

Adjustments to National Food Survey Estimates

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This note explains the adjustments made to historical National Food Survey estimates to make them comparable with current Family Food estimates from 2001/02 onwards. It was originally published in Chapter 9 of the 2002/03 Family Food Report which is available on the [National Archives website](#).

Background

The figures in Family Food are sourced from The Living Costs and Food Survey run by the Office for National Statistics (ONS). One element of the survey - The Family Food Module collects detailed quantity and expenditure information on food and drink, household purchases and itemised lists of food and drink eating out purchases for use by Defra.

The Office for National Statistics has overall project management and financial responsibility for the survey while Defra sponsors the specialist food data.

History

Data on purchases and expenditure have been collected by various surveys since 1940. The National Food Survey was established in July 1940 to provide an assessment of the effectiveness of the national food policy at the time. In 2001 the National Food Survey was merged with the Family Expenditure Survey to form the Expenditure and Food Survey. The Expenditure and Food Survey was an extended Family Expenditure Survey, extended to incorporate the National Food Survey requirement. This extension is now known as the Family Food Module.

In 2008 the Expenditure and Food Survey was renamed as the Living Costs and Food Survey when it became part of the Integrated Household Survey.

For some types of food, particularly snack foods and alcoholic drinks, the National Food Survey estimates of expenditure were considerably lower than in the Family Food.

The Expenditure and Food Survey estimates are broadly comparable with historic Family Expenditure Survey estimates but not with historic National Food Survey estimates, probably due to the similarity in methodology of the Expenditure and Food Survey (EFS) and the Family Expenditure Survey (FES).

In the National Food Survey there was one main diary keeper who recorded all expenditure and consumption. In the Expenditure and Food Survey and Living Costs and Food Survey all household members from the age of seven years record their expenditure in personal diaries. The diary is simpler in that it records details of purchases only and not the additional burden of consumption of items not purchased.

Defra decided to adjust the historical estimates from the National Food Survey so that the adjusted estimates of expenditure would be comparable with the expenditure estimates from the succeeding survey. This process reduces the problem of under-reporting in the National Food Survey.

Estimates from the Family Expenditure Survey in 2000 are available for expenditure on each of 65 types of food. Corresponding estimates were constructed from the National Food Survey. The differences in the estimates, after accounting for demographic and socio-economic differences in the samples, were used to determine the adjustment factors.

ONS project of deriving multiplicative adjustment factors

Defra commissioned the ONS to carry out a project to devise a way of correcting the NFS diary data. The study carried out statistical analysis comparing FES and NFS results in 2000 (1999 and 1998 were also looked at but it was decided to use the 2000 analysis only). In order to make this comparison, NFS food codes had to be mapped to FES food codes. The result was a set of 65 codes based on FES to which the more than 200 NFS codes were mapped. In addition, demographic and socio-economic variables used in deriving the factors needed to be made comparable.

The essence of the method was to compare FES and NFS diary data. Four variables were found to be associated with the under-reporting: age of the main diary keeper (7 age groups), income band (5 income bands), government office region (13 regions) and household composition (11 groups). The method produced a different factor for each of the variables and each of the mapped food codes. Thus, there are $(5+7+13+11)*65=2340$ different factors derived from the 2000 NFS and EFS datasets. The factors are applied by multiplication with the quantity and cost variables recorded in the diary. Each diary entry would be multiplied by the appropriate food code factors for age of main diary keeper, income band, government office region and household composition.

Defra original scaling (published in October 2003)

The 2340 factors derived using NFS data for 2000 were intended to be used on previous years' NFS datasets. Unfortunately using the factors on the diary data for years other than 2000 produced unstable results due to extrapolation beyond the range of the 2000 data (i.e. some combinations of the variables were not present in 2000 but were in previous years). Therefore, a second set of factors was derived based on the adjusted estimates of average consumption and average expenditure across the UK for the year 2000. These adjusted UK averages were compared to the original NFS UK averages for 2000 for 24 groupings of foods and an adjustment factor derived for each grouping. These factors were then used to adjust the datasets for earlier years. The 24 factors were published in Family Food 2001/02.

Defra revised scaling

Problems were identified with the original adjustments mainly due to heterogeneity within the 24 food groupings. The solution was to allow a different adjustment for each individual food code in the 2000 year NFS dataset.

Applying the adjustments back to 1974

The method is based on the assumption that the percentage of underreporting has not changed significantly between 1974 and 2000. The overall level of under-reporting turns out to be lower in 1974 because the foods most prone to under-reporting were less common then.

Because food codes have changed over the years it was necessary to construct factors for the codes that are not present in the 2000 dataset. Factors for these other codes were derived on an 'ad hoc' basis. Each entry in the original NFS diary data for the years from 1974 to 2000 was multiplied by the adjustment factor from the extended list of minor food codes. These datasets were aggregated to form UK averages for each NFS minor food code as they existed in the respective years. Nutrient and energy intakes were derived by applying the appropriate nutrient conversion factors.

Finally the estimates of consumption and expenditure in NFS format were converted into EFS codes. Each NFS code was mapped either directly to an EFS food code or distributed across more than one EFS code.

The adjustment factors for each individual National Food Survey food code and the mapping into Expenditure and Food Survey codes are available in an Excel spreadsheet on the [Defra website](#).

Impact of the adjustments

Table 1 compares the adjusted National Food Survey estimates for the year 2000 with unadjusted estimates. The adjusted estimate for confectionery is more than double (2.37 times) the size of the unadjusted estimate. This indicates considerable under-reporting in the National Food Survey probably due mainly to difficulties capturing instances of snacks where there is just one diary keeper. The adjustments for alcoholic drinks, beverages and sugar and preserves are also significant but not as large.

