

Scientific Advisory Committee on Nutrition

Paper for discussion: Findings of the National Diet and Nutrition Survey Adults 19-64 years

Agenda item: 7

Please see attached paper for discussion.

- The paper summarises the findings of the NDNS of adults aged 19-64 years.
- The Committee is invited to:
 - draw conclusions from the data presented on the diet and nutritional status of the adult population and consider the public health implications of the findings;
 - make recommendations for secondary analysis of the NDNS data set;
 - make recommendations for areas requiring broader research.

Scientific Advisory Committee on Nutrition

Summary

1. Overall the results of the survey show that, based on a comparison of nutrient intakes with the UK Dietary Reference Values (DRV), adults in Britain are generally getting sufficient nutrients from their diets, although some sub-groups in particular young women (and to a lesser extent young men) and people living in benefit households, are more likely to have low intakes of micronutrients. There is some evidence that adults' diets are healthier when compared with the last survey of this age group in 1986/87, although this is not true for all age groups. The mean proportion of food energy derived from fat has fallen since the last survey and is now close to the DRV. There has also been a reduction in the proportion of food energy derived from saturated fatty acids although the mean is still in excess of the DRV. Average consumption of fruit and vegetables and oily fish had increased slightly compared with the earlier survey although the increase was mainly in the oldest women and there was little change in young adults. Older adults, particularly older women, generally have healthier diets than younger adults, in terms of consumption of fruit and vegetables and oily fish and micronutrient intakes. Mean intakes of non-milk extrinsic sugars exceed the DRV for all age and sex groups except the oldest women, and are particularly high in the youngest group.
2. The physical measurements of this survey population confirm findings from other surveys that the prevalence of overweight and obesity has increased, a substantial proportion of adults have high blood pressure, mainly in the oldest group and that physical activity levels are low. Elevated blood levels of total cholesterol were found in almost half of the group as a whole and in more than half the men and three-quarters of the women in the 50-64 age group.
3. Findings on nutritional status also indicate that the majority of adults are adequately nourished, as defined by levels of biochemical indices of status for vitamins and minerals falling within normal ranges. However a proportion of men and women fell below thresholds indicating low status for some markers, 14% of men and 15% of women for vitamin D, 5% of men and women for red cell folate, 5% of men and 3% of women for vitamin C and 11% of women for iron.
4. The findings suggest that young adults, especially young women, and adults living in households where someone is receiving benefits, are potentially at-risk of low intakes and status of some micronutrients. Young women under 25 in particular, but also women aged 25-34 and to a lesser extent young men, are more likely than other adults to have low intakes of vitamins and minerals, including vitamin A, riboflavin, iron, potassium and magnesium. This is likely to be at least partly due to lack of variety in the diet, e.g. low consumption of fruit and vegetables. High intakes of non-milk extrinsic sugars were found in the youngest

group (19-24), especially in men. The youngest group were also more likely to have low vitamin D status, and, for women, poor iron and red cell folate status. People in benefit households had lower intakes of most micronutrients than the non-benefit group and intakes below the LRNI were more common in this group, particularly for magnesium, potassium, vitamin A, riboflavin and (for women) iron. There is also some evidence of lower mean status levels in this group.

National Diet and Nutrition Survey Programme

Background

5. The National Diet and Nutrition Survey programme (NDNS) is a series of cross-sectional surveys of different population age groups. It aims to provide a comprehensive picture of the dietary habits and nutritional status of the population of Great Britain. The programme is split into four separate surveys, conducted at about three-yearly intervals. Each survey has examined a nationally representative sample drawn from four different population age groups: children aged 1½-4½ years, young people aged 4-18 years, people aged 65 years and over and adults aged 19-64 years. The programme was set up by the Ministry of Agriculture, Fisheries and Food and the Department of Health (DH) in 1990 following the success of the Dietary and Nutritional Survey of British Adults, the first survey of this type. The programme is now jointly funded and managed by the FSA and DH. Each survey collects detailed quantitative information on food consumption and nutrient intake, physical measurements, nutritional status indices and socio-economic, demographic and lifestyle characteristics.

