

# Investigating the Appeal of Nicotine Pouch Packaging, Flavour and Nicotine Descriptors among Adults in the UK: An Online Experiment

Eve Taylor PhD<sup>1,2</sup>, Madeleine Ebdon MSc<sup>2</sup>, Matilda Nottage MSc<sup>2</sup>, Eriks Simonavicius PhD<sup>2</sup>, Leonie Brose PhD<sup>2</sup>, Ann McNeill PhD<sup>2</sup>, Deborah Arnott MBA<sup>3</sup>, Hazel Cheeseman MSc<sup>3</sup>, Laura Bunce MSc<sup>3</sup>, Katherine East PhD<sup>2,4</sup>.

- 1) Department of Behavioural Science and Health, University College London, London, UK
- 2) Department of Addictions, King's College London, United Kingdom
- 3) Action on Smoking and Health (ASH), London, United Kingdom
- 4) Department of Primary Care and Public Health, Brighton and Sussex Medical School, Brighton, UK

**Corresponding author:** Eve Taylor

**Email:** [eve.taylor@ucl.ac.uk](mailto:eve.taylor@ucl.ac.uk)

**Address:** Department of Behavioural Science and Health, University College London, London, UK

© The Author(s) 2025. Published by Oxford University Press on behalf of the Society for Research on Nicotine and Tobacco.

This is an Open Access article distributed under the terms of the Creative Commons Attribution License (<https://creativecommons.org/licenses/by/4.0/>), which permits unrestricted reuse, distribution, and reproduction in any medium, provided the original work is properly cited.

**Introduction:** Nicotine pouches have the potential to be used for tobacco harm reduction. Pouches can currently be sold in brightly coloured packaging with conceptual flavour and nicotine descriptors, which may appeal to youth. Therefore, the UK government are considering packaging regulations. We examined the impact of standardised packaging, limiting flavour names and standardising nicotine descriptors on appeal and harm perceptions of nicotine pouches among adults.

**Methods:** A 2024 Prolific Academic online experiment among UK Adults (N=2,967) was used. Participants were randomised to one of four packaging conditions: (1) branded, (2) standardised with usual descriptors, (3) standardised with limited flavour descriptors, and (4) standardised with limited flavour and standardised nicotine descriptors. Logistic regressions examined associations between packaging conditions and (a) no interest in trying the products displayed and (b) harm perceptions relative to cigarettes.

**Results:** There were no significant differences in reporting no interest in trying nicotine pouches in branded compared to standardised packaging with usual descriptors, standardised packaging with limited flavour descriptors, and standardised packaging with limited flavour and nicotine descriptors. When stratified by vaping/smoking status, participants who currently vaped had lower odds of reporting no interest in standardised packaging with limited flavour descriptors, compared to branded. There were no significant differences in harm perceptions by packaging condition.

**Conclusions:** Overall, standardising packaging, limiting flavour descriptors, and standardising nicotine descriptors had little effect on adults' interest in trying nicotine pouches or their perceptions of relative harm. There were, however, some differences by vaping status.

**Implications:** Findings suggest that if a standardised packaging, flavour and nicotine descriptors policy is introduced for nicotine pouches to deter youth use, there might be little impact on appeal or harm perceptions among adults. This is important because nicotine pouches could be a helpful part of the toolkit for tobacco harm reduction.

## Introduction

Nicotine pouches are small pouches that can be put between the lip or gum to release nicotine into the bloodstream. They generally contain nicotine, flavours, sweeteners and plant fibre, but exact ingredients vary between products<sup>1</sup>. In 2020, current nicotine pouch use was low among 16–19-year-olds and adults in England, at 0.14% and 1.4% in 2020 respectively<sup>2,3</sup>. However, ever use has since risen to 17% among adults who currently smoked, 7.2% among adults who used to smoke, and 1.5% among adults who had never smoked in 2024 (Brose et al; *in press*). Among 11-17-year-olds, 3.3% reported ever using nicotine pouches in 2024<sup>4</sup>.

There is little evidence of the overall health effects of nicotine pouches. Since nicotine pouches do not contain tobacco and do not involve combustion, they are likely less harmful than cigarettes, which kill up to two thirds of long-term users<sup>5</sup>. Industry research has reported that nicotine pouches do not contain toxicants such as nitrosamines or polycyclic aromatic hydrocarbons<sup>6</sup>, and toxicant exposure was reduced when people who smoked switched to nicotine pouch use for 7 days<sup>7</sup>. Some nicotine pouches have been reported to contain Tobacco Specific Nitrosamines, however at substantially lower levels than cigarettes<sup>8</sup>. Pharmacokinetic studies have also reported that nicotine pouches are effective at relieving nicotine cravings to a certain degree, so they may be an option for smoking cessation, although research here is very limited<sup>9</sup>.

In the UK, nicotine pouches do not currently have an age of sale limit, unlike cigarettes and vaping products (e-cigarettes and e-liquids) which cannot legally be sold to under 18s<sup>10</sup>. Also unlike vaping products, nicotine pouches do not have a limit on their nicotine content, and the way nicotine strength is described is not standardised across brands. Similar to vapes, nicotine pouches are widely marketed<sup>11</sup>, sold in brightly coloured packaging with a range of flavours<sup>12–14</sup>, and evidence suggests these factors may increase their appeal<sup>15</sup>. There is concern that the use of these products may cause nicotine dependence among youth. Therefore, in 2024 the UK government proposed new powers to regulate the marketing, packaging and flavours of all nicotine-containing products in the UK, including nicotine pouches<sup>16</sup>. Canada has already introduced legislation restricting flavours, labelling, advertising and limiting sales of nicotine pouches to behind the counter in pharmacies<sup>17</sup>, but effects have not yet been evaluated.

