



Paper for information: NDNS update

Agenda item: 4

Please see attached paper for information.

SACN

National Diet and Nutrition Survey: report of years 1 and 2 (combined) 2008/09-2009/10

Introduction

1. The main report of the National Diet and Nutrition Survey (NDNS) years 1 and 2 (combined) 2008/09-2009/10, covering food consumption and nutrient intakes, was published in July 2011¹, followed by a supplementary report covering results from blood analytes in October². This report supersedes and replaces the year 1 report published in 2010. The key findings from both reports are at Annex 1. The raw dataset is available from the UK Data Archive. SACN members have been provided with these reports previously.
2. This paper highlights some of the methodological issues that have affected reporting and sets out plans for future reporting.

Background

3. The NDNS aims to provide detailed, quantitative information on food consumption, nutrient intakes, nutritional status and related characteristics in the general population. It is the only UK national dietary survey that provides this type of data for individuals, allowing breakdown by age and sex and analysis of the distribution of intakes within the population.
4. The NDNS is a continuous survey with fieldwork carried out every year. Fieldwork for the current contract began in 2008 and continues for five years until 2013. The current contract is carried out by a consortium of three organisations: National Centre for Social Research, MRC Human Nutrition Research and University College London. The sample size is 500 adults and 500 children per year, covering all ages from 1½ years

¹ Bates B, Lennox A, Bates C, Swan G (eds). National Diet and Nutrition Survey. Headline results from Years 1 and 2 (combined) of the Rolling Programme (2008/09 – 2009/10). Available online: http://www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsStatistics/DH_128166

² Bates B, Bates C, Prentice A, Swan G (eds). National Diet and Nutrition Survey. Headline results from Years 1 and 2 (combined) of the Rolling Programme (2008/09 – 2009/10). Available online: http://www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsStatistics/DH_130728

upwards living in private households. People living in institutions are not covered and pregnant and lactating women are also excluded. The sample is designed to be representative of the UK and is generated from households with up to one adult and one child sampled from each household. The survey includes boosted samples in Scotland, Wales and Northern Ireland so that separate results can be obtained for these countries.

5. Survey components:

- Face to face interview collecting background information on dietary habits, socio-demographic status and lifestyle.
- Four-day unweighed diary to provide detailed, quantitative information on foods consumed and nutrient intake
- Physical measurements: height (infant length under 2 years); demispan (65 years +) weight; waist and hip circumference (11 years +); mid upper arm circumference (up to 15 years).
- Blood pressure (4 years and over)
- Fasting blood sample for biochemical indices of nutritional status.
- 24-hour urine collection to estimate salt intake (age 4 years and over)
- Physical activity assessment by accelerometry (Actigraph) for children and by questionnaire for adults.
- Assessment of energy expenditure by doubly labelled water in a sub-sample to assess under-reporting

Sample size

6. The sample size is 1000 people per year across the UK (500 adults and 500 children). The sample size is constrained by the available budget and does limit the ability of the survey to assess trends. Because the annual sample size is small, the decision was made to publish combined results for years 1 and 2 and no comparison is made between years. The same approach will be used for the years 1-3 (combined) report to be published in July 2012. The report of years 1-4 due for publication in 2013 will

include some comparisons between years 1 and 2 combined and years 3 and 4 combined. However it may be that the size of changes likely to occur in diet and nutrient intakes over this period will be smaller than the magnitude we are able to detect with the given sample size.

Choice of dietary methodology

7. The dietary methodology chosen for the rolling programme was the four-day estimated diary. A comparison study carried out in Spring 2007 on 1100 adults and children compared two alternative dietary assessment methods – the multiple pass 24 hour recall repeated on four non-consecutive days and an unweighed diary completed for four consecutive days. The results showed no real difference between the response rates for the two methods (49% 24 hour recall; 47% diary) and no indications of major differences in data quality between the methods. A literature review identified a small number of studies which compared the 24 hour recall and unweighed diary methods but concluded that there was very little difference between the two methods in terms of energy intake estimates.
8. The NDNS Project Board decided that on balance the four day unweighed diary was the preferred method. It was felt to be a more flexible and adaptable method to cover the wide population age range in the survey (in particular it was thought to be more suitable for young children who may have more than one carer). MRC HNR, who lead the dietary assessment component of the survey also had more experience of using the unweighed diary method.

Balance of weekdays and weekend days

9. The original survey design used in year 1 over-sampled weekend days relative to weekdays and so some bias may have been introduced into the results for year 1 for foods and nutrients for which intakes differ between week days and weekend days, for example, alcohol. The design was changed for year 2 so that weekend days were under-sampled, in order to redress the balance and give an equal representation of days of the week for years 1 and 2 combined. There remains a slight bias towards weekend

days in the years 1 and 2 combined dataset but this is much smaller than in year 1.

