Department for Transport

National Travel Survey 2019: Quality Report

About this release

This document supports the National Travel Survey (NTS) statistics. The NTS is a household survey of personal travel by residents of England travelling within Great Britain, from data collected via interviews and a one week travel diary.

The NTS is part of a continuous survey that began in 1988, following ad-hoc surveys from the 1960s, which enables analysis of patterns and trends.

Further information

Public enquiries

020 7944 3077

national.travelsurvey@dft.gov.uk

Media enquiries

020 7944 3066

Follow @DfTStats

About the National Travel Survey

The National Travel Survey (NTS) is a diary-based travel survey designed to provide a rich source of data on personal travel and has been running since the mid-1960s. The survey is primarily designed to track long-term development of trends; therefore care should be taken when drawing conclusions from short-term changes. NTS data is collected via two main methods: a household survey conducted face-to-face with all members of the household, followed by a 7 day travel diary for each household member. The NTS covers travel by people in all age groups, including children, across England.

Quality of the NTS Data

The NTS is produced to high professional standards set out in the Code of Practice for Statistics. The NTS was confirmed as National Statistics in July 2011 by the UK Statistics Authority and passed its most recent Office for Statistics Regulation compliance check in 2018. This report outlines some of the quality aspects of the NTS data and covers topics such as sampling, response rates, imputation levels, quality control measures and standard errors.

In this publication

Key strengths and limitations of the NTS

The NTS is a world leading travel survey and many other countries have used the methodologies as a base for their own travel surveys. The longevity, quality of data collected and stringent quality controls in place mean it is widely considered as the 'gold standard' of travel surveys. This section highlights the key strengths and limitations of the NTS.

Strengths

Long term and continuous: The NTS first ran in 1965 and has been running on an annual basis since 1988. The methodology has been broadly unchanged meaning that long-term trends can be monitored, which is a key purpose of the NTS.

Detailed travel pattern data collected: The NTS collects a rich level of travel data including who, how, why and when people travelled. There is no other data source which collects this level of detail at a national level.

Large and representative sample: A lot of work is put in to obtain a suitable sample size that is representative of England's population. This makes it possible to analyse data by various demographics such as age, gender, region and ethnic group.

Response rates: After the response rates declined between 2015 (61%) and 2017 (53%) and remained stable in 2018, response rates have slightly increased in the latest survey. The 2019 survey had a response rate of 54% and 15,953 individual respondents, recording 207,036 unweighted and ungrossed trips.

Inclusivity: As a household survey with a randomly stratified sample, every address in England has a known and calculable chance of being invited to particpate in the survey. The diary is completed by pen and paper which, whilst not as modern as some other survey data collection methods, is still one of the most accessible ways for participants to undertake surveys. However, research whether using digital survey tools would be beneficial for the NTS is ongoing. A recently completed Alpha phase found sufficient user need and expected benefits of a digitised travel diary. The project will next proceed to Beta, which will include pilot testing of the digital diary in field.

National Statistics: The NTS results are produced to high professional standards set out in the Code of Practice for Statistics, including undergoing many different types of validation checks to ensure the integrity of the data. The NTS was assessed by the UK Statistics Authority and was confirmed as National Statistics in July 2011. It passed its most recent Office for Statistics Regulation compliance check in September 2018.

Strong, established reputation: The NTS is widely considered the gold-standard of travel surveys and produces statistics to a high quality standard. Consequently the NTS is used to inform the evidence base for many different transport policies in the Department for Transport as well as being used by many external organisations including transport planners and academics.

Open data: The NTS dataset is freely accessible from the UK Data Service for users who wish to explore micro-level data for themselves.

Limitations

Lower level geographies: The NTS is not designed to produce robust data below regional level. Whilst it is possible to analyse data for smaller geographies than regions, for example local authorities, often many years of data need to be combined to obtain a suitable sample size. Even then this is not ideal as weightings are applied to the sample to be representative of England. This is likely to skew analyses as demographics at sub-national level can vary significantly from the national level.

Difficult to perform multiple breakdowns: Just as with analyses for smaller geographies, it is also difficult to obtain a large enough sample size to produce robust analysis for specific groups which require multiple demographic breakdowns (for example analysing motorcycle trips of men over the age of 50 in London).

Self-reporting may not reflect actual travel behaviour: Disadvantages to relying on self-reporting include inaccurate recall, forgetting to write journeys down and wrongly estimating time/distances of journey (for example rounding a 7 minute journey to 10 minutes). Whilst there are extensive validation checks in place to minimise error, it is not possible to eliminate them entirely.

Limitations to the amount of data that can be collected: Whilst the NTS collects a rich level of detail of travel patterns, it is not currently able to collect other types of data such as journey satisfaction or how participants would prefer to travel (for example a participant may have taken the bus but would have preferred to travel by train if that travel option was available). This is because the physical limitations of a pen and paper method would make it too much of a burden for participants to provide this data as well.

Not fully inclusive: Even though a household survey is considered one of the most inclusive methodologies for surveys, the NTS does excludes certain groups such as people with no fixed abode or people living in communal establishments such as residential care homes.

Does not cover Great Britain: The NTS used to cover all households in Great Britain but since 2013 it has covered England only. The reasons for this are outlined in the 2011 Consultation on the Future Design of the National Travel Survey.

