

## Appendix B: Methodology for Years 5 and 6 of the NDNS RP

### B.1 Overview of methodology

This chapter provides an overview of methodology for Years 5 and 6 of the NDNS RP.

In order to meet the aims of the survey (see Introduction to main report) a sample of people representative of the UK population aged 1.5 years and over was required. This sample was drawn from the Postcode Address File (PAF),<sup>i</sup> a list of all the addresses in the UK. In order to improve cost effectiveness, the addresses were clustered into Primary Sampling Units (PSUs), small geographical areas, based on postcode sectors, randomly selected from across the UK. A list of addresses was randomly selected from each PSU.

Information describing the purpose of the survey was posted to all selected addresses. This was followed by a face-to-face visit by an interviewer to each address to recruit participants in the eligible age range(s). The survey aimed to collect data from a UK representative core sample of 1,000 people per year, 500 adults (aged 19 years and over) and 500 children (aged 1.5 to 18 years). In order to achieve (as far as possible) equal numbers of adults and children in the sample, at some addresses only children were selected to take part. Extra addresses were selected in Wales (Years 5 and 6) and Northern Ireland (Year 6 only) to boost the sample size in these countries and enable comparisons to be made between the UK countries.

At each address, the interviewer enumerated the number of households and, in cases where there were two or more, randomly selected one for the NDNS RP. From each selected household the interviewer randomly selected up to one adult and one child to take part in the survey. These are known as *participants*.

The first stage of the survey comprised a face-to-face Computer Assisted Personal Interview (CAPI) with each participant (or in the case of a young child, their parent or guardian<sup>ii</sup>), completion of a four-day food diary by the participant, measurements of height and weight and collection of a spot urine sample (aged four years and over in Year 6 only). The interviewer also collected information on shopping and food preparation practices and facilities in the household by additionally interviewing the *Main Food Provider* (MFP)<sup>iii</sup> of the household where this was not a selected participant. The MFP was the person who was best placed to answer questions about food purchased and prepared for the participant(s). The interview also identified the *Household Reference Person* (HRP)<sup>iv</sup> in each household and asked questions about

housing tenure, as well as his or her employment, to determine the socio-economic classification of the household.<sup>v</sup>

Participants who took part in the CAPI interview and completed a food diary for at least three days were classified as ‘*fully productive*’ and were invited to take part in the second stage of the survey.<sup>vi</sup> This involved a visit from a nurse to take further physical measurements and a blood sample.<sup>vii</sup> In addition, a sub-sample of participants were recruited for a Doubly Labelled Water (DLW) sub-study to measure energy expenditure.

## B.2 Sample design

### B.2.1 Selecting addresses

The sample was drawn from the PAF. In Years 5 and 6 combined, a total of 8,879 addresses were selected from 296 PSUs. This included “country boosts” in Wales (Years 5 and 6) and Northern Ireland (Year 6 only).<sup>viii</sup> The address sample was drawn as follows:

	Year 5	Year 6	Years 5 and 6 combined
Core UK sample	3,240 addresses in 120 PSUs	3,360 addresses in 120 PSUs	6,600 addresses in 240 PSUs
Wales “country boost”	486 addresses in 18 PSUs	504 addresses in 18 PSUs	990 addresses in 36 PSUs
Northern Ireland “country boost”	-	560 addresses in 20 PSUs	560 addresses in 20 PSUs

In each PSU, a number of addresses (27 in Year 5, 28 in Year 6) were randomly selected. At each address, the interviewer established the number of households and, in cases where there were two or more, selected one household at random.

### B.2.1 Selecting participants

As only around one-third of households contain children, over-sampling of children was required in order to achieve equal numbers of adult (19 years and over) and child (1.5 to 18 years) participants each year. Selected addresses were randomly allocated to one of two groups to determine whether an adult (aged 19 years or over) and a child (aged 1.5 to 18 years), or a child only, were selected for interview. At 9 of the selected addresses the interviewer selected one adult and, where present, one child for inclusion in the survey (“basic” addresses). The remaining addresses (18 in Year 5, 19 in Year 6) were for a “child boost” and the interviewer only carried out interviews in households with children. In households containing

more than one eligible person (adult and/or child), interviewers selected the participant(s) using a random selection procedure.

