



Statistical Summary: National Diet and Nutrition Survey: Years 1 to 9 of the Rolling Programme (2008/09 – 2016/17): Time trend and income analyses

Today, Public Health England published time trend and income analyses from the first nine years of the UK National Diet and Nutrition Survey (NDNS) rolling programme (2008/09 -2016/17).

The NDNS rolling programme is a continuous cross-sectional survey, designed to assess the diet, nutrient intake and nutritional status of a representative sample of around 1000 people per year (500 adults and 500 children) from the general population aged 18 months upwards living in private households in the UK. The NDNS comprises an interview, a four-day diet diary and collection and analysis of blood and urine samples. Results are used by government to monitor the diet and nutritional status of the population, to provide the evidence base for policy development and to track progress towards public health nutrition objectives such as reducing intakes of sugar, calories, saturated fat and salt and increasing intakes of fibre.

The NDNS is jointly funded by Public Health England and the UK Food Standards Agency. Work for years 1 to 9 of the rolling programme was carried out by a consortium led by NatCen Social Research working with the Medical Research Council Elsie Widdowson Laboratory (formerly known as MRC Human Nutrition Research).

Key findings: time trends between 2008/09 and 2016/17

1. Mean consumption of fruit and vegetable portions was unchanged between 2008/09 and 2016/17 for adults and children aged 11 to 18 years and was consistently below the 5 A Day recommendation in both groups. There was evidence of a fall in fruit juice consumption over this period in most age groups. For children under 11 years there was no clear trend in total fruit and vegetable consumption over the same period but there was a fall in consumption of fruit juice.
2. There was generally little change in oily fish consumption over time. Although the percentage of children aged 11 to 18 years consuming oily fish increased by 10 percentage points between 2008/09 and 2016/17 mean consumption remained well below recommended levels in all age groups.
3. Consumption of red and processed meat showed a downward trend. For adults aged 19 to 64 years consumption declined by 19g over nine years from 2008/09 to 2016/17. For children aged 11 to 18 years there was a decline of 15g and adults 65 years and over 11g over the same period. Mean consumption for adult men remained above the recommended maximum of 70g/day.
4. There was a downward trend in consumption of sugar-sweetened soft drinks in all age groups. The percentage consuming over the four days of the survey fell between 2008/09 and 2016/17 by 26 percentage points for children aged 1½ to 3 years, 35 percentage points for children aged 4 to 10 years and 17 percentage points for children aged 11-18 years. There was a smaller reduction of 13 percentage points in adults 19 to 64 years. The

quantities of sugar-sweetened soft drinks drunk by consumers also declined over the same period in children and older adults.

5. Total fat and saturated fatty acid intakes as a percentage of energy showed no change between 2008/09 and 2016/17 while trans fatty acids showed a reduction over the same period
6. Free sugars intake as a percentage of energy fell in children between 2008/09 and 2016/17 by 2.4-3.5 percentage points in each age group, and by 1.2 percentage points in adults. However intakes remained at least double the maximum recommendation of no more than 5% of total energy over the whole period.
7. Fibre intakes were below recommendations in all age groups over the whole nine years. Fibre intake for children 4 to 10 years decreased by 1.1g between 2008/09 and 2016/17. Men aged 19 to 64 years showed an increase in fibre intake of 2.4g/day over the same period.
8. There was a reduction in sodium intake from food between 2008/09 and 2016/17 in all age groups, equivalent to 0.5g sodium (1.25g salt) for children and 0.3-0.4g sodium (0.9g salt) for adults.
9. There was a downward trend in intakes of most vitamins and minerals for most age groups between 2008/09 and 2016/17. This was most marked for folate and vitamin A. Over the nine years, mean folate intakes for girls aged 11 to 18 years dropped from meeting the Reference Nutrient Intake (RNI) to below the RNI.
10. Blood folate concentrations decreased between 2008/09 and 2016/17 for most age/sex groups and the proportions with concentrations indicating risk of anaemia increased. For red blood cell folate there was a 19 percentage point increase for children aged 11-18 years and a 9 percentage point increase for adults in the proportions below thresholds indicating risk of anaemia.
11. For women of childbearing age the proportion with a red blood cell folate concentration indicating increased risk of neural tube defect-affected pregnancies increased from approximately two-thirds in 2008/09 to almost 90% in 2016/17.

Key findings – Equivalised household income (based on analysis of year 5-9 data)

1. Although those on higher incomes were closer to meeting some recommendations, overall where diets failed to meet recommendations this was the case across the range of income.
2. Fruit and vegetable consumption increased with income (except in men aged 65 and over) but consumption was below the 5 A Day recommendation in all income groups
3. The percentage consuming fruit juice and oily fish over the four survey days increased with income while the percentage consuming sugar-sweetened soft drinks over the four survey days decreased with income in most age groups
4. Intakes of fibre and most micronutrients increased with income
5. Total fat intakes as a percentage of energy increased with income for adults but not for children and decreased with income for children aged 1½ to 3 years.
6. Saturated fat intakes as a percentage of energy tended to increase with income although the changes were generally small and not statistically significant in all groups. Intakes exceeded the maximum recommendation across the range of income
7. Free sugars intakes as a percentage of energy decreased with income in adults but not in younger children (under 11 years). Intakes exceeded the maximum recommendation across the range of income
8. Sodium intake increased with income in adults but not in younger children (under 11 years).
9. Blood and urine markers of nutritional status tended to increase with higher income although this was not consistent for all nutrients or all age groups

Key findings – blood vitamin D status by season (based on year 1-9 data)

