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# BMJ Open

## Youth's engagement and perceptions of disposable e-cigarettes: a focus group study

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3 **Youth's engagement and perceptions of disposable e-cigarettes: a**  
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6 **focus group study**  
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## ABSTRACT

**Objectives:** Evidence suggests that use of flavoured disposable electronic cigarettes (e-cigarettes) is increasing. Considering the growing popularity and rapid evolution of e-cigarettes, we explored youth's perceptions and engagement with disposable e-cigarettes.

**Methods:** Twenty focus groups were conducted between March and May 2022, with 82 youths aged 11-16 living in the Central belt of Scotland. Youths were asked about smoking and vaping behaviours and disposable e-cigarettes and were shown vaping-related images and videos from social media which were used to stimulate discussion about different messages, presentations, and contextual features. Transcripts were imported into NVivo 12, coded thematically, and analysed.

**Results:** Youths described disposable e-cigarettes as 'cool', 'fashionable', and enticing and viewed as a modern lifestyle 'accessory'. Tank models were perceived as being used by older adults. Youths stated that disposable e-cigarettes were designed in a way to target youths and the brightly coloured devices and range of flavourings encouraged youths to want to try the products, particularly sweet flavourings. Participants perceived e-cigarettes to be less harmful compared to combustible cigarettes but noted the uncertainty of ingredients in disposable e-cigarettes.

**Conclusions:** Youths distinguish between e-cigarettes with varying characteristics and social perceptions of users. These findings provide evidence that disposable e-cigarettes are attractive to youths. Future research is needed to understand the factors that contribute to youth perceptions of disposable e-cigarettes. Policymakers should work together to design and implement policies and strategies to prevent youth uptake of vaping.

### What is already known on this topic

- The use of disposable e-cigarettes among youths in UK has increased in 2022 compared to 2021.
- Despite differences in opinion within the public health community regarding the value of e-cigarettes in harm reduction for adults, there is broad consensus on the need to protect young people from initiating vaping.

### What this paper adds

- E-cigarettes are appealing to young people and they perceive disposable e-cigarettes as targeted at them.
- The compact design of disposable e-cigarettes allows young people to conceal the products when in school.

### How this study might affect research, practice or policy

- Policymakers should work together to develop and implement comprehensive policies to prevent initiation among youths and evaluate the safe recycling and disposal of disposable e-cigarettes.
- Future research should investigate e-cigarette sub-types to understand product perceptions more fully; and should be considered in future prevention and regulatory efforts.

## BACKGROUND

The introduction of electronic nicotine delivery products (ENDS) to the market has resulted in the polarisation of many public health debates. The use of e-cigarettes among youths in Great Britain (GB) has increased in 2022 compared to 2021; however, use among never-smokers remains low and mostly experimental [1, 2]. Despite differences in opinion within the public health community regarding the value of e-cigarettes in harm reduction for adults, there is broad consensus on the need to protect young people from initiating vaping [3].

Since the development of the first e-cigarette in 2003, there are now a variety of models or ‘generations’ available. First-generation e-cigarettes (sometimes referred to as ‘cigalikes’) were disposable and designed to mimic the look and feel of combustible cigarettes [4]. Over time, new e-cigarette types were developed to more effectively deliver nicotine contained in e-liquid. Second-generation e-cigarettes are larger and are generally refillable using e-liquids [5]. Third-generation e-cigarettes (tanks or mods) are much larger than the previous generations and are refillable and rechargeable [4, 6]. They are modifiable devices (‘mods’), meaning the user can customise the substances in the device [7] and adjust the power of the device to give a stronger throat hit [8, 9]. The fourth generation of e-cigarettes is called ‘Pod Mod’. They contain a prefilled or refillable ‘pod’ or pod cartridge with a modifiable ‘mod’ system (‘Pod-Mod’) [6].

Recently, disposable e-cigarettes (such as “Puff-bar”, “Elf-bar”, or “Geek-bar”) have started to dominate the market [10]. Unlike earlier first-generation disposables, these products deliver nicotine more effectively using similar technology to pod devices [11, 12]. The majority of these products contain 20 mg of nicotine salt, with a total of 600 puffs - equivalent to 45 cigarettes [12]. Disposable e-cigarettes retail for around £5 to £7 (\$7 to \$9) in the UK — about half the price of a pack of 20 cigarettes [13]. In Great Britain, data captured in 2022, found that disposable e-cigarettes have become the most common device type (52.0% compared to 7.7% in 2021), with Elf Bar and Geek Bar being the most popular brands [1]. Despite the popularity of disposable e-cigarettes, little is known about the design, chemical characteristics, or how they may impact health.

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3 Considering the rapid growth and popularity of disposable e-cigarettes, this research aims to explore  
4 youth's perceptions and engagement with disposable e-cigarettes, awareness of product  
5 characteristics, appeal of products and flavours, perceptions of harm, perceived target group, and  
6 purchasing behaviours.  
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## 11 12 13 **METHODS**

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16 We conducted 20 focus groups between March and May 2022. Focus groups included between three  
17 and five participants (a total of 82 participants). Purposive sampling was used to recruit a diverse  
18 sample of youths in terms of sex, socio-economic background, and smoking and vaping status. Eleven  
19 groups were recruited through youth workers in local youth organisations. These gatekeepers handed  
20 out information sheets and helped achieve the sampling frame in terms of youth demographics and  
21 experiences with regard to traditional cigarettes and e-cigarettes. The three organisations that helped  
22 with participant recruitment worked specifically with young people from disadvantaged backgrounds  
23 in urban areas. This recruitment strategy resulted in the inclusion of a range of participants from more  
24 affluent and more deprived backgrounds and with experiences of smoking and vaping. Seven groups  
25 were recruited through the Schools Health and Wellbeing Improvement Research Network (SHINE)  
26 Newsletter which is distributed monthly to over 500 schools in Scotland. The remaining two groups  
27 were recruited via personal networks directly by MS.  
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41 Focus group discussions were facilitated to allow the research team to explore how opinions about  
42 disposable e-cigarettes are developed. Friendship groups of 3–5 participants were used to facilitate in-  
43 depth insights and promote participant interaction. Each participant was given a £20 shopping  
44 voucher as compensation for their time.  
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50 Prior to the start of the focus groups, participants completed a short anonymous questionnaire about  
51 their age, sex, postcode, smoking, and e-cigarette use status. For both traditional cigarettes and e-  
52 cigarettes, the questionnaire asked participants to specify whether they had tried or used them in the  
53 past or were using them at the time of the study. Based on a review of the literature a topic guide was  
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3 developed which covered three key areas, including different types of e-cigarette products and  
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5 flavours, perceptions of harm, and purchasing behaviours.  
6  
7 Images of different types of e-cigarettes ('tanks', disposables, and pod devices) and e-liquids were  
8  
9 used as conversation starters. Group discussions were facilitated by MS. Ten of the groups were  
10  
11 conducted online using Microsoft Teams and ten were conducted face-to-face. Of these, one of the  
12  
13 groups was conducted on the youth organisation's premises, and the other nine were conducted at the  
14  
15 school, with representatives of the youth organisation present. Groups lasted between 40 and  
16  
17 66 minutes. Field-notes reflecting on the focus group and individual issues discussed were written up  
18  
19 for each group. All focus groups were audio recorded with participants' permission and transcribed  
20  
21 verbatim. Each transcript was imported into NVivo 12, coded independently, cross-checked, and  
22  
23 analysed by MS and SH. Contradictory cases and group dynamics were discussed, making use of  
24  
25 transcripts and field notes. Ethical approval for the study was obtained from the University of  
26  
27 Glasgow's Medical and Veterinary Life Sciences Ethics Committee (reference 200210034).  
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### 32 **Patient and public involvement**

33  
34 This research was done without patient or public involvement. It was not appropriate to involve  
35  
36 patients or the public in the design, or conduct, or reporting, or dissemination plans of our research.  
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## 43 **RESULTS**

### 44 **Participant characteristics**

45  
46 Eighty-two youths aged 11–16 years participated (47 females (57%) and 35 males (43%)),  
47  
48 representing diversity in sociodemographic characteristics and smoking-related behaviours. Age  
49  
50 distribution within the sample was skewed slightly towards 14–15-year-olds, with 14-year-olds  
51  
52 making up the largest subgroup (n= 24). While the majority of participants did not currently smoke or  
53  
54 use e-cigarettes, the sample included 10 smokers and 18 youths who used e-cigarettes. Table 1  
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3 describes the focus group composition and participants in more detail and Table 2 summarises  
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5 smoking and e-cigarette use among the sample.  
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Group	Area	Sex	Age	Cigarette Smoker	E-cigarette use
1	Affluent	Female	13-15	Never	Never
2	Affluent	Female	14-15	Never	Mixed – Never (4) / Tried (1)
3	Affluent	Female	13-16	Never	Mixed – Never (2) / Tried (1)
4	Deprived	Mixed – Male (3)/Female (2)	12-15	Mixed – Never (3) / Current (2)	Mixed – Never (3) / Tried (1)/ Current (1)
5	Deprived	Mixed – Male (1)/ Female (4)	14-16	Mixed – Never (2)/ Tried (2)/ Current (1)	Mixed – Never (2)/ Tried (2)/ Current (1)
6	Deprived	Male	12-15	Never	Never
7	Deprived	Male	16	Current	Current
8	Affluent	Mixed – Male (2)/Female (3)	14	Never	Never
9	Deprived	Male	16	Mixed – Tried (1)/ Current (2)	Current
10	Deprived	Mixed – Male (4)/Female (1)	14-15	Mixed – Never (3)/ Tried (1)/ Current (1)	Mixed – Never (3)/ Tried (1)/ Current (1)
11	Deprived	Mixed – Male (3)/Female (2)	13-16	Mixed – Never (2)/ Tried (2)/ Current (1)	Mixed – Never (1)/ Current (4)
12	Affluent	Mixed – Male (2)/Female (1)	15-16	Tried	Mixed – Tried (2)/ Current (1)
13	Affluent	Female	13-16	Never	Never
14	Deprived	Mixed – Male (1)/Female (3)	11-12	Never	Never
15	Deprived	Mixed – Male (3)/Female (1)	11-12	Never	Never
16	Deprived	Mixed – Male (2)/Female (2)	11-12	Never	Never
17	Deprived	Female	14-16	Mixed – Never (4)/ Tried (1)	Mixed – Never (1)/ Tried (1)/ Current (3)
18	Deprived	Male	13-16	Never	Never
19	Deprived	Female	14	Never	Mixed – Tried (2)/ Current (1)
20	Affluent	Female	15-16	Never	Tried (3)

**Table 1: Focus group location, participants and their cigarette smoking and e-cigarette use.**

	E-cigarette use											
	Never			Tried			Current			Total		
<b>Cigarette smoker</b>	<b>n</b>	<b>(col %)</b>	<b>(row %)</b>	<b>n</b>	<b>(col %)</b>	<b>(row %)</b>	<b>n</b>	<b>(col %)</b>	<b>(row %)</b>	<b>n</b>	<b>(col %)</b>	<b>(row %)</b>
<b>Never</b>	49	98.0%	79.0%	9	64.3%	14.5%	4	22.2%	6.5%	62	75.6%	100.0%
<b>Tried</b>	1	2.0%	10.0%	4	28.6%	40.0%	5	27.8%	50.0%	10	12.2%	100.0%
<b>Current</b>	0	0.0%	0.0%	1	7.1%	10.0%	9	50.0%	90.0%	10	12.2%	100.0%
<b>Total</b>	50	1	89.0%	14	100.0%	14.6%	18	100.0%	22.0%	82	100.0%	100.0%

**Table 2. E-cigarette use according to cigarette smoking.**

### Product characteristics

Youths referred to disposable e-cigarettes as vapes or disposable vapes. Participants described products based on product characteristics including rechargeable/disposable and design (small versus large). Some reported that the disposable variety were not e-cigarettes and the rechargeable were.

