

Vaping: a guide for health and social care professionals



NCSCT

Vaping: a guide for health and social care professionals

Authors: Andy McEwen, Hayden McRobbie, Louise Ross & Kirstie Soar

Contributors: Lynne Dawkins, Jamie Hartmann Boyce & Caitlin Notley

Copy editor and proofing: Tom Coleman-Haynes

Reviewers: Jamie Brown, Chris Bullen, Hazel Cheeseman, Nicky Coote, Dave Cross, Martin Dockrell, Peter Hajek, Wayne Hall, Elspeth Henderson, Yvonne Hermon, Sarah Jakes, Catherine Kimber, Joanne Locker, Sophia Papadakis, Julia Robson.

This document has been produced with the support of the Office for Health Improvement and Disparities and with user reviews from the New Nicotine Alliance.

© 2023 National Centre for Smoking Cessation and Training (NCSCT)

Version 3. Date of last modification: November 2023

ISBN 978-1-915481-00-9

Contents

Foreword	4
Introduction	5
Glossary	7
Background	9
Regulation	13
Vaping by adults: who, what and why?	15
Use of vapes during pregnancy	25
Use of vapes among young people	26
Vaping and health	30
Health and social care professionals: recommendations for practice	35
Vape Friendly Services	38
Clinical issues, reports and myths	41
Conclusion	48
Resources	49
References	51
Appendix	54

Foreword

Everyone agrees that we must do more to prevent ill health in the first place – not just treat it afterwards. Cutting smoking is one of the most effective and evidence-based interventions that we can take.

We have already got smoking initiation rates down to record low levels. Yet smoking continues to cause another death in England every 8 minutes. Another hospital admission every minute. Now we must help smokers to quit in larger numbers than ever before.



In October 2023, the Prime Minister unveiled plans to introduce a new law to stop children who turn 14 this year or younger from ever legally being sold cigarettes, in a bid to create the first 'smokefree generation' supported by substantial new funding for stop smoking services and campaigns. He set out the government's concerns about the worrying rise in vaping among children, with youth vaping tripling in the last 3 years and 1 in 5 children having now used a vape. Vaping is rightly used by adults as a tool to quit smoking, but the health advice is clear – if you don't smoke, don't vape and children should never vape.

I am enormously proud of the leadership that England has shown in supporting smokers to quit, first in building the evidence for expert behavioural support and most recently in embracing new opportunities to help smokers quit that puts us firmly on their side as they transform their lives. The National Centre for Smoking Cessation and Training has been at the forefront of this work in England and around the world.

This is especially true on our work on vaping where our policy has two goals – sometimes in tension but never in conflict – to maximise the opportunities to help smokers to quit smoking whilst preventing young people and non-smokers from starting vaping. They are never in conflict because they share the ultimate mission of reducing harm and improving health.

The science shows us that vaping can help smokers to quit, at least as effectively as the other approaches at our disposal. While they are not risk-free, the science also shows that when used for smoking cessation for up to two years, they are no more hazardous than licensed medicines. That is why, in April this year, we announced a world-first, a plan to provide one million smokers in England with a vape to help them quit smoking.

It won't be enough just to hand out vapes indiscriminately. To give smokers the best chance of quitting – and to make informed choices about when to stop vaping – we depend on well-trained, well-informed professionals. That is why I commend this guide to you and why I thank you for the vital lifesaving work you do every day.

Neil O'Brien OBE

Parliamentary Under-Secretary of State for Primary Care and Public Health

Introduction

When the NCSCT published *Electronic cigarettes: a briefing for stop smoking services* in 2014, it was a **world-first review of the literature on use, effectiveness, and safety of e-cigarettes**. The second edition in 2016 provided an update, drawing on a comprehensive independent evidence review published by Public Health England,¹ and giving guidance for stop smoking practitioners and services.

In the last few years there has been a **significant increase in research** on e-cigarettes and evidence reviews have been, and continue to be, regularly published. This briefing is specifically written to **summarise information and address issues relevant to health and social care professionals and to stop smoking practitioners in particular**.

We draw heavily on the 2022 evidence review by King's College London for the Office for Health Improvement and Disparities (OHID),² recent annual surveys by Action on Smoking and Health (ASH)^{3,4} and the University College London (CRUK funded) Smoking Toolkit Study.⁵

The 2022 Cochrane Review that concluded with high certainty that people who smoke are more likely to stop smoking for at least six months using nicotine-containing e-cigarettes compared to nicotine replacement therapy (NRT) is also significant.⁶

Everyone is entitled to their own opinion,
but they are not entitled to their own facts.

The 2021 NICE guidance⁷ identified **nicotine-containing e-cigarettes as a first choice stop smoking aid** and recommended that people who smoke and want to quit should be advised that **nicotine-containing e-cigarettes, when combined with behavioural support, are more likely to result in them successfully stopping smoking**.⁷

This briefing addresses some of the issues that have been raised about the use of e-cigarettes and addresses common misconceptions. In the *Resources* section we link to more comprehensive evidence reviews, plus sources of further information for health and social care professionals, and for those who smoke.

Whilst this briefing is based on the most recent data at the time of publication, this is a dynamic area. The data from this year may not hold next year. Products, user groups and behaviours are changing rapidly. This is especially the case with the rise of single-use products amongst young people who have never smoked.

Time for a change in terminology

The terms *electronic cigarette* or *e-cigarette* have never made much sense, largely because the devices are not cigarettes! Some early devices were designed to resemble cigarettes – but the newer, and more effective, devices do not.

It makes no sense to have a single term when there are so many different devices, each with their own design, technology, and delivery mechanisms – people also differ in how they use these devices.

From now on in this briefing we will refer to **vapes** or **vaping devices**, to the use of these devices as **vaping** and occasionally to people who use these devices as **people who vape**.

"Manufacturers originally used the term electronic cigarette to signal to smokers that this was an alternative to cigarettes. Very few vapers use this term at all, other than when talking to non-vapers, and they use it then because it's the quickest way to explain what the device is to someone unfamiliar with colloquial vaping terminology."

Unfortunately, because the term contains the word cigarette it now seems to carry negative connotations to many of those who are engaged in the battle against smoking and may explain some of the reluctance to accept that vaping is very different to smoking."

Sarah Jakes, a person who vapes and trustee of the New Nicotine Alliance
(an advocacy organisation with no affiliation to industry)

This briefing provides guidance on **how to support those who smoke to switch to vaping, either as a means of stopping smoking or to reduce the harm of continued smoking should they feel currently unable or unwilling to quit**. Abstinence from nicotine is not necessarily a priority, the most urgent priority is to support people to switch away from smoking tobacco.

Further information and guidance on helping people who smoke to switch to vaping is contained in our online training module on the NCSCT website: *Vaping: a guide for healthcare professionals*.

The previous two editions of this briefing were limited by the absence of good quality and reliable studies on the role vaping can play in smoking cessation. This is no longer the case. We now have strong, high-quality research evidence that means that we can be more **confident in the information and advice that we give about vaping to people who smoke**.

ACTION

Share this briefing with your local Integrated Care Board, NHS Trusts and patient groups to widen the availability of trusted information about vaping.

Glossary

Terms used by people who vape will vary according to geography, experience, technical interest, and personal preference. This glossary provides some basic terms and how to understand them which should be useful when communicating with people who vape. It is worth noting that there is a tendency for people to use the terms *vape* or *device* when referring to a complete system, and a *tank* or *pod* when referring to the part that holds the liquid.

Atomiser: a heating coil that converts e-liquid into vapour. People who vape will generally just call atomisers a *coil*. Coils can also come with an in-built temperature control to avoid a *dry hit*.

Cartomiser: a cartridge with an in-built atomiser. Many people who vape regard this technology as dated and obsolete.

Cartridge: a tube usually prefilled with e-liquid which is soaked into a fibrous material.

Clearomiser: tanks which are clear (often with a measuring gauge) which house an atomiser and use wicking to draw up the liquid to the atomiser rather than cotton-fibre that the cartridges/cartomisers use.

Cloud-chasing: creating large volumes of exhaled vapour, and often doing tricks with the vapour. Cloud-chasing is a conscious act and not a by-product of regular vaping.

Cigalikes: early vapes designed to look like cigarettes. See *Device types* table in next section.

Disposables: see *Single-use devices* as they are **not** disposable.

Draw-activated: a device that automatically activates when the user inhales on the mouthpiece. There is no control button and thus closer to the action of smoking a cigarette.

Dry hit: when insufficient liquid gets to the coil, so it becomes hot and dry, leading to an unpleasant burnt taste.

Dual user: a person who engages in both vaping and cigarette smoking.

E-liquid: a solution that typically contains nicotine, propylene glycol and/or vegetable glycerine, and flavours. People who vape generally call it *juice*.

Heating coil: see *Atomiser*.

Heated tobacco products (or heat-not-burn products): electronic devices that, unlike vapes, contain tobacco leaf heated to a high temperature without setting it alight. They are likely to be reduced-risk products but, because these products use tobacco, the extent of the reduced risk is uncertain.

IQOS: see *Heated tobacco products*.

Juice: see *E-liquid*.

Juul: a vaping company based in the US.

Long term ex-smoker: a person that used to smoke but has not smoked for approximately one year or more.

Mod devices: the term *mod* comes from modification. In the early days of vape technology, users who wanted nicotine delivery and more vapour made their own simple devices, often modifying torch tubes. Broadly, there are two types of mod devices: *Regulated mods* (see *Device types* table in next section) and *Mechanical mods*. People who vape will generally use the term *mod* to refer to *Regulated mods*. *Mechanical mods* are homemade devices which most new vape users and health professionals will never encounter as they tend to be for users who like building their own devices.

Mouth to Lung (MTL) and Direct to Lung (DTL): these are terms that people who vape use. MTL is a technique reported by 95% of people who vape. The inhaled vapour is held in the mouth before taking into the lungs. The 5% who report using the DTL technique inhale straight into the lungs, making a big volume of cloud; this allows the user to reduce the nicotine strength as less is needed for the desired effect.

Never smoker: a person who has never regularly smoked tobacco. Never smoker is often defined as a person who has smoked fewer than 100 cigarettes (including roll ups and cannabis joints) in their lifetime.

Nicotine salts (nic salts): a different presentation of nicotine, giving a 'smoother' experience with less throat hit. *Freebase* nicotine found in cigarettes and most e-liquid is achieved by adding ammonia which strips away the protons; this raises the pH and makes it easier to absorb. Nicotine salts (or nic salts), popularised by Juul (a vaping company in the US), have acids, notably benzoic acid, added to increase absorption but reduce pH levels. Nicotine concentrations are typically higher than freebase nicotine, but the available nicotine is not so high when absorbed.

Open systems and Closed systems: *open* systems are a category of devices which contain a refillable tank reservoir and can typically be recharged. *Closed* systems represent a category of devices that are typically single-use, non-rechargeable and non-refillable.

Pods: vapes that use device-specific cartridges usually prefilled with a chosen flavour and nicotine strength. See *Device types* table in next section.

Single-use devices: also known as *Disposables*, they are prefilled with e-liquid, are non-refillable, have non-rechargeable batteries and no replaceable parts. See *Device types* table in next section.

Tank: a fluid-filled reservoir for e-liquid.

Tank systems: those who vape will generally use the term *ego* or *mod* for these devices, depending on the style and design. See *Device types* table in next section.

Vaporiser: generic term for a vape.

Variable voltage devices: regulated mod devices that allow users to adjust the voltage delivered to the atomiser.

Variable wattage devices: regulated mod devices that allow users to adjust the wattage, which in turn sets the voltage accordingly.

ACTION

Practitioners can familiarise themselves with these terms to hold well-informed conversations with smokers about the option of switching. It is likely that new terms and concepts will be learned from discussions with experienced users.

Background

Vapes have been popular with people who smoke for over a decade and **are now the most common stop smoking aid in England**. Whilst there are new vaping devices regularly appearing on the market, we can no longer characterise vaping as *new*.

Vape /veip /

Noun: An electronic vaping device that is hand held and produces for inhalation an aerosol formed by heating an e-liquid using a battery-powered heating coil. <https://tinyurl.com/vape-def>

Verb: To inhale and exhale vapour produced by a device designed for this purpose.

The widespread use of vaping devices in the UK means that most health and social care professionals have some knowledge of vapes. However, it is still useful to restate some of the main characteristics of vapes.

Unlike cigarettes, there is no combustion (burning) involved in vaping and therefore no smoke or other harmful products of combustion, such as tar and carbon monoxide; nor is formaldehyde usually produced during normal use.

Designed to look like a cigarette, the first devices (*cigalikes*, developed around 2005–2007 in China) were quickly followed by other devices with additional technology, improved effectiveness in delivering nicotine and better user experience. We used to speak about first, second and third *generation* devices, implying that earlier generations were replaced by later ones, but all types remain available, and the diverse technology probably means this distinction isn't that helpful.

"I feel so confused by vaping. Just when I think I've got my facts straight something new comes along, like these pods. That's why I'd rather talk about NRT, I'm trained to do that."

Stop smoking practitioner with over 10 years of experience




Healthcare professionals and stop smoking practitioners who don't vape will possibly feel confused about the number and diversity of vapes on the market. **This diversity and choice of devices are factors which make vapes attractive and useful to support smoking cessation, as users choose products that meet their individual and differing needs.**⁸



Whilst there is a variety of devices, the important thing to remember is that all vapes generally consist of the same things: **a heating element or coil** (atomiser) which is powered by **a battery**, and **a tank or pod which contains e-liquid**. The diverse terminology you hear only really refers to differences in size, shape or peripheral controls.

Vaping devices are consumer products and the language and terms used can sometimes be confusing. But as vapes *belong* to users and not health professionals, it is our responsibility to gain an understanding of vaping.

Device types

Cigalikes, Tank devices, Mod devices, Pod systems and Single-use devices differ mainly in terms of appearance, effectiveness in delivering nicotine and in appeal to those who smoke.

Type of device	Characteristics	User experience	Examples
Single-use	Entering the market in 2019 – 2020, these devices could be viewed as an improved version of the original cigalikes. They are non-rechargeable, one-piece devices with no detachable or replaceable parts. They are compact and prefilled with a flavoured e-liquid. They are draw-activated (i.e., there is no button, and the vapour is produced upon a draw through the mouthpiece). They offer approximately 500 puffs and, once empty, they are designed to be disposed of and replaced with a new one.	They are simple to use. They require no filling or practice to use and are relatively cheap. People who smoke but are not ready to commit to vaping may experiment with them. They are much cheaper and are particularly popular with younger adults. The effectiveness of nicotine delivery is yet to be established, although reports from users are favourable.	
Cigalike	Most cigalikes are either single-use or have a replaceable cartomiser that is typically prefilled. When the user takes a puff (or presses a button on some models) the cartomiser is activated, creating the vapour. Some models have a light on the end of the device that glows when a puff is taken.	For many people who smoke, cigalikes are their first experience of vaping, but they tend to deliver small amounts of nicotine and most people who currently smoke or used to smoke and now vape prefer other devices.	
Pod	Pod systems are simple, discrete, and compact. These devices use pods (small refills of e-liquid) made specifically for the device, often using nicotine salts. Most of these pods come prefilled with a chosen flavour, although some newer models have refillable pods that allow a choice of flavour.	A step above a basic cigalike, but not as advanced as some of the larger full-sized mod vaporisers. Due to their smaller battery and the limit on nicotine content, delivery of nicotine is currently not comparable to the more sophisticated devices with higher powered batteries such as the tank systems and mod devices.	

