

# FY2 Wave 6 Technical report: Weighting

## Overview of weighting

The same weighting approach was taken in Wave 6 as in previous waves. Weights were initially calculated separately for each country in two stages:

1. Calculation of selection weights (described in the section on selection weights)
2. Calibration of selection weights to country population totals (described in section on population weights)

Next, weights were created for use in analyses of combined-country data by scaling the weighted country sample sizes to be proportional to the corresponding country population values (for adults aged 16 and over).

Because it was not possible to include all questions in the postal questionnaires (see the section called 'Questionnaire development and cognitive testing'), four separate question-type weights were calculated in each country, and in the combined all-country sample. These four question-type weights were designed to be used as follows:

1. All-questionnaire weights to be used for questions asked of all sample members in all online and postal questionnaires
2. Online questionnaire weights to be used for questions asked only of online participants (for example, questions not asked in the postal questionnaires)
3. Online questionnaire plus Eating at Home (EH) postal questionnaire weights to be used for questions asked only of online participants and postal questionnaire respondents receiving only the EH version (for example, questions not asked in the version EO postal questionnaires)
4. Online questionnaire plus Eating Out (EO) postal questionnaire weights to be used for questions asked only of online participants and postal questionnaire respondents receiving only the EO version (for example, questions not asked in the version EH postal questionnaires)

Four additional weights (one for each of these question types) were calculated for the combined all-country sample. Once the main weights were calculated as described above, supplementary 'Wales & Welsh-England' weights were calculated. These were designed to allow comparisons to be made between Wales and England (excluding London) after controlling for country profile differences in age within gender, ethnic group, number of adults per household, and urban-rural mix.

## Calculation of selection weights

Selection weights were created to compensate for (i) variations in within-household individual selection probabilities and response propensities and (ii) the fact that, by design, some questions were not included in all questionnaires. As a maximum of two eligible adults were surveyed per household, adults in larger households are less likely to be included in the survey. So without this weight, individuals living in households in which some eligible adults were not interviewed would be underrepresented relative to individuals living in households in which all eligible adults were interviewed. They were calculated in the following stages:

1. The all-questionnaire selection weight was calculated as: (number of eligible people aged 16 years or over in the household)/(number of participants in the household).
2. The online questionnaire selection weight was calculated as: (number of eligible people aged 16 years or over in the household)/(number of online participants in the household).
3. Next the Online questionnaire plus version EH postal questionnaire weight and the online questionnaire plus version EO postal questionnaire weight were calculated by doubling the value of the all-questionnaire selection weight for postal respondents relative to the corresponding value for online respondents (because the relevant questions were only asked in half the postal questionnaires).

Values were capped to the range 1-3 for the all-questionnaire and online selection weights, and to the range 1-6 for the online questionnaire plus version EH postal questionnaire and online questionnaire plus version EO postal questionnaire weights to restrict variance inflation.

## Calibration to population values

Next, selection weights were applied to the three individual country samples and each was calibrated to the corresponding country population values for the number of adults aged 16 or over by:

- (i) age band within gender
- (ii) geographic area (defined separately for each country)
- (iii) deprivation quintile (calculated using each country's multiple deprivation index).

These weighting variables are often used as standard in social surveys because they correlate reliably with both response propensity and a wide range of survey variables. We note that in some previous rounds of the face-to-face Food and You survey, working status was used as a weighting variable instead of deprivation quintile. In previous waves of Food and You 2 it was decided not to use this variable for weighting the sample because survey fieldwork took place during the Covid-19 pandemic, during which rates of employment were likely to be unstable.

Deprivation quintile was used as a substitute indicator of general economic prosperity. This approach was taken again for Wave 6, and is expected to continue for the immediate future for comparability.

Weighting targets are shown in the next section, taken from ONS Mid 2020 Population Estimates and NISRA Mid 2020 Population Estimates.

**Table 9: Population totals for age within gender in England**

Age band	Males	Females
16 to 24	3,066,029	2,884,608
25 to 29	1,924,416	1,847,077
30 to 34	1,916,412	1,908,240
35 to 39	1,852,969	1,885,240

Age band	Males	Females
40 to 44	1,730,268	1,746,035
45 to 49	1,803,208	1,835,431
50 to 54	1,911,318	1,964,033
55 to 59	1,852,593	1,909,189
60 to 64	1,568,489	1,628,324
65 to 69	1,347,714	1,436,586
70+	2,278,001	2,546,119
All	1,1651,748	1,689,851

**Table 10: Population totals for age within gender in Wales**

Age band	Males	Females
16 to 24	180,657	164,947
25 to 29	106,877	101,237
30 to 34	98,579	98,093
35 to 39	91,729	94,144
40 to 44	85,290	87,640
45 to 49	93,969	98,496
50 to 54	105,438	111,532
55 to 59	108,081	114,141

Age band	Males	Females
60 to 64	95,915	101,501
65 to 69	87,314	92,641
70+	149,473	163,436
All	71,981	103,745

**Table 11: Population totals for age within gender in Northern Ireland**

Age band	Males	Females
16 to 24	104,333	96,676
25 to 29	60,377	59,442
30 to 34	62,883	63,699
35 to 39	60,758	63,594
40 to 44	56,927	61,017
45 to 49	59,844	63,095
50 to 54	63,786	66,797
55 to 59	62,595	64,908
60 to 64	53,421	55,599
65 to 69	44,862	45,831
70+	68,762	77,834
All	32,527	50,133

**Table 12: Population totals for regions in England**

England Region code	England Region name	Population total
E12000001	North East	2,203,353
E12000002	North West	5,957,266
E12000003	Yorkshire and The Humber	4,474,428
E12000004	East Midlands	3,963,265
E12000005	West Midlands	4,791,343
E12000006	East of England	5,051,203
E12000007	London	7,149,281
E12000008	South East	7,442,850
E12000009	South West	4,664,909
Total	-	45,697,898

