Adult smoking habits in the UK methodology

Methodology information for the Adult smoking habits in the UK annual statistical bulletin

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Table of contents

1 . About this methodology

This methodology article contains information on the data included and the methods used to produce our annual Adult smoking habits in the UK statistical bulletin.

The information in this article will provide:

- an overview of the data used in our bulletin from the Annual Population Survey (APS) and Opinions and Lifestyle Survey (OPN)
- changes to data collection methods in recent years
- details of the analysis used in the annual Adult smoking habits in the UK publication
- an explanation of the adjustment to weighting method for correction of discontinuity in survey data in 2020

2 . Data included in Adult smoking habits in the UK bulletin

The Office for National Statistics (ONS) collects data on adult smoking habits using two surveys. The Annual Population Survey (APS) provides indicators of the number of adults aged 18 years and over who smoke in the UK, and the Opinions and Lifestyle Survey (OPN) collects more detailed information on smoking habits and e-cigarette users aged over 16 years in Great Britain. Data from both surveys are collated and analysed as part of the annual publication that reports on Adult smoking habits in the UK.

Annual Population Survey (APS)

The data on smoking habits in the UK come from the APS. The survey covers residents of the UK aged 18 years and over. Further information on the Annual Population Survey and survey methodology is available.

In March 2020, the data collection method for the APS changed from mixed mode (face-to-face, telephone) to telephone only. APS data collection returned to mixed mode (face-to-face and telephone) in October 2023.

From April 2021, a field strategy referred to as "knock to nudge" was introduced, which involved interviewers visiting sampled addresses where no phone numbers could be obtained through either telematching or the online portal. The interviewers encouraged residents at the address to provide their phone number and arrange a telephone appointment. This field strategy proved to improve response rates as well as follow-up on those people that were otherwise harder to reach. However, this change in data collection mode also resulted in a potential bias in survey response, which is discussed later in this article.

Opinions and Lifestyle Survey (OPN)

Data on smoking and e-cigarette use for Great Britain for those aged 16 years and over used in the bulletin come from the OPN. Further information on the Opinions and Lifestyle Survey and survey methodologyis available.

In March 2020, the OPN was transformed from a monthly to weekly omnibus survey to understand how the coronavirus (COVID-19) pandemic was affecting life in Great Britain.

From 25 August 2021, as we moved to a period where COVID-19 restrictions had been lifted across Great Britain, the OPN covered roughly fortnightly periods with an issued sample size of around 5,000 adults in each period to help ensure the survey remained sustainable. Consequentially, the number of questions relating to smoking and vaping habits were greatly reduced. As such, caution is recommended when interpreting trends over this period from OPN data used in theAdult smoking habits bulletin. Conclusions from apilot studyon the move to mixed mode in the OPN are available for reference.

From June 2024, the OPN has moved to monthly data collection and outputs. Data collection is split over two 12-day collection periods each month. The OPN has a sample size of approximately 5,000 per month rather than 5,000 per fortnight, with an overall response of approximately 2,000 adults per month.

3 . Data collection changes during the pandemic

As noted in our releaseSmoking prevalence in the UK and the impact of data collection changes: 2020, the change in the mode of data collection for the Annual Population Survey (APS), introduced at the end of March 2020, affected the comparability of our smoking prevalence estimates with previous years.

