Annexe A. Healthy Start

Jill Sommerville, Helen Henderson and Alison Lennox

Table of contents

List of tables

List of figures

A.1. Introduction

Healthy Start[1] (HS) is a UK Government scheme set up to provide a nutritional safety net for pregnant women, breastfeeding mothers, and children aged under four years in very low income families, and to encourage them to eat a healthier diet. The HS scheme provides vouchers to use to assist in the purchase of milk, fresh or frozen fruit and vegetables, and infant formula milk. Coupons to exchange for free vitamin supplements via the National Health Service (NHS) are also given. The scheme was launched in the UK in 2006, replacing the Welfare Food Scheme. Uptake of HS is increasing and it is currently estimated that 22% of infants aged 4 to 18 months in the UK are currently on the scheme. Applications for the scheme are countersigned by a health visitor or midwife who is also expected to provide relevant information and advice on breastfeeding and healthy eating. Healthy Start is means-tested and targeted specifically at pregnant women and families in receipt of:

- Income Support, or
- Income-based Jobseeker's Allowance, or
- Income related Employment and Support Allowance, or
- Child Tax Credit (but not Working Tax Credit, unless the family is receiving Working Tax Credit run-on only) with an income of £16,190 a year or less (2012/13)

All pregnant women who are under the age of 18 years are also eligible to apply and are supported until their child is born even if they do not meet the means-tested criteria above. Once the child is born the standard eligibility criteria apply to women under 18 years.

A.2. Response rates and use of Healthy Start Vouchers

A.2.1. Representativeness of the HS boost sample compared to the entire UK sample

A number of mothers of children within the Diet and Nutrition Survey of Infants and Young Children (DNSIYC) core sample were identified as in receipt of HS vouchers once they had completed the Computer Assisted Personal Interview (CAPI) questionnaire (n=487). Based on current HS uptake, the sample of mothers estimated to be in receipt of HS vouchers was too small for separate analysis and therefore, an additional boost sample of HS recipients was selected (n=93). The database containing details of recipients of HS vouchers belongs to the Department of Health but is managed by Vertex Data Science Ltd. NatCen was given permission from the Department of Health to use the records for sampling a boost sample of HS recipients for DNSIYC. This boost sample was combined with the HS recipients from the core sample to form the DNSIYC HS sample (n=580).

Table A.1.1 shows the profile of the selected boost HS sample and HS population totals provided by Vertex. At the time of sampling there were 199,633 women in receipt of HS vouchers in the UK. The two distributions are generally close, although there are some differences in the mother's age profile. This is likely to be due to the small sample sizes involved in the DNSIYC HS sample. The small sample size means the sampling error has more impact on the distribution than for a larger sample. The differences in profile are not considered large enough to suggest the sample is biased.

Table A.1.1

A.2.2 Response rates

Details of Stage 1 (carried out in participant's home) and Stage 2 (carried out in a clinic) are described in Chapter 2 of the main report and Appendix A.

A.2.2.1 Individual level response to Stage 1 in the HS sample

It is not possible to calculate individual level response to Stage 1 of the survey for the DNSIYC HS sample as HS recipients in the core DNSIYC sample i.e. not in the HS boost, could only be identified once they had completed the CAPI questionnaire. The proportion of HS recipients in the core UK sample who refused to take part in the survey is therefore not known. Figure A.1 in section A.2.3 shows that fully productive interviews were achieved with 580 HS recipients (499 excluding recipients in Scotland).

A.2.2.2 Individual level response to Stage 2 in the HS sample

Forty two per cent (n=209) of HS participants completing at least three diary days attended a clinic[2].

Skinfold thickness measurements were achieved for 41% of fully productive HS participants (97% of those who visited a clinic).

A blood sample was provided by 24% of fully productive HS participants (58% of those who visited a clinic).

The stable isotope component of the study was undertaken by 36% of HS participants who completed at least three diary days (87% of those who attended the clinic).