Comparisons with previous NDNS

10. In order to make comparisons between the rolling programme and previous NDNS the previous datasets based on seven-day diaries have been recalculated to a four-day basis so that comparisons can be made for percentages consuming food groups or meeting reference values. Recalculated food consumption and nutrient intakes from the previous surveys can be found in Appendix K of the year 1 and 2 (combined) report.

Under-reporting

11. Mis-reporting of food consumption, generally under-reporting, is known to be a problem in NDNS as in all dietary surveys. No attempt has been made to adjust results to take account of under-reporting. Doubly labelled water assessment of energy expenditure has been undertaken in a sub-sample of 200 participants. Results will be published as part of the year 4 report in 2013.

Blood sampling

12. The response rate for blood sample collection is lower than for the dietary survey component as some participants drop out when asked to agree to a nurse visit and a further percentage decline to give a blood sample. About half of adults who completed a diary, and about 40% of older children went on to agree to give a blood sample. The percentage agreeing to a blood sample is even lower for younger children and results for this age group and adults aged 65 years and over have not yet been published as the numbers are too small.

13. The results for blood analytes reported in years 1 and 2 (combined) are based on relatively small numbers and so it was decided not to make definitive statements about the proportion of the population with values outside reference ranges. These will be included in the year 1-3 (combined) report.

14. The nurse visit to collect physical measurements and blood and urine samples takes place at least two months and up to four months after the collection of the dietary data. This limits the ability to look at associations between diet and nutritional status in individuals.

Future reports

15. A boosted sample of adults aged 19-64 years in England was recruited to provide an estimate of salt intake for this group in autumn 2011. Results are due for publication in May 2012.

16. Combined data for years 1-3 covering food consumption, nutrient intakes and blood analytes will be published in July 2012. This report will not include any comparisons between years. The findings are expected to be very similar to the year 1 and 2 (combined) report and so the amount of commentary on the dietary findings will be reduced. However the blood analytes chapter will include an analysis of the proportions outside reference ranges, where these exist.

17. A full report of results for years 1-4 is planned for publication in 2013. This will be based on combined data for years 1-4 with a more detailed age breakdown than has been included in previous reports. There will also be a section comparing results from years 1 and 2 with years 3 and 4. This report will also include:

- blood analyte results for children under 11 years and adults over 65 years. The number of blood samples collected for young children is very small so the age splits for reporting are to be decided;
- salt intakes based on 24-hour urinary sodium for children and older adults;
- physical activity results based on questionnaire for adults and actigraph for children;
- assessment of under-reporting based on doubly labelled water;
- assessment of socioeconomic differences

18. Separate reports on the results from boosted samples in Scotland, Northern Ireland and Wales will be published following the main year 1-4 report.

Secondary analysis

19. A programme of secondary analysis will be considered when the dataset for years 1-4 is available. Members' views will be sought on the priorities for analysis.

Future contract

20. The current contract has been extended to include a fifth year of fieldwork to run from April 2012 to March 2013. The Department is awaiting approval of a business case to tender for a new contract for a further four years of fieldwork (years 6-9). It is likely that the same dietary assessment method would be used for the new contract but there may be changes to the other components. SACN's input into the content of the new contract will be sought via the SACN representatives on the NDNS Project Board.
21. We plan to commission a scoping study to inform the direction of methodological development of the dietary assessment method in the longer term, with a view to making use of new technologies to assist with data collection and coding in future.

Department of Health
January 2012

Annex 1**Key findings from NDNS years 1 and 2 (combined) 2008-09 - 2009/10****i) Main report (diet and nutrient intakes)**

The results in this report confirm the results in the Year 1 report. Findings suggest that the overall picture of the diet and nutrition of the UK population is broadly similar to previous surveys in the NDNS series carried out between 1992 and 2001. Intakes of saturated fat and sugars remain above recommended levels. The analyses presented in this report do not identify any new nutritional problems in the general population.

