BCS70 technical report

Age 46 Survey

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1 Introduction

1.1 The 1970 British Cohort Study – Age 46 Survey

The 1970 British Cohort Study (BCS70) is one of Britain's world famous national longitudinal birth cohort studies, three of which are run by the Centre for Longitudinal Studies (CLS) at the UCL Institute of Education.

Britain has a unique tradition of carrying out national birth cohort studies, following the same group of people from birth into and through adulthood, and providing a picture of whole generations. There are four such surveys, of which the BCS70 is the third:

- National Survey of Health and Development (following those born in 1946)
- National Child Development Study (following those born in 1958)
- 1970 British Cohort Study (following those born in 1970)
- Millennium Cohort Study (following those born in 2000)

In addition, Next Steps, also run by CLS, follows those born in 1990 but started in 2004 when participants were 13-14.

Each follows a large number of individuals born at a particular time through the course of their lives, charting the effects of events and circumstances in early life on outcomes and achievements later on. The questions on health, education, family, employment and so on are put together by academic researchers and policy makers to understand and improve life in Britain today and in the future.

This report provides an account of the design, development and conduct of the Age 46 Survey which took place in 2016-2018.

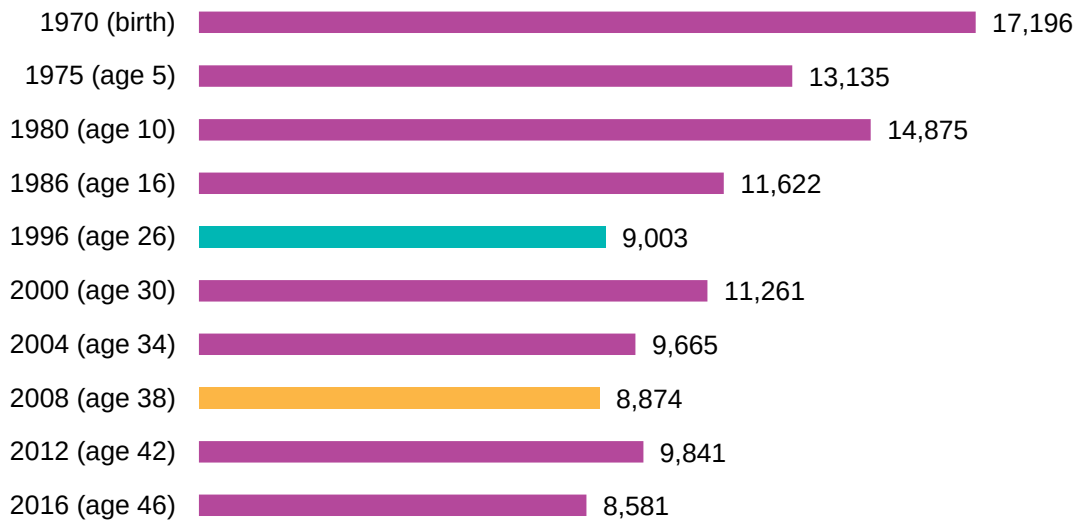
1.2 Background to the study

BCS70 began when data were collected about the births and families of 17,196 babies born in the UK during one week in April 1970. Since then, there have been eight surveys gathering information from respondents living in England, Scotland and Wales. With each successive attempt, the scope of enquiry has broadened from a strictly medical focus at birth, to encompass physical and educational development at age five (1975), physical, educational and social development at ages ten (1980) and sixteen (1986), and then to include economic development and other wider factors at age 26 (1996), 30 (1999/2000), 34 (2004/2005) 38 (2008/2009) and 42 (2012/2013).
The Centre for Longitudinal Studies (CLS) at the Institute for Education, University College London, (and formerly the Social Statistics Research Unit at City University), has been responsible for the study since 1991. The study is core-funded by the ESRC (the Economic and Social Research Council). Additional funding for the Age 46 Survey was supplied the MRC (Medical Research Council) and the British Heart Foundation. NatCen Social Research in collaboration with CLS were responsible for the development, fieldwork and initial data preparation for the Age 46 Survey.

1.3 Participation by sweep

The chart below shows the number of interviews achieved at each sweep of BCS70. All sweeps were conducted face to face with the exception of the age 26 sweep (postal) and the age 38 sweep (telephone).

Figure 1:1 Number of interviews per sweep of BCS70



1.4 Ethical approval

The Age 46 Survey, including the collection of blood, was approved by the Health Research Authority's London - Central Research Ethics Committee.

2 Survey design

2.1 Introduction

The aim of the Age 46 Survey was to collect key details of the cohort members' lives including their socio-economic circumstances (e.g. household composition, cohabiting relationships, housing, economic activity, and income) and their health (physical health, mental health, medication, and health behaviours). This survey also had a biomedical focus, as physical measurements and assessments were conducted for the first time in the cohort members' adulthood. Respondents were aged between age 46 and 48 when they took part in the survey.

The Age 46 Survey involved the following elements:

- Advance paper self-completion questionnaire
- CAPI interview (including CASI self-completion section and cognitive assessments)
- Biomeasures (height, weight, bodyfat, hip circumference, waist circumference, blood pressure, grip strength, balance, collection of blood sample)
- Accelerometry – physical activity measured for 7 days
- Online dietary questionnaire

2.2 Initial design: nurses only (Waves 1-3)

The initial approach taken for the Age 46 survey was to use nurses to conduct all aspects of the data collection, including making initial contact with participants and conducting the interview. This was different to the 'standard' approach to collecting biomeasures used on other NatCen studies, where interviewers make initial contact and carry out the interview before passing on the case to a nurse for the biomedical measures to be conducted.

This approach was used for the first three waves of fieldwork. However, it became apparent that the nurses were achieving a lower response rate than had been achieved in previous sweeps of BCS70. Various steps were carried out to investigate the issue and attempt to improve response. It was theorised that the nurses might be less able or willing than interviewers to make the necessary contact attempts with respondents or to encourage reluctant respondents to participate in the survey. In addition to the low response rate, the relatively small size of the nurse panel meant that fieldwork was not being covered at the required rate and was falling considerably behind timetable. At the outset it had been envisaged that participants would appreciate being able to complete both the interview and the biomeasures in a single visit as this would have been more convenient. However, it was perhaps the case that actually the perceived burden of agreeing to a 100 minute visit was off-putting, particularly to those who were less keen to take part in the biomeasures.

Because of these issues of coverage and response, it was decided to trial a new approach in wave 4 of the survey.

2.3 Revised design: interviewers and nurses (Waves 4-8)

Wave 4 was used as a pilot study which sought to evaluate using interviewers to make initial contact and conduct the interviews. Two different approaches were trialled:

- Using interviewers to make contact and interview all respondents.
- Continuing to use nurses to conduct all aspects of data collection for the majority of cases but to use interviewers to make initial contact and carry out interviews with a subset of participants identified as likely to be more difficult to contact or to persuade to take part.

Where interviewers were used they completed the CAPI interview, CASI and cognitive assessments, as well as placing and collecting the paper self-completion. On completion of the interview, respondents were asked if they were happy to be contacted by a nurse for a second visit. Nurses completed the biomeasures and placed the activity monitor and online dietary questionnaire. Nurses also collected names of medications and completed drug coding. In the initial design the medication section appeared in the "health" module in the interview, but in the revised design it was moved to the beginning of the blood pressure module.

The response rates, costs, and practical issues of the two different approaches were compared and based on this it was decided that all further interviews in England and Wales should be conducted by an interviewer, with a nurse follow up visit to collect the biomeasures. The pilot indicated that this would deliver the highest interview response rate which was the key objective of the survey. This approach would also ensure that fieldwork coverage targets could be achieved so that fieldwork could be completed in a reasonable timeframe.

Due to the lack of interviewer availability in Scotland it was not possible to change the design there. Therefore, the original design of nurses carrying out all the data collection was continued throughout the whole fieldwork period in Scotland. In addition, a large proportion of wave 5 cases in England and Wales (called wave 5a) were issued to nurses rather than interviewers, so that fieldwork could continue whilst the new field processes were put into place.

3 Sample design

3.1 Introduction

In the first sweep of BCS70 all babies born in the UK during one week in April 1970 were selected. During the surveys at ages 5, 10 and 16, the cohort was augmented by additional children who were born outside Great Britain, but within the target week in 1970, and subsequently moved to and were educated within Britain. Individuals from Northern Ireland, who had been included in the birth survey, were not followed-up in subsequent sweeps (unless they moved to England, Scotland or Wales by the age of 16).

3.2 Issued sample for the Age 46 survey

The issued sample for the Age 46 survey consisted of 12,368 cohort members in total. 204 of these cohort members were allocated to the dress rehearsal, and the remaining 12,164 were only allocated to the mainstage. As the data collected in the dress rehearsal was very similar to the mainstage it has been possible to merge the two datasets together.

Forty four cohort members that were originally issued but were unproductive in the dress rehearsal were then issued to the mainstage sample, meaning that the original issued mainstage sample consisted of 12,208 cohort members. Twenty seven cohort members were removed from the sample before fieldwork started, due to them being ineligible, and a further 11 cases that had been traced were added to the total issued sample meaning that 12,192 cases were issued to the mainstage in total.

The majority of those issued had been interviewed in the Age 42 survey (in 2012), but there were a considerable proportion (7%) who had not been interviewed since childhood.

Table 3:1 Sweep of last interview of all cases issued in the Age 46 Survey

	N	*%*
1970 (birth)	59	*1*
1975 (Age 5)	51	*<1*
1980 (Age 10)	339	*3*
1986 (Age 16)	347	*3*
1996 (Age 26)	153	*1*
2000 (Age 30)	388	*3*
2004 (Age 34)	541	*4*
2008 (Age 38)	740	*6*
2012 (Age 42)	9,574	*79*
Total	*12,192*	*100*
Base: *all issued mainstage sample*		

3.3 Sample structure

The mainstage sample was examined to identify 'likely movers' and 'likely refusals'. Together these cases were categorised as "difficult" cases.

