Y RHWYDWAITH YMCHWIL IECHYD MEWN YSGOLION

THE SCHOOL HEALTH RESEARCH NETWORK

shrn.org.uk

The School Health Research Network (SHRN)

Updating terminology around e-cigarette use in a national school-based survey: impacts on self-reported use, age of onset, and harm perceptions

Research Brief, July 2025

Rhwydwaith Ysgolion Cymru sy'n Hybu Iechyd a Lles
Welsh Network of Health and Well-being Promoting Schools

DECIPHer
Centre for Development, Evaluation, Complexity and Implementation in Public Health Improvement
A Public Health Research Centre of Excellence

GIG CYMRU NHS WALES
Iechyd Cyhoeddus Cymru
Public Health Wales

CANCER RESEARCH UK

Llywodraeth Cymru
Welsh Government

CARDIFF UNIVERSITY
PRIFYSGOL CAERDYDD

Authors

Max. R. Ashton, Cardiff University
James. J. Lewis, Cardiff University
Chris Emmerson, Public Health Wales
Lianna Angel, Cardiff University
Nicholas Page, Cardiff University

To Cite: Ashton, M. R., Lewis, J. J., Emmerson, C., Angel, L., and Page, N. 2025. Updating terminology around e-cigarette use in a national school-based survey: impacts on self-reported use, age of onset, and harm perceptions. *The School Health Research Network (SHRN)*: Research Brief, July 2025.

Acknowledgement

The School Health Research Network (SHRN) is a partnership between Cardiff University, Welsh Government, and Public Health Wales, funded by the Welsh Government. SHRN infrastructure funding via Health and Care Research Wales is gratefully acknowledged between 2015 and 2025. Funding for the 2023 SHRN Student Health and Well-being (SHW) survey was via support from the Health and Social Services and Education Departments, Welsh Government. We thank all schools and students that participated in 2023 for their ongoing support of SHRN.

Abstract

Purpose: Failing to adjust for societal shifts in language from e-cigarettes to vapes could increase chances of measurement bias in youth surveys. We examined impacts on self-reported e-cigarette use, age of onset, and harm perceptions, following the introduction of language around vaping into a national school-based survey of adolescents in Wales, UK.

Methods: Cross-sectional data were obtained from The School Health Research Network (SHRN) 2023 Student Health and Well-being (SHW) survey of 11-16-year-olds. Students were randomized to receive questions on ‘e-cigarettes’ or ‘e-cigarettes/vapes’. Regression models were used to assess any difference in participant response between groups.

Results: Estimates of e-cigarette ever use, regular use, and age of onset, were comparable between the e-cigarette and e-cigarette/vape groups. While there was some minor difference in harm perception, this did not result in substantially contrasting trends.

Conclusions: Using ‘e-cigarette’ or ‘e-cigarette/vape’ did not affect responses to survey questions on usage in a large UK-based sample of adolescents, suggesting the latter may be an acceptable update to terminology in existing youth surveys.

Keywords: e-cigarette; vaping; adolescent; school survey; UK

Introduction

A proliferation of device types has led to a diversification of terms used to describe e-cigarettes. While ‘e-cigarette’ and ‘vape’ remain the most widespread descriptors, myriad others exist, including ‘e-hookahs’, ‘vape pens’, ‘mods’, ‘tanks’, and popular brand names (e.g. JUUL, Elfbar).[1-4] Studies have shown the term e-cigarette is typically used to describe older ‘cigalike’ devices, whereas more contemporary devices that are not cigarette-shaped are more frequently identified as vapes.[2, 3] This poses a challenge for public health surveillance tools such as population surveys that rely on comparable measures to assess change over time – and may be particularly problematic when assessing use among child and adolescent cohorts for whom certain terms may become less familiar if rapid product innovation continues.[4] Hence a dilemma for those leading large-scale surveys is how best to maintain comparability to prior estimates while simultaneously adjusting for this shift in language from e-cigarettes to vapes to prevent possible measurement bias.[5] In this study, the authors’ exercised their role in designing and delivering a large national school-based survey in Wales, UK, to explore comparability in adolescent self-reported e-cigarette use, age of onset, and harm perceptions, following randomization to receive questions referring to ‘e-cigarettes’ or ‘e-cigarettes/vapes’.