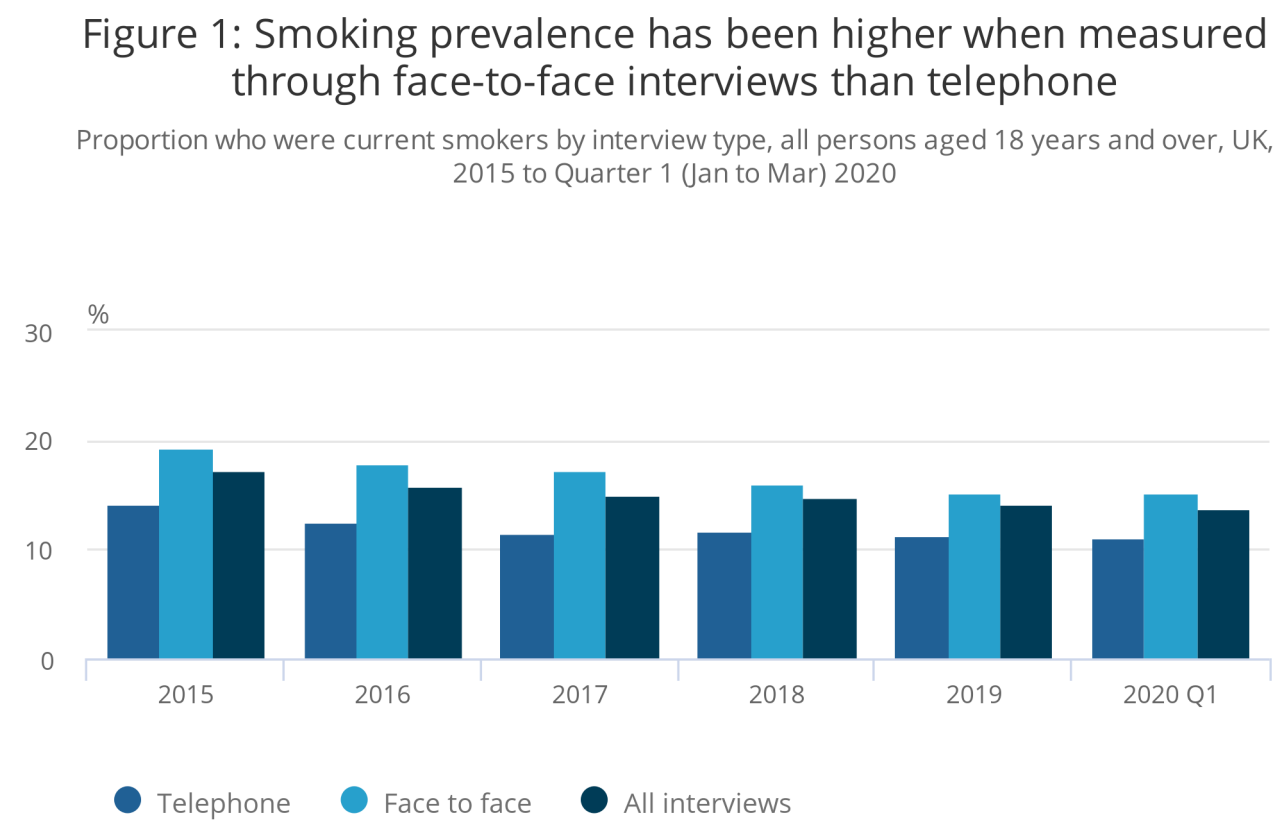
Because of the coronavius (COVID-19) pandemic, data collection for the APS moved from mixed-mode (face-to-face and telephone) to telephone-only data collection. This resulted in a potential bias in the sample and meant our estimates for April to December 2020 were not comparable with previous years.

When looking at pre-coronavirus data, the proportion of adult cigarette smokers has always been lower when responses were recorded on the telephone compared with face-to-face. In addition, the number of face-to-face interviews was always higher than the number of telephone interviews.

With the change to telephone-only interviews in 2020, there was a sudden drop in the proportion of adults who smoked cigarettes, in APS data (see Figure 1). This may be related tothe move to telephone-only response type, which has also been shown in previous research. One explanation for this effect could be because of social desirability, where respondents under-report smoking behaviour over the telephone in order not to be negatively viewed by others. However, another explanation may be that in 2020, people may have given up smoking because of health concerns, or lack of access to tobacco while isolating and no longer smoking socially.

Figure 1: Smoking prevalence has been higher when measured through face-to-face interviews than telephone

Proportion who were current smokers by interview type, all persons aged 18 years and over, UK, 2015 to Quarter 1 (Jan to Mar) 2020



Source: Annual Population Survey from the Office for National Statistics

Notes:

1. Quarter 1 2020 is based on data where most were collected before the UK-wide lockdown (January to March) and has been weighted to produce estimates comparable with previous years.

To account for the discontinuity caused by the move to telephone-only interviewing, we introduced a weighting adjustment for APS data from 2020 to 2023. Initially, a single scaling factor was applied in the 2021 release of Adult smoking habits in the UK. We revised this approach in the 2024 release to apply separate scaling factors for each year, reflecting the return to mixed mode (face-to-face and telephone) interviewing at the end of 2023. This update improves consistency with underlying trends across the affected period. Please read more in Section 5: Method of weighting adjustment for the APS.

4 . Analysis of data for the Adult smoking habits in the UK bulletin

How we analyse and interpret the data

The analysis reported in the Adult smoking habits annual release uses survey weights to make estimates representative of the population. Survey weights take into account non-response and attrition as well as the distribution of population characteristics such as sex and age, where someone lives and socio-economic characteristics.

An adjusted weighting methodology has been implemented from the 2021 release of Adult smoking habits in the UK. This is to correct for discontinuity in data as a result of survey response changes in the Annual Population Survey (APS). This update is detailed in Section 5: Method of weighting adjustment for the APS of this article.

All data presented in the Adult smoking habits UK release are proportions of observed values calculated from APS and Opinions and Lifestyle Survey (OPN) data.

In addition, 95%confidence intervalsare calculated for each proportion. This is done by first calculatingstandard error. As values provided from the OPN and APS are taken from a sample of the population, they are likely to be different to the "true" unknown population value.