NDNS: Adults Aged 19-64 Years

6. Fieldwork for the NDNS of adults aged 19-64 years took place over 12 months between July 2000 and June 2001, following a feasibility study in 1999. Food consumption data was collected using a seven-day weighed intake dietary record, with estimated portion sizes for foods eaten outside the home. Physical measurements taken were height, weight, waist and hip circumferences and blood pressure. A 24-hour urine sample was collected, primarily to assess sodium intake. A venous blood sample was collected and analysed for a range of indices of nutritional status. Information on physical activity was collected via a seven-day record and a face-to-face interview collected information on socio-demographic and lifestyle characteristics. Oral health status was assessed by a self-count of the number of teeth and amalgam fillings.
7. Seven-day weighed dietary records were collected from 1724 respondents, a response rate of 47% of the eligible sample. Blood samples were collected from 1347 respondents, a response rate of 36% of the eligible sample¹ and 74% of those who completed dietary records. The response rate for the dietary record was lower than expected and lower than in previous NDNS surveys. When the response rate is low there is a higher possibility of response bias as little or no

¹ The eligible sample is defined as the sample identified through the doorstep sift as eligible to take part in the survey, i.e. aged between 19 and 64 years and not pregnant or breastfeeding.

information may be collected on particular sub-groups in the survey population. An independent evaluation of the potential impact of non-response bias was undertaken by the University of Southampton. The authors concluded that on the basis of the limited information available there was no evidence to suggest serious non-response bias. However this conclusion should be interpreted with caution as little information was available on refusals and non-contacts. The data have been weighted to correct for biases due to lower sampling probabilities and lower levels of response by, in particular, men and young adults.

8. The survey findings are being published as a series of five reports. The first, published in December 2002, covered types and quantities of food consumed. The second and third, published in July 2003 covered intakes of energy and macronutrients (volume 2) and micronutrients and urinary analytes (volume 3). The fourth report covering the nutritional status, physical measurements and physical activity levels of the participants was published in [February] 2004 and a summary volume will complete the series later this year. Results are presented by sex and four age bands: 19-24 yrs; 25-34 yrs; 35-49 yrs; 50-64 yrs. Nutrient intakes are compared with UK Dietary Reference Values and nutritional status indices are compared with reference values where available.
9. Under-reporting of food consumption is a well recognised phenomenon common to dietary surveys world-wide and is known to occur in NDNS. The doubly labelled water study carried out as part of the feasibility study for this survey on a small sub-sample of 66 subjects suggested that energy intakes were under-reported by around 25% on average. As part of fieldworker training before the main survey, greater emphasis was placed on the importance of checking the records and probing for missing information. However it is likely that intakes in the main survey were under-reported although the extent is not yet known. Based on evidence from other research it is likely that the under-reporting is selective by food type and is greater in the obese group than in the lean. Work is in progress to get a better estimation of the level of under-reporting in the dataset and variation between sub-groups. The intake data presented here and in the published reports have not been 'corrected' for under-reporting, nor has any attempt been made to exclude 'under-reporters' from the dataset.

Detailed Findings

Food Consumption

10. Average consumption of fruit and vegetables² was 2.7 portions a day for men and 2.9 for women, well short of the five-a-day target. Thirteen percent of men and 15% of women met the five-a-day target. Twenty-one percent of men and 15% of women reported eating no fruit in the survey week, while 2% ate no vegetables and 1% reported eating no fruit or vegetables. Compared with 1986/87, average consumption of fruit and vegetables had increased slightly overall although most of the increase was in the oldest women.

² Fruit and vegetables defined as for the Government's Five-a-day programme and using a portion size of 80 grams.

11. Average consumption of oily fish, excluding canned tuna, is well below the target of one portion a week, at just over a third of a portion overall (53g/week). Average consumption had increased from 34g/week in 1986/87. Most of the increase was for women and particularly older women.
12. Average consumption of soft drinks for the group as a whole had nearly doubled compared with 1986/87; consumption levels in 2000/01 were equivalent to about 4-5 cans per week. The majority of soft drinks consumed were carbonated. Women consumed similar amounts of diet and non-diet varieties on average while men consumed more of the non-diet type.
13. There were also changes in consumption of other foods between 1986/87 and 2000/01. Mean consumption of breakfast cereals had increased substantially and was a third higher for men and 50% higher for women in this survey compared to 1986/87. Consumption of crisps and savoury snacks was also between a fifth and a quarter higher on average in this survey and consumption of burgers and kebabs had increased for men. However average consumption of chocolate was the same in this survey as in 1986/87 while average consumption of chips and bread were significantly lower for men in this survey and average consumption of biscuits was significantly lower for women.
14. Twenty four percent of women and 10% of men reported that they were dieting to lose weight during the survey period. Seven percent of women and 2% of men reported being vegetarian or vegan, although half of this group said they ate fish. The percentage reporting being vegetarian or vegan increased to 12% of women aged 19-24 years and 11% of those aged 25-34 years.