Methods

Study design and sample

The School Health Research Network (SHRN) Student Health and Well-being (SHW) survey is a cross-sectional, school-based survey administered to 11-16-year-olds (UK school years 7-11) in Wales, UK, every two years. The sampling frame includes all maintained ('public') secondary schools (*n*=205) and seven independent ('private') schools. The SHW survey design supports four nationally representative pathways (or 'routes') through the survey, meaning some survey questions are asked to students in all schools (e.g. socio-demographics), while others are asked only to subsamples of schools. Stratified random sampling is used to assign schools to survey routes (see [6] for further detail on SHW survey design).

In the 2023 survey, this design was utilized to support an experimental approach to questions on e-cigarette use. Approximately half the sample were asked questions around 'e-cigarette' use (*n* = 66,881 / 51.5%), consistent with wording in previous SHW surveys. The remaining sample received questions around 'e-cigarette/vape' use (n = 62,880 / 48.5%). Ethical approval for the 2023 SHRN SHW Survey was obtained from Cardiff University's School of Social Sciences Research Ethics Committee (SREC).

Measures

E-cigarette Use

Measures of ever and regular use (at least weekly), age of onset, and harm perceptions relative to tobacco smoking, were derived from responses to questions referring to 'e-cigarettes' or 'e-cigarettes/vapes'. Responses of 'I do not want to answer' were omitted. All outcome measures are reported in full in appendices.

Other Measures

Student gender, school year group (age proxy), socioeconomic status (via the family affluence scale),[7] and substance use (weekly smoking, past month cannabis use, and ever use of alcohol), were used to assess similarity between the samples.

Analysis

Students who dropped out of the survey prior to questions on smoking and e-cigarettes were omitted from analyses (n=3,498; 2.7%). Missingness was 3.3% (n=2,215) in the e-cigarette group and 2.0% (n=1,283) in the e-cigarette/vape group. Both the number of survey questions and items students were exposed to prior to receiving questions on smoking and e-cigarettes were broadly comparable across survey routes (see **Table 1**):

Table 1: *Comparability of groups according to sample size, question exposure and missingness*

Group	Survey route (sample size)	Number of questions (and items) exposed to prior to smoking questions	Number (%) of dropouts prior to smoking questions	Analytical sample size (% of total sample in route)
E-cigarette (*n*=66,881)	1 (36,150)	28 (33)	1,213 (3.4)	34,937 (96.6)
	3 (30,731)	27 (32)	1,002 (3.3)	29,729 (96.7)
E-cigarette/vape (*n*=62,880)	2 (29,851)	26 (31)	555 (1.9)	29,296 (98.1)
	4 (33,029)	26 (31)	728 (2.2)	32,301 (97.8)

Logistic regressions assessed between-group differences by demographic and substance use measures. However, the SHW survey design, which randomized schools (and thus students) to receive questions on either e-cigarettes or e-cigarettes/vapes, should have reduced opportunities for bias. Differences in outcomes were examined using logistic, ordinal, or multinomial regression models, with group (e-cigarette vs. e-cigarette/vape) as the exposure. Robust standard errors were used to adjust for school-level clustering.

Results

Overall, 64,666 (51.2%) students answered questions on e-cigarettes and 61,597 (48.8%) on e-cigarettes/vapes. **Table 2** presents student characteristics and substance use by group. Students in both groups had comparable demographic and substance use, apart from ever use of alcohol which was marginally higher in the e-cigarette group (36.7% vs. 34.5%, p=0.04). Outcomes by group are presented in **Table 3**. Regression models provided no statistical evidence for minor differences in ever use (OR=1.08, 95% CI: 0.98, 1.18), regular use (OR=0.96, 95% CI: 0.84, 1.09), or age of onset (OR=0.99, 95% CI: 0.91,1.07) between groups.