*“They [disposable e-cigarettes] aren’t real ‘cause they are disposable, they aren’t real vapes.” (Male, current smoker, current vaper)*

Product characteristics such as design were also used to classify products. Participants discussed disposable e-cigarettes being small colourful products, whereas the rechargeable tank models were bulky.

*“I think they’ve been designed differently, so you can tell which ones apart. Like, the electrical ones, the ones that you charge, they’re like bigger, and a bit, like, bulkier.” (Female, never smoker, never vaper)*

Participant views diverged when shown illustrative examples of different types of vaping products, particularly disposable e-cigarettes. Several participants were able to easily recognise disposable e-cigarettes but not other types:

*“There is definitely like one that I recognise like the small wee pink one with the black top. But I didn’t recognise the rest to be honest.” (Female, never smoker, never vaper)*

Several participants were not able to identify disposable e-cigarettes when shown illustrative examples and often thought they were other products, such as highlighters or lighters.

*“That’s not a vape, it was a highlighter.” (Male, never smoker, never vaper)*

*“When I first saw it, it looked like a lighter.” (Male, never smoker, never vaper)*

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2  
3 *“Like a tin of mints or something.” (Female, never smoker, tried vaping)*  
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### 6 **Appeal of products**

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8 Participants described several positive attributes of disposable e-cigarettes including the design, as  
9 they were portable and discreet.  
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12  
13 *“If you’re an underage child vaping you’re not going to want to have that big*  
14 *bulky thing ’cause you might get caught with it. Something as small as the thin*  
15 *thing, that could easily fit in your pocket and not have anyone notice. But that*  
16 *thing [tank model], you’d have it sticking out to see.” (Male, never smoker, never*  
17 *vaper)*  
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25 This was also discussed by participants when referring to using the products at school.  
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27

28 *“Yeah, they are much smaller so, they can hide them when at school.” (Female,*  
29 *never smoker, current vaper)”*  
30  
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### 33 **Appeal of flavours**

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35 Participants particularly liked the variety of flavours that are available such as apple and pink  
36 lemonade. Several participants discussed that the variety of flavours encouraged users to try other  
37 available flavours.  
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41  
42 *“You get like different flavours in sweets and stuff, you might like the taste of*  
43 *blueberry and because in the vape you’ve got that same taste, that’s where it’d be*  
44 *like, oh I really like blueberry, I’d want to see if it is, and then that’s what also*  
45 *gets you addicted to it.” (Male, tried smoking, current vaper)*  
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52 Interestingly, when participants discussed flavours, they specifically referred to disposable e-  
53 cigarettes, with several participants unaware that e-liquids were available in a variety of flavourings.  
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3 *“Like the range of flavours, and how we were saying about how the disposable*  
4 *vapes had, like, a lot of different flavours. But we weren't aware of the flavours*  
5 *that came with e-liquid ones.” (Female, never smoker, never vaper)*  
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10 Participants associated the colour of disposable e-cigarettes with flavourings, for example, one dual  
11 user stated, *“certain flavours would have different designs. Strawberry would have pink or red”*  
12 *(Male, current smoker, current vaper)*. While, one nonuser explained, *“the likes of strawberry, that*  
13 *would be red because strawberries are red. And they would do different colours like that, 'cause of*  
14 *the flavours” (Female, never smoker, never vaper)*.  
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### 23 **Perceived negative attributes**

24 Disposable e-cigarettes are designed for single use and the environmental impact of the waste was  
25 raised by participants.  
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30 *“They [disposable e-cigarettes] are bad for the environment because people just*  
31 *throw them away.” (Female, never smoker, current vaper)*  
32  
33  
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35 Participants also spoke about the products being non-recyclable and that this affects the environment.  
36 One participant stated, *“I don't think they're recyclable, either, so it's like a lot more waste” (Female,*  
37 *never smoker, never vaper)*, another participant added, *“they [disposable e-cigarettes] take longer to*  
38 *break down, definitely” (Male, never smoker, never vaper)*.  
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46 One e-cigarette user explained that the environmental impact of using a disposable e-cigarette does  
47 not affect his choice to use them.  
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50  
51 *“I like to use the ones which are disposable and not ones which are refillable. It is*  
52 *a collective effort to save the environment, but I don't want to put extra money to*  
53 *save the environment.” (Male, tried smoking, current vaper)*  
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### 58 **Perceived target audience**

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3 The design of the products was further referred to by participants when discussing the target audience  
4 of the different types of vaping products. Participant views of users were dependent on the subtype of  
5 products used. For example, the larger tank models were perceived to be targeted at and used by users  
6 older in age, while disposable e-cigarettes were described as ‘cool’, ‘trendy’, and a ‘fashion  
7 accessory’ and were perceived to be targeted at and used by youths.  
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14  
15 *“The disposables are used by like all younger people like aged 15 and 16. But*  
16 *adults, they’ve got the bigger ones like the rechargeable ones.” (Female, tried*  
17 *smoking, tried vaping)*  
18

19  
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21  
22 *“The disposable ones have got different colours, they’re brighter, that’s probably*  
23 *more aimed at younger people. Whereas, you know, like the big chunky ones are*  
24 *probably more aimed for people who have actually come off smoking.” (Female,*  
25 *never smoker, tried vaping)*  
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### 30 31 **Perceptions of harm**

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33 Many youths perceived disposable e-cigarettes as less harmful than combustible cigarettes.  
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37 *“They’re not as bad as actual cigarettes for you. So, it can cut down the amount*  
38 *of cigarettes that you smoke.” (Female, current smoker, current vaper)*  
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44 Although disposable e-cigarettes were perceived as less harmful compared to tobacco cigarettes, non-  
45 user youths who mentioned composition and the ingredients of disposable e-cigarettes, were  
46 concerned about the uncertainty of product ingredients and how they could affect their health.  
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53 *“There’s like about 40 or 50 chemicals that go into vapes that nobody in this*  
54 *room could name, all cheaply produced. So, see when you’re inhaling it deep into*  
55 *your lungs it’s obviously not going to be the best for you.” (Male, never smoker,*  
56 *never vaper)*  
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1  
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3 *“I saw a thing on TikTok, Elfbars and Geek bars have got 50 unknown chemicals*  
4 *in them.” (Male, never smoker, never vaper)*  
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8 *“Just see like the actual vapes instead of the disposables, they’ve all been tested. I*  
9 *don’t think the disposables have been tested.” (Male, never smoker, never vaper)*  
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13 Several participants from different focus groups reported seeing people attempting to reuse the  
14 disposable e-cigarettes once they have been discarded.  
15

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18 *“A lot of people will go and find them. It’s weird. It’s like people chuck them and*  
19 *other people go and find them and use them.” (Male, never smoker, never vaper)*  
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### 23 **Purchasing behaviours**

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25 Several participants commented on the low cost of disposable e-cigarettes.  
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29 *“Like metal ones, I don’t even know, I’m guessing around like 70 or £80, but then*  
30 *the disposable ones are like 6 to 12 or something like that.” (Female, never*  
31 *smoker, never vaper)*  
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35  
36 With some participants commenting favourably on the relatively low cost of disposable e-cigarettes,  
37 suggesting that price could be a factor in why youths experiment with the products.  
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41 *“They’re cheap and cheerful.” (Female, never smoker, current vaper)*  
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44  
45 *“That’s probably an attraction for young people because they’re more*  
46 *affordable.” (Female, never smoker, tried vaping)*  
47  
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49  
50 Participants also described the ease of purchasing disposable e-cigarette products, particularly in  
51 corner shops.  
52

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54  
55 *“Like, I’m 16 and I buy Red Bull in there [corner shop] but I’ve got such a baby*  
56 *face. Like, I could walk into the shop and go, you’re not 16. But if I was to buy a*  
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3 *vape they would give me it, loads of folk underage buy them [disposable e-*  
4 *cigarettes] there.” (Female, tried smoking, tried vaping)*  
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8 Several participants discussed the ease of being able to purchase the products online as well.  
9

10  
11 *“Some places, some websites online, you don't need to put your age or anything.*  
12 *I've seen a thing on TikTok. Like, they put them [disposable e-cigarettes] in the*  
13 *wee boxes and all that, or you could put them in secret packaging like behind the*  
14 *lashes. Like you can order it off their website and they'll hide it in the packaging,*  
15 *they put a few bits of sweeties on top of your vapes so your mum doesn't see it.”*  
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22 *(Female, tried smoking, current vaper)*  
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## 27 **DISCUSSION**

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30 Our qualitative thematic analysis of youths' perceptions and engagement of disposable e-cigarettes  
31 highlighted a public health concern. We identified several themes that reflected both user and non-  
32 user experiences and understandings regarding the products. E-cigarettes have become increasingly  
33 popular and visible in public life and perceptions about e-cigarette users were tied to product  
34 characteristics, with tank models being associated with adults and disposable e-cigarettes associated  
35 with youths. The design of disposable e-cigarettes was a recurrent topic. Youth discussed the positives  
36 of the compact design of the product as this allowed them to be discretely carried and hidden when in  
37 school. We found that youths commonly mistake the products for other everyday products, such as  
38 highlighters and tins of mints. This combined with the compact design of the products raises concerns  
39 about the way manufactures design the products and if this has been done intentionally to target a  
40 younger audience.  
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53 E-cigarette users believed that disposable e-cigarettes are less harmful than combustible cigarettes,  
54 while nonusers reported concerns about the unknown chemical composition of disposable e-  
55 cigarettes. While e-cigarettes are considered less harmful than combustible cigarettes [14, 15],  
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3 balanced policies are needed that motivate cigarette smokers to switch to e-cigarettes, yet prevent  
4 non-smokers or non-nicotine users from initiating, particularly youths.  
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6  
7 The increased popularity of disposable e-cigarettes (such as PuffBar and ElfBar), has resulted in the  
8 generation of more single-use plastic waste. Both users and non-users were aware of the negative  
9 environmental impact of using disposable e-cigarettes. E-cigarettes remain subject to political and  
10 public health debates for various reasons, including the lack of evidence on their long-term health  
11 impact, and now there is a new topic in the scientific debate; disposable e-cigarettes are a rising  
12 environmental threat [16, 17]. Thus, regulation should not only focus on the health effects of e-  
13 cigarette products, but may wish to consider their environmental impact.  
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17 Consistent with previous research [18, 19], our study found that participants particularly like the  
18 variety of disposable e-cigarette flavours. Consistent with previous research the variety of available  
19 flavours is one of the top reasons for experimentation with e-cigarettes among youths [18, 20-22].  
20 Interestingly, in our study, participants discussed flavours predominately in relation to disposable e-  
21 cigarettes, often associating the colour of the product with its flavour. It was perceived from the  
22 youths in this study that disposable e-cigarettes are targeted to younger audiences. While rechargeable  
23 e-cigarettes (tank models) were perceived by our participants, as products for adults.  
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26  
27 More research is needed to determine the most effective means to counter the favourable/positive  
28 aspects of e-cigarettes to reduce youths' interest in product trial and use. In addition, more evidence is  
29 needed to determine what has contributed to the popularity of disposable e-cigarettes among youths,  
30 including, but not limited to, the role of marketing. These findings could inform future policies on e-  
31 cigarette prevention.  
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35 As with all research, our study has some limitations. First, and consistent with the qualitative design,  
36 the sample does not aim to be representative of UK youth, as our study focused on Scottish youths.  
37 However, we did have a diverse sample of both sexes. Secondly, the study's geographical remit has to  
38 be considered when interpreting the findings. The UK is considered an international leader in tobacco  
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3 control policy. It is possible that participants' views may have been influenced by the UK's unique  
4 favourable policy approach to e-cigarettes and legal and socio-cultural context, including low  
5 smoking prevalence. Thirdly, the data was collected in different formats (online and face-to-face), and  
6 it is possible that this may have influenced participants' responses. Two of the online groups were  
7 conducted in a classroom with a teacher present, and during seven face-to-face groups, a  
8 teacher/youth worker was present in the room. It is possible that the presence of a teacher/youth  
9 worker may have influenced youth's willingness to answer questions and their responses. Finally, two  
10 of the groups were recruited through personal networks and this may have impacted on the youth's  
11 responses. Despite these limitations, our study results have implications for public health and policy.  
12 Results from our study highlighted that youths positively describe the relatively low cost of  
13 disposable e-cigarettes, suggesting that price could be a factor in why youths experiment with  
14 disposable e-cigarettes. Raising prices on combustible cigarettes and alcohol has consistently shown  
15 to be inversely related to use [23, 24], particularly among younger populations [25, 26]. Therefore,  
16 policymakers could consider implementing measures to deter youth experimentation with disposable  
17 e-cigarettes, while not making the products inaccessible to vulnerable groups who may use them as a  
18 smoking cessation option. Our study suggests the growing need for policymakers to work together to  
19 develop and implement comprehensive policies to prevent initiation among youths and evaluate the  
20 safe recycling and disposal of disposable e-cigarettes.  
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## 43 CONCLUSION

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45 We found that youths differentiated between disposable e-cigarettes and larger tank models, for which  
46 they had varying perceptions of product users. Our study highlights the need for additional research  
47 on e-cigarette sub-types to understand product perceptions more fully; and should be considered in  
48 future prevention and regulatory efforts. In addition, while many positive attributes of disposable e-  
49 cigarettes were reported, key negative attributes that may discourage use, such as unknown chemical  
50 composition and environmental impact, were also described. The findings from our study suggest the  
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growing need for policymakers to work together to develop and implement policies to prevent uptake among youths.