Table A.1.2

A.2.3. Summary of response to stages in the HS sample

Figure A.1. Summary of response to stages in the HS sample

Healthy Start sample (n=580)

Included:

- Healthy Start core sample (n=487)
- Healthy Start boost sample (n=93)

Stage 1

Measure	CAPI	Food diary	Weight	Length	Head circumference	Maternal height	Maternal weight
n	580	580	548	512	519	560	551

Stage 2 (n=209)

Measure	Length	Weight	Head Circumference	Tricep skinfold	Subscapular skinfold	FBC [2] result	Serum result	Maternal height	Maternal weight
n	205	208	199	203	201	113	109	192	194

Note: all measurements were optional

[1] Computer Assisted Personal Interview

[2] Full blood count (full or partial)

A.2.3. Use of Healthy Start Vouchers

Of the DNSIYC HS sample households, 47% spent all or most of their vouchers on infant formula, 63% for children aged 4 to 11 months and 29% for those aged 12 to 18 months.

Twenty five per cent of HS recipients spent their vouchers only or mainly on fruit and vegetables, increasing with age of child from 18% for children aged 4 to 11 months to 34% for those aged 12 to 18 months. For much smaller proportions of households, vouchers were spent only or mainly on cow’s milk (9% overall), or on mixtures of fruit and vegetables and infant formula or cow’s milk, or on supplements. In 3% of the DNSIYC HS sample households, the vouchers were received but not used.

Table A.2

A.3. Food consumption and nutrient intakes

Summary of findings

- Food consumption patterns were in general similar in the DNSIYC HS sample as for the UK sample.

- Nine per cent of children aged 4 to 11 months and 4% of those aged 12 to 18 months in the DNSIYC HS sample consumed breast milk during the four-day diary period, considerably less (although not tested for statistical significance) than in the UK sample, where over 20% of those aged 4 to 9 months, 15% of those aged 10 to 11 months and 8% of those aged 12 to 18 months consumed breast milk. There were no children exclusively breastfed in the DNSIYC HS sample at the time of the survey.

- Thirty per cent of children aged 4 to 11 months consumed whole milk over the survey period with a mean consumption of 175g per day among consumers. This increased to 73% of those aged 12 to 18 months with a mean consumption of 356g per day.

- When tested statistically consumption of total fruit and vegetables was significantly lower in the DNSIYC HS sample compared to the UK sample for both children aged 4 to 11 months (108g vs. 145g) and children aged 12 to 18 months (123g vs. 170g).

- Over the four-day diary period, the proportion of children in the DNSIYC HS sample given a dietary supplement ranged from 6% to 7%. Multi-vitamins were most commonly given. It is not known what proportion were Healthy Start vitamins. These proportions were similar to those seen for the UK sample.

- Mean daily intakes of all vitamins and minerals from all sources (including supplements), were above the Reference Nutrient Intake (RNI) for all age groups with the exception of vitamin D for non-breastfed children aged 12 to 18 months and across both age groups for breastfed children (by any degree of breastfeeding) although these estimates exclude the contribution of breast milk, this is therefore an underestimation of vitamin D intake.

A.3.1 Introduction

The results presented in this chapter derive from the dietary assessment using the four-day food diary and represent a daily average of the days assessed. The survey was designed to start on a random day, such that all days of the week would be equally represented. If the allocated day was inconvenient for parents of participants they were asked to start the following day and if this was not possible, then the next convenient day. This was to offer flexibility in order to maintain high response rates. As shown in Table A.1, there was a greater proportion of Fridays, Saturdays and Sundays in the completed diary days for the DNSIYC HS sample, suggesting that there was a preference to complete diaries at the weekend. This pattern was also seen for the DNSIYC UK sample.

Table A.1 Percentage of records by day of week

Day of Week	Days Recorded	% of total days
Monday	322	14.0
Tuesday	260	11.3
Wednesday	254	11.1
Thursday	292	12.7
Friday	367	16.0
Saturday	408	17.8
Sunday	395	17.2
All	2298	100

For other details about considerations associated with the foods consumed and nutrient intakes in the DNSIYC HS sample, please refer to the main report (sections 6.1 to 6.4). Items of policy interest have been tested at the 95% significance level and only significant differences are discussed in the text. All other comparisons discussed between the DNSIYC HS sample and the main UK sample have not been tested for significance and are therefore only observations.

