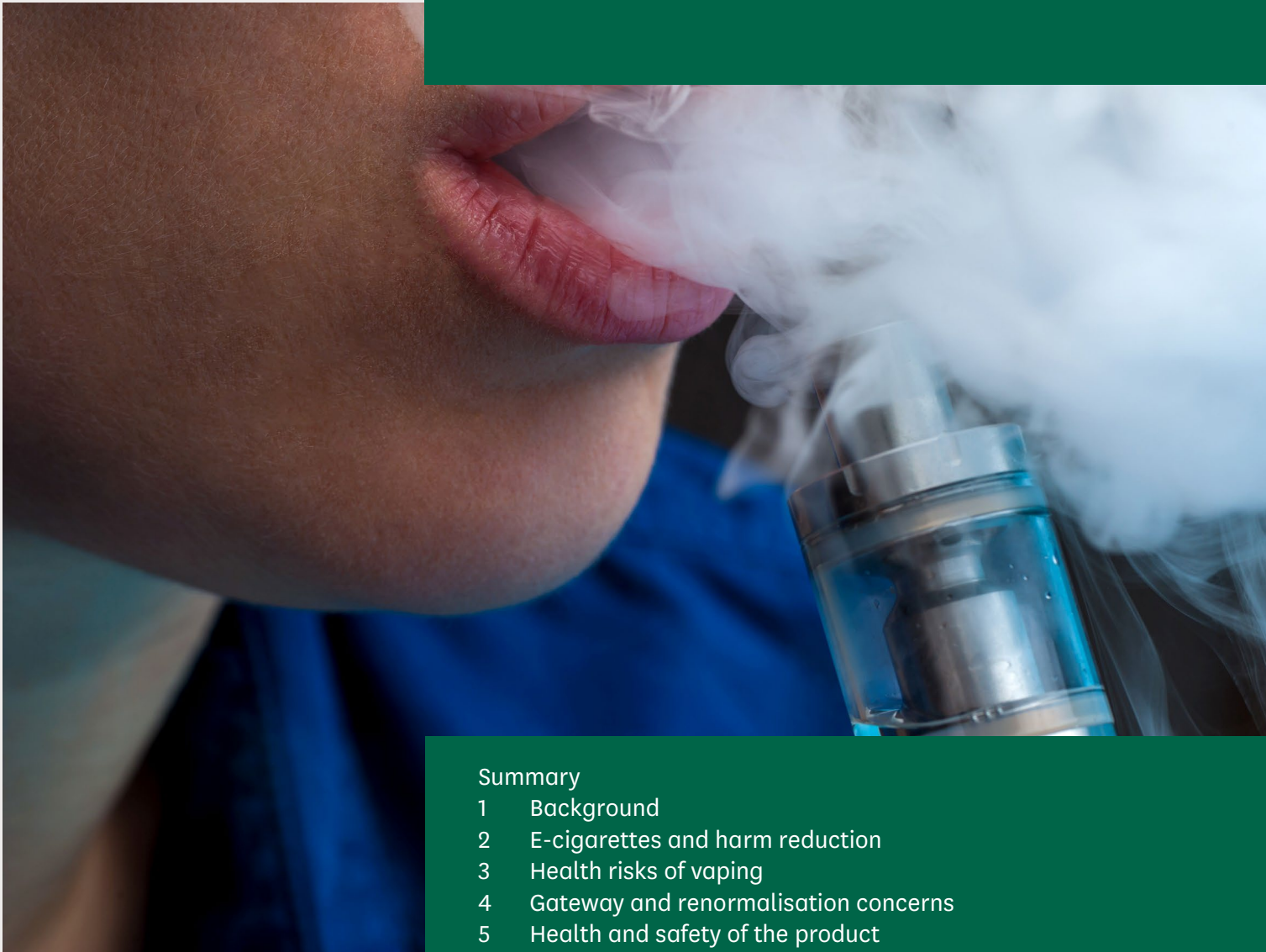


Research Briefing

12 January 2024

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# Vaping and health



## Summary

- 1 Background
- 2 E-cigarettes and harm reduction
- 3 Health risks of vaping
- 4 Gateway and renormalisation concerns
- 5 Health and safety of the product

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## Summary

E-cigarettes, otherwise known as vapes, are devices that allow users to inhale nicotine in a vapour rather than smoke. They are recognised as a way for smokers to manage nicotine dependence in a less harmful way than tobacco smoking.

### Health risks associated with vaping

The international scientific and medical community is generally in agreement that vaping is significantly less harmful than conventional smoking. However, it also cautions that the long-term risks of vaping are still unclear.

This uncertainty is largely due to the novelty of e-cigarettes, which were brought to market in the early 2000s, and did not become widespread until the mid-2010s. Not enough time, therefore, has passed for any studies to report on potential long-term effects of vaping.

Despite this, there is an early understanding of the kind of health problems that vaping is associated with.

### Statements on risk from medical organisations

Many vape products contain nicotine. In 2018, [Public Health England concluded that the risks of nicotine to human health were low](#). However, the [World Health Organization has noted that nicotine can have adverse effects during pregnancy](#) (PDF), and that it might contribute to cardiovascular disease and tumour formation.

The Royal College of Physicians noted that [some cancer-causing substances present in tobacco smoke have also been detected in e-cigarette vapour](#). This raised the possibility that long-term use of e-cigarettes may increase the risk of lung cancer, chronic obstructive pulmonary disease, cardiovascular disease, and other smoking-related diseases. It did, however, note that the extent of these risks was likely to be substantially lower than that of smoking.

Uncertainty about the long-term health risks has likely underpinned the [NHS' recommendation that vaping should only be used by adults as a smoking cessation tool](#). Professor Sir Chris Whitty, Chief Medical Officer for England, summarised this advice succinctly in May 2023; [“if you smoke, vaping is much safer; if you don't smoke, don't vape”](#).

## Illegal vapes

There is an additional risk posed by vapes that do not comply with regulatory standards. The sale and use of illicit e-cigarettes, which do not conform to the necessary product standards, place users at risk of ingesting [unsafe levels of metals such as nickel, lead and chromium and other harmful substances](#).

## Mental health and behavioural effects

As well as the possibility of physiological risks, researchers are considering the effects of vaping on mental health. [One study identified an association between vaping and the incidence of mental health conditions](#) in young people although a number of limitations to the study meant that its findings were not conclusive.

Questions are also being raised about vaping's behavioural impact, namely, whether it acts as a "gateway" to smoking tobacco and whether it risks "renormalising smoking", thereby undermining efforts to reduce smoking made in the last few decades.

## Future research into vaping and health

The next steps in understanding the health effects of vaping include conducting more and longer-term studies involving people who vape.

Another area of research that will be of interest to policy makers is whether vaping helps to reduce smoking rates, and if it does, how much it might improve public health.

# 1 Background

Figures in section 1 are sourced from the ONS dataset on [E-cigarette use in Great Britain](#)

Electronic cigarettes (also known as e-cigarettes, electronic nicotine delivery system (ENDS), or vaporisers/vapes) work by heating a solution of water, flavouring, propylene glycol (or vegetable glycerine) and, typically, nicotine to create a vapour that the user inhales. The act of using an e-cigarette is often referred to as ‘vaping’.

Devices tend to consist of a mouthpiece, a battery-powered heating element, a cartridge or refillable tank containing the liquid solution and an atomiser that vaporises the solution when heated.

In 2022, around 5.2% of people aged 16 and over in Great Britain reported that they were currently daily users of an e-cigarette (daily vapers). A further 3.5% reported that they were occasional vapers.

In total, this equates to around 4.5 million vapers in Great Britain.

## 1 Age restrictions on the sale of e-cigarettes in England

The [Nicotine Inhaling Products \(Age of Sale and Proxy Purchasing\) Regulations 2015](#) apply to nicotine products, like e-cigarettes.

[Regulation 2](#) makes the proxy purchasing of nicotine products an offence, while [Regulation 3](#) prohibits the sale of nicotine inhaling products to persons under the age of 18. The Regulations are enforced by local authority Trading Standards.

The Regulations do not apply to non-nicotine vaping products; these fall under [the General Product Safety Regulations 2005](#). Therefore, the sale of non-nicotine vaping products to under 18s is currently permitted in England.<sup>1</sup>

In May 2023, the Prime Minister announced a commitment to review the rules on selling nicotine-free vapes to under 18s.<sup>2</sup>

The sale of non-nicotine vaping products is enforced jointly by Trading Standards and the [Office of Product Safety and Standards](#). These bodies have the power to prosecute companies for placing unsafe products on the market.