In general the adjustments have had the effect of increasing the estimates but for eggs and carcass meat the adjusted estimates are lower. In the case of eggs the estimates of expenditure from the Family Expenditure Survey were on average 8 per cent lower than the estimates from the National Food Survey. The reasons for differences in the two surveys include the sampling design, the questionnaire design, the keying, the coding and the validation procedures.

Energy intake in the year 2000 has been adjusted upwards by 14 per cent and most nutrient intakes adjusted upwards by about 10 per cent. Added sugars and alcohol have been adjusted upwards by 30 per cent and 62 per cent respectively in line with their dependence on confectionery and alcoholic drinks.

Table 2 shows the adjustments to the 1974 estimates. The impact is smaller mainly because confectionery, soft drinks and alcoholic drinks were not collected then and have large adjustments in 2000. However the impact is also reduced because there were fewer purchases in 1974 of items with high adjustments.

Table 1: Comparison of adjusted and unadjusted NFS estimates, 2000

		unadjusted	adjusted	Ratio	
		2000	2000		
Household consumption		<i>per person per week</i>			
Milk and cream	(ml)	2087	2164	1.04	
Cheese	g	109	109	1.00	
Carcase meat	g	248	235	0.95	
Other meat and meat products	g	716	779	1.09	
Fish	g	141	144	1.02	
Eggs	(no.)	1.8	1.6	0.92	
Fats and oils	g	188	193	1.03	
Sugar and preserves	g	139	167	1.20	
Potatoes	g	922	1002	1.09	
Vegetables	g	1072	1147	1.07	
Fruit	g	1111	1189	1.07	
Total Cereals	g	1516	1698	1.12	
Beverages	g	57	70	1.22	
Soft drinks ^(a)	(ml)	1533	1699	1.11	
Alcoholic drinks	(ml)	430	725	1.69	
Confectionery	g	64	151	2.37	
Household Intakes ^(e)		<i>per person per day</i>			
Energy	kcal	1881	2152	1.14	
	MJ	8	9	1.14	
Total Protein	g	67	72	1.07	
Fat	g	76	86	1.13	
Fatty acids:					
	Saturates	g	30	35	1.14
	Mono-unsaturates	g	27	31	1.14
	Poly-unsaturates	g	14	15	1.11

Cholesterol	mg	225	236	1.05
Carbohydrate (b)	g	239	277	1.16
including				
Total sugars	g	108	131	1.22
Non-milk extr sugars	g	67	88	1.30
starch	g	131	145	1.11
Fibre ^(c)	g	13	14	1.10
Alcohol	g	4	7	1.62
Calcium	mg	887	967	1.09
Iron	mg	10	11	1.10
Zinc	mg	8	9	1.07
Magnesium	mg	239	266	1.12
Sodium ^(d)	g	2.606	2.896	1.11
Potassium	g	2.721	3.006	1.10
Thiamin	mg	1	2	1.07
Riboflavin	mg	2	2	1.08
Niacin Equivalent	mg	29	31	1.07
Vitamin B ₆	mg	2	2	1.06
Vitamin B ₁₂	µg	6	6	1.07
Folate	µg	252	269	1.06
Vitamin C	mg	64	70	1.09
Vitamin A:				
Retinol	µg	499	613	1.23
Carotene	µg	1760	1906	1.08
Retinol equivalent	µg	793	931	1.17
Vitamin D	µg	3	3	1.04
Vitamin E	mg	10	11	1.13

(a) Converted to unconcentrated equivalent by applying a factor of 5 to concentrated and low calorie concentrated soft drinks

(b) Available carbohydrate, calculated as monosaccharide

(c) As non-starch polysaccharides

(d) Excludes sodium from table salt

(e) Contributions from pharmaceutical sources are not recorded by the Survey

Table 2: Comparison of adjusted and unadjusted NFS estimates 1974

		unadjusted	adjusted	Ratio	
		1974	1974		
Household consumption		<i>per person per week</i>			
Milk and cream	(ml)	2897	2978	1.03	
Cheese	g	105	105	1.00	
Carcase meat	g	413	393	0.95	
Other meat and meat products	g	606	630	1.04	
Fish	g	123	123	1.01	
Eggs	(no.)	4.1	3.7	0.92	
Fats and oils	g	316	316	1.00	
Sugar and preserves	g	441	535	1.21	
Potatoes	g	1374	1437	1.05	
Vegetables	g	1073	1141	1.06	
Fruit	g	670	731	1.09	
Total Cereals	g	1629	1842	1.13	
Beverages	g	91	107	1.18	
Household Intakes^(a)		<i>per person per day</i>			
Energy	kcal	2326	2534	1.09	
	MJ	10	11	1.09	
Total Protein	g	71	74	1.04	
Fat	g	106	111	1.05	
Fatty acids:					
	Saturates	g	51	52	1.03
	Mono-unsaturates	g	40	42	1.05
	Poly-unsaturates	g	11	12	1.09

Carbohydrate ^(b)	g	287	327	1.14
Calcium	mg	1012	1067	1.06
Iron	mg	12	13	1.11
Thiamin	mg	1	1	1.06
Riboflavin	mg	2	2	1.07
Niacin Equivalent	mg	29	30	1.05
Vitamin C	mg	51	54	1.06
Vitamin A:				
Retinol	µg	775	1008	1.30
Carotene	µg	2154	2272	1.05
Retinol equivalent	µg	1228	1480	1.20
Vitamin D	µg	9	9	1.03

(a) Contributions from pharmaceutical sources are not recorded by the Survey

(b) Available carbohydrate, calculated as monosaccharide