A.3.2. Foods consumed

Tables A.3.1.1 and A.3.1.2 summarise foods consumed by the DNSIYC HS sample. The commentary provided below relates only to foods relevant to the HS scheme.

A.3.2.1. Milk and milk products

Whole milk was the most commonly consumed type of cow's milk. Thirty per cent of children aged 4 to 11 months and 73% aged 12 to 18 months consumed whole milk in the DNSIYC HS sample. The volume consumed by consumers was 175g per day for the younger age group and 356g per day for the older age group. A small proportion of children consumed semi-skimmed milk, 7% of those aged 4 to 11 months and 16% of those aged 12 to 18 months. This was similar to the UK consumption.

Table A.3.1.1 and A.3.1.2

A.3.2.2. Vegetables and fruit

Tables A.3.1.1 and A.3.1.2 provide results for fruit and vegetable consumption excluding the contribution from composite dishes. This section describes consumption of fruit and vegetables including composite dishes.

Table A.3.1.3 shows the mean consumption of vegetables for the DNSIYC HS sample including non-consumers based on disaggregated data, for children aged 4 to 11 and 12 to 18 months. When tested statistically, vegetable consumption was significantly lower in the HS sample than in the UK sample for both children aged 4 to 11 months (61g vs. 75g) and children aged 12 to 18 months (61g vs. 74g).

Mean daily fruit consumption after disaggregation was 46g for children aged 4 to 11 months and 62g for those aged 12 to 18 months. Fruit consumption was significantly lower in the HS sample than in the UK sample for both children aged 4 to 11 months (46g vs. 70g) and children aged 12 to 18 months (62g vs. 96g).

Mean daily consumption of total fruit and vegetable consumption (not including fruit juice) was 108g for children aged 4 to 11 months and 123g for those aged 12 to 18 months, significantly lower than in the UK for both age groups.

Table A.3.1.1 to A.3.1.4

A.3.2.3. Breast milk and infant formula

Nine per cent of children in the DNSIYC HS sample aged 4 to 11 months consumed breast milk in the four-day diary period, lower than the UK sample (although not tested for statistical significance) where over 20% of this age consumed breast milk. Four per cent of those aged 12 to 18 months in the DNSIYC HS sample consumed breast milk in the diary periods, compared to 8% for the UK sample. The mean daily volume of breast milk consumed estimated from recorded feeding times was higher for those aged 4 to 11 months at 500g compared to 270g per day for those aged 12 to 18 months. There were no children exclusively breastfed at the time of the survey in the DNSIYC HS sample.

There were greater proportions of consumers of 'first milk' (25%), 'hungrier babies milk' (20%) and follow-on milk (45%) for those aged 4 to 11 months than for children 12 to 18 months. There was little consumption of 'growing up milk'; 1% for children aged 4 to 11 months and 18% for those aged 12 to 18 months. These patterns were similar to the UK sample.

Table A.3.1.1 and A.3.1.2

A.3.3. Dietary supplements

Information on consumption of dietary supplements was collected for the HS sample as described in the UK report (section 6.3).

Seven per cent of children in the HS sample aged 4 to 11 months and 6% of those aged 12 to 18 months were given at least one supplement during the four-day diary recording period. The main supplement given to children during the four-day diary period was a multi-vitamin supplement. A higher proportion of parents reported having given at least one supplement to their children during the previous year than had done so in the four-day diary period. Thirteen per cent of children aged 4 to 11 months and 22% of those aged 12 to 18 months had been given a supplement in the past year. The main supplement given to children in the past year was a multi-vitamin supplement. These percentages were similar to those seen for the UK sample. It is not known what proportion of these supplements were Healthy Start vitamins.

Tables A.3.1.5 and A.3.1.6

A.3.4. Nutrient intakes

This section presents daily intakes of energy, macronutrients (protein, fat, carbohydrate, sugars and non-starch polysaccharides) and micronutrients (vitamins and minerals) for the HS sample estimated from the food consumption data, including from the consumption of supplements.