Energy and Macronutrient Intakes

15. The mean daily total energy intake was 9.72MJ (2313kcal) for men and 6.87MJ (1632kcal) for women. There was a wide range of energy intakes in each age/sex group, with energy intakes at the upper end of the range about 2-3 times higher than those at the lower end. Table 1 shows the mean energy intake for each age/gender group and the mean intake as a percentage of the Estimated Average Requirement (EAR). Mean energy intakes fell below the EAR for each age/gender group and, overall, were 92% of the EAR for men and 85% for women.
16. Table 2 presents data for the percentage of food energy (i.e. excluding energy from alcohol) and total energy derived from macronutrients for each age/gender group, with the Dietary Reference Values (DRV) for comparison. Mean intake of total fat as a percentage of food energy intake was 35.8% for men, approaching the DRV of 35%, and 34.9% for women, meeting the DRV. The range of intakes was wide, from under a quarter of energy from fat at the lower 2.5th percentile to almost half at the upper 2.5th percentile.
17. Mean intake of saturated fatty acids was 13.4% of food energy for men and 13.2% for women, well in excess of the DRV (11%). Intakes at the lower 2.5th percentile were 7-8% of food energy while at the upper 2.5th percentile a fifth of

food energy was derived from saturated fatty acids.

18. The proportion of food energy derived from total carbohydrate was 47.7% for men and 48.5% for women, close to the DRV of 50%. Intakes ranged from just over a third of food energy at the lower 2.5 percentile to 60% at the upper 2.5 percentile.
19. The proportion of food energy derived from non-milk extrinsic sugars (NMES) was 13.6% for men and 11.9% for women, in excess of the DRV of 11%. The range of intakes was extremely wide. Intakes at the lower 2.5th percentile were 2-3% of food energy while at the upper 2.5th percentile nearly 30% of energy was derived from NMES. In the youngest age group (19-24 years) men derived 17.4% of food energy intake from NMES on average, and women 14.2%. In the oldest group (50-64 years) women met the DRV, deriving 11.0% of their food energy from NMES on average, while men derived 12.2%.
20. The main sources of NMES for the group as a whole were table sugar, which provided 19% of average intake, soft drinks (16%) and biscuits, buns, cakes and pastries (11%). For the youngest group (19-24 years) soft drinks (mainly carbonated) were the main source, providing 37% of average intake.
21. Mean intake of non-starch polysaccharide (NSP) was 15.2g/day for men and 12.6g/day for women, well below the DRV of 18g/day. Intakes ranged from 6.2 and 5.0g/day for men and women at the lower 2.5th percentile to 28.9 and 24.2g/day at the upper 2.5th percentile.
22. The proportion of total energy derived from alcohol for the total sample, including non-consumers was 6.5% for men and 3.9% for women. When non-consumers were excluded the proportions were 8.1% for men and 5.7% for women. At the upper 2.5th percentile the proportion of energy derived from alcohol for consumers only was 25.8% for men and 18.9% for women.
23. Sixty percent of men and 44% of women exceeded the recommended daily benchmarks for alcohol consumption³, on at least one of the seven dietary-record days and 3% of men exceeded them on all seven days. On their heaviest drinking day, 39% of men and 22% of women drank more than twice the recommended daily benchmarks.

Micronutrient Intakes

24. Table 3a shows the mean intake of vitamins by sex and age, the mean intake as a percentage of the Reference Nutrient Intake (RNI) for each sex/age group and the percentage below the Lower Reference Nutrient Intake (LRNI) in each group.

³ Current advice for adults is that men should drink no more than three to four units of alcohol a day and women no more than two to three units a day. Consistently drinking four or more units a day for men or three or more units a day for women is not advised as a sensible drinking level because of the progressive health risk it carries. One unit of alcohol is approximately equivalent to half a pint of lager or cider, a single measure of spirits, one glass of wine or one small glass of sherry, port or other fortified wine. One unit is equivalent to 8g of alcohol consumed.