Type of device	Characteristics	User experience	Examples
Tank	Typically the size of a mascara or fountain pen, they have more powerful batteries than single-use devices. The battery is linked to the atomiser and a <i>tank</i> that the user fills with their choice of e-liquid. These devices can often be used with an interchangeable range of atomisers, cartomisers or clearomisers and the atomiser is typically activated upon a button press.	The user can choose their own flavour and strength of e-liquid. With repeated use, experienced users can obtain blood nicotine levels comparable to that achieved from cigarettes.	
Regulated Mods	These devices still use a tank, but generally have much larger batteries. Regulated Mods contain a chip that controls the power being delivered to the atomiser which prevents the device from short-circuiting. Many devices allow the user to adjust the voltage or wattage applied to the coil and some offer temperature control as well. Some mods come with puff counters or downloadable software that allow users to program their own voltage and wattage level, and to monitor their patterns of use. Sub-ohm devices are a further development in which the atomisers have a resistance of less than one ohm, resulting in more power being delivered to the coil.	Regulated Mods come in a variety of shapes and sizes (from simple pen-style to larger box-shaped devices) and are designed to allow modifications and substitution of individual components according to user preference. They allow for more control over nicotine delivery.	

E-liquid

E-liquid is made up of: Propylene Glycol (PG), Vegetable Glycerine (VG), flavourings, and nicotine.

All the ingredients of an e-liquid are listed on the bottle of regulated products. E-liquids are available in two presentations: freebase and nicotine salts. Nicotine salts have a lower pH level than freebase e-liquids, which allows for higher nicotine concentrations and a smoother *throat hit*.

E-liquid is available without nicotine, **but it makes sense for people who smoke to choose an e-liquid that contains nicotine to relieve or avoid nicotine withdrawal symptoms and urges to smoke.**

The maximum permitted strength of nicotine in e-liquid in the UK is 20 mg of nicotine per ml of liquid (20 mg/ml; 2%). The most common strengths are >0 mg, 3 mg, 6 mg, 12 mg and 18 mg, with <6 mg/ml the most widely used.⁹

Propylene Glycol (PG) is an alcohol and not a lipid. It has a slightly sweet taste and no real odour. PG carries flavour and produces a *throat hit*. It produces less visible vapour than Vegetable Glycerine. PG is used in pharmaceutical nicotine replacement therapies, namely some formulations of mouth spray.

Vegetable Glycerine (VG) is an alcohol like PG. It is colourless, has no smell and a sweet taste. It is a thick and viscous liquid, and it is this which produces the clouds of vapour. Some e-liquids high in VG add aqueous glycerine to make the liquid thin enough to use in older vaping devices.

The ratio of VG to PG is commonly indicated as VG/PG. Liquids with a lot of VG (e.g., 80VG/20PG) produce lots of dense vapour, but not a lot of *throat hit*. The opposite is true when the balance shifts towards PG (e.g., 50VG/50PG). The best ratio and strength for new users may take some time to get right. Some people like the *throat hit* of a high PG e-liquid, while others may prefer the smoother experience of a higher VG. Nicotine salts can be a good starter e-liquid for new users, as they are both effective and smooth. Both VG and PG are considered safe to inhale.

Flavours

E-liquid does not have much taste on its own, so it is **flavoured with food-grade additives**. It is fair to say that there is an endlessly wide range of flavours of e-liquid to choose from. The most popular flavour category among adults who have tried and are still using vapes is fruit flavours, followed by menthol flavours³ and they are perhaps one of the reasons why vaping is such an attractive alternative to smoking. It is probably worth noting that the **sweet flavours are derived from sweeteners, not actual sugar, so do not pose a threat to oral health or people with diabetes.**

E-liquid flavour is a personal choice and **one of the advantages of vaping is that people can experiment and try new flavours.** To complement anecdotal evidence, there is emerging preliminary research evidence that flavour switching occurs and that fruit and other sweet-flavoured e-liquids are positively related to people who smoke transitioning away from cigarettes.¹⁰ Nevertheless, many people do choose one flavour and stick with it.

ACTION

To become more confident when discussing vapes, take the time to ask questions of vape users about their experience of vaping and the devices they use. Consider going to a local vape shop and asking about the different types of devices and e-liquid that they stock.

Regulation

Vapes sold in the UK have never been unregulated. They were covered by general product safety legislation up until 2016, and in May 2016 the **Tobacco and Related Products Regulations 2016** came into force, implementing the revised EU Tobacco Products Directive in the UK.

Under these regulations, vaping devices can be licensed as medicines by the Medicines and Healthcare products Regulatory Agency (MHRA). At present there is no medicinally licensed vaping device commercially available in the UK. Such products, once available, would be able to be advertised and to make health claims.

If not medically licensed, vapes and e-liquids are subject to quality and safety standards, packaging and labelling requirements, and restrictions on advertising. The regulations include specification of ingredients, limits on nicotine concentration and on the size of tanks and refills, and child- and tamper-proof containers. See Appendix 1 for a summary of the regulations governing vapes and e-liquids.

Since 1 October 2015, the sale of nicotine vaping products to under-18s in England and Wales has been prohibited. It is also an offence, subject to a fixed penalty, for an adult to purchase nicotine vaping products for someone under the age of 18. However, current regulation on vapes is likely to change and we should be mindful of any implications this may have.

ACTION

Reassure people switching from smoking to vaping that UK regulations ensure standards of safety and quality and advise them to only purchase from recognised and reputable retailers. For guidance on reputable retailers see our resource [Working with vape shops](http://www.ncsct.co.uk/publication_working_with_vape_shops.php):
www.ncsct.co.uk/publication_working_with_vape_shops.php

ACTION

Any breaches of regulations should be reported to your local Trading Standards department.

Environmental impact of vaping

Taken in isolation, most vapes aren't particularly environmentally friendly because of the production process and the components needed, such as lithium batteries, plastic, metals and cardboard packaging (single-use devices are particularly unfriendly to the environment). However, in comparison with smoking they are more favourable because most users do not vape long-term and because of the huge environmental impact of smoking.

To reduce their negative impact upon the environment vapes can be recycled/disposed of as small electrical devices and responsible behaviour should be strongly encouraged.

Tobacco Industry and vaping

The World Health Organization (WHO) Framework Convention on Tobacco Control (FCTC)¹¹ is a global health treaty designed to help countries work to eliminate the harm caused by tobacco. The UK is a Party to the FCTC.

FCTC Article 5.3 is intended to protect public health policy from the influence of the tobacco industry: *"In setting and implementing their public health policies with respect to tobacco control, Parties shall act to protect these policies from commercial and other vested interests of the tobacco industry in accordance with national law."*

Some vapes are manufactured and marketed by the tobacco industry. However, there are many independent (non-tobacco industry) sector vaping products to choose from. In the UK the largest share of the market is independent vape manufacturers.

Article 5.3 **does not mean that you cannot support people who want to use tobacco industry products.** It does mean that you should **avoid contact with the manufacturers and marketers of these products** to avoid any possible influence in health policy and practice; the tobacco industry has a long and inglorious history of seeking to influence policy-making in its favour!

For further information please see: <https://tinyurl.com/government-engagement>

Vaping by adults: who, what and why?

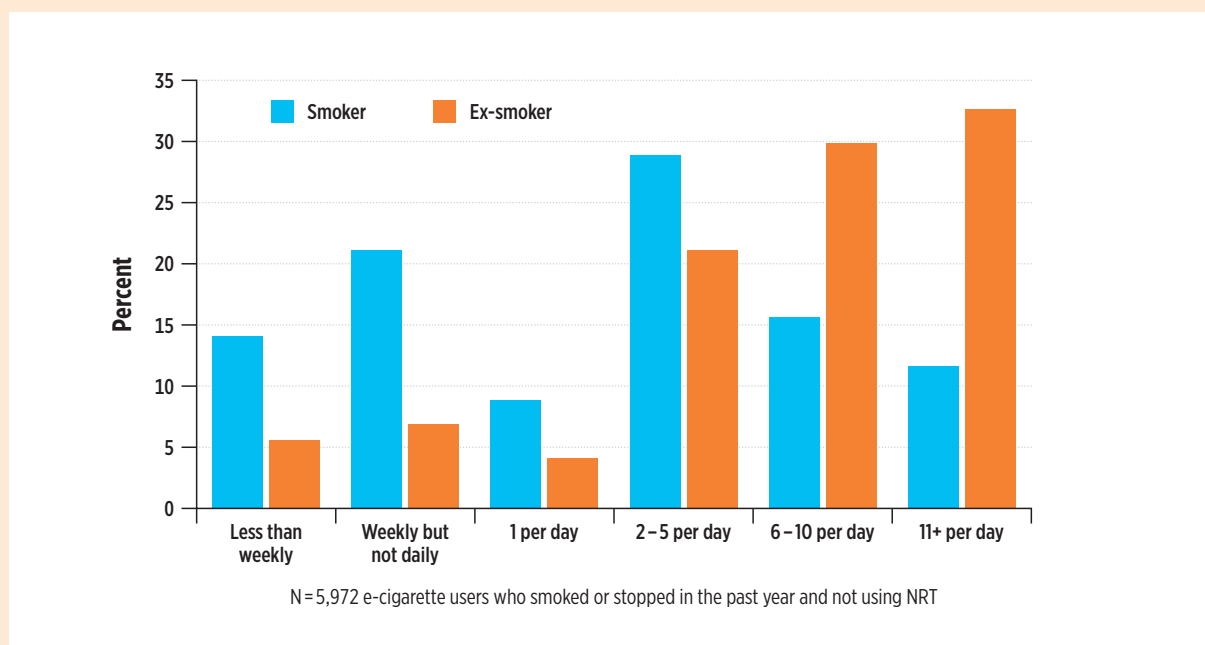
This isn't an easy question to answer as vaping is reported both by people who currently smoke and those who no longer smoke (ex-smokers), and surveys of those who vape often have different definitions of what constitutes *regular vaping*.

Patterns and prevalence of vaping

The Action on Smoking and Health (ASH) survey published in 2023 estimated that 9.1% of the adult population (about 4.8 million people) in Great Britain vape.³ Over half of people who currently vape (56%) were no longer smoking, while the proportion of people who vape who also smoke (dual users) was 37%. Only 1.1% of adults who had never smoked were currently vaping (amounting to 6.7% of people who vape).³

We can see from Figure 1 that the frequency of vaping varies. In 2023 frequency of use among vapers was greatest in those who no longer smoke.⁵

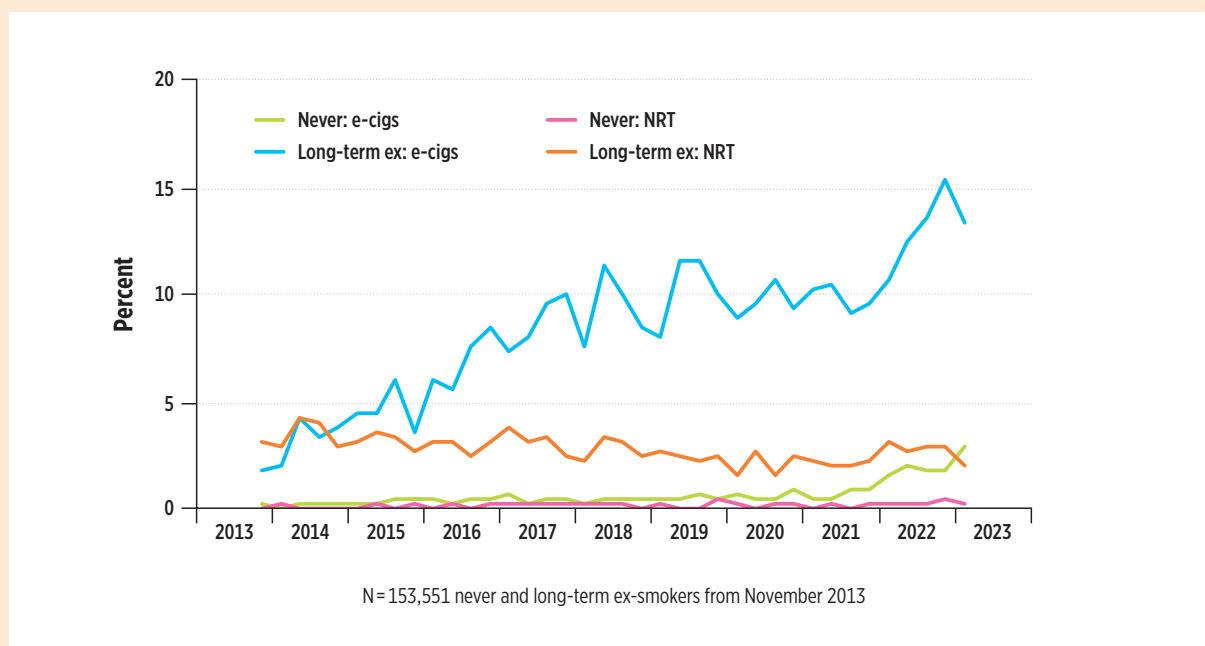
Figure 1: Reported frequency of vaping in England (2023)⁵



In 2023 there was no clear social gradient, or significant difference between men and women, in vaping in England.⁵ The Smoking Toolkit Study did show that vaping was less popular with older people who smoke than among younger people who smoke.⁵

Figure 2 (overleaf), from the Smoking Toolkit Study, shows that vaping and use of nicotine replacement therapy (NRT) by never smokers was very low between 2013 and 2021. Use by never smokers increased since 2021 but remains relatively uncommon (~3%).¹²

Figure 2: Nicotine use by never smokers and long-term ex-smokers (2013–2023)⁵



Figures 3 and 4 (overleaf) show that vaping by people who have recently stopped smoking has declined from a peak in 2016 (Figure 3) but has increased in the past few years. Among those who smoke, vape use plateaued between 2013 and 2020 but has grown since then (Figure 4). In both those who have recently stopped smoking and those currently smoking, the use of vapes remains higher than use of NRT, suggesting a preference for vapes.⁵

Figure 3: Use of nicotine products in people who have recently stopped smoking (2011–2022)⁵