Standardising packaging and limiting flavour descriptors for cigarettes<sup>18,19</sup> and vapes<sup>20–22</sup> has been found to reduce their appeal among young people. However, standardising packaging for vapes has also been found to inflate the inaccurate perception that vaping is equally/more harmful than smoking<sup>20</sup>. Little is known about the effects of limiting flavour and standardising nicotine descriptors for nicotine pouches.

As nicotine pouches have the potential to be used for tobacco harm reduction, it is important that any packaging regulations balance the need to discourage youth use, while not inflating inaccurate harm perceptions relative to cigarettes among adults who smoke. This study therefore aimed to examine associations between standardised nicotine pouch packaging, flavour descriptors and nicotine descriptors and 1) interest in trying nicotine pouches, and 2) harm perceptions of nicotine pouches relative to cigarettes, among adults in the UK.

# Methods

## Participants

Data were from an online survey hosted on Qualtrics, collected between 24 May and 6 June 2024. Participants were adults aged 18+ years, drawn from Prolific Academic (a pre-existing panel) with quota samples set to ensure the sample was representative of age, sex, and ethnicity in the UK<sup>23</sup>. All participants provided informed consent. Ethical approval was granted by King's College London (MRA-23/24-42484).

An initial sample of N=3,025 was recruited, of whom 58 participants were removed due to missing demographic data, leaving an analytical sample of N=2,967.

## Design

The design was based on previous studies conducted on standardised vape and cigarette packaging<sup>19–22,24</sup>, where an experiment was embedded in an online survey. This design was chosen to investigate primarily standardised packaging, but also how the addition of extra regulation, such as standardising flavour and nicotine descriptions could enhance the effect of standardised packaging. This was a between-subject experimental design where participants were randomly allocated at a 1:1:1:1 ratio to one of four conditions:

1. Branded packaging
2. Standardised packaging with usual descriptors
3. Standardised packaging with limited flavour descriptors
4. Standardised packaging with limited flavour descriptors and standardised nicotine strength descriptors

Each experimental condition included images of pouches from four different brands. Brands and flavours were chosen to represent the range of products currently available on the market.

Packaging images are available on the Open Science Framework <https://osf.io/qpk8m>.

## Measures

See <https://osf.io/849nk> for the full questionnaire.

## Outcome variables

Outcome measures were based on those used in previous research conducted on standardised vape and cigarette packaging<sup>19–22,24</sup>,

**Interest in trying:** Participants were shown a set of four images of nicotine pouch packs based on their experimental condition and asked, “Which of the following products would you be most interested in trying?” Participants could either select one of the four nicotine pouches, or response options “None of these products” or “I don’t know”. Responses were coded as ‘No Interest (None of these products)’ vs ‘Interest (selecting any of the four products)’. “I don’t know” responses represented less than 5% of the data (n=42, 1.4%) and so they were removed from regression models.

**Relative harm perceptions:** Participants then viewed the ‘ZYN’ branded pouch, based on the packaging condition (outlined above) they had previously been randomised to, and asked, “How harmful do you think it is to use this product?”. Response options included: “Not at all harmful”, “Harmful, but less harmful than smoking cigarettes”, “As harmful as smoking cigarettes”, “More harmful than smoking cigarettes”, and “Don’t Know”. In line with the limited research on nicotine

pouch toxicant exposure<sup>6</sup> and that pouches do not contain tobacco and do not involve combustion, perceptions were coded 'Harmful, but less harmful than smoking cigarettes' or 'Other (Not at all harmful, As harmful as smoking cigarettes, More harmful than smoking cigarettes, Don't Know)'.

## Nicotine and tobacco use measures

**Nicotine pouch use:** Participants were asked "Nicotine pouches are small pouches of nicotine which are placed in the mouth between your lip and gum. Brands include Lyft, Skruf, ZYN, Nordic Spirit and Velo. Which of the following statements BEST applies to you?". Response options included: 1) I have tried nicotine pouches and still use them, 2) I have tried nicotine pouches but do not use them (anymore), 3) I have heard of nicotine pouches but have never tried them, 4) I have never heard of nicotine pouches, 5) Don't know. Responses were coded as 'Ever use (1-2)' and 'Never use/Don't know (3-5)'.

**Vaping status:** Participants were asked "The following questions relate to vapes (also called e-cigarettes). Which of the following statements BEST applies to you?". Response options included: 1) I have never tried vapes (e-cigarettes), 2) I have tried vapes (e-cigarettes) but do not use them (anymore), 3) I have tried vapes (e-cigarettes) and still use them. Responses were coded: 'Currently vaping' (3), 'Past vaping' (2), 'Never vaping' (1).

**Smoking status:** Participants were asked "Which of the following best applies to you? Please note we are referring to cigarettes and other kinds of tobacco that you set light to and NOT 'heated tobacco (e.g. IQOS)'. Response options included 1) I smoke cigarettes (including hand-rolled) every day, 2) I smoke cigarettes (including hand-rolled), but not every day, 3) I do not smoke cigarettes at all, but I do smoke tobacco of some kind (e.g. Pipe, cigar or shisha), 4) I have stopped smoking completely in the last year, 5) I stopped smoking completely more than a year ago, 6) I have never been a smoker (i.e. smoked for a year or more). Responses were coded: 'Currently smoking' (1-3), 'Past smoking' (4-5), 'Never smoking' (6).

## Demographic measures

Exact measures are outlined in Supplementary file 1.

Age was coded '18-24', '25-34', '35-44', '45-54', '55 or older'.