A cohort member was considered a likely mover if:

- they had a status of 'gone away' on CLS's database (meaning that CLS had established that the cohort member no longer lived at the issued address); or
- they had an address status of "unconfirmed" – meaning that CLS had not confirmed the address of a cohort member; or
- they had a status of 'confirmed' but were non-contacts or not issued at the Age 42 survey (in 2012) and had not confirmed their contact details with CLS since 2012; or
- they were traced through HSCIC records.

A cohort member was considered a likely refusal if:

- they refused at the Age 42 survey (in 2012); or
- they had refused at the Age 38 survey (in 2008) and had not taken part in the Age 42 survey (in 2012).

Using this classification, 1,584 cohort members were designated as likely movers and 1,009 as likely refusals. However, there was some overlap between these groups. Where a cohort member was both a likely refusal and a likely mover, they were treated as a likely refusal when it came to allocating sample to waves. The total number of cases identified as difficult was 2,105.

3.4 Serial numbers

Each BCS70 cohort member has a unique serial number that was allocated at the beginning of the study. In order to facilitate fieldwork management and data processing, and to increase confidentiality, each cohort member was allocated a unique NatCen serial number, specific to this sweep of fieldwork. The NatCen serial number was used on all letters (advance letters, tracing letters, thank you letters) as well as paper self-completion questionnaires, consent forms, and other documents.

3.5 Allocating the sample to waves

3.5.1 Original sample

Before fieldwork, CLS delivered an original sample file containing 12,154 cases. To help manage fieldwork, the original sample was allocated to eight waves. A lower proportion of cases identified as difficult were allocated to wave 1, as it was thought that nurses would be better placed to persuade more reluctant respondents to take part if they had already had experience of completing an 'easier' wave 1 assignment. A higher proportion of cohort members identified as "difficult" were allocated to waves 2 to 5, in order to allow for more time to trace these cohort members.

The rest of the sample was allocated to waves based on the most efficient geographical clustering. Earlier waves included more cohort members than waves 7 and 8. However, some cases were moved to a different wave during fieldwork (see section 3.5.3).

3.5.2 Cases traced through the NHS

The sample file contained 528 addresses that had been traced using the NHS central register shortly before fieldwork began. Of these addresses, 150 (29%) resulted in a productive interview.

A further NHS tracing exercise was completed towards the end of fieldwork. NatCen provided a file containing potential movers. CLS received permission to trace the addresses in May 2018 and sent 1,370 cases to match on to NHS records. The exercise resulted in 247 potential new addresses. These new addresses were then sent back out to field, and 36 cases resulted in a productive interview. Further detail relating to movers can be found in Section 8.5.

3.5.3 Number of cohort members in each wave

Originally, cohort members were allocated to 8 waves. The table below shows the number of cohort members allocated to each wave, and the proportion of "difficult" cases in each.

Table 3:2 Number of cases in each ORIGINAL wave

	Non-difficult		*Difficult*		*Total*
	N	*%*	*N*	*%*	
Wave 1	1,458	87	214	13	1,672
Wave 2	1,390	76	450	24	1,840
Wave 3	1,444	78	396	22	1,840
Wave 4	1,430	79	371	21	1,803
Wave 5	1,391	78	385	22	1,776
Wave 6	1,242	87	178	13	1,420
Wave 7	1,287	94	82	6	1,369
Wave 8	459	94	29	6	488
Total	*10,101*	*83*	*2,104*	*17*	*12,208*

Base: all originally issued cases (including the 27 that were removed before being issued to field, and not including 11 cohort members added to the sample during fieldwork).

Due to the difficulties with coverage, some cases were moved between waves during fieldwork. After the interviewer pilot in wave 4 (see section 7.3), new waves were added:

- Wave 5 was split into two waves:
    - Wave 5a: included cases issued to nurses that were able to work them (original fieldwork design) so that fieldwork could continue whilst the new field processes were put into place for the interviewer-first fieldwork design.
    - Wave 5b: interviewer first: An interviewer made initial contact with the cohort member and completed the first half of the interview, including the Computer Assisted Self-completion (CASI) and the cognitive assessments. A separate appointment was then arranged by a nurse, in order to collect the biomeasures.
- Waves SC5-SC8: The original "nurse-only" fieldwork model was continued in Scotland, so Scottish fieldwork was divided into separate waves.

Table 3:3 Difficult cases in each final wave					
	Non-difficult		*Difficult*		*Total*
	N	*%*	*N*	*%*	*N*
Wave 1	1,475	88	197	12	1,672
Wave 2	1,249	76	395	24	1,644
Wave 3	1,138	78	320	22	1,458
Wave 4	1,181	81	272	19	1,453
Wave 5a	367	80	92	20	459
Wave 5b	1,032	81	239	19	1,271
Wave 6	1,118	85	193	15	1,311
Wave 7	1,176	89	148	11	1,324
Wave 8	1,014	89	132	11	1,146
Wave SC5	102	81	24	19	126
Wave SC6	114	86	18	14	132
Wave SC7	106	77	32	23	138
Wave SC8	39	67	19	33	58
Total	*10,111*	*83*	*2,081*	*17*	*12,192*
					Base: all issued mainstage sample

Table 3:4 Number of cases in each final wave, by fieldwork model of finalissue of each case					
	Interviewer first		*Nurse-only*		*Total*
	N	*%*	*N*	*%*	*N*
Wave 1	0	0	1,672	100	1,672
Wave 2	0	0	1,644	100	1,644
Wave 3	0	0	1,458	100	1,458
Wave 4	754	52	699	48	1,453
Wave 5a	0	0	459	100	459
Wave 5b	1,272	100	0	0	1,272
Wave 6	1,312	100	0	0	1,312
Wave 7	1,324	100	0	0	1,324
Wave 8	1,145	100	0	0	1,145
Wave SC5	0	0	126	100	126
Wave SC6	0	0	131	100	131
Wave SC7	0	0	138	100	138
Wave SC8	0	0	58	100	58
Total	*5,807*	*49*	*6,385*	*51*	*12,192*
					Base: all issued mainstage sample

3.5.4 Fieldwork dates

First issue fieldwork for each wave took place between the following dates. The dates for Wave 5b through to Wave 8 include nurse follow-up fieldwork.

Wave 1: 18th July 2016 – 12th September 2016
Wave 2: 6th September 2016 – 28th October 2016
Wave 3: 31st October 2016 – 3rd January 2017
Wave 4: 6th February 2017 – 30th May 2017
Wave 5a: 10th August 2017 – 6th October 2017
Wave 5b: 4th October 2017 – 28th February 2018
Wave 6: 15th November 2017 – 14th April 2018
Wave 7: 25th January 2018 – 4th May 2018
Wave 8: 21st March 2018 – 18th June 2018
Wave SC5: 11th May 2017 – 7th July 2017
Wave SC6: 10th July 2017 – 18th September 2017
Wave SC7: 19th September 2017 – 13th November 2017
Wave SC8: 14th November 2017 - 1st February 2018

3.6 The sample files

CLS was responsible for providing sample information for the cohort members who were to be issued. The original sample that was sent through to NatCen contained all sample members, and included the following information:

- Serial number
- Survey status (i.e. whether case ineligible and why)
- Name
- Sex
- Date of birth
- Address
- Date address first recorded and date address last confirmed
- Telephone numbers and email address
- Partner name and telephone number
- Stable contact details
- Delicate/useful memos
- Outcomes from previous surveys
- Reasons for refusals
- Sweep of last interview
- Address at last interview
- Whether cohort member had known vision, hearing or literacy problems
- Whether last interview was conducted by proxy

3.6.1 Other sample information

"Feed-forward" data files were also delivered to NatCen before the start of fieldwork. These contained the answers cohort members had given to key questions in previous interviews.

Feed forward data included:

- Cohort member's sex after gender reassignment
- Cohort member's sex at birth
- Whether known to have undergone gender reassignment
- Marital status at last interview
- Whether in an unfinished union at last interview – e.g. still married but no longer living with spouse
- Whether cohort member's mother/father was alive at the last interview
- Date moved into address current at last interview
- Housing tenure at last interview
- Economic activity at last interview
- Whether respondent had a period in the 12 months prior to Age 42 survey

- Whether respondent had an oophorectomy or hysterectomy by Age 42 survey
- Whether respondent was having HRT at Age 42 survey
- Whether had a vasectomy or was sterilised at Age 42 survey
- Household grid numbers of children

The feed forward data was provided in two files. One file which included information about the cohort member only, and one hierarchical file with details of all individuals that had lived with each cohort member about whom information had been collected at previous sweeps of the study.

The answers contained in the file were loaded or “fed-forward” into the CAPI questionnaire. For example, the cohort member’s partner’s name and other details were fed forward and the respondent was asked if this was still their partner.

Feed-forward data was also used in question routing. For example, a question such as, “Is your mother still alive” would be routed past if the cohort member had said at a previous interview that their mother had died.

3.7 Sample updates

CLS continued to trace cohort members during fieldwork and also received updated contact details from cohort members during the course of fieldwork. Newly obtained information was sent to NatCen in weekly sample update files. CLS started sending updates through to NatCen five weeks before the start of fieldwork and these were then sent on a weekly basis until two weeks before the end of fieldwork. The following information was included in the sample update files:

- Serial numbers
- Survey status
- Cohort member details (Name, DOB, gender)
- Contact details for the cohort member (address, up to 3 telephone numbers, email)
- Name and mobile number of the cohort member’s partner
- Contact details of up to two stable contacts (family members or friends who could be used to trace cohort members if required).

Section 7.9 gives details of how sample updates were processed by NatCen.