Sampling

Sample Selection

The NTS is designed to provide a representative sample of households in England and is based on a stratified, clustered random sample of 12,852 private households. This sampling frame is the Postcode Address File (PAF), which is a list of all addresses in England. Postcode sectors are employed as Primary Sampling Units (PSUs). The sample is drawn by selecting 756 PSUs and then by selecting 17 addresses within each PSU. The NTS uses a quasi-panel design, where half the PSUs in a given year's sample are retained for the next year's sample and the other half are replaced. This has the effect of reducing the variance of estimates of year-on-year change. For example 378 of the PSUs selected for the 2017 sample were retained for the 2018 sample, supplemented with 378 new PSUs.

Stratification

Grouped postcode sectors in England are stratified using a regional variable, an urban/rural indicator, car ownership and a working from home indicator. This is done to increase the precision of the sample and to ensure that the different strata in the population are correctly represented.

Ineligible households

There are some address types which are classified as ineligible to participate in the NTS. These types of addresses include houses which are not yet built or under construction, vacant houses and non-residential addresses such as an address occupied solely by a business.

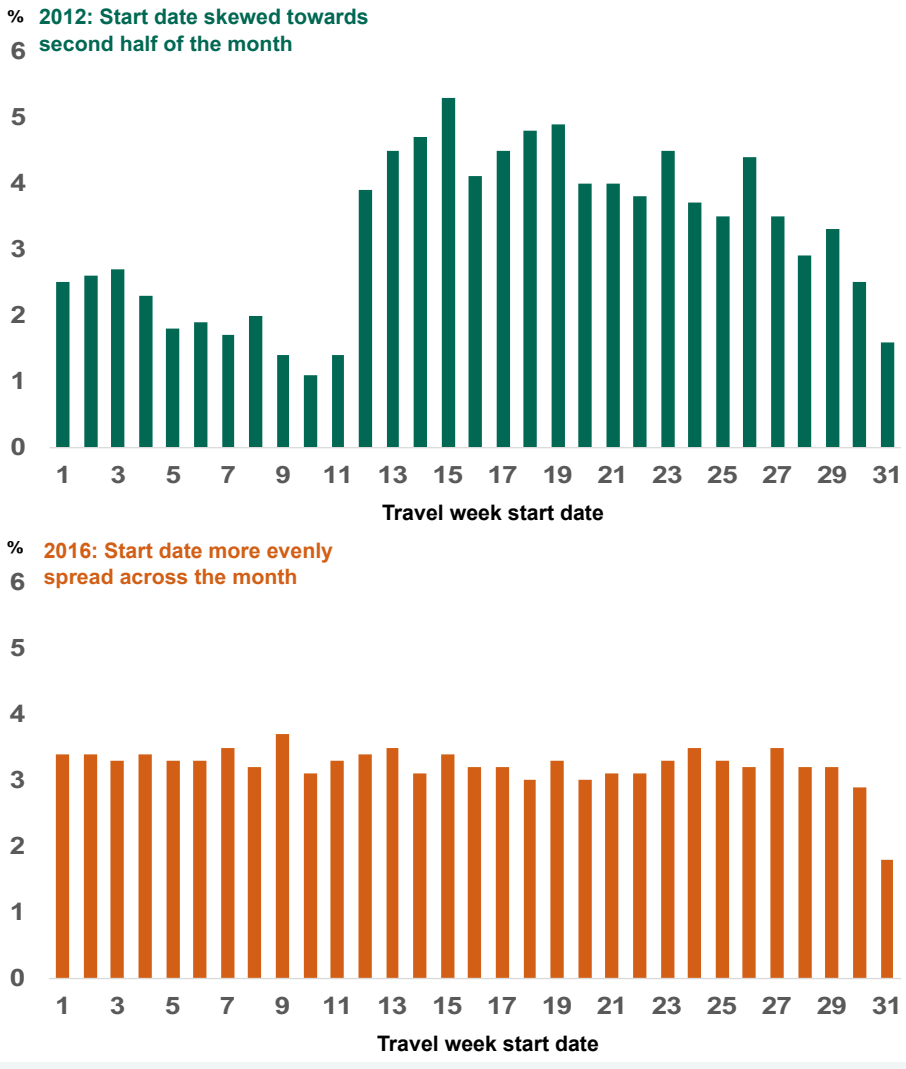
London

Response rates tend to be much lower in London compared with the rest of England. The NTS oversamples London with the aim of achieving responding sample sizes in London and elsewhere which are proportional to their population.

Start date

Since 2014 interviewers have been assigned to start on different dates across the month to ensure that the interviewing and travel week start dates are evenly spread across the month (**Chart 1**). This reduces sample bias and means there is more data available for analysis on days of the month which were previously under-represented.