## Declarations

**Ethical approval:** Ethical approval for the study was obtained from the University of Glasgow's Medical and Veterinary Life Sciences Ethics Committee (reference 200210034).

**Data availability:** No additional data available.

**Competing interests:** The authors declare that they have no competing interests.

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**Authors' contributions:** MS conducted all focus groups and performed all analysis. All authors contributed to the design of the topic guide. MS wrote the first draft of the manuscript. All authors read and approved the final manuscript.

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# BMJ Open

## Youth's engagement and perceptions of disposable e-cigarettes: a UK focus group study

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4 1 **Youth's engagement and perceptions of disposable e-cigarettes: a**  
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7 2 **UK focus group study**  
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11 4 Marissa J. Smith<sup>1\*</sup>, Anne Marie MacKintosh<sup>2</sup>, Allison Ford<sup>2</sup> and Shona Hilton<sup>1</sup>  
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## 13 ABSTRACT

14 **Objectives:** Evidence suggests that use of flavoured disposable electronic cigarettes (e-cigarettes) is  
15 increasing. Considering the growing popularity and rapid evolution of e-cigarettes, we explored  
16 youth's perceptions and engagement with disposable e-cigarettes.

17 **Methods:** Twenty focus groups were conducted between March and May 2022, with 82 youths aged  
18 11-16 living in the Central belt of Scotland. Youths were asked about smoking and vaping behaviours  
19 and disposable e-cigarettes and were shown vaping-related images and videos from social media  
20 which were used to stimulate discussion about different messages, presentations, and contextual  
21 features. Transcripts were imported into NVivo 12, coded thematically, and analysed.

22 **Results:** Youths described disposable e-cigarettes as 'cool', 'fashionable', and enticing and viewed as  
23 a modern lifestyle 'accessory'. Tank models were perceived as being used by older adults. Youths  
24 stated that disposable e-cigarettes were designed in a way to target youths and the brightly coloured  
25 devices and range of flavourings encouraged youths to want to try the products, particularly sweet  
26 flavourings. Participants perceived e-cigarettes to be less harmful compared to combustible cigarettes  
27 but noted the uncertainty of ingredients in disposable e-cigarettes.

28 **Conclusions:** Youths distinguish between e-cigarettes with varying characteristics and social  
29 perceptions of users. These findings provide evidence that disposable e-cigarettes are attractive to  
30 youths. Future research is needed to understand the factors that contribute to youth perceptions of  
31 disposable e-cigarettes. Policymakers should work together to design and implement policies and  
32 strategies to prevent youth uptake of vaping.

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3 34 **Strengths and limitation of this study**  
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- 5 35 • This research offers timely insights into youths perceptions about the growing use of  
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8 36 disposable e-cigarettes.  
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10 37 • It provides an in-depth analysis from interviews with a diverse sample of 82 youths  
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12 38 aged 11-16.  
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14 39 • Our findings present new evidence on how youths experience targeted e-cigarette  
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16 40 marketing via social media content as visual prompts.  
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18 41 • Our qualitative thematic analysis of the data allows depth of opinions but cannot offer  
19  
20 42 predictions about the frequency of specific opinions with a wider population.  
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22 43 • However, these findings provide evidence to policymakers that disposable e-cigarettes  
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24 44 are attractive to youths, supporting legislation for policies to prevent youth uptake of  
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26 45 vaping.  
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## 51 BACKGROUND

52 The use of e-cigarettes among youths in Great Britain (GB) has increased in 2022 compared to 2021;  
53 however, use among never-smokers remains low and mostly experimental [1, 2]. Since the  
54 development of e-cigarettes, public health researchers and tobacco control advocates have debated the  
55 role of e-cigarettes as a harm reduction tool. Proponents of e-cigarette harm reduction believe e-  
56 cigarettes can play a role in eliminating smoking related diseases and consider them to be a  
57 breakthrough in harm reduction development [3-5] Whereas opponents of the e-cigarette harm  
58 reduction debate argue that caution should be taken when endorsing e-cigarette products until crucial  
59 evidence becomes available [6]. E-cigarettes are often termed a short-term tobacco harm reduction  
60 tool, as they do not contain tobacco or tar which are known to cause numerous smoking-related  
61 diseases, including cardiovascular disease. A newly published Cochrane review [7] found that  
62 nicotine e-cigarettes were superior to placebo e-cigarettes and at least as effective as nicotine  
63 replacement therapy (NRT) for smoking cessation, which is consistent with findings from other  
64 randomised controlled trials (RCTs) [8-10]. In addition, the review stated that there is moderate  
65 certainty in the evidence that nicotine-containing e-cigarettes increase the quit rate compared to NRT  
66 and non-nicotine-containing e-cigarettes [7]. Despite differences in opinion within the public health  
67 community regarding the value of e-cigarettes in harm reduction for adults, there is broad consensus  
68 on the need to protect young people from initiating vaping [11].  
69 Since the development of the first e-cigarette in 2003, there are now a variety of models or  
70 ‘generations’ available. First-generation e-cigarettes (sometimes referred to as ‘cigalikes’) were  
71 disposable and designed to mimic the look and feel of combustible cigarettes [12]. Over time, new e-  
72 cigarette types were developed to more effectively deliver nicotine contained in e-liquid. Second-  
73 generation e-cigarettes are larger and are generally refillable using e-liquids [13]. Third-generation e-  
74 cigarettes (tanks or mods) are much larger than the previous generations and are refillable and  
75 rechargeable [12, 14]. They are modifiable devices (‘mods’), meaning the user can customise the  
76 substances in the device [15] and adjust the power of the device to give a stronger throat hit [16, 17].

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3 77 The fourth generation of e-cigarettes is called ‘Pod Mod’. They contain a prefilled or refillable ‘pod’  
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5 78 or pod cartridge with a modifiable ‘mod’ system (‘Pod-Mod’) [14].  
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7 79 Recently, disposable e-cigarettes (such as “Puff-bar”, “Elf-bar”, or “Geek-bar”) have started to  
8  
9 80 dominate the market [18]. Disposable e-cigarettes retail for around £5 to £7 (\$7 to \$9) in the UK —  
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11 81 about half the price of a pack of 20 cigarettes [19]. In Great Britain, data captured in 2022, found that  
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13 82 disposable e-cigarettes have become the most common device type (52.0% compared to 7.7% in  
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15 83 2021), with Elf Bar and Geek Bar being the most popular brands [1]. Despite the popularity of  
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17 84 disposable e-cigarettes, little is known about the design, chemical characteristics, or how they may  
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19 85 impact health.  
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22 86 Considering the rapid growth and popularity of disposable e-cigarettes, this research aims to explore  
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24 87 youth's perceptions and engagement with disposable e-cigarettes, awareness of product  
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26 88 characteristics, appeal of products and flavours, perceptions of harm, perceived target group, and  
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28 89 purchasing behaviours. User-generated and influencer marketing content on social media represents a  
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30 90 key influence on young people’s understandings of products. It is essential to monitor the content that  
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32 91 young people access related to e-cigarettes and through focus groups with youths so we can  
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34 92 understand how young people relate to that content, why e-cigarettes might appeal to youths, and why  
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36 93 they need protected, which would not be feasible with population surveys.  
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## 41 95 **METHODS**

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43 96 We conducted 20 focus groups between March and May 2022. Focus groups included between three  
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45 97 and five participants (a total of 82 participants). Purposive sampling was used to recruit a diverse  
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47 98 sample of youths in terms of sex, socio-economic background, and smoking and vaping status. Eleven  
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49 99 groups were recruited through youth workers in local youth organisations. These gatekeepers handed  
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51 100 out information sheets and helped achieve the sampling frame in terms of youth demographics and  
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53 101 experiences with regard to traditional cigarettes and e-cigarettes. The three organisations that helped  
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55 102 with participant recruitment worked specifically with young people from disadvantaged backgrounds  
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57 103 in urban areas. This recruitment strategy resulted in the inclusion of a range of participants from more  
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3 104 affluent and more deprived backgrounds and with experiences of smoking and vaping. Seven groups  
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5 105 were recruited through the Schools Health and Wellbeing Improvement Research Network (SHINE)  
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7 106 Newsletter which is distributed monthly to over 500 schools in Scotland. The remaining two groups  
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9 107 were recruited via personal networks directly by MS.  
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11 108 Focus group discussions were facilitated to allow the research team to explore how opinions about  
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13 109 disposable e-cigarettes are developed. Friendship groups of 3–5 participants were used to facilitate in-  
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15 110 depth insights and promote participant interaction. Each participant was given a £20 shopping  
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17 111 voucher as compensation for their time.  
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19 112 Prior to the start of the focus groups, participants completed a short anonymous questionnaire about  
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21 113 their age, sex, postcode, smoking, and e-cigarette use status. For both traditional cigarettes and e-  
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23 114 cigarettes, the questionnaire asked participants to specify whether they had tried or used them in the  
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25 115 past or were using them at the time of the study. Based on a review of the literature a topic guide was  
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27 116 developed which covered three key areas, including different types of e-cigarette products and  
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29 117 flavours, perceptions of harm, and purchasing behaviours.  
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31 118 Images of different types of e-cigarettes ('tanks', disposables, and pod devices) and e-liquids were  
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33 119 used as conversation starters. Group discussions were facilitated by MS. Ten of the groups were  
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35 120 conducted online using Microsoft Teams and ten were conducted face-to-face. Of these, one of the  
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37 121 groups was conducted on the youth organisation's premises, and the other nine were conducted at the  
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39 122 school, with representatives of the youth organisation present. Groups lasted between 40 and  
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41 123 66 minutes. Field-notes reflecting on the focus group and individual issues discussed were written up  
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43 124 for each group. All focus groups were audio recorded with participants' permission and transcribed  
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45 125 verbatim. We conducted thematic analysis of the data from the interview transcripts and discussion  
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47 126 group minutes. The process followed Braun and Clarke's [20] six-phase framework for thematic  
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49 127 analysis. The steps involved were: 1) familiarisation with the data; 2) generating initial codes; 3)  
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51 128 searching for themes; 4) reviewing themes; 5) defining and naming themes; and 6) writing the report  
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53 129 [20]. The research team read and re-read the transcripts to become familiar with the data, and then  
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55 130 iteratively constructed a coding frame based upon the topic to enable consistent organisation of  
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57 131 relevant data. NVivo was used to organise categories on the basis of inductive themes that emerged

