

# Diet and Nutrition Survey of Infants and Young Children in Scotland, 2011

## Executive Summary

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## **Executive summary**

### **Introduction**

The Scottish Government and the Food Standards Agency in Scotland (FSAS) funded a boost to the Department of Health (DH) and Food Standards Agency (FSA) commissioned Diet and Nutrition Survey of Infants and Young Children (DNSIYC)<sup>1</sup>. This report, the Diet and Nutrition Survey of Infants and Young Children in Scotland (DNSIYCS) provides the only source of high quality nationally representative detailed information on food consumption and nutrient intakes of infants and young children aged 4 up to 18 months<sup>2</sup> living in private households in Scotland. It will contribute to a robust evidence base for work in Scotland to develop and implement sound public health policies and food safety assessments. Results from this and other surveys carried out in Scotland will be invaluable in informing the progress of the Maternal and Infant Nutrition Framework for Action<sup>3</sup>, which was launched in January 2011. This framework for action can be taken by NHS Boards, local authorities and others to improve the nutrition of pregnant women, babies and young children.

The survey was carried out by a consortium of organisations: Medical Research Council Human Nutrition Research (MRC HNR), NatCen Social Research (NatCen), the MRC Epidemiology Unit and the Human Nutrition Research Centre at Newcastle University. Fieldwork was carried out between January and May 2011. Additional recruitment was undertaken among those in receipt of Healthy Start (HS)<sup>4</sup> vouchers in order to provide more detailed analysis of these populations.

### **Methods**

The key components of the survey carried out in the participant's home were:

- Detailed face-to-face interview to collect background information on family dietary habits, socio-demographic status and health information, feeding practices, eating patterns, developmental stages, sunlight exposure and gastrointestinal symptoms.
- Dietary data collection (estimated food diary, completed for four consecutive days) to provide a quantitative estimate of food consumption and nutrient intakes.
- Physical measurements (height and weight of mother; length, weight and head circumference of child).

## **Response rates and sample**

Of the 987 individuals living in Scotland sampled from Child Benefit Records, 97% were eligible to take part in the survey. Of these, 65% were fully productive, i.e. three or four dietary recording days<sup>5</sup> were completed resulting in a sample size of 616 fully productive individuals. Weighting factors were applied to ensure that the results were representative of the Scottish population of children according to 2011 Child Benefit data.

The profile of the achieved Scotland sample was very close to that of the population of infants and young children in the United Kingdom (UK) in terms of age and sex and region, but not ethnicity. After applying weighting factors, 95% of children in DNSIYCS were white, a higher proportion than in the UK sample (82%). There was a wide range of socio-economic circumstances for the children in the survey; larger proportions of their parents were home owners (55%) than living in rented accommodation (42%). This compared to 47% and 46% respectively for the UK sample. A fifth (19%) received Healthy Start (HS) vouchers, a similar proportion to the UK sample.

## **Contents of this report**

The results in this report cover the following areas:

- Sample characteristics including use of child care, smoking and drinking habits of family members, neurological development, medical history, sun exposure and maternal characteristics
- Physical measurements
- Feeding practices
- Food consumption
- Use of dietary supplements
- Energy, macronutrients and micronutrient intake

## **Recommendations for infant feeding, diet and nutrition**

The Scottish Government recommends that:

- Mothers exclusively breastfeed for the first six months of the child's life<sup>4,6</sup>.
- Breastfeeding mothers should take vitamin D supplements of 10µg per day<sup>7</sup>.
- Scottish Government guidance regarding the safe preparation, storage and handling of infant formula should be followed if parents choose to formula feed their babies, for example: Powdered formula should be made up as needed, with boiled water that has been allowed to cool for no more than 30 minutes<sup>8</sup>.

- Follow-on formula, ‘toddler’ and ‘Goodnight’ milks are not nutritionally necessary. If formula feeding, whey based infant formula is recommended until the child is one year of age<sup>9</sup>.
- Soya based formula should not be given unless recommended by a health professional and goat’s milk formula should not be given to infants under one year<sup>9,10</sup>.
- At six months of age suitable complementary foods<sup>11</sup> should be introduced alongside continued breastfeeding (and/or breast milk substitutes, if used)<sup>6</sup>.
- Cow’s milk should not be introduced as a main drink until after 12 months<sup>9</sup>.
- Semi-skimmed milk can be given as a drink from two years of age, provided the child is a good eater and growing well. Skimmed and 1% milk should not be given as a drink until five years of age<sup>9</sup>.
- Salt should not be added to children’s food<sup>12</sup>.
- Vitamin A, C and D supplements should be given from six months unless the child is formula fed and receiving more than 500ml of formula per day. Breastfed infants born to mothers with a low vitamin status may require supplements earlier, from the age of one month<sup>13</sup>.
- From about six months mothers should start to introduce infants to drinking from cups and beakers<sup>9</sup>.
- Tooth brushing twice a day should begin as soon as teeth begin to appear<sup>14</sup>.