Chart 1: Percentage of travel weeks which start on each day of the month, England, 2012 and 2016



Response rates

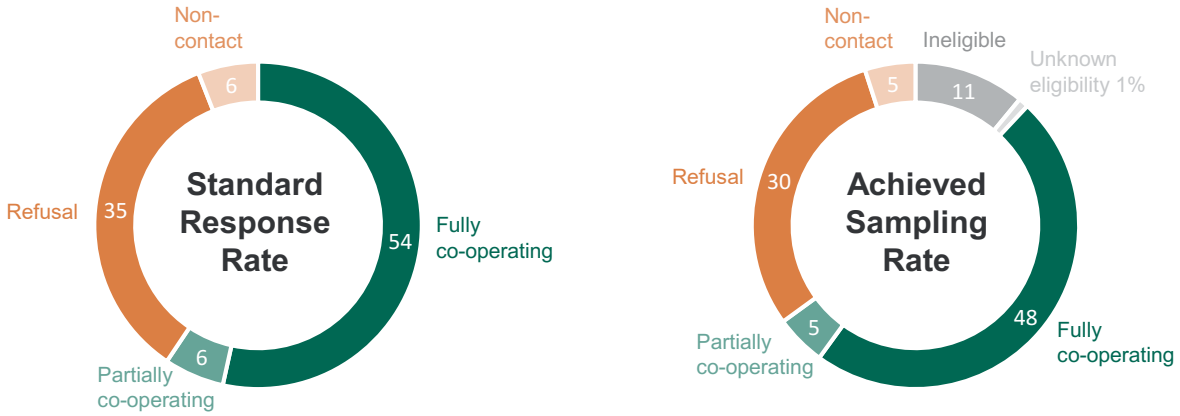
Only data for fully co-operating households are included in the final diary dataset used for analysis. There are 2 ways of measuring response rates: the achieved sample rate and the standard response rate. The achieved response rate is the percentage of fully co-operating households amongst all 12,852 addresses selected in the sampling frame. The standard response rate is the percentage of fully co-operating households amongst the eligible households within the sampling frame (i.e. ineligible households such as empty homes are excluded from the total). Usually about 10% of selected households are ineligible to participate in the NTS (**Chart 2**,figures may not add to 100 due to rounding).

Definitions

Fully co-operated: All household members fully completed the interview and travel diary.

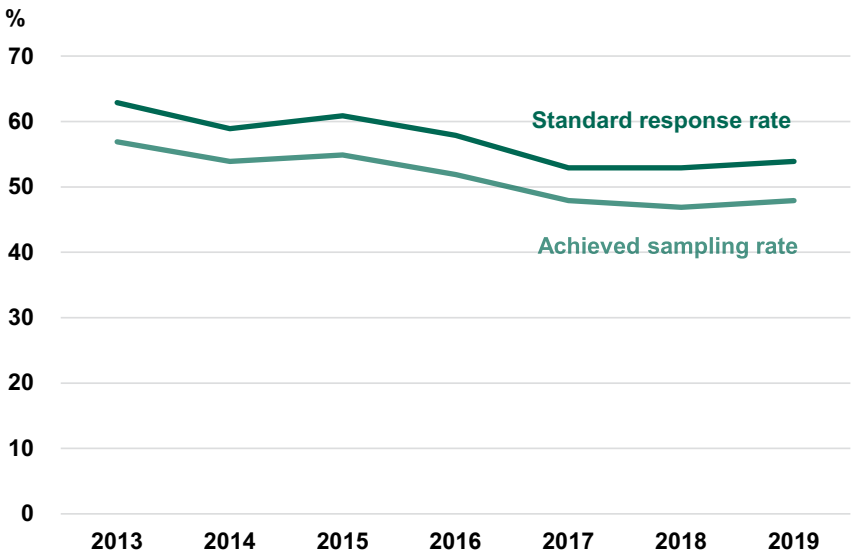
Partially co-operated: All household members completed the interview but not all completed the travel diary.

Chart 2: NTS achieved sampling rate and standard response rate: England, 2019



Standard response rates declined 8 percentage points between 2015 (61%) and 2017 (53%), remained stable in 2018 and increased slightly to 54% in 2019 (**Chart 3**). In recent years there has been a trend of falling response rates in Government surveys. The NTS team is undertaking research exploring how to reverse the decline in NTS response rates.

Chart 3: Response rate and achieved sampling rate: England 2013-19



Quality control measures

As National Statistics, NTS statistics are produced to high professional standards set out in the Code of Practice for statistics and many quality control measures are in place to ensure the integrity of the data.

Sampling: As detailed in the sampling section, the NTS is designed to provide a representative sample of households in England and the sampling methodology has been refined and improved over the years. Weights are applied to the sample to reduce non-response bias.

Start date: It is important that the choice of Travel Week and its start date is not left to the discretion of the respondent or interviewer as this could lead to bias. To prevent bias, diary travel weeks are evenly spread over the days of the week as well as the weeks of the quota month. If the respondent says they are unable to begin recording their Travel Week on the assigned start date then they are removed from the survey.

Interviewer standards: Interviewers play a crucial role in the delivery of the NTS. All interviewers recruited to work on the NTS have significant experience working on other major surveys. Interviewers new to the NTS receive a 2 day briefing which covers all aspects of the survey and includes role-play exercises to practice. They receive a comprehensive set of instructions which they can refer to throughout fieldwork, and all new interviewers are accompanied by an experienced interviewer on their first day working on the NTS. Interviewers also attend a one day refresher briefing every year to be trained on any changes being made to the survey.

Interviewers are set clear assignment-level performance targets which include a deadline for completion, coverage milestones, a requirement for all cases to be contacted within the first seven days of the wave, and minimum expected response rate. During the fieldwork period, close attention is paid to response rates and coverage so that swift action can be taken to remedy any potential shortfall. There are a number of other performance indicators that are be monitored regularly at an assignment level, such as number of completed interviews, hours worked, strike rate achieved, number of broken appointments and number of refusals.

