the findings are consistent with the growing body of research on the effects of e-cigarettes on the vascular system.¹³
- The level of nicotine and other components released varies greatly among products, even at equal levels of nicotine in the refill liquid, due to the considerable differences among the different types and brands of e-cigs. The voltage of the system also affects nicotine delivery. Consequently, it is not possible to extrapolate findings from one product to another.

Conclusion:

The health risks associated with e-cigarettes remain uncertain but they **cannot be considered safe. What is certain is that statements that they are some percentage safer than conventional cigarettes are so far unjustified.**

Are e-cigs effective in helping to quit smoking?

- E-cigarettes are promoted in some countries as a tool to quit conventional smoking. However a recent meta-analysis of 27 studies reports that smokers (the whole population, including heavy smokers and all other smokers) who use e-cigarettes are about 1/3 less likely to quit smoking, compared to smokers who do not use e-cigarettes.¹⁴
- These findings are consistent with a study using survey data from all 28 EU Member States, which also found that e-cigarette use was associated with reduced quitting.¹⁵
- A Cochrane Review of the small number of randomized trials concluded that the evidence for their effectiveness was of low quality¹⁶ and a subsequent large randomised controlled trial found that they were of no additional benefit when added to provision of information and motivational text messages.¹⁷
- One large US study following exclusive e-cig and dual users over a year found that, while some of each group did quit or moved from dual use to sole e-cig use, more than twice as many continued to smoke, with a net increase in risk.¹⁸

- The largest review to date, conducted by the US National Academies of Science, Engineering and Medicine,¹⁹ concluded that “For youth and young adults, there is substantial evidence that e-cigarette use increases the risk of ever using combustible tobacco cigarettes. For e-cigarette users who have also ever used combustible tobacco cigarettes, there is moderate evidence that e-cigarette use increases the frequency and intensity of subsequent combustible tobacco cigarette smoking.”

Conclusion:

Overall, e-cigarettes may help some smokers quit but, for most, e-cigarettes depress quitting.

Do e-cigarettes act as a gateway to tobacco consumption?

- Evaluating the association between e-cig use and subsequent smoking is complicated by the fact that smoking rates among young people are falling in many countries, regardless of whether e-cigs are available or not.
- A recent meta-analysis reports never-smoking adolescents and young adults who have at least tried e-cigarettes have a greater risk of starting conventional smoking (quadruple the odds compared to those that did not try e-cigarettes).²⁰ This cannot be explained by arguments that these young people would otherwise have started smoking.²¹
- The overall evidence has recently been summarised in a major report for the Australian government as follows: “The evidence for a strong positive relationship between use of e-cigarettes and later cigarette smoking amongst youth continues to accumulate. The evidence is consistent in observational studies and across different countries. A plausible biological pathway from use of e-cigarettes to conventional cigarette smoking operates through developing addiction to nicotine. The use of e-cigarettes with higher concentrations of nicotine is observed to have a stronger association to later conventional cigarette use.”²²
- Among adults, dual use is the predominant pattern.

Conclusion:

The net effect of making e-cigarettes widely available, at population level, seems likely to be an increase in sole and dual use of e-cigarettes and sole smoking unless there is very stringent regulation.

What is the role of the tobacco industry?

- The tobacco industry is promoting e-cigs as well as their related heated tobacco products (which they inaccurately label 'heat-not-burn') intensely, especially in smaller countries where tobacco control communities are weaker. One vehicle for this is the Philip Morris-funded Foundation for a Smoke Free World.²³ Consistent with the views of WHO and many Schools of Public Health, EUPHA’s view is that public health organisations should not accept funding from this foundation under any circumstances.

Conclusion:

E-cigarettes and “smoke not burn” products are portrayed publicly by the tobacco industry as a means to reduce smoking yet, at the same time, these companies are actively promoting their combustible products.