Adequacy of nutrient intake for the population is assessed by comparing intake with age/sex specific UK Dietary Reference values (DRVs)<sup>7</sup>. The only DRVs set for this age group for macronutrients are an Estimated Average Requirement (EAR) for energy<sup>15</sup> and a Reference Nutrient Intake (RNI) for protein. For vitamins and minerals, mean intakes as a proportion of the RNI and the proportion with intakes below the Lower Reference Nutrient Intake (LRNI) are given. The RNIs and LRNIs set for each vitamin and mineral are shown in tables 6.22 and 6.33.

Results are presented for four age groups: 4 to 6 months, 7 to 9 months, 10 to 11 months and 12 to 18 months.

### **Methodological issues**

Mis-reporting of food consumption is known to be a problem in all dietary surveys, although it is generally considered to be less of an issue for younger children than adults. It is not known to what extent it is a problem for infants and young children aged 4 to 18 months. Biased estimates of intake can result from under- or over-reporting of actual intake or intake being modified during the recording period. In this

age group there is a particular risk of over-reporting due to an underestimation of food wastage. There is also day-to-day variation in diet, making it difficult to capture habitual diet over the short assessment period of four days. The potential for some mis-reporting needs to be borne in mind when interpreting findings from this survey. Evidence suggests that some foods and nutrients may be under- or over- reported to a greater extent than others, but there is no information available on the extent to which different foods and nutrients are misreported in the survey.

## **Key Findings**

### **Overall findings**

Infants and young children aged 4 to 18 months in DNSIYCS were reported to consume a varied diet; dietary recommendations were generally met by the majority of the survey population. Food consumption patterns and macro and micronutrient intakes were in general very similar in Scotland as for the UK.

The proportion of children who had ever been breastfed was lower in DNSIYCS (68%) than in the UK DNSIYC sample (78%), and lower than the Scottish results in the Infant Feeding Survey (IFS) of 2010<sup>16</sup> (74%). Thirty two per cent of infants had never been breastfed, and of those who were breastfed, 65% were not breastfed beyond three months of age. Infant formula was the largest contributor to energy intake for children aged under 12 months (28% to 56%) while the food category 'milk and milk products' was the largest contributor (27%) for those aged 12 to 18 months, similar to the UK.

A progression in ability to eat pureed and lumpy foods, finger foods, drink from a cup or beaker with a spout, and use of a spoon was reported with age. Most of the children who had food other than milk 'almost always' or 'sometimes' (62%) had the same food as their parents, or 'sometimes' had a different meal to, but prepared by, their parents (49%). A substantial proportion (23%) 'never' had the same food as their parents, although this was more common for younger children. Over half (59%) of children who had food other than milk had eaten a commercial baby or toddler meal and a fifth had eaten a commercially prepared adult ready meal, which was similar to the UK. Baby rice was the most common first food for children in DNSIYCS (63%), followed by pureed fruit or vegetables (18%).

Mean total fruit and vegetable consumption, including the contribution from mixed dishes, was relatively high (similar to consumption in teenagers<sup>17</sup>) ranging from 96g per day for children aged 4 to 6 months to 176g per day for those aged 12 to 18 months, equivalent to one to two 80g adult portions per day. When tested statistically, results were similar to the UK with the exception of fruit consumption, which was significantly higher in Scotland for children aged 4 to 11 months.

White bread was the most commonly consumed bread in children aged 7 to 18 months (consumed by 36% to 69% across the age groups). At least 27% of children in these age groups consumed wholemeal bread. Breakfast cereal consumption increased with age, so that over 80% of those 12 to 18 months consumed this in the four day period. The proportion of children consuming biscuits (72% for the highest age group); 'buns, cakes, pastries and fruit pies' (34% the highest); savoury snacks (42% the highest); and 'sugar, preserves and confectionery' (65% the highest) increased with age.

Mean consumption of beverages other than milk increased with age, with the most frequent consumption in older age groups, after milk and water, being low calorie soft drinks, consumed by 4% of those aged 4 to 6 months, rising to 51% of those aged 12 to 18 months. Fruit juice was consumed by 9% of children aged 4 to 6 months rising to 25% of those aged 12 to 18 months. The food category 'yoghurt, fromage frais and other dairy desserts' was consumed by 48% of children aged 4 to 6 months, rising to 82% of those aged 12 to 18 months.