For an explanation on Dietary Reference Values (DRVs) for food energy and nutrients, Reference Nutrient Intakes (RNIs) and Lower Reference Nutrient Intakes (LRNIs) please refer to section 6.4 of the main report. DRVs are provided in Tables 6.19 and 6.28.

Intakes of vitamins and minerals are reported in two ways: 1) intakes from all sources, that is, including supplements as recorded in the four-day food and drink diary; and 2) intakes from food sources only excluding the contribution of supplements, only presented for vitamins covered by Healthy Start supplements (i.e. A, C and D). The proportion of children taking supplements was small, as reported in section A.3.3. The percentage contribution of the major food types to selected minerals are shown.

The commentary in this section refers to mean intakes for the HS sample only. Statistical testing has been done for selected vitamins (A, C and D) in this section at the 95% significance level for two age groups, 4 to 11 months and 12 to 18 months, and these are stated in the text. Any other differences are only observations.

The mean daily intake of total energy[2] for children aged 4 to 11 months was 3.29 MJ (782 kcal) and for children aged 12 to 18 months was 4.07 MJ (967 kcal).

Mean protein intakes were well above the RNI in both age groups[3]. Protein provided 12% of total energy for children aged 4 to 11 months increasing to 15% for children aged 12 to 18 months.

Total fat provided an average of 32% of total energy for children aged 4 to 11 months and 40% for those aged 12 to 18 months. Saturated fatty acids provided 14% of total energy for children aged 4 to 11 months and 18% for children aged 12 to 18 months. Trans fatty acids[4] provided 0.5% or less of total energy across both age groups.

Total carbohydrate provided an average of 51% of total energy for children aged 4 to 11 months and 48% for children aged 12 to 18 months. Total sugars provided 32% of total energy for children aged 4 to 11 months and 24% for those aged 12 to 18 months. Non-milk extrinsic sugars (NMES) intakes increased with age, providing between 6% of total energy for children aged 4 to 11 months and 8% for children aged 12 to 18 months. Intrinsic and milk sugars (IMS) provided an average of 26% of total energy for children aged 4 to 11 months and 17% for those aged 12 to 18 months. For children aged 4 to 11 months, starch provided 19% of total energy and 24% for children aged 12 to 18 months.

Mean daily intakes of non-starch polysaccharides (NSP) provided an average of 5.8g for children aged 4 to 11 months and 6.5g for children aged 12 to 18 months.

Table A.3.2

A.3.4.1. Vitamins

Average daily intakes of vitamins A and C from all sources (including supplements) were above the RNI for all age groups. Average daily intakes of vitamin A were significantly lower in the DNSIYC HS sample compared to the UK sample for children aged 4 to 11 months (854µg vs. 969µg) and children aged 12 to 18 months (599µg vs. 698µg). Daily intakes of vitamin C were significantly lower in the DNSIYC HS sample compared to the UK sample for children aged 12 to 18 months (57mg vs. 62mg). The proportion of children below the LRNI for vitamins from all sources was small.

Mean intakes of vitamin D were below the RNI for non-breastfed children aged 12 to 18 months (53% of the RNI). Mean intakes of vitamin D were below the

RNI for children who were breastfed (by any degree of breastfeeding) excluding the contribution from breast milk for both age groups (about 55% of the RNI), although this is an underestimation of vitamin D intake for this group. There is no LRNI set for vitamin D. Average daily intakes of vitamin D for non-breastfed children were significantly higher for children aged 4 to 11 months in the DNSIYC UK sample (8.7µg) compared to the DNSIYC HS sample (8.5µg). For breastfed children, those children aged 12 to 18 months in the DNSIYC HS sample had a significantly higher mean daily vitamin D intake (3.9µg) than breastfed children of the same age in the UK (2.6µg), although the sample sizes were small.

There was little change in the mean intakes of vitamins A, C and D from food sources only compared to mean intakes from all sources. For those children who were breastfed the average intake of vitamin D from food sources as a percentage of the RNI ranged from 35% of the RNI to 38% of the RNI, slightly lower than the percentage meeting the RNI from all sources. Dietary supplements providing vitamins A and C had no effect on the proportions with intakes meeting the RNI and below the LRNI.