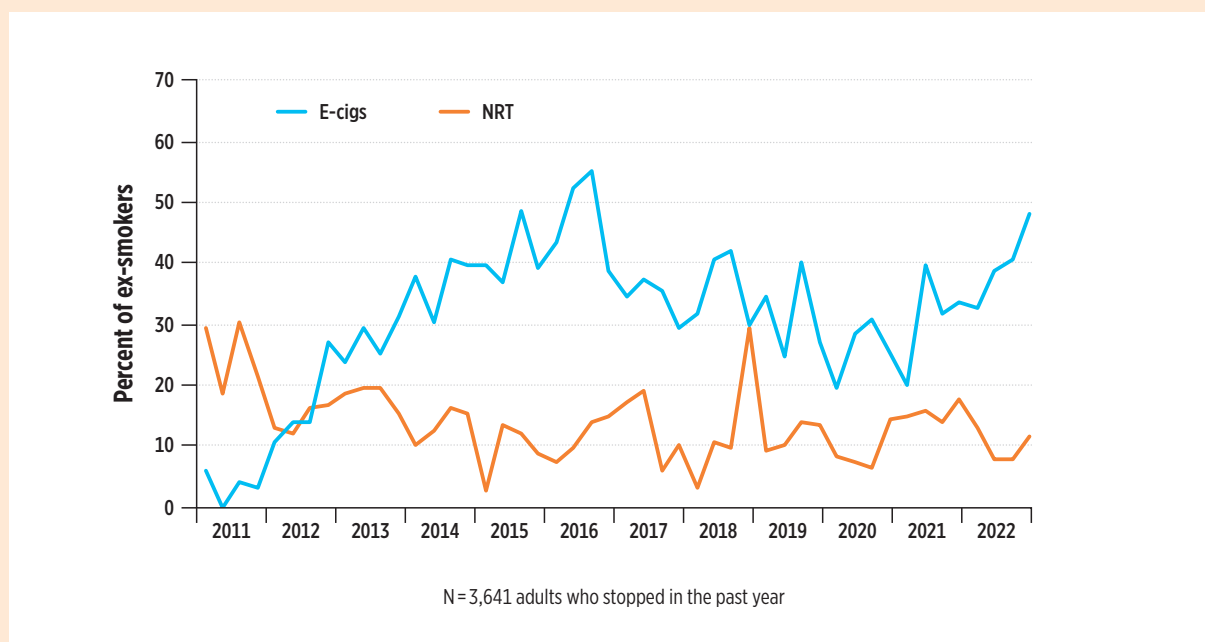
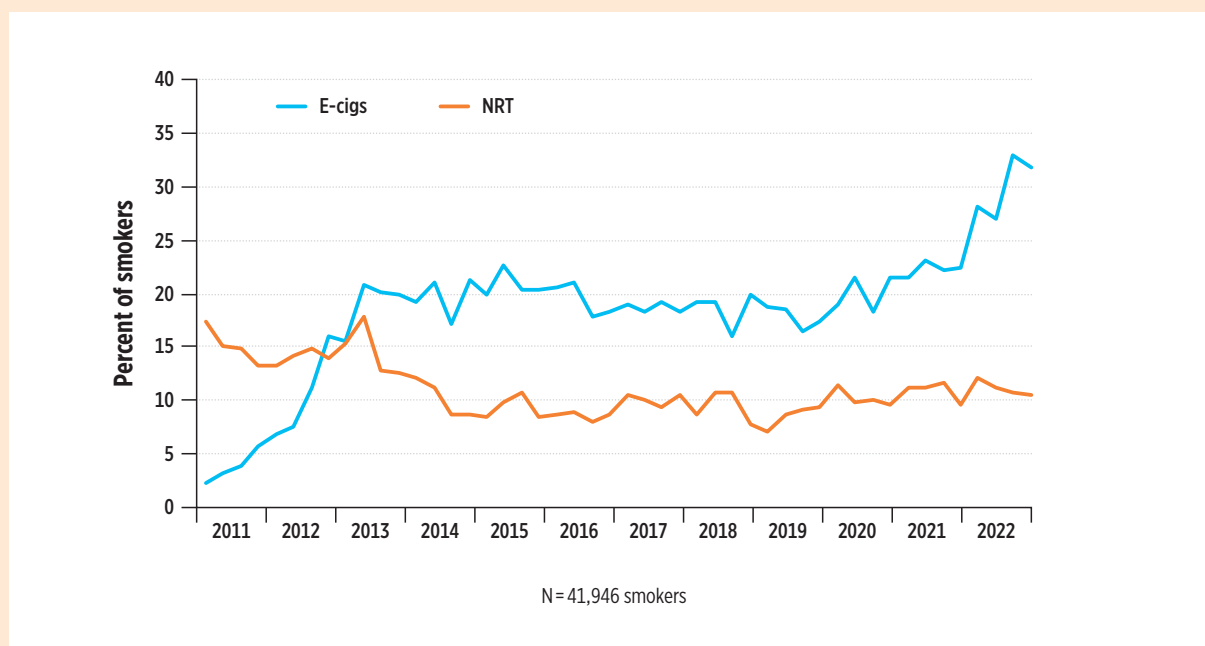


Figure 4: Use of nicotine in people who smoke (2011–2022)⁵

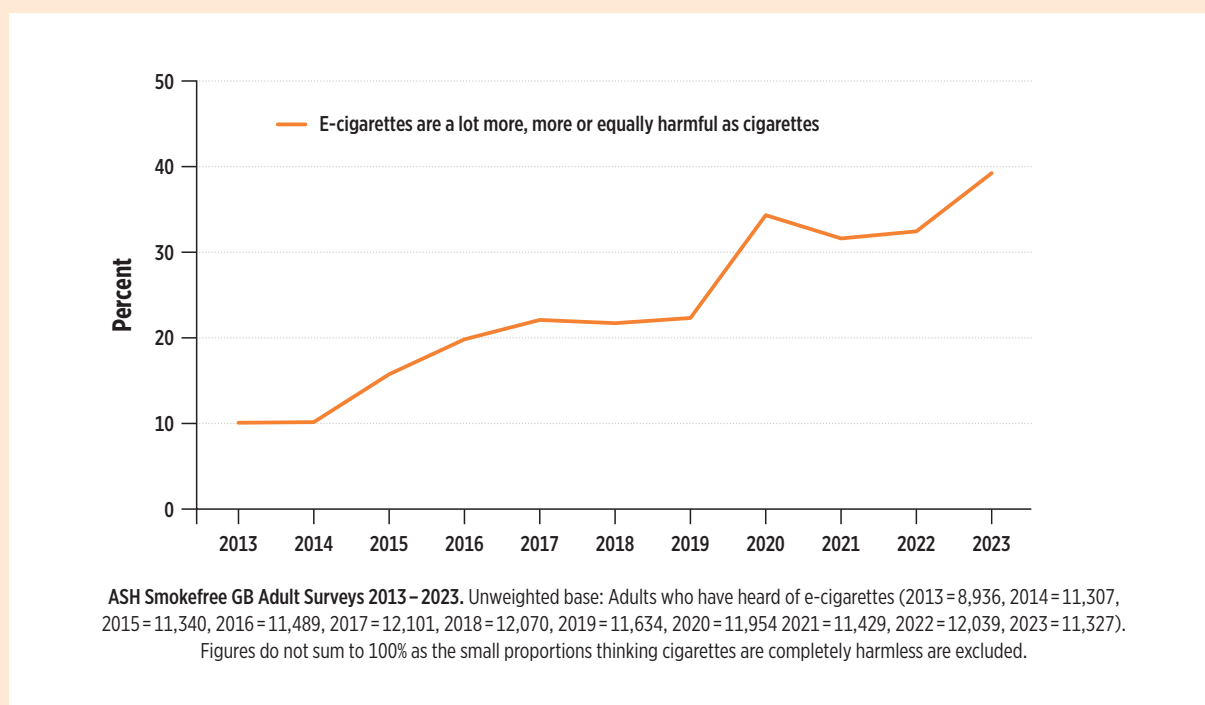


Overall, vaping by the adult population in England remained relatively stable between 2013 and 2020 but has increased gradually since 2020, especially among young adults.

Perception of harm from vaping

The proportion of people who smoke incorrectly believing vaping is more or equally harmful as smoking increased dramatically from 2014 to 2023 and constitutes over a third of people who smoke (39%) (see Figure 5).

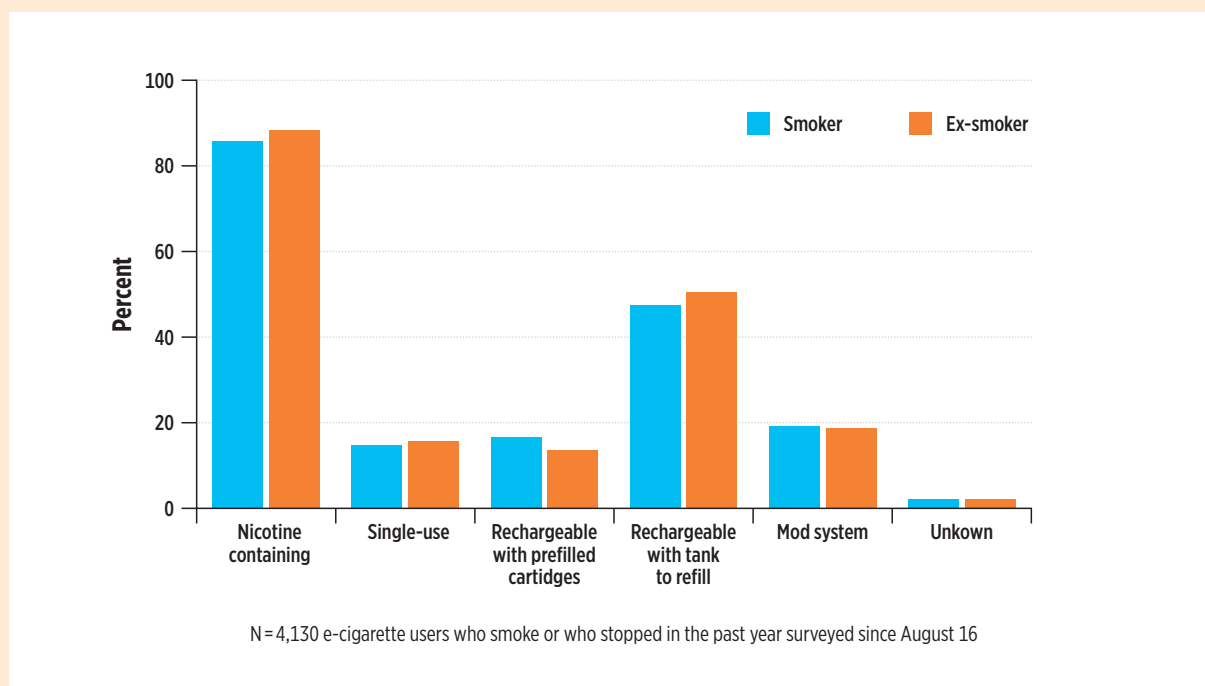
Figure 5: Perceptions of harm from vapes from people who currently smoke (2014–2023)³



Vaping devices used

As Figure 6 shows, tank devices are still the most popular amongst both current and ex-smokers.⁵ However, there has been a rapid rise in single-use vapes since 2020; taken together these account for nearly 50% of all vapes used in 2022.

Figure 6: Type of vape used (2023)⁵

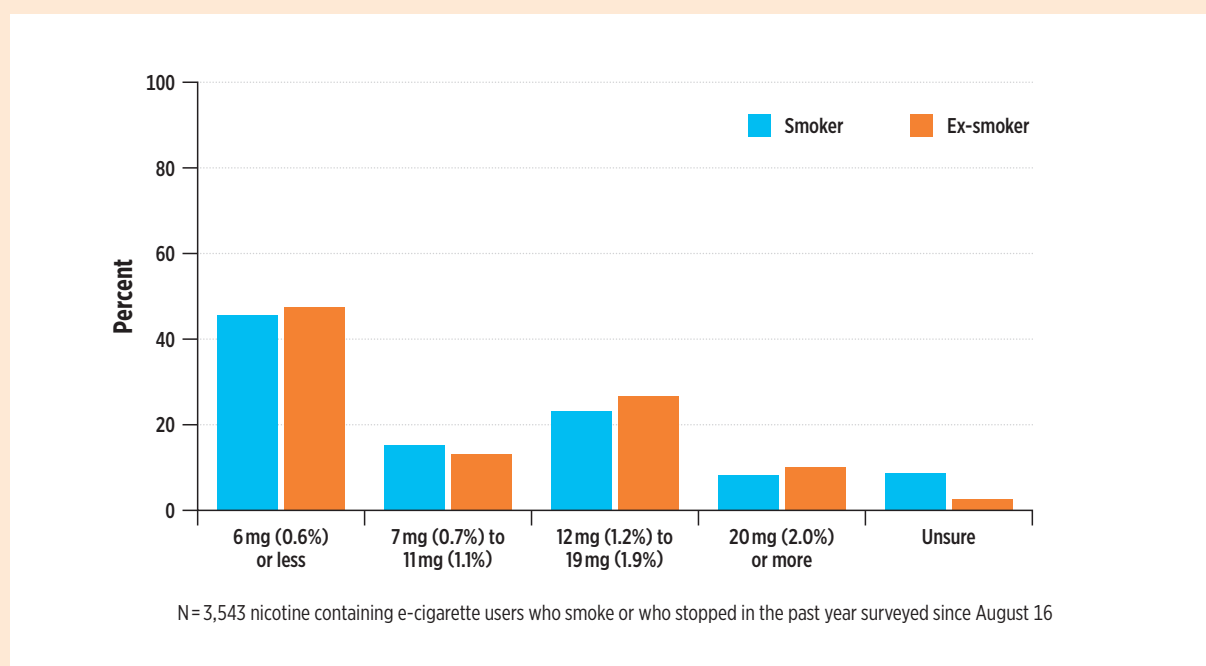


The Smoking Toolkit Study⁵ reports that the **majority** of users who smoke (39%), or who have recently stopped smoking (40%) who vape, **purchase their devices from a specialist vape shop**. This has declined since 2018 with the rise in purchases from non-specialist shops. The next most popular source of vaping devices is a supermarket (16% for both users who smoke or have recently stopped smoking), followed by newsagents (15% of those who have recently stopped smoking and 16% of those who smoke) and online vape shops (15% of those who have recently stopped smoking and 13% of those who smoke). Other sources used to purchase vapes (by less than 7% of vape users who have smoked or continue to smoke) include other online retailers, petrol stations and friends.

Nicotine strength of e-liquid

Most people who continue to smoke, and those that have stopped smoking, use devices containing nicotine (Figure 6). The most popular nicotine strength, used by both those who smoke and those who have stopped smoking, is 6mg/ml or less. Those who have stopped smoking tend to use e-liquids with stronger concentrations of nicotine (see Figure 7). The use of 20mg/ml nicotine and stronger has increased significantly since 2016 in both those who smoke and those who have stopped smoking.⁵ This is likely due to the increase in popularity of single-use devices amongst young people (see later section on Children and Young people, page 26) that typically come with 20mg/ml of nicotine due to the lower powered batteries used in these types of products.