Table 2: *Student characteristics and substance use within the e-cigarette and e-cigarette/vape groups*

	n (%)		
Characteristic	e-cigarette (n = 64,666)	e-cigarette / vape (n = 61,597)	P-value[a]
Gender			0.292
Boy	32,061 (49.6)	30,063 (48.8)	
Girl	30,954 (47.9)	29,942 (48.6)	
Neither word describes me	959 (1.5)	879 (1.4)	
I do not want to answer	692 (1.1)	713 (1.2)	
Year group			0.989
7 (11-12 yrs)	14,088 (21.8)	13,315 (21.6)	
8 (12-13 yrs)	13,763 (21.3)	13,149 (21.4)	
9 (13-14 yrs)	13,353 (20.7)	12,794 (20.8)	
10 (14-15 yrs)	12,122 (18.8)	11,555 (18.8)	
11 (15-16 yrs)	11,340 (17.5)	10,784 (17.5)	
Socioeconomic status[b]			0.686
Low	8,029 (12.4)	7,456 (12.1)	
Medium	21,930 (33.9)	20,641 (33.5)	
High	30,329 (46.9)	29,169 (47.4)	
Missing	4,378 (6.8)	4,331 (7.0)	
Weekly smoker	1,703 (2.7)	1,581 (2.7)	0.660
Cannabis use in last 30 days	2,642 (4.3)	2,424 (4.1)	0.444
Ever use of alcohol	22,500 (36.7)	20,153 (34.4)	0.046

[a] Logistic regression-based p-values with adjustment for school-level clustering; [b] measured via the 6-item family affluence scale (FAS III).[7] FAS scores range from zero to 13, with higher scores reflecting greater household affluence. Scores were categorized into low (0-6), medium (7-9), and high (10-13).

There was some evidence of between-group differences in perceived harm – although the extent of variation was generally small, ranging from 1.1 to 4.1 percentage points (inclusive of confidence limits), and the overall patterning of responses were similar. Students in both groups were most likely to perceive e-cigarettes and tobacco smoking as equally health harming and least likely to perceive e-cigarettes as more harmful: this was consistent among both ever and never e-cigarette users. Never users in the e-

cigarette/vape group were more likely than those in the e-cigarette group to perceive either tobacco (RRR=1.24, 95% CI: 1.17, 1.32) or e-cigarettes (RRR=1.24, 95% CI: 1.15,1.35) as more health harming than consider both substances as equally harmful. Ever users in the e-cigarette/vape group were more likely to report not knowing which substance was more harmful (RRR=1.17, 95% CI: 1.07,1.28).

Table 3: *Self-reported use, age of onset, and harm perceptions within the e-cigarette and e-cigarette/vape groups*