Table 3b presents the same information for minerals. Intakes are presented from food sources, excluding contributions from dietary supplements.

25. Mean intakes of all vitamins were above the RNIs for men and women overall (taking all ages together). There was some evidence of low intakes of vitamin A and riboflavin in younger groups. Mean intakes of vitamin A fell below the RNI for the youngest men and the two younger groups of women. Sixteen percent of men and 19% of women in the youngest age group had intakes below the LRNI. The main sources of vitamin A were meat and meat products and vegetables. Mean riboflavin intakes were above the RNI in all age/sex groups but intakes below the LRNI were found in 8% and 15% of the youngest men and women respectively and in 10% of women aged 25-34. The main sources of riboflavin were milk and milk products and cereals and cereal products (mainly from fortified breakfast cereals).
26. Mean intakes of folate were above the RNI in all age/sex groups and no more than 3% of any group had intakes below the LRNI. However only 14% of women aged 19-24 years, 8% of the 25-34 year group and 16% of the 35-49 group had a folate intake of 400µg/day or more including intake from supplements. The main dietary source of folate was cereals and cereal products, which provided a third of intake.
27. Mean intakes of most minerals were above the RNIs for men and women. However there was evidence of low intakes of a number of minerals, including iron, potassium, magnesium, calcium, zinc, copper and iodine, especially in the younger age groups.
28. Mean iron intakes in women were well below the RNI in all but the oldest group and in the two younger groups over 40% had intakes below the LRNI. Cereals and cereal products was the main food source, providing over 40% of average intake. Under a fifth of intake came from meat and meat products on average for the group as a whole.
29. Mean potassium intakes were slightly below the RNI for men and well below for women. In men, intakes below the LRNI were found in 6% overall, increasing to 18% in the 19-24 age group. For women 19% had low intakes overall, increasing to 30% in the 19-24 and 25-34 age groups. Potatoes, meat, milk, cereals and drinks all provided over 10% of intake on average.
30. Mean intakes of magnesium were above the RNI for men as a group but fell below for women at 85% of the RNI. Nine percent of men and 13% of women had intakes below the LRNI, increasing to 17% of men aged 19-24 and around a fifth of women in the 19-24 and 25-34 age groups. Cereals and cereal products was the main source, followed by drinks. Beer and lager was a significant source for men. Meat, milk and potatoes all provided around 10% of magnesium intake on average.
31. The youngest group of women had a mean calcium intake just below the RNI and 5% of men and 8% of women in the youngest group had intakes below the LRNI.

Milk and milk products provided over 40% of average intake, and cereals 30%.

32. Mean intakes of zinc fell below the RNI for the youngest men and younger women and low intakes were seen in 7% and 5% of the youngest men and women. For the group as a whole, about a third of intake came from meat, a quarter from cereals and a sixth from milk.
33. Mean iodine intakes fell below the RNI for the youngest women, 12% with intakes below the LRNI. Milk and milk products provided over 40% of intake for women. Beer and lager was a significant source for men.
34. Mean copper intakes fell below the RNI for women in all age groups and the youngest men. For the group as a whole, around a third of intake came from cereals and a sixth of intake from meat.

Dietary Supplements

35. Forty percent of women and 29% of men overall reported taking dietary supplements in the survey week. This increased to 55% of the oldest women. Cod liver oil and other fish oil based supplements and multi-vitamins and multi-minerals were the most popular types. Dietary supplements increased mean intakes of most vitamins, and some minerals (iron, zinc, calcium) particularly in older women. However supplements had little or no impact on the proportions with intakes below the LRNI, suggesting that those taking supplements had adequate micronutrient intakes from food.

Salt

36. Mean salt intakes estimated from urinary sodium excretion were 11.0g/day for men and 8.1g/day for women (9.5g/day overall) and were well above the 6g/day recommendation in all age/sex groups. 15% of men and 31% of women had average salt intakes of 6g or less over the survey week. Mean sodium intakes estimated from dietary record data, (excluding discretionary salt) were equivalent to 8.3g salt/day for men and 5.8g/day for women.