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3 132 from close reading of the, capture of both areas of agreement and less typical perspectives across a  
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5 133 range of categories. Each transcript was imported into NVivo 12, coded independently, cross-  
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7 134 checked, and analysed by MS and SH. Contradictory cases and group dynamics were discussed,  
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9 135 making use of transcripts and field notes. The researcher reflected on her role as researcher, remained  
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11 136 constantly aware of her position and took care not to introduce bias throughout the research. To  
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13 137 further reduce bias the researcher recorded the focus groups and analysed them some time after they  
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15 138 were completed ensuring a more reflective view point of occurrences. Ethical approval for the study  
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17 139 was obtained from the University of Glasgow's Medical and Veterinary Life Sciences Ethics  
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19 140 Committee (reference 200210034).  
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#### 23 24 142 **Patient and public involvement**

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26 143 None.  
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## 29 30 145 **RESULTS**

### 31 32 146 **Participant characteristics**

33  
34 147 Eighty-two youths aged 11–16 years participated (47 females (57%) and 35 males (43%)) in this  
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36 148 study. This sample represented a wide diversity diversity in sociodemographic characteristics and  
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38 149 smoking-related behaviours. The age distribution within the sample was skewed slightly towards 14–  
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40 150 15-year-olds, with 14-year-olds making up the largest subgroup (n= 24). While the majority of  
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42 151 participants did not currently smoke or use e-cigarettes, the sample included 10 smokers and 18  
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44 152 youths who used e-cigarettes. Table 1 describes the focus group composition and participants in more  
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46 153 detail and Table 2 summarises smoking and e-cigarette use among the sample.  
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Group	Area	Sex	Age	Cigarette Smoker	E-cigarette use
1	Affluent	Female	13-15	Never	Never
2	Affluent	Female	14-15	Never	Mixed – Never (4) / Tried (1)
3	Affluent	Female	13-16	Never	Mixed – Never (2) / Tried (1)
4	Deprived	Mixed – Male (3)/Female (2)	12-15	Mixed – Never (3) / Current (2)	Mixed – Never (3) / Tried (1)/ Current (1)
5	Deprived	Mixed – Male (1)/ Female (4)	14-16	Mixed – Never (2)/ Tried (2)/ Current (1)	Mixed – Never (2)/ Tried (2)/ Current (1)
6	Deprived	Male	12-15	Never	Never
7	Deprived	Male	16	Current	Current
8	Affluent	Mixed – Male (2)/Female (3)	14	Never	Never
9	Deprived	Male	16	Mixed – Tried (1)/ Current (2)	Current
10	Deprived	Mixed – Male (4)/Female (1)	14-15	Mixed – Never (3)/ Tried (1)/ Current (1)	Mixed – Never (3)/ Tried (1)/ Current (1)
11	Deprived	Mixed – Male (3)/Female (2)	13-16	Mixed – Never (2)/ Tried (2)/ Current (1)	Mixed – Never (1)/ Current (4)
12	Affluent	Mixed – Male (2)/Female (1)	15-16	Tried	Mixed – Tried (2)/ Current (1)
13	Affluent	Female	13-16	Never	Never
14	Deprived	Mixed – Male (1)/Female (3)	11-12	Never	Never
15	Deprived	Mixed – Male (3)/Female (1)	11-12	Never	Never
16	Deprived	Mixed – Male (2)/Female (2)	11-12	Never	Never
17	Deprived	Female	14-16	Mixed – Never (4)/ Tried (1)	Mixed – Never (1)/ Tried (1)/ Current (3)
18	Deprived	Male	13-16	Never	Never
19	Deprived	Female	14	Never	Mixed – Tried (2)/ Current (1)
20	Affluent	Female	15-16	Never	Tried (3)

155 **Table 1: Focus group location, participants and their cigarette smoking and e-cigarette use.**



	E-cigarette use											
	Never			Tried			Current			Total		
<b>Cigarette smoker</b>	<b>n</b>	<b>(col %)</b>	<b>(row %)</b>	<b>n</b>	<b>(col %)</b>	<b>(row %)</b>	<b>n</b>	<b>(col %)</b>	<b>(row %)</b>	<b>n</b>	<b>(col %)</b>	<b>(row %)</b>
<b>Never</b>	49	98.0%	79.0%	9	64.3%	14.5%	4	22.2%	6.5%	62	75.6%	100.0%
<b>Tried</b>	1	2.0%	10.0%	4	28.6%	40.0%	5	27.8%	50.0%	10	12.2%	100.0%
<b>Current</b>	0	0.0%	0.0%	1	7.1%	10.0%	9	50.0%	90.0%	10	12.2%	100.0%
<b>Total</b>	50	1	89.0%	14	100.0%	14.6%	18	100.0%	22.0%	82	100.0%	100.0%

**Table 2. E-cigarette use according to cigarette smoking.**

### Product characteristics

Youths referred to disposable e-cigarettes as vapes or disposable vapes. Participants described products based on product characteristics including rechargeable/disposable and design (small versus large). Some reported that the disposable variety were not e-cigarettes and the rechargeable were.

*“They [disposable e-cigarettes] aren’t real ‘cause they are disposable, they aren’t real vapes.” (Male, current smoker, current vaper)*

Product characteristics such as design were also used to classify products. Participants discussed disposable e-cigarettes being small colourful products, whereas the rechargeable tank models were bulky.

*“I think they’ve been designed differently, so you can tell which ones apart. Like, the electrical ones, the ones that you charge, they’re like bigger, and a bit, like, bulkier.” (Female, never smoker, never vaper)*

Participant views diverged when shown illustrative examples of different types of vaping products, particularly disposable e-cigarettes. Several participants were able to easily recognise disposable e-cigarettes but not other types:

*“There is definitely like one that I recognise like the small wee pink one with the black top. But I didn’t recognise the rest to be honest.” (Female, never smoker, never vaper)*

Several participants were not able to identify disposable e-cigarettes when shown illustrative examples and often thought they were other products, such as highlighters or lighters.

*“That’s not a vape, it was a highlighter.” (Male, never smoker, never vaper)*

*“When I first saw it, it looked like a lighter.” (Male, never smoker, never vaper)*

*“Like a tin of mints or something.” (Female, never smoker, tried vaping)*

## Appeal of products

Participants described several positive attributes of disposable e-cigarettes including the design, as they were portable and discreet.

*“If you’re an underage child vaping you’re not going to want to have that big bulky thing ’cause you might get caught with it. Something as small as the thin thing, that could easily fit in your pocket and not have anyone notice. But that thing [tank model], you’d have it sticking out to see.” (Male, never smoker, never vaper)*

This was also discussed by participants when referring to using the products at school.

*“Yeah, they are much smaller so, they can hide them when at school.” (Female, never smoker, current vaper)”*

## Appeal of flavours

Participants particularly liked the variety of flavours that are available such as apple and pink lemonade. Several participants discussed that the variety of flavours encouraged users to try other available flavours.

*“You get like different flavours in sweets and stuff, you might like the taste of blueberry and because in the vape you’ve got that same taste, that’s where it’d be like, oh I really like blueberry, I’d want to see if it is, and then that’s what also gets you addicted to it.” (Male, tried smoking, current vaper)*

Interestingly, when participants discussed flavours, they specifically referred to disposable e-cigarettes, with several participants unaware that e-liquids were available in a variety of flavourings.

1  
2  
3 *“Like the range of flavours, and how we were saying about how the disposable*  
4 *vapes had, like, a lot of different flavours. But we weren't aware of the flavours*  
5 *that came with e-liquid ones.” (Female, never smoker, never vaper)*  
6  
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10 Participants associated the colour of disposable e-cigarettes with flavourings, for example, one dual  
11 user stated, *“certain flavours would have different designs. Strawberry would have pink or red”*  
12 *(Male, current smoker, current vaper)*. While, one nonuser explained, *“the likes of strawberry, that*  
13 *would be red because strawberries are red. And they would do different colours like that, 'cause of*  
14 *the flavours” (Female, never smoker, never vaper)*.  
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### 23 **Perceived negative attributes**

24 Disposable e-cigarettes are designed for single use and the environmental impact of the waste was  
25 raised by participants.  
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30 *“They [disposable e-cigarettes] are bad for the environment because people just*  
31 *throw them away.” (Female, never smoker, current vaper)*  
32  
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36 Participants also spoke about the products being non-recyclable and that this affects the environment.  
37 One participant stated, *“I don't think they're recyclable, either, so it's like a lot more waste” (Female,*  
38 *never smoker, never vaper)*, another participant added, *“they [disposable e-cigarettes] take longer to*  
39 *break down, definitely” (Male, never smoker, never vaper)*.  
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46 One e-cigarette user explained that the environmental impact of using a disposable e-cigarette does  
47 not affect his choice to use them.  
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50  
51 *“I like to use the ones which are disposable and not ones which are refillable. It is*  
52 *a collective effort to save the environment, but I don't want to put extra money to*  
53 *save the environment.” (Male, tried smoking, current vaper)*  
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### Perceived target audience

The design of the products was further referred to by participants when discussing the target audience of the different types of vaping products. Participant views of users were dependent on the subtype of products used. For example, the larger tank models were perceived to be targeted at and used by users older in age, while disposable e-cigarettes were described as ‘cool’, ‘trendy’, and a ‘fashion accessory’ and were perceived to be targeted at and used by youths.

*“The disposables are used by like all younger people like aged 15 and 16. But adults, they’ve got the bigger ones like the rechargeable ones.” (Female, tried smoking, tried vaping)*

*“The disposable ones have got different colours, they’re brighter, that’s probably more aimed at younger people. Whereas, you know, like the big chunky ones are probably more aimed for people who have actually come off smoking.” (Female, never smoker, tried vaping)*

### Perceptions of harm

Many youths perceived disposable e-cigarettes as less harmful than combustible cigarettes.

*“They’re not as bad as actual cigarettes for you. So, it can cut down the amount of cigarettes that you smoke.” (Female, current smoker, current vaper)*

Although disposable e-cigarettes were perceived as less harmful compared to tobacco cigarettes, non-user youths who mentioned composition and the ingredients of disposable e-cigarettes, were concerned about the uncertainty of product ingredients and how they could affect their health.

*“There’s like about 40 or 50 chemicals that go into vapes that nobody in this room could name, all cheaply produced. So, see when you’re inhaling it deep into your lungs it’s obviously not going to be the best for you.” (Male, never smoker, never vaper)*

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3 *“I saw a thing on TikTok, Elf bars and Geek bars have got 50 unknown chemicals*  
4 *in them.” (Male, never smoker, never vaper)*  
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8 *“Just see like the actual vapes instead of the disposables, they’ve all been tested. I*  
9 *don’t think the disposables have been tested.” (Male, never smoker, never vaper)*  
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13 Several participants from different focus groups reported seeing people attempting to reuse the  
14 disposable e-cigarettes once they have been discarded.  
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18 *“A lot of people will go and find them. It’s weird. It’s like people chuck them and*  
19 *other people go and find them and use them.” (Male, never smoker, never vaper)*  
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### 23 24 25 **Purchasing behaviours**

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27 Several participants commented on the low cost of disposable e-cigarettes.  
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31 *“Like metal ones, I don’t even know, I’m guessing around like 70 or £80, but then*  
32 *the disposable ones are like 6 to 12 or something like that.” (Female, never*  
33 *smoker, never vaper)*  
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38 With some participants commenting favourably on the relatively low cost of disposable e-cigarettes,  
39 suggesting that price could be a factor in why youths experiment with the products.  
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44 *“They’re cheap and cheerful.” (Female, never smoker, current vaper)*  
45  
46