<sup>1</sup> See, for example comments made by Neil O’Brien, then Parliamentary Under-Secretary of State for Health and Social Care, Hansard, [Under-age vaping](#), HC Deb, 12 July 2023, Vol 736, c455

<sup>2</sup> [No more free vapes for kids](#) (online), press notice by the Department of Health and Social Care, The Rt Hon Rishi Sunak MP and Neil O’Brien MP, 30 May 2023, (accessed 15 December 2023)

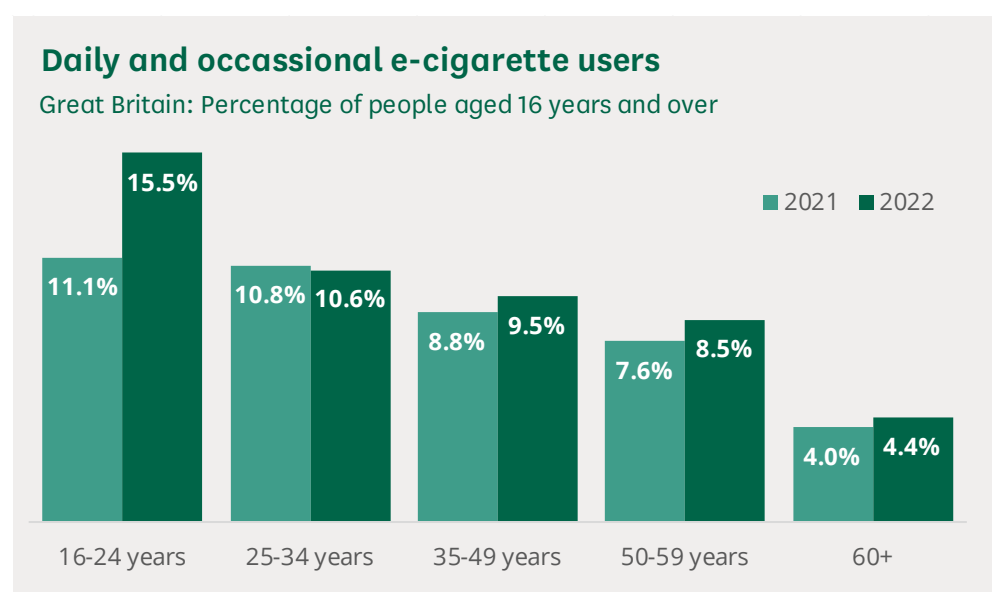
Further information is available in other Library briefings:

- Section 2.4 of the Library briefing, [Advertising, marketing and promotion of vaping products](#), advises on compliance and enforcement of vaping product sales.
- Section 4 of the Library briefing, [The regulation of e-cigarettes](#), advises on age restrictions on the sale of vaping products in England, Wales, Scotland and Northern Ireland.

## 1.1 E-cigarette use by age group

In 2022, 16-to-24-year-olds were more likely to report daily or occasional vaping than all other age groups. There was a statistically significant<sup>3</sup> increase in daily or occasional vaping compared with 2021 rates, rising from 11.1% in 2021 to 15.5% in 2022.

E-cigarette use by age group in 2021 and 2022 is shown in the chart below.



Source: ONS [E-cigarette use in Great Britain, Table 1](#)

The 2022 increase in e-cigarette usage among 16-to-24-year-olds was due to changes in rates for young women. The percentage of women aged 16 to 24 years reporting daily or occasional vaping increased from 9.0% in 2021 to

<sup>3</sup> Meaning we can be confident that there was a change in prevalence.

18.9% in 2022. Among men aged 16 to 24 years there was a small decrease from 13.0% down to 12.3%.

## 1.2

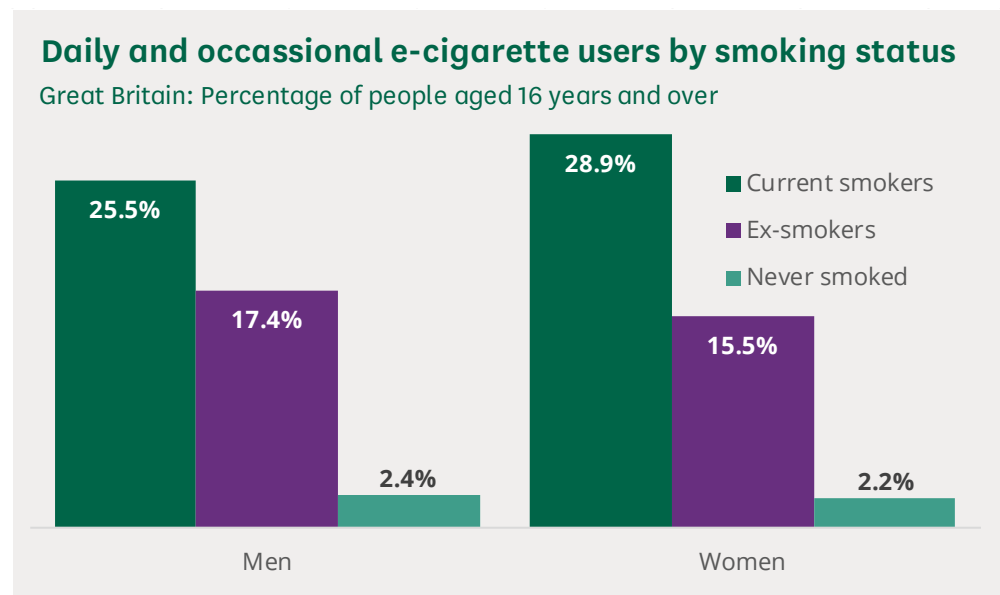
### E-cigarette use by smoking status

Daily and occasional vaping was most common among current cigarette smokers: 25.5% of men and 28.9% of women who currently smoked were also daily or occasional e-cigarette users in 2022.

Among those who had never smoked, 2.4% of men and 2.2% of women used e-cigarettes daily or occasionally.

Ex-smokers were more likely to use e-cigarettes than those who had never smoked, with 17.4% of men and 15.5% of women reporting daily or occasional use.

This data is shown in the chart below.



Source: ONS [E-cigarette use in Great Britain, Table 2](#)

## 1.3

### Vaping and health: what are the key questions?

Debates on vaping and health have typically focused on:

- Does vaping have a role in harm reduction and helping people to reduce, or stop, smoking?



- Does vaping ‘normalise’ smoking and act as a ‘gateway’ to conventional tobacco products, particularly among children and young people?
- Are vapes that are currently available on the market fundamentally safe products?

Definitive answers to these questions are not yet available. The diversity of e-cigarette brands, models, product claims, nicotine strengths, flavours and ingredients, together with variations in use from person to person, have all made assessing the public health impact and safety of e-cigarettes challenging.

The World Health Organization (WHO) has similarly emphasised that the health impact of e-cigarettes on users will depend on numerous factors including:

- the design of the e-cigarette;
- how often the e-cigarette is used and with what type of liquid;
- what other product(s) the consumer is using at the same time, such as conventional tobacco cigarettes.<sup>4</sup>

Furthermore, because of the rapid development of e-cigarettes and their novelty (particularly in comparison with tobacco cigarettes), some suggest that conclusive evidence on the risks and benefits may be years, and possibly decades, away.<sup>5</sup>

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<sup>4</sup> World Health Organization, [WHO Report on the Global Tobacco Epidemic, 2021: Addressing new and emerging products](#), July 2021, p36

<sup>5</sup> Conference of the Parties to the WHO Framework Convention on Tobacco Control, [Electronic nicotine delivery systems. Report by WHO](#), September 2014, para 15

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## 2 E-cigarettes and harm reduction

### 2.1 What is harm reduction?

Harm reduction refers to policies, programmes and practices that aim to reduce the negative effects associated with a behaviour in people unable or unwilling to stop, rather than eliminating the behaviour altogether. It has been a controversial issue in tobacco control because smoking cessation and prevention have long been the focus of public health strategies.<sup>6</sup>

The Royal College of Physicians reported that “harm reduction, and in particular the role of e-cigarettes, has probably split global and, to some extent, national opinion on tobacco control more than any other issue”.<sup>7</sup>

### 2.2 Does vaping help people to reduce / stop tobacco smoking?

The effect of vaping on tobacco smoking is unclear. There are two broad schools of thought.

One is that vaping offers a reduced-risk means of managing nicotine dependence in smokers. By vaping, smokers can move partially or wholly away from conventional cigarettes, significantly reducing the risk of harm associated with smoking.

[A study published in 2023](#) sought to examine this theory.<sup>8</sup> A group of independent researchers, funded by the UK’s National Institute for Health Research, analysed data on smoking and the use of alternative nicotine products over time. They compared data on smoking from countries that have similar tobacco control history, but either have a relaxed approach to e-cigarette use (such as the UK and US) or have banned their use (such as Australia).

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<sup>6</sup> Z Cahn and M Siegel, [Electronic cigarettes as a harm reduction strategy for tobacco control: a step forward or a repeat of past mistakes?](#) J Public Health Policy, Vol 32 (2011) pp 16-31

<sup>7</sup> Royal College of Physicians, [Nicotine without smoke. Tobacco harm reduction. A report by the Tobacco Advisory Group of the Royal College of Physicians](#), 28 April 2016, p3

<sup>8</sup> F Pesola and others. [Effects of reduced-risk nicotine-delivery products on smoking prevalence and cigarette sales: an observational study](#) Public Health Res 2023;11(7)

Although there was no conclusive association between use of alternative nicotine products and smoking prevalence, the researchers found that the decline in smoking may have been slower in Australia than in the UK and US. They suggested that this may be because “allowing alternative nicotine products to be sold seems to have been linked with lowered rather than increased rates of smoking”.<sup>9</sup>

However, the researchers emphasised that they could not draw any reliable conclusions because of the limited availability of data. They suggested that more definitive findings would be possible as more data on the use and sales of alternative nicotine products are collected.