Physical Measurements

37. Two-thirds (66%) of men and over half of women (53%) taking part in the survey were overweight or obese (Body Mass Index (BMI) over 25). Forty two percent of men and 32% of women were overweight (BMI between 25 and 30); one in four men (25%) and one in five women (20%) were obese (BMI over 30). Overweight and obesity was more prevalent in the oldest group (50-64years) compared with the younger groups (19-34 years). 78% of the oldest men and 64% of the oldest women were overweight or obese. Seven percent of men and 3% of women overall were underweight (BMI 20 or less). This increased to almost a fifth (19%) of the youngest group of women (19-24 years).

38. Almost a quarter of men (23%) and 15% of women had a waist circumference: hip circumference ratio above the guideline thresholds for increased health risk⁴. Men in the older groups (35-64 years) were more likely to have a waist:hip ratio above the risk threshold than were men in the younger groups (19-34 years) while the oldest women (50-64 years) were more likely to have a high waist:hip ratio than other women.
39. Over a fifth of men (22%) and 13% of women overall had high blood pressure (hypertensive) and 24% of men and 13% of women had blood pressure that is classified 'high normal'⁵. A quarter of men (24%) and half of women (51%) had blood pressure levels classified as optimal and 30% of men and 23% of women had levels classified as normal. As expected the proportions of men and women with high blood pressure increased with age. In the oldest group (50-64 years) 37% of men and 33% of women had high blood pressure.

Nutritional Status

40. Table 4a and b present mean levels for key blood indices of nutritional status and the percentages with levels below threshold values indicating low status for men and women separately. The results of the analysis of nutritional status indices in blood samples indicate that the majority of adults are adequately nourished with indices for most nutrients within normal ranges. However for a few nutrients, in particular vitamin D, also for vitamin C, and for women, iron and folate, a proportion had levels below thresholds for poor status.
41. Three percent of men and 8% of women overall had haemoglobin levels below the WHO thresholds defining anaemia. There was no evidence of an age trend. Eleven percent of women and 4% of men had serum ferritin levels below the normal range, increasing to 16% of women in the 19-24 group.
42. Five percent of men and women had a red cell folate concentration indicative of marginal status with increased risk of deficiency. This increased to 8% of the youngest women, 13% of the youngest men and 4% of men and women in the 25-34 year group. No more than 1% of any age/sex group had a red cell folate concentration indicating severe deficiency.
43. Five percent of men and 3% of women had plasma vitamin C levels below 11µmol/l indicating biochemical depletion.
44. Low vitamin D levels were found in a substantial proportion of the blood samples, particularly those for the youngest age group and those taken in the winter months. Levels of plasma 25-hydroxyvitamin D (25-OHD) below 25nmol/l, the threshold used to indicate low vitamin D status, were found in 14% of men and 15% of women. In the youngest group, 24% of men and 28% of

⁴ Guideline thresholds for increased risk are a ratio of ≥ 0.95 for men and ≥ 0.85 for women.

⁵ Based on systolic blood pressure. WHO guidelines indicate that hypertension (140/90 mmHg) and high normal blood pressure (130/85-140/90 mmHg) pose a threat to health. Optimal blood pressure is defined as less than 120/80 mmHg and normal blood pressure as 120/80-130/85 mmHg.

women had levels below 25nmol/l. The proportion with low status was higher in the winter months (January to March) than in the summer (July to September). Nearly a quarter of blood samples collected in January to March were below the 25nmol/l threshold.

45. Two thirds of men and women had an erythrocyte glutathione reductase activation coefficient (EGRAC) above 1.30, the upper end of the normal range. High values suggest depleted riboflavin status. However EGRAC is known to be very sensitive and moderately raised values are not associated with known functional abnormality and the high proportion of apparently deficient values is characteristic of the sensitivity of the assay.
46. Plasma homocysteine levels above the upper limit of the normal range were found in a third of men and just over a fifth of women. There were no age differences in the proportion with high values.
47. Almost half (48%) of men and women overall had blood levels of total cholesterol above the optimal level⁶. Over a third had mildly elevated levels, just over one in 10 had moderately elevated levels and 2% of men and 3% of women had severely elevated levels. In the oldest group (50-64 years) 59% of men and 75% of women had levels above optimal.