3.8 Return of sample to CLS at the end of fieldwork

NatCen was responsible for updating contact information for cohort members that were interviewed at this sweep of fieldwork and transferring this updated information to CLS at various key points during the course of fieldwork (with a final file delivered after fieldwork had finished). Updated contact information was also supplied, where possible, for cases who were not interviewed at this sweep – this was provided after fieldwork had finished.

4 Overview of BCS70 Age 46 Survey Self-completion and CAPI Interview

4.1 Paper self-completion questionnaire

Respondents were asked to complete a paper self-completion questionnaire before their interview. This was posted or given to respondents by the interviewer or nurse when the appointment was made for their first visit. The interviewer or nurse would then collect the completed questionnaire when they interviewed the respondent.

The paper self-completion questionnaire included questions on:

- Feelings, opinions and attitudes
- Physical and mental health
- Physical activities in the home
- Activity at work
- Recreation activities

4.2 The CAPI interview

The CAPI interview was made up of the following modules:

- Household grid – collected details about partnerships, children (including those not in the household) and any other household members,
- Family – asked about non-cohabiting relationships, grandchildren, parents, social contact and social support.
- Housing – collected information on cohort member's housing history and current accommodation.
- Employment – collected information on cohort member's current and previous economic activity. Those in work were asked about their hours and pay.
- Income – collected details on income, savings, investments and debt.
- Education – asked questions about any new educational qualifications gained since the last interview.
- Health – asked questions around physical and mental health and wellbeing, dental health, hospital visits.
- Computer Assisted Self-Interview (CASI) – contained questions about work, relationship satisfaction, partner's health, drinking habits, mental health, life events, children who have died, unsuccessful pregnancies, gynaecological problems, voting, car ownership and life satisfaction.
- Cognitive assessments – 4 short memory and concentration tasks.
- Contact information – updating contact details for cohort member, partner and stable contacts.

4.2.1 Event histories

There were three event histories included in the CAPI interview: a relationship history, a housing history, and an economic activity history.

Cohort members that had been interviewed in the last three sweeps (at either the age 34, 38 or 42 sweeps) were asked to update their relationship situation from the date of their last interview. Cohort members that had not been interviewed in the last three sweeps were asked to update their situation from 1st January 2004.

Cohort members that had been interviewed in the last two sweeps (at either the age 38 or age 42 sweeps) were asked to update their housing or economic situation from the date of their last interview. Cohort members that had not been interviewed in the last two sweeps were asked to update their situation from 1st January 2008.

4.2.2 CASI interview

Towards the end of the main CAPI interview, the cohort member was asked to complete the CASI self-completion section. This lasted around ten minutes and covered more sensitive questions. Cohort members were encouraged to answer this section themselves, but the interviewer or nurse could read the questions to the cohort member if they were not able to do so. At the end of this section, the cohort member was asked to confirm they had completed the section and then "lock" the CASI section so that the answers could not be looked at by the interviewer or nurse, before handing the laptop back to the interviewer or nurse.

4.2.3 Cognitive function tasks

During the CAPI interview, all cohort members were asked to undertake four different cognitive assessments. The tasks were designed to measure different aspects of cognition and have been included in various other studies such as the National Child Development Study (NCDS) and the English Longitudinal Study of Ageing (ELSA).

- Word-list recall:
  This tested verbal learning and recall. Cohort members were asked to listen to a list of 10 words. They were then asked to recall the words immediately. In most cases, the list was presented by the computer using a recorded voice. In some cases, where the cohort member could not hear recorded voice, the interviewer or nurse read out the list.

- Animal naming:
  This tested how quickly cohort members could think of words from a particular category. Cohort members were asked to name as many different animals as they could think of in one minute. The timing was controlled by the computer. Interviewers or nurses entered the number of animals the cohort member said into CAPI, not counting any repetitions.

- Letter cancellation:
  This tested attention, mental speed and visual scanning. Cohort members were given a page of random letters of the alphabet arranged in a grid and were asked to cross out as many "P"s and "W"s as possible in one minute. They were then scored on both how accurately they completed the task, and how far along the grid they managed to get within one minute.

- Delayed word-list recall:
  This tested short term memory. Cohort members were asked to recall as many words as they could remember from the list they heard during the first word recall test. They were not permitted to listen to the list again.

Interviewers and nurses were required to gain verbal consent for each of the cognitive assessments. Cohort members could choose which assessments they took part in. Interviewers and nurses were asked to make sure that the tests took place in conditions that allowed optimal performance of the cohort member, such as making sure they had their glasses if needed. Where possible, the tests should have been conducted in private, preferably at a table, and in settings that were as free as possible from interruption or disturbance.

4.2.4 Collection of contact information

At the beginning of the interview cohort members were asked to confirm, update or provide their name, address and their home and mobile telephone numbers. The final module of the main CAPI interview confirmed and updated further contact details: work telephone number, partner's name and telephone number (if applicable) and up to two stable contacts, who could be contacted in the future to help trace the cohort member if they had moved.

4.3 Who could be interviewed

Only the cohort member themselves could be interviewed. The option of conducting a proxy interview was not available for the Age 46 survey so if the cohort member themselves could not understand the questions or communicate the answers for themselves, they were not able to take part. Cohort members who had moved out of England, Scotland and Wales were not eligible to be interviewed.

5 Overview of biomeasures collection

5.1 Measures taken during the nurse visit

Protocols for each measure can be found in appendix B

5.1.1 Anthropometry

The anthropometry module included the following measurements:

- Height
- Weight
- Body fat percentage
- Waist and hip circumference

These measurements were given to cohort members on their measurement record card if they wished.

5.1.2 Blood pressure

Three sets of resting systolic and diastolic blood pressure and pulse readings were taken. If they wished, cohort member's results were given to them on their measurement record card along with an indication as to whether their blood pressure was normal or raised, and advice on appropriate action they should take. Cohort members were also asked for their consent for their blood pressure results to be sent to their GP.

5.1.3 Grip strength

A measure of upper body strength was taken using an analogue grip gauge. The respondent was asked to squeeze the gauge up to three times with each hand. The results were recorded on the cohort member's measurement record card if they wished.

5.1.4 Leg raise

Eligible cohort members were asked to raise one leg off the floor with their eyes open. The nurse then noted the length of time they could hold this position, up to 30 seconds. If the cohort member held this position for 30 seconds, they were asked to raise their leg off the floor with their eyes closed for 30 seconds. These measures are important indications of functions of locomotion.

5.1.5 Blood sample

Respondents were eligible to have a blood sample taken if they did not meet any of the following exclusion criteria: (1) had a clotting or bleeding disorder, (2) had had a fit or convulsion in the last five years, (3) were taking anticoagulant drugs or (4) were pregnant.

If cohort members consented to all blood sample measurements, three tubes of blood were taken. Two tubes were sent to the RVI in Newcastle for cholesterol and glycated haemoglobin analysis. One tube was sent to Bristol university labs for DNA extraction and storage, and storage of blood for other unspecified future analysis. Blood samples collected from May 2017 onwards were also analysed by RVI for triglycerides, C-

reactive protein, insulin like growth factor, ferritin, cytomegalovirus (CMV) and red blood cell count. CMV Avidity was also analysed for 82 samples.

Once the blood samples were collected, nurses were advised to post the samples as soon as possible.

The tables below show a summary of the number of days it took for the two labs to receive the blood samples.

Table 5:1 Number of days from date of interview to sample being received at the Bristol lab

Days	*N*	*%*
1	965	16
2	1,733	29
3	1,571	26
4	970	16
5	387	6
6	170	3
7+	157	3
No data available	12	0
Total samples sent to Bristol lab	*5,965*	*100*

Table 5:2 Number of days from date of interview to sample being received at the RVI Newcastle lab

Days	*N*	*%*
1	1,168	19
2	2,049	33
3	1,495	24
4	926	15
5	338	5
6	106	2
7+	96	2
No data available	20	0
Total samples sent to Newcastle lab	*6,198*	*100*

The table below shows the number of aliquots which were extracted by the Bristol lab from each sample, indicating the quality of the sample.

Table 5:3 Number of aliquots gained from blood sample sent to Bristol		
Aliquots per sample	*N*	*%*
0	39	1
1	54	1
2	225	4
3	599	10
4	1,642	28
5	2,706	45
6	675	11
7	25	0
Total samples sent to Bristol lab	*5,965*	*100*

Table 5:4 shows the percentage of analyses that were successfully conducted at the RVI lab.

Table 5:4 Analyses successfully conducted												
	Total cholesterol		*HDL cholesterol*		*Glycated Haemoglobin*		*Triglycerides*		*C-reactive protein*		*Insulin-like growth factor*	
	N	%	N	%	N	%	N	%	N	%	N	%
Analysed	6,049	98	6,037	97	5,996	97	3,421	55	3,422	55	3,424	55
Not analysed	149	2	161	3	202	3	2,777	45	2,776	45	2,774	45
Total	*6,198*	*100*	*6,198*	*100*	*6,198*	*100*	*6,198*	*100*	*6,198*	*100*	*6,198*	*100*

Table 5:5 Analyses successfully conducted (cont.)										
	Ferritin		Cytomegalovirus - IgG		Cytomegalovirus - IgM		Cytomegalovirus - Avidity		*Red blood cell count*	
	N	%	N	%	N	%	N	%	N	%
Analysed	3,424	55	3,424	55	3,413	55	82	1	3,385	55
Not analysed	2,774	45	2,774	45	2,785	45	6,116	99	2,813	45
Total	*6,198*	*100*	*6,198*	*100*	*6,198*	*100*	*6,198*	*100*	*6,198*	*100*

5.1.6 Activity monitor

Physical activity monitoring provides an objective measure of physical activity, in order to overcome the potential biases in self-reported data. The activPAL™ device, which was placed on the thigh, was chosen due to its ability not only to pick up on activity, but to also differentiate between different sedentary postures, particularly by being able to accurately estimate the amount of time the cohort member spent in a sitting or lying position. Research shows that the amount of time we spend sitting can impact our health so it was important to the research team to accurately record this through the monitor.