47 *“That’s probably an attraction for young people because they’re more*  
48 *affordable.” (Female, never smoker, tried vaping)*  
49  
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52 Participants also described the ease of purchasing disposable e-cigarette products, particularly in  
53 corner shops.  
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56  
57 *“Like, I’m 16 and I buy Red Bull in there [corner shop] but I’ve got such a baby*  
58 *face. Like, I could walk into the shop and go, you’re not 16. But if I was to buy a*  
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3 *vape they would give me it, loads of folk underage buy them [disposable e-*  
4 *cigarettes] there.” (Female, tried smoking, tried vaping)*  
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8 Several participants discussed the ease of being able to purchase the products online as well.  
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10  
11 *“Some places, some websites online, you don't need to put your age or anything.*  
12 *I've seen a thing on TikTok. Like, they put them [disposable e-cigarettes] in the*  
13 *wee boxes and all that, or you could put them in secret packaging like behind the*  
14 *lashes. Like you can order it off their website and they'll hide it in the packaging,*  
15 *they put a few bits of sweeties on top of your vapes so your mum doesn't see it.”*  
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22 *(Female, tried smoking, current vaper)*  
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## 27 **DISCUSSION**

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30 E-cigarettes have become increasingly popular and visible in public life and perceptions about e-  
31 cigarette users were tied to product characteristics, with tank models being associated with adults and  
32 disposable e-cigarettes associated with youths. The design of disposable e-cigarettes was a recurrent  
33 topic. Youth discussed the positives of the compact design of the product as this allowed them to be  
34 discretely carried and hidden when in school. We found that youths commonly mistake the products  
35 for other everyday products, such as highlighters and tins of mints. This combined with the compact  
36 design of the products raises concerns about the way manufactures design the products and if this has  
37 been done intentionally to target a younger audience.  
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46 E-cigarette users believed that disposable e-cigarettes are less harmful than combustible cigarettes,  
47 while nonusers reported concerns about the unknown chemical composition of disposable e-  
48 cigarettes. It is possible that if e-cigarette users perceive cigarettes as more harmful to their health  
49 they will be less likely to take up smoking and this may explain the potential displacement of  
50 cigarettes as reported in [2]. This suggests it is important to track such changes in the population  
51 through longitudinal studies to detect and monitor youths perceptions, behaviours and assessment of  
52 risk in relation to e-cigarettes verse cigarettes. While e-cigarettes are considered less harmful than  
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3 combustible cigarettes [21, 22], balanced policies are needed that motivate cigarette smokers to switch  
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5 to e-cigarettes, yet prevent non-smokers or non-nicotine users from initiating, particularly youths.

6  
7 The increased popularity of disposable e-cigarettes (such as PuffBar and ElfBar), has resulted in the  
8  
9 generation of more single-use plastic waste. Both users and non-users were aware of the negative  
10  
11 environmental impact of using disposable e-cigarettes. E-cigarettes remain subject to political and  
12  
13 public health debates for various reasons, including the lack of evidence on their long-term health  
14  
15 impact, and now there is a new topic in the scientific debate; disposable e-cigarettes are a rising  
16  
17 environmental threat [23, 24]. Thus, regulation should not only focus on the health effects of e-  
18  
19 cigarette products, but may wish to consider their environmental impact.

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23 Consistent with previous research [25-29], our study found that participants particularly like the  
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25 variety of disposable e-cigarette flavours and the variety of available flavours is one of the top reasons  
26  
27 for experimentation with e-cigarettes among youths. Interestingly, in our study, participants discussed  
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29 flavours predominately in relation to disposable e-cigarettes, often associating the colour of the  
30  
31 product with its flavour. It was perceived from the youths in this study that disposable e-cigarettes are  
32  
33 targeted to younger audiences. While rechargeable e-cigarettes (tank models) were perceived by our  
34  
35 participants, as products for adults. Several studies [30-33] have recommended banning the sale of all  
36  
37 flavoured e-cigarette products to help protect children and youth from the harms of vaping. However,  
38  
39 some researchers argue that removing flavours will promote more combustible tobacco use and  
40  
41 remove a product that facilitates smoking cessation [34, 35] as research has shown that flavourings  
42  
43 may help reduce the amount of cigarettes used by adult smokers in the short term [8]. In late 2022,  
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45 China prohibited the domestic marketing and sales (including online) of flavoured disposables e-  
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47 cigarettes, meaning e-cigarette that have flavourings other than tobacco cannot be sold on the  
48  
49 domestic market [36, 37]. In addition, they have introduced regulations that all e-cigarette packaging  
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51 must include warning labels stating that they are harmful to health and must not be used by  
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53 schoolchildren [36, 37]. Notably, flavoured disposable e-cigarettes can still be manufactured in China  
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55 and shipped around the world, including to the UK. The Chinese government have stated that the  
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57 devices must conform to the regulations of the importing country [36, 37].  
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5 More research is needed to determine the most effective means to counter the favourable/positive  
6 aspects of e-cigarettes to reduce youths' interest in product trial and use. In addition, more evidence is  
7 needed to determine what has contributed to the popularity of disposable e-cigarettes among youths,  
8 including, but not limited to, the role of marketing. These findings could inform future policies on e-  
9 cigarette prevention.  
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18 As with all research, our study has some limitations. First, and consistent with the qualitative design,  
19 the sample does not aim to be representative of UK youth, as our study focused on Scottish youths.  
20 However, we did have a diverse sample of both sexes. Secondly, the study's geographical remit has to  
21 be considered when interpreting the findings. The UK is considered an international leader in tobacco  
22 control policy. It is possible that participants' views may have been influenced by the UK's unique  
23 favourable policy approach to e-cigarettes and legal and socio-cultural context, including low  
24 smoking prevalence. Thirdly, the data was collected in different formats (online and face-to-face), and  
25 it is possible that this may have influenced participants' responses. Two of the online groups were  
26 conducted in a classroom with a teacher present, and during seven face-to-face groups, a  
27 teacher/youth worker was present in the room. It is possible that the presence of a teacher/youth  
28 worker may have influenced youth's willingness to answer questions and their responses. Finally, two  
29 of the groups were recruited through personal networks and this may have impacted on the youth's  
30 responses. Despite these limitations, our study results have implications for public health and policy.  
31 Results from our study highlighted that youths positively describe the relatively low cost of  
32 disposable e-cigarettes, suggesting that price could be a factor in why youths experiment with  
33 disposable e-cigarettes. Raising prices on combustible cigarettes and alcohol has consistently shown  
34 to be inversely related to use [38, 39], particularly among younger populations [40, 41]. Therefore,  
35 policymakers could consider implementing measures to deter youth experimentation with disposable  
36 e-cigarettes, while not making the products inaccessible to vulnerable groups who may use them as a  
37 smoking cessation option. Our study suggests the growing need for policymakers to work together to  
38 develop and implement comprehensive policies to prevent initiation among youths and evaluate the  
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3 safe recycling and disposal of disposable e-cigarettes. Our study suggests the growing need for  
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5 policymakers to work together to develop and implement comprehensive policies to prevent initiation  
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7 among youths, such as through youth awareness programs designed to prevent the start of e-cigarette  
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9 use among youths which could include information on the effects of vaping the body, how to identify  
10  
11 false marketing, and how to resist peer pressure [42]. In addition, our research suggests policies are  
12  
13 required to evaluate the safe recycling and disposal of disposable e-cigarettes (such as requiring  
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15 manufacturers and retailers to install collection points inside shops).  
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## 20 CONCLUSION

21  
22 We found that youths differentiated between disposable e-cigarettes and larger tank models, for which  
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24 they had varying perceptions of product users. Our study highlights the need for additional research  
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26 on e-cigarette sub-types to understand product perceptions more fully; and should be considered in  
27  
28 future prevention and regulatory efforts. In addition, while many positive attributes of disposable e-  
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30 cigarettes were reported, key negative attributes that may discourage use, such as unknown chemical  
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32 composition and environmental impact, were also described. The findings from our study suggest the  
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34 growing need for policymakers to work together to develop and implement policies to prevent uptake  
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36 among youths.  
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## 42 Declarations

43  
44 **Ethical approval:** Ethical approval for the study was obtained from the University of Glasgow's  
45  
46 Medical and Veterinary Life Sciences Ethics Committee (reference 200210034).  
47

48  
49 **Data availability:** All data relevant to the study are included in the article or uploaded as  
50  
51 supplementary information.

52  
53 **Competing interests:** The authors declare that they have no competing interests.

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58  
59  
60

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**Authors' contributions: Marissa J. Smith:** Conceptualisation, Data Curation, Investigation, Methodology, Validation, Visualisation, Writing- Original draft preparation. **Anne Marie**

**MacKintosh:** Conceptualisation, Methodology, Writing - Review & Editing. **Allison Ford:**

Conceptualisation, Methodology, Writing - Review & Editing. **Shona Hilton:** Conceptualisation, Methodology, Validation, Writing - Review & Editing.

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# Standards for Reporting Qualitative Research (SRQR)\*

<http://www.equator-network.org/reporting-guidelines/srqr/>

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## Title and abstract

<b>Title</b> - Concise description of the nature and topic of the study Identifying the study as qualitative or indicating the approach (e.g., ethnography, grounded theory) or data collection methods (e.g., interview, focus group) is recommended	1
<b>Abstract</b> - Summary of key elements of the study using the abstract format of the intended publication; typically includes background, purpose, methods, results, and conclusions	2

## Introduction

<b>Problem formulation</b> - Description and significance of the problem/phenomenon studied; review of relevant theory and empirical work; problem statement	4 and 5
<b>Purpose or research question</b> - Purpose of the study and specific objectives or questions	5

## Methods

<b>Qualitative approach and research paradigm</b> - Qualitative approach (e.g., ethnography, grounded theory, case study, phenomenology, narrative research) and guiding theory if appropriate; identifying the research paradigm (e.g., postpositivist, constructivist/ interpretivist) is also recommended; rationale**	5-7
<b>Researcher characteristics and reflexivity</b> - Researchers' characteristics that may influence the research, including personal attributes, qualifications/experience, relationship with participants, assumptions, and/or presuppositions; potential or actual interaction between researchers' characteristics and the research questions, approach, methods, results, and/or transferability	7 and 17
<b>Context</b> - Setting/site and salient contextual factors; rationale**	5-7
<b>Sampling strategy</b> - How and why research participants, documents, or events were selected; criteria for deciding when no further sampling was necessary (e.g., sampling saturation); rationale**	5-7
<b>Ethical issues pertaining to human subjects</b> - Documentation of approval by an appropriate ethics review board and participant consent, or explanation for lack thereof; other confidentiality and data security issues	7
<b>Data collection methods</b> - Types of data collected; details of data collection procedures including (as appropriate) start and stop dates of data collection and analysis, iterative process, triangulation of sources/methods, and modification of procedures in response to evolving study findings; rationale**	5-7
<b>Data collection instruments and technologies</b> - Description of instruments (e.g., interview guides, questionnaires) and devices (e.g., audio recorders) used for data collection; if/how the instrument(s) changed over the course of the study	5-7
<b>Units of study</b> - Number and relevant characteristics of participants, documents, or events included in the study; level of participation (could be reported in results)	5-7

<b>Data processing</b> - Methods for processing data prior to and during analysis, including transcription, data entry, data management and security, verification of data integrity, data coding, and anonymization/de-identification of excerpts	5-7
<b>Data analysis</b> - Process by which inferences, themes, etc., were identified and developed, including the researchers involved in data analysis; usually references a specific paradigm or approach; rationale**	5-7
<b>Techniques to enhance trustworthiness</b> - Techniques to enhance trustworthiness and credibility of data analysis (e.g., member checking, audit trail, triangulation); rationale**	5-7

## Results/findings

<b>Synthesis and interpretation</b> - Main findings (e.g., interpretations, inferences, and themes); might include development of a theory or model, or integration with prior research or theory	7-14
<b>Links to empirical data</b> - Evidence (e.g., quotes, field notes, text excerpts, photographs) to substantiate analytic findings	7-14

## Discussion

<b>Integration with prior work, implications, transferability, and contribution(s) to the field</b> - Short summary of main findings; explanation of how findings and conclusions connect to, support, elaborate on, or challenge conclusions of earlier scholarship; discussion of scope of application/generalizability; identification of unique contribution(s) to scholarship in a discipline or field	15-18
<b>Limitations</b> - Trustworthiness and limitations of findings	17

## Other

<b>Conflicts of interest</b> - Potential sources of influence or perceived influence on study conduct and conclusions; how these were managed	18
<b>Funding</b> - Sources of funding and other support; role of funders in data collection, interpretation, and reporting	18

\*The authors created the SRQR by searching the literature to identify guidelines, reporting standards, and critical appraisal criteria for qualitative research; reviewing the reference lists of retrieved sources; and contacting experts to gain feedback. The SRQR aims to improve the transparency of all aspects of qualitative research by providing clear standards for reporting qualitative research.