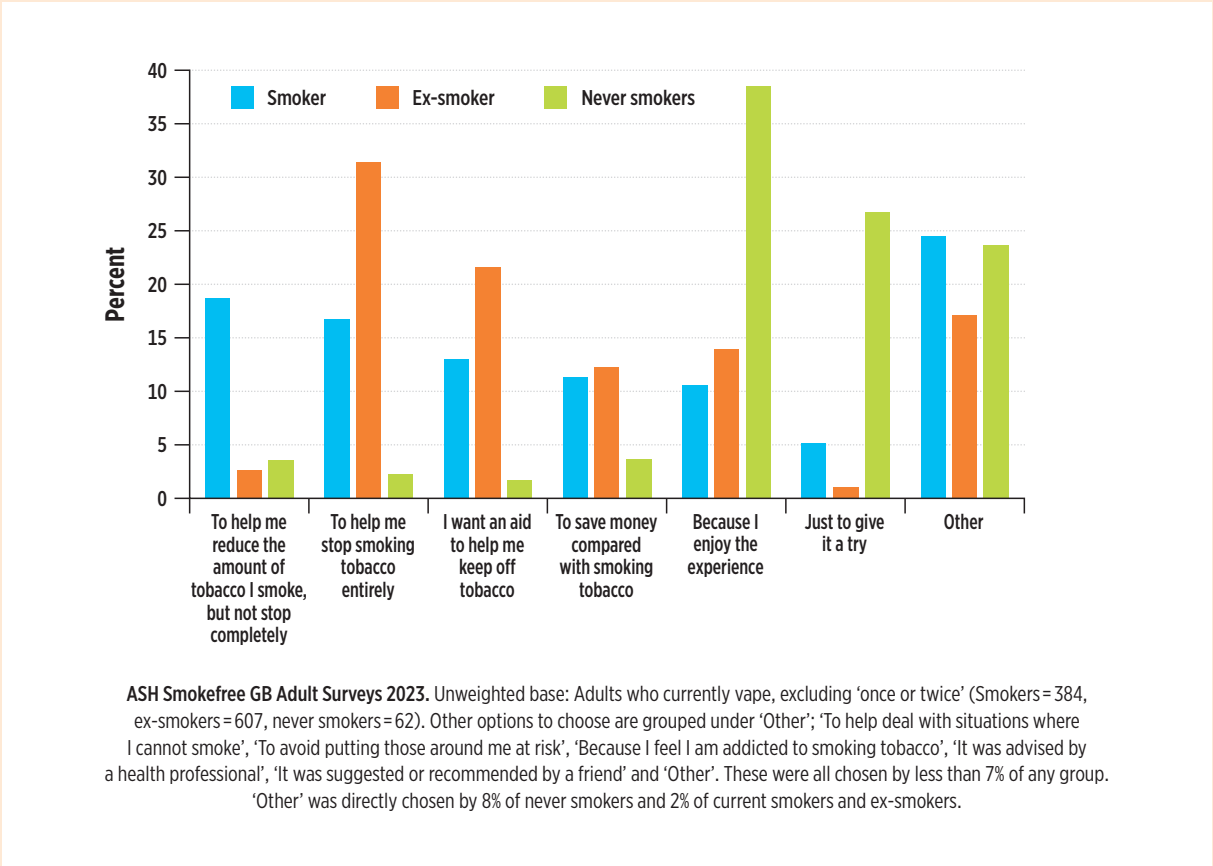
Figure 7: Nicotine strength of e-liquid used (2023)⁵



Reasons for vaping

Figure 8 reveals that over half of those who have recently stopped smoking vape to help them quit smoking and to keep them from returning to smoking (preventing relapse).³ Amongst people who currently smoke and who also vape (dual users), 19% say that it is to help them cut down the amount that they smoke, 17% to help them quit smoking and 13% to keep them off tobacco. Saving money and enjoyment also feature as reasons for vaping among people who smoke and those who have recently stopped smoking.³

Figure 8: Main reasons for vaping (2023)³



Vaping to quit smoking

Among all people who vape, the two main reasons for vaping are to quit smoking (22%) followed by preventing relapse (16%).

As part of an abrupt quit attempt, vapes provide nicotine to replace some of the nicotine previously obtained by smoking cigarettes – exactly like NRT.

Until relatively recently, research into the effectiveness of vapes within local stop smoking services was lacking. In 2019 the first RCT was conducted which examined whether clients attending stop smoking services would benefit from using vapes as a quit aid. Eight hundred and eighty-eight smokers attending local stop smoking services in London, Leicester, and East Sussex were recruited.¹³

Smokers who were open to using either a vape or NRT were randomly allocated to receive NRT of their choice, including combination NRT (N=447), or a vaping starter pack consisting of a refillable device and one bottle of e-liquid, with guidance on how to purchase further supplies (N=439). All participants also received a standard weekly behavioural support programme. The study found that:

- Vapes were more effective than combination NRT.
- One year sustained quit rates verified by carbon monoxide (CO) readings were 18% in the vape group and 10% in the NRT group. When participants who quit smoking using non-allocated products were excluded (i.e., participants in the NRT group who used a vape and vice versa), the quit rates were 18% vs 8%.
- Participants who had quit smoking in the vape group were more likely to still be using their product at one year than those in the NRT group (80% vs 9%).
- Vape users experienced fewer urges to smoke and less withdrawal discomfort.
- Among smokers who did not manage to stop smoking, those in the vape group reduced their cigarette consumption by $\geq 50\%$, significantly more than those in the NRT arm.
- People who quit smoking using vapes had a greater reduction in coughs and phlegm production than those who quit with NRT.
- In this study, as vapes were more effective and less costly than NRT, they were also more cost-effective.¹⁴

This evidence supports the recent Cochrane Reviews^{6,15} that found the strongest evidence yet that vapes help people to quit smoking more effectively than traditional NRT such as patches and gum.

According to returns submitted to NHS Digital by stop smoking services in 2022–23, vapes ('unlicensed nicotine containing products') were used in 14% of quit attempts.¹⁶ This includes instances where unlicensed nicotine-containing products were used in addition to NRT. Of those who used vapes and no other stop smoking aid, 59% were self-reported quits at four weeks compared with 54% who used only NRT. This real-world setting might involve bias (e.g., those using vapes were less dependent and thus more likely to quit, or the opposite to this), but does provide evidence for the popularity and effectiveness of vapes.

Vaping to cut down the amount of tobacco smoked

People who smoke are used to certain regular doses of nicotine¹⁷ and, when they reduce the number of cigarettes that they smoke, they maintain these doses unconsciously by taking more and deeper puffs, holding smoke in the lungs longer and smoking more of the cigarette.¹⁸ Similar levels of nicotine are achieved,¹⁹ but this also means similar levels of carbon monoxide, tar and other toxicants. This is known as **compensatory smoking** and means that **cutting down the number of cigarettes smoked does not convey health benefits**.²⁰

However, **there are health benefits when the smoking reduction is accompanied by use of pharmacotherapy** such as NRT.²¹ This may be the case for people who smoke who use vaping to cut down the amount that they smoke.²² A Cochrane Review assessing biomarkers of potential harm across several measures found switching to dual use significantly reduces levels of biomarkers of potential harm relative to only smoking.²³

Vaping for temporary abstinence from cigarettes

Even short periods of abstinence from smoking (1–2 hours) can result in people who smoke experiencing strong urges to smoke and withdrawal symptoms (e.g., irritability and poor concentration). Using nicotine-containing vapes will help reduce these unpleasant feelings.

There are probably no health benefits of vaping for temporary abstinence, but it may be a step towards quitting smoking tobacco.

Quitting vaping

Following successful quitting with the use of a vape, some people may want to look at stopping vaping. Many people who vape find that they get to this stage after about 12 months and NHS Better Health provides some guidance for them on how to do this:

www.nhs.uk/better-health/quit-smoking/vaping-to-quit-smoking

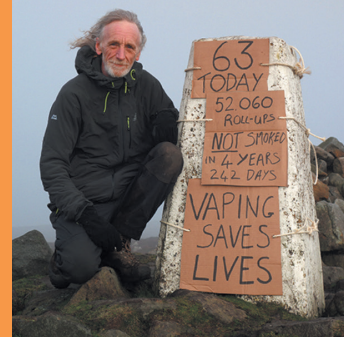
Smoking, quitting and vaping in disadvantaged populations

- **Smoking is far more common among people with lower incomes.** The more disadvantaged someone is, the more they are likely to smoke²⁴ and to suffer from smoking-related disease and premature death.²⁵
- Smoking-related health inequalities are not restricted to people on lower incomes. The poorer health of people in some areas of the country is in part due to higher rates of smoking. **Smoking rates are also higher among people with poor mental health, those in the criminal justice system, people with alcohol and substance use issues, looked-after children, the lesbian, gay, bisexual, transgender, queer and questioning community (LGBTQ+), people living in social housing²⁶ and those experiencing homelessness.^{27–28}**
- People in disadvantaged groups **want to stop smoking but are less likely to be successful,**²⁹ possibly because they are more tobacco dependent,²⁴ live in households where smoking is *normal* and because they have access to relatively cheap tobacco.
- Switching from smoking to vaping can be daunting for people who smoke who have little disposable income. **Stop smoking services offering free vaping starter kits have seen enthusiastic uptake by those who smoke from disadvantaged groups.**³⁰ It is likely that the cost of continued vaping is around one third of the cost of continued smoking.³¹
- Some people from disadvantaged groups can **take time to switch fully to vaping** and may both smoke and vape for a while; **they should be encouraged to switch completely**, with an explanation that it is **not nicotine that causes harm**.
- Some people from disadvantaged groups **may vape for temporary abstinence** (e.g., at work, or while in a mental health inpatient setting) before deciding to switch completely.
- **It is important that people from disadvantaged groups receive a clear and definite message that vaping is much less harmful than smoking.**

A vaper's story: away from the facts and figures

Chris Baxter, a former smoker and now vaper

"By my fifties I had given up trying to quit – I was a smoker and that was it. My health was suffering, I had an awful hacking cough, and I would have been in trouble if I'd needed a general anaesthetic: it would have been refused! Just eleven months after switching, I completed the Swaledale Marathon: 24 miles of moorland tracks and bogs, with 4,000 feet of ascent. I feel like I've been given a second chance, and I owe it all to vaping."



ACTION

Practitioners should attempt to embrace the diversity of individual intentions and behaviour in relation to vaping, including quitting smoking, harm reduction from continued smoking and temporary abstinence from smoking.

Use of vapes during pregnancy

Smoking when pregnant adversely affects the pregnancy and fetal development in a range of ways. For example, carbon monoxide in tobacco smoke restricts oxygen supply to the fetus, directly contributing to poor birth outcomes.

Reducing smoking rates in those who are pregnant is a government and NHS priority.³² However, prevalence has yet to fall dramatically and in 2022 – 23 it was 8.8%.³³ **Rates of smoking are higher among poorer, younger parents, often having chaotic complex lifestyles and living in challenging circumstances.**³⁴

Those who are pregnant and smoke suffer more stigma than those who aren't pregnant and smoke. Some may vape to help them quit smoking but may also be stigmatised for this and try to conceal it.³⁵ Possibly because of this stigmatisation, it is difficult to get accurate data on the prevalence and patterns of vaping amongst people who are pregnant.³⁶ **The limited data that is available suggests that one in 20 people who are pregnant report vaping and, in most cases, they also smoke** (dual use).³⁷

A large research trial published in 2022 reported that **vapes were more effective than nicotine patches in those who were pregnant and smoked.** Participants allocated to vapes were less likely to have babies with low birthweight (<2,500g), most likely because they smoked less.³⁸

If a person is pregnant and is smoking and vaping, they should be advised to switch completely to vaping.

Some people who are pregnant and smoke, or who used to smoke, may already be vaping and may be concerned about the risks to the baby. We consider vaping and health in relation to parent and baby on page 32 and make recommendations for maternity services on page 37.

Use of vapes among young people

According to the 2023 ASH-Y survey, well **over three quarters of 11–17-year-olds in Great Britain had never tried or were unaware of vapes (79%) but the proportion that have tried a vape has grown from 11.2% (in 2021) to 20.5% (in 2023).**⁴ Of these adolescents that reported having tried a vape, **the majority had only vaped once or twice (11.6%) and 7.6% reported that they are currently vaping.**

In this survey the researchers make a clear distinction between levels of vape use: experimentation (tried vaping once or twice) and current use, which is further distinguished between vaping less than once a week and more than once a week – not all research makes this important distinction.

Of the 7.6% of 11–17-year-olds reported to be currently vaping in 2023, 3.9% reported vaping less than once a week, and 3.6% reported vaping more than once a week.⁴

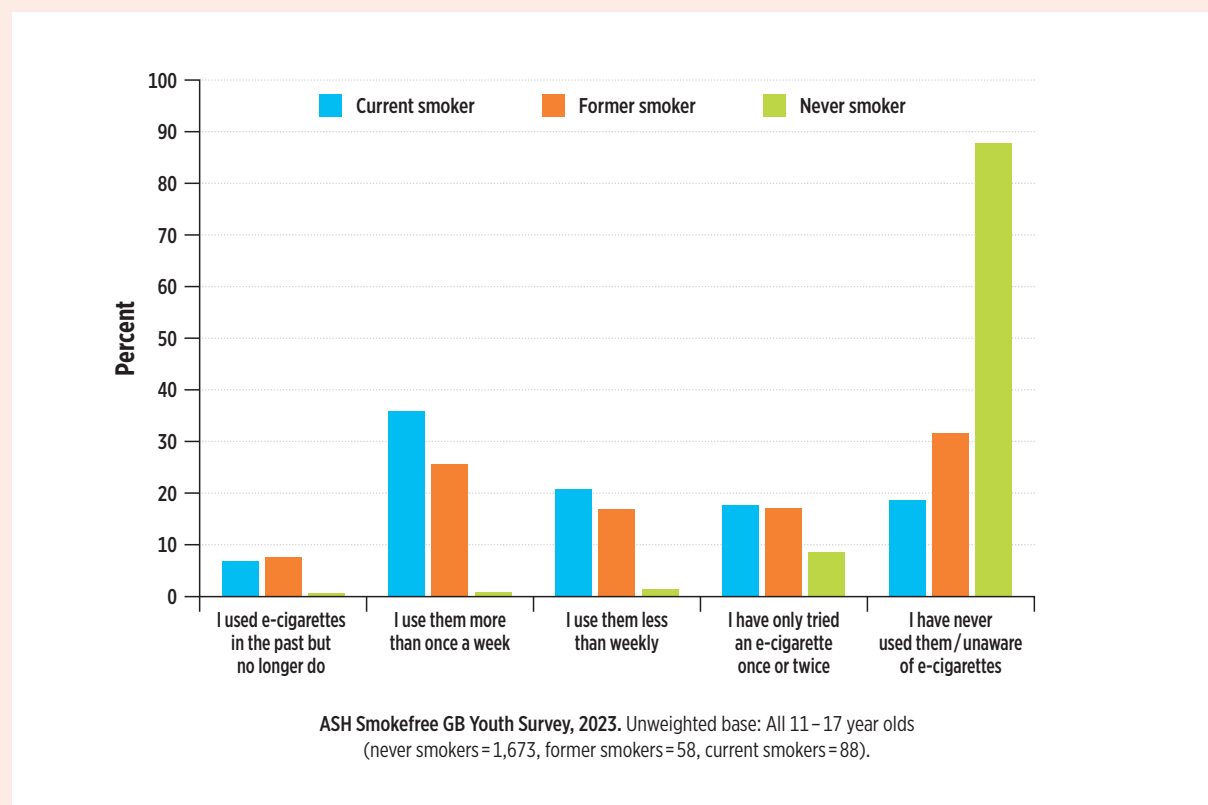
The growth in adolescent vaping is being driven mainly by experimental use (trying once or twice), which rose from 7.7% (in 2022) to 11.6% (in 2023), whilst the change in current vaping only rose from 6.9% to 7.6% over this same period. The increase in experimental use is highest in the older age groups (16–18-year-olds).⁴

The majority of adolescents are using single-use devices. A significant increase (61%) in use of single-use devices has been seen since 2021, with the most popular (60%) being fruit flavoured devices. Whilst fruit and dessert e-liquids are popular with young people, it should be noted they are as equally popular with adults and are not the most frequent reason for use in 11–18-year-olds who had never smoked.⁴

Adolescents report vaping mainly: *'just to give it a try', 'to join in'* and because *'I like the flavours'*.⁴

Vaping in adolescents is mainly amongst those who currently smoke or used to smoke and ASH-Y suggests it is more likely they tried smoking before vaping⁴ (see Figure 9). Current smoking nor current vaping have grown significantly since 2022, but in 2023 we have seen that the proportion of adolescents currently vaping (7.6%) is greater than those currently smoking (3.6%).