The monitor was placed by the nurse at the end of their visit. Cohort members were excluded from wearing an activity monitor if they had an allergy to plasters or adhesives, allergic to the plastic used to waterproof the monitor (low-density polyethylene) or had a skin condition that would prevent them from wearing the monitor. Cohort members were also advised not to wear the monitor if they were travelling through a security checkpoint (e.g. airport security).

The nurse used the CAPI program to activate the monitor, which then began recording for the next seven days. The nurse then sealed the monitor in waterproof packaging, allowing the monitor to be worn constantly throughout the week, meaning that a continuous measure of activity was recorded. The nurse then attached the monitor to the front of the respondent's thigh using a medical grade "Tegaderm" dressing. Cohort members could attach the monitor themselves if they were more comfortable doing this.

Cohort members were asked to wear the monitor for seven days. If the monitor fell off at any point before this, they were advised not to reattach it but send it straight back to the office. At the end of the seven days cohort members were asked to remove the monitor and send it back to the office using pre-paid packaging provided by the nurse.

Cohort members were asked to complete a sleep diary for each day that they wore the monitor. The diary recorded some key information including the time they went to bed, the time they woke up, and how many times they got up in the night.

Cohort member who wore the activity monitor were provided with a summary of feedback from the monitor along with their thank you letter.

5.1.7 Online dietary questionnaire

Cohort members were asked to complete an online dietary questionnaire about two randomly selected days, one weekday and one weekend day, over the seven day period following the interview. The questionnaire used was the Oxford WebQ, developed by the Cancer Epidemiology Unit at the University of Oxford. The online questionnaire was hosted by the University of Oxford. Cohort members were provided with a leaflet containing a link to the questionnaire and a unique login code.

The questionnaire asked about everything that the cohort member ate and drank the previous day, taking them through each food group and asking detailed questions about type of food and amount.

5.2 Consents and eligibility

For each measure in the nurse visit, the nurse was required to gain verbal consent, and ask the cohort member questions to assess their eligibility to complete the measure.

Written consents were required for a number of measurements. In total there were six different written consents that cohort members were asked to give. Cohort members were also asked whether they would like to be sent a copy of their blood sample results. The consent forms covered the following:

- Consent to send blood pressure results to the respondent's GP
- Consent for their blood sample to be taken and analysed, including:
    - Analysis of cholesterol and glycated haemoglobin
    - Agreement to send blood sample results to GP
    - Consent to any remaining blood being stored for future analysis
- Blood sample for DNA extraction and storage
- Consent to wear an activity monitor

5.3 Survey doctor

A survey doctor was employed by the study to provide advice to nurses on the occasion that they visited somebody with a highly abnormal blood pressure reading. The survey doctor was also consulted where highly abnormal results were seen after the blood samples had been analysed, and for any medical issues that arose during the interview.

6 Development work

6.1 Scope of the development work

The development stages of the Age 46 Survey took place over a 15-month period from March 2015 to July 2016.

The programme of development work included a pre-pilot study and a dress rehearsal. The key aims of the pre-pilot were to evaluate the activity monitoring and online dietary questionnaire which had not been previously been used in any of the CLS cohort studies or any studies conducted by NatCen. The dress rehearsal was conducted to check the content and order of the interview, the interview length, nurse protocols and instructions and the design of survey documents.

6.2 Pre-pilot survey

6.2.1 Objectives

The first pilot, or "pre-pilot" took place in October 2015. The key aims of this pre-pilot were to test two specific elements of the Age 46 Survey:

- Activity monitoring
- Online dietary questionnaire

6.2.2 Elements included in the pre-pilot

The fieldwork was carried out by NatCen nurses. The nurses were asked to conduct a 20 minute CAPI interview including:

- Demographic/background questions
- Introducing the activity monitoring task (including obtaining consent, fitting/helping to fit the activity monitors)
- Introducing the online dietary questionnaire

6.2.3 Pre-pilot briefing and fieldwork

Pre-pilot fieldwork took place from the 1st to 21st October 2015. Seven nurses worked on the pre-pilot with each nurse given between 7 and 13 cases. The cases were in the following locations in England:

- Herefordshire
- Croydon
- Liverpool
- Rutland
- Sheffield
- West London
- South West London

6.2.4 Pre-pilot sample

There were 72 cases issued in the first instance, all of whom had taken part in the pilot in the previous BCS70 survey sweep and had agreed to be re-contacted. Some interviews in the pre-pilot were also carried out with "top-up sample" – sample freshly recruited for the pre-pilot. At the end of interviews with the issued sample, respondents were asked if they knew of anyone who might want to take part. A small number of other potential respondents were also sought through staff at NatCen (although the staff members themselves were not eligible).

The top-up sample needed to be aged between 41 and 51 years and living in the same areas as the issued respondents.

A total of 43 interviews were achieved.

6.2.5 Key findings and changes

Overall, response to the activity monitor and online dietary questionnaire was positive, with 40 of the 43 participants wearing and returning the monitor, and 38 of the participants completing the online dietary questionnaire. Almost all of the participants completed the online questionnaire on two days. Because of the good response achieved in the pre-pilot, it was decided that the study should go ahead with the activity monitoring and online dietary questionnaire, with some recommendations suggested based on the pre-pilot feedback:

- Activity monitoring:
    - Recommendations from the pre-pilot were to give respondents feedback of their results, pre-cut the "Tegaderm" dressing given to nurses, and review the flow of the CAPI for placing the monitor and the instructions for the sleep diary.
    - A number of respondents experienced redness or itching when wearing the monitor. For the dress rehearsal another dressing, "Opsite", was trialled.
    - A number of activity monitors did not record correctly so investigations were carried out with the supplier.
- Online dietary questionnaire:
    - Recommendations were made to make it clearer that participants should complete the diary on the assigned days whenever possible, and to print the log-in code in a large, clear font on the participant documents.

6.3 Second pilot survey – the Dress Rehearsal

6.3.1 Objectives

The aim of the dress rehearsal was to test all aspects of the BCS70 Age 46 Survey, including:

- Contact and tracing procedures
- Length of the interview
- CAPI – question wording, routing, technical issues
- Aspects of the questionnaire new to BCS70 respondents (i.e. elements of the health module, the specific cognitive assessments)

- Protocols and consent for all the biomeasures
- Revised protocols and response rates for the activity monitors and online dietary questionnaire

6.3.2 Elements included in the Dress Rehearsal

The nurses were asked to carry out a full interview including the biomedical measurements. Before the interview, cohort members were given a paper self-completion questionnaire to complete. Cohort members were also asked to wear the activity monitor for the seven days following the interview and to complete the online dietary questionnaire on two specified days in that period.

6.3.3 Dress Rehearsal briefing and fieldwork

The BCS70 Age 46 Survey dress rehearsal fieldwork took place between 23rd January – 6th March 2016. 204 cases were selected from the main BCS70 sample to be included. The fieldwork was carried out by 16 NatCen nurses, with each nurse allocated 12 cases. Nurses attended a 4 day briefing which trained them in all aspects of the survey and biomeasure protocols.

6.3.4 Dress Rehearsal sample

The dress rehearsal sample consisted of 204 BCS70 sample cohort members.

6.3.5 Response

A total of 130 productive interviews were achieved and the overall response rate was 67%.

6.3.6 Key findings and changes

Response and contact with respondents

- The response rate achieved (67%) was lower than hoped (75%). However, it was felt that this was due to it being a pilot (with a shorter fieldwork period than the mainstage).
- There was very little indication from the findings of the dress rehearsal that the nurses were less able or willing than interviewers to contact respondents or persuade them to participate.
- Nurses generally found the tracing steps easy to follow. However, feedback from the nurses suggested that a reminder be added to the admin block to contact the neighbours of an address before tracing is completed.

Paper self-completion questionnaire

- On a small number of occasions nurses forgot to give or send the self-completion questionnaire. For mainstage it was decided that a tick-box would be added to each case on the sample cover sheet, as a reminder to the nurse to send the self-completion questionnaire.

CAPI interview

- The questions about headaches were not easy to answer for some respondents. These questions were reviewed for the mainstage.

- The CAPI would not allow non-UK addresses or telephone numbers to be entered for stable contacts. This was amended for the mainstage.
- Five questions had over 5% non-response (answers of “don’t know” or “refusal”). These were all to be expected, and included the SOC and SIC job codes, total take home income, and GP address details.
- Based on feedback from nurses and respondents, a number of other minor changes were made to questions in the CAPI interview to improve clarity.

SOC and SIC coding

In the dress rehearsal, SOC (job) and SIC (industry) coding was carried out by nurses during the interview. Two approaches were trialled:

1) Look-up – the CAPI program contained a look-up table with the descriptions of all SOC and SIC codes. Nurses entered keywords based on information given by respondents and the occupational codes containing these keywords were displayed so that the nurse could select the appropriate code.
2) Verbatim - Nurses also collected verbatim responses which were coded to SOC and SIC by office-based coders (who were able to refer to coding manuals).

The occupational coding conducted by nurses using the look-up were compared with the coding conducted by office based coders. This trial continued through to the start of mainstage fieldwork, so that a larger number of interviews were completed to conduct a meaningful analysis. The findings showed that the codes identified by the office were more accurate compared to those chosen by the nurses for both SOC and SIC. Therefore, it was decided that nurses would not code job or industry data during the interview but collect verbatim responses which would be office coded.

Cognitive assessments

- Nurses generally found the assessments easy to explain but noticed a couple of participants completing the letter cancellation slightly wrong. It was recommended that the nurse should reiterate to the respondent that they should read across each line left to right as though reading a book for the letter cancellation test.
- Nurses reported that the last question(s) in the cognitive module were not relevant if the cohort member did not complete any tests. The routing of these questions was amended for the mainstage.