Gender was recorded as 'Male', 'Female', 'In another way'. For regression analyses, gender was coded 'Female' and 'Other' (male or in another way) due to small sample sizes for. 'Prefer not to say' responses (n=7) were removed.

Perceived Financial Status (PFS) was coded as 'Comfortable on present income', 'Coping on present income', 'Finding it difficult on present income', 'Finding it very difficult on present income', 'Don't know'. Prefer not to say responses (n=40) were removed.

Ethnicity was coded 1) Asian, Asian British, 2) Black, Black British, Caribbean or African, 3) Mixed or Multiple ethnic groups, 4) White, 5) Other ethnic group, in line with the Census definitions<sup>25</sup>. Due to small sample sizes for regression analysis, ethnicity was coded 'White (4)', and 'Racialised minorities (1-3, 5)'. 'Prefer not to say' responses (n=15) were removed.

## Data analysis

Analyses were pre-registered on the Open Science framework: <https://osf.io/849nk>.

Frequencies were used to describe current nicotine pouch use, vaping and smoking status and participant demographics. To test for successful randomisation, chi-square tests were used to test for differences in participant demographics by condition.

To investigate research question 1, logistic regressions examined associations between 'No interest' in trying any of the displayed nicotine pouches and condition (branded packaging vs the three standardised packaging conditions). Analysis was first unadjusted, and then adjusted for pouch use, smoking status, vaping status, PFS, age, gender and ethnicity.

To investigate research question 2, logistic regressions examined associations between nicotine pouch harm perceptions relative to smoking and nicotine pouch packaging condition (branded packaging vs the three standardised packaging conditions). Analyses were first run unadjusted, and then adjusted for nicotine pouch use, smoking status, vaping status, perceived financial status, age, gender and ethnicity.

***Deviation from the pre-registered analyses:***

Due to the small proportion of 'Don't Know' responses across all packaging conditions for interest in trying (n=42, 1.4%), planned sensitivity analyses using multinomial logistic regressions comparing 'Interest (reference)', 'No interest' and 'Don't know' were not conducted.

In addition to the pre-registered analyses, to further investigate differences in interest in trying by smoking and vaping status, and relative harm perceptions by smoking status, exploratory analyses were conducted by repeating logistic regression analyses stratifying participants by smoking and vaping status.

**Sensitivity analyses**

First, to explore the different relative harm perceptions, logistic regressions examined associations between each of the nicotine pouch harm perceptions vs all other perceptions and nicotine pouch packaging condition. Analyses were adjusted for nicotine pouch use, smoking status, vaping status, perceived financial status, age, gender and ethnicity.

Second, as people who have never heard of pouches would not know how harmful products are, analyses were also repeated excluding people who had never heard of, or do not know if they have heard of nicotine pouches.

# Results

## Sample characteristics

Half of participants were female (51.5%), most identified as white (86.0%), and perceived their financial status as 'coping' (47.8%) or 'comfortable' (26.6%). Few participants had used nicotine pouches (13.0%), with most having heard of but never tried pouches (58.2%), just under a third had never heard of pouches (28.4%), and few did not know if they had tried nicotine pouches (0.4%). Just under a fifth of participants currently smoked (19.3%) and/or currently vaped (17.1%) (Table 1).

## Interest in trying nicotine pouches

Across all conditions, 27.0% of participants reported interest in trying a nicotine pouch and 73.0% reported no interest. In unadjusted and adjusted analyses, there was no significant difference in participants reporting no interest in trying nicotine pouches in branded packs (75.1%) compared to standardised packaging with usual descriptors (70.6%), standardised packaging with limited flavour descriptors (72.1%) and standardised packaging with limited flavour and nicotine descriptors (74.1%) (Table 2, Supplementary figure 1).

When the three standardised packs were compared, participants randomised to view standardised packaging with limited flavour and standardised nicotine descriptors had higher odds of reporting no interest compared to standardised packaging with usual descriptors (74.1% vs 70.6%; AOR=1.53 95%CI= 1.14-2.04,  $p=.004$ ). There were no other significant differences in interest between the different types of standardised packs.

Age was the only participant demographic that was significantly associated with interest in trying. Across all packaging conditions, participants who were aged 44-55 years (76.4%) or 55 or older (85.4%) had greater odds of reporting no interest compared to participants aged 18-24 (57.3%) (Table 2).

Irrespective of packaging condition, participants who used to vape (55.6%) or had never vaped (91.4%) had significantly greater odds of reporting no interest in trying pouches than participants who currently vaped (24.9%). Participants who used to smoke (71.4%) or had never smoked (87.8%) also had greater odds of reporting no interest in trying pouches compared to participants who currently smoked (36.3%) (Table 2).

When analyses were stratified by smoking status, there were no significant differences in interest in trying by packaging condition (Table 3).

When analyses were stratified by vaping status, participants who currently vaped had lower odds of reporting no interest in trying pouches in standardised packaging with limited flavour descriptors (28.3%) compared to branded packs (41.3%). There were no significant differences for any other vaping status group (Supplementary table 1).

## Relative harm perceptions

Across all packaging conditions, 3.3% of participants perceived pouches as 'not at all harmful', 57.1% as 'harmful, but less harmful than smoking cigarettes', 24.9% as 'equally harmful as smoking cigarettes', 5.2%, as 'more harmful than smoking cigarettes', and 9.5% reported they did not know.

When exploring effects of standardised packaging on harm perceptions, in both unadjusted and adjusted analyses, there was no significant difference by packaging condition (Table 2). There were also no significant differences in harm perceptions between the three types of standardised packs ( $p>.05$ ).