In general, children in DNSIYCS were taller (i.e. longer), heavier and had larger head circumferences than the UK-WHO Growth Standard for their age and sex. This was also seen for the UK sample. This might be partially explained by the predominance of formula feeding by this group at the time of the survey, as predominantly formula fed children are on average larger for their age compared to exclusively or predominantly breastfed children on which these growth standards are based. Research shows that breastfed children tend to gain weight at a slower and healthier pace. At age 4 to 11 months, both boys and girls in DNSIYCS were significantly taller (longer) than those in the DNSIYC UK sample. Girls in Scotland also had significantly greater average weight and head circumference measurements across the age groups than the UK sample.

### **Findings relevant to recommendations**

- Thirty two per cent of infants had never been breastfed, and of those who were breastfed, 65% were not breastfed beyond three months of age.
- Fifty seven per cent of breastfeeding mothers in Scotland reported taking any type of supplement, most often a multi-vitamin and mineral supplement, which was taken by 35% of breastfeeding mothers. The proportion taking supplements containing vitamin D is not known.
- The majority of children in the survey were drinking infant formula at the time of the survey, except in the oldest age group of 12 to 18 months. The majority of parents feeding their child infant formula in the home followed recommendations for preparation. For example, 75% reported making up the

formula as needed and 68% used water that had been left to cool for no longer than 30 minutes. When feeding outside of the home however, the majority did not follow recommendations; for example, 54% made up formula using cold or cooled water. Results were similar to the UK sample.

- Twenty seven per cent of infants aged 4 to 6 months consumed follow-on formula, which is not recommended before six months and is not nutritionally necessary.
- Seventy seven per cent of children were given food apart from milk before six months of age, and were therefore not in compliance with the recommendation to delay the introduction of solids to six months.
- Thirteen per cent of children aged 4 to 6 months consumed whole cow's milk over the survey period, increasing to 80% of those aged 12 to 18 months. Children aged below 10 months consumed less than a quarter of a pint (146g) of whole milk per day, generally in keeping with the recommendation. Among consumers aged 10 to 11 months however, consumption was greater at 189g per day.
- A small proportion of children consumed semi-skimmed milk, 4% of infants aged 4 to 6 months increasing to 12 to 13% of children aged 10 to 18 months. Small proportions of children consumed 'other milk and cream' including 1% milk, skimmed milk, increasing from 0% of those aged 4 to 6 months to 9% of those aged 12 to 18 months.
- For those children who had food other than milk, most parents (89%) reported never adding salt to the child's food.
- Over the four-day food diary period, 6% to 9% of children were given a micronutrient supplement, most often a multi-vitamin supplement. In relation to vitamin D exposure, nearly half of all infants and young children had been outside between the hours of 10am and 3pm every day in the previous seven days before the interview. Most had not been on a holiday with strong sun in the previous year.
- The proportion of children who had ever drunk from a cup or beaker with a spout increased with age, from 63% of those aged 4 to 6 months to 95% of those aged 12 to 18 months.
- A toothbrush was reported to be used at least once every day for 84% of children with at least one tooth. There was greater compliance with recommendations for brushing of teeth of young children in Scotland than in the UK sample.



## **Key findings in relation to the DRVs**

- Seventy seven per cent of boys and 74% of girls exceeded the EAR for energy.
- Mean protein intakes were well above the RNI in all age groups.
- Mean daily intakes of vitamins and minerals from all sources (including supplements), were above or close to the RNI for all age groups with the exception of vitamin D for non-breastfed children aged 12 to 18 months and for breastfed children (by any degree of breastfeeding), across all age groups, although these are underestimates as they do not include the contribution of breast milk to vitamin D intake.
- The proportion of children with daily intakes of vitamins and minerals from all sources below the LRNI was low (8% or less for all age groups) except for iron for children aged over 7 months (11% to 17%) and magnesium for infants aged 4 to 6 months (11%).
- Mean daily intakes of sodium were only 79% of the RNI for children aged 4 to 6 months, but increased to 203% for children aged 12 to 18 months. This equates to an intake of 2.5g salt per day for children aged 12 to 18 months, exceeding the population goal for this age group of no more than 2g salt per day.

## **Comparisons of dietary data to the UK report**

There were no statistically significant differences in intakes of energy and non-milk extrinsic sugars (NMES), and key vitamins and minerals between DNSIYCS and the UK sample, with the exception of vitamin C intake, which was significantly lower for children aged 12 to 18 months in Scotland when compared to the UK. Comparisons for intakes of protein, fat, carbohydrate, other sugars, non-starch polysaccharides and other micronutrients, were not tested for significance, but appeared similar between Scotland and the UK.