The other school of thought maintains that promoting vaping, a practice that bears significant resemblance to tobacco smoking, makes it attractive to non-smokers. Some suggest that vaping acts as a “gateway” for non-smokers by “renormalising” what might be seen by some as a type of smoking and undoing the decades-long work that has gone into making smoking socially unacceptable. There are also concerns that vaping simply facilitates another mechanism of nicotine dependence but there is limited evidence examining this concept.

## 2.3

### Vaping as a smoking cessation aid

Smoking cessation aids refer to activities that help a person who smokes to stop (or ‘quit’) smoking. At present, there is a lack of high-quality evidence on the efficacy of e-cigarettes as a method to help people quit, or reduce, smoking tobacco.<sup>10</sup>

Despite the lack of evidence about the role of e-cigarettes in harm reduction, and smoking cessation, surveys indicate that consumers in Great Britain are using e-cigarettes as a method to stop smoking tobacco products and/or to stop smoking entirely. For example, the public health charity Action on Smoking and Health’s (ASH) [survey on the use of e-cigarettes among adults in Great Britain](#) (PDF) reported in August 2023 that the main reason given by ex-smokers for vaping:

[...] is to help them quit (31%) [...] the main reasons given by current smokers for vaping is to cut down on smoking (19%), to try to help them quit (17%) and to prevent relapse (13%).<sup>11</sup>

<sup>9</sup> F Pesola and others. [Effects of reduced-risk nicotine-delivery products on smoking prevalence and cigarette sales: an observational study](#). Public Health Res 2023;11(7), Plain language summary

<sup>10</sup> K Stratton, L Y Kwan, and D L Eaton (eds) [Public Health Consequences of E-Cigarettes, A Consensus Study Report of The National Academies of Science, Engineering, Medicine \(USA\)](#), January 2018 (chapter 17)

<sup>11</sup> ASH, [Use of e-cigarettes \(vapes\) among adults in Great Britain](#) (PDF), August 2023 (survey carried out in February and March 2023 with a sample size of 12,271 participants)

## National Institute for Health and Care Excellence (NICE) guidelines for tobacco harm reduction

In the UK, tobacco harm reduction strategies have been pursued alongside smoking cessation services, but with an emphasis on prescribing medically licensed products, such as nicotine replacement therapies.<sup>12</sup> The National Institute for Health and Care Excellence (NICE) guidelines for tobacco harm reduction, for example, state that:

The approaches for harm reduction in this guideline should not detract from providing the highly cost-effective interventions to help people stop smoking altogether. Instead, recommendations on harm reduction are intended to support and extend the reach and impact of existing stop-smoking support. Although existing evidence is not clear about the health benefits of smoking reduction, people who reduce the amount they smoke are more likely to stop smoking eventually.<sup>13</sup>

In March 2018, however, NICE included reference to e-cigarettes in its guidelines on stop smoking interventions and stop smoking services for the first time. The guidelines set out the points that should be covered by healthcare professionals when discussing e-cigarettes as a means to quit smoking tobacco.<sup>14</sup>

## Position of the World Health Organization on e-cigarettes on smoking cessation

The World Health Organization (WHO) reported in 2014, and reiterated in 2019, that the “evidence for the effectiveness of ENDS [Electronic nicotine delivery systems] as a method for quitting tobacco smoking is limited and does not allow conclusions to be reached”.<sup>15</sup>

In its 2021 report on [the Global Tobacco Epidemic, 2021: Addressing new and emerging products](#), the WHO continued to stress that the “evidence on the potential role for ENDS in cessation is still inconclusive” and that “ENDS are addictive and not without harm”.<sup>16</sup>

Most recently, an evidence review carried out by the WHO, and published in December 2023, did not find sufficient evidence to conclude that e-cigarettes

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<sup>12</sup> C Rooke, [Harm reduction and the medicalisation of tobacco use](#), *Sociology of Health & Illness*, Vol 35 (2012) pp 361–376. E-cigarettes are not considered nicotine replacement therapies in this context as, to date, medically licensed e-cigarette products are not yet available in the UK.

<sup>13</sup> NICE, [Tobacco: preventing uptake, promoting quitting and treating dependence \(PDF\)](#), NG29, 30 November 2021 (updated January 2023), p100

<sup>14</sup> NICE, Guidelines, [Stop smoking interventions and services NICE guideline \[NG92\]](#), 28 March 2018; this guideline has since been replaced by [Tobacco: preventing uptake, promoting quitting and treating dependence \(PDF\)](#), 30 November 2021 (updated January 2023), p30

<sup>15</sup> Conference of the Parties to the WHO Framework Convention on Tobacco Control, [Electronic nicotine delivery systems. Report by WHO](#), September 2014, para 19; [WHO Report on the Global Tobacco Epidemic, 2019: Offer help to quit tobacco use](#), July 2019, p46, p56

<sup>16</sup> World Health Organization, [WHO Report on the Global Tobacco Epidemic, 2021: Addressing new and emerging products](#), July 2021, p39

were effective in supporting tobacco smoking cessation in the general population:

Currently, the evidence does not support a generalizable conclusion that commercialization of ecigarettes as consumer products will improve population health by supporting tobacco use cessation. Use of e-cigarettes as consumer products has not proven effective for cessation at the population level, as actually used in the real world.<sup>17</sup>

Based on this conclusion, the WHO warned governments against permitting the use of e-cigarettes to support a smoking cessation objective. Instead, it recommended that this should be pursued by regulating e-cigarettes as medicines alongside a tobacco control strategy:

Given the risk of uptake, it is not recommended that governments permit sale of e-cigarettes as consumer products in pursuit of a cessation objective. Recognizing that there is emerging evidence of some e-cigarettes potentially playing a role in supporting cessation under controlled medical conditions, it is recommended that any cessation objective governments may have utilizing e-cigarettes, be pursued by regulating e-cigarettes as medicines - with a comprehensive tobacco control strategy.<sup>18</sup>

## Reports commissioned by Public Health England

This briefing does not aim to provide a systematic review of the evidence that has been published to date on the effectiveness of e-cigarettes as a harm reduction tool or smoking cessation aid. Overviews of the evidence, however, can be found in a [series of reports commissioned by what was Public Health England](#) (PHE, and has since become the Office for Health Improvements and Disparities) and were published in 2015 and between 2018 and 2022.

[In a summary of its 2021 findings](#), the authors of the PHE-commissioned report stated vaping was “positively associated with quitting smoking successfully” and that in 2017, vaping had helped “over 50,000 smokers” to stop smoking tobacco.<sup>19</sup> It recognised the “extensive use” of vaping products in quit attempts compared with licensed medication, and suggested that vaping products may reach more people who smoke and therefore have more impact on smoking cessation than licensed products such as nicotine replacement therapy and varenicline.<sup>20</sup>

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<sup>17</sup> WHO, [Technical note on call to action on electronic cigarettes](#), 14 December 2023

<sup>18</sup> WHO, [Technical note on call to action on electronic cigarettes](#), 14 December 2023

<sup>19</sup> A McNeill and others, [Vaping in England: an evidence update including vaping for smoking cessation](#), February 2021, A report commissioned by Public Health England

<sup>20</sup> A McNeill and others, [Vaping in England: an evidence update including vaping for smoking cessation](#), February 2021, A report commissioned by Public Health England. [Varenicline](#) is a licenced medication that reduces nicotine cravings and helps with withdrawal symptoms. [Nicotine replacement therapy](#) provides low doses of nicotine without the harmful chemicals present in tobacco cigarettes; it is available in different products, including patches, chewing gum and inhalators.

## 2.4 Medicinally licensed e-cigarette products

At present there are no medicinally licensed e-cigarette products available in the UK.<sup>21</sup>

E-cigarette manufacturers can only make claims relating to smoking cessation once their products have been licensed by the [Medicines and Healthcare products Regulatory Agency](#) (MHRA – the UK’s medicines and medical devices regulator) and have successfully evidenced those claims for that particular product.<sup>22</sup> To achieve a licence (known as a ‘marketing authorisation’), products would need to meet the standards of quality, safety, and efficacy expected of medicinal products.

