

WNTS 2025-26: Assessment of the Paper Diary

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1. Introduction and background

1.1 Background

The Wales National Travel Survey (WNTS) is a large, annual, random-sample survey designed to collect data on travel attitudes and behaviours from people across Wales. Respondents can complete the survey online (Computer Assisted Web Interviewing; CAWI), via an in-person interview (Computer Assisted Personal Interviewing; CAPI), or via the telephone (CAPI-Tel). The WNTS includes questions for users and non-users of different transport modes, as well as a two-day travel diary.

The travel diary asks respondents to detail the journeys they have made over the previous two days. During CAPI interviews, respondents are encouraged to complete this section of the interview themselves; however, interviewers may complete it on their behalf too. Respondents record the locations they have visited using an interactive map. Then, they provide information on journey purpose and transport modes used, alongside mode-specific questions. This data is used to produce estimates for the share of journeys by different modes, average distance travelled per person and the number of multimodal journeys. Crucially, the interactive map element means that the travel diary can only be completed online, which requires a stable internet connection.

During the second WNTS pilot study, CAPI interviewers commonly encountered issues of internet connectivity, which hampered the ability of interviewers and respondents to complete the travel diary (Vaughan et al., 2024). When this occurred, interviewers described using different, unstandardised approaches to collect the travel diary data. This included jotting information down on paper, which was preferable to scheduling a call that could be missed or avoided, rendering the interview incomplete. Ultimately, the introduction of a standardised backup paper diary for CAPI interviews was accepted as the most viable short-term solution for addressing connectivity issues and gathering usable location data (recommendation 20). This was designed and implemented ahead of the main survey launch on 10th March 2025 and was used for the duration of the survey year, which closed on 28th April 2026. At the time of writing, the paper diary is currently in use for the following year of the survey, which commenced on 1st April 2026.

1.2 Paper diary development

The paper diary was designed to capture comprehensive and detailed travel information for each journey the respondent reported (see figure 1), so that it could be entered back into the web version of the travel diary. A single journey was reported across a double-sided sheet which allowed room for a location and destination to be described, and for the answers to any mode-relevant follow up questions to be recorded. Thus, a double-sided sheet was completed for each and every journey the respondent reported. Interviewers were trained on completing the paper diary during briefings and instructed to update the web diary with the information they had recorded as soon as reasonably possible, before shredding any documents containing personal information. A guidance document reminding them when to use the paper diary, which journeys were of interest (i.e. journeys which were not for work and were in Wales), and when the travel days began (i.e. 5.00am) accompanied the paper diary.

Figure 1: Final paper diary design

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GENERAL INFORMATION BLOCK

Which day are you recording a journey for?
Yesterday ☐ Day before yesterday ☐

Journey: #

Serial number:

Start location: HOME ☐ OR SOMEWHERE ELSE:

End location: HOME ☐ OR SOMEWHERE ELSE:

Start time: AM ☐ PM ☐

What was the purpose of this journey? If more than one purpose is given, please note the main purpose. (Showcard L1):

HOW DID YOU TRAVEL ON THIS JOURNEY? (SHOWCARD L2)

Please select the main mode of transport

BUS ☐ → GO TO BUS START

CYCLE ☐ → GO TO CYCLE

CAR ☐ → GO TO CAR

TRAIN ☐ → GO TO TRAIN START

WALKING OR WHEELING ☐ → GO TO OTHER TRAVEL

TAXI ☐ → GO TO OTHER TRAVEL

OTHER ☐ → GO TO OTHER TRAVEL

DESCRIBE:

→ TURN PAGE

BUS START

Where did you **get on** the bus?

Where did you **get off** the bus?

→ GO TO TICKETS

TRAIN START

At which station did you **get on** the train?

At which station did you **get off** the train?

→ GO TO TICKETS

TICKETS

Was a concessionary or discounted card used for the journey? Yes ☐ No ☐

Was a season ticket, multi-trip ticket or unlimited travel ticket used for the journey? Yes ☐ No ☐

Excluding these cards and tickets, did this specific journey cost anything? Yes ☐ No ☐

How much did you pay for your ticket for this specific journey? £

→ GO TO TRAIN/BUS END

TRAIN/BUS END (SHOWCARD L5/L6)

Please select all that apply

How did you **get to** the train station/bus stop?

How did you **get from** the train station/bus stop to your destination?