Interviews are back-checked to ensure that interviewers were working to the standards to which they were trained and in accordance with survey requirements. A minimum of 10% of the total productive interviews are back-checked, the majority (usually 90%) by telephone but by letter where this was not possible. If the responses received indicate significant deviations from the standards set, a supervisor will revisit the address(es) concerned personally. Most back-checking

is carried out within 2 weeks, and always within 4 weeks, of the interview date. Back-checking has found no systematic errors in the way interviewers are working. All interviewers are also subject to twice yearly supervisions to confirm that they are working to the highest standards.

Mid-week check: Interviewers are encouraged to check on respondents halfway through the Travel Week in order to encourage and help out respondents with any difficulties they might be experiencing whilst filling out their travel diaries. This could be either a phone call or a personal visit and is at the interviewer's discretion, although they are strongly encouraged to conduct a face-to-face check for elderly participants. Around 80% of households receive a mid-week check, of which about 50% are face-to-face and 30% are telephone calls.

Incentivising respondents: Incentives are offered to participants in order to maximise response rates, although as mentioned these have been falling in recent years. All households invited to participate are given a book of 6 First Class stamps when sent the invitation letter, and households may keep these regardless of whether they decide to participate or not. If the household participates in the interview and all household members complete the travel diary, then everybody in the household is given a £5 gift voucher. Text message reminders are also sent to households (who agree to be contacted in this way) to remind them when the Travel Week is beginning to reduce the chances of households forgetting to complete the diary. We are currently undertaking research investigating how to improve response rates, including recent experiments exploring the effects of increasing the incentive values and sending out a new advance letter inviting participation to the survey. Reports for the research so far have been published here.

Gazetteer: The NTS uses a Gazetteer of over 100,000 places in Great Britain to check the starting places of trips, and their destinations, and the distance between them. During the interview and the data checking stage, the CAPI and Diary Entry System uses the gazetteer's grid references to calculate reasonably precise distances between each named location using checks based on straight line distances. For trips of 15 miles or over, respondents' estimates of distance are flagged for checking if they are not between 0.75 and 1.75 as the crow fly miles at the data processing stage. Discrepancies in distance estimates are not flagged where respondent and crow fly miles are both below 15 miles. Alongside this, trip times are also checked with respect to the distance. For example, if the respondent says a 100 mile car trip took 20 minutes then that is impossible and would be corrected. If a 2 mile car trip took an hour, then that is unlikely but not impossible as the respondent could have been stuck in stationery traffic. If the distance and time were correct this would be noted on the diary by the interviewer so it would not be rechecked by the coder later on.

Pick-up interview: After the end of the Travel Week the interviewer will conduct a short interview known as the pick-up interview. The two main purposes of this is to collect vehicle mileage information and also to check if there have been any changes since the household interview. For example, the pick-up interview checks if any vehicles have been acquired or disposed of and whether any new driving licences or season tickets have been acquired since the initial interview.

Validation checks: There are validation checks on the data at all stages of processing. The first stage of checking is done by interviewer at the mid-week interview to check that the respondent is filling out the diary correctly, and then by the interviewer at the pick-up interview where they will check each diary to make sure that all the necessary information has been included.

When converting the diaries into a dataset, data coders will contact interviewers for clarification on any diary data that is unclear (e.g. if they are unable to read handwriting) or seems unusual (such as no return trip entered). In some cases the interviewer will go back to the respondent for clarification. There are many further quality assurance checks in place both when NatCen compile and clean the dataset and when the DfT NTS team produce the statistics based on the underlying dataset.

Survey review: Every year the NTS is reviewed to assess if any questions need to be added, removed or amended to ensure the survey meets user needs as much as possible. Any new questions undergo in-depth levels of pilot testing to check that they are fit for purpose and understood by respondents. Recent examples include the request for user feedback on proposals for changes to NTS questions and the cognitive testing of new questions.

Imputation rates

There are a relatively small number of variables which undertake an imputation process where missing values are derived by looking at other known data. A variety of techniques are used in the imputation routines and are automated and run in a specific order due to the dependencies between variables. In 2017, 49 out of 935 variables contained imputed data. Of these 49 variables, 34 had less than 1% of their cases imputed. Table 1 lists the 15 variables which had more than 1% of their cases imputed.

Table 1: NTS variables with more than 1% of cases imputed, 2018

Variable	% of imputed cases
Household:HHIncome_Imp	28
Individual:IndIncome_Imp	19.6
Stage:NumBoardings_Imp	88.8
Stage:StageTime_Imp	1.5
Trip:TripTotalTime_Imp	2.2
Trip:TripTravTime_Imp	1.3
Vehicle:EngineCap_Imp	6.1
Vehicle:RegLetterBImp	16.5
Vehicle:RegYear_Imp	5.4
Vehicle:VehAge_Imp	4.9
Vehicle:VehAnMileage_Imp	4.1
Vehicle:VehBusMile_Imp	22.5
Vehicle:VehComMile_Imp	22.8
Vehicle:VehPriMile_Imp	24.4
Vehicle:VehRank_Imp	4.1

There are some variables with noticably high imputation rates, although none are considered as a cause for concern and there are legitimate reasons for them. For example, the ‘NumBoardings’ variable records the number of boardings for a stage of a public transport journey and has an imputation rate of 89%. Whilst this may seem high, for almost all these cases the number of boardings does not actually apply (e.g. travelling by private modes of transport) and so a value of ‘0’ is imputed into the final dataset. Further details about these variables can be found on the NTS Documentation section of the UK Data Archive.