Figure 9: Use of vapes by young people (11–17-year-olds) who are currently smoking, used to smoke or have never smoked⁴



While it is preferable for young people to neither smoke nor vape, when assessing the risks, priority should be given to supporting young people not to smoke.

Only 11.5% of adolescents who reported trying vaping had never smoked (see Figure 9). Of these, most (62%) engaged in experimental use (trying only once or twice).⁴ However, continued surveillance is needed as we have seen an increase since 2020 in young people trying vaping who have never smoked, more so than amongst adults.²

As part of the 2023 ASH-Y survey, young people currently vaping and currently smoking were also asked about the frequency and intensity of the urge to smoke and vape. A greater proportion of adolescents reported no urges to vape (30.2%) compared to no urges to smoke (18.6%), but despite this there is still a small proportion that report strong to extremely strong urges to vape.⁴ For those young people (12 or above) who feel they are dependent on vaping, nicotine replacement therapy (NRT) could be offered as an alternative.

Guidance and advice around vaping and young people is available on the ASH website: <https://ash.org.uk/resources/view/ash-brief-for-local-authorities-on-youth-vaping>. This includes a comprehensive set of resources for schools, public health officials and trading standards officers but also information for counsellors, schools, parents and retailers.

Uptake of vaping by young people: a gateway effect into smoking?

The *gateway hypothesis* is the belief that use of non-tobacco nicotine will result in people seeking to obtain nicotine through smoking tobacco. Specifically, that vaping by people who have never smoked, particularly children, could cause them to take up smoking. Similar concerns have been raised in the past about NRT and smokeless tobacco.

Had this *gateway hypothesis* held true we would have expected to see an increase in smoking, when in fact **smoking in young people (and adults) has been in general decline since 2010**. Recent figures show a decrease from 2018 to 2021 in young people who: had ever smoked, from 16% to 12%; are current smokers, from 5% to 3%; are regular smokers, from 2% to 1%.⁴ These figures also dispel any notion that vaping would *re-normalise* smoking.³⁹

"Concerns that vaping might lead young people to start smoking in large numbers have proved unfounded."

John Britton, Professor of Epidemiology, Director UK Centre for Tobacco & Alcohol Studies, University of Nottingham

Although individual studies show that young people who vape are more likely to go on to smoke, it is unclear whether one causes the other, or if it is due to shared risk factors for tobacco use (e.g., whether an adolescent drinks alcohol, is surrounded by people who smoke, has poor mental health, is in looked-after care and in contact with the criminal justice system).⁴⁰ Since vaping is relatively prevalent, if it were causing young people to start smoking who wouldn't have otherwise, we'd expect to see population rates of youth smoking increase after the introduction of vapes, and that has not happened.

We do know that parental smoking is a proven causal factor for young people starting to smoke, so helping parents switch to vaping could help prevent youth uptake of smoking.

ACTION

For the current and future health of children and young people, we should be advising that:

- young people shouldn't smoke
- young people who do smoke would be better off vaping than smoking
- young people who do not smoke or do not intend to smoke should not vape

The dangers of exposing children to secondhand vapour

The serious harms of exposure to secondhand tobacco smoke, particularly for children, are well known. Passive exposure to exhaled vapour from devices (there is no side stream vapour) will vary according to the device, e-liquid, how the vape is used and where the exposure occurs (e.g., at home or outdoors).

There could be passive exposure to nicotine or other toxicants from exhaled vapour, but there is no evidence that exposure over short periods of time would cause significant harm.²

ACTION

Encourage colleagues to look at the evidence and appraise its quality rather than act upon assumptions. Youth smoking and vaping is under regular surveillance in the UK and this surveillance is made public and disseminated by the NCSCT.

Vaping and health

Much of the debate about vaping is framed in terms of whether vaping is safe. This is setting a high bar and one that is certainly not applied to drinking alcohol, eating fast food, or playing sport, for example.

There is a tendency to focus on the theoretical long-term health risks of vaping without thinking enough about the health benefits. Whilst not risk-free, there is no doubt that, relative to continued smoking, **vaping is far less harmful.**²

"In short and medium term, vaping poses a small fraction of the risks of smoking."

Office for Health Improvement and Disparities²

Overall, vaping is associated with lower toxicant emissions and exposure than smoking when biomarkers are measured, and modelling reveals that the **cancer risk for people who vape is considerably lower than for those who smoke.**^{22,41–43}

A study that aimed to examine the cardiovascular impact of switching from smoking to vaping among people who had smoked long-term found **significant improvements in vascular health.**⁴⁴

Long-term regular vaping has also been found to improve, not worsen, smoking-related diseases such as chronic obstructive pulmonary disease (COPD)⁴⁵ and smoking-exacerbated diseases such as asthma,⁴⁶ in people who have fully switched to vaping from smoking.

A study which followed a small cohort of people who had never smoked but who vaped daily found no deterioration in lung function, and no signs of development of respiratory symptoms, changes in markers of lung inflammation or signs of early lung damage.⁴⁷

Like oral nicotine replacement therapy (NRT) products, reported short-term effects of vaping relate predominantly to mouth and throat irritation, and tend to stop when vaping stops.⁴⁸ It is unclear whether these short-term airway effects will translate into long-term airway damage.^{38,49}

Although the evidence to date indicates that vapes deliver fewer carcinogens, oxidants, and toxicants at significantly lower concentrations than cigarettes,³⁹ **long-term vaping is unlikely to be without consequences.** There is a theoretical possibility that long-term vaping may increase the risks of lung cancer, COPD, cardiovascular and other smoking-related diseases. **However, these risks are likely to be significantly lower than the risks of smoking and low in absolute terms.**³⁹

"Smokers are driven by an addiction to nicotine, but it is the many other components of tobacco smoke that disable and kill. So, the emergence of e-cigarettes, which allow smokers to inhale nicotine without smoke and hence at much-reduced risk, has been a game-changer."

John Britton, Professor of Epidemiology, Director UK Centre for Tobacco & Alcohol Studies, University of Nottingham

Many of the negative news stories about vaping involve unregulated products which have been tampered with and it is therefore important to reinforce the use of regulated products.

"It could be that in 30 years' time some health concerns emerge, but we know that most smokers run a significant risk of not living long enough to find that out!"

Louise Ross, former manager of Leicester Stop Smoking Service and founder of the first e-cigarette friendly local stop smoking service

ACTION

Anyone who switches from smoking to vaping is instantly improving their current and future health. Encourage colleagues to look at the evidence reviews published by the Office for Health Improvement and Disparities rather than act upon press stories.

Vaping during pregnancy

Nicotine contained in NRT is not considered a threat to the health of parent or child during pregnancy or breastfeeding and it is recommended to switch from smoking tobacco to using less harmful nicotine products “at the earliest opportunity in pregnancy”.⁷ While licensed NRT products such as nicotine patches, gum and inhalers are the recommended option, **if a person who is pregnant chooses to use a vape, and if that helps them to quit smoking and stay smokefree, they should be supported to do so.**

Although the authors note that further research is required, a recent Cochrane Review of the efficacy and safety of NRT found **no evidence that using NRT during pregnancy is harmful.**⁵⁰ While very little research exists on the safety of vaping during pregnancy, a recent study found that **vaping nicotine has a similar safety profile to NRT** and is **more effective in preventing low birth weight and more effective in helping those who are pregnant and smoke quit than NRT.**³⁸

Nicotine-containing vapes are an effective aid for those who are pregnant and wanting to quit smoking, especially for those who do not wish to access formal support or use NRT.

To maximise health benefits and reduce the risks caused by smoking tobacco, the best outcome is for those who are pregnant and smoke to switch completely to vaping. If this is not possible, both smoking and vaping (dual use) may reduce health risks relative to only smoking.²³

COVID-19: Smoking, quitting and vaping

- The evidence on smoking and the chances of contracting COVID-19 is mixed.
- People who smoke who get COVID-19 are twice as likely to attend hospital and tend to report more symptoms than people who don't smoke.⁵¹
- Vaping is an effective aid to stopping smoking and staying smokefree.
- It is unknown what effect vaping may have on the risk of infection with COVID-19, or how it may affect the severity of the virus. To reduce the risk of infection from COVID-19, sharing vaping devices should be avoided.
- There is no evidence of an increased risk of contracting COVID-19 from breathing in secondhand vapour. However, in the absence of specific evidence and so as not to alarm bystanders, people who vape should avoid breathing out clouds of vapour in the presence of others.
- There is no evidence that vaping offers any protection from COVID-19.
- Switching from smoking to vaping improves health in general, and lung health specifically, and is likely to improve outcomes of infection with COVID-19.

Unwanted effects

The most recent Cochrane Review⁶ indicates that **the number of unwanted effects (including serious unwanted effects) reported from vaping are low**. The unwanted effects most often reported from vaping are throat or mouth irritation, headache, cough and feeling sick. These tend to reduce over time as people continue vaping.

Since January 2021 there have been 14 reports to the Medicines and Healthcare products Regulatory Agency (MHRA) which have been considered serious adverse reactions from vaping products, and no fatalities.²

Whilst we do not have data on the number of people using these products and these reports do not infer causality, by comparison, in 2021 there were 78 reports (no fatalities) of adverse events for varenicline (Champix),⁵² which has currently been unavailable since June 2021.² In the same year there were 48 reports (no fatalities) of adverse events of bupropion (Zyban)⁵³ and 279 (no fatalities) for NRT.⁵⁴

In the most recent data from 2019 – 20 an estimated **506,100 hospital admissions were for smoking-related conditions²⁵ and 74,600 people died prematurely in the UK because of smoking.**²⁵

To reduce unwanted effects and ensure that vaping products do not contain harm-causing chemicals that are prohibited, people should be advised to make sure their products are legal and purchased from reputable retailers meeting UK trading standards (see page 13 and Appendix 1 for guidance).

The case of vaping deaths reported from the United States

In late 2019 and early 2020 there was an outbreak of serious lung injury to people vaping in the US, leading to over 50 deaths. Called 'E-cigarette, or vaping, product-use associated lung injury' (EVALI), the outbreak was originally attributed to nicotine vaping but subsequently confirmed by the US Centers for Disease Control to be associated with vaping illicit THC (cannabis) e-liquids containing vitamin E acetate, both of which are banned under UK regulations. There has been no similar outbreak of vaping-related lung disease in the UK.

It is worth acknowledging there are reports of people using cannabis in vaping devices, but current evidence on this in the UK is lacking.

Safety in the home

Nicotine is a toxin and is potentially dangerous to health if a large quantity is consumed: “the dose makes the poison”. If a little drop of e-liquid accidentally gets into a person's mouth, this is unpleasant but harmless. They should rinse their mouth out with water if required.

Swallowing a small amount is not a serious risk for adults; however, if a child swallows nicotine e-liquid, medical advice should be sought immediately.

Nicotine can also be absorbed through skin and so any spills should be wiped off and washed with soapy water.

E-liquids should be stored in a cool, dark place out of reach of children and pets, and empty bottles should be disposed of safely.

It is worth making sure that all vaping devices, chargers and batteries display a CE mark. This is a certification mark that indicates conformity with European health, safety and environmental protection standards.

To reduce the risk of fire, the correct charger for the device should always be used and vapes should not be left charging unattended or overnight.

People using home oxygen should be advised that they should not vape while using supplemental oxygen, as there is risk of igniting the vape device or the oxygen tubing in the person's nose. They should come off oxygen for at least five minutes before vaping. People should also make sure they charge their vape in a different room, away from their oxygen supply.

Health and social care professionals: recommendations for practice

Vaping has posed some difficulties for health and social care professionals as it is a consumer-led technology that hasn't been developed through traditional scientific and medical processes. There have also been critical views from some public health bodies and a lack of training on vapes and vaping. In addition, it is a dynamic technology within a constantly changing landscape.

The cautious statement below isn't uncommon:

"I would only trust e-cigarettes if there was a licensed product."

Practice Nurse, Leicester

When we try to fit vapes into our traditional medical model, we make the mistake of focusing on us (we want the certainty and security of a *licensed product*) and not on consumers (who like the variety of devices, designs and flavours).

One device has been granted a license by the MHRA but wasn't popular and therefore didn't achieve large sales. We know that a licensed product would reassure some healthcare professionals,⁵⁵ but **it is highly unlikely that a single, or even a small number of licensed devices, would be popular with all people who smoke.**

The National Institute for Health and Care Excellence (NICE) recommends advising people who smoke that they are **more likely to successfully stop smoking** when combination NRT (a short-acting product plus a longer-acting product) or **nicotine-containing vapes are combined with behavioural support**, compared with bupropion (Zyban) or single product NRT.⁷

It is in the best interests of people who smoke that we are open to vaping in people keen to try it. These are the main recommendations for practice:

1. Provide advice on vaping that includes:

- Vapes provide nicotine in a far less harmful form than smoking tobacco; the harm from smoking is not caused by nicotine.
- Some people find vaping helpful for quitting, cutting down the amount of tobacco smoked and/or managing temporary abstinence from smoking.
- There is a wide range of vapes and people may need to try various types, flavours and nicotine strengths before they find something suitable for them.