1. Average blood vitamin D concentrations were lowest in the winter months – January to March, and highest in the summer months – July to September. During January to March 19% of children aged 4 to 10 years, 37% of children aged 11 to 18 years and 29% of adults had blood vitamin D concentrations below 25nmol/L, the threshold indicating risk of deficiency

Background notes

1. The NDNS rolling programme is commissioned as a continuous survey but is retendered at regular intervals. The first contract collected data over a four year period from 2008/09 to 2011/12 with an extension to a fifth year covering 2012/13. The contract under which this report was produced ran for a further four years covering 2013/14 to 2017/18 (year 6-10). At the end of 2017, following an open tender process, PHE awarded a contract for years 11 to 14 of the rolling programme to NatCen Social Research working with the MRC Epidemiology Unit at the University of Cambridge.
2. The report published today presents new analysis of data collected over the whole nine years of the rolling programme from 2008/09 to 2016/17 to assess trends over time, and new analysis of data collected from years 5-9 to assess differences in diet and nutrition by equivalised household income.
3. The time trend analysis over nine years used a linear regression model which splits each survey year into quarters and provides an estimate of the average per year change over the nine year period. The analyses are shown in the report as plots in Excel for each age/sex group.
4. For the equivalised household income analysis, the average change in each outcome per £10,000 increase in equivalised household income was estimated via the slope from a linear regression model. The analyses are shown in the report as plots in Excel for each age/sex group.
5. All differences highlighted in this summary are statistically significant at the 95% level unless otherwise stated
6. Percentage consumers refers to the percentage who consumed during the four-day dietary recording period and not the percentage who ever consumed.
7. Responsibility for nutrition policy in England and Wales transferred from FSA to Health Departments in 2010. Management of NDNS also transferred to the Department of Health in England at that time. From 1 April 2013, responsibility for the survey transferred to Public Health England, an operationally autonomous executive agency of DH.
8. The Government recommends an intake of at least five portions of fruit and vegetables per person per day. The Health Survey for England (HSE) is used to monitor '5 A Day' in England. 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, at least in part, because NDNS captures the contribution from composite dishes containing fruit and vegetables.
9. Government recommendations for energy and nutrient intakes for males and females aged 1-18 years and 19+ years are summarised in Government Dietary Recommendations https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/618167/government_dietary_recommendations.pdf. These are based on recommendations from the Committee on Medical Aspects of Food and Nutrition Policy (COMA) and its successor the Scientific Advisory Committee on Nutrition (SACN).

10. Saturated fat is the kind of fat found in animal foods such as butter and lard, fatty cuts of meat, sausages and bacon, cheese and cream and foods containing them such as pies, cakes and biscuits. Consuming high levels of saturated fat can lead to raised blood cholesterol levels, which are associated with greater risk of developing heart disease.
11. Trans fats are formed when liquid vegetable oils are turned into solid or semi-solid fats through a process of hydrogenation. The main sources of trans fats in the diet are from partially hydrogenated vegetable oils (PHVOs), dairy and meat from ruminant animals. Hydrogenated Vegetable Oils can be used as ingredients in products such as biscuits, cakes and desserts and are also used as cooking and ingredient oils. Naturally occurring trans fats are found in dairy produce and the flesh of ruminant animals e.g. beef and lamb. Trans fats raise the levels of the type of cholesterol in the blood, which may increase the risk of heart disease.
12. In 2015 the Scientific Advisory Committee on Nutrition (SACN) recommended that a new definition of free sugars should be adopted in the UK and the population average intake of free sugars should not exceed 5% of total energy for adults and children aged 2 years and over. Free sugars include all added sugars, sugars naturally present in fruit and vegetable juices, purees and pastes and all sugars in drinks other than from dairy sources.
13. This report does not include results for salt intake based on 24-hour urinary sodium. The latest results for salt intake for adults aged 19 to 64 years in England were published in 2016. <https://www.gov.uk/government/statistics/national-diet-and-nutrition-survey-assessment-of-dietary-sodium-in-adults-in-england-2014>
14. Sodium intake estimates are based on the sodium content of foods consumed. They do not fully take account of salt added during cooking and exclude salt added at the table by participants.
15. Nutritional status means the level of nutrients available to the body (after absorption) for use in metabolic processes. For some micronutrients, status can be assessed by directly measuring the level of the nutrient in blood, while for others it is assessed by a functional measure such as the activity of vitamin-dependent enzymes.
16. Severe vitamin D deficiency causes rickets in children and osteomalacia in adults, this is a condition characterised by pain, muscle weakness and bone fractures. Both conditions are rare in the UK although there is evidence of significant incidence in South Asian and Afro-Caribbean groups. SACN's report on vitamin D and health published in 2016 set an RNI of 10µg per day for all age groups. In the summer months most people will meet their requirements through a combination of sunlight on skin and a healthy balanced diet.
17. Folate status is assessed against the clinical thresholds for risk of anaemia, based on red blood cell folate (305nmol/L) and serum folate (7nmol/L - deficiency' 13nmol/L – possible deficiency). For women of childbearing age, folate status is also assessed against the red blood cell folate concentration below which indicates elevated risk of neural tube defects (748nmol/L). Red blood cell folate is usually a better indicator of long-term status than plasma or serum folate because it reflects longer term body stores whereas serum folate concentrations respond rapidly to changes in dietary intake.
18. Folate in the diet comes from naturally occurring folates in foods and folic acid from fortified foods such as some breakfast cereals and from dietary supplements. Low folate status of women of childbearing age (16 to 49 years) is a particular public health concern. Increased folic acid intake through supplementation has been shown to reduce the risk of neural tube defects such as spina bifida if taken in the periconceptional period. Women planning pregnancy are therefore advised to take a 400µg folic acid supplement daily until the 12th week of pregnancy.