In November 2022, the MHRA published updated ‘[Guidance for licensing electronic cigarettes and other inhaled nicotine-containing products as medicines](#)’. A Department of Health and Social Care press release in October 2021 described the MHRA’s guidance as paving the way for “medicinally licensed e-cigarette products to be prescribed for tobacco smokers who wish to quit smoking”. It added:

Manufacturers can approach the MHRA to submit their products to go through the same regulatory approvals process as other medicines available on the health service. This could mean England becomes the first country in the world to prescribe e-cigarettes licensed as a medical product.<sup>23</sup>

As of April 2022, the MHRA had received no new marketing authorisation applications for e-cigarettes, though an MHRA spokesperson told the *Pharmaceutical Journal* that there had been “much interest from companies who wish to achieve regulatory approval”.<sup>24</sup>

## 2.5 National policy on tobacco harm reduction

The government’s position has been that “the best thing a smoker can do is to quit and quit for good” but that for those “that are unable to quit, switching to e-cigarettes is less harmful than continuing to smoke”.<sup>25</sup>

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<sup>21</sup> [PQ 202976](#) [on Smoking: Health Services], 23 October 2023. The MHRA [The MHRA granted a licence to 'Nicoventures'](#) (PDF), a company owned by British American Tobacco (BAT), for its ‘e-voke’ 10mg and 15mg electronic inhaler, in November 2015. This authorises the company to market the device as a smoking cessation aid. Reuters, however, reported in January 2017 that [BAT had “quit plans to market a nicotine inhaler called Voke](#) to focus on consumer items like e-cigarettes rather than health products” after manufacturing issues delayed the launch of Voke.

<sup>22</sup> The MHRA regulates medicines, medical devices and blood components for transfusion in the UK.

<sup>23</sup> [News story: E-cigarettes could be prescribed on the NHS in world first](#), Department of Health and Social Care, 29 October 2021

<sup>24</sup> Carolyn Wickware, [No new licence applications for e-cigarettes since UK medicines regulator changed its guidance](#), *The Pharmaceutical Journal*, 7 April 2022

<sup>25</sup> [PQ 48248](#) [on Electronic Cigarettes: Sales], 18 October 2016

The government has also singled out vaping as an “important tool to help the government achieve its ambition for England to be smokefree by 2030”.<sup>26</sup> For example, in April 2023, the government announced funding for a new national ‘swap to stop’ scheme. Its aim is to encourage “one million smokers to swap cigarettes for vapes” to help cut tobacco smoking rates.<sup>27</sup>

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<sup>26</sup> Office for Health Improvement & Disparities, [Youth vaping: call for evidence](#), April 2023

<sup>27</sup> [Smokers urged to swap cigarettes for vapes in world first scheme - GOV.UK](#), 11 April 2023

## 3 Health risks of vaping

In addition to considering if e-cigarettes can be an effective smoking reduction and cessation aid, attention has also turned to their health implications and whether they pose a risk to human health.

Much of the available research compares the risks associated with using e-cigarettes to the risks linked to smoking tobacco. There is also a growing recognition that vaping is not risk free, particularly for young people and those who have never smoked tobacco.

There are recognised limitations with the available evidence on vaping harms, most notably the absence of evidence on the long-term risks. Most of the evidence currently available on the risks of e-cigarettes focuses on health outcomes that can be identified within months or years of starting to use the product.

A systematic review of available literature was conducted as part of the government's [Nicotine vaping in England: 2022 evidence update](#).

The main conclusions from this work indicate that switching from smoking to vaping has the potential to:

- reduce exposure to toxicants and carcinogens, which may have relevant outcomes for cancer prevention.
- slow down the development of respiratory diseases.

However, the current evidence is not sufficient to assess the impact of vaping on cardiovascular health or measurable indications of potential harm to health.

The evidence update notes the need for future research among people who vape and have never smoked to determine health impacts exclusively due to vaping rather than because of prior long-term smoking.

In addition, possible vaping-related harms could involve other factors not related to vaping or smoking. For example, diet and levels of physical activity may influence cardiovascular health. Robust research which can control for these factors is needed to accurately determine the health impacts of vaping.



## 3.1

# Nicotine

The majority of e-cigarettes contain nicotine – the primary addictive component of tobacco cigarettes. Concerns have been raised about the harms associated with nicotine consumption and whether the amount delivered via e-cigarettes is sufficient to cause health problems.

According to the tobacco control charity ASH (Action on Smoking and Health), the prevailing body of evidence indicates that nicotine does present “some risks to health” but that “overall they are relatively minor”.<sup>28</sup> The Royal College of Physicians reported that there was “sufficient evidence to conclude that any harm from long-term nicotine use will still be negligible compared with the harm of tobacco use”.<sup>29</sup> Similarly, a report commissioned by Public Health England (PHE) concluded in 2018 that the risks of nicotine to human health were low:

While nicotine has effects on physiological systems that could theoretically lead to health harms, at systemic concentrations experienced by smokers and e-cigarette users, long-term use of nicotine by ‘snus’ (a low nitrosamine form of smokeless tobacco) users has not been found to increase the risk of serious health problems in adults, and use of nicotine replacement therapy by pregnant smokers has not been found to increase risk to the foetus.<sup>30</sup>

The World Health Organization (WHO), however, has highlighted that nicotine can have “adverse effects during pregnancy and may contribute to cardiovascular disease”. It also noted that while “nicotine itself is not a carcinogen, it may function as a “tumour promoter” on the grounds that it has been shown to alter “essential biological processes”. These include the formation of new blood vessels, as well as the growth, division and migration of “a wide variety of cells including fetal, embryonic and adult stem cells, adult tissues as well as cancer cells”.<sup>31</sup>

The WHO went on to state that, for these reasons, “the evidence is sufficient to caution children and adolescents, pregnant women, and women of reproductive age about [e-cigarettes delivering nicotine] use because of the potential for fetal and adolescent nicotine exposure to have long-term consequences for brain development”.<sup>32</sup> In 2021, the WHO called attention to research into the impact of nicotine on brain development, stating:

The consumption of nicotine in children and adolescents has deleterious impacts on brain development, leading to long-term consequences for brain

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<sup>28</sup> ASH, [Fact Sheet no.8 Nicotine and Addiction](#), August 2018 (PDF)

<sup>29</sup> Royal College of Physicians, [Nicotine without smoke. Tobacco harm reduction. A report by the Tobacco Advisory Group of the Royal College of Physicians](#), 28 April 2016, p 63

<sup>30</sup> A McNeill and others, [Evidence review of e-cigarettes and heated tobacco products 2018 A report commissioned by Public Health England](#), February 2018, p12

<sup>31</sup> Conference of the Parties to the WHO Framework Convention on Tobacco Control, [Electronic nicotine delivery systems. Report by WHO \(PDF\)](#), September 2014, para 13

<sup>32</sup> Conference of the Parties to the WHO Framework Convention on Tobacco Control, [Electronic nicotine delivery systems. Report by WHO \(PDF\)](#), September 2014, para 13

development and potentially leading to learning and anxiety disorders. Nicotine exposure in pregnant women can have similar consequences for the brain development of the fetus.<sup>33</sup>

While nicotine delivery from e-cigarettes is variable, an analysis conducted by researchers at the US Food and Drug Administration (FDA) found that e-cigarettes usually delivered less nicotine than smoking traditional tobacco cigarettes:

Nicotine yields from automated smoking machines suggest that e-cigarettes deliver less nicotine per puff than traditional cigarettes, and clinical studies indicate that e-cigarettes deliver only modest nicotine concentrations to the inexperienced e-cigarette user.<sup>34</sup>

They cautioned, however, that more experienced e-cigarette users could “achieve systemic nicotine and/or cotinine concentrations similar to those produced from traditional cigarettes”.<sup>35</sup>

## 3.2 Comparing the risk of tobacco smoking to vaping

In addition to harms arising from nicotine, the Royal College of Physicians (RCP) noted that some of the compounds and toxins present in tobacco smoke have also been detected in e-cigarette vapour. This raises the possibility that long-term use of e-cigarettes may increase the risk of smoking-related diseases, such as lung cancer, and COPD (chronic obstructive pulmonary disease). The RCP went on to state, however, that “the magnitude of such risks is likely to be substantially lower than those of smoking, and extremely low in absolute terms”.<sup>36</sup>

A similar point about the magnitude of risk was made in the 2015 evidence review of e-cigarettes commissioned by PHE. It reported that the “best estimates show e-cigarettes are 95% less harmful to your health than normal cigarettes” and that “when supported by a smoking cessation service [they] help most smokers to quit tobacco altogether”.<sup>37</sup> PHE has not revised its

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<sup>33</sup> World Health Organization, [WHO Report on the Global Tobacco Epidemic, 2021: Addressing new and emerging products](#), July 2021, p36

<sup>34</sup> M Schroeder and A Hoffman, [Electronic cigarettes and nicotine clinical pharmacology \(PDF\)](#), Tobacco Control Vol 23, (2014) pp ii30–ii35.

<sup>35</sup> M Schroeder and A Hoffman, [Electronic cigarettes and nicotine clinical pharmacology \(PDF\)](#), Tobacco Control Vol 23, (2014) pp ii30–ii35.