### B.3 Ethics approval

Ethics approval for the study was obtained from the Cambridge South NRES Committee (Ref. No. 13/EE/0016).<sup>ix</sup> The letters of approval for the original submission and subsequent substantial amendments, together with approved documents, were sent to all Local Research Ethics Committees (LRECs) covering areas where fieldwork was being conducted. Research governance<sup>x</sup> approval was sought for all participating NHS laboratories and obtained where required by the Research and Development (R&D) Committee for each laboratory.

### B.4 Fieldwork

Year 5 and Year 6 fieldwork was issued monthly to interviewers and nurses in the following quarters:

	<u>Interviewers (Stage 1)</u>	<u>Nurses (Stage 2)</u>
<u>Year 5</u>		
Quarter 1	April-June 2012	July-September 2012
Quarter 2	July-September 2012	October-December 2012
Quarter 3	October-December 2012	January-March 2013
Quarter 4	January-March 2013	April-June 2013
<u>Year 6</u>		
Quarter 1	April-June 2013	July-September 2013
Quarter 2	July-September 2013	October-December 2013
Quarter 3	October-December 2013	January-March 2014
Quarter 4	January-March 2014	April-June 2014

Stage 1 fieldwork commenced on the first weekday of the month, and interviewers were given six weeks in which to complete their assignment. Stage 2 fieldwork for a particular month started six weeks after the interviewer deadline (for example, Year 6 interviewers completed April assignments by mid-May 2013 and nurse visits to these participants started in July 2013). Nurses had up to seven weeks to complete their work.

## B.5 Overview of survey components and fieldwork procedures

There were two stages to the survey:

### *Stage 1: Interviewer visit:*

- Four-day food diary
- Detailed background interview
- Interview with MFP
- Height and weight measurements
- Smoking and drinking self-completion questionnaires
- Physical activity self-completion questionnaire
- Collection of spot urine sample (Year 6 only)
- DLW sub-study (Year 6 only)

### *Stage 2: Nurse visit:*

- Blood sample
- Physical measurements<sup>xi</sup>: waist and hip, demispan, mid upper arm circumference (MUAC)<sup>xii</sup> and infant length
- Blood pressure
- Collection of information about prescribed medicines
- 24-hour urine collection (Year 5 only)

### B.5.1 Stage 1: the interviewer visits

A letter and leaflet describing the purpose of the survey was sent to all sampled addresses before the fieldwork start date. A few days later, interviewers visited the addresses to determine whether the address was private, residential and occupied. They then carried out the selection process and, for children aged under 16 years, sought both the child's and their parent's (or guardian's) consent to interview.

Interviewers carried out three main visits to households who agreed to participate:

- **Visit 1:** Four-day food diary explained to the participant and left with them to complete; interviewer-administered CAPI; height and weight measurements; collection of spot urine sample (Year 6 only); self-completion booklets in which children and young people were asked to record their smoking and drinking habits. Participants aged 16 years and above were asked to fill in a self-completion questionnaire designed to collect information about physical activity (the Recent Physical Activity Questionnaire (RPAQ)).<sup>xiii,xiv</sup>
- **Visit 2:** The diary check up visit, where the interviewer reviewed the completion of the four-day food diary so far and filled in any missing information with the participant.
- **Visit 3:** Review and collection of four-day food diary, RPAQ self-completion and further CAPI questionnaire administration.<sup>xv</sup>

At the end of the third main interviewer visit, interviewers gave each participant completing at least three food diary recording days a token of appreciation (£30 in high street vouchers). Interviewers then introduced the second stage of the survey, asking for permission for the nurse to visit. In addition in Year 6, a sub-sample of participants was recruited for a DLW sub-study to measure energy expenditure.

Further details about information collected during the interviewer stage (and the fieldwork documents used) can be found in appendices C to F.

#### *Computer Assisted Personal Interview (CAPI) programme*

CAPI interviewing involves the interviewer reading questions from a laptop screen and entering the participants' responses into designated fields. The CAPI questionnaire had three main elements: household composition/ structure interview, MFP interview and individual interview. The individual questionnaire, asked of each selected participant, had two parts: Part 1, which was asked at the first main interviewer visit; and Part 2, which was asked at the third main visit after the interviewer collected the food diary.