Physical Activity

48. Based on information from the seven-day physical activity diary, just over a third of men (36%) and about a quarter of women (26%) met the current Department of Health recommendation on physical activity for adults of at least 30 minutes of physical activity of at least moderate intensity on five or more days a week. One in six people did not record any time spent in activities of at least moderate intensity over the seven-day period. However, when interviewed, about half of those who took part in the survey said that they were fairly physically active and a further fifth said they were very physically active.

Comparison With 1986/87 Adults Survey

49. Results from this NDNS have been compared with the findings of the Dietary and Nutritional Survey of British Adults in 1986/87 that covered adults aged 16-64 years. Information on food and nutrient intakes, collected using a seven-day weighed intake methodology in both surveys are largely comparable, as are physical measurements. However blood pressure measurements and most of the nutritional status measures are not comparable because of the use of different measurement instruments and analytical methods. Physical activity levels were not assessed in the earlier survey.
50. Comparison of food consumption in the two surveys shows that the older groups and particularly the oldest women in this survey had higher consumption of some foods indicative of healthier diets but this was not the case for the youngest

⁶ It is generally accepted that a plasma total cholesterol concentration below 5.2mmol/l represents an optimal level, 5.2mmol/l to 6.4mmol/l mildly elevated, 6.5mmol/l to 7.8mmol/l moderately elevated and above 7.8mmol/l a severely elevated level.

adults. Average consumption of fruit and vegetables had increased overall for women but not for men. The increase for women is mainly in the oldest group. Consumption of oily fish also increased significantly for the oldest group of women while there has been little change for younger women or men.

51. Both men and women were consuming more soft drinks than in the last survey. Diet soft drinks consumption had increased for men and women while consumption of standard varieties had only increased for men. Carbonated drinks accounted for the majority of consumption. Consumption of breakfast cereals and crisps and savoury snacks were higher in 2000/01 than 1986/7 for both men and women, and consumption of burgers and kebabs was higher for men. However, consumption of chocolate was unchanged, while consumption of chips and bread was lower in 2000/01 for men and biscuits lower for women.
52. Table 5 compares intakes of energy and macronutrients for men and women in the two surveys. Average reported energy intake was 6% lower for men in 2000/01 than in 1986/87 while intake for women was unchanged. Mean intake of total fat, saturated, trans and cis-monounsaturated fatty acids as a proportion of food energy were all lower in 2000/01 than in 1986/87 while intake of cis n-3 polyunsaturated fatty acids was higher. The proportion of energy derived from total carbohydrate had increased since 1986/87. Data on non-milk extrinsic sugars intake are not available from the 1986/87 survey for comparison.
53. Tables 6 and 7 show vitamin and mineral intakes compared with the RNIs and LRNIs for the two surveys. Assessed mean intakes of many vitamins and minerals, including thiamin, niacin equivalents, vitamin B6, folate, pantothenic acid, vitamin C and vitamin E were higher in the 2000/01 NDNS than in the 1986/87 survey. This is partly due to increased fortification practices since the 1986/87 survey particularly of breakfast cereals with B vitamins, but also of soft drinks with vitamin C and fat spreads with vitamins D and E. Revision of composition data between the surveys affects comparisons of intakes of vitamin D (new analytical methods found measurable amounts in meat and poultry in the early 1990s) and retinol (downward revision of composition values for liver and milk). Mean intakes of calcium, potassium and phosphorus were also significantly higher in 2000/01 while intakes of copper, iodine and zinc had fallen.
54. Mean salt intake, estimated from 24-hour urinary sodium excretion, was higher in 2000/01, 9.5g/day compared with 1986/87, 9g/day. There was no change in assessed intake of sodium from food sources (excluding discretionary sources).
55. Men and women in this survey were heavier on average than men and women in the last survey of this age group in 1986/87 and men (but not women) were also taller on average. Mean BMI was higher in this survey than in 1986/87 for both men and women and a higher proportion were overweight or obese (45% of men and 36% of women in 1986/7 compared with 66% of men and 53% of women in 2000/01). The proportion who were obese also increased from 8% and 12% of men and women in 1986/7 to 25% of men and 20% of women in 2000/01.