- Vaping is not like smoking and people may need to experiment and learn to use vapes effectively (e.g., *sipping* rather than deep inhalations, and several short puffs may be needed initially to activate the vaporiser and improve nicotine delivery). They may also need to recognise when atomisers need replacing. Simply drinking water can help avoid the dry mouth that can be experienced.
 - If users report vaping continuously to get relief from cravings, they may be getting insufficient nicotine; increasing the nicotine strength of e-liquid may help and result in reduced puffing. In most cases when vaping is used to help quit smoking, users reduce their nicotine strengths comfortably when the time is right for them.
 - People who vape might also report that the frequency they vape has increased relative to how often they smoked. This is expected, mainly due to a change in the amount of nicotine consumed, and the speed at which it is delivered to the brain. Rather than smoking a cigarette every hour or so for 10 minutes, people will often find themselves regularly taking a few puffs on their vape. People who vape and still smoke cigarettes (e.g., to reduce the number of cigarettes that they smoke) may need to consider changing devices and/or nicotine concentrations when making a quit attempt.
 - If withdrawal and cravings for smoking are not being effectively managed by using a vape, it can be combined with a form of nicotine replacement therapy (NRT), such as the patch.
 - Although some health risks from vaping may yet emerge, these are likely, at worst, to be a small fraction of the risks of smoking. This is because vapour does not contain the products of tobacco combustion (burning) that cause lung and heart disease, and cancer.
2. Multi-session behavioural support provided by trained stop smoking practitioners will improve the chances of successfully stopping smoking whether or not people use vapes. Encourage clients to familiarise themselves with the use of their vape before setting a quit date.
 3. Stop smoking services can provide behavioural support to clients who are using vapes to stop smoking and can include this in their national data returns.
 4. Clients of stop smoking services who are using vapes and who also want to use NRT can safely use the two in conjunction; they do not need to have stopped using a vaping device before they can use NRT.
 5. Some service users have also vaped whilst using varenicline (Champix) to quit smoking. There have been supply issues with Champix since 2021 and with bupropion (Zyban) between 2022 and 2023, but use of vapes with Champix and Zyban, and cytisine when it is available, should not be seen as problematic.
 6. Services should routinely offer vaping starter packs.

ACTION

Encourage colleagues to act on the above guidance so that they can deliver a life-saving intervention. If the commissioners of your service are sceptical or will not agree to the idea of including vaping as an option in usual care, ask them to consider the messages in this publication, the latest published evidence or to talk to services where it has been a success.

Maternity services: recommendations for practice

The recommendations above can largely be replicated for health and social care professionals who encounter those who are pregnant who smoke. However, there are several specific issues that are worth emphasising:⁵⁶

- Smoking during pregnancy can harm the baby in the womb from day one. Stopping smoking is one of the best things a person and their partner can do to protect the health of their baby through pregnancy and beyond.
- Very little research exists regarding the safety of vaping during pregnancy. However, the one large randomised controlled trial indicated that vaping nicotine has a similar safety profile to NRT, and vaping nicotine was more effective in preventing low birth weight and in helping pregnant smokers quit than NRT.³²
- While licensed NRT is the recommended option, vapes have a similar safety profile in pregnancy.³⁸ If a pregnant person chooses to use a vape and if that helps them to quit smoking and stay smokefree, they should be supported to do so.
- In households with one or more people who smoke, vaping can be used to maintain a smokefree home and protect children from secondhand smoke.
- There is no reason to believe that using a vape would compromise breastfeeding. People who vape following birth should not be discouraged from doing so if it enables them to stay quit and maintain a smokefree home.

The cautious statement below isn't uncommon:

"I spoke to my midwife about using a vape, as I was finding it hard to quit with patches, and she told me not to because 'we don't know what's in them'."

Pregnant woman, Shrewsbury

As part of the mandatory collection of smoking status at booking and delivery, if a pregnant person is only vaping and not smoking tobacco, they should be documented as a 'non-smoker'.

ACTION

Maternity colleagues can be reassured that vaping is considerably safer than smoking and that it offers a route out of smoking for those struggling to quit with traditional methods.

See the Resources section for useful tools from the Smoking in Pregnancy Challenge Group.

Vape Friendly Services

The Office for Health Improvement and Disparities (OHID) recommends that stop smoking services should **offer support to people who are using a vape in a quit attempt, in the same way that they would for someone using a licensed stop smoking medication such as nicotine replacement therapy (NRT)**. This means including vaping alongside stop smoking medications when discussing options with service users.

Vapes ("unlicensed nicotine containing products") have been included in the national data returns that stop smoking services submit since 2014. It is important that services record all use of vapes, with or without NRT, and whether the service user bought their own device or if it was supplied by the service.

Adoption of vaping as a stop smoking aid is not as widespread as it should be and varies between services. Some services give **free vaping starter kits to clients**, others **don't turn people away who want to use vaping** as part of their quit attempt but don't promote them, and some services (under instruction from their commissioners) continue to regard vapes as a choice of last resort, when everything else has failed. Some services are even using their resources, intended to help smokers to quit, to get people to stop vaping. **Stopping smoking should be the priority, not stopping nicotine use.**

We have published a short briefing on why we don't have local stop vaping services:
www.ncsct.co.uk/publication_briefing_stop_vaping_services.php

In partnership with OHID, we have published information on Crown Commercial Services' recent inclusions of new vaping product catalogues within existing public sector procurement frameworks: www.ncsct.co.uk/publication_service_advice_vapes.php

"What is the point of making smokers try other products first, especially when they've already said they haven't worked for them. Would you make a diabetic patient use something ineffective before you put them on insulin?"

Specialist Stop Smoking Practitioner, acute care

Services that are not vape friendly are vape unfriendly.

"When stop smoking services support people who want to use e-cigarettes to help them quit smoking, it brings together the most effective method of quitting (stop smoking services) with the most popular (vaping)."

Martin Dockrell, Tobacco Control Programme Lead, Office for Health Improvement and Disparities

There are three principles that services must adopt if they are to be Vape Friendly:

1. Recognise the potential benefit that vapes have in helping those who smoke to quit.
2. Respect the choices clients make when considering what evidence-based methods to use for a quit attempt, including the choice to use a vape.
3. Operate a system of support, including behavioural support, for people who choose to use vapes to quit smoking.

To register as an *NCSCCT Vape Friendly Service*, managers of stop smoking services* can submit their commitment to these principles, and confirm that they have the other specific service characteristics listed below in place, at this site: https://elearning.ncsct.co.uk/vape_friendly_service

* **Note:** only one submission per service provider

ACTION

Stop smoking service managers should use the link above to register their service as an *NCSCCT Vape Friendly Service* and promote their service as such to smokers. For those services who don't currently qualify, they could engage with their commissioners and work towards incorporating the necessary service characteristics.

Characteristics of a Vaping Friendly Service:

In addition to current best practice for established stop smoking services⁵⁷ our service also:

Service characteristic	✓
Actively reaches out to smokers considering using a vape to stop smoking, and encourages them to come to the service for behavioural support	
Ensures that staff understand the evidence on the safety and effectiveness of vaping and encourages them to extend their knowledge base on vapes and vaping by talking to people with lived experience	
Provides accurate and balanced information based on current scientific knowledge about the benefits and risks of vapes	
Ensures that staff are familiar with common types of vapes and use terminology that people understand	
Is clear that smoking is the problem, not nicotine, and that long-term use of vapes may protect against relapse to smoking	
Recognises that vapes, regulated either as medicines or consumer products, can help people quit smoking, and supports clients to choose the most appropriate in light of their circumstances or preferences	
Is prepared to work in partnership with reputable local vaping retailers by referring clients to them for product support and advice	
Accepts that some clients will choose to continue to use vapes in the long term, and may have no intention of stopping the use of nicotine for recreational purposes	
Engages with other healthcare providers and frontline services in order to share knowledge and encourage a common approach to vaping across services in their area	
Celebrates a successful switch to vaping as it would a quit by any other method	
Routinely offers vaping starter packs	
Requires that staff complete the NCSCT online module: <i>Vaping: a guide for healthcare professionals</i>	
Makes the NCSCT vaping briefing available to all staff	

Clinical issues, reports and myths

Vaping is the most popular method for stopping smoking in England⁵ and smokers need evidence-based information and advice to assist with their decisions and maximise their chances of quitting successfully.

This chapter lays out some of the clinical issues, and misleading reports and myths, relating to vaping that health and social care professionals may encounter.

Clinical issues

Healthcare professionals, and stop smoking practitioners in particular, are trusted sources of information on vaping and it is likely that smokers will raise some or all of these issues with you.

Selecting a device

People who smoke who have decided to use a vape will often ask:

Which vape should I start with?

This is very much a personal choice. Tank devices might take a bit of getting used to, but they allow the use of more flavours and a better sensation, and generally deliver significantly more nicotine than single-use devices. They are also much more environmentally friendly. Pods are convenient but more expensive in the long run. It can often come down to:

- how much the person wants to spend
- if they want a single-use or rechargeable device
- what size of device they want (smaller cigalike or pen-like tank devices versus the bigger mods used by those with more vaping experience)
- if they want to choose the amount of nicotine they inhale
- if choice of flavour is important
- how much vapour they want to produce

The first device used should be simple enough to manage easily while giving satisfaction.

Specialist vape retailers can provide advice and there are also internet forums where people who vape discuss the different product types.

Nicotine strength

It makes sense for people using vapes to choose an e-liquid that contains nicotine, and enough nicotine to relieve or avoid nicotine withdrawal symptoms and urges to smoke.

This is true whether using vapes to quit, stay quit, reduce the amount of tobacco smoked or to help with temporary abstinence.

How much nicotine someone will require will depend upon how much nicotine they were getting from their cigarettes. **People who smoke who are more dependent generally benefit from higher doses of nicotine.** As we would with nicotine replacement therapy (NRT), an assessment of tobacco dependency using the Heaviness of Smoking Index⁵⁸ can help guide the selection of the initial strength of nicotine used in e-liquid.

Using too low a nicotine strength can increase the amount of vaping and subsequent exposure to chemicals. As a result, a high nicotine strength may be more beneficial for some initially to reduce the risk of relapsing to smoking.

The maximum permitted strength of nicotine in e-liquid in the UK is 20 mg/ml (2%); the most common strengths are 3 mg/ml (0.3%), 6 mg/ml (0.6%) 12 mg/ml (1.2%) and 18 mg/ml (1.8%).

The strength of nicotine needed can depend on the vaping device used and how effectively the device delivers nicotine, but also on the puffing behaviour of the user. Higher nicotine concentrations are usually needed with smaller devices, due to the less powerful batteries (i.e., cigalikes, single-use devices), but lower nicotine concentrations are better for mod devices. Many people new to vaping are likely to be starting on pen-like tank devices so can be advised to start on 12 mg/ml, then taking their e-liquid strength higher or lower as needed.

Reinforcing the role of nicotine in assisting with the management of urges to smoke and withdrawal symptoms in the first 8–12 weeks following quitting is important. Nicotine concentrations can be reduced over time at a pace that clients are comfortable with, and this can be paused if they feel that they are at risk of returning to smoking.

Vaping with tank and mod devices, and with experience of using them, often results in less vaping liquid being used. This can happen naturally and doesn't need to be a conscious decision. People switching from smoking to vaping should not worry about reducing their nicotine use too quickly; users typically find that they use less as time passes.

Flavours

There is a **huge array of flavours** of e-liquid to choose from. The most popular category of flavour among adults who have tried and are still using vapes is now fruit flavours, followed by menthol flavours.

Technique

The frequency of vape use is likely to be different from the frequency at which people smoked cigarettes, mainly due to a change in the amount of nicotine consumed, and the speed at which it is delivered to the brain.

Rather than smoking a cigarette every hour or so for 10 minutes, people will often find themselves **regularly taking a few puffs on their vape**. As one person who vapes put it:

“When I smoked cigarettes I used to binge on nicotine, now that I vape, I graze on it.”

Smoking a cigarette usually involves two stages: puffing into the mouth and then inhaling into the lungs. There are two techniques for vaping:

- Mouth to Lung (MTL) which is similar to smoking
- Direct to Lung (DTL) where the vapour is drawn straight into the lungs; more commonly used by those with more vaping experience and those using devices designed for this technique. However, DTL can result in a dry hit if used on the wrong device.

What are heated tobacco products?

Alternative nicotine delivery systems include heated tobacco products, sometimes called heat-not-burn products. They heat a small plug of tobacco, often contained in a pod or stick which looks like a very small cigarette, producing an inhalable vapour. Heated tobacco products are not the same as vapes.

Because these devices are intended to heat rather than burn tobacco, they are likely to produce far fewer toxicants than traditional cigarette smoking. However, because they use tobacco, they are likely to be more harmful than vapes.

These heated tobacco devices are manufactured exclusively by the tobacco industry. Currently there is very little independent evidence about the safety or effectiveness for cessation of heated tobacco products. The latest Cochrane Review has reported that the effectiveness of heated tobacco for smoking cessation remains uncertain.⁵⁹ However, a more recent randomised control trial has shown that heated tobacco product use resulted in a reduction in smoking among people who did not intend to quit; this effectiveness in reducing smoking was comparable to a refillable vape.⁶⁰

How do I cope in vape-free venues?

In places where vaping is banned (e.g., at work, school or in hospital) other nicotine-containing products can be used for temporary abstinence. Faster-acting NRT products such as the mouth and nasal sprays or 4mg lozenges can help, along with tobacco-free nicotine pouches. It is important not to let nicotine levels drop too much or withdrawal symptoms, and strong urges to smoke, can take hold and increase the likelihood of smoking.

Where vaping is not banned but discretion is needed, lower powered devices used with e-liquid high in propylene glycol create less vapour. People can also reduce the amount of vapour they exhale by waiting a few seconds before breathing out.

Guidance on quitting vaping

Some people are happy to vape long-term, some want to stop eventually, and some want to stop as soon as possible.

Our priority should always be to ensure that people who stop vaping do not return to smoking cigarettes. As such, it is important to assess why they want to stop vaping and their risk of relapse, and to plan and prepare appropriately to stop vaping (either gradually or in one step).

We can use an adapted very brief advice (VBA) approach when working with people who want to stop vaping:

ASK: about the reason they want to stop vaping

Some may feel that they are simply at a stage where they are ready to discontinue vaping and are not at risk of relapse. Others may want to stop vaping because of concerns arising from inaccurate press reports or from stories that they have heard. Pressure to stop can also come from family members who worry about them vaping too much. Some people may not feel that vaping is helpful to them, that it is not reducing tobacco withdrawal symptoms or helping them to manage without cigarettes. Some may also not be able to afford the cost or may not want to continue paying for e-liquids or devices.

ADVISE: clarifying information and offering reassurance

We should acknowledge the individual's success with quitting and their interest in stopping vaping. They should be reassured that, if it helps them not smoke, there is no need to rush to stop using their vape. What we don't want is people to feel they must stop vaping before they are ready, increasing the risk of a relapse to smoking.

It is important to clarify any misinformation about the safety of vaping and to let people know what the evidence says about safety – that in the short to medium-term (up to two years) vaping poses a small fraction of the risks compared to smoking. For individuals who report that vaping is not working for them, or who are in the early stages of quitting, it is important to assess whether they are using the correct device for them, using the device correctly, and using the appropriate strength of nicotine.

ACT: support client with stopping vaping

Check the person's reason for wanting to stop vaping. Provide accurate information and reassurance as required. Assess the risk of relapse. If the person is certain that they want to stop vaping because they are concerned about the cost, being dependent upon vaping or the long-term consequences of vaping AND they are not worried that they are at risk of returning to smoking, then they can gradually reduce their vaping over weeks or months, pausing at intervals dependent on their response and assessment of risk of relapse.

Nicorette QuickMist Mouthspray has been granted approval from the Medicines and Healthcare products Regulatory Agency (MHRA) for a new indication to relieve and/or prevent craving and nicotine withdrawal symptoms in nicotine dependence, including those arising from nicotine vaping.