<sup>36</sup> Royal College of Physicians, [Nicotine without smoke. Tobacco harm reduction. A report by the Tobacco Advisory Group of the Royal College of Physicians](#), 28 April 2016, p87

<sup>37</sup> A McNeill and others, [E-cigarettes: an evidence update. A report commissioned by Public Health England \(PDF\)](#), August 2015, p5

'95%' figure in either its 2018 evidence review or its 2019, 2020 or 2021 evidence updates.<sup>38</sup>

The quality of the evidence upon which the 95% figure is based was questioned in an editorial in the medical journal, The Lancet. The Lancet stated that the figure came from a single paper, authored by Professor David Nutt and colleagues, and that PHE failed to "report the caveats that Nutt and colleagues themselves emphasised in their paper".<sup>39</sup>

A joint statement was published in 2016 by PHE with 12 other health charities and public health bodies. It explained that:

We all agree that e-cigarettes are significantly less harmful than smoking. One in two lifelong smokers dies from their addiction. All the evidence suggests that the health risks posed by e-cigarettes are relatively small by comparison but we must continue to study the long-term effects.<sup>40</sup>

In its Response to the Commons Science and Technology Select Committee's 2018 report into e-cigarettes, the Government stated that it was "firmly committed to more research" into the relative health risks of e-cigarettes and noted that it had commissioned the independent Committee on Toxicity of Chemicals in Food, Consumer Products and the Environment (COT) "to consider areas of research on potential harms from e-cigarettes".<sup>41</sup> This includes work examining "the impact of nicotine on e-cigarette aerosols and on the toxicity of flavourings".<sup>42</sup>

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<sup>38</sup> A McNeill and others, [Evidence review of e-cigarettes and heated tobacco products 2018 A report commissioned by Public Health England \(PDF\)](#), February 2018; A McNeill and others, [Vaping in England: an evidence update February 2019 A report commissioned by Public Health England \(PDF\)](#), February 2019; more recent reviews can be accessed at [E-cigarettes and vaping: policy, regulation and guidance - \(www.gov.uk\)](#)

<sup>39</sup> The Lancet (editorial), [E-cigarettes: Public Health England's evidence-based confusion](#), 29 August 2015

<sup>40</sup> Public Health England, [E-cigarettes: a developing public health consensus \(PDF\)](#). Joint statement on e-cigarettes by Public Health England and other UK public health organisations, July 2016.

<sup>41</sup> Department of Health and Social Care, [The Government Response to the Science and Technology Committee's Seventh Report of the Session 2017-19 on E-cigarettes \(PDF\)](#), December 2018, Cm 9738, p3

<sup>42</sup> Department of Health and Social Care, [The Government Response to the Science and Technology Committee's Seventh Report of the Session 2017-19 on E-cigarettes \(PDF\)](#), December 2018, Cm 9738, p3

## 2 Why might vaping be less harmful than tobacco smoking?

Unlike conventional cigarettes, e-cigarettes do not contain some of the components that are most associated with the harmful effects of smoking.

- Conventional cigarettes contain tobacco. The tobacco plant contains nicotine, which causes addiction. Tobacco plants also absorb harmful chemicals from the soil while growing:
  - Cadmium, a carcinogen and toxic metal.
  - Lead, a toxic metal.
  - Nitrates, from fertilizer, which have been classified as “probably carcinogenic” by the International Agency for Research on Cancer.<sup>43</sup>

During the tobacco curing process, ammonia may be added to increase nicotine absorption, while sugar and flavour additives may be added to mask the harshness of smoke. These additives form carcinogens during combustion.<sup>44</sup>

Tobacco smoking requires combustion (burning). Tobacco smoke contains carbon monoxide, a harmful gas that reduces the oxygen-carrying capacity of the blood. The heart must work harder to ensure that sufficient oxygen is carried to organs, and this increases the risk of heart disease and stroke.<sup>45</sup>

Combustion also produces tar – a sticky brown substance that collects in the lung when tobacco smoke is ingested. Tar contains carcinogens and increases the risk of lung diseases, such as chronic obstructive pulmonary disease.<sup>46</sup>

There are several forms of “smokeless tobacco” – tobacco ingested without the combustion of the tobacco – such as chewing tobacco.<sup>47</sup> There are some suggestions that “smokeless tobacco” is less harmful than smoked tobacco because it does not involve combustion. However, smokeless tobacco is associated with an increased risk of mouth cancer and oesophageal (food pipe) cancer).<sup>48</sup>

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<sup>43</sup> US Food and Drug Administration, [Chemicals in tobacco products and your health](#), 5 January 2020

<sup>44</sup> US Food and Drug Administration, [Chemicals in tobacco products and your health](#), 5 January 2020

<sup>45</sup> Cancer Research UK, [What's in a cigarette?](#), accessed 11 December 2023

<sup>46</sup> Cancer Research UK, [What's in a cigarette?](#), accessed 11 December 2023

<sup>47</sup> For further information, see the NHS webpage on [Paan, bidi and shisha](#)

<sup>48</sup> NHS, [Paan, bidi and shisha](#), accessed 11 December 2023

## Committee on Toxicity of Chemicals in Food, Consumer Products and the Environment (COT) statement on toxicological risks from e-cigarettes

COT was asked by the Department of Health and Social Care, and Public Health England, to review any possible harms to human health that may arise from using nicotine, and non-nicotine, containing e-cigarettes to help people stop smoking.<sup>49</sup>

The Committee published its report in September 2020. It concluded that while there were large evidence gaps within the existing literature, the replacement of conventional cigarette smoking with nicotine e-cigarettes was likely to be associated with a reduction in overall risk of adverse health effects. Its conclusions are set out in Box 2. E(N)NDS, referred to in Box 2, is the collective abbreviation for electronic nicotine delivery systems (ENDS) and electronic non-nicotine delivery systems (ENNDS).

### 3 COT overall conclusions on toxicological risks from e-cigarettes

- The use of E(N)NDS products, produced according to appropriate manufacturing standards and used as recommended, as a replacement for smoking cigarettes, is likely to lead to a reduction in harm to health. The amount by which the risk decreases will depend on the health effect in question.
- People who do not already use tobacco products who take up using E(N)NDS risk some negative health effects to which they would not otherwise have been subject.
- The use of flavouring products in e-liquids is an area of uncertainty, as very little information is available on whether these chemicals can damage human health when heated and inhaled. There is currently no information that this is happening, but this is an important data gap.
- E(N)NDS use leads to some emissions into surrounding air. The risks to bystanders in rooms where vaping takes place appears to be low in most situations, but some effects from exposure to nicotine in the surrounding air may occur, such as increased heart rate.
- Much of the knowledge that is needed to assess the risks related to possible harm to human health from long term use of E(N)NDS is not currently available and can be obtained only from suitable epidemiology studies. This is reflected in the different policies on E(N)NDS across different countries.

<sup>49</sup> Committee on Toxicity of Chemicals in Food, Consumer Products and the Environment (COT), [Statement on the potential toxicological risks from electronic nicotine \(and non-nicotine\) delivery systems \(E\(N\)NDS – e-cigarettes\) \(PDF\)](#). Non-technical summary, July 2020, p1

- Information and science relating to E(N)NDS is changing rapidly and the COT will keep this area under review.

Source: Committee on Toxicity of Chemicals in Food, Consumer Products and the Environment (COT), [Statement on the potential toxicological risks from electronic nicotine \(and non-nicotine\) delivery systems \(E\(N\)NDS – e-cigarettes\) \(PDF\)](#). Non-technical summary, July 2020, p4

### 3.3 Mental health

There is little research exploring whether vaping causes or exacerbates mental health conditions.

Research undertaken by PHE suggests that vaping rates are higher among people with existing mental health conditions. This is thought to be related to the fact that tobacco smoking is more prevalent in those with a history of mental health conditions.<sup>50</sup>

PHE's 2020 evidence review on vaping included a systematic review of vaping among people with mental health conditions. PHE identified 17 studies that reported vaping prevalence in people with mental health conditions. None of the studies were undertaken in the UK. Overall, it found that vaping rates were higher among people with existing mental health conditions:

Overall, rates of current vaping ranged from 3% to 20% among people with mental health conditions in nationally representative population samples. Rates ranged from 0.3% to 21% in representative state-wide or regional survey samples and from 7% to 45% among participants recruited from clinical settings. These high rates of vaping likely reflect the high prevalence of smoking among people with mental health conditions.<sup>51</sup>

### 3.4 E-cigarette or Vaping Use-Associated Lung Injury (EVALI)

In Autumn 2019, the US Centers for Disease Control and Prevention (CDC) began to investigate a national outbreak of "EVALI" (e-cigarette, or vaping, use-associated lung injury). By 18 February 2020, a total of 2,807 cases of hospitalisation or death associated with EVALI had been reported to the CDC

<sup>50</sup> E Taylor and others. [Associations between smoking and vaping prevalence, product use characteristics, and mental health diagnoses in Great Britain: a population survey](#). *BMC Medicine*, 21, 211 (2023).