CYCLE → GO TO CYCLE

CAR → GO TO CAR

OTHER MODE → GO TO END

CYCLE

On this journey, what type of cycle did you use? (Showcard L4):

→ GO TO OTHER TRAVEL

CAR

Number of other adults (16 and over):

Children (under 16):

On this journey, were you the driver or passenger? Driver ☐ Passenger ☐

Type of fuel (Showcard L3):

→ GO TO OTHER TRAVEL

OTHER TRAVEL

Please select all that apply

What **other** mode(s) of transport did you use for this journey?

END

Did you make any other journeys? Yes ☐ No ☐

YES → START NEW JOURNEY
NO → DIARY DAY COMPLETE

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As the paper diary was implemented as a reaction to technical limitations, there is a requirement to assess how effective it has been during the first year of the WNTS, allowing for more informed discussion about future (longer-term) solutions to the problem of interviewer connectivity. Crucial to this discussion, it is important to understand whether the use of the paper diary has had any unintended effects on data collection, compared to the

conventional method of collecting diary data via the web. To do this, the different methods of collecting travel data can be compared.

This report examines whether respondents completing CAPI interviews supported by the paper diary differ from respondents completing CAPI interviews using the standard web diary. Differences may lie in the socio-demographic composition of the two groups, their experience completing the survey, and in the quantity of diary data they provided.

As such, this report looks at fully completed CAPI interviews from the first full year of the WNTS (2025-26), comparing the two groups on the following factors:

- Socio-demographic characteristics: sex, age, region, and disability status.
- Survey experience: perceived survey difficulty and length.
- Trip estimates: number of trips collected and trip rate.

Web interviews are omitted to limit the number of confounding factors and more accurately isolate the effects of the different diary data collection methods.

1.3 Data preparation

The 2025-26 WNTS data set contains 6,117 productive cases. To isolate the effects of the two methods of collecting travel diary data, the data set was filtered to remove partially productive cases ($n = 16$), cases missing a completed diary ($n = 16$), CAWI cases ($n = 4,509$), CAPI-Tel cases ($n = 124$) and cases where the interviewer had failed to indicate whether the diary had been completed via web or via the paper backup ($n = 6$). As such, the data set for analysis comprised 1446 cases where the respondent had fully completed a CAPI interview and the method of diary completion was known.

The 1446 cases deemed suitable for comparison were divided into two groups: those who completed the diary using the web link and those who completed an interview supported by the paper diary. To determine whether the interviewer used the paper diary, the administration question “Intlss” was used. This question asks interviewers whether they had any issues using the map during their interview, giving them the option to say “No”, “Yes, it was in some way useable”, “Yes, but I managed to work through the issues with a respondent”, “Yes, and I had to complete with respondent remotely at another time”, and “Yes, and I had to use the offline paper backup diary”. To define the two groups used for analysis, any interviews where the interviewer selected the “Yes, and I had to use the offline paper backup diary” option were counted as interviews which were supported by the use of the paper diary, and all other responses were counted as interviews where the web diary was used.

In total, 717 CAPI interviews (49.6%) were supported by the paper diary, and 729 CAPI interviews (50.4%) were conducted using the web link.

2. Analysis

To assess the performance of the paper diary, the paper and web groups were compared across three distinct groups of factors. Socio-demographic items were selected to identify whether different groups of respondents were being supported by the paper diary, items measuring survey experience were selected to identify whether the use of the paper diary had any effects on how respondents felt about completing the WNTS, and trip estimates were selected to identify whether the use of the paper diary had an effect on the quantity of trip data collected.

The indicators presented were selected to assess three potential risks associated with differing modes of data collection: respondent selection effects, respondent burden effects, and impacts on trip reporting, which is a critical analytical output of the survey.

It should be noted that the comparisons are limited in their scope. This report provides descriptive statistics, which can be used to provide an overview of the different measures, but should not be used to infer cause and effect or whether there are significant differences between the two groups. The data reported here should be used to establish whether – broadly – the paper diary is performing similarly to the web diary and to identify differences which warrant further investigation.

Socio-demographic characteristics

For comparison between the paper diary and web diary groups, measures of sex, age, region and disability status were selected as key socio-demographic items. The sex, age and disability status items were self-reported measures, asked during the WNTS. The region information was taken from the sample data, and the two comparison groups have been split by the 22 local authorities which comprise Wales.