CASI module

- Response to the CASI was positive – all but two respondents were willing to complete it, and 3 respondents required help from the nurse.
- The CASI was easy to explain to the respondents - most had done something similar before.
- The blue progress bar at the bottom of CASI did not move along – this was discouraging for respondents as they couldn’t track their progress through the module and was removed for mainstage.
- It was reported that the last few questions of the CASI didn’t really flow so the order of questions was reviewed for mainstage.

Biomeasures

- Respondents were asked how they felt about their biomeasures being taken in the feedback form. The majority were ok or happy about them being taken. Five

respondents had some minor concerns or didn't want to give a blood sample. One respondent reported that they felt nervous and would have preferred the measures to have been taken at a health centre. There were no major objections reported to any of the biomeasures.

- Some nurses reported difficulty entering measurements into the CAPI where repeat measures needed to be entered on different pages. For the mainstage, all the readings for a measure were presented on the same CAPI page for blood pressure, grip strength and waist and hip.
- The consent for hip measurement was considered unnecessary by one nurse, if they had already consented to the waist measurement. These verbal consents were combined for mainstage.
- Nine respondents who completed a feedback form reported refusing the blood test – the main reasons for refusal were a dislike of needles and the respondent feeling it was unnecessary as they have their blood tested regularly.
- Nurses reported that there were generally no problems getting participants to consent to a blood sample. Some participants didn't want to give consent to storage and DNA because it was not clear enough what we wanted to do with samples. It was agreed to clarify this on the respondent-facing documents
- One nurse sent one blood sample to the wrong lab, so the instructions on the despatch slip were clarified for the mainstage.

Activity monitoring

- The nurses felt the protocol was easy to follow, although there was some confusion with the sequence of lights displayed on the device.
- When initialising the device, the black screen was considered to be hard to read. For the mainstage, a more user friendly initialisation screen was developed. A check also ran that did not allow nurses to initialise the monitor if the monitor was not sufficiently charged.
- Two types of heat sealers were used in the dress rehearsal to make the activity monitors waterproof. It was decided that the larger heat sealers would be used in the mainstage as these were of better quality.
- Two types of dressing were trialled in the dress rehearsal, however there was no evidence to suggest that one was better than the other. It was decided that Tegaderm would be used for the mainstage.
- Seven percent of cohort members fitted the activity monitor themselves, the rest were happy for the nurse to attach it to them.
- It was suggested that the CAPI be changed to state consistently that the respondent should not wear the monitor when travelling through a security check-point, e.g. at an airport. Two cohort members mentioned that they go through metal detectors at work, and nurses requested clearer advice regarding this.
- Seven of the 30 respondents that provided feedback mentioned that the activity monitor caused redness or a rash, and eight reported problems that the dressing began to peel off.
- Six of the respondents also mentioned in the feedback that they were disappointed that they did not receive their results. For the mainstage, activity monitor feedback was provided to all respondents that took part.
- 90% of the activity monitors were returned to the office, which was in line with expectation.

- 81% of sleep diaries were returned to the office and completed correctly. General feedback was that the sleep diary worked well.

Online dietary questionnaire

- 42% of cohort members completed both days of the questionnaire on the correct day. 86% of cohort members completed the questionnaire on at least one day.
- It was recommended that the online dietary questionnaire leaflet should clarify that the questionnaire should be completed on the allocated day, and that the questionnaire can only be filled in once per day.

Changes made during fieldwork

- CASI: During main stage fieldwork, new questions were added concerning the general election in 2017.

7 Conduct of fieldwork

All interviews were conducted by either nurses or interviewers working for NatCen in England, Scotland and Wales. In total, 188 interviewers and 122 nurses worked on the Age 46 Survey.

7.1 Briefings

All interviewers and nurses that worked on the Age 46 Survey were briefed by members of the research team at NatCen. Researchers from CLS attended some of the briefings.

Original nurse briefings

A total of 6 nurse briefings were conducted from June to July 2016. Nurse briefings lasted for 4 days and covered the following topics:

- Overview of the project, sample and fieldwork
- Contacting participants and making appointments, including general doorstep approach and refusal conversion
- How to trace respondents
- Recording contact attempts and tracing, and how to use the admin module
- Documents to send to participants after making appointments, including the paper self-completion questionnaire
- Interview modules, including collecting information on employment
- Cognitive assessments
- Grip strength training, practice and accreditation
- Height, weight and body fat percentage training, practice and accreditation
- Overview of other biomedical measures
- Blood sample consents and dispatch
- Activity monitor placement
- Online dietary questionnaire placement
- Documents to return to the office after completing an appointment

Interviewer briefings

As fieldwork moved to an interviewer first approach, a total of 6 interviewer briefings were conducted in February 2017 - April 2017. A further 10 briefings were conducted in September 2017 – January 2018.
Interviewer briefings lasted for one day and covered the following topics:

- Introduction and overview of the project, sample and fieldwork
- Contacting participants, booking appointments and starting an interview
- Documents to send to the respondent after making an appointment
- How to trace respondents
- Overview of the CAPI modules
- Cognitive assessments
- Paper self-completion placement and collection

At this stage, nurses who were already working on the project attended a one-day refresher briefing which covered the key changes to fieldwork and focused on improving response to the different biomeasures.

Nurses that were new to the project attended a 2-day briefing which covered the following areas:

- Introduction and overview to BCS70 and fieldwork

- Contacting participants and booking appointments
- Height, weight and body fat percentage practice and accreditation
- Grip strength practice and accreditation
- Blood samples, consents and dispatch
- Overview of other biomedical measures
- Activity monitor placement
- Online dietary questionnaire placement
- Refusal conversion

Accreditation
All nurses working on BCS70 completed an accreditation for height, weight, body fat percentage and grip strength measurements. All NatCen nurses working on the project had previously been trained and accredited to complete waist and hip measurements.

7.2 Materials for interviewers and nurses

Interviewers and nurses were sent work packs containing all the materials they needed for working on the study. The packs included:

Contact materials

- A sample information sheet for each cohort member in their assignment (this included basic contact information – the majority of contact information was held electronically)
- An assignment map showing the locations of addresses in their assignment

Advance materials

- Copies of the generic advance letter based on the letter sent from the office
- Spare copies of the advance booklet sent from the office
- Appointment letters (for sending once an appointment was made), which confirmed the appointment details and contained information on how to complete the paper self-completion questionnaire
- Envelopes and stamps for posting appointment letters and paper self-completion questionnaires

Tracing materials

- Occupier letters
- Tracing letters
- Stable contact tracing letters
- Freepost envelopes for returning tracing slips to the office
- Blank pre-paid envelopes for posting the tracing letters

Paper self-completion questionnaire

- Paper self-completion questionnaires
- Blank envelopes to seal the paper self-completion questionnaire in for privacy once completed

Interview documents

- Cognitive assessment booklet

- Showcards
- Change of address cards

Nurse follow up visit

- Nurse follow up letter and leaflet (given to the respondent at the end of the interview when the interviewer first approach was used) containing information on all biomeasures, including the activity monitor and venepuncture leaflets
- Where nurses completed the full visit, all the information about biomeasures was included in the advance booklet, with separate activity monitor placement and venepuncture leaflets
- Consent booklet
- Respondent-personalised labels for consent booklet and other documents
- Online dietary questionnaire placement leaflet
- Sleep diary
- Example of activity monitor feedback
- Packaging for respondent to return activity monitor, including checklist
- Measurement record card

Other materials

- Interviewer and nurse project instructions
- Overview of steps (for nurses and interviewers)

7.3 Interviewer / nurse-only assignments

Original survey design – nurse fieldwork
Before fieldwork started the original issued sample was grouped into eight waves. Waves 1-7 contained between 90-110 assignments, and wave 8 contained 37 assignments. Assignment sizes varied from three cohort members, up to 21 cohort members but the average number of cohort members per assignment was 16.

Assignments were created based on geographical clustering, taking into account the representativeness of the sample. Originally, wave 1 was assigned a lower proportion of “difficult” cases, with a higher proportion of difficult cases in waves 2 to 5. Nurses could be given more than one assignment within each wave.

Interviewer fieldwork
Wave 4 involved an interviewer pilot which trialled 2 different types of fieldwork model: 1) interviewers making contact and attempting to interview the 25% most difficult cases, and nurses completing the rest of the cases and 2) interviewers making contact and attempting to interview all of the cases.

After the interviewer pilot, wave 5 was split into 5a and 5b. Wave 5a contained 28 assignments which were worked by nurses, and wave 5b contained 79 assignments worked by interviewers with a nurse follow up appointment. Waves 6-8 in England and Wales were all worked interviewer first, and contained between 75-85 assignments, with an average of 16 cohort members in each assignment.

Scottish fieldwork
Nurses worked all cases in Scotland throughout the entire fieldwork period. Four separate Scottish waves were created with all outstanding Scottish sample from waves 5-8. Waves SC5 - SC8 contained between 8 to 11 assignments, and most assignments included between 6 – 17 cohort members.

7.4 Issuing sample to interviewers and nurses

Sample was allocated to interviewers/nurses based on their geographical closeness to an assignment and their availability during the fieldwork period. Interviewers/nurses were sent their packs and sample information at the beginning of each fieldwork wave.

Sample information was provided electronically, but interviewers/nurses were also provided with some information on a paper sample overview sheet. Interviewers/nurses were asked to review their assignment as soon as they had received the sample information to ensure it included no one they knew. The sample information showed if there were any cases that were likely to require tracing or likely to refuse, based on participation history and confirmation of address updates. Interviewers/nurses were advised to identify these cases when they received their assignments as they may require further tracing or more encouragement to participate. Interviewers/nurses were asked to start work on their assignment early in fieldwork to allow plenty of time for contacting and interviewing cohort members.