Tables A.3.3.1 to A.3.3.6

A.3.4.2. Minerals

Average daily intakes of selected minerals from all sources (including supplements) were above the RNI for most age groups[5].

The proportion of children with daily intakes of minerals from all sources below the LRNI was low (≤5%), except for iron (12% to 16% below the LRNI across all age groups.

Eight per cent of children aged 4 to 11 months were below the LRNI for sodium. It should be noted that the DRVs set for sodium are based on physiological requirements for children. For this age group the RNI for sodium ranges from 280mg per day for children aged 4 to 6 months up to 500mg per day for children aged 1 to 3 years. The LRNI ranges from 140mg per day for children aged 4 to 6 months up to 200mg per day for children aged 1 to 3 years. The Department of Health (DH) recommends less than 400mg sodium (1g salt) per day for children aged 0 to 12 months and less than 800mg sodium (2g salt) per day for children aged 1 to 3 years[6]. It should be noted that the most reliable estimates of sodium intake are obtained from chemical urinary analysis as estimates derived from patterns of food consumption cannot consider salt added during food preparation.

The major contributor to iron intake for children aged 4 to 11 months was infant formula (providing 51%) followed by the food group ‘commercial infant foods’

(19%). For children aged 12 to 18 months, the main contributor to iron intake was the food group ‘cereals and cereal products’ (40%) followed by infant formula (18%).

Infant formula (29%) was the main contributor to sodium intake for children aged 4 to 11 months followed by the food group ‘cereals and cereal products’ (18%). The food group ‘cereals and cereal products’ (28%) was the main contributor to sodium intake followed by ‘milk and milk products’ (19%) for children aged 12 to 18 months.

Tables A.3.4.1 to A.3.4.4

A.4. Blood analysis

Summary of findings

- Fifteen per cent of children aged 5 to 11 months, and 16% of children aged 12 months or over in the HS sample had haemoglobin concentrations below the lower reference limits.

- The proportion of children with serum ferritin concentrations below the lower reference limits was 10% for those aged 5 to 11 months and 18% for children aged 12 months or over.

- The proportion of children with haemoglobin concentrations and plasma ferritin concentrations below which anaemia is indicated was 2%.

- Four per cent of children aged 5 to 11 months and 3% aged 12 months or over had 25-hydroxyvitamin D (25-OHD) concentrations below the lower threshold for vitamin D adequacy.

A.4.1. Introduction

Results in this section are presented for two age groups, 5 to 11 months and 12 months or over, as the youngest child to provide a blood sample was aged 5 months when the sample was taken. Samples were collected between February and August 2011. The results in section A.3 are based on assessment of food consumption over four days and indicate dietary intake over a short period. Analysis of blood samples provides an indication of the nutritional status of the population usually over a long period. Nutritional status means the concentration of nutrients available to the body (after absorption) for use in metabolic processes and in this age group includes any stores acquired in utero. In DNSIYC, dietary intake therefore cannot be compared directly to nutritional status, as status does not just reflect the intake of nutrients from the diet.

An overview of the purpose, methodologies and other procedures associated with obtaining blood samples from participants, as well as the response rates achieved, are provided in the main report Chapters 1 and 2 and Appendices A and O. Appendix I contains examples of consent forms and Appendix K contains examples of the feedback letters sent to a participant's parent and/or their general practitioner (GP) containing results for reportable analytes measured in the blood sample. Appendix O details the laboratory quality control data and methodology of blood analysis for each analyte described in this report. Details of the nutritional relevance of the blood analytes measured in DNSIYC and the associated thresholds are presented in Chapter 8 of the main report.

A.4.1.2. Obtaining the blood sample

Thirty per cent (n=172) of the HS sample eligible to attend Stage 2[7] (clinic visit) consented to give a blood sample. Of these, blood was attempted but unsuccessful in 21% (n=36) and not attempted in 8% (n=14), mainly due to there being no suitable vein or due to the child being too distressed. A blood sample was therefore successfully obtained in 71% (n=122) of children attending the clinic. Of those from whom a blood sample was obtained, 89% provided a full set of two tubes (EDTA and serum). In total, full blood count (FBC) was successfully measured in 113 children (23% of the DNSIYC HS sample), vitamin D in 109 children (22%), serum ferritin in 109 children (22%) and transferrin receptors in 108 children (22%). In 1% (n=5) of cases where a blood sample was obtained, analysis was unsuccessful for FBC, vitamin D and iron status. The main reason for unsuccessful analysis was insufficient volume of blood obtained.