The content of the CAPI questionnaires is shown in appendix D.

#### *Collection of dietary data: the four-day food diary<sup>xvi</sup>*

Based on the day of the first individual CAPI interview, the interviewer's laptop program selected four consecutive days as the food diary recording period. Participants were provided with a diary and asked to keep a record of everything they ate and drank over these four days, both in and outside the home. Interviewers carried out a food diary check visit with participants on the second or third day of recording either in person or, where a visit was not possible, over the telephone, with the aim of collecting missing detail for foods recorded, improving recording for the remaining days and also providing encouragement to participants to continue recording. Interviewers then returned to collect the diary and check the remaining days no later than three days after the final day of recording.

As participants were not expected to weigh their food and drink, portion sizes were estimated using household measures (eg two thick slices of bread, four tablespoons of peas) or using weights from labels (eg 420g tin of baked beans, 330ml can of lemonade). Those aged 16 years and over were also able to describe their portion size using photographs of 10 frequently consumed foods reproduced in the diary. For those aged under 16 years, age-appropriate food photograph atlases were used. The atlases presented a range of served and leftover portion sizes for 10 commonly consumed foods for which portion size estimation is difficult. Most photographs could be used to estimate amounts for other foods in addition to the actual foods shown e.g. photos of rice could also be used for couscous. These alternatives were listed on a separate card - the Equivalent Foods List (EFL). When reviewing the diaries, interviewers asked participants to select the appropriate portion sizes for all diary entries represented in the atlas.

A parent was asked to keep the food diary on behalf of participants aged 11 years and younger, with the child contributing information where possible and with help from other carers.

Appendix A provides full details of the dietary data collection and processing protocols.

#### *Selection of food diary start day*

The study design aimed to give an even representation of diary days on all days of the week so the food diary could start on any day of the week and run for four consecutive days. The diary start day for each participant was assigned by the CAPI program but could be changed by the interviewer if the participant preferred a different day.

Results in this report are based on dietary assessment using a four-day estimated food diary and represent a daily average of the days assessed.<sup>xvii</sup> The survey is designed so that all days of the week were evenly represented (see endnote 16 in the main report).

#### *Spot urine sample*

Spot urine samples were collected in order to provide an assessment of iodine levels in the UK population. Participants aged four years and over were asked to provide a small sample of urine in a sterile container (a 'spot urine sample') after reading the relevant information leaflets and providing written consent.<sup>xviii</sup>

### **B.5.2 Stage 2: the nurse visit**

Stage 2 of the survey was carried out by a qualified nurse and took place within two to four months of the final interviewer visit. All individuals completing three or four food diary days were eligible for a nurse visit.

At the end of Stage 1, interviewers provided participants with information leaflets giving details of the nurse visit. Nurses could provide these again if necessary. The nurse asked questions about prescribed medications before taking, with agreement, a number of physical measurements.

#### *Measurements taken by the nurse*

A summary of the information collected during the nurse stage is provided below. Some of the information collected by nurses was limited to particular age groups.

<b>Measurement or procedure</b>	<b>Participant</b>
Details of prescribed medications	All ages
Blood pressure	Aged four years and over
Infant length measurement	Aged 18 to 23 months

Waist and hip circumferences	Aged 11 years and over
Demispan	Aged 65 years and over and those aged 16 to 64 years where height could not be measured
MUAC	Aged 2 to 15 years (Year 5 only) <sup>xii</sup>
Non-fasting blood sample	Aged 1.5 to 3 years and people with diabetes not willing to fast
Fasting blood sample	Aged four years and over
24-hour urine collection	Aged four years and over, fully out of nappies (Year 5 only) <sup>xix</sup>

The nurse fieldwork documents are provided in appendices G and H. Measurement protocols are provided in appendix L.