7.4.1 Electronic contact (admin) module

The admin module consisted of two main parts – the sample information screens to provide the interviewer/nurse with various information, and forms to record all contact attempts with the cohort member and others.

The sample information screens contained:

- Latest contact details, including the address currently held for cohort member, whether this address has been confirmed as correct and any telephone numbers and email addresses held for the cohort member
- Cohort member personal details, including name, date of birth and sex, and any known difficulties with language and communication
- Previous attempts to contact the cohort member: History of all previous calls and visits made to the cohort member at this sweep, by the interviewer/nurse currently assigned, or previous interviewers/nurses should the case be a reissue
- Details of any appointments made with the respondent
- History of participation in previous sweeps
- Tracing activity undertaken at the current sweep
- Stable contact and partner details, including name, address, phone number and relationship to cohort member. This information was updated to show whether they had already been contacted at this sweep.
- Address at last interview – to use for tracing
- Blood pressure results for the nurse to inform the survey doctor in cases of considerably raised blood pressure.

The second part of the admin module was a CAPI script which the interviewer/nurse used to record all contact attempts with the cohort member, and anyone else they spoke to in attempting to make contact with the cohort member. Interviewers and nurses were required to log all face-to-face calls, telephone calls, text messages and emails. This is also where they could enter new contact details and record case outcomes. Interviewers/nurses were also required to record any tracing activities they

undertook and any contact information updates they received. If new contact details were obtained these were updated on the sample information screens.

7.4.2 Sample information paper sheet

The sample overview sheet contained the following information:

- Serial number
- Date of birth
- Gender
- Address
- Whether initial contact was to be face-to-face or telephone (see section 7.6)

There was also space for the interviewer/nurse to record the final outcome, transmission date and details of appointments made.

It was made clear to interviewers/nurses that all contact and appointment details should be recorded in the admin module, and that the sample overview sheets were for their use only (not as a record).

7.5 Contact procedures

7.5.1 Stage 1: Pre-notification letter

A pre-notification letter was sent to all cohort members from the NatCen office, approximately 5 weeks before the start of fieldwork for each wave. The original letter informed cohort members that the Age 46 Survey would start soon and that a nurse from NatCen would contact them. The wording was changed after the fieldwork re-model in England and Wales to refer to an interviewer visit instead when applicable.

A copy of the pre-notification letter can be found in section appendix A

7.5.2 Stage 2: Advance letter and survey leaflet

Every cohort member included in the Age 46 Survey was sent an advance letter before a nurse/interviewer tried to contact them. The letters were posted from the NatCen office approximately one week before the start of fieldwork for each wave.

There were three different types of advance letter:

- for cases that had taken part in the 2012 survey
- for cases that refused to take part in the 2012 survey
- for cases that could not be contacted at the 2012 survey

Each of the letters introduced the study, explained the value of the survey and the importance of cohort members continuing participation, but the wording varied slightly to make it more relevant to the cohort member's response at the previous survey. The letters contained the name of the interviewer/nurse that would be getting in contact with the cohort member.

An advance booklet was sent along with the advance letter, entitled "1970 British Cohort Study: 2016-18 Survey A Step-by-Step Guide". This included an introduction to the study, key findings from previous sweeps, and explained NatCen's role in the survey. For the nurse only fieldwork, this contained detailed information on all aspects

of the survey, including the core interview modules and biomeasures, as well as a brief introduction to the blood sample, activity monitor and online dietary questionnaire. After the fieldwork re-model, the decision was made to move most of the information about the follow up nurse visit to a separate booklet to be given to the respondent at the end of the interview.

Copies of the advance letter and leaflet can be found in appendix A.

7.5.3 Stage 3: Telephone contact with cohort members

For the majority (80%) of cases, interviewers/nurses were asked to attempt their first contact with respondents by telephone. This was partly for the convenience of cohort members based on feedback that this was their preferred method of contact, and also to make fieldwork more efficient for interviewers/nurses.

Cohort members were allocated to initial telephone contact if a telephone number was available and if: they had taken part in the 2012 survey; or they had taken part in the 2008 survey and not refused at the 2012 survey. If interviewers/nurses were unable to contact these cohort members by telephone, then they tried making personal visits.

7.5.4 Stage 4: Personal visits

For the remaining 20% of the sample that did not fulfil the criteria for initial telephone contact, interviewers/nurses were instructed to attempt initial contact with cohort members by making personal visits. Interviewers/nurses could, however, attempt to contact these cohort members by telephone (if a telephone number was available) if they were unable to contact them through making personal visits.

Interviewers/nurses were supplied with calling cards to leave behind if no one was at home when they visited an address – these let household members know that they had called and would call back another time. They also included a Freephone number for NatCen so cohort members could call to arrange an appointment or opt out of the survey. If interviewers/nurses were unable to contact cohort members by telephone or by making personal visits then they were expected to follow tracing procedures outlined in the next section.

7.6 Tracing cohort members

If interviewers/nurses found that the cohort member no longer lived at the issued address, or they could not confirm that the cohort member lived at the issued address, there were several steps they were expected to undertake to try to trace the cohort member, before returning the case for further tracing by CLS:

- Trying all available telephone number for the cohort member, particularly mobile and work numbers;
- Asking current occupiers for a new address or other contact information for the cohort member;
- Asking neighbours for a new address or other contact information for the cohort member;
- Calling the cohort member's partner's mobile telephone number (if available) to ask them for up to date contact details for the cohort member;
- Contacting stable contacts (if available) to ask them for a new address or other contact information for the cohort member.
- If any of these steps led to a new address being provided for the cohort member, interviewers/nurses would enter this address into the admin module. They also recorded whether the address was in their area or not. If it was, the

interviewer/nurses would send the cohort member an advance mailing at the new address before visiting. If the new address was outside the interviewer's/nurse's area it would be returned to the office for re-allocation to a more local interviewer/nurse.

- If these tracing attempts were unsuccessful the case would be returned to CLS for further tracing. Cases for tracing were sent to CLS fortnightly throughout fieldwork in a 'mover' file. This file included details of all the tracing attempts already undertaken by NatCen.
- Table 8.11 shows the total number of movers.

7.6.1 Tracing letters

Tracing letter

Interviewers/nurses were provided with tracing letters that they could use to help the tracing process. These letters were used if interviewers/nurses spoke to someone (such as a neighbour) who knew the new address of the cohort member but was not happy to pass this information to the interviewer/nurse. The tracing letter was addressed to the cohort member. It explained that we were trying to contact them for the study and asked them to contact NatCen with their new contact details. Interviewers/nurses would put this letter in a stamped envelope and ask the person who knew their address to post or give it to the cohort member.

Stable contact letter

There was also a tracing letter which was designed to be sent to the stable contact. It explained that we were trying to contact the cohort member, and that the cohort member had nominated them as someone who may be able to help find them. The letter asked the stable contact to get in touch with NatCen to provide the cohort member's new details, or to pass the letter on to the cohort member so they could contact NatCen with their new details.

Interviewers/nurses used the stable contact tracing letter if they could not contact the stable contact by telephone and their address was too far away to visit. Interviewers/nurses also used this letter if they had spoken to the stable contact but they were reluctant to provide a new address for the cohort member.

Copies of these tracing letters are included in appendix A.

Occupier letter

If interviewers/nurses had made several attempts to contact an address but had not managed to contact anyone there and had not been able to confirm with neighbours whether the cohort member still lived there, they could use the occupier letter. The occupier letter was addressed to the resident of the address. It explained that we were trying to contact the cohort member at that address and asked them to either call NatCen or return a slip from the bottom of the letter to confirm whether the cohort member lived at the address, and to provide a new address for the cohort member if possible.

A copy of the occupier letter is included in the appendix A.

7.7 Making appointments

Once interviewers/nurses made contact with a cohort member, they generally tried to make an appointment for an interview rather than trying to interview them straight away, although interviewers/nurses could also do “walk-in” interviews. When interviewers/nurses had agreed an appointment time with cohort members, they would send them an appointment letter (or give it to them if they were making an appointment in person). This letter included a space for the interviewer/nurse to write in the appointment date and time. The letter also asked the cohort member to complete the paper self-completion questionnaire in advance of their interview, and this paper questionnaire was sent (or given) to the cohort member along with a blank envelope to seal for privacy. Once an appointment was made, an automatic reminder email and text was sent to the cohort member the day before their appointment.

A copy of the appointment letter is included in appendix A.

7.8 Follow up nurse visits (in the interviewer first model).

7.8.1 Issuing sample to nurses

At the end of the interview, interviewers asked the cohort members if they would consent to be contacted by a nurse to arrange a follow up visit. The interviewer gave the cohort member a “Nurse visit: a step-by-step guide leaflet” which explained the nurse visit in more detail. The interviewer could explain the nurse visit further but was advised to let the cohort member speak to the nurse regarding any specific biomeasures.

Interviewers were asked to record anything that may be helpful for a nurse to know when making contact with the cohort member again, such as the cohort member’s availability. These notes were fed through to the nurse on the sample information screen of the admin module.

Interviewers then coded in the CAPI that the cohort member had consented to be contacted by a nurse, and the case was returned to the office with a specific outcome code. The case was then allocated to a nurse in that area. The allocation process took roughly three days from receiving the case back in the office, to sending it out to a nurse.

7.8.2 Contact procedures

Nurses were required to make contact with respondents via telephone in the first instance, unless the interviewer had provided specific instructions for a cohort member to be contacted in a different way.

The same call patterns applied to the nurse visit as for interviewers, calling each phone number twice at different times/days, and completing a minimum of four face-to-face visits before coding the case as a non-contact.

7.8.3 Making appointments

Nurses were required to enter the details of the follow-up appointment into the CAPI.

An automatic email and text reminder was sent to cohort members the day before their nurse appointment.