It will be a local decision whether clients self-fund or are provided with the product as part of your service. Except in cases of extreme dependence, it is probably not necessary to fund this from your service budget; most people who vape are able to reduce their use of a vape and discontinue when they are ready.

More detailed guidance on stopping vaping is contained in the publication available on the NCSCT website: *Supporting clients who want to stop vaping*:

www.ncsct.co.uk/publication_support_stop_vaping.php

Inaccurate press reports

We covered reports of vaping deaths from the United States in Chapter 8, but there have been other press reports that impact negatively upon people's perceptions of vaping.

FALSE

VAPING IS AS HARMFUL AS SMOKING

This is simply not true. The main chemicals present in vapour have not been associated with any serious risk. The constituents of cigarette smoke that harm health, including carcinogens, are either absent in vapour or, if present, are mostly at levels significantly below 5% (mostly below 1%) of doses from smoking and far below safety limits for occupational exposure.

In the short- and medium-term, vaping poses a small fraction of the risks of smoking.

The evidence reviewed suggests there is significantly lower exposure to harmful substances from vaping compared with smoking, as shown by biomarkers associated with the risk of respiratory and cardiovascular conditions, and cancer.

Some poorly conducted studies, often reported initially in the American press, purport to show that people who vape are more likely to suffer serious illness. These studies do not consider the effect of historical smoking and the cumulative impact upon health that this causes in the individuals included in the research; some have even counted illnesses that occurred before vaping started!

FALSE

VAPING CAUSES POPCORN LUNG

Popcorn lung (obliterative bronchiolitis) is a rare but serious untreatable condition where the smallest airways in the lungs are scarred and cease to work efficiently. It causes symptoms not unlike chronic obstructive pulmonary disease (COPD) such as shortness of breath, wheezing, dry cough, reduced ability to exercise and fatigue.

Popcorn lung has several causes, all due to inhaling chemicals, including chlorine, ammonia, sulphur dioxide, metal fumes from welding and diacetyl. It is from diacetyl (a flavouring that produces a buttery taste) that popcorn lung gets its name. Between 1992 and 2000, eight cases of lung disease were detected in employees of a Missouri popcorn factory who had spent considerable time mixing diacetyl with hot oil in large vats.

This is where the headline about vaping causing popcorn lung came from. Diacetyl is banned in the UK and the European Union as an ingredient in e-liquids, but previously, some e-liquid flavours (e.g., butterscotch) did contain small amounts of diacetyl. **But no one who vapes has ever contracted popcorn lung.** In fact, despite cigarettes containing at least 100 times as much diacetyl as e-liquids that have it as an ingredient, no one who smokes has ever been diagnosed with popcorn lung either!

FALSE**VAPING PRODUCES CHEMICALS AS HARMFUL AS SMOKING**

Concern has been expressed about high levels of formaldehyde and other aldehydes that are generated when vapes are operated at high temperatures in laboratory studies.^{61–62} However, in real world use when an e-liquid is heated at high temperatures it produces an unpleasant taste (known as a *dry hit*). People who vape dislike this taste and do their best to avoid producing it.^{62–63} **People who smoke who switch to vaping show significant reductions in exposure to the aldehyde acrolein**, even in those who do not stop smoking completely (i.e., dual users).⁶⁴

Some studies have detected chemicals in vapour that are known to cause health problems. **However, these chemicals have been found at very low levels that are unlikely to represent a serious risk to health.**

FALSE**NICOTINE DAMAGES BRAIN DEVELOPMENT IN YOUNG PEOPLE**

There are concerns that nicotine damages brain development in young people. However, there is **insufficient evidence to support this**.⁶⁵ Further still, when reviewing the evidence for the toxicity of vapes, the UK Committee on Toxicity concluded that no data were available on direct effects of nicotine exposure in human adolescents.⁶⁶

Additionally, it is worth noting that NRT is licensed by the MHRA for smoking cessation for young people aged 12 upwards and there is good evidence of efficacy, safety and comparative cost-effectiveness.

Myths

Here you will find some **commonly held myths about vapes**, and suggested responses.

You can't use vapes with NRT ❌ MYTH

The short answer is: yes you can! The most important thing for the person who smokes (whether quitting, cutting down or managing temporary abstinence) is getting sufficient nicotine to alleviate the withdrawal symptoms that accompany stopping or reducing smoking tobacco. It doesn't matter whether nicotine is obtained from vapes alone, NRT alone or from a combination of both.

Switching to vaping is just swapping one addiction for another ❌ MYTH

Switching to vaping from smoking cigarettes does not involve *swapping one addiction for another*. It is nicotine that causes dependence and vapes typically contain nicotine. It's the same nicotine whether smoked, vaped or used as NRT.

But with vaping, there is no burning and therefore no tar, carbon monoxide and other harmful constituents that are inhaled from tobacco smoke.

This question is often posed by people who smoke who are uncertain if they want to stop smoking completely, or uncertain if they will be successful if they try to quit. It is important that we offer reassurance about the safety of long-term nicotine use and that vapes offer a significantly less harmful way of consuming nicotine than smoking.

Vaping is re-normalising smoking ❌ MYTH

It seems highly unlikely that the popularity of vapes is somehow *re-normalising* smoking. If anything, more people vaping would normalise vaping, not smoking.

We simply do not have any data to show that this is occurring. Indeed, available data points in the opposite direction because cigarette smoking prevalence among both adults and young people has continued to fall in England as vaping has increased.

I'm vaping more than I used to smoke. It must be worse for me! ❌ MYTH

Vaping is different from smoking and nicotine is absorbed from the vapour differently to how it is absorbed from tobacco. As a result, people may feel like they are vaping more than they smoked. This is because people who vape tend to *graze* on their vape, which allows them to maintain a constant level of nicotine to avoid going into withdrawal. People who smoke, on the other hand, *binge* on tobacco, with blood levels of nicotine going down in between cigarettes.

Conclusion

We can no longer talk of vaping as a new phenomenon, although technology is always advancing and new vapes constantly come onto the market. Vapes are now the most popular stop smoking aid in England. Technical advances will lead to even better nicotine delivery and future innovation will hopefully continue to appeal to people who smoke and help them to switch from smoking to vaping.

Whilst the phrase *more evidence is needed* is almost always true, we can now speak with greater confidence about the safety and effectiveness of vaping. This confidence hasn't been translated to the public, however, a third of whom still think that vaping is as bad as or worse than smoking.

Healthcare professionals have an important role to play in ensuring that people who smoke have accurate information about vaping founded upon evidence. But we also need to remember to ask questions of, and listen to, people who vape as they are often the real experts in vaping and always the experts in themselves.

Behavioural support to stop smoking from a trained practitioner adds value to a quit attempt, even more so if it is tailored to the individual. One size does not fit all when it comes to the support that people need, and the same goes for stop smoking aids.

Vaping has a role in helping people who smoke to quit, reduce the harm from smoking, and manage temporary abstinence. Organisations can set themselves a mission to become a Vape Friendly Service. Individual healthcare professionals can embrace the opportunity that vapes offer to transform the lives of those who smoke.

Resources

Vaping: a guide for healthcare professionals

NCSCT online training module that includes modelling film clips and covers all the issues in this briefing.

<https://elearning.ncsct.co.uk/vaping-launch>

The Switch

The NCSCT, in partnership with Public Health England and New Nicotine Alliance, produced several short films for the public on vaping. These enjoyable short films will also be of interest to healthcare professionals.

The Switch: <https://tinyurl.com/the-switch-playlist>

Guidance

Incorporating nicotine vaping products (e-cigarettes) into Stop Smoking Services:
Making the case and addressing concerns

www.ncsct.co.uk/publication_service_advice_vapes.php

Vape Friendly Services

A site for representatives of organisations who want to register their organisation as an NCSCT Vape Friendly Service

https://elearning.ncsct.co.uk/vape_friendly_service

NICE

NICE Guideline NG209 (2021).

Tobacco: preventing uptake, promoting quitting and treating dependence

www.nice.org.uk/guidance/ng209

Smoking in Pregnancy Challenge Group

Resources and information about the use of vapes before, during and after pregnancy.

<https://tinyurl.com/ash-e-cigarettes-pregnancy>

<https://tinyurl.com/rcm-smoking-in-pregnancy>

Supporting clients to stop vaping

www.ncsct.co.uk/publication_support_stop_vaping.php

Evidence reviews

Nicotine vaping in England: an evidence update including health risks and perceptions, 2022
A report commissioned by the Office for Health Improvement and Disparities

<https://tinyurl.com/nicotine-vaping-2022>

Action on Smoking and Health (ASH)

Use of e-cigarettes among adults in Great Britain, 2023

<https://tinyurl.com/e-cigarettes-adults-2023>

Use of e-cigarettes among young people in Great Britain, 2023

<https://tinyurl.com/e-cigarettes-young-people-2023>

Cochrane Review on Electronic cigarettes for smoking cessation

Summary

<https://tinyurl.com/cochrane-e-cigarettes>

Full review

<https://tinyurl.com/cochrane-e-cigarettes-full>

UCL Smoking Toolkit Study

<https://smokinginengland.info/graphs/top-line-findings>

Royal College of Physicians, Nicotine without smoke

Nicotine without smoke: Tobacco harm reduction | RCP London

<https://tinyurl.com/nicotine-without-smoke>

Recycling of Vapes

Vapes recycling: An industry briefing for retailers and producers.

<https://tinyurl.com/recycling-vapes>

References

- Public Health England. E-cigarettes: an evidence update. London: Crown Copyright; 2015. Available from: <https://www.gov.uk/government/publications/e-cigarettes-an-evidence-update>
- McNeill A, Simonavicius E, Brose LS, Taylor E, East K, Zulkova E, et al. Nicotine vaping in England: an evidence update including health risks and perceptions, 2022. London: Office for Health Improvement and Disparities; 2022.
- Action on Smoking and Health. Use of e-cigarettes among adults in Great Britain, August 2023. Action on Smoking and Health; 2023. Available from: <https://ash.org.uk/resources/view/use-of-e-cigarettes-among-adults-in-great-britain-2021>
- Action on Smoking and Health. Use of e-cigarettes among young people in Great Britain, June 2023. Action on Smoking and Health; 2023. Available from: <https://ash.org.uk/resources/view/use-of-e-cigarettes-among-young-people-in-great-britain>
- Smoking Toolkit Study. Latest Statistics – Resources – Smoking in England. 2023. Available from: <https://smokinginengland.info/resources/latest-statistics>
- Hartmann-Boyce J, Lindson N, Butler AR, McRobbie H, Bullen C, Begh R, et al. Electronic cigarettes for smoking cessation. Cochrane Database Syst Rev. 2022; Issue 11. Art. No.: CD010216. Available from: <https://doi.org/10.1002/2F14651858.CD010216.pub7>
- National Institute for Health and Care Excellence. Tobacco: preventing uptake, promoting quitting and treating dependence: NICE guideline NG209. London: NICE; 2021. Available from: <https://www.nice.org.uk/guidance/ng209>
- Notley C, Ward E, Dawkins L, Holland R. The unique contribution of e-cigarettes for tobacco harm reduction in supporting smoking relapse prevention. Harm Reduct J. 2018 Jun 20;15(1):31. Available from: <https://doi.org/10.1186/s12954-018-0237-7>
- Tattan-Birch H, Brown J, Shahab L, Jackson SE. Trends in use of e-cigarette device types and heated tobacco products from 2016 to 2020 in England. Sci Rep. 2021;11:13203. Available from: <https://doi.org/10.1038/s41598-021-92617-x>
- Li L, Borland R, Cummings KM, Fong GT, Gravelly S, Smith DM, et al. How Does the Use of Flavored Nicotine Vaping Products Relate to Progression Toward Quitting Smoking? Findings From the 2016 and 2018 ITC 4CV Surveys. Nicotine Tob Res. 2021 Aug 18;23(9):1490-7. Available from: <https://doi.org/10.1093/ntr/ntab033>
- Action on Smoking and Health. Toolkit: Article 5.3 of the WHO Framework Convention on Tobacco Control. Action on Smoking and Health. 2018. Available from: <https://ash.org.uk/local-resources/toolkit-article-5-3-framework-convention-tobacco-control/>
- Tattan-Birch H, Jackson SE, Kock L, Dockrell M, Brown J. Rapid growth in disposable e-cigarette vaping among young adults in Great Britain from 2021 to 2022: a repeat cross-sectional survey. Addiction. 2023;118(2):382-6. Available from: <https://doi.org/10.1111/add.16044>
- Hajek P, Phillips-Waller A, Przulj D, Pesola F, Myers Smith K, Bisal N, et al. A Randomized Trial of E-Cigarettes versus Nicotine-Replacement Therapy. N Engl J Med. 2019; 380(7):629-37. Available from: <https://doi.org/10.1056/NEJMoal808779>
- Li J, Hajek P, Pesola F, Wu Q, Phillips-Waller A, Przulj D, et al. Cost-effectiveness of e-cigarettes compared with nicotine replacement therapy in stop smoking services in England (TEC study): a randomized controlled trial. Addiction. 2020 Mar;115(3):507-17. Available from: <https://doi.org/10.1111/add.14829>
- Hartmann-Boyce J, McRobbie H, Lindson N, Bullen C, Begh R, Theodoulou A, et al. Cochrane review of e-cigarettes for smoking cessation: update on the latest evidence. ASH webinar: Using e-cigarettes to support smoking cessation in the NHS. April 2022. Available from: <https://ash.org.uk/resources/view/using-e-cigarettes-to-support-smoking-cessation-in-the-nhs>
- NHS Digital. Statistics on NHS Stop Smoking Services in England – April 2021 to March 2022. November 2022. Available from: <https://digital.nhs.uk/data-and-information/publications/statistical/statistics-on-nhs-stop-smoking-services-in-england/april-2021-to-march-2022>
- Benowitz NL. Compensatory smoking of low-yield cigarettes. In: National Cancer Institute, editor. Risks associated with smoking cigarettes with low machine-measured yields of tar and nicotine. Bethesda, MD: US Department of Health and Human Services, National Institutes of Health, National Cancer Institute; 2001. 39-64.
- Adda J, Cornaglia F. Taxes, cigarette consumption, and smoking intensity. Am Econ Rev. 2006;96(4):1013-28. Available from: <https://www.jstor.org/stable/30034328>
- Frost C, Fullerton FM, Stephen AM, Stone R, Nicolaides-Bouman A, Densen J et al. The tar reduction study: randomised trial of the effect of cigarette tar yield reduction on compensatory smoking. Thorax. 1995;50(10):1038-43. Available from: <https://doi.org/10.1136/thx.50.10.1038>
- Godtfredsen NS, Holst C, Prescott E, Vestbo J, Osler M. Smoking reduction, smoking cessation, and mortality: a 16-year follow-up of 19,732 men and women from The Copenhagen Centre for Prospective Population Studies. Am J Epidemiol. 2002; 156(11):994-1001. Available from: <https://doi.org/10.1093/aje/kwf150>
- Moore D, Aveyard P, Connock M, Wang D, Fry-Smith A, Barton P. Effectiveness and safety of nicotine replacement therapy assisted reduction to stop smoking: systematic review and meta-analysis. BMJ. 2009;338:b1024. Available from: <https://doi.org/10.1136/bmj.b1024>
- Shahab L, Goniewicz ML, Blount BC, Brown J, McNeill A, Alwis KU, et al. Nicotine, Carcinogen, and Toxin Exposure in Long-Term E-Cigarette and Nicotine Replacement Therapy Users: A Cross-sectional Study. Ann Intern Med. 2017;166(6):390-400. Available from: <https://www.ncbi.nlm.nih.gov/pubmed/28166548>
- Hartmann-Boyce J, Butler AR, Theodoulou A, Onakpoya IJ, Hajek P, Bullen C, et al. Biomarkers of potential harm in people switching from smoking tobacco to exclusive e-cigarette use, dual use or abstinence: secondary analysis of Cochrane systematic review of trials of e-cigarettes for smoking cessation. Addiction. 2023 Mar;118(3):539-45. Available from: <https://doi.org/10.1111/add.16063>