Irrespective of packaging conditions, perceptions that nicotine pouches are 'harmful, but less harmful than smoking cigarettes' were significantly lower among participants who identified as female compared to another gender; participants who identified as a racialised minority compared to white; and participants who were 55+, 45-55 or 35-44 compared to 18-24 (Table 2). Across all packaging conditions, those who currently vaped were more likely to perceive that the product displayed is harmful, but less harmful than smoking cigarettes than those who used to vape or had never vaped (Table 2).

When analyses were stratified by smoking status, participants who had never smoked were more likely to perceive the nicotine pouches 'harmful, but less harmful than smoking cigarettes' when products were in standardised packs with usual descriptors (57.1%) compared to branded packs (49.5%) (Table 3). There were no other significant differences (Table 3).

### Sensitivity analyses

When exploring effects of standardised packaging on each of the five relative harm perceptions, there were no significant differences in reporting each of relative harm perceptions between the three types of standardised packs ( $p>.05$ ) (Supplementary table 2).

When people who had never heard of or did not know if they had heard of nicotine pouches were removed, there was no significant difference in harm perceptions by packaging condition (Supplementary table 3).

## Discussion

There was little difference in UK adults reporting interest in trying nicotine between products presented in standardised or branded packaging. However, when looking at only the three standardised packaging conditions, interest in trying was significantly greater for nicotine pouches in standardised packaging with usual descriptors compared to standardised packaging with limited flavour and standardised nicotine descriptors. Standardising packaging also had little significant effect overall on the relative harm perceptions of nicotine pouches, although there were some differences by smoking status: incorrect harm perceptions were more common among people who had never smoked and viewed standardised packs with usual descriptors, compared with branded packs.

The findings that standardising nicotine pouch packaging had little impact on adults' interest in trying them are in line with previous research on standardised vape packaging among adults<sup>22</sup>. However, limiting flavour and standardising nicotine descriptors did reduce interest in trying when nicotine pouch packaging was standardised, consistent with previous research on e-liquid flavours among youth<sup>26</sup>. Due to the experimental design, we were unable to determine the effects of limiting flavour and standardising nicotine descriptors in isolation from the effects of standardised packaging. However, in relation to the UKs tobacco and nicotine products regulatory policy, it is unlikely that new regulations would target nicotine and/or flavour descriptors only without standardising nicotine pouch packaging.

Similar to misperceptions of vapes<sup>27</sup>, harm perceptions that nicotine pouches were more or equally as harmful as cigarettes were common, with 30% of participants considering the pouches that they were shown to be equally or more harmful than cigarettes. This may be due to overall inaccurate harm perceptions of the role that nicotine plays in the health effects of tobacco smoking<sup>28,29</sup>. Also, almost a third of participants had never heard of pouches (28.4%), therefore those unfamiliar with them may have been unsure about their relative harms. Contrary to findings assessing vape packaging among youth<sup>20</sup>, standardising packaging in this study did not change harm perceptions among adults. However, similarly to previous research on nicotine pouches, which found little difference in harm perceptions between pouches with conceptual flavour names (dark frost) and characterising names (coffee), we found little effect of flavour descriptors on any of the relative harm perceptions<sup>30</sup>.

The combination of findings, suggesting that there is little impact of standardising nicotine pouch packaging on interest in trying and harm perceptions, is promising. Overall they suggest that if the UK government does introduce standardised packaging for nicotine pouches to deter youth use<sup>16</sup> there might be little impact among adults. This is important because nicotine pouches could potentially be part of the toolkit for tobacco harm reduction. The evidence for standardising flavour descriptors is less clear, although this should still be considered as our previous research on vaping products has suggested this may reduce their appeal to youth<sup>21</sup>. Standardising nicotine descriptors might also provide consumers with more accurate information on their nicotine use. This is particularly important because there is often confusion around the strength of nicotine described as mg/ml or as a percentage in vapes<sup>31</sup>; therefore, a standardised scale for conveying nicotine strength should be considered across nicotine products<sup>32</sup>. Age of sale should also be introduced across all nicotine products, as youth under the age of 18 can currently legally purchase nicotine pouches. Also, if packaging regulations are introduced for nicotine pouches, policymakers should be mindful of new products that utilise loopholes in regulation, as was seen with the introduction of limited-

edition cigarette tins during the phase-in of standardised cigarette packaging and the introduction of short-fill e-liquids in response to caps on e-liquid concentration and bottle size<sup>10,33</sup>.

This study has several strengths. First, this study was based on previous work using similar designs, using a randomised experiment to reduce confounding<sup>20-22</sup>. Second, it was the first study of its kind to assess the impact of standardising nicotine pouch packaging among adults, and it is timely for UK policy<sup>16</sup>.

There are also several limitations. We used quota sampling to achieve a sample nationally representative of age, sex, and ethnicity. Although our sample was broadly in line with 2021 Census data for age, sex and ethnicity, however, it was skewed towards people with higher socioeconomic status and current smoking, vaping and nicotine pouch use were higher than estimates from national surveys<sup>27,34</sup>; therefore, the sample may not be truly representative in terms of the use of nicotine products in the UK population. Second, it is uncertain whether findings on interest in the use of nicotine pouches would translate into purchasing and actual use, particularly because of the lack of ecological validity from online experiments compared to the real-world retail environment. Third, harm perceptions questions were only based on one of the brand images (ZYN), therefore, findings may not be generalised to other brands, especially brands with different styles of packaging. Fourth, the sample was among adults only and future research should explore the effects of standardising packaging among youth, who should be deterred from using nicotine pouches especially due to regulatory loopholes meaning that under 18s can legally purchase them in the UK.

### Conclusions

There was little evidence of an effect of standardising packaging and limiting flavour and standardising nicotine descriptors on UK adults' interest in trying nicotine pouches or harm perceptions relative to smoking.