<sup>51</sup> PHE, [Vaping in England: an evidence update including mental health and pregnancy](#), 4 March 2020

from all 50 US states, with 48 deaths confirmed in 25 states and the District of Columbia.<sup>52</sup>

Investigations into the outbreak indicated that the group of people affected was very specific: 66% of hospitalized EVALI patients were male and 76% were under 35 years old, with a median age of 24 years. In addition, 82% reported using vaping products containing THC (Tetrahydrocannabinol – the principal psychoactive constituent of cannabis) in the three months before their symptoms began. Cases peaked in September 2019 and have shown a steady but continued decline since then.<sup>53</sup>

The CDC's findings suggest that the THC-containing e-cigarettes had often been obtained from "informal sources", including friends, family, "or in-person or online dealers", with the CDC reporting that these informal sources have played "a major role in the outbreak".<sup>54</sup>

It added that Vitamin E acetate is also "strongly linked" to the EVALI outbreak, with Vitamin E acetate found in product samples tested by Food and Drug Administration (FDA) and state laboratories. The CDC has emphasised, however, that the "evidence is not yet sufficient to rule out the contribution of other chemicals of concern".<sup>55</sup>

#### 4 Vitamin E acetate – key facts

- Vitamin E acetate is used as an additive, most notably in THC-containing e-cigarette, or vaping, products.
- Vitamin E is a vitamin found in many foods, including vegetable oils, cereals, meat, fruits, and vegetables. It is also available as a dietary supplement and in many cosmetic products, like skin creams.
- Vitamin E acetate usually does not cause harm when ingested as a vitamin supplement or applied to the skin. However, previous research suggests that when vitamin E acetate is inhaled, it may interfere with normal lung functioning.

Source: CDC, [Outbreak of Lung Injury Associated with the Use of E-Cigarette, or Vaping, Products](#), 3 August 2021

<sup>52</sup> Centres for Disease Control and Prevention, [Outbreak of Lung Injury Associated with the Use of E-Cigarette, or Vaping, Products](#), February 2020

<sup>53</sup> Centres for Disease Control and Prevention, [Outbreak of Lung Injury Associated with the Use of E-Cigarette, or Vaping, Products](#), February 2020

<sup>54</sup> Centres for Disease Control and Prevention, [Outbreak of Lung Injury Associated with the Use of E-Cigarette, or Vaping, Products](#), February 2020

<sup>55</sup> Centres for Disease Control and Prevention, [Outbreak of Lung Injury Associated with the Use of E-Cigarette, or Vaping, Products](#), February 2020

In response to questions about whether a similar outbreak could occur in the UK, John Newton (then PHE's Director of Health Improvement), stated that EVALI was not linked to regulated e-cigarettes:

We need to be clear about what this outbreak is and is not. It is not a problem linked to long-term use of regulated nicotine vaping products. If it were, we would expect to see a very different demographic profile affected, more typical of long term vapers.<sup>56</sup>

He added that e-cigarettes containing nicotine “are more tightly regulated in the UK than in the US” and that the “main chemicals under suspicion in the US such as THC and Vitamin E acetate oil are not permitted in e-cigarettes in this country”.<sup>57</sup> Professor Newton also wrote a letter to *The Lancet*, hypothesising that a “bad batch” of illicit cannabis vaping products may be responsible for the EVALI outbreak in the US.<sup>58</sup>

Following the outbreak, PHE did not change its advice on nicotine-containing e-cigarettes, stating that “smokers should consider switching completely and vapers should stop smoking”.<sup>59</sup> PHE's 2021 evidence update on vaping in England states that since 20 May 2016, the Medicines and Healthcare products Regulatory Agency (MHRA – the UK's medicines regulator) has reported that there have been “3 fatalities [linked to adverse reactions to e-cigarettes], one of which appeared to meet the criteria for the so-called ‘E-cigarette, or Vaping product, use-Associated Lung Injury’, ‘EVALI’”.<sup>60</sup>

## 3.5

## Health implications of youth vaping

### Nicotine

As noted in section 3.1 above, the WHO cautions against the use of ENDS (e-cigarettes) in children and adolescents on the grounds that nicotine exposure at this time can have long-term, detrimental consequences for brain development and function.<sup>61</sup> The US Centers for Disease Control and Prevention states that nicotine can:

[...] harm the parts of the brain that control attention, learning, mood, and impulse control. Each time a new memory is created or a new skill is learned,

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<sup>56</sup> J Newton, [Vaping and lung disease in the US: PHE's advice](#), October 2019. See also the [Letter from Rt Hon Norman Lamb MP](#) (PDF), Chair, Science and Technology Committee, to Professor John Newton, Director of Health Improvement, PHE, 26 September 2019 and [Professor Newton's response](#) (PDF), dated October 2019

<sup>57</sup> J Newton, [Vaping and lung disease in the US: PHE's advice](#), October 2019

<sup>58</sup> J Newton, [Time for The Lancet to realign with the evidence on e-cigarettes?](#) *The Lancet* correspondence, vol 394 16 November 2019, p1804-5

<sup>59</sup> J Newton, [Vaping and lung disease in the US: PHE's advice](#), October 2019

<sup>60</sup> A McNeill and others, [Vaping in England: an evidence update including vaping for smoking cessation](#), February 2021, A report commissioned by Public Health England, p38-9

<sup>61</sup> Conference of the Parties to the WHO Framework Convention on Tobacco Control, [Electronic nicotine delivery systems. Report by WHO \(PDF\)](#), September 2014, para 13



stronger connections – or synapses – are built between brain cells. Young people’s brains build synapses faster than adult brains. Nicotine changes the way these synapses are formed.<sup>62</sup>

Nicotine is also highly addictive and it can be hard for young people to stop using once they have started.<sup>63</sup>

## Mental health

Vaping in young people has been associated with an increased incidence of mental health conditions.

In one systematic review, researchers identified 40 studies examining the prevalence of mental health conditions among adolescents and young adults who use e-cigarettes.<sup>64</sup> They concluded that e-cigarette use in this demographic is associated with greater mental health problems compared with the non-use of e-cigarettes. Researchers identified an association between e-cigarette use and a range of mental health conditions. This included depression, suicidality, disordered eating, attention deficit hyperactivity disorder (ADHD), impulsivity and perceived stress, with additional limited evidence for an association with anxiety.

The researchers cautioned that the long-term evidence linking vaping to mental ill health was limited and said that further research is needed to better understand how ongoing mental illness affects the uptake, use patterns and cessation of e-cigarette use in adolescents and young adults.

It is important to note that this research considered associations between vaping and mental health conditions; it did not seek to determine if vaping caused mental illness.

The researchers suggested that mental health comorbidities “generally parallel those of combustible cigarette use, with a few exceptions”. They noted that “future e-cigarette prevention and treatment strategies may be enhanced by addressing mental health”.

Over 20,000 US students in grades 6 to 12 (equivalent to ages 11 to 17 years) took part in the 2021 National Youth Tobacco Survey, administered by the US Food and Drug Administration and US Centers for Disease Control and Prevention. Among students who reported current use of e-cigarettes, the most cited reason for doing so was “I am feeling anxious, stressed or depressed” (43.4%).<sup>65</sup>

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<sup>62</sup> CDC, [Quick Facts on the Risks of E-cigarettes for Kids, Teens, and Young Adults](#), November 2023

<sup>63</sup> [Vapes | FRANK \(talktofrank.com\)](#), accessed 5 December 2023

<sup>64</sup> Timothy D Becker, Melanie K Arnold, Vicky Ro, Lily Martin, Timothy R Rice, [Systematic Review of Electronic Cigarette Use \(Vaping\) and Mental Health Comorbidity Among Adolescents and Young Adults](#), *Nicotine & Tobacco Research*, Volume 23, Issue 3, March 2021, Pages 415–425

<sup>65</sup> AS Gentzke and others. [Tobacco Product Use and Associated Factors Among Middle and High School Students — National Youth Tobacco Survey, United States, 2021](#). *MMWR Surveill Summ* 2022;71(No. SS-5):1–29, p2

## Aerosol from e-cigarettes

In addition to considering the effects of nicotine on health, researchers have also focused on the aerosol from e-cigarettes, since substances used in e-liquids (which is heated to produce the aerosol) contain respiratory irritants.<sup>66</sup> Substances identified in e-cigarette liquids and aerosols include heavy metals, ultrafine particles, volatile organic compounds and other potentially harmful substances.

A 2018 review of the [Public health consequences of e-cigarettes](#) (PDF) by the US National Academies of Sciences, Engineering, and Medicine found “moderate evidence” of increased “cough and wheeze” symptoms among adolescents who use e-cigarettes as well as an increase in asthma exacerbations.<sup>67</sup>

## Illegal vapes

Trading Standards departments within local authorities are responsible for enforcing consumer protection legislation. Trading standards teams in the North East of England reported seizing over 1.4 tonnes of illicit vapes, over a 6 month period in 2023, that did not comply with UK quality and safety regulations (as set out in the [Tobacco and Related Products Regulations 2016](#)).<sup>68</sup> It is difficult to determine what substances illegal vapes contain and what effect they may have on a person’s health.

The issue of illegal vapes appears to particularly impact children and young people. Kate Pike, from the Chartered Trading Standards Institute, told The Guardian newspaper that “non-compliant vapes were particularly popular with underage consumers – because they were cheap and could be bought in places that were less likely to check ID”.<sup>69</sup>

[A BBC News investigation](#) in May 2023 analysed 18 vapes confiscated from pupils at a secondary school in Worcestershire. It found that “most were illegal and had not gone through any kind of testing before being sold in the UK”. Notably, they contained “high levels of lead, nickel and chromium”.<sup>70</sup>

More information on the enforcement of the Tobacco and Related Products Regulations 2016 is set out in the Commons Library briefing paper on [Advertising, marketing and promotion of vaping products](#).