Real household income equivalence

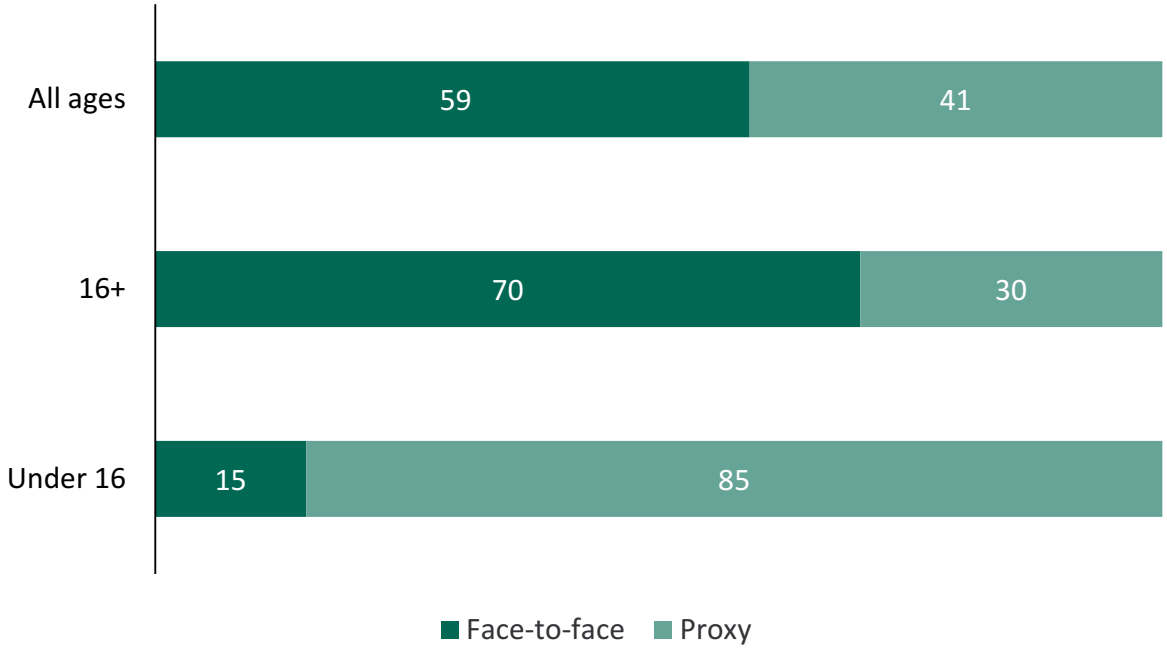
To allow analysis of trip behaviour by income on a comparable basis, households are categorised into income bands based on a measure of household affluence known as real household income equivalence. This adjusts a household’s stated income so that the households size and composition are taken into account. This adjustment is carried out using a measure called the McClements Scale. Incomes are also adjusted for inflation to facilitate analysis across time periods.

Completing the survey by proxy

The NTS covers all ages and a consequence of this is a significant amount of data is collected by proxy (**Chart 4**); that is that someone in the household completes the survey on behalf of another household member (or members). For example the individual questionnaire is not asked to children under 11 years old and is completed on their behalf by an adult in the household. There are also instances where not all adults in the household are present and so the interview can be completed by another adult on their behalf.

It is also common for the travel diary to be completed by proxy for similar reasons in that there are children which would be too young to complete it (although unlike the interview, there is no set age limit) or that it is not always practical for every adult in the house to complete it directly themselves.

Chart 4: Proportion of interviews completed face to face or by proxy, by age: England, 2019



Data revisions

The NTS does not have any regular scheduled data revisions and the statistics published each year are usually considered as final. There have been 2 major revisions made to NTS data in the last 15 years. These revisions are the result of methodological improvements made which could be applied to previous years in some form. These improvements were applying weightings to the NTS sample and changing the diary day when short walk data is collected.

Introducing weightings

Varying non-response rates across groups can result in sample bias. The NTS applies many different weightings to the sample to reduce this non-response bias and full details can be found in the Technical Report. As a simple example, young men are under-represented in the NTS and middle-aged women are over-represented. Consequently young men are given a higher weighting and middle-aged women are given a lower weighting to make the final NTS results more representative of the England population. Weightings are also used to account for the drop off in reporting of the number of trips recorded by respondents during the course of the travel week.