7.8.4 Reminders after the nurse visit

Automatic email and text reminders were sent to cohort members on the following days:

- The two days they were due to complete the online dietary questionnaire
- The day after they were due to send back their activity monitor
- Three days after they removed the activity monitor
- Twenty five days after they removed the monitor (if they had not returned their activity monitor by then).

7.9 Sample management during fieldwork

CLS started sending weekly sample updates five weeks before fieldwork began. These continued throughout fieldwork.

The action taken as a result of sample updates depended on the type of sample update and the progress of the case, that is whether interviewers/nurses had already worked on a case or not. Table 7.1 summarises the actions taken by NatCen as a result of sample updates from CLS.

Respondents also sometimes contacted NatCen with information. This information was handled in the same way as the sample updates from CLS.

Table 7:1 Actions taken as a result of sample updates

Type of update	**Not yet issued to interviewer/nurse**	**Issued to interviewer/nurse and not yet returned with final outcome**	**Issued to interviewer/nurse and returned with final outcome**
Change in eligibility status, i.e. death or emigration of cohort member	Appropriate outcome assigned and case not issued to an interviewer/nurse.	Interviewer/nurse notified, interviewer/nurse recorded appropriate outcome code no further contact attempts made.	If case had a productive outcome, no action. If case had an unproductive outcome then outcome updated to reflect change of status.
Change in participation status (e.g. cohort member refused to take part)	As above	As above	As above (and the case would not be considered for re-issue).
Change in address status: issued address invalid and no new address	Case issued to interviewer/nurse and interviewer/nurse told to start tracing activities ASAP.	Interviewer/nurse notified and asked to start tracing activities ASAP (if not already started).	No action

Table 7:1 Actions taken as a result of sample updates			
Change to contact information	The main sample file was amended and the updated contact information was issued to an interviewer/nurse.	If the change was a new address in a different area then the original interviewer/nurse was notified to return the case to the office as a traced mover. The case was re-allocated to a more local interviewer/nurse. If the new contact information was not a change of area then the updated contact details were communicated to the interviewer/nurse, and the interviewer/nurse would update the admin module and continue to contact the cohort member at the new address.	For productive outcomes, and unproductive outcomes where the interviewer/nurse had made contact with the cohort member, the sample database was amended and the updated contact information was used when the case was returned to CLS. For unproductive cases with untraced or non-contact outcomes, the case was re-issued.

7.9.1 Fieldwork progress

Mainstage fieldwork began in July 2016 and finished in July 2018. This was a longer fieldwork period than was originally anticipated, due to slow coverage during the early waves of fieldwork which were conducted by nurses only and the subsequent decision to relaunch fieldwork using an 'interviewer-first' approach.

Table 7.2 below shows the number of interviews achieved each month, broken down by fieldwork wave.

Table 7:2 Month of interview by wave															
	DR	*1*	*2*	*3*	*4*	*5a*	*5b*	*6*	*7*	*8*	*SC5*	*SC6*	*SC7*	*SC8*	*Total*
Jan-16	13	0	0	0	0	0	0	0	0	0	0	0	0	0	13
Feb-16	112	0	0	0	0	0	0	0	0	0	0	0	0	0	112
Mar-16	5	0	0	0	0	0	0	0	0	0	0	0	0	0	5
Jul-16	0	123	0	0	0	0	0	0	0	0	0	0	0	0	123
Aug-16	0	547	0	0	0	0	0	0	0	0	0	0	0	0	547
Sep-16	0	323	277	0	0	0	0	0	0	0	0	0	0	0	600
Oct-16	0	74	414	0	0	0	0	0	0	0	0	0	0	0	488
Nov-16	0	16	99	344	0	0	0	0	0	0	0	0	0	0	459
Dec-16	0	2	27	128	0	0	0	0	0	0	0	0	0	0	157
Jan-17	0	0	16	169	9	0	0	0	0	0	0	0	0	0	194
Feb-17	0	9	29	89	197	0	0	0	0	0	0	0	0	0	324
Mar-17	0	9	30	34	193	0	0	0	0	0	0	0	0	0	266
Apr-17	0	9	7	26	123	0	0	0	0	0	0	0	0	0	165
May-17	0	17	6	10	169	0	0	0	0	0	13	0	0	0	215
Jun-17	0	9	6	1	153	0	0	0	0	0	40	0	0	0	209
Jul-17	0	6	4	0	37	0	0	0	0	0	21	11	0	0	79
Aug-17	0	0	0	0	4	98	0	0	0	0	1	45	0	0	148
Sep-17	0	0	0	0	2	152	0	0	0	0	0	11	4	0	169
Oct-17	0	0	0	0	0	29	130	0	0	0	0	2	55	0	216
Nov-17	0	0	0	0	0	0	504	51	0	0	0	0	13	3	571
Dec-17	0	1	0	2	0	0	103	165	0	0	0	0	6	17	294
Jan-18	0	5	7	3	6	1	86	418	4	0	0	1	2	8	541
Feb-18	0	4	4	4	2	1	21	197	251	0	1	0	0	7	492
Mar-18	0	14	14	16	8	0	7	36	389	6	4	1	0	1	496
Apr-18	0	16	30	21	24	1	4	25	203	241	2	2	3	1	573
May-18	0	7	24	18	7	2	10	9	71	340	1	7	1	2	499

Jun-18	0	16	26	50	20	12	27	33	46	188	0	1	1	0	420
Jul-18	0	13	23	22	25	10	16	23	16	56	0	0	2	0	206
Total	*130*	*1,220*	*1,043*	*937*	*979*	*306*	*908*	*957*	*980*	*831*	*83*	*81*	*87*	*39*	*8,581*

7.9.2 Progress reporting

Fieldwork reports were sent to CLS on a fortnightly basis from the 26th July 2016 until the end of fieldwork.

All reports contained the following tables detailing outcomes. Each table was also produced showing the status of cases without a final outcome to monitor fieldwork coverage:

- Outcome by fieldwork wave
- Outcome by country
- Outcome by outcome at the Age 42 Survey
- Outcome by sweep of last interview
- Outcome by case difficulty

After the fieldwork re-model, the basic report included the following tables:

- All cases, current outcome by wave
- All cases, first issue outcome by wave
- Nurse only cases, first issue outcome by wave
- Interviewer first cases, first issue outcome by wave
- All cases, first issue outcome by difficulty
- Cases issued to nurse follow up, outcome by wave
- Reissue cases, outcome by wave.

Every other week, an extended fieldwork report was produced and this also included the following tables, detailing the response to various aspects of the survey:

- First issue outcome by country
- First issue outcome by outcome at Age 42 Survey
- First issue outcome by sweep of last interview
- First issue outcome by whether address was traced through HSCIC records
- Response to CASI by wave
- Response to paper self-completion by wave
- Return rate of paper self-completion by wave
- Response to 4x cognitive assessments by wave
- Response to grip strength by wave
- Response to leg raise by wave
- Response to blood pressure by wave
- Response to height measurement by wave
- Response to weight measurement by wave
- Response to body fat measurement by wave
- Response to waist measurement by wave
- Response to hip measurement by wave
- Response to blood sample by wave
- Consent to future blood analysis by wave
- Consent to DNA analysis by wave
- Agreement to complete online dietary questionnaire (ODQ) by wave
- Number of days of ODQ completed by how many days should have been completed
- Frequency of whether respondent completed the ODQ on the correct days
- Consent to wear the activity monitor by wave
- Return rate of activity monitor by wave
- Sleep diary return rate
- Table showing the status of mover cases by wave

7.9.3 Re-issues

The following unproductive outcomes were considered for re-issue:

- Non-contact
- Broken appointment
- Refusal to interviewer
- Ill at home during survey period
- Away/in hospital throughout field period
- Address inaccessible/unable to be found

Each case with these outcomes was examined to gauge whether it might be converted to a productive outcome if re-issued. Non-contacts were generally re-issued unless a very high number of contact attempts had been made. Broken appointments were almost all re-issued unless interviewer/nurse comments gave a good reason for them not to be. For refusals, reasons for refusal, interviewer/nurse comments and whether the interviewer/nurse recorded the case should not be re-issued or was a permanent refusal were all examined. For other outcomes the interviewer's/nurse's notes were examined to see if the case might be worth re-issuing.

There were 4,651 unproductive cases at first issue which were still eligible to take part in the survey. Of these unproductive cases, a total of 2,022 cases were selected for re-issue and these resulted in 537 productive interviews. Cases were only reissued once.

Table 7:3 Outcome of reissue cases

First issue outcome	*Total*	*Number reissued*	*% of cases reissued*	*Number of productive reissues*	*% of productive reissues, out of total reissues*	*% of productive reissues, out of total un-productive cases*
Unproductive - non-contact	765	494	65	94	19	12
Unproductive - refusal	2,759	953	35	258	27	9
Unproductive - other	386	201	52	67	33	17
Unknown eligibility	731	364	50	115	32	16
Unknown	10	10	100	3	30	30
Total	*4,651*	*2,022*	*43%*	*537*	*27%*	*12%*
Base: all unproductive cases at first issue						

7.9.4 Translations

Cohort members living in Wales received the advance letter in English and Welsh. This was the only document that was translated and, because all cohort members were educated in the British school system, interpreters were not necessary for the CAPI interview.

7.9.5 Thank you letter

Thank you letters were sent to all cohort members who took part in the survey. As well as thanking the cohort member for taking part, if the cohort member had worn an

activity monitor, a summary of their activity data was included in the thank you letter. The thank you letter and an example of the activity monitor feedback are included in the appendix A.

7.9.6 Blood results letters

Cohort members who gave a blood sample were also sent a breakdown of their blood sample results for total cholesterol, HDL cholesterol and glycated haemoglobin (if they consented to this). The letters also contained an explanation of each result and a desirable range. The results letter let the cohort member know that their GP had also been sent their results (if they had consented to this).