### *Blood sample*

After providing the physical measurements, participants were asked whether they were willing to give a small blood sample by venepuncture after an overnight fast (those aged 1.5 to 3 years and people with diabetes not willing to fast were asked whether they were willing to provide a non-fasting blood sample). The nurse obtained written consent from the participants aged 16 years and over before the sample was taken. For children aged 1.5 to 15 years, written consent of a parent or guardian was required and nurses additionally obtained the assent of the child where possible. For those aged 10 years or younger, blood was taken by a paediatric phlebotomist who accompanied the nurse on the visit.<sup>xx</sup> Nurses also sought written agreement to store part of the blood sample for additional analyses at a future date. Participants who provided a blood sample were given high street vouchers (£15 in Year 5, £20 in Year 6) as a token of appreciation for agreeing to this part of the study.<sup>xxi</sup>

## **B.7 Feedback to participants and GPs**

Participants who completed three or four food diary recording days were asked whether they would like to be sent feedback on the analysis of their diary and how this compared to nutrient intake recommendations. The feedback also included general information on sources of healthy eating advice. Further information about the dietary feedback can be found in appendix A and an example of the dietary feedback is provided in appendix I.

Each participant was also given a 'Measurement Record Card' on which the interviewer and nurse recorded the person's height, weight, body mass index (BMI) (if aged 16 years and over), blood pressure (if aged four years and over) and other age-dependent anthropometric measurements: waist and hip circumferences (if aged 11 years and over); MUAC (aged two to 15 years – Year 5 only); demispan measurement (if aged 65 years and over) and infant length (if aged 18 to 23 months). Participants who provided a blood sample were asked whether they wished to be sent results of the blood sample analyses most related to their health. Participants were asked if they wanted details of these analyses, their BMI and their blood pressure readings to be sent to their GP. If they did, written consent was obtained from the individual (or from the parent/guardian in the case of a child). See Appendix I for an example of feedback to GPs.

## B.7 Fieldwork quality control

### B.7.1 Project specific training for interviewers and nurses

Fieldwork in England, Scotland and Wales was carried out by NatCen's panel of interviewers and nurses. In Northern Ireland, fieldwork was carried out by interviewers and nurses working for the Northern Ireland Statistics and Research Agency (NISRA).

All interviewers and nurses working on the NDNS RP were briefed and trained before undertaking an assignment and were monitored during their assignment. Fieldworkers were also issued with comprehensive written instructions covering survey procedures and measurement protocols.

### B.7.2 Training for interviewers

All new-to-NDNS RP interviewers (and those who had not worked on the study in the previous fieldwork year) attended a one and a half day training course where they were fully briefed on the protocols and administration of the survey. Interviewers who had worked on the previous survey year attended a one-day refresher briefing.

The full and refresher briefing sessions covered background and content, doorstep approach, questionnaire administration (including practice sessions), placement and collection of self-completions and the placement, checking and collection of the four-day food diaries. Interviewers also attended an annual 'accreditation' session which provided training and assessment on taking consistent, accurate height and weight measurements.

After the briefing, "early work" checks were carried out on the first two or three food diaries returned by each interviewer with timely feedback provided on any areas of concern. Before working on a second or subsequent assignment, all interviewers



received feedback on the diaries from their previous assignment. Further, any interviewer who had more than three months gap between assignments completed their own two-day diary which was reviewed and comments fed back.

### B.7.3 Training for nurses

Nurse briefings lasted one and a half days and covered equipment training, blood sampling and questionnaire administration (including practice sessions). Nurses were also briefed on 24-hour urine collection protocols (Year 5 only) and the demispan, MUAC (Year 5 only) and infant length measurement protocols (i.e. the physical measurements less regularly taken on other surveys). All other physical measurements were either regularly taken by nurses on the NDNS RP and other NatCen surveys or the newer nurses attended a general training session which covered these protocols. From Year 6, nurses also attended an annual 'accreditation' session which provided training and assessment on taking consistent and accurate waist and hip and demispan measurements.

Nurses who had a gap of three months or more between assignments and new-to-NDNS RP nurses completed three homework exercises (covering blood sample tube labelling, urine collection protocols and consents/blood and urine despatch) which were marked and individual feedback given to each nurse.

## B.8 Weighting the survey data

It is necessary to apply weighting factors to the data collected in the NDNS RP for two reasons: to remove any bias in the observed results which may be due to differences in the probability of households and individuals being selected to take part; and to attempt to reduce non-response bias.

The survey was designed so that no more than one adult and one child were selected from any one household to take part. This meant that adults living in households with one or more other adults, and children in households with one or more other child were less likely to be selected than were adults or children in single adult/child households.