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<sup>66</sup> A Ratajczak and others. [How close are we to definitively identifying the respiratory health effects of e-cigarettes?](#) Expert Rev Respir Med. 2018 Jul;12(7):549-556.

<sup>67</sup> Committee on the Review of the Health Effects of Electronic Nicotine Delivery Systems, National Academies of Sciences, Engineering, and Medicine, [Public health consequences of e-cigarettes](#) (PDF), 2018, p19

<sup>68</sup> Chartered Trading Standards Institute, [News, 1.4 tonnes of illegal vapes seized by North East Trading Standards teams](#), 14 December 2022

<sup>69</sup> Sarah Marsh, [Millions of illegal vapes seized in UK in three years, data shows | Vaping | The Guardian](#), 23 June 2023

<sup>70</sup> [Vaping: High lead and nickel found in illegal vapes - BBC News](#), 23 May 2023

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## 4 Gateway and renormalisation concerns

There have been longstanding concerns about whether the growing use of e-cigarettes in adults increases their appeal to those aged under 18. There are also concerns about whether e-cigarettes act as a route (or “gateway”) into smoking tobacco cigarettes among young people.

Concerns about “renormalisation” focus on whether the growing prevalence of vaping could reverse a decades-long societal shift away from tobacco smoking. By normalising “smoking in the form of vaping”, it is suggested that conventional tobacco smoking could become socially acceptable once again.

The section below examines the evidence on gateway and renormalisation concerns published between 2010 and 2020. After 2020, and particularly from 2022 onwards, surveys (such as the [ASH Smokefree GB Survey of 11-18 year olds](#)) have shown a significant increase in youth experimentation with e-cigarettes. Since 2021, for example, ASH reported that the proportion of children currently vaping has been greater than those currently smoking (7.6% compared to 3.6% in 2023).

### 4.1 Evidence between 2010 and 2020

#### Research from official UK, US, and EU organisations

Public Health England’s (PHE) 2015 evidence review questioned the idea that e-cigarettes act as a ‘gateway’ to traditional tobacco consumption among young people and non-smokers, stating that:

Cigarette smoking among youth and adults has continued to decline and there is no current evidence in England that [e-cigarettes] are renormalising smoking or increasing smoking uptake. Instead, the evidence reviewed in this report point in the direction of an association between greater uptake of [e-cigarettes] and reduced smoking.<sup>71</sup>

A different picture was presented by the US Surgeon General, Vivek H Murthy, in his 2016 report on ‘E-Cigarettes Use Among Youth and Young Adults’ in the United States. According to the report, e-cigarette use has grown “900% among [US] high school students [between] 2011 [and] 2015”, to the point where they have become the “most commonly used tobacco product among

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<sup>71</sup> A McNeill and others, [E-cigarettes: an evidence update. A report commissioned by Public Health England](#), August 2015, p 7

youth in the United States”.<sup>72</sup> The report also stated that e-cigarette use among young people is “associated with the use of other tobacco products, including conventional cigarettes”.<sup>73</sup>

A report by the European Commission Scientific Committee on Health, Environmental and Emerging Risks (SCHEER), which assessed the available evidence on vaping products published before April 2019, similarly concluded that there was “moderate evidence that electronic cigarettes are a gateway to smoking for young people”. SCHEER added that there was “strong evidence” that nicotine in e-cigarettes can lead to addiction and that flavours available can make them more attractive to young people.<sup>74</sup>

PHE has previously questioned the reporting of similar findings, stating that most of the increase in use of e-cigarettes by young people in the United States “occurred as a result of use by people who already use some form of tobacco product”.<sup>75</sup> More recently, in 2021, PHE drew attention to the SCHEER methodology, noting that it was “not reported in sufficient detail [...] to be able to understand how the evidence summarised had been selected” and that there was “no information on the quality of the studies included”.<sup>76</sup>

PHE’s 2019 evidence update reported that, from 2010 to 2015, “cigarette smoking [had] not been renormalised among 13 and 15 year olds in Great Britain”. It went on to note that this was a period when e-cigarettes were “becoming popular and were relatively unregulated”. It added that further research was planned to assess if this had changed since the implementation of the Tobacco Products Directive in 2016.<sup>77</sup>

In 2018, the Government also committed to “monitoring the evidence annually on the appeal of e-cigarettes to young people” in its [response to the Commons Science and Technology Select Committee’s report](#) on e-cigarettes. It stated that the government would “not hesitate to consider further regulatory action, in the event that the data suggests they [e-cigarettes] are causing an increase in youth nicotine consumption”.<sup>78</sup>

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<sup>72</sup> US Department of Health and Human Services, [E-Cigarette Use Among Youth and Young Adults. A Report of the Surgeon General](#), December 2016, p vii

<sup>73</sup> US Department of Health and Human Services, [E-Cigarette Use Among Youth and Young Adults. A Report of the Surgeon General](#), December 2016, p v

<sup>74</sup> Scientific Committee on Health, Environmental and Emerging Risks, SCHEER, [Opinion on electronic cigarettes](#), 16 April 2021. The SCHEER report was requested by the European Commission. Its purpose was to assist the EC with its reporting obligations under Article 28 of the Tobacco Products Directive and assess the need for any legislative amendments.

<sup>75</sup> J Britton and I Bogdanovica, [Electronic cigarettes. A report commissioned by Public Health England](#), May 2014, p8

<sup>76</sup> A McNeill and others, [Vaping in England: an evidence update including vaping for smoking cessation](#), February 2021, A report commissioned by Public Health England, p35

<sup>77</sup> A McNeill and others, [Vaping in England: an evidence update February 2019 A report commissioned by Public Health England](#), February 2019, 44-45

<sup>78</sup> Department of Health and Social Care, [The Government Response to the Science and Technology Committee’s Seventh Report of the Session 2017-19 on E-cigarettes](#), December 2018, Cm 9738, p3 & p10

## NHS Digital research

Data from 2018, published by NHS Digital in 2019, showed that 6% of secondary school pupils in England (mostly aged 11 to 15) were current e-cigarette users, while a quarter (25%) had used e-cigarettes at least once. Of the 25% who had tried e-cigarettes, 92% of those pupils smoked tobacco cigarettes regularly. E-cigarette use was lower among pupils who had never smoked (1%).<sup>79</sup>

The number of “current” e-cigarette users in this age group appears to be increasing. Data collected between September 2021 and February 2022 by NHS Digital indicated that current e-cigarette use among 11-to-15-year-olds had increased from 6% to 9%.<sup>80</sup> More information about current trends is presented below in section 4.2.

## Academic studies

A study published in 2017 reported that “surveys across the UK show a consistent pattern: most e-cigarette experimentation does not turn into regular use”, adding that regular use was low (at 3% or lower) among 11-to-16-year-olds and largely confined to regular smokers. The study drew on five large-scale surveys conducted between 2015 and 2017 which, cumulatively, collected data from over 60,000 young people aged 11 to 16.<sup>81</sup>

A separate study, published in 2017, found that the sample of UK adolescents studied were more likely to begin smoking (or smoke more) tobacco cigarettes if they had ever used e-cigarettes. It relied on data from 2836 people aged 13 to 14 years in 20 schools in England. The study authors, however, urged caution when interpreting the results. They noted that while:

a causal relationship may be plausible, we cannot confirm this based on our findings and the trends observed over the same time period in the UK; rates of e-cigarette use have increased, but the rates of cigarette use have continued to decline.<sup>82</sup>

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<sup>79</sup> NHS Digital, [Smoking, Drinking and Drug Use Among Young People in England - 2018](#), August 2019..

<sup>80</sup> NHS Digital, [Smoking, Drinking and Drug Use among Young People in England, 2021](#). September 2022

<sup>81</sup> A Bauld and others, [Young People’s Use of E-Cigarettes across the United Kingdom: Findings from Five Surveys 2015–2017](#), *International Journal of Environmental Research and Public Health*, 2017, 14, 973.

<sup>82</sup> M Conner and others, [Do electronic cigarettes increase cigarette smoking in UK adolescents? Evidence from a 12-month prospective study.](#) *Tobacco Control*, 2018; **27**:365-372.