Potentially At-Risk Groups:

People in Households Receiving Benefits

56. Adults living in households in which someone was receiving state benefits generally had poorer diets than those in non-benefit households. There was also some evidence of poorer nutritional status in this group.
57. People living in benefit households consumed fewer portions of fruit and vegetables, on average 2.1 portions per day for men and 1.9 portions for women, compared with 2.8 and 3.1 portions per day for men and women in non-benefit households. 35% of men and 30% of women in benefit households ate no fruit during the seven-day recording period, compared with 19% and 12% in non-benefit households. A much smaller proportion ate no vegetables during the same period: 4% of men and 6% of women in benefit households compared with 2% of men and 1% of women in non-benefit households.
58. People in benefit households were less likely to eat oily fish than were those in non-benefit households.
59. Men and women in benefit households had lower mean energy intakes than those in non-benefit households and thus absolute intakes of some macronutrients were also lower for this group. Women in benefit households derived a higher proportion of energy intake from non-milk extrinsic sugars and a lower proportion from protein than did women in non-benefit households. There was no difference between the benefit and non-benefit groups in the proportion of energy derived from fat or fatty acid categories.
60. Those in benefit households were less likely to have recorded consuming alcohol during the dietary recording period than those in non-benefit households. For those who consumed alcohol there was no difference in mean intake between benefit and non-benefit households.
61. Table 8 shows intakes of vitamins and minerals from food sources compared with RNIs and LRNIs for men and women in benefit and non-benefit households. People in benefit households had lower mean daily intakes of the majority of vitamins and almost all minerals compared to those in non-benefit households. For some nutrients mean intakes in the benefit group fell below the RNI while in the non-benefit group they were above the RNI: zinc for men and women, magnesium for men and vitamin A, calcium and iodine for women. Compared with the non-benefit group, a higher proportion of the benefit group had intakes of some vitamins and many minerals below the LRNI, for example for women in the benefit group, 22% had low intakes of vitamin A, 19% of riboflavin, 27% magnesium and 34% potassium.
62. There was no difference in mean BMI between the benefit and non-benefit groups. However women in benefit households had a higher mean waist: hip circumference than those in non-benefit households.
63. There was some evidence of lower micronutrient status for the benefit group. People living in benefit households had lower mean status levels for vitamin C,

red cell folate, vitamin E and selenium for men and women and carotenoids and vitamin D for women.

64. There was no difference in mean blood lipid levels between the benefit and non-benefit groups.
65. There was no difference in physical activity levels between the benefit and non-benefit groups.

Young Adults (19-24 and 25-34 Years)

66. The survey shows that the youngest group of adults (19-24 years) and also the 25-34 years group, especially women, tend to have poorer diets than older adults. Consumption of fruit and vegetables and oily fish is lower in the youngest group than in other groups and consumption had not increased for this group since the last survey. The youngest men and women ate 1.3 and 1.8 portions of fruit and vegetables per day on average and none of the men and 4% of the women in the youngest group met the 5-a-day recommendation.
67. The youngest adults consumed 3 times as much soft drinks (mainly carbonated drinks) as the oldest group. Consumption in the youngest group had doubled since the last survey and half of the increase was due to standard (sugared) soft drinks.
68. The dietary patterns in young adults were reflected in higher intakes of NMES and lower intakes of many micronutrients. The proportion of energy derived from NMES in the 19-24 year group was 17.4% for men and 14.2% for women on average. Men and women at the top end of the distribution derived 36% and 29% respectively of their energy intake from NMES. Mean intakes of most vitamins and minerals were lowest in the youngest group and this group, particularly young women, had mean intakes of some vitamins and many minerals below the RNI and a significant proportion had intakes below the LRNI for vitamin A, riboflavin, iron, potassium, magnesium and to a lesser extent calcium, zinc and iodine, and for women, vitamin B6 (Tables 3a and 3b). This was also true for women in the 25-34 age group, especially for iron, magnesium and potassium. Over 40% of women in the 19-24 and 25-34 age groups had iron intakes below the LRNI.
69. Nineteen percent of women in the youngest group were underweight (BMI 20 or less).
70. Sixteen percent of the youngest women had low serum ferritin levels and 7% had low haemoglobin levels. 8% had marginal red cell folate status. Poor vitamin D status (defined by the 25nmol/l threshold) was found in 24% of the youngest men and 28% of the youngest women (see Table 4a and b).
71. The youngest men were more physically active than the oldest group but there was no age difference for women.