A.4.1.3. *Representativeness of those HS recipients who gave blood compared to HS recipients in the UK sample*

Information about the UK population distribution of HS mothers by age and geography was provided by Vertex/the Department of Health. This allowed a comparison to be made between the profiles of the HS recipients who provided a blood sample in DNSIYC and HS recipients in the UK population. We compared mothers' age and the geographic distribution.

HS mothers who allowed a blood sample to be taken from their child tended to be slightly older than the UK population; 10% of the HS blood sample members were aged 16 to 19 years and 33% over 30 years, compared with 13% aged 16 to 19 years and 29% aged over 20 years in the UK population. There were also differences by region, although the small overall sample size and small numbers in some categories contributes to this. Overall, the differences are small and the two distributions are generally close. The differences are not large enough to bias the sample and were corrected by the non-response weighting factors.

Table A.4.1

A.4.2. Blood analytes, by age

A.4.2.1 Iron status analytes

For children who provided a serum sample, the mean serum ferritin for those aged 5 to 11 months was 33.6μg/L and was 27.6μg/l for those aged 12 months or over. There were four (12%) children aged 5 to 11 months and five (8%) children aged 12 months or over who were below the age-related lower serum ferritin reference limits.

The mean transferrin receptor concentration was 7.3µg/mL for children aged 5 to 11 months and 9.5µg/mL for children aged 12 months or over. There were four children (10%) aged 5 to 11 months and 10 children (18%) aged 12 months or over who were above the upper transferrin receptor reference.

Haemoglobin was measured as part of the FBC for children who provided an EDTA sample. The mean haemoglobin concentration was similar in each age group, at 11.6g/dL for children aged 5 to 11 months and 11.8g/dL for children aged 12 months or over. There were six (15%) children aged 5 to 11 months and 10 (16%) children aged 12 months or over who fell below the lower haemoglobin reference limit.

Haemoglobin and ferritin, in combination, are considered to be the most useful indicators of iron status[8,9]. In the HS sample one child (2%) aged 5 to 11 months and one child (2%) child aged 12 months or over indicated anaemia[10].

Table A.4.2.1

A.4.2.2. Vitamin D

For children who provided a serum sample, the mean 25-OHD concentration for those aged 5 to 11 months was 66.4nmol/L and 63.6nmol/L for those aged 12 months or over. Only one child (4%) aged 5 to 11 months and two children (3%) aged 12 months or over were below the lower 25-OHD reference limit.

Table A.4.2.2

References and endnotes

[1] http://www.healthystart.nhs.uk/

[2] There was no Stage 2 in the Scotland boost and so Scotland boost participants receiving Healthy Start vouchers are excluded from any analyses related to response at Stage 2.

[3] 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

[4] Trans fatty acids are derived from two sources in the diet: those that occur naturally in meat and dairy products of ruminant animals, and those produced artificially through food processing.

[5] The consumption of dietary supplements was small therefore the contribution of dietary supplements to mean vitamin intakes was nominal and does not differ from food sources alone, therefore mineral intakes from all sources only is presented in this section.

[6] Scientific Advisory Committee on Nutrition (SACN). *Salt and Health*. The Stationery Office (London, 2003). Available online: http://www.sacn.gov.uk/pdfs/sacn_salt_final.pdf

[7] Scotland boost not included (n=499) because Scotland was a dietary survey only.

[8] World Health Organization. Centers for Disease Control and Prevention. Assessing the Iron Status of Populations. Geneva: WHO, 2004.

[9] Endorsed by the Committee on Medical Aspects of Food and Nutrition Policy (COMA) in 1994.

[10] The number of participants with haemoglobin and ferritin results differed. The base for haemoglobin was used to calculate the percentage of children indicating anaemia.