## 4.2

## Developments in youth vaping since 2022

**ASH's Smokefree GB survey**

The [Smokefree GB survey of 11-to-18-year-olds](#) (PDF), undertaken by ASH (a tobacco control charity) in March/April 2023 and involving 2,656 people in this age group, reported:

- In 2023, 20.5% had tried vaping, compared to 15.8% in 2022, 11.3% in 2021 and 13.9% in 2020.
- In 2023, 69% said the most frequently used device was a disposable (single use) vape, up from 52% in 2022 and 7.7% in 2021. The most popular brand was Elf Bar.
- Use of e-cigarettes [among 11-17 year olds] remains largely confined to current or former smokers with 88% of [those who have] never [smoked] never having vaped.
- There is an age gradient both for 'ever' and 'current' vaping. Among 11-15 year olds 15% have ever tried vaping, compared to 34% of 16-17 year olds and 38% of 18 year olds. The figures for current use are 4.6% among those aged 11-15, 15% for 16-17 and 18% for 18-year-olds.<sup>83</sup>

Other results from this survey might seem to support concerns that e-cigarettes could be a gateway to tobacco for young people. Of 2,656 11-to-18-year-olds surveyed in Great Britain, 472 said they had tried an e-cigarette. Of these:

- 22% had tried an e-cigarette before they first tried smoking a conventional cigarette. This figure has shown a steady, general increase since 2014, when it was 9.8%.
- 26% said they tried smoking a conventional cigarette before first trying an e-cigarette. This figure has steadily declined since 2014, when it was 66%.

However, this trend cannot be used to conclude that vaping acts as a gateway to tobacco smoking.

- It is difficult to know which young people would have gone on to try a conventional cigarette, whether e-cigarettes were available to them or not.
- As national tobacco smoking rates decline, it would naturally follow that fewer young people would have tried conventional cigarettes.

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<sup>83</sup> ASH, [Use of e-cigarettes \(vapes\) among young people in Great Britain](#), June 2023 (PDF)

## The International Tobacco Control (ITC) Youth Survey

The 2021 International Tobacco Control Youth Survey, comprising 4,224 people aged 16 to 19 years in England, reported a vaping prevalence in this age group of 9.1% in February 2021, compared with 9.4% in February 2020 and 7.7% in August 2019. Prevalence was defined as “vaping on more than 10 days in their lifetime and having vaped in the past 30 days”.<sup>84</sup>

Noting the “higher vaping prevalence [...] across all age categories”, the authors of a report commissioned by the Office for Health Improvement and Disparities recommended in September 2022 that “enforcement of age of sale regulations for vaping [...] needs to be improved to reduce young people’s access to vaping products”.<sup>85</sup>

## The Khan review: Making smoking obsolete

Similarly, the 2022 [Khan Review: making smoking obsolete](#) recommended that the Government “should do everything they possibly can to prevent children and young people from vaping, including by banning child friendly packaging and descriptions”.<sup>86</sup>

### 5 Khan Review: Young people and vaping

The Secretary of State for Health and Social Care commissioned Dr Javed Khan to undertake an independent review into the Government’s current tobacco control policies and its ambition to make England smokefree by 2030.

The Khan Review was published in June 2022. Five recommendations were made that were specifically aimed at preventing young people, and those who have never smoked, from taking up vaping:

1. Ban cartoon characters or images appealing to young people from vaping products. I see no justification for their use.
2. Review the way flavours are described – or even the flavours themselves – to ensure vapes do not appeal to young people.
3. Prohibit vaping companies from giving away vapes for free. This is a current loophole in our laws.

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<sup>84</sup> [Nicotine vaping in England: an evidence update including health risks and perceptions, 2022](#) (PDF). A report commissioned by the Office for Health Improvement and Disparities, published 29 September 2022, p22

<sup>85</sup> [Nicotine vaping in England: an evidence update including health risks and perceptions, 2022](#) (PDF). A report commissioned by the Office for Health Improvement and Disparities, published 29 September 2022, p25

<sup>86</sup> Dr Javed Khan, [Independent report, Making smoking obsolete: summary](#). Published by the Office for Health Improvement and Disparities, last updated 25 August 2022

4. Make the use (or even the possession) of any age restricted products illegal on school and college premises. They do not belong in schools and colleges.
5. Update the school health education curriculum to talk about the risks of vaping and its age restrictions. This should include guidance on policies associated with cannabis vaping among young people. This can be added to the associated material that teachers use on the risks related to smoking and drinking.<sup>87</sup>

The Government has not issued a formal response to the Khan Review. However, in a [written statement made on 17 April 2023](#), the Government announced “further measures to protect children from the use of vaping products in recognition of the sharp increase in vaping among children in recent years”. The measures included:

- [a youth vaping call for evidence](#) [which] aims to identify opportunities to reduce the number of children accessing and using vapes, exploring issues such as regulatory compliance, the marketing and promotion of vape products and the environmental impact of disposable vapes;
- clamp[ing] down on those businesses who rely on children buying vapes and getting them hooked on nicotine;
- [...] commit[ing] £3 million of new funding to create a specialised “illicit vapes enforcement squad” to enforce the rules on the sale of vapes, tackling illicit vapes and underage sales. This national programme will gather intelligence, coordinate efforts across the country, undertake test purchasing and develop guidance to build regulatory compliance.<sup>88</sup>

On 30 May 2023, the Government announced three additional steps to address youth vaping:

1. Closing the loophole that allows companies to give out free samples of vaping products to under 18s;
2. A review into banning the vaping industry selling ‘nicotine-free’ vapes to under 18s and;
3. A review into the rules on issuing fines to shops selling vapes to under 18s illegally to allow local Trading Standards to issue on-the-spot fines and fixed penalty notices more easily.<sup>89</sup>

In its accompanying press release, the Government linked the increasing numbers of children trying vaping to the “shameful marketing of vaping products to children” and what it described as the “recent surge in the use and promotion of cheap, colourful [vaping] products that businesses are

<sup>87</sup> [The Khan review. Making smoking obsolete. Independent review into smokefree 2030 policies](#). Dr Javed Khan OBE. Published 9 June 2022, p40 (PDF)

<sup>88</sup> [Statement UIN HCWS710](#) [on Achieving Smokefree 2030: cutting smoking and stopping kids vaping], 19 April 2023

<sup>89</sup> Department of Health and Social Care, [No more free vapes for kids](#), 30 May 2023



targeting children”.<sup>90</sup> The Royal College of Paediatrics and Child Health has recommended that the UK Government should:

- transition advertising of vaping products so they are only advertised for their medicinal purpose as a smoking aid rather than a lifestyle product and;
- implement a ban of disposable vapes to reduce their accessibility to young people and harm to the environment.<sup>91</sup>

More information on the marketing and advertising of vapes, particularly to young people, can be found in the Commons Library briefing on [Advertising, marketing and promotion of vaping products](#).

## Public consultations

Two public consultations on youth vaping have since followed in England;

- [Youth vaping: call for evidence \(April 2023\)](#)
- [Creating a smokefree generation and tackling youth vaping: your views \(October 2023\)](#)

For further information on these consultations, see the Commons Library briefing, [Youth vaping in England](#).

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<sup>90</sup> Department of Health and Social Care, [No more free vapes for kids](#), 30 May 2023

<sup>91</sup> [Policy briefing: Vaping in young people | RCPCH](#), last updated 6 June 2023

## 5

## Health and safety of the product

Other health concerns associated with e-cigarettes include:

- physical injuries that have been linked to the quality and safety of the product
- risk of fires
- battery explosions
- ingestion of the e-liquid/poisonings.

The Royal Society for the Prevention of Accidents notes that “poorly made or counterfeit chargers for e-cigarettes have caused house fires” and therefore encourages users to “only buy e-cigarettes from reputable outlets, use the correct charger for the device, follow the manufacturer’s instructions and don’t leave an e-cigarette charging unattended or overnight”.<sup>92</sup> Additional information about the safe use of e-cigarettes is provided by the National Fire Chiefs Council in its 2018 guidance note.<sup>93</sup>

A report commissioned by Public Health England (PHE) concluded in 2015 that there was “a risk of fire from the electrical elements of [e-cigarettes] and a risk of poisoning from ingestion of e-liquids” and that these “risks appear to be comparable to similar electrical goods and potentially poisonous household substances”.<sup>94</sup>

More recently, a report commissioned by PHE’s successor, the Office for Health Improvement and Disparities, concluded in September 2022 that there was “a lack of UK research or published case reports on poisonings, fires and explosions involving vaping products”. It recommended that “information on poisonings, fires and explosions should be monitored and reported routinely in publicly available reports by relevant authoritative bodies”.<sup>95</sup>

Following its review in 2021, the European Commission’s Scientific Committee on Health, Environmental and Emerging Risks (SCHEER) reported that the “overall weight of evidence for risks of poisoning and injuries due to burns and

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<sup>92</sup> ROSPA, [Vaping](#), not dated [accessed on 11 January 2022]

<sup>93</sup> National Fire Chiefs Council, [E-cigarette use in smokefree NHS settings](#), June 2018

<sup>94</sup> A McNeill and others, [E-cigarettes: an evidence update. A report commissioned by Public Health England](#), August 2015, p 84

<sup>95</sup> [Nicotine vaping in England: an evidence update including health risks and perceptions, 2022](#) (PDF). A report commissioned by the Office for Health Improvement and Disparities, published 29 September 2022, p67

explosion [from vaping products], was strong”, though it added that the incidence of such events was “low”.<sup>96</sup>

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<sup>96</sup> Scientific Committee on Health, Environmental and Emerging Risks, SCHEER, [Opinion on electronic cigarettes](#), 16 April 2021, p2

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