	Exposure - Percentage (95% CI)			
Outcome	e-cigarette	e-cigarette/vape	coefficient (95% CI)[a]	P-value
Ever use (*n*=118,485)^	25.0 (24.7, 25.4)	26.4 (26.1, 26.8)	1.08 (0.98, 1.18)	0.116
Regular use (*n*=116,859)^	7.1 (6.9, 7.3)	6.8 (6.6, 7.1)	0.96 (0.84, 1.09)	0.510
Age at first use (*n*=25,273)*			0.99 (0.91, 1.07)	0.811
11 years old or less	19.7 (19.0, 20.4)	19.8 (19.1, 20.5)		
12 years old	24.5 (23.8, 25.3)	24.2 (23.5, 25.0)		
13 years old	26.7 (26.0, 27.5)	26.9 (26.1, 27.7)		
14 years old	18.5 (17.8, 19.2)	19.2 (18.5, 20.0)		
15 years old	8.6 (8.2, 9.1)	8.4 (7.9, 8.9)		
16 years old	2.0 (1.8, 2.3)	1.5 (1.3, 1.7)		
Harm perceptions - never users (*n*=86,805) ¥				
Tobacco worse	15.8 (15.5, 16.1)	18.4 (18.0, 18.8)	1.24 (1.17, 1.32)	<0.001
E-cigarette worse	6.7 (6.5, 7.0)	7.8 (7.6, 8.1)	1.24 (1.15, 1.35)	<0.001
Both equally as harmful	51.3 (50.9, 51.8)	48.2 (47.7, 48.7)	Reference	
I don't know	26.2 (25.8, 26.6)	25.5 (25.1, 26.0)	1.04 (0.98, 1.11)	0.233
Harm perceptions - ever users (*n*=29,653) ¥				
Tobacco worse	27.8 (27.1, 28.5)	28.5 (27.8, 29.2)	1.09 (1.00, 1.18)	0.043
E-cigarette worse	11.9 (11.4, 12.4)	12.0 (11.5, 12.5)	1.07 (0.97, 1.18)	0.198
Both equally as harmful	43.7 (42.9, 44.5)	41.2 (40.4, 42.0)	Reference	
I don't know	16.6 (16.0, 17.2)	18.3 (17.7, 18.9)	1.17 (1.07, 1.28)	0.001

[a] Odds ratios reported for logistic (^) and ordinal (*) regression models and relative risk ratios (¥) for multinomial models. All models were adjusted for school-level clustering with group (e-cigarette vs. e-cigarette/vape) as the exposure.

Discussion

This study found use of the term ‘e-cigarette’ or ‘e-cigarette/vape’ did not substantially affect responses to questions on the use of these devices among a large sample of adolescents completing a national school-based survey in Wales, UK. These findings underscore previous research that both ‘e-cigarette’ and ‘vape’ are well-known and widely used terms,[2, 3] and suggest questions referring explicitly to e-cigarette use in youth population surveys may not currently lead to underestimations in prevalence.

Minor differences between groups regarding e-cigarette harm perceptions were observed, but these did not result in contrasting trends and may reflect the greater subjectivity of the question compared to those on usage. Current evidence is mixed with regards to adolescent perceptions of e-cigarette harms.[8] Repeat cross-sectional findings from the US, England, and Canada, have previously shown a decline in the proportion of adolescents perceiving e-cigarettes as being less harmful than tobacco smoking.[9] Recent research from the UK shows growth in the proportion of adolescents inaccurately perceiving both substances as equally health harming.[10]

A strength of this study is its use of a large national sample of 11-16-year-olds, increasing the likelihood that findings may be generalizable to other similar contexts. The split-sample

design applied here also mirrors that used by other national surveys (see for example [11], page 68) when assessing impacts of changes to question wording on participant response. A limitation is that by design we opted not to assess terms independently - as the term 'e-cigarette' was included in questions asked to both groups. This was preferred from a survey development perspective as it provided a practical solution on how best to proceed if responses were comparable.

References

1. Feeney S, Rossetti V, and Terrien J. E-Cigarettes—a review of the evidence—harm versus harm reduction. Tob Use Insights. 2022;15doi:10.1177/1179173X221087524

2. Pearson JL, Reed DM, and Villanti AC. Vapes, E-cigs, and Mods: What Do Young Adults Call E-cigarettes? Nicotine Tob Res. 2020;22(5):848-852.

3. Walker KL, McLeish AC, Wood LA, and Hart JL. Vape Gods, Vape Lords, and Fiends: The Language of Vaping. Youth. 2023;3:1421-1428.

4. Morean ME, Camenga DR, Bold KW, et al. Querying about the use of specific e-cigarette devices may enhance accurate measurement of e-cigarette prevalence rates among high school students. Nicotine and Tobacco Research. 2020;22(5):833-837.