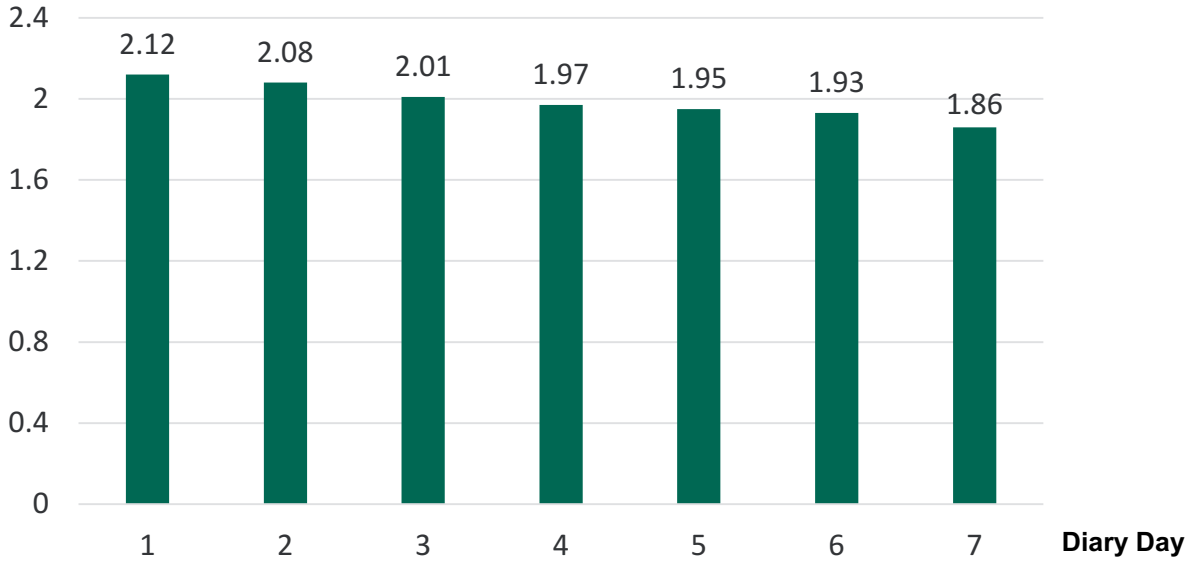
Weights were first applied to the NTS dataset in 2005 in order to compensate for this non-response bias and the drop off in reporting of the number of trips recorded by respondents during the course of the travel week. These weighting methods applied to data back to 1995.

Short walks

Historically in the NTS short walks (walks of more than 50 yards and less than one mile) were recorded on the seventh day of the travel diary. The problem with this is that respondents tend to write fewer entries in the diary as the week progresses (**Chart 5**) which results in an under-reporting of short walks. Note that day numbers refer to day of the participant's Travel Week, not Monday-Sunday (i.e. if the household was assigned Tuesday as the start of their Travel Week, then Tuesday is day 1).

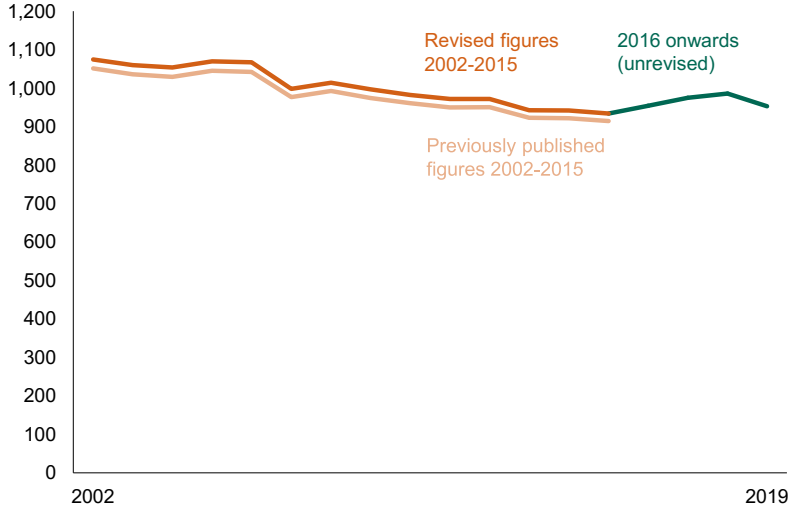
In 2016 half of short walk data was collected on day 1 of the diary and the other half of day 7 as an experiment to investigate the impact of reporting day. It was found collecting short walk data on day 1 of the diary was a significant methodological improvement and so short walk data from 2017 onwards is now collected on day 1.

Chart 5: Average number of journeys recorded by Diary Day: England, 2019



We have revised the back series from 2002 to 2015 to account for the previous under-reporting and the impact is a revision upwards of 20 to 25 short walk trips per person per year. The data were revised by applying an uplift factor to the short walk weight that increased the probability of reporting short walks on day 7 to match the probability of reporting them on day 1. The figures for 2016 were weighted using the information from both samples (day 1 and day 7) to produce NTS results as if all respondents for 2016 had reported short walks on day 1. **Chart 6** shows the trend from 2002 to 2017 before and after reweighting. In 2015, the reweighting produced an increase in the average number of trips per person per year by 2.2%; a negligible increase in the average distance travelled; and a 1% increase in the average time spent travelling. There was a 10% increase in total walking trips, and a 15% increase in short walk trips. The revisions for other years produced similar results.

Chart 6: Trips per person per year, pre- and post-short walk reweighting: England, 2002 onwards



Standard Errors

Prior to 2002/03, standard errors were calculated for the NTS every 3-4 years. Since 2005 the NTS has applied a weighting strategy to compensate for non-response bias. In 2010, the Office for National Statistics (ONS) designed a methodology for calculating standard errors with a weighted NTS sample and applied this to the 2009 dataset. The methodology and set of standard errors are available from the NTS standard errors guide web page.

The process for calculating standard errors in this way however was resource intensive and so it was not possible to produce an update on standard errors on NTS data for the years after this. However, the process for producing these has now been implemented into R (as opposed to STATA, although the underlying methodology remains the same) which has led to efficiency improvements which will allow us to update these tables more frequently in the future.

Standard Errors

Sampling error in any survey arises because the variable estimates are based on a sample rather than a full census of the population. The results obtained for any single sample varies slightly from the true values for the population. The difference between the estimates derived from the sample and the true population values is referred to as the standard error.