**Table 13: Population totals for regions in Wales**

Wales Region	Population total
North	579,711
Mid	174,082
South West	586,562
South East	1,266,501
Total	2,606,856

**Table 14: Population totals for regions in Northern Ireland**

Northern Ireland (Local Government District code)	Northern Ireland (Local Government District name)	Population total
N09000001	Antrim and Newtonabbey	113,924
N090000011	Ards and North Down	132,057
N09000002	Armagh City, Banbridge and Craigavon	168,360
N09000003	Belfast	274,369
N09000004	Causeway Coast and Glens	116,337
N09000005	Derry City and Strabane	118,371
N09000006	Fermanagh and Omagh	91,929
N09000007	Lisburn and Castlereagh	116,887
N09000008	Mid and East Antrim	112,616
N09000009	Mid Ulster	114,153
N090000010	Newry, Mourne and Down	140,697
Total	-	1,499,700

**Table 15: Population totals for deprivation quintiles in England**

England Quintiles	16+_Pop_20
1	9,138,329
2	9,140,152
3	9,139,700

England Quintiles	16+_Pop_20
4	9,139,337
5	9,140,380
Total	45,697,898

**Table 16: Population totals for deprivation quintiles in Wales**

Wales Quintiles	16+_Pop_20
1	521,330
2	520,803
3	521,290
4	522,008
5	521,425
Total	2,606,856

**Table 17: Population totals for deprivation quintiles in Northern Ireland**

NI Quintiles	16+_Pop_20
1	299,268
2	300,459
3	299,450
4	300,395

NI Quintiles	16+_Pop_20
5	300,128
Total	1,499,700

Initial calibration was carried out separately in each country for each of the four questionnaire type weights described above. For each questionnaire type weight, calibration adjustment factors were calculated by dividing the individual country weights by the selection weights. These adjustment factors were then capped at the 99th percentile value to limit variance inflation and applied to selection weight to produce final individual country weights.

After calibration and adjustment factor capping, the individual country level weights were scaled to equalise unweighted and weighted sample sizes in each country.

The aim of these within-country calibration procedures was to match the profile of the weighted sample to that of the population aged 16 or over on gender, age band, geographic region, and deprivation quintile. In practice, there will be slight discrepancies between weighted sample totals and population figures as a result of the adjustment factor caps.

## Creating of all country weight

An all-country version of each questionnaire type weight was then constructed by combining the individual country samples and rescaling final individual country weights so that weighted sample country proportions matched the respective country population (aged 16 years or over) proportions.

### 'Wales and Welsh England' standardisation weight

This weight was designed to calibrate English sample estimates to Welsh population characteristics for comparative purposes. It was calculated from the England sample as follows:

1. London cases were dropped (London being in many ways unique in the UK)
2. The non-London England sample proportions were calibrated to the weighted Wales sample proportions for four variables: number of adults in the household, ethnic group, urban-rural and age by gender. These four variables were selected when the 'Wales & Welsh-England' weights were first constructed in Wave 1. Weighted estimates for Wales and non-London England were compared across a range of candidate variables and statistically significant differences were found for urban-rural, ethnic group, household size and age within gender.

The final weighting variables were defined as follows:

**Table 18: Age within gender (male and female)**

Males	Females
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16 to 24	16 to 24
25 to 29	25 to 29
30 to 34	30 to 34
35 to 39	35 to 39
40 to 44	40 to 44
45 to 49	45 to 49
50 to 54	50 to 54
55 to 59	55 to 59
60 to 64	60 to 64
65 to 69	65 to 69
70+	70+

**Number of adults in household:**

- 1 adult
- 2 adults
- 3+ adults
- Question not answered

**Ethnic group:**

- White
- Asian
- Black
- Mixed
- Other/not answered

**Urban rural:**

Urban: OA falls into a built up area with a population of 10,000 or more

Rural: All other OAs

'Wales & Welsh-England' weights were calculated only for respondents in England outside London and in Wales (where they were the same as the individual country weight for Wales).

**Table 18: Summary list of weights and when to use each one**

<b>Weight</b>	<b>When to be used</b>
wt1	Estimates for all-countries: questions asked of all sample members completing the online and postal questionnaires
wt2	Estimates for all-countries: questions asked only of online participants (not asked in postal questionnaire)
wt3	Estimates for all-countries: questions asked of all sample members completing the online questionnaires and those completing EH version of the postal questionnaire
wt4	Estimates for all-countries: questions asked of all sample members completing the online questionnaires and those completing EO version of the postal questionnaire
wt5	Individual country estimates for England, Wales and Northern Ireland: questions asked of all sample members completing the online and postal questionnaire
wt6	Individual country estimates for England, Wales and Northern Ireland: questions asked only of online participants (not asked in postal questionnaire)
wt7	Individual country estimates for England, Wales and Northern Ireland: questions asked of all sample members completing the online questionnaires and those completing EH version of the postal questionnaire
wt8	Individual country estimates for England, Wales and Northern Ireland: questions asked of all sample members completing the online questionnaires and those completing version EO of the postal questionnaire
wt9	'Wales and Welsh-England' estimates: questions asked of all sample members in the online and postal questionnaire
wt10	'Wales and Welsh-England' estimates: questions asked only of online participants (not asked in postal questionnaire)
wt11	'Wales and Welsh-England' estimates: questions asked of all sample members completing the online questionnaires and those completing EH version of the postal questionnaire

Weight	When to be used
wt12	'Wales and Welsh-England' estimates: questions asked of all sample members completing the online questionnaires and those completing version EO of the postal questionnaire