24. Beard E, Brown J, Jackson SE, West R, Kock L, Boniface S, et al. Independent Associations Between Different Measures of Socioeconomic Position and Smoking Status: A Cross-Sectional Study of Adults in England. *Nicotine Tob Res.* 2021; 23(1):107–14. Available from: <https://doi.org/10.1093/ntr/ntaa030>
25. NHS Digital. Statistics on smoking, England 2020. 2020. Available from: <https://digital.nhs.uk/data-and-information/publications/statistical/statistics-on-smoking/statistics-on-smoking-england-2020/part-1-smoking-related-ill-health-and-mortality>
26. Jackson SE, Cheeseman H, Arnott D, et al (2022) Smoking in social housing among adults in England, 2015–2020: a nationally representative survey. *BMJ Open.* 2022;12:e061013. Available from: doi: 10.1136/bmjopen-2022-061013
27. Action on Smoking in Health. Health Inequalities and Smoking. Action on Smoking and Health; September 2019. Available from: https://ash.org.uk/wp-content/uploads/2019/09/ASH-Briefing_Health-Inequalities.pdf
28. Soar K, Dawkins L, Robson D, Cox S. Smoking amongst adults experiencing homelessness: A systematic review of prevalence rates, interventions and the barriers and facilitators to quitting and staying quit. *Journal of Smoking Cessation.* 2020;15(2):94–108. Available from: <https://doi.org/10.1017/jsc.2020.11>
29. Hiscock R, Bauld L, Amos A, Fidler J, Munafo M. Socioeconomic status and smoking: a review. *Ann N Y Acad Sci.* 2012; 1248:107–23. Available from: <https://doi.org/10.1111/j.1749-6632.2011.06202.x>
30. Action on Smoking and Health and Housing Learning and Improvement Network. Smoking and social housing: supporting residents, addressing inequalities. Action on Smoking and Health and Housing Learning and Improvement Network; May 2022. Available from: <https://ash.org.uk/uploads/ASH-Housing-LIN-Smoking-and-Social-Housing-May-2022.pdf?v=1652284469>
31. Jackson SE, Shahab L, Kock L, West R, Brown J. Expenditure on smoking and alternative nicotine delivery products: a population survey in England. *Addiction.* 2019;114(11):2026–36. Available from: <https://doi.org/10.1111/add.14709>
32. Department of Health. Towards a smokefree generation: a tobacco control plan for England. London: Crown Copyright; 2017.
33. NHS Digital (2023) Statistics on Women's Smoking Status at Time of Delivery: England Quarter 4 2022–23. June 2023. Available from: <https://digital.nhs.uk/data-and-information/publications/statistical/statistics-on-women-s-smoking-status-at-time-of-delivery-england/statistics-on-womens-smoking-status-at-time-of-delivery-england-quarter-4-2022-23>
34. Smoking in Pregnancy Challenge Group. Review of the Challenge 2018. Smoking in Pregnancy Challenge Group. 2018. Available from: <https://ash.org.uk/uploads/Smoking-in-pregnancy-2018-Challenge-Group-report-FINAL.pdf?v=1655484455>
35. Grant A, Morgan M, Gallagher D, Mannay D. Smoking during pregnancy, stigma and secrets: Visual methods exploration in the UK. *Women Birth.* 2020;33(1):70–6. Available from: <https://doi.org/10.1016/j.wombi.2018.11.012>
36. Calder R, Gant E, Bauld L, McNeill A, Robson D, Brose LS. Vaping in Pregnancy: A Systematic Review. *Nicotine Tob Res.* 2021;23(9):1451–8. Available from: <https://academic.oup.com/ntr/article/23/9/1451/6128578>
37. Bowker K, Lewis S, Phillips L, Orton S, Ussher M, Naughton F, et al. Pregnant women's use of e-cigarettes in the UK: a cross-sectional survey. *BJOG.* 2021;128(6):984–93. Available from: <https://doi.org/10.1111/1471-0528.16553>
38. Hajek P, Przulj D, Pesola F, Griffiths C, Walton R, McRobbie H, et al. Electronic cigarettes versus nicotine patches for smoking cessation in pregnancy: a randomized controlled trial. *Nat Med.* 2022;28(5):958–64. Available from: <https://doi.org/10.1038/s41591-022-01808-0>
39. Royal College of Physicians. Nicotine without smoke: Tobacco harm reduction. London: Royal College of Physicians; 2016. Available from: <https://www.rcplondon.ac.uk/projects/outputs/nicotine-without-smoke-tobacco-harm-reduction>
40. Kim S, Selya AS. The Relationship Between Electronic Cigarette Use and Conventional Cigarette Smoking Is Largely Attributable to Shared Risk Factors. *Nicotine Tob Res.* 2020;22(7):1123–30. Available from: <https://doi.org/10.1093/ntr/ntz157>
41. Farsalinos KE, Gillman G. Carbonyl Emissions in E-cigarette Aerosol: A Systematic Review and Methodological Considerations. *Front Physiol.* 2018;8:1119. Available from: <https://doi.org/10.3389/fphys.2017.01119>
42. Stephens WE. Comparing the cancer potencies of emissions from vapourised nicotine products including e-cigarettes with those of tobacco smoke. *Tob Control.* 2017;27:10–17. Available from: <https://doi.org/10.1136/tobaccocontrol-2017-053808>
43. Scungio M, Stabile L, Buonanno G. Measurements of electronic cigarette-generated particles for the evaluation of lung cancer risk of active and passive users. *J Aerosol Sci.* 2018;115:1–11. Available from: <https://doi.org/10.1016/j.jaerosci.2017.10.006>
44. George J, Hussain M, Vadeveloo T, Ireland S, Hopkinson P, Struthers A, et al. Cardiovascular Effects of Switching From Tobacco Cigarettes to Electronic Cigarettes. *J Am Coll Cardiol.* 2019;74(25):3112–20. Available from: <https://doi.org/10.1016/j.jacc.2019.09.067>
45. Polosa R, Morjaria JB, Prosperini U, Russo C, Pennisi A, Puleo R, et al. Health effects in COPD smokers who switch to electronic cigarettes: a retrospective-prospective 3-year follow-up. *Int J Chron Obstruct Pulmon Dis.* 2018;13:2533–42. Available from: <https://doi.org/10.2147/copd.s161138>

46. Polosa R, Morjaria JB, Caponnetto P, Caruso M, Campagna D, Amaradio MD, et al. Persisting long term benefits of smoking abstinence and reduction in asthmatic smokers who have switched to electronic cigarettes. *Discov Med*. 2016;21(114):99–108. Available from: <https://doi.org/10.1016/j.jaci.2015.12.017>
47. Polosa R, Cibella F, Caponnetto P, Maglia M, Prosperini U, Russo C, et al. Health impact of E-cigarettes: a prospective 3.5-year study of regular daily users who have never smoked. *Sci Rep*. 2017;7(1):13825. Available from: <https://doi.org/10.1038/s41598-017-14043-2>
48. Dawkins L, Corcoran O. Acute electronic cigarette use: nicotine delivery and subjective effects in regular users. *Psychopharmacology*. 2014;231(2):401–7. Available from: <https://doi.org/10.1007/s00213-013-3249-8>
49. McRobbie H, Bullen C, Hartmann-Boyce J, Hajek P. Electronic cigarettes for smoking cessation and reduction. *Cochrane Database Syst Rev*. 2014; Issue 12. Art. No.: CD010216. Available from: <https://doi.org/10.1002/14651858.CD010216.pub2>
50. Claire R, Chamberlain C, Davey M, Cooper SE, Berlin I, Leonardi-Bee J, et al. Pharmacological interventions for promoting smoking cessation during pregnancy. *Cochrane Database Syst Rev*. 2020; Issue 3. Art. No.: CD010078. Available from: <https://doi.org/10.1002/14651858.CD010078.pub3>
51. Zoe Health Study. Smoking associated with increased risk of COVID-19 symptoms. 6 January 2021. Available from: <https://covid.joinzoe.com/post/covid-smoking-risk>
52. Medicines & Healthcare products Regulatory Agency. Interactive Drug Analysis Profile: Varenicline; updated August 2023. Available from: https://info.mhra.gov.uk/drug-analysis-profiles/dap.html?drug=/UK_EXTERNAL/NONCOMBINED/UK_NON_000174190963.zip&agency=MHRA
53. Medicines & Healthcare products Regulatory Agency. Interactive Drug Analysis Profile: Bupropion; updated August 2023. Available from: https://info.mhra.gov.uk/drug-analysis-profiles/dap.html?drug=/UK_EXTERNAL/NONCOMBINED/UK_NON_001071644332.zip&agency=MHRA
54. Medicines & Healthcare products Regulatory Agency. Interactive Drug Analysis Profile: Nicotine; updated August 2023. Available from: https://info.mhra.gov.uk/drug-analysis-profiles/dap.html?drug=/UK_EXTERNAL/NONCOMBINED/UK_NON_00067195387.zip&agency=MHRA
55. Hiscock R, Arnott, D, Dockrell M, Ross L, McEwen A. Stop Smoking Practitioners' understanding of e-cigarettes' use and efficacy with particular reference to vapers' socioeconomic status. *J Smok Cessat*. 2019;14(1):21–31. Available from: <https://doi.org/10.1017/jsc.2018.9>
56. Smoking in Pregnancy Challenge Group. Use of electronic cigarettes before, during and after pregnancy. A guide for maternity and other healthcare professionals. Smoking in Pregnancy Challenge Group. 2019. Available from: <https://smokefreeaction.org.uk/wp-content/uploads/2019/08/2019-Challenge-Group-ecigs-briefing-FINAL.pdf>
57. National Centre for Smoking Cessation and Training. Local Stop Smoking Services: Service and Delivery Guidance, 2014. National Centre for Smoking Cessation and Training in partnership with Public Health England. 2014. Available from: https://www.ncsct.co.uk/usr/pub/LSSS_service_delivery_guidance.pdf
58. Heatherton TF, Kozlowski LT, Frecker RC, Rickert W, Robinson J. Measuring the Heaviness of Smoking: Using self-reported time to the first cigarette of the day and number of cigarettes smoked per day. *Br J Addict*. 1989;84(7):791–9. Available from: <https://doi.org/10.1111/j.1360-0443.1989.tb03059.x>
59. Tattan-Birch H, Hartmann-Boyce J, Kock L, Simonavicius E, Brose L, Jackson S, et al. Heated tobacco products for smoking cessation and reducing smoking prevalence. *Cochrane Database Syst Rev*. 2022; Issue 1. Art. No.: CD013790. Available from: <https://doi.org/10.1002/14651858.cd013790.pub2>
60. Caponnetto P, Campagna D, Maglia M, Benfatto F, Emma R, Caruso M, et al. Comparing the Effectiveness, Tolerability, and Acceptability of Heated Tobacco Products and Refillable Electronic Cigarettes for Cigarette Substitution (CEASEFIRE): Randomized Controlled Trial. *JMIR Public Health Surveill* 2023;9:e42628. Available from: <https://publichealth.jmir.org/2023/1/e42628>
61. Jensen RP, Luo W, Pankow JF, Strongin RM, Peyton DH. Hidden formaldehyde in e-cigarette aerosols. *N Engl J Med*. 2015;372:392–4. Available from: <https://www.nejm.org/doi/10.1056/NEJMc1413069>
62. Farsalinos KE, Voudris V, Poulas K. E-cigarettes generate high levels of aldehydes only in 'dry puff' conditions. *Addiction*. 2015;110:1352–6. Available from: <https://doi.org/10.1111/add.12942>
63. Nitzkin JL, Farsalinos K, Siegel M. More on hidden formaldehyde in e-cigarette aerosols. *N Engl J Med*. 2015;372(16):1575. Available from: <https://doi.org/10.1056/NEJMc1502242/>
64. McRobbie H, Phillips A, Goniewicz ML, Smith KM, Knight-West O, Przulj D. Effects of Switching to Electronic Cigarettes with and without Concurrent Smoking on Exposure to Nicotine, Carbon Monoxide, and Acrolein. *Cancer Prev Res (Phila)*. 2015;8(9):873–8. Available from: <https://doi.org/10.1158/1940-6207.capr-15-0058>
65. Banks E, Yazidjoglou A, Brown S, Nguyen M, Martin M, Beckwith K, et al. Electronic cigarettes and health outcomes: umbrella and systematic review of the global evidence. *Med J Aust*. 2023 Apr 3;218(6):267–75. Available from: <https://doi.org/10.5694/mja2.51890>
66. 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). 2020. Available from: <https://cot.food.gov.uk/sites/default/files/2020-09/COT%20E%28N%29NDS%20statement%202020-04.pdf>

Appendix 1: Regulation

The main elements of the Tobacco and Related Products Regulations 2016 related to vaping:

- A notification scheme where manufacturers must provide a dossier of information six months before a product can be placed on the market. All existing products had to be notified by November 2016.
- Manufacturers are required to submit data on product sales annually.
- Restrictions on advertising, sponsorship, and promotion of e-cigarettes.
- Limiting the strength of nicotine in e-liquid to 20mg/ml (2%).
- Restricting the size of e-liquid containers to 10ml.
- Limiting the size of vape device tanks to 2ml.
- Banning additional ingredients such as vitamins, minerals, caffeine, and taurine.
- Products must be child and tamper proof, protected against breakage and leakage and have a mechanism that ensures refilling without leakage.
- Mandatory health warnings that cover at least 30% of the packaging and state: "This product contains nicotine which is a highly addictive substance".
- Product labelling that includes a list of all the ingredients, nicotine content, batch number and recommendation to keep out of reach of children; use of certain descriptors (e.g., natural or organic) is also prohibited.
- Products must include a leaflet containing information on instructions for use, contraindications (e.g., non-smokers and young people), warnings for specific groups, possible side effects, addictiveness and toxicity, and the contact details of the manufacturer or importer.
- Manufacturers to set up a system whereby consumers can notify them of suspected adverse events.
- Members of the public and healthcare professionals can use the MHRA Yellow Card Scheme to report any suspected side effects or safety concerns with vapes or e-liquids.