Standard errors can help provide guidance when attempting to establish the level of confidence of the statistics produced. Large samples within the NTS often have a high degree of confidence but there will be lower degres of confidence for smaller samples (e.g. cycling trip rates amongst males aged over 80 in London).

We have produced standard errors for some key tables for the 2018 dataset. For comparative purposes, **Table 2** presents 2009 and 2018 standard error data for trips per person per year by main mode. It should be noted that 2009 covers Great Britain and 2018 covers England, and the 2009 table presents the standard errors for the unrevised short walk figures (see page 12). However the standard errors and level of confidence for the statistics are broadly similar to each other.

Table 2: Standard errors of trips per person per year by mode: 2009 (GB) and 2018 (England)

2009

Main mode	Mean (trips)	Standard Error	95% Confidence Interval		Deft
Walk	228	4.7	218.5	237.0	1.6
Bicycle	15	0.8	13.7	16.9	1.4
Car/van driver	395	4.5	385.8	403.4	1.2
Car/van passenger	217	2.7	211.8	222.5	1.2
Motorcycle	3	0.3	2.4	3.7	1.2
Other private transport	9	0.7	7.5	10.3	1.6
Bus in London	19	1.4	16.0	21.5	1.9
Other local bus	49	1.6	45.4	51.8	1.7
Non-local bus	1	0.1	0.4	0.8	1.4
London underground	9	0.9	7.2	10.8	2.0
Surface rail	16	0.8	14.8	17.8	1.4
Taxi/minicab	11	0.5	10.2	12.0	1.4
Other public transport	2	0.4	1.3	2.7	2.1
All modes	973	6.9	959.4	986.6	1.6

2018

Main mode	Mean (trips)	Standard Error	95% Confidence Interval		Deft
Walk	262	5.8	251.1	273.8	1.5
Bicycle	17	1.1	14.9	19.2	1.4
Car/van driver	395	5.0	385.1	404.8	1.3
Car/van passenger	207	3.2	201.1	213.8	1.4
Motorcycle	2	0.3	1.3	2.5	1.3
Other private transport	7	0.7	6.1	8.8	1.4
Bus in London	15	0.9	13.4	16.9	1.5
Other local bus	33	1.4	29.9	35.4	1.5
Non-local bus	0	0.1	0.3	0.5	1.2
London underground	11	1.0	8.9	12.7	1.9
Surface rail	22	1.2	19.7	24.6	1.8
Taxi/minicab	10	0.6	9.2	11.6	1.6
Other public transport	3	0.6	2.2	4.7	2.1
All modes	986	8.1	970.4	1002.2	1.6

Confidentiality

Respondents are informed at the beginning of the survey process in the advance letter about data confidentiality and that participation is voluntary. The Frequently Asked Questions that accompany the advance letter outline the NTS compliance with the current General Data Protection Regulations. The NTS is collected for reasons of public interest. Information provided by respondents is confidential and is not passed on to anyone outside NatCen or the statistics section at DfT in a form that could be used to identify them. Respondents are provided with a telephone number for NatCen's Operations Department to contact if they have any queries.

Security

Interviewers and remote coders (who conduct data entry for the travel diary) have a dedicated work laptop and data is transferred directly via NatCen via a secure internet collection. These laptops are PGP encrypted and have secure account logins (managed via Microsoft Active Directory) and require password changes every 30 days. The servers the data is uploaded to has high security measures in place and access is restricted to the relevant teams. Development is carried out in accordance with ISO27001 for Information and Security Management.

Refusal questionnaire

In 2018 a ‘refusal’ or ‘non-response’ questionnaire was introduced to capture basic household-level information for households which chose not to take part in the survey. This consisted of three questions covering the number of adults in the household, the tenure of the household and whether anyone in the household owns or has continuous use of any motor vehicles. These variables were selected as they are used in the current non-response model.

NatCen reviewed the non-response questionnaire data to consider whether to include it in the 2018 non-response model. In total, 29% of cases which decided not to take part in the NTS answered at least one of these questions. Although 29% is a good level of response to a refusal questionnaire, the relatively high level of missing data meant that incorporating the information into a ‘single’ household non-response model was not deemed to be appropriate and it was excluded from the 2018 weighting. Instead, NatCen will use the 2018 figures to run two post-hoc models to determine whether the data can be used to improve the precision of the current non-response model:

(a) A ‘refusal’ non-response model (for non-respondents only) with response to the refusal questionnaire as the dependent variable and the same covariates as the current household non-response model. This will weight the ‘refusal questionnaire’ respondents back to all non-respondents.