Standard errorsare a way to estimate the sampling error, or the error related to the difference between the sample population and the true population. The method used to calculate the standard error is a "linearised jacknife" variance estimator ("glinjack").

Further information can be found in aguide to calculating standard errors for Office for National Statistics (ONS) social surveys. This guide also contains more information of the effect of sampling design on standard error calculation. Once the standard error is calculated, lower and upper 95% confidence limits can be obtained, which form an interval that is a measure of statistical precision of an estimate. Further information on the calculation of confidence limits and uncertainty can be found in ONS statistical concepts guidance.

How we disseminate the data

Main findings from the data are published as anannual bulletinand all data related to adult smoking habits, cigarette and e-cigarette uses are provided in theaccompanying datasets. You may re-use the data in the publication (not including logos) free of charge in any format or medium, under the terms of theOpen Government Licence.

5 . Method of weighting adjustment for the APS

Original method (2020 to 2023)

The size of the discontinuity effect caused by changes in survey response was estimated by calculating the year-on-year trend for each of the four responses given to the smoking prevalence question in the Annual Population Survey (APS).

The year-on-year trend was obtained using a three-year moving average for data from 2011 to 2021. This approach ensured that for 2019 and 2020, the years affected by discontinuity, annual data trends were correctly captured and calculated. Respondents aged under 18 years were omitted from the usual calculation of national estimates and were therefore also excluded from this method of adjustment.

Once the trends were identified, the change in trend between 2019 and 2020 was calculated. The effect of the discontinuity was then estimated as the difference between the observed change in national estimates and the change in the trend. This calculation relied on the assumption that the discontinuity was responsible for the entirety of the non-trend movement in the data during this period, with no other irregular component.

A scaling factor was created using the formula:

$$\mathrm{sf} = \frac{\Delta\hat{y} - \Delta\mathrm{t}}{\hat{y}_{20}}$$

Where:

$_{y}$ = the observed change in estimated value between 2019 and 2020

$_{t}$ = the change in trend value over the same period

y_{20} = the estimated value in 2020

This scaling factor was applied to the existing weight to produce a new weighting variable that removed the assumed effect of the discontinuity. The new weight was applied to national weighting procedures from 2020 to 2023. Under the original method, the same scaling factor was carried forward to each subsequent year in the data time series.

Revised method (2020 to 2023)

Following the reintroduction of mixed mode (face-to-face and telephone) data collection in 2023, the original adjustment method was reviewed. Rather than continuing to apply a single scaling factor across multiple years, a revised approach was introduced to better reflect changes in survey methodology and the gradual return to pre-pandemic data collection methods.

Under the revised method, separate scaling factors were calculated for each year from 2020 to 2023, using 2019 as the baseline. This allowed for year-specific adjustments that more accurately captured the discontinuity effect as it changed over time.

The revised discontinuity effect for each year was calculated as:
$\text{Discontinuity effect}_y = \Delta\hat{y}_y - \Delta\hat{t}_y$

Where:
$\Delta\hat{y}_y = \hat{y}_y - y_{2019}, \Delta t_y = t_y - t_{2019}$

And the corresponding scaling factor for each year was:
$\text{Scaling Factor}_y = \frac{\Delta\hat{y}_y}{\Delta t_y}$

Where:

y_y = the observed estimate in year y (2020 to 2023)

t_y = the trend estimate in year yy$_{2019}$ and t_{2019} = the baseline values from 2019

This method represents an additive ramp adjustment, rather than a level shift, and was applied to the final calibration weights for each respective year. It reflects the assumption that the discontinuity effect varied year by year, rather than remaining constant.

Because of the reliance on three-year trend estimates, a scaling factor for 2024 could not be tested. However, with the return of mixed mode (face-to-face and telephone) interviewing in 2023, it was agreed that no further discontinuity adjustment should be applied from 2024 onwards. From this point, standard weighting procedures are to be used.

This revised approach was introduced to improve the accuracy of smoking prevalence estimates during a period of changing survey conditions. By applying year-specific adjustments rather than a single fixed correction, the method better reflects how the discontinuity effect varied over time. This allows for more reliable comparisons across years and ensures that observed changes in prevalence are more closely aligned with underlying trends.

6 . Related links

Adult smoking habits in the UK: 2024
Bulletin | Released 4 November 2025
Cigarette smoking habits among adults in the UK, including the proportion of people who smoke, demographic breakdowns, changes over time and use of e-cigarettes.

Smoking prevalence in the UK and the impact of data collection changes: 2020
Bulletin | Released 7 December 2021
Impact that the coronavirus (COVID-19) pandemic has had on data collection, how this has influenced estimates of smoking prevalence and the comparability of these estimates.

7 . Cite this methodology

Office for National Statistics (ONS), updated 4 November 2025, ONS website, methodology, Adult smoking habits in the UK methodology