The comparison groups did not differ much in measures of sex (table 1) or age (table 2). Across both groups, 40-44% of respondents were male and roughly the same proportions of respondents took part across each age banded category. The mean age of survey respondents was similar between the paper diary ($M = 63.1$, $SD = 18.2$) and the web diary ($M = 62.2$, $SD = 19.3$) comparison groups.

Table 1: Paper and web diary completion by sex

	Male		Female		Non-substantive answers		Total
Paper	310	43.2%	405	56.5%	2	0.3%	717
Web	297	40.7%	430	59.0%	2	0.3%	729

Table 2: Paper and web diary completion by age band

Age group	Paper		Web	
16-24	14	2.0%	30	4.1%
25-34	52	7.3%	61	8.4%
35-44	77	10.7%	57	7.8%
45-54	66	9.2%	72	9.9%
55-64	111	15.5%	117	16.0%
65-74	165	23.0%	165	22.6%
75-84	179	25.0%	160	21.9%
85+	53	7.4%	67	9.2%
Total	717	100.0%	729	100.0%

The groups were comparatively similar on the measure of disability status too (table 3). Across both groups, 56-62% of respondents reported having a disability. This is approximately a 20-30% increase on the main sample but likely reflects the differences between CAWI and CAPI modes of completion and raises no immediate concerns about the paper diary.

Table 3: Paper and web diary completion by disability status

	Non-disabled		Disabled		Non-substantive answers		Total
Paper	268	37.4%	440	61.4%	9	1.3%	717
Web	302	41.4%	413	56.7%	14	1.9%	729

Although inspection suggests no clear geographical pattern, some variation was observed between local authorities. Given the relatively small sample sizes involved, these differences may simply reflect random variation. Nevertheless, the observed variation may warrant further investigation to assess whether interviewer effects, local connectivity issues, or broader regional factors are associated with the use of the paper diary.

Table 4: Paper and web diary completion by local authority

Local authority	Paper		Web	
Blaenau Gwent	11	1.5%	16	2.2%
Bridgend	34	4.7%	18	2.5%
Caerphilly	24	3.3%	38	5.2%
Cardiff	60	8.4%	83	11.4%
Carmarthenshire	48	6.7%	25	3.4%
Ceredigion	18	2.5%	18	2.5%
Conwy	27	3.8%	37	5.1%
Denbighshire	14	2.0%	49	6.7%
Flintshire	25	3.5%	86	11.8%
Gwynedd	39	5.4%	24	3.3%
Isle of Anglesey	20	2.8%	24	3.3%
Merthyr Tydfil	4	0.6%	7	1.0%

Monmouthshire	24	3.3%	32	4.4%
Neath Port Talbot	57	7.9%	20	2.7%
Newport	36	5.0%	14	1.9%
Pembrokeshire	27	3.8%	24	3.3%
Powys	77	10.7%	59	8.1%
Rhondda Cynon Taf	50	7.0%	42	5.8%
Swansea	36	5.0%	31	4.3%
Torfaen	29	4.0%	11	1.5%
Vale of Glamorgan	27	3.8%	41	5.6%
Wrexham	30	4.2%	30	4.1%
Total	717	100.0%	729	100.0%

Survey experience

Two measures were selected to examine survey experience: a question asking respondents about any difficulty they encountered completing the survey and a question asking respondents whether the length of the survey matched their expectations.

The survey difficulty item (table 5) asked, “How difficult was it for you to understand and answer the questions in this survey?” and allowed respondents to answer on a 5-point scale, ranging from “Not at all difficult” to “Extremely difficult”. Generally, respondents across both comparison groups found the survey questions easy to understand and answer, with over 97% of respondents in each group replying, “Not at all difficult” or “Slightly difficult”.

Table 5: Paper and web diary completion by perceived survey difficulty

	Not at all difficult	Slightly difficult	Moderately difficult	Very difficult	Extremely difficult
Paper	92.2%	6.1%	1.4%	0.0%	0.0%
Web	88.3%	8.9%	2.1%	0.1%	0.4%

The perceived survey length item (table 6) asked, “Was today’s survey longer than you expected, shorter than you expected, or about as long as you expected?” and allowed respondents to answer on a 5-point scale, ranging from “Much longer” to “Much shorter”. Once again, respondents across both comparison groups had reported a similar survey experience. Roughly three quarters of respondents in both groups found the survey took about as long as they expected.