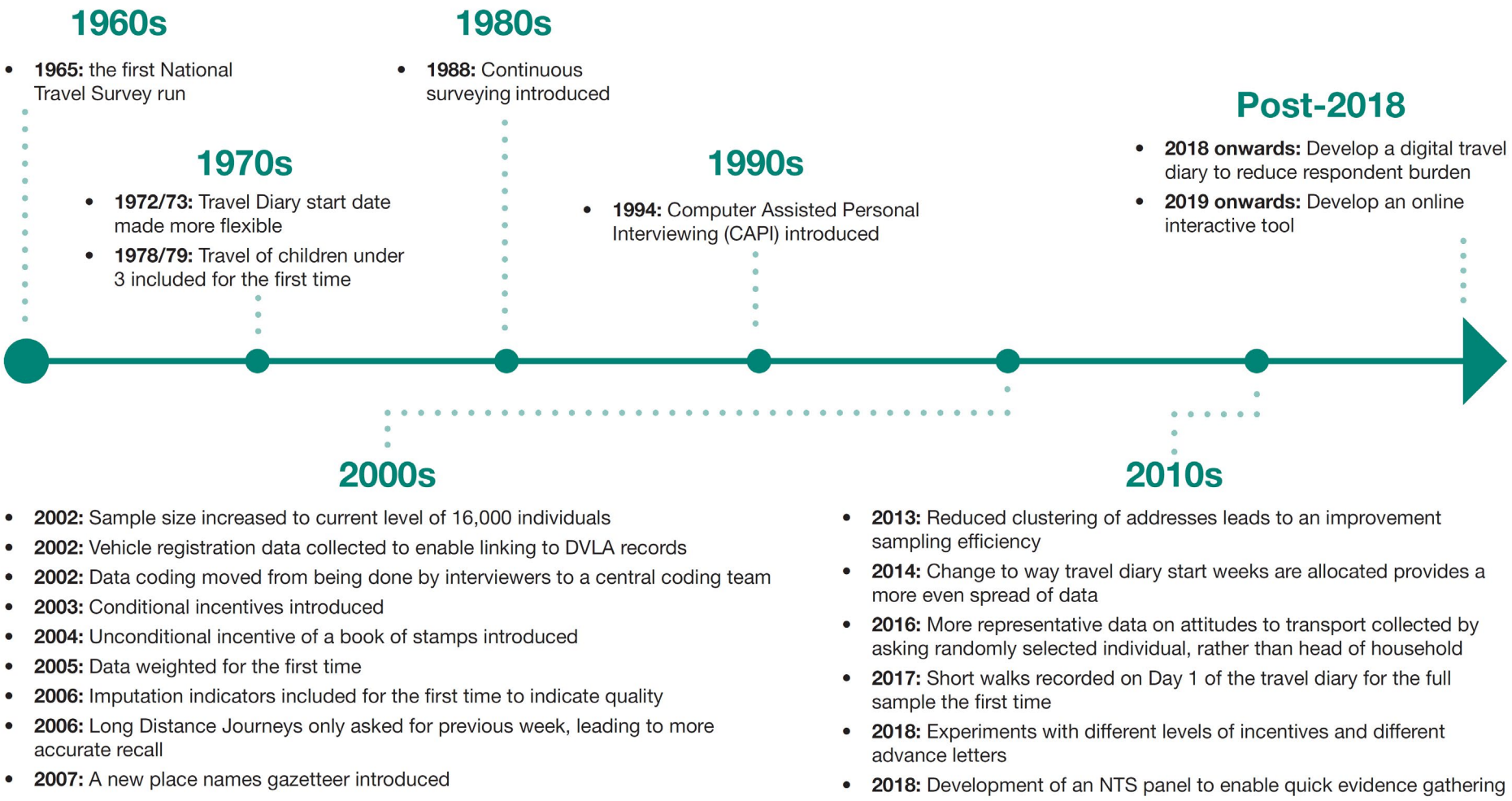
(b) The ‘actual’ household non-response model for survey respondents and refusal questionnaire respondents only using the same covariates plus: tenure, number of adults, number of vehicles.

Based on this, a recommendation will be made as to whether to use the refusal questionnaire data in the weighting procedure.

Methodlogical changes

Figure 1 below summarises the key methodological improvements made to the NTS since it began over 50 years ago.

Figure 1: Time series of methodological improvements



Related documents

The National Travel Survey covers a range of topics which are covered in main publications, factsheets and data tables at:

https://www.gov.uk/government/collections/national-travelsurvey-statistics

Full guidance on the methods used to conduct the survey, response rates, weighting methodology and survey materials can be found in the National Travel Survey Technical Report at:

https://www.gov.uk/government/statistics/national-travel-survey-2019

A 'Notes and definitions' document which includes background to the NTS, response rates, sample size and standard error information and a full list of definitions can be found at:

https://www.gov.uk/government/statistics/national-travel-survey-2019

UK Data Archive

Accessing micro-level NTS data for analysis In addition to the published statistics described in this document together with accompanying statistical tables, the underlying dataset and guidance in analysing it can be accessed from the UK Data Service or the Office for National Statistics Secure Research Service for users who wish to explore the data for themselves.

https://beta.ukdataservice.ac.uk/datacatalogue/studies/study?id=5340 https://beta.ukdataservice.ac.uk/datacatalogue/studies/study?id=5340

https://www.ons.gov.uk/aboutus/whatwedo/statistics/requestingstatistics/approvedresearcherscheme#accessing-the-secure-research-service-srs

R

R and its survey package was used to produce the standard errors. For further information see:

R Core Team (2018). R: A language and environment for statistical computing. R Foundation for Statistical Computing, Vienna, Austria. https://www.R-project.org/

T. Lumley (2017) "survey: analysis of complex survey samples". R package version 3.32.

T. Lumley (2004) Analysis of complex survey samples. Journal of Statistical Software 9(1): 1-19

To hear more about DfT statistics publications as they are released please follow us on Twitter via our @DfTstats account: http://www.twitter.com/DfTstats. TWITTER, TWEET, RETWEET and the Twitter logo are trademarks of Twitter, Inc. or its affiliates