\*\*The rationale should briefly discuss the justification for choosing that theory, approach, method, or technique rather than other options available, the assumptions and limitations implicit in those choices, and how those choices influence study conclusions and transferability. As appropriate, the rationale for several items might be discussed together.

### Reference:

O'Brien BC, Harris IB, Beckman TJ, Reed DA, Cook DA. **Standards for reporting qualitative research: a synthesis of recommendations.** *Academic Medicine*, Vol. 89, No. 9 / Sept 2014  
DOI: [10.1097/ACM.0000000000000388](https://doi.org/10.1097/ACM.0000000000000388)

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# BMJ Open

## Youth's engagement and perceptions of disposable e-cigarettes: a UK focus group study

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<b>Primary Subject Heading</b>:	Public health
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Keywords:	Health policy < HEALTH SERVICES ADMINISTRATION & MANAGEMENT, PUBLIC HEALTH, QUALITATIVE RESEARCH

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4 1 **Youth's engagement and perceptions of disposable e-cigarettes: a**  
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7 2 **UK focus group study**  
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11 4 Marissa J. Smith<sup>1\*</sup>, Anne Marie MacKintosh<sup>2</sup>, Allison Ford<sup>2</sup> and Shona Hilton<sup>1</sup>  
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## 13 ABSTRACT

14 **Objectives:** Evidence suggests that use of flavoured disposable electronic cigarettes (e-cigarettes) is  
15 increasing. Considering the growing popularity and rapid evolution of e-cigarettes, we explored  
16 youth's perceptions and engagement with disposable e-cigarettes.

17 **Design:** Twenty focus groups were conducted between March and May 2022, with 82 youths aged  
18 11-16 living in the Central belt of Scotland.

19 **Methods:** Youths were asked about smoking and vaping behaviours and disposable e-cigarettes and  
20 were shown vaping-related images and videos from social media which were used to stimulate  
21 discussion about different messages, presentations, and contextual features. Transcripts were imported  
22 into NVivo 12, coded thematically, and analysed.

23 **Results:** Youths described disposable e-cigarettes as 'cool', 'fashionable', and enticing and viewed as  
24 a modern lifestyle 'accessory'. Tank models were perceived as being used by older adults. Youths  
25 stated that disposable e-cigarettes were designed in a way to target youths and the brightly coloured  
26 devices and range of flavourings encouraged youths to want to try the products, particularly sweet  
27 flavourings. Participants perceived e-cigarettes to be less harmful compared to combustible cigarettes  
28 but noted the uncertainty of ingredients in disposable e-cigarettes.

29 **Conclusions:** Youths distinguish between e-cigarettes with varying characteristics and social  
30 perceptions of users. These findings provide evidence that disposable e-cigarettes are attractive to  
31 youths. Future research is needed to understand the factors that contribute to youth perceptions of  
32 disposable e-cigarettes. Policymakers should work together to design and implement policies and  
33 strategies to prevent youth uptake of vaping.

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3 35 **Strengths and limitations of this study**  
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- 5 36 • This research offers timely insights into youths perceptions about the growing use of  
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8 37 disposable e-cigarettes.  
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10 38 • It provides an in-depth analysis from interviews with a diverse sample of 82 youths  
11  
12 39 aged 11-16.  
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14 40 • Our findings present new evidence on how youths experience targeted e-cigarette  
15  
16 41 marketing via social media content as visual prompts.  
17  
18 42 • Our qualitative thematic analysis of the data allows depth of opinions but cannot offer  
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20 43 predictions about the frequency of specific opinions with a wider population.  
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## 49 BACKGROUND

50 The use of e-cigarettes among youths in Great Britain (GB) has increased in 2022 compared to 2021;  
51 however, use among never-smokers remains low and mostly experimental [1, 2]. Since the  
52 development of e-cigarettes, public health researchers and tobacco control advocates have debated the  
53 role of e-cigarettes as a harm reduction tool. Proponents of e-cigarette harm reduction believe e-  
54 cigarettes can play a role in eliminating smoking related diseases and consider them to be a  
55 breakthrough in harm reduction development [3-5] Whereas opponents of the e-cigarette harm  
56 reduction debate argue that caution should be taken when endorsing e-cigarette products until crucial  
57 evidence becomes available [6]. E-cigarettes are often termed a short-term tobacco harm reduction  
58 tool, as they do not contain tobacco or tar which are known to cause numerous smoking-related  
59 diseases, including cardiovascular disease. A newly published Cochrane review [7] found that  
60 nicotine e-cigarettes were superior to placebo e-cigarettes and at least as effective as nicotine  
61 replacement therapy (NRT) for smoking cessation, which is consistent with findings from other  
62 randomised controlled trials (RCTs) [8-10]. In addition, the review stated that there is moderate  
63 certainty in the evidence that nicotine-containing e-cigarettes increase the quit rate compared to NRT  
64 and non-nicotine-containing e-cigarettes [7]. Despite differences in opinion within the public health  
65 community regarding the value of e-cigarettes in harm reduction for adults, there is broad consensus  
66 on the need to protect young people from initiating vaping [11].  
67 Since the development of the first e-cigarette in 2003, there are now a variety of models or  
68 ‘generations’ available. First-generation e-cigarettes (sometimes referred to as ‘cigalikes’) were  
69 disposable and designed to mimic the look and feel of combustible cigarettes [12]. Over time, new e-  
70 cigarette types were developed to more effectively deliver nicotine contained in e-liquid. Second-  
71 generation e-cigarettes are larger and are generally refillable using e-liquids [13]. Third-generation e-  
72 cigarettes (tanks or mods) are much larger than the previous generations and are refillable and  
73 rechargeable [12, 14]. They are modifiable devices (‘mods’), meaning the user can customise the  
74 substances in the device [15] and adjust the power of the device to give a stronger throat hit [16, 17].

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3 75 The fourth generation of e-cigarettes is called ‘Pod Mod’. They contain a prefilled or refillable ‘pod’  
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5 76 or pod cartridge with a modifiable ‘mod’ system (‘Pod-Mod’) [14].  
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7 77 Recently, disposable e-cigarettes (such as “Puff-bar”, “Elf-bar”, or “Geek-bar”) have started to  
8  
9 78 dominate the market [18]. Disposable e-cigarettes retail for around £5 to £7 (\$7 to \$9) in the UK —  
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11 79 about half the price of a pack of 20 cigarettes [19]. In Great Britain, data captured in 2022, found that  
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13 80 disposable e-cigarettes have become the most common device type (52.0% compared to 7.7% in  
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15 81 2021), with Elf Bar and Geek Bar being the most popular brands [1]. Despite the popularity of  
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17 82 disposable e-cigarettes, little is known about the design, chemical characteristics, or how they may  
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19 83 impact health.  
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22 84 Considering the rapid growth and popularity of disposable e-cigarettes, this research aims to explore  
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24 85 youth's perceptions and engagement with disposable e-cigarettes, awareness of product  
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26 86 characteristics, appeal of products and flavours, perceptions of harm, perceived target group, and  
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28 87 purchasing behaviours. User-generated and influencer marketing content on social media represents a  
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30 88 key influence on young people’s understandings of products. It is essential to monitor the content that  
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32 89 young people access related to e-cigarettes and through focus groups with youths so we can  
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34 90 understand how young people relate to that content, why e-cigarettes might appeal to youths, and why  
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36 91 they need protected, which would not be feasible with population surveys.  
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## 41 93 **METHODS**

42  
43 94 We conducted 20 focus groups between March and May 2022. Focus groups included between three  
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45 95 and five participants (a total of 82 participants). Purposive sampling was used to recruit a diverse  
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47 96 sample of youths in terms of sex, socio-economic background, and smoking and vaping status. Eleven  
48  
49 97 groups were recruited through youth workers in local youth organisations. These gatekeepers handed  
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51 98 out information sheets and helped achieve the sampling frame in terms of youth demographics and  
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53 99 experiences with regard to traditional cigarettes and e-cigarettes. The three organisations that helped  
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55 100 with participant recruitment worked specifically with young people from disadvantaged backgrounds  
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57 101 in urban areas. This recruitment strategy resulted in the inclusion of a range of participants from more  
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3 102 affluent and more deprived backgrounds and with experiences of smoking and vaping. Seven groups  
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5 103 were recruited through the Schools Health and Wellbeing Improvement Research Network (SHINE)  
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7 104 Newsletter which is distributed monthly to over 500 schools in Scotland. The remaining two groups  
8  
9 105 were recruited via personal networks directly by MS.  
10  
11 106 Focus group discussions were facilitated to allow the research team to explore how opinions about  
12  
13 107 disposable e-cigarettes are developed. Friendship groups of 3–5 participants were used to facilitate in-  
14  
15 108 depth insights and promote participant interaction. Each participant was given a £20 shopping  
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17 109 voucher as compensation for their time.  
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19 110 Prior to the start of the focus groups, participants completed a short anonymous questionnaire about  
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21 111 their age, sex, postcode, smoking, and e-cigarette use status. For both traditional cigarettes and e-  
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23 112 cigarettes, the questionnaire asked participants to specify whether they had tried or used them in the  
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25 113 past or were using them at the time of the study. Based on a review of the literature a topic guide was  
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27 114 developed which covered three key areas, including different types of e-cigarette products and  
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29 115 flavours, perceptions of harm, and purchasing behaviours.  
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31 116 Images of different types of e-cigarettes ('tanks', disposables, and pod devices) and e-liquids were  
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33 117 used as conversation starters. Group discussions were facilitated by MS. Ten of the groups were  
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35 118 conducted online using Microsoft Teams and ten were conducted face-to-face. Of these, one of the  
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37 119 groups was conducted on the youth organisation's premises, and the other nine were conducted at the  
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39 120 school, with representatives of the youth organisation present. Groups lasted between 40 and  
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41 121 66 minutes. Field-notes reflecting on the focus group and individual issues discussed were written up  
42  
43 122 for each group. All focus groups were audio recorded with participants' permission and transcribed  
44  
45 123 verbatim. We conducted thematic analysis of the data from the interview transcripts and discussion  
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47 124 group minutes. The process followed Braun and Clarke's [20] six-phase framework for thematic  
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49 125 analysis. The steps involved were: 1) familiarisation with the data; 2) generating initial codes; 3)  
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51 126 searching for themes; 4) reviewing themes; 5) defining and naming themes; and 6) writing the report  
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53 127 [20]. The research team read and re-read the transcripts to become familiar with the data, and then  
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55 128 iteratively constructed a coding frame based upon the topic to enable consistent organisation of  
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57 129 relevant data. NVivo was used to organise categories on the basis of inductive themes that emerged



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3 130 from close reading of the, capture of both areas of agreement and less typical perspectives across a  
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5 131 range of categories. Each transcript was imported into NVivo 12, coded independently, cross-  
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7 132 checked, and analysed by MS and SH. Contradictory cases and group dynamics were discussed,  
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9 133 making use of transcripts and field notes. The researcher reflected on her role as researcher, remained  
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11 134 constantly aware of her position and took care not to introduce bias throughout the research. To  
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13 135 further reduce bias the researcher recorded the focus groups and analysed them some time after they  
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15 136 were completed ensuring a more reflective view point of occurrences. Ethical approval for the study  
16  
17 137 was obtained from the University of Glasgow's Medical and Veterinary Life Sciences Ethics  
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19 138 Committee (reference 200210034).  
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#### 24 140 **Patient and public involvement**

26 141 None.