- Adults aged 19 to 64 years on average consumed 4.2 portions of fruit and vegetables per day and older adults 4.4 portions³. Thirty per cent of adults and 37% of older adults met the five-a-day recommendation.
- Mean consumption of fruit and vegetables was 3.1 portions per day for boys aged 11 to 18 years and 2.7 portions per day for girls. Thirteen per cent of boys and 7% of girls in this age group met the five-a-day recommendation.
- The majority of participants did not eat oily fish during the four-day diary period and mean consumption was well below recommended one portion per week in all age groups.
- Mean energy intakes for adults were 1918 kcal/day for adults aged 19 to 64 years and 1721 kcal per day for adults aged 65 years and over. In children mean energy intakes ranged from 1127kcal per day for children aged 1.5 to three years, 1556 kcal per day for children aged four to 10 years and 1827 kcal per day for children aged 11 to 18 years.
- Mean intake of total fat met the DRV (no more than 35% food energy) in all age/sex groups except for women aged 65 years and over and men aged 65 years and over for whom, on average, total fat provided 35.9% and 37.1% food energy respectively.

³ The Health Survey for England is used to monitor five-a-day. HSE estimates of fruit and vegetable consumption are based on a recall of consumption over the previous 24 hours and are therefore different from NDNS estimates which are based on a four-day diary. NDNS estimates are higher than HSE estimates, at least in part because NDNS is better able to capture the contribution from composite dishes containing fruit and vegetables.

- Mean intakes of saturated fat exceeded the DRV (no more than 11% food energy) in all age groups. Mean saturated fat intake for adults 19 to 64 years was 12.8% food energy.
- Mean intakes of *trans* fatty acids provided 0.7-0.9% of food energy for all age groups, thus meeting the DRV (no more than 2% food energy).
- Mean NMES intakes exceeded the DRV (no more than 11% food energy) for children aged four to 18 years and adults aged 19 to 64 years. Soft drinks were the largest contributor to NMES intake for children aged four to 18 years.
- Sixty-one per cent of adults aged 19 to 64 years and 53% of older adults aged 65 years and over consumed alcohol during the four-day recording period. Adults who consumed alcohol during the four-day recording period obtained 9% of energy intake from alcohol in the 19 to 64 age group and 6% in the 65 years and over group.
- Mean intakes of Non-Starch Polysaccharides (NSP) were below the adult DRV (at least 18g per day) for all age groups.
- Mean intakes of vitamins (except vitamin D) from food sources were close to or above the Reference Nutrient Intake (RNI)⁴ for all groups. Twelve per cent of children aged 11 to 18 years had vitamin A and riboflavin intakes below the Lower Reference Nutrient Intake (LRNI).⁵ The contribution of dietary supplements did not reduce the proportions below the LRNI.
- Mean intakes of minerals from food sources were below the Reference Nutrient Intake (RNI) for some age groups, in particular children aged 11 to 18 years and a substantial proportion of this age group, particularly girls, had intakes below the LRNI. Mean intakes of iron were below the RNI for girls aged 11 to 18 years and women aged 19 to 64 years and 44% of girls and 22% of women were below the LRNI. Use of supplements had little effect on the proportions below the LRNI. Mean intakes of minerals in

⁴ The RNI for a vitamin or mineral is the amount of the nutrient that is sufficient for about 97% of people in the group. If the average intake of the group is at the RNI, then the risk of deficiency in the group is judged to be very small. However, if the average intake is lower than the RNI then it is possible that some of the group will have an intake below their requirement.

⁵ The adequacy of vitamin or mineral intake can be expressed as the proportion of individuals with intakes below the LRNI. The LRNI for a vitamin or mineral is set at the level of intake considered likely to be sufficient to meet the needs of only 2.5% of the population.

younger children aged under 10 years were above RNIs and few children in this age group had intakes below the LRNI.

- A quarter of adults aged 19 to 64 years and more than a third of adults aged 65 years and over reported taking at least one dietary supplement during the four-day recording period.

ii) Supplementary report (blood analytes)

The results in this report suggest that the areas of concern with respect to the nutritional status of adults and older children are similar to those found in previous NDNS carried out in 1997 and 2000/01 and are also in line with findings from other surveys where similar analytes have been measured. The findings are also not inconsistent with the findings from the dietary data. The results do not indicate any new areas of concern in the nutritional status of these population groups.

- There is evidence of iron-deficiency anaemia (as indicated by low haemoglobin levels) and low iron stores (plasma ferritin) in a proportion of adult women and older girls. This is in line with findings from previous surveys and does have health implications for these groups.
- There is evidence of low vitamin D status in adults and older children, both male and female. This has implications for bone health, in particular increased risk of rickets and osteomalacia.
- A substantial proportion of adults and older children have functional riboflavin status values indicative of low status. However the health implications of this are not known.
- There is no evidence of low status for other micronutrients where normal ranges or thresholds for low status have been set. Levels of vitamin C, B₆, B₁₂, thiamin, retinol and vitamin E fell within the normal range.
- A proportion of adults had elevated levels of blood lipids, increasing risk of cardiovascular disease. This is well known and in line with findings from health surveys.