5. Page LA, Henderson M. Appraising the evidence: what is measurement bias? Evidence Based Mental Health. 2008;11(2):36-37. doi:10.1136/ebmh.11.2.36

6. Page N, Liu S, Angel L, et al. Data Resource Profile: The School Health Research Network (SHRN) Student Health and Well-being (SHW) Survey of 11-16-year-olds (2017-2023). Int J Epidemiol. 2024;doi:10.1093/ije/dyae161

7. Hartley JEK, Levin K, and Currie C. A new version of the HBSC Family Affluence Scale - FAS III: Scottish Qualitative Findings from the International FAS Development Study. Child Indic Res. 2016;9:233-245. doi:10.1007/s12187-015-9325-3

8. Sharma A, McCausland K, and Jancey J. Adolescents' health perceptions of E-cigarettes: A systematic review. Am J Prev Med. 2021;60(5):716-725.

9. East K, Reid JL, Burkhalter R, et al. Exposure to Negative News Stories About Vaping, and Harm Perceptions of Vaping, Among Youth in England, Canada, and the United States Before and After the Outbreak of E-cigarette or Vaping-Associated Lung Injury ('EVALI'). Nicotine Tob Res. 2022;24(9):1386-1395. doi:10.1093/ntr/ntac088

10. Action on Smoking and Health (ASH). Use of vapes (e-cigarettes) among young people in Great Britain. 2024. https://ash.org.uk/uploads/Use-of-vapes-among-young-people-in-Great-Britain-2024.pdf?v=1725288402

11. Welsh Government. National Survey for Wales 2018-19 questionnaire. nd,. https://www.gov.wales/sites/default/files/statistics-and-research/2020-01/national-survey-wales-questionnaire-2018-19.pdf

Appendix

Both the original ('e-cigarette') and revised ('e-cigarette/vape') survey questions used during data collection are provided below.

Ever use of e-cigarettes

(Original)
Have you ever tried electronic cigarettes (sometimes called an 'e-cigarette')?

I have never tried e-cigarettes
I have tried e-cigarettes once
I have tried e-cigarettes more than once
I do not want to answer

(Revised)
Have you ever tried electronic cigarettes / vapes (usually called vaping)?

I have never tried e-cigarettes / vapes
I have tried e-cigarettes / vapes once
I have tried e-cigarettes / vapes more than once
I do not want to answer

Current use of e-cigarettes

(Original)
How often do you use e-cigarettes at present?

Every day
At least once a week, but not every day
Less than once a week
I do not use e-cigarettes at present
I do not want to answer

(Revised)
How often do you use e-cigarettes / vapes at present?

Every day
At least once a week, but not every day
Less than once a week
I do not use e-cigarettes / vapes at present
I do not want to answer

E-cigarette harm perceptions relative to tobacco

(Original)
Which of the following statements do you agree with the most?

Tobacco cigarettes are worse for your health than e-cigarettes.
E-cigarettes are worse for your health than tobacco cigarettes
Tobacco and e-cigarettes are equally bad for your health
I don't know
I don't want to answer

(Revised)
Which of the following statements do you agree with the most?

Tobacco cigarettes are worse for your health than e-cigarettes / vapes
E-cigarettes / vapes are worse for your health than tobacco cigarettes
Tobacco and e-cigarettes / vapes are equally bad for your health
I don't know
I don't want to answer

Age at first e-cigarette use

(Original)
At what age did you first do the following things? If there is something that you have not done, choose the 'never' category.

Use an e-cigarette (more than a puff)

Never
11 years old or less
12 years old
13 years old
14 years old
15 years old
16 years old
I don't want to answer

(Revised)
At what age did you first do the following things? If there is something that you have not done, choose the 'never' category.

Use an e-cigarette / vape (more than a puff)

Never
11 years old or less
12 years old
13 years old
14 years old
15 years old
16 years old
I don't want to answer

Y RHWYDWAITH YMCHWIL IECHYD MEWN YSGOLION

THE SCHOOL HEALTH RESEARCH NETWORK

The School Health Research Network (SHRN)
SPARK
Maindy Road
Cardiff
CF24 4HQ

shrn.org.uk

shrn@cardiff.ac.uk

The School Health Research Network

@shrnwales.bsky.social

School Health Research Network