28 142

## 30 143 **RESULTS**

### 33 144 **Participant characteristics**

35 145 Eighty-two youths aged 11–16 years participated (47 females (57%) and 35 males (43%)) in this  
36  
37 146 study. This sample represented a wide diversity in sociodemographic characteristics and smoking-  
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39 147 related behaviours. The age distribution within the sample was skewed slightly towards 14–15-year-  
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41 148 olds, with 14-year-olds making up the largest subgroup (n= 24). While the majority of participants did  
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43 149 not currently smoke or use e-cigarettes, the sample included 10 smokers and 18 youths who used e-  
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45 150 cigarettes. Table 1 describes the focus group composition and participants in more detail and Table 2  
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47 151 summarises smoking and e-cigarette use among the sample.  
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Group	Area	Sex	Age	Cigarette Smoker	E-cigarette use
1	Affluent	Female	13-15	Never	Never
2	Affluent	Female	14-15	Never	Mixed – Never (4) / Tried (1)
3	Affluent	Female	13-16	Never	Mixed – Never (2) / Tried (1)
4	Deprived	Mixed – Male (3)/Female (2)	12-15	Mixed – Never (3) / Current (2)	Mixed – Never (3) / Tried (1)/ Current (1)
5	Deprived	Mixed – Male (1)/ Female (4)	14-16	Mixed – Never (2)/ Tried (2)/ Current (1)	Mixed – Never (2)/ Tried (2)/ Current (1)
6	Deprived	Male	12-15	Never	Never
7	Deprived	Male	16	Current	Current
8	Affluent	Mixed – Male (2)/Female (3)	14	Never	Never
9	Deprived	Male	16	Mixed – Tried (1)/ Current (2)	Current
10	Deprived	Mixed – Male (4)/Female (1)	14-15	Mixed – Never (3)/ Tried (1)/ Current (1)	Mixed – Never (3)/ Tried (1)/ Current (1)
11	Deprived	Mixed – Male (3)/Female (2)	13-16	Mixed – Never (2)/ Tried (2)/ Current (1)	Mixed – Never (1)/ Current (4)
12	Affluent	Mixed – Male (2)/Female (1)	15-16	Tried	Mixed – Tried (2)/ Current (1)
13	Affluent	Female	13-16	Never	Never
14	Deprived	Mixed – Male (1)/Female (3)	11-12	Never	Never
15	Deprived	Mixed – Male (3)/Female (1)	11-12	Never	Never
16	Deprived	Mixed – Male (2)/Female (2)	11-12	Never	Never
17	Deprived	Female	14-16	Mixed – Never (4)/ Tried (1)	Mixed – Never (1)/ Tried (1)/ Current (3)
18	Deprived	Male	13-16	Never	Never
19	Deprived	Female	14	Never	Mixed – Tried (2)/ Current (1)
20	Affluent	Female	15-16	Never	Tried (3)

153 **Table 1: Focus group location, participants and their cigarette smoking and e-cigarette use.**

	E-cigarette use											
	Never			Tried			Current			Total		
<b>Cigarette smoker</b>	<b>n</b>	<b>(col %)</b>	<b>(row %)</b>	<b>n</b>	<b>(col %)</b>	<b>(row %)</b>	<b>n</b>	<b>(col %)</b>	<b>(row %)</b>	<b>n</b>	<b>(col %)</b>	<b>(row %)</b>
<b>Never</b>	49	98.0%	79.0%	9	64.3%	14.5%	4	22.2%	6.5%	62	75.6%	100.0%
<b>Tried</b>	1	2.0%	10.0%	4	28.6%	40.0%	5	27.8%	50.0%	10	12.2%	100.0%
<b>Current</b>	0	0.0%	0.0%	1	7.1%	10.0%	9	50.0%	90.0%	10	12.2%	100.0%
<b>Total</b>	50	100.0%	89.0%	14	100.0%	14.6%	18	100.0%	22.0%	82	100.0%	100.0%

**Table 2: E-cigarette use according to cigarette smoking.**

### Product characteristics

Youths referred to disposable e-cigarettes as vapes or disposable vapes. Participants described products based on product characteristics including rechargeable/disposable and design (small versus large). Some reported that the disposable variety were not e-cigarettes and the rechargeable were.

*“They [disposable e-cigarettes] aren’t real ‘cause they are disposable, they aren’t real vapes.” (Male, current smoker, current vaper)*

Product characteristics such as design were also used to classify products. Participants discussed disposable e-cigarettes being small colourful products, whereas the rechargeable tank models were bulky.

*“I think they’ve been designed differently, so you can tell which ones apart. Like, the electrical ones, the ones that you charge, they’re like bigger, and a bit, like, bulkier.” (Female, never smoker, never vaper)*

Participant views diverged when shown illustrative examples of different types of vaping products, particularly disposable e-cigarettes. Several participants were able to easily recognise disposable e-cigarettes but not other types:

*“There is definitely like one that I recognise like the small wee pink one with the black top. But I didn’t recognise the rest to be honest.” (Female, never smoker, never vaper)*

Several participants were not able to identify disposable e-cigarettes when shown illustrative examples and often thought they were other products, such as highlighters or lighters.

*“That’s not a vape, it was a highlighter.” (Male, never smoker, never vaper)*

*“When I first saw it, it looked like a lighter.” (Male, never smoker, never vaper)*

*“Like a tin of mints or something.” (Female, never smoker, tried vaping)*

## Appeal of products

Participants described several positive attributes of disposable e-cigarettes including the design, as they were portable and discreet.

*“If you’re an underage child vaping you’re not going to want to have that big bulky thing ’cause you might get caught with it. Something as small as the thin thing, that could easily fit in your pocket and not have anyone notice. But that thing [tank model], you’d have it sticking out to see.” (Male, never smoker, never vaper)*

This was also discussed by participants when referring to using the products at school.

*“Yeah, they are much smaller so, they can hide them when at school.” (Female, never smoker, current vaper)”*

## Appeal of flavours

Participants particularly liked the variety of flavours that are available such as apple and pink lemonade. Several participants discussed that the variety of flavours encouraged users to try other available flavours.

*“You get like different flavours in sweets and stuff, you might like the taste of blueberry and because in the vape you’ve got that same taste, that’s where it’d be like, oh I really like blueberry, I’d want to see if it is, and then that’s what also gets you addicted to it.” (Male, tried smoking, current vaper)*

Interestingly, when participants discussed flavours, they specifically referred to disposable e-cigarettes, with several participants unaware that e-liquids were available in a variety of flavourings.

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3 *“Like the range of flavours, and how we were saying about how the disposable*  
4 *vapes had, like, a lot of different flavours. But we weren't aware of the flavours*  
5 *that came with e-liquid ones.” (Female, never smoker, never vaper)*  
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10 Participants associated the colour of disposable e-cigarettes with flavourings, for example, one dual  
11 user stated, *“certain flavours would have different designs. Strawberry would have pink or red”*  
12 *(Male, current smoker, current vaper)*. While, one nonuser explained, *“the likes of strawberry, that*  
13 *would be red because strawberries are red. And they would do different colours like that, 'cause of*  
14 *the flavours” (Female, never smoker, never vaper)*.  
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### 23 **Perceived negative attributes**

24 Disposable e-cigarettes are designed for single use and the environmental impact of the waste was  
25 raised by participants.  
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30 *“They [disposable e-cigarettes] are bad for the environment because people just*  
31 *throw them away.” (Female, never smoker, current vaper)*  
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35 Participants also spoke about the products being non-recyclable and that this affects the environment.  
36 One participant stated, *“I don't think they're recyclable, either, so it's like a lot more waste” (Female,*  
37 *never smoker, never vaper)*, another participant added, *“they [disposable e-cigarettes] take longer to*  
38 *break down, definitely” (Male, never smoker, never vaper)*.  
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46 One e-cigarette user explained that the environmental impact of using a disposable e-cigarette does  
47 not affect his choice to use them.  
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51 *“I like to use the ones which are disposable and not ones which are refillable. It is*  
52 *a collective effort to save the environment, but I don't want to put extra money to*  
53 *save the environment.” (Male, tried smoking, current vaper)*  
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### Perceived target audience

The design of the products was further referred to by participants when discussing the target audience of the different types of vaping products. Participant views of users were dependent on the subtype of products used. For example, the larger tank models were perceived to be targeted at and used by users older in age, while disposable e-cigarettes were described as ‘cool’, ‘trendy’, and a ‘fashion accessory’ and were perceived to be targeted at and used by youths.

*“The disposables are used by like all younger people like aged 15 and 16. But adults, they’ve got the bigger ones like the rechargeable ones.” (Female, tried smoking, tried vaping)*

*“The disposable ones have got different colours, they’re brighter, that’s probably more aimed at younger people. Whereas, you know, like the big chunky ones are probably more aimed for people who have actually come off smoking.” (Female, never smoker, tried vaping)*

### Perceptions of harm

Many youths perceived disposable e-cigarettes as less harmful than combustible cigarettes.

*“They’re not as bad as actual cigarettes for you. So, it can cut down the amount of cigarettes that you smoke.” (Female, current smoker, current vaper)*

Although disposable e-cigarettes were perceived as less harmful compared to tobacco cigarettes, non-user youths who mentioned composition and the ingredients of disposable e-cigarettes, were concerned about the uncertainty of product ingredients and how they could affect their health.

*“There’s like about 40 or 50 chemicals that go into vapes that nobody in this room could name, all cheaply produced. So, see when you’re inhaling it deep into your lungs it’s obviously not going to be the best for you.” (Male, never smoker, never vaper)*

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3 *“I saw a thing on TikTok, Elf bars and Geek bars have got 50 unknown chemicals*  
4 *in them.” (Male, never smoker, never vaper)*  
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8 *“Just see like the actual vapes instead of the disposables, they’ve all been tested. I*  
9 *don’t think the disposables have been tested.” (Male, never smoker, never vaper)*  
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13 Several participants from different focus groups reported seeing people attempting to reuse the  
14 disposable e-cigarettes once they have been discarded.  
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18 *“A lot of people will go and find them. It’s weird. It’s like people chuck them and*  
19 *other people go and find them and use them.” (Male, never smoker, never vaper)*  
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### 23 24 25 **Purchasing behaviours**

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27 Several participants commented on the low cost of disposable e-cigarettes.  
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31 *“Like metal ones, I don’t even know, I’m guessing around like 70 or £80, but then*  
32 *the disposable ones are like 6 to 12 or something like that.” (Female, never*  
33 *smoker, never vaper)*  
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38 With some participants commenting favourably on the relatively low cost of disposable e-cigarettes,  
39 suggesting that price could be a factor in why youths experiment with the products.  
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44 *“They’re cheap and cheerful.” (Female, never smoker, current vaper)*  
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47 *“That’s probably an attraction for young people because they’re more*  
48 *affordable.” (Female, never smoker, tried vaping)*  
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52 Participants also described the ease of purchasing disposable e-cigarette products, particularly in  
53 corner shops.  
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57 *“Like, I’m 16 and I buy Red Bull in there [corner shop] but I’ve got such a baby*  
58 *face. Like, I could walk into the shop and go, you’re not 16. But if I was to buy a*  
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3 *vape they would give me it, loads of folk underage buy them [disposable e-*  
4 *cigarettes] there.” (Female, tried smoking, tried vaping)*  
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8 Several participants discussed the ease of being able to purchase the products online as well.  
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11 *“Some places, some websites online, you don't need to put your age or anything.*  
12 *I've seen a thing on TikTok. Like, they put them [disposable e-cigarettes] in the*  
13 *wee boxes and all that, or you could put them in secret packaging like behind the*  
14 *lashes. Like you can order it off their website and they'll hide it in the packaging,*  
15 *they put a few bits of sweeties on top of your vapes so your mum doesn't see it.”*  
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22 *(Female, tried smoking, current vaper)*  
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## 27 **DISCUSSION**

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30 E-cigarettes have become increasingly popular and visible in public life and perceptions about e-  
31 cigarette users were tied to product characteristics, with tank models being associated with adults and  
32 disposable e-cigarettes associated with youths. The design of disposable e-cigarettes was a recurrent  
33 topic. Youth discussed the positives of the compact design of the product as this allowed them to be  
34 discretely carried and hidden when in school. We found that youths commonly mistake the products  
35 for other everyday products, such as highlighters and tins of mints. This combined with the compact  
36 design of the products raises concerns about the way manufactures design the products and if this has  
37 been done intentionally to target a younger audience.  
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46 E-cigarette users believed that disposable e-cigarettes are less harmful than combustible cigarettes,  
47 while nonusers reported concerns about the unknown chemical composition of disposable e-  
48 cigarettes. It is possible that if e-cigarette users perceive cigarettes as more harmful to their health  
49 they will be less likely to take up smoking and this may explain the potential displacement of  
50 cigarettes as reported in [2]. This suggests it is important to track such changes in the population  
51 through longitudinal studies to detect and monitor youths perceptions, behaviours and assessment of  
52 risk in relation to e-cigarettes verse cigarettes. While e-cigarettes are considered less harmful than  
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3 combustible cigarettes [21, 22], balanced policies are needed that motivate cigarette smokers to switch  
4 to e-cigarettes, yet prevent non-smokers or non-nicotine users from initiating, particularly youths.