EUPHA's view on e-cigs:

Given the available evidence, EUPHA strongly supports the precautionary approach taken in the EU Tobacco Products Directive and in statements by WHO. It is not possible, at this point, to make any claims about the relative safety of e-cigs compared to traditional cigarettes. The overall effect may well be to worsen the tobacco epidemic first by deflecting smokers from using proven smoking cessation strategies and shifting them to e-cigs, which, for most smokers, reduce successful smoking cessation, and second by deflecting discussion from measures opposed by the tobacco industry. E-cigarettes are expanding the nicotine market by attracting youth who were at low risk of initiating nicotine use with conventional cigarettes, but many of whom are now moving on to those conventional cigarettes. Even if they do not progress, **promoting nicotine use to youth is bad public health policy.**

EUPHA also welcomes the recent Bloomberg Stop! Initiative, which will provide important additional information on the strategies used by the tobacco industry, while commending to journalists, researchers and others the important resource Tobacco Tactics.²⁴

As The Lancet noted in a recent Editorial,²⁵ referring to a heavily criticized UK House of Commons Science and Technology Committee report on e-cigarettes, it is "naive and premature... to confuse an absence of evidence with an absence of harm."

Meantime, the tobacco industry continues to promote its "core product", traditional cigarettes globally, and with a special focus on low and middle income countries: EUPHA urges all concerned to reduce smoking to maintain their focus on evidence-based measures that will reduce smoking.

"The market competes on addiction—the most addictive products win out. With research, they [firms], like the cigarette companies, may find out which of their ingredients is most effective in increasing sales/addiction. [...]they are loath to give up these profit opportunities, no matter the costs to society."

Joseph E. Stiglitz, Recipient of the Nobel Memorial Prize in Economic Sciences, 2008

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The European Public Health Association, or EUPHA in short, is an umbrella organisation for public health associations in Europe. Our network of national associations of public health represents around 20'000 public health professionals. Our mission is to facilitate and activate a strong voice of the public health network by enhancing visibility of the evidence and by strengthening the capacity of public health professionals. EUPHA contributes to the preservation and improvement of public health in the European region through capacity and knowledge building. We are committed to creating a more inclusive Europe, narrowing all health inequalities among Europeans, by facilitating, activating, and disseminating strong evidence-based voices from the public health community and by strengthening the capacity of public health professionals to achieve evidence-based change.