*Funding:* Research was funded by an internal King's College London grant supported by Research England.

*Conflicts of interest:* All authors declare no conflicts of interest

*Data availability:* Data are available on a reasonable request to eve.taylor@ucl.ac.uk

bioRxiv preprint doi: <https://doi.org/10.1101/809476>; this version posted March 26, 2025. The copyright holder for this preprint (which was not certified by peer review) is the author/funder, who has granted bioRxiv a license to display the preprint in perpetuity. It is made available under a [aCC-BY-ND 4.0 International license](https://creativecommons.org/licenses/by-nd/4.0/).

## References

1. Committee on Toxicology. Statement on the bioavailability of nicotine from the use of oral nicotine pouches and assessment of the potential toxicological risk to users. 2023. <https://cot.food.gov.uk/Statement%20on%20the%20bioavailability%20of%20nicotine%20from%20the%20use%20of%20oral%20nicotine%20pouches%20and%20assessment%20of%20the%20potential%20toxicological%20risk%20to%20users#overall-conclusion>
2. Tattan-Birch H, Jackson SE, Dockrell M, Brown J. Tobacco-free Nicotine Pouch Use in Great Britain: A Representative Population Survey 2020–2021. *NTR*. 2022;24(9):1509-1512. doi:10.1093/ntr/ntac099
3. Hammond D, Reid JL. Trends in vaping and nicotine product use among youth in Canada, England and the USA between 2017 and 2022: evidence to inform policy. *Tob Control*. Published online November 8, 2023. doi:10.1136/TC-2023-058241
4. Action on Smoking and Health. 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=1723555613>
5. Doll R, Peto R, Boreham J, Sutherland I. Mortality in relation to smoking: 50 Years' observations on male British doctors. *Br Med J*. 2004;328(7455):1519-1528. doi:10.1136/bmj.38142.554479.ae
6. Back S, Masser AE, Rutqvist LE, Lindholm J. Harmful and potentially harmful constituents (HPHCs) in two novel nicotine pouch products in comparison with regular smokeless tobacco products and pharmaceutical nicotine replacement therapy products (NRTs). *BMC Chem*. 2023;17(1):9. doi:10.1186/s13065-023-00918-1
7. Rensch J, Edmiston J, Wang J, Jin X, Sarkar M. A Randomized, Controlled Study to Assess Changes in Biomarkers of Exposures Among Adults Who Smoke That Switch to Oral Nicotine Pouch Products Relative to Continuing Smoking or Stopping All Tobacco Use. *The Journal of Clinical Pharmacology*. 2023;63(10):1108-1118. doi:10.1002/jcph.2293
8. Mallock N, Schulz T, Malke S, Dreiack N, Laux P, Luch A. Levels of nicotine and tobacco-specific nitrosamines in oral nicotine pouches. *Tob Control*. 2024;33(2):193-199. doi:10.1136/tc-2022-057280
9. Keller-Hamilton B, Alalwan MA, Curran H, et al. Evaluating the effects of nicotine concentration on the appeal and nicotine delivery of oral nicotine pouches among rural and Appalachian adults who smoke cigarettes: A randomized cross-over study. *Addiction*. 2024;119(3):464-475. doi:10.1111/add.16355
10. The Secretary of State. The Tobacco and Related Products Regulations 2016. 2016. Accessed August 11, 2022. <https://www.legislation.gov.uk/uksi/2016/507/introduction/made>
11. Sun T, Tattan-Birch H. Sports, Gigs, and TikToks: Multichannel Advertising of Oral Nicotine Pouches. *NTR*. Published online August 27, 2024. doi:10.1093/ntr/ntae188
12. Gaiha SM, Lin C, Lempert LK, Halpern-Felsher B. Use, marketing, and appeal of oral nicotine products among adolescents, young adults, and adults. *Addictive Behaviors*. 2023;140:107632. doi:10.1016/j.addbeh.2023.107632

13. Shaikh SB, Newton C, Tung WC, et al. Classification, Perception, and Toxicity of Emerging Flavored Oral Nicotine Pouches. *Int J Environ Res Public Health*. 2023;20(5):4526. doi:10.3390/ijerph20054526

14. Czaplicki L, Tfayli D, Spindle TR, et al. Content analysis of marketing features in US nicotine pouch ads from 2021 to 2023. *Tob Control*. Published online December 3, 2024:tc-2024-059010. doi:10.1136/tc-2024-059010

15. Clark SA, Baler G, Jarman KL, Byron MJ, Goldstein AO, Ranney LM. Qualitative perspective on nicotine pouches from adults who smoke cigarettes in North Carolina. *Tob Control*. Published online February 2, 2024:tc-2023-058334. doi:10.1136/tc-2023-058334

16. Department of Health and Social Care. *Tobacco and Vapes Bill 2024*. House of Commons; 2024. <https://www.gov.uk/government/collections/tobacco-and-vapes-bill-2024>

17. Health Canada. Health Canada introduces new measures to help prevent harms to youth from nicotine replacement therapies. Government of Canada. 2024. <https://www.canada.ca/en/health-canada/news/2024/08/health-canada-introduces-new-measures-to-help-prevent-harms-to-youth-from-nicotine-replacement-therapies.html>

18. McNeill A, Gravely S, Hitchman SC, Bauld L, Hammond D, Hartmann-Boyce J. Tobacco packaging design for reducing tobacco use. *Cochrane Database of Systematic Reviews*. Published online April 27, 2017. doi:10.1002/14651858.CD011244.pub2

19. Hammond, Daniel S, White CM. The effect of cigarette branding and plain packaging on female youth in the United Kingdom. *Journal of Adolescent Health*. 2013;52(2):151-157. doi:10.1016/j.jadohealth.2012.06.003