## **Dietary habits of mothers collected during the interview**

Diets of mothers in Scotland were largely similar to those in the UK sample, although mothers in Scotland reported eating crisps and sweets more frequently, drinking sweetened drinks more often, being more likely to use butter as spread, less likely to eat oily fish frequently and to have fresh vegetables available in the home. There were some encouraging aspects of the mothers' diets overall, such as the high proportion who had breakfast every day, did not eat the fat on meat and consumed water rather than other drinks when thirsty. As in the UK sample, the diets of older mothers were reported as generally healthier than younger mothers. As seen in the

UK sample, there were some examples of mothers representing opposite ends of the health awareness and behaviour spectrum. For example, the two most common responses to use of salt were either 'always' adding salt to food or 'never' adding salt to food. This was also seen in the choice of diet or low calorie soft drinks, where 'always' and 'never' were the answers chosen most often. Most mothers (86%) were aware of the recommendation that five portions of fruit and vegetables should be eaten daily, but far fewer were aware of the recommendations for salt (13%) and oily fish (11%).

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## References and endnotes

<sup>1</sup> Details of the Diet and Nutrition Survey of Infants and Young Children UK report are available online: <http://www.dh.gov.uk/en/index.htm>

<sup>2</sup> Includes children aged up to 17 months and 28-31 days.

<sup>3</sup> 'Improving Maternal and Infant Nutrition: A Framework for Action' Scottish Government 2011. Available online: <http://www.scotland.gov.uk/Publications/2011/01/13095228/0>

<sup>4</sup> Healthy Start is a Government scheme set up to offer a nutritional safety net for pregnant women, new mothers and children under 4 years of age in very low income families, and encourage them to eat a healthier diet. The scheme provides vouchers to put towards the cost of milk, fruit and vegetables or infant formula, and coupons for free Healthy Start vitamin supplements, (see Annexe A of the main UK report for more details).

<sup>5</sup> Respondents completing three or four diary days were considered fully productive.

<sup>6</sup> [http://www.who.int/nutrition/topics/complementary\\_feeding/en/index.html](http://www.who.int/nutrition/topics/complementary_feeding/en/index.html)

<sup>7</sup> Report of Health and Social Subjects 41 *Dietary Reference Values (DRV's) for Food Energy and Nutrients for the UK*. Report on the Panel on DRV's of the Committee on Medical Aspects of Food Policy (COMA) 1991. The Stationery Office. London

<sup>8</sup> The key recommendations for making and storing powdered infant formula are:

- Feeds should be made up with boiled water that has been allowed to cool to no less than 70°C. Thus the feed should be made within 30 minutes after the water has boiled.
- When making the feed the boiled water should be added to the bottle first, followed by the correct amount of powdered formula.
- Once the feed is prepared it should be cooled as quickly as possible to feeding temperature.
- Ideally, powdered formula should be made up fresh for each feed rather than being stored. Although not ideal, feeds can be made up and stored below 5°C for a maximum of 24 hours.
- If mothers need to feed their infant when away from home they should make up fresh feeds as they need them, following the recommendations above.

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- It is suggested that mothers may consider carrying a flask of just boiled water with them when away from the home. Alternatively, mothers could use a liquid ready-to-feed formula when away from home

NHS Health Scotland 'Formula Feeding: How to feed your baby safely 2011.  
<http://www.healthscotland.com/documents/5523.aspx>

<sup>9</sup> NHS Health Scotland Drinks for babies and young children 2012. Available online: <http://www.healthscotland.com/documents/5064.aspx>

<sup>10</sup> Committee on Toxicity of Chemicals in Food, Consumer Products and the Environment. 1996. Statement on Phytoestrogens.  
<http://cot.food.gov.uk/pdfs/cotstatementphyto96.pdf>

<sup>11</sup> Complementary foods/feeding: the period where infants make the gradual transition from liquid foods to eating solid and family foods.

<sup>12</sup> NHS Health Scotland, Fun First Foods. 2012.  
<http://www.healthscotland.com/documents/4276.aspx>

<sup>13</sup> Department of Health. 1994. Weaning and the weaning diet. Report on health and social subjects, 45. HMSO, London.

<sup>14</sup> NHS Health Scotland, Oral Health and Nutrition Guidance for Professionals, 2012. Available online <http://www.healthscotland.com/documents/5885.aspx>

<sup>15</sup> Scientific Advisory Committee on Nutrition. *Dietary Recommendations for Energy*. The Stationery Office (London, 2011).

<sup>16</sup> The Infant Feeding Survey (IFS) is a longitudinal postal survey carried out every five years, which collects information on infant feeding practices across the UK for infants aged 4 weeks to 10 months. Available online:

<http://www.ic.nhs.uk/statistics-and-data-collections/health-and-lifestyles-related-surveys/infant-feeding-survey/infant-feeding-survey-2010>

<sup>17</sup> Bates B, Lennox A, Prentice A, Bates C, Swan G (2012) National Diet and Nutrition Survey; Headline results from Years 1, 2 and 3 (combined) of the Rolling Programme (2008/09- 2010/11) [Online]. Available online: <http://transparency.dh.gov.uk/2012/07/25/ndns-3-years-report/> (accessed 30/08/12)