- 1 Special Eurobarometer 458 - Attitudes of Europeans towards tobacco and electronic cigarettes. Available at <http://ec.europa.eu/commfrontoffice/publicopinion/index.cfm/Survey/getSurveyDetail/instruments/SPECIAL/surveyKy/2146>. (accessed 28th August 2018)
- 2 WHO Report to COP7 on ENDS/ENNDS. Available at <http://www.who.int/tobacco/communications/statements/electronic-cigarettes-january-2017/en/>.
- 3 European Union. Tobacco Products Directive (2014/40/EU). Available at <https://ec.europa.eu/health/tobacco/products/revision>. (accessed 28th August 2018)
- 4 Public Health England. <https://www.gov.uk/government/news/phe-publishes-independent-expert-e-cigarettes-evidence-review> (accessed 28th August 2018)
- 5 McKee M, Capewell S. Evidence about electronic cigarettes: a foundation built on rock or sand? *BMJ*. 2015 Sep 15;351:h4863.
- 6 Nutt DJ, Phillips LD, Balfour D, Curran HV, Dockrell M, Foulds J, Fagerstrom K, Letlape K, Milton A, Polosa R, Ramsey J, Sweanor D. Estimating the harms of nicotine-containing products using the MCDA approach. *Eur Addict Res* 2014;20(5):218-25
- 7 Salamanca JC, Meehan-Atrash J, Vreeke S, Escobedo JO, Peyton DH, Strongin RM. E-cigarettes can emit formaldehyde at high levels under conditions that have been reported to be non-averse to users. *Sci Rep*. 2018 May 15;8(1):7559.
- 8 Cardinale A, Nastrucci C, Cesario A, Russo P. Nicotine: specific role in angiogenesis, proliferation and apoptosis. *Crit Rev Toxicol*. 2012 Jan;42(1):68-89.
- 9 Sanner T, Grimsrud TK. [Nicotine: Carcinogenicity and Effects on Response to Cancer Treatment - A Review](#). *Front Oncol*. 2015 Aug 31;5:196.
- 10 Scott A, Lugg ST, Aldridge K, Lewis KE, Bowden A, Mahida RY, Grudzinska FS, Dosanjh D, Parekh D, Foronjy R, Sapey E, Naidu B, Thickett DR. Pro-inflammatory effects of e-cigarette vapour condensate on human alveolar macrophages. *Thorax*. 2018 Aug 13. pii: thoraxjnl-2018-211663. doi: 10.1136/thoraxjnl-2018-211663.
- 11 Viswam D, Trotter S, Burge PS, Walters GI. [Respiratory failure caused by lipid pneumonia from vaping e-cigarettes](#). *BMJ Case Rep*. 2018 Jul 6;2018. pii: bcr-2018-224350. doi: 10.1136/bcr-2018-224350
- 12 Miyashita L, Suri R, Dearing E, Mudway I, Dove RE, Neill DR, Van Zyl-Smit R, Kadioglu A, Grigg J. E-cigarette vapour enhances pneumococcal adherence to airway epithelial cells. *Eur Respir J*. 2018 Feb 7;51(2). pii: 1701592. doi: 10.1183/13993003.01592-2017.
- 13 Alzahrani, T., Pena, I., Temesgen, N., & Stanton Glantz, S. A. Association Between Electronic Cigarette Use and Myocardial Infarction. *Am J Prev Med* 2018; doi: 10.1016/j.amepre.2018.05.004.
- 14 Glantz SA, Bareham DW. E-Cigarettes: Use, Effects on Smoking, Risks, and Policy Implications. *Annual Review of Public Health* 2018; 39(1): 215–235.
- 15 Kulik MC, Lisha NE, Glantz SA. E-cigarettes Associated With Depressed Smoking Cessation: A Cross-sectional Study of 28 European Union Countries. *Am J Prev Med*. 2018 Apr;54(4):603-609.
- 16 McRobbie H, Bullen C, Hartmann-Boyce J, Hajek P. Electronic cigarettes for smoking cessation and reduction. *Cochrane Database Syst Rev*. 2014;(12):CD010216. doi: 10.1002/14651858.CD010216.pub2
- 17 Halpern SD, Harhay MO, Saulsgiver K, Brophy C, Troxel AB, Volpp KG. A Pragmatic Trial of E-Cigarettes, Incentives, and Drugs for Smoking Cessation. *N Engl J Med*. 2018 Jun 14;378(24):2302-2310.

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- 18 Coleman B, Rostron B, Johnson SE, Persoskie A, Pearson J, Stanton C, Choi K, Anic G, Goniewicz ML, Cummings KM, Kasza KA, Silveira ML, Delnevo C, Niaura R, Abrams DB, Kimmel HL, Borek N, Compton WM, Hyland A. Transitions in electronic cigarette use among adults in the Population Assessment of Tobacco and Health (PATH) Study, Waves 1 and 2 (2013-2015). *Tob Control*. 2018 Apr 25. pii: tobaccocontrol-2017-054174. doi: 10.1136/tobaccocontrol-2017-054174.
- 19 NASEM. Public Health Consequences of E-Cigarettes. Washington DC, NASEM, 2018.
- 20 Soneji S, Barrington-Trimis JL, Wills TA, Leventhal A, Unger JB, et al. 2017. Association between initial use of e-cigarettes and subsequent cigarette smoking among adolescents and young adults: a systematic review and meta-analysis. *JAMA Pediatr*. 171:788–97.
- 21 Chaffee BW, Watkins SL, Glantz SA. Electronic Cigarette Use and Progression From Experimentation to Established Smoking. *Pediatrics*. 2018 Apr;141(4). pii: e20173594. doi: 10.1542/peds.2017-3594.
- 22 Byrne S, Brindal E, Williams G, Anastasiou K, Tonkin A, Battams S, Riley M. E-cigarettes, smoking and Health : A Literature Review Update. Canberra : CSIRO, 2018
- 23 Daube M, Moodie R, McKee M Towards a smoke-free world? Philip Morris International's new Foundation is not credible. *Lancet*. 2017 Oct 14;390(10104):1722-1724.
- 24 http://tobaccotactics.org/index.php?title=Main_Page, last accessed, 29 August 2018
- 25 The Lancet. E-cigarettes—is the UK throwing caution to the wind? *Lancet* 2018;192: 614