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6 The increased popularity of disposable e-cigarettes (such as PuffBar and ElfBar), has resulted in the  
7 generation of more single-use plastic waste. Both users and non-users were aware of the negative  
8 environmental impact of using disposable e-cigarettes. E-cigarettes remain subject to political and  
9 public health debates for various reasons, including the lack of evidence on their long-term health  
10 impact, and now there is a new topic in the scientific debate; disposable e-cigarettes are a rising  
11 environmental threat [23, 24]. Thus, regulation should not only focus on the health effects of e-  
12 cigarette products, but may wish to consider their environmental impact.  
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23 Consistent with previous research [25-29], our study found that participants particularly like the  
24 variety of disposable e-cigarette flavours and the variety of available flavours is one of the top reasons  
25 for experimentation with e-cigarettes among youths. Interestingly, in our study, participants discussed  
26 flavours predominately in relation to disposable e-cigarettes, often associating the colour of the  
27 product with its flavour. It was perceived from the youths in this study that disposable e-cigarettes are  
28 targeted to younger audiences. While rechargeable e-cigarettes (tank models) were perceived by our  
29 participants, as products for adults. Several studies [30-33] have recommended banning the sale of all  
30 flavoured e-cigarette products to help protect children and youth from the harms of vaping. However,  
31 some researchers argue that removing flavours will promote more combustible tobacco use and  
32 remove a product that facilitates smoking cessation [34, 35] as research has shown that flavourings  
33 may help reduce the amount of cigarettes used by adult smokers in the short term [8]. In late 2022,  
34 China prohibited the domestic marketing and sales (including online) of flavoured disposables e-  
35 cigarettes, meaning e-cigarette that have flavourings other than tobacco cannot be sold on the  
36 domestic market [36, 37]. In addition, they have introduced regulations that all e-cigarette packaging  
37 must include warning labels stating that they are harmful to health and must not be used by  
38 schoolchildren [36, 37]. Notably, flavoured disposable e-cigarettes can still be manufactured in China  
39 and shipped around the world, including to the UK. The Chinese government have stated that the  
40 devices must conform to the regulations of the importing country [36, 37].  
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5 More research is needed to determine the most effective means to counter the favourable/positive  
6 aspects of e-cigarettes to reduce youths' interest in product trial and use. In addition, more evidence is  
7 needed to determine what has contributed to the popularity of disposable e-cigarettes among youths,  
8 including, but not limited to, the role of marketing. These findings could inform future policies on e-  
9 cigarette prevention.  
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18 As with all research, our study has some limitations. First, and consistent with the qualitative design,  
19 the sample does not aim to be representative of UK youth, as our study focused on Scottish youths.  
20 However, we did have a diverse sample of both sexes. Secondly, the study's geographical remit has to  
21 be considered when interpreting the findings. The UK is considered an international leader in tobacco  
22 control policy. It is possible that participants' views may have been influenced by the UK's unique  
23 favourable policy approach to e-cigarettes and legal and socio-cultural context, including low  
24 smoking prevalence. Thirdly, the data was collected in different formats (online and face-to-face), and  
25 it is possible that this may have influenced participants' responses. Two of the online groups were  
26 conducted in a classroom with a teacher present, and during seven face-to-face groups, a  
27 teacher/youth worker was present in the room. It is possible that the presence of a teacher/youth  
28 worker may have influenced youth's willingness to answer questions and their responses. Finally, two  
29 of the groups were recruited through personal networks and this may have impacted on the youth's  
30 responses. Despite these limitations, our study results have implications for public health and policy.  
31 Results from our study highlighted that youths positively describe the relatively low cost of  
32 disposable e-cigarettes, suggesting that price could be a factor in why youths experiment with  
33 disposable e-cigarettes. Raising prices on combustible cigarettes and alcohol has consistently shown  
34 to be inversely related to use [38, 39], particularly among younger populations [40, 41]. Therefore,  
35 policymakers could consider implementing measures to deter youth experimentation with disposable  
36 e-cigarettes, while not making the products inaccessible to vulnerable groups who may use them as a  
37 smoking cessation option. Our study suggests the growing need for policymakers to work together to  
38 develop and implement comprehensive policies to prevent initiation among youths and evaluate the  
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3 safe recycling and disposal of disposable e-cigarettes. Our study suggests the growing need for  
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5 policymakers to work together to develop and implement comprehensive policies to prevent initiation  
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7 among youths, such as through youth awareness programs designed to prevent the start of e-cigarette  
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9 use among youths which could include information on the effects of vaping the body, how to identify  
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11 false marketing, and how to resist peer pressure [42]. In addition, our research suggests policies are  
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13 required to evaluate the safe recycling and disposal of disposable e-cigarettes (such as requiring  
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15 manufacturers and retailers to install collection points inside shops).  
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## 20 CONCLUSION

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22 We found that youths differentiated between disposable e-cigarettes and larger tank models, for which  
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24 they had varying perceptions of product users. Our study highlights the need for additional research  
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26 on e-cigarette sub-types to understand product perceptions more fully; and should be considered in  
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28 future prevention and regulatory efforts. In addition, while many positive attributes of disposable e-  
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30 cigarettes were reported, key negative attributes that may discourage use, such as unknown chemical  
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32 composition and environmental impact, were also described. The findings from our study suggest the  
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34 growing need for policymakers to work together to develop and implement policies to prevent uptake  
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36 among youths.  
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## 42 Declarations

43  
44 **Ethical approval:** Ethical approval for the study was obtained from the University of Glasgow's  
45  
46 Medical and Veterinary Life Sciences Ethics Committee (reference 200210034).  
47

48  
49 **Data availability:** All data relevant to the study are included in the article or uploaded as  
50  
51 supplementary information.

52  
53 **Competing interests:** The authors declare that they have no competing interests.

54  
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**Authors' contributions: Marissa J. Smith:** Conceptualisation, Data Curation, Investigation, Methodology, Validation, Visualisation, Writing- Original draft preparation. **Anne Marie**

**MacKintosh:** Conceptualisation, Methodology, Writing - Review & Editing. **Allison Ford:**

Conceptualisation, Methodology, Writing - Review & Editing. **Shona Hilton:** Conceptualisation, Methodology, Validation, Writing - Review & Editing.

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# Standards for Reporting Qualitative Research (SRQR)\*

<http://www.equator-network.org/reporting-guidelines/srqr/>

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## Title and abstract

<b>Title</b> - Concise description of the nature and topic of the study Identifying the study as qualitative or indicating the approach (e.g., ethnography, grounded theory) or data collection methods (e.g., interview, focus group) is recommended	1
<b>Abstract</b> - Summary of key elements of the study using the abstract format of the intended publication; typically includes background, purpose, methods, results, and conclusions	2

## Introduction

<b>Problem formulation</b> - Description and significance of the problem/phenomenon studied; review of relevant theory and empirical work; problem statement	4 and 5
<b>Purpose or research question</b> - Purpose of the study and specific objectives or questions	5

## Methods

<b>Qualitative approach and research paradigm</b> - Qualitative approach (e.g., ethnography, grounded theory, case study, phenomenology, narrative research) and guiding theory if appropriate; identifying the research paradigm (e.g., postpositivist, constructivist/ interpretivist) is also recommended; rationale**	5-7
<b>Researcher characteristics and reflexivity</b> - Researchers' characteristics that may influence the research, including personal attributes, qualifications/experience, relationship with participants, assumptions, and/or presuppositions; potential or actual interaction between researchers' characteristics and the research questions, approach, methods, results, and/or transferability	7 and 17
<b>Context</b> - Setting/site and salient contextual factors; rationale**	5-7
<b>Sampling strategy</b> - How and why research participants, documents, or events were selected; criteria for deciding when no further sampling was necessary (e.g., sampling saturation); rationale**	5-7
<b>Ethical issues pertaining to human subjects</b> - Documentation of approval by an appropriate ethics review board and participant consent, or explanation for lack thereof; other confidentiality and data security issues	7
<b>Data collection methods</b> - Types of data collected; details of data collection procedures including (as appropriate) start and stop dates of data collection and analysis, iterative process, triangulation of sources/methods, and modification of procedures in response to evolving study findings; rationale**	5-7
<b>Data collection instruments and technologies</b> - Description of instruments (e.g., interview guides, questionnaires) and devices (e.g., audio recorders) used for data collection; if/how the instrument(s) changed over the course of the study	5-7
<b>Units of study</b> - Number and relevant characteristics of participants, documents, or events included in the study; level of participation (could be reported in results)	5-7



<b>Data processing</b> - Methods for processing data prior to and during analysis, including transcription, data entry, data management and security, verification of data integrity, data coding, and anonymization/de-identification of excerpts	5-7
<b>Data analysis</b> - Process by which inferences, themes, etc., were identified and developed, including the researchers involved in data analysis; usually references a specific paradigm or approach; rationale**	5-7
<b>Techniques to enhance trustworthiness</b> - Techniques to enhance trustworthiness and credibility of data analysis (e.g., member checking, audit trail, triangulation); rationale**	5-7

## Results/findings

<b>Synthesis and interpretation</b> - Main findings (e.g., interpretations, inferences, and themes); might include development of a theory or model, or integration with prior research or theory	7-14
<b>Links to empirical data</b> - Evidence (e.g., quotes, field notes, text excerpts, photographs) to substantiate analytic findings	7-14

## Discussion

<b>Integration with prior work, implications, transferability, and contribution(s) to the field</b> - Short summary of main findings; explanation of how findings and conclusions connect to, support, elaborate on, or challenge conclusions of earlier scholarship; discussion of scope of application/generalizability; identification of unique contribution(s) to scholarship in a discipline or field	15-18
<b>Limitations</b> - Trustworthiness and limitations of findings	17

## Other

<b>Conflicts of interest</b> - Potential sources of influence or perceived influence on study conduct and conclusions; how these were managed	18
<b>Funding</b> - Sources of funding and other support; role of funders in data collection, interpretation, and reporting	18

\*The authors created the SRQR by searching the literature to identify guidelines, reporting standards, and critical appraisal criteria for qualitative research; reviewing the reference lists of retrieved sources; and contacting experts to gain feedback. The SRQR aims to improve the transparency of all aspects of qualitative research by providing clear standards for reporting qualitative research.

\*\*The rationale should briefly discuss the justification for choosing that theory, approach, method, or technique rather than other options available, the assumptions and limitations implicit in those choices, and how those choices influence study conclusions and transferability. As appropriate, the rationale for several items might be discussed together.

### Reference:

O'Brien BC, Harris IB, Beckman TJ, Reed DA, Cook DA. **Standards for reporting qualitative research: a synthesis of recommendations.** *Academic Medicine*, Vol. 89, No. 9 / Sept 2014  
DOI: [10.1097/ACM.0000000000000388](https://doi.org/10.1097/ACM.0000000000000388)

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