In addition, the multi-stage design means there were a number of stages in the survey where it was possible for participants to drop out. If the people who refused to participate at a particular stage were systematically different from those who took part then the sample would be biased.

Weighting factors were used to correct for both these cases. There were two stages to the weighting scheme: the first was to generate a set of design weights to correct for the unequal selection probabilities; and the second was to create a set of weights to adjust for

non-response. The final weights were a product of the selection weights and the non-response weights.

The sample design includes an adjustment for selecting more addresses in Wales (Years 5 and 6) and Northern Ireland (Year 6 only). All of the addresses in these countries, and therefore participants, are weighted down as a result. The applied weights puts the four countries into their correct population proportions in the UK so that, for example, the percentage of the NDNS RP sample in Wales is the same as the percentage of the UK population that is in Wales.

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<sup>i</sup> The sample was drawn from the 'small users' sub-file of the Postcode Address File (PAF), a computer list, prepared by the Post Office, of all the addresses (delivery points) which receive fewer than 25 articles of mail a day.

<sup>ii</sup> A guardian is defined as a person with legal responsibility for the child.

<sup>iii</sup> The Main Food Provider (MFP) is the person in the household with the main responsibility for shopping and preparing food. If these tasks were shared equally between two people, for example if one person did all the shopping and another person did all the cooking, then either resident could be classified as the MFP.

<sup>iv</sup> The 'Household Reference Person' (HRP) was defined as the householder (a person in whose name the property is owned or rented) with the highest income. If there was more than one householder and they had equal income, then the eldest was selected as the HRP.

<sup>v</sup> Questions were asked to ascertain whether the HRP was in paid work at the time of the interview and, if not, whether they had ever had a paid job. If the HRP had ever worked, there were further questions about their current or most recent job in order to classify HRPs into the National Statistics Socio-economic Classification (NS-SEC) groupings.

<sup>vi</sup> The majority of participants completed four days of the food and drink diary. Only 2% (n=46) completed three days.

<sup>vii</sup> In Year 5 only, participants aged four years and over who were fully out of nappies were asked to provide a 24-hour urine collection.

<sup>viii</sup> The sample was boosted in Wales in Years 2-5 and 6-9 and in Northern Ireland in Years 1-4 and 6-9.

<sup>ix</sup> This covered Years 6 to 9 of the RP. Ethical approval for Years 1 to 5 was obtained from the Oxfordshire A Research Ethics Committee (Ref. No. 07/H0604/113).

<sup>x</sup> The Research Governance Framework is intended to define the broad principles of good research practice, and to ensure that health and social care research is conducted to high scientific and ethical standards.

<sup>xi</sup> See section B.5.2 for age ranges for each physical measurement.

<sup>xii</sup> This measurement was discontinued after Year 5 due to the absence of cut offs appropriate to the UK population.

<sup>xiii</sup> Based on the Recent Physical Activity Questionnaire developed by the MRC Epidemiology Unit, Cambridge.

<sup>xiv</sup> Children aged under 16 years were asked about physical activity during the CAPI interview.

<sup>xv</sup> Height and weight measurements and spot urine collection could also be carried out at this visit if not possible at visit 1.

<sup>xvi</sup> Appendix X of the UK Years 1 to 4 combined report includes a consideration of the methodological issues and limitations of self-reported measures of food intake which should be borne in mind when interpreting findings.

<sup>xvii</sup> Participants with dietary data for at least three days were included in the analyses (only 46 of the 2,546 participants had three rather than four days of dietary data).

<sup>xviii</sup> Individuals using a urinary catheter, females on their period and children aged 4 and over who are not dry during the day were excluded from providing a sample.

<sup>xix</sup> After Year 5, 24-hour urines were not collected as part of the NDNS RP interview. Instead, standalone studies were carried out in England and Scotland in 2014 and Northern Ireland (2015) have been reported on separately.

<sup>xx</sup> Nurses qualified and experienced in paediatric phlebotomy took blood samples from children. Protocols and procedures are in line with official RCN guidelines. Ref: RCN (2013). An education and training competence framework for capillary blood sampling and venepuncture in children and young people, RCN London. ISBN 978-1-908782-56

<sup>xxi</sup> In Year 5, participants providing a 24-hour urine sample were given a £10 voucher.