20. Simonavičius E, East K, Taylor E, et al. Impact of E-liquid Packaging on Vaping Product Perceptions Among Youth in England, Canada, and the United States: A Randomized Online Experiment. *NTR*. 2023;XX:1-10. doi:10.1093/NTR/NTAD144

21. Taylor E, Simonavičius E, Nottage M, et al. Association of fully branded, standardized packaging and limited flavor and brand descriptors of e-liquids with interest in trying products among youths in Great Britain. *Addiction*. Published online January 13, 2025. doi:10.1111/add.16763

22. Taylor E, Arnott D, Cheeseman H, et al. Association of Fully Branded and Standardized e-Cigarette Packaging With Interest in Trying Products Among Youths and Adults in Great Britain. *JAMA Netw Open*. 2023;6(3):e231799. doi:10.1001/jamanetworkopen.2023.1799

23. Prolific Academic. Representative samples. 2024. Accessed October 16, 2024. <https://researcher-help.prolific.com/en/article/95c345>

24. Hammond D, Dockrell M, Arnott D, Lee A, McNeill A. Cigarette pack design and perceptions of risk among UK adults and youth. *Eur J Public Health*. 2009;19(6):631-637. doi:10.1093/eurpub/ckp122

25. Office for National Statistics. Ethnic group classifications: Census. Census 2021 dictionary. 2023. <https://www.ons.gov.uk/census/census2021dictionary/variablesbytopic/ethnicgroupnationalidentitylanguageandreligionvariables/census2021/ethnicgroup/classifications>

26. Taylor E, Simonavičius E, Nottage M, et al. Examining the effect of standardized packaging and limited flavour and brand descriptors of e-liquids among youth in Great Britain. *Psyarxiv*. Published online February 5, 2024. doi:10.31234/OSF.IO/WBJ5V

27. Action on Smoking and Health. Use of vapes (e-cigarettes) among adults in Great Britain. 2024. <https://ash.org.uk/uploads/Use-of-vapes-among-adults-in-Great-Britain-2024.pdf?v=1723194891>

28. King B, Borland R, Le Grande M, et al. Associations between smokers' knowledge of causes of smoking harm and related beliefs and behaviors: Findings from the International Tobacco Control (ITC) Four Country Smoking and Vaping Survey. *PLoS One*. 2023;18(10):e0292856. doi:10.1371/journal.pone.0292856

29. East K, Vu G, Sun T, et al. Harm perceptions across vaping product features: An on-line cross-sectional survey of adults who smoke and/or vape in the United Kingdom. *Addiction*. Published online June 5, 2024. doi:10.1111/add.16572

30. Mays D, Long L, Alalwan MA, et al. The Effects of Oral Nicotine Pouch Packaging Features on Adult Tobacco Users' and Non-Users' Product Perceptions. *Int J Environ Res Public Health*. 2023;20(4):3383. doi:10.3390/ijerph20043383

31. Morean ME, Wackowski OA, Eissenberg T, Delnevo CD, Krishnan-Sarin S. Adults who use e-cigarettes have difficulty understanding nicotine concentrations presented as mg/ml and percent nicotine. *Addictive Behaviors*. 2021;120:106965. doi:10.1016/j.addbeh.2021.106965

32. Morean ME, Wackowski OA, Eissenberg T, Delnevo CD, Krishnan-Sarin S, Gueorguieva R. Novel Nicotine Concentration Labels Improve Adolescents' and Young Adults' Understanding of the Nicotine Strength of Electronic Nicotine Delivery System Products. *NTR*. 2022;24(7):1110-1119. doi:10.1093/ntr/ntac024

33. Taylor E, East K, Reid JL, Hammond D. Awareness and Use of Short-fill E-liquids by Youth in England in 2021: Findings From The ITC Youth Tobacco and Vaping Survey. Published online March 14, 2022. doi:10.17605/OSF.IO/YD2C8

34. Buss V, West R, Kock L, Kale D, Brown J. Resources Relating to Smoking in England. *Smoking in England*. 2023. <https://smokinginengland.info/resources/key-publications>

Table 1: Participant Characteristics of Nicotine Pouch Study; Adults in the UK 2024 (N=2967)