Table 6: Paper and web diary completion by perceived survey length

	Much longer	Somewhat longer	About as long as I expected	Somewhat shorter	Much shorter
Paper	0.6%	4.2%	76.8%	14.2%	1.5%
Web	1.4%	9.7%	71.1%	13.7%	1.2%

Overall, there is little evidence that the experience of respondents who completed CAPI interviews supported by the paper diary differed much to those who completed the diary element of their CAPI interview using a web link.

Trip estimates

Finally, the paper and web diary completion groups were compared on the quantity of data collected. One concern was that the support of the paper diary might slow down data collection and discourage respondents from providing complete journey information - cutting data collection short. As such, the number of trips recorded per group has been calculated, alongside a trip rate figure which represents how many journeys each respondent provided information for on average (table 7). Overall, there were no large differences between the two comparison groups. Both methods collected approximately 3.5 trips per respondent.

Table 7: Paper and web diary completion by recorded number of trips and trip rate

Group	Day 1		Day 2		Both	
	Trips	Trip rate	Trips	Trip rate	Trips	Trip rate
Paper	1402	1.96	1117	1.56	2519	3.51
Web	1414	1.94	1115	1.53	2529	3.47

3. Discussion and future considerations

The paper diary was introduced in response to internet stability and connectivity issues which prevented the capture of usable location data. Effectively, it was required to facilitate data collection in situations where data would not have otherwise been captured. To this end, it seems that it has been successful. When comparing CAPI interviews supported by the paper diary to CAPI interviews which used the conventional web link to access the diary, descriptive findings suggest there are no alarming differences in respondents' socio-demographic characteristics, their survey experience, or in the quantity of diary data collected. It would be fair to conclude that in the absence of a long-term solution, the paper diary remains a suitable solution for the short-to-medium term with no evidence from the descriptive measures examined in this report that its use substantially affects respondent characteristics, survey experience, or trip reporting volumes.

Formal testing was outside the scope of this report, but the descriptive statistics presented in this report provide an overview, with the goal of broadly assessing the performance of the different modes of data collection for the travel diary. While trip rates were broadly equivalent between groups, this does not necessarily indicate an absence of mode effects. Similar observed outcomes may arise despite differences in respondent composition or reporting behaviour.

Further work could investigate whether interviewer characteristics, geographical factors, or respondent characteristics are associated with the use of the paper diary. Such analyses would require multivariate modelling to disentangle these factors and establish whether any observed differences remain after controlling for relevant covariates.

A key outstanding question is whether respondents who complete CAPI interviews supported by the paper diary record their trips with greater, similar, or lower accuracy than those who complete CAPI interviews using the web diary. Such differences are referred to as 'mode measurement effects', where the mode of data collection influences measurement error and/or the likelihood of missing data. Mode measurement effects can arise through various mechanisms (d'Ardenne et al., 2025) such as presentation effects, where differences in the format and instructions of the instruments influence how respondents report their travel behaviour.

The descriptive statistics presented in this paper showed that the mean number of trips reported by respondents across the two comparison groups was broadly comparable. However, this finding alone does not guarantee measurement equivalence across the modes. Respondents completing the survey in each mode may differ with respect to protected and geographical characteristics that are themselves associated with 'true' travel behaviour.

Consequently, the similarity in observed trip rates by mode *could* mask underlying differences in reporting between the two modes. Although the distributions of age, sex, and disability appear to be similar across both modes, it has not yet been established whether this is the case for other potential covariates. Additional indicators beyond trip rates may also need to be assessed to build a more comprehensive picture of how the two diary collection methods perform during the CAPI phase of fieldwork.

Disentangling these effects requires more complex modelling that goes beyond the descriptive results from this paper. Sets of models could be estimated to assess whether, for a range of diary metrics, there is evidence of mode measurement effects after key respondent and geographical characteristics have been controlled for. These analyses would be restricted to face-to-face survey data, given that the aim of the work would be to establish the performance of the two modes during the CAPI phase.

Future models could also assess whether the interviewer effect on trip rate reporting varies by diary mode. However, the additional complexity involved in estimating and interpreting variable interviewer effects may not be proportionate, given the findings of this report and recent mode effect research for the English National Travel Survey found interviewer-level variation in trip rate reporting to be small and comparable across paper and digital modes¹ (Perera et al., 2026).

¹ Findings from the English National Travel Survey (NTS) may not hold in the WNTS context because of important methodological differences between the two surveys. For example, the NTS is a household survey that collects a seven-day travel diary, whereas the WNTS is an individual survey that uses a two-day travel diary.

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