	Total	Branded packaging	Standardised packaging with usual descriptors	Standardised packaging with limited flavour descriptors	Standardised with limited flavour and standardised nicotine descriptors
	% (n)	% (n)	% (n)	% (n)	% (n)
<b>Total</b>	100(2967)	25.7(762)	24.0(713)	24.5(726)	25.8(766)
<b>Gender</b>					
Female	51.5(1527)	51.0(389)	51.9(370)	52.9(384)	50.1(384)
Male	48.0(1425)	48.5(361)	47.5(339)	46.6(338)	49.5(379)
Identify in another way	0.5(15)	0.5(4)	0.6(4)	0.6(4)	0.4(3)
<b>Perceived financial status</b>					
Comfortable	26.6(790)	26.5(202)	26.4(188)	26.9(195)	26.8(205)
Coping	47.8(1419)	47.1(359)	49.4(352)	47.0(341)	47.9(367)
Finding it difficult	18.0(534)	18.2(139)	17.4(124)	18.3(133)	18.0(138)
Finding it very difficult	7.6(224)	8.2(62)	6.9(49)	7.9(57)	7.3(56)
<b>Age</b>					
18-24	10.6(314)	10.4(79)	9.4(67)	10.6(77)	11.9(91)
25-34	17.2(511)	16.9(129)	16.1(115)	17.4(126)	18.4(141)
35-44	16.3(483)	16.8(128)	16.4(117)	15.8(115)	16.1(123)
45-54	17.2(510)	17.2(131)	17.0(121)	17.8(129)	16.8(129)
55 or older	38.7(1149)	38.7(295)	41.1(293)	38.4(279)	36.8(282)
<b>Country</b>					
England	84.6(2512)	86.6(661)	82.6(589)	84.3(612)	84.9(650)
Scotland	4.4(131)	3.9(30)	5.5(39)	4.4(32)	3.9(30)
Wales	8.4(249)	7.7(59)	8.7(62)	8.1(59)	9.0(69)
Northern Ireland	2.6(76)	1.7(13)	3.2(23)	3.2(23)	2.2(17)
<b>Ethnicity</b>					
Asian, Asian British	7.8(232)	8.1(62)	8.0(57)	7.6(55)	7.6(58)
Black, Black British, Caribbean or African	3.6(106)	3.7(28)	3.1(22)	3.2(23)	4.3(33)
Mixed or Multiple Ethnic groups	1.4(43)	0.9(7)	1.4(10)	1.7(12)	1.8(14)
White	86.0(2553)	86.4(659)	86.1(614)	86.1(625)	85.4(655)
Other Ethnic Group	1.1(33)	0.8(6)	1.4(10)	1.5(11)	0.8(6)
<b>Pouch status</b>					
Not used/ Don't know	87.0(2584)	88.1(672)	88.2(629)	87.9(638)	84.1(645)
Ever used	13.0(385)	11.9(91)	11.8(84)	12.1(88)	15.9(122)
<b>Vaping status</b>					
Currently vape	17.1(506)	15.2(115)	19.1(136)	17.8(129)	16.4(126)
Used to vape	24.8(737)	24.0(183)	22.2(158)	26.3(191)	26.9(206)
Never vaped	58.1(1724)	60.9(464)	58.8(419)	55.9(406)	56.7(435)
<b>Smoking status</b>					
Currently smoke	19.3(573)	18.9(144)	20.1(143)	18.6(135)	19.7(151)
Used to smoke	30.6(909)	29.9(228)	29.3(209)	33.3(242)	30.0(230)
Never smoked	50.1(1485)	51.2(390)	50.6(361)	48.1(349)	50.3(386)

Table 2: Associations between interest in trying nicotine pouches, packaging condition and participant characteristics; Adults in the UK, 2024 (N=2,967)<sup>a</sup>

	Interest in trying (ref) <sup>a</sup>		No interest in trying <sup>b</sup>		Harmful, but less harmful than smoking cigarettes (ref) <sup>c</sup>		Other perception <sup>d</sup>	
	% (n)	% (n)	AOR (95%CI)	p	% (n)	% (n)	AOR (95%CI)	p
<b>Total</b>	27.0 (789)	73.0 (2136)			57.1 (1693)	42.9 (1274)		
<b>Packaging condition</b>								
Branded packaging	24.9 (186)	75.1 (562)	1	ref	55.4 (422)	44.6 (340)	1	ref
Standardised packaging with usual descriptors	29.4 (207)	70.6 (498)	0.76 (0.57-1.01)	.056	58.5 (417)	41.5 (296)	0.87 (0.70-1.08)	.207
Standardised packaging with limited flavour descriptors	27.9 (200)	72.1 (516)	0.92 (0.69-1.23)	.582	57.9 (420)	42.1 (306)	0.92 (0.74-1.14)	.447
Standardised with limited flavour and standardised nicotine descriptors	25.9 (196)	74.1 (560)	1.15 (0.87-1.54)	.329	56.7 (434)	43.3 (332)	1.00 (0.81-1.23)	.999
<b>Gender+</b>								
Other <sup>c</sup>	30.9 (435)	69.1 (975)	1	ref	63.2 (910)	36.6 (530)	1	ref
Female	23.4 (354)	76.6 (1161)	0.97 (0.79-1.19)	.779	51.3 (783)	48.7 (744)	1.50 (1.29-1.75)	<.001
<b>Ethnicity+</b>								
White	25.9 (651)	74.1 (1866)	1	ref	58.2 (1486)	41.8 (1067)	1	ref
Racialised minorities <sup>c</sup>	33.9 (138)	66.2 (270)	0.77 (0.58-1.02)	.070	50.0 (207)	50.0 (207)	1.65 (1.32-2.07)	<.001
<b>Age (years)</b>								
18-24	42.7 (132)	57.3 (177)	1	ref	71.3 (224)	28.7 (90)	1	ref
25-34	39.8 (202)	60.2 (305)	1.19 (0.83-1.69)	.346	67.7 (346)	32.3 (165)	1.16 (0.85-1.59)	.353
35-44	36.1 (172)	63.9 (304)	1.36 (0.93-1.97)	.112	56.5 (273)	43.5 (210)	1.83 (1.33-2.51)	<.001
45-54	23.6 (118)	76.4 (382)	2.98 (2.00-4.43)	<.001	56.1 (286)	43.9 (224)	1.84 (1.34-2.53)	<.001
55 or older	14.6 (165)	85.4 (968)	4.23 (2.91-6.15)	<.001	49.1 (564)	50.9 (585)	2.44 (1.81-3.29)	<.001
<b>Perceived Financial Status</b>								
Comfortable	21.8 (171)	78.2 (614)	1	ref	54.7 (432)	45.3 (358)	1	ref
Coping	26.9 (376)	73.1 (1021)	1.00 (0.77-1.29)	.980	57.6 (818)	42.4 (601)	0.94 (0.78-1.12)	.473
Finding it difficult	32.1 (169)	67.9 (358)	0.98 (0.72-1.34)	.890	60.7 (324)	39.3 (210)	0.88 (0.69-1.11)	.273
Finding it very difficult	33.8 (73)	66.2 (143)	0.86 (0.57-1.30)	.467	53.1 (119)	46.9 (105)	1.21 (0.89-1.55)	.229
<b>Pouch status</b>								
Never used/ Don't know	21.1 (538)	78.9 (2012)	1	ref	54.6 (1411)	45.4 (1172)	1	ref
Ever used	67.0 (251)	33.0 (124)	0.39 (0.30-0.52)	<.001	73.4 (282)	26.6 (102)	0.62 (0.48-0.82)	<.001
<b>Vaping status</b>								
Currently vape	65.1 (321)	24.9 (172)	1	ref	71.1 (360)	28.9 (146)	1	ref
Used to vape	44.4 (321)	55.6 (402)	1.73 (1.33-2.26)	<.001	63.8 (470)	36.2 (267)	1.51 (1.16-1.96)	.002
Never vaped	8.6 (147)	91.4 (1562)	6.38 (4.67-8.72)	<.001	50.1 (863)	49.9 (861)	2.11 (1.60-2.78)	<.001
<b>Smoking status</b>								
Currently smoke	63.7 (353)	36.3 (202)	1	ref	60.4 (346)	39.6 (227)	1	ref
Used to smoke	28.6 (256)	71.4 (639)	2.40 (1.85-3.12)	<.001	60.3 (548)	39.7 (361)	0.67 (0.53-0.85)	.001
Never smoked	12.2 (180)	87.8 (1295)	4.83 (3.52-6.63)	<.001	53.8 (799)	46.2 (686)	0.72 (0.56-0.94)	.015

<sup>a</sup> models are adjusted for vaping status, pouch use, age, gender, ethnicity and perceived financial status<sup>b</sup> Don't know responses (N=42, 1.4%) were removed from 'interest' analysis, in line with the pre-registration (if <5% don't know this response is excluded from analyses).<sup>c</sup> Due to small cell counts, ethnicity was collapsed into 'White' and 'Racialised minorities'. Gender was also collapsed into 'Female' and 'Other'.<sup>d</sup> 'Other perceptions' include: 'not at all harmful', 'as harmful as smoking cigarettes', 'more harmful than smoking cigarettes', 'don't know'.

Table 3: Associations between interest in trying, harm perceptions, and nicotine pouches and packaging condition, stratified by smoking and vaping status; Adults in the UK 2024 (N=2967)<sup>a</sup>

	Interest in trying (ref) <sup>c</sup>				Harmful, but less harmful than smoking cigarettes (ref)				Other <sup>b</sup>			
	% (n)	% (n)	AOR (95% CI)	p	% (n)	% (n)	AOR (95% CI)	p	% (n)	% (n)	AOR (95% CI)	p
<b>Currently smoking</b>	(n=555) <sup>c</sup>				(n=573)							
Branded packaging	60.3(82)	39.7(54)	1	ref	63.9(92)	36.1(52)	1	ref				
Standardised packaging with usual descriptors	65.9(91)	34.1(47)	0.79(0.49-1.30)	.357	58.0(83)	42.0(60)	1.33(0.81-2.18)	.262				
Standardised packaging with limited flavour descriptors	65.9(87)	34.1(45)	0.80(0.48-1.31)	.366	56.3(76)	43.7(59)	1.37(0.83-2.28)	.217				
Standardised packaging with limited flavour and standardised nicotine descriptors	62.4(93)	37.6(56)	0.93(0.58-1.49)	.750	62.9(95)	37.1(56)	1.10(0.67-1.81)	.702				
<b>Used to smoke</b>	(n=895) <sup>c</sup>				(N=909)							
Branded packaging	27.2(61)	72.8(163)	1	ref	60.1(137)	39.9(91)	1	ref				
Standardised packaging with usual descriptors	32.2(67)	67.8(141)	0.79(0.52-1.19)	.258	61.2(128)	38.8(81)	0.94(0.63-1.40)	.756				
Standardised packaging with limited flavour descriptors	30.0(71)	70.0(166)	0.88(0.58-1.31)	.518	62.4(151)	37.6(91)	0.91(0.62-1.34)	.622				
Standardised packaging with limited flavour and standardised nicotine descriptors	25.2(57)	74.8(169)	1.11(0.73-1.69)	.628	57.4(132)	42.6(98)	1.16(0.79-1.71)	.459				
<b>Never smoked</b>	(n=1475) <sup>c</sup>				(n=1485)							
Branded packaging	11.1(43)	88.9(345)	1	ref	49.5(193)	50.5(197)	1	ref				
Standardised packaging with usual descriptors	13.6(49)	86.4(310)	0.79(0.51-1.22)	.287	57.1(206)	42.9(155)	0.71(0.52-0.96)	.025				
Standardised packaging with limited flavour descriptors	12.1(42)	87.9(305)	0.91(0.58-1.42)	.666	55.3(193)	44.7(156)	0.78(0.57-1.05)	.102				
Standardised packaging with limited flavour and standardised nicotine descriptors	12.1(46)	87.9(335)	0.91(0.73-1.42)	.677	53.8(207)	46.2(178)	0.88(0.65-1.18)	.388				

<sup>a</sup> models are adjusted for vaping status, pouch use, age, gender, ethnicity and perceived financial status

<sup>b</sup> 'Other perceptions' include: 'not at all harmful', 'as harmful as smoking cigarettes', 'more harmful than smoking cigarettes', 'don't know'.

<sup>c</sup> Don't know responses (N=42, 1.4%) were removed from analysis, in line with the pre-registration (if <5% don't know this response is excluded from analyses).

Due to small cell counts, ethnicity was collapsed into 'White' and 'Racialised minorities'. Gender was also collapsed into 'Female' and 'Other'.