If written consent was provided, results letters were also sent to the cohort member's GP. These contained the cohort member's blood sample results (if measured) along with their blood pressure and pulse readings (again if the respondent consented). The letters also included an explanation of the study and desirable ranges for the results. The survey doctor's contact details were included should the GP have any questions regarding the results.

7.9.7 Fieldwork quality control

All interviewers were required to attend a one-day briefing, and all nurses were required to attend a 4 day full briefing, or 2 day briefing for nurse follow-up visits. The briefing covered all elements of the survey, including how to use the admin module. Interviewers and nurses were given 'test cases' as part of their assignment and were instructed to use these to practice going through the interview script at home before starting their assignment.

Interviewers'/nurses' work was checked when it was returned to the office to ensure that sufficient tracing was undertaken where necessary, that outcome codes were assigned correctly, and that all necessary paperwork, such as consent forms and paper self-completion questionnaires, was returned. If it was felt that an interviewer/nurse had not tried hard enough to trace respondents that had moved or had not completed the required call patterns then the case was returned to the interviewer/nurse for further work.

All new interviewers and nurses were supervised on their first interview. Nurses flagged in the quality report as underperforming on certain elements of the interview were supervised again at a further visit. NatCen also back check at least ten percent of interviews on all projects. This involves respondents being re-contacted by phone to confirm key pieces of information about the interview process.

The interviewer's/nurse's route through the CAPI questionnaire was programmed so that all relevant questions came on route according to the cohort member's earlier answers. Consistency checks of values and measurements were built into the CAPI. The "hard" checks did not allow entries outside a given range, and the "soft" checks asked the interviewer/nurse to confirm what he or she had entered. Soft checks were usually triggered where values were implausible but not impossible.

A separate quality report was produced every 1-2 months throughout fieldwork focusing on response rates to the cognitive assessments, income questions, biomeasures, online dietary questionnaire and activity monitor, as well as flagging any abnormally high or low measures in each of these. The report flagged interviewers/nurses that appeared to be getting a high proportion of refusals or unusual measurements. The nurse centre and regional interviewer managers would then follow up with the interviewer/nurse in question. A summary of this report was sent to CLS,

which included actions that were being taken to improve the response and quality for these different measures.

7.9.8 Fieldwork complaints

Complaints about the survey could be received by NatCen or by CLS. All complaints were logged in a complaints and cause for concern spreadsheet. Depending on the nature of the complaint it was then either dealt with by CLS (if it related to the nature of the study or previous sweeps of the study) or by NatCen (if it related to the conduct of fieldwork or survey processes). For complaints dealt with by NatCen:

- The complaint was allocated an 'owner' who decided on and recorded the follow up action required, and ensured that the matter was dealt with in a timely fashion;
- Where the complaint was concerned with the actions of an interviewer/nurse, the interviewer/nurse concerned was contacted and their account of any incident recorded;
- Once the follow-up investigation was completed the complaint was assessed as being valid or invalid and an appropriate course of action was decided upon; If a complaint against an interviewer/nurse was upheld, the interviewer/nurse was informed in writing and any action required was documented;
- The complainant was written to confirming the nature of their complaint and the actions taken.

In total, twenty five complaints were received from cohort members during fieldwork. Thirteen of these complaints referred to interviewer/nurse conduct when contacting cohort members to make an interview appointment. Often this was to do with interviewers/nurses turning up when unexpected, or cohort members feeling like the interviewer/nurse was pressuring them to take part.

Five of the complaints referred to aspects of the interview, for example, the nurse not being able to take a blood sample, the interview taking too long, and the cohort member disputing the weight measurements.

The rest of the complaints were around a variety of different issues: One cohort member received a copy of another cohort member's consent forms (by nurse error). One case was reissued in error as face-to-face when they had previously complained about this, and one complained about the study using their old name in correspondence.

An additional 18 causes for concern were received from cohort members during fieldwork. Many of these were cohort members letting the office know that the activity monitor had caused a rash or skin irritation. These issues were not judged to be complaints but were followed up to ensure that they did not turn into complaints.

7.9.9 Safety, consent and confidentiality issues

As part of their general initial training, all interviewers/nurses were briefed on health and safety when working. Interviewers/nurses were also briefed to be mindful of respondent safety and confidentiality. Interviewers/nurses carry an ID badge and are instructed to always show this to respondents on the doorstep. Interviewers/nurses were also instructed to avoid mentioning the name of the study to anyone but the cohort member or their immediate family. As mentioned in the advance letter, the cohort member's answers were treated in strict confidence in accordance with the Data Protection Act. In addition, interviewers/nurses were not permitted to interview anyone

known to them personally, such as a friend, a neighbour or a colleague. Such instances were re-assigned to other interviewers/nurses.

8 Survey response

8.1 Summary

A total of 8,451 cohort members were interviewed during main stage fieldwork between July 2016 and July 2018. This was a survey response rate of 70%[1], and a co-operation rate of 73%[2]. When the productive cases in the dress rehearsal are added in this gives a total of 8,581 productive cases overall.

Of the 12,192 cohort members issued in the total sample, 95% (n=11,591) were successfully traced and eligible. The remaining 5% were made up of sample members who were confirmed to be ineligible (1%) or movers whose eligibility was uncertain as they could not be traced (4%). Where ineligibility was confirmed, it was found that 61 cohort members had emigrated, 21 had died and 9 were in prison. The “uncertain eligibility” category was made up of cohort members who had moved and could not be traced by either NatCen or CLS, and some cases where there was no time to reissue or trace.

For completeness the response rates detailed in the tables of this chapter show both the "co-operation rate" (base excludes both confirmed and uncertain ineligibles) and the "survey response rate" (base excludes confirmed ineligibles only). For reasons of clarity the text accompanying the tables generally quotes figures for one of these only, and that is the survey response rate.

Table 8:1 Summary of sample eligibility

	N	*% issued sample*
Confirmed eligible	11,593	95
Confirmed ineligible	99	1
Died	*22*	*0*
Moved abroad	*61*	*1*
In prison	*10*	*0*
Other	*6*	*0*
Uncertain eligibility (untraced movers)	500	4
Total sample issued to mainstage	*12,192*	*100*

8.2 Details of survey response

Productive interviews were completed for 73% of the confirmed eligible sample (the co-operation rate). Productive cases were for the most part fully productive personal interviews, where the cohort member completed both the core interview and the biomeasures (7,543). The remaining productive interviews were made up of 900 complete interviews where the cohort member did not complete the biomeasures, and a small number (9) of partially productive interviews.

[1] The survey response rate is the percentage of productive interviews from the sample with known/possible eligibility, that is excluding those confirmed ineligible cohort members.

[2] The co-operation rate is the percentage of productive interviews from the sample of confirmed eligible cohort members that is excluding confirmed and uncertain ineligibles.

The unproductive cases were largely refusals (20%), made either directly to the office (2%), or to the interviewer/nurse in person (17%). The overall survey response rate was 70%.

8.2.1 Response by survey wave

Response varied by wave. The higher response in wave 1 can be explained due to the lower proportion of difficult cases included in the first wave. Waves 6, 7 and 8 also had a lower proportion of difficult cases compared to waves 2 to 5. Whether the wave was worked by interviewers or nurses only is also a key reason for the difference in response across waves.

Table 8:2 Response by wave in mainstage

	1		*2*		*3*		*4*		*5a*		*5b*		*6*		*7*		*8*	
	N	*%*	*N*	*%*	*N*	*%*	*N*	*%*	*N*	*%*	*N*	*%*	*N*	*%*	*N*	*%*	*N*	*%*
Total issued	1,672	100	1,644	100	1,458	100	1,453	100	459	100	1,272	100	1,312	100	1,324	100	1,145	100
Productive	1,220	73	1,043	63	937	64	979	67	306	67	908	71	957	73	980	74	831	73
Non-contact	75	4	100	6	76	5	70	5	22	5	57	4	53	4	64	5	50	4
Refusal	292	17	368	22	334	23	286	20	104	23	224	18	202	15	192	15	175	15
Other unproductive	25	1	39	2	21	1	27	2	7	2	17	1	36	3	24	2	24	2
Unknown Eligibility (no-contact)	47	3	86	5	77	5	77	5	16	3	50	4	56	4	54	4	54	5
Ineligible	13	1	8	0	13	1	14	1	4	1	16	1	8	1	10	1	11	1
Interviewer response	*76%*		*67%*		*68%*		*72%*		*70%*		*75%*		*77%*		*78%*		*77%*	
Survey response	*74%*		*64%*		*65%*		*68%*		*67%*		*72%*		*73%*		*75%*		*73%*	

Table 8:2 Response by wave (continued)										
	SC5		*SC6*		*SC7*		*SC8*		*Total*	
	N	*%*	*N*	*%*	*N*	*%*	*N*	*%*	*N*	*%*
Total issued	126	100	131	100	138	100	58	100	12,192	100
Productive	83	66	81	62	87	63	39	67	8,451	69
Non-contact	8	6	13	10	9	7	3	5	600	5
Refusal	29	23	28	21	29	21	10	17	2,273	19
Other unproductive	-	-	3	2	7	5	-	-	230	2
Unknown Eligibility (no-contact)	5	4	6	5	6	4	5	9	539	4
Ineligible	1	1	-	-	-	-	1	2	99	1
Interviewer response	*69%*		*65%*		*66%*		*75%*		*73%*	
Survey response	*66%*		*62%*		*63%*		*68%*		*70%*	

8.2.2 Response by country of issue

Survey response was highest in England (70%) and lower in Scotland (68%) and Wales (65%). The proportion of refusals was consistent across the three countries, but the non-contact rate was slightly higher in Wales (8%) compared to England (5%) and Scotland (6%).

Table 8:3 Response by country

	England		*Scotland*		*Wales*		*Jersey/ Guernsey/ Isle of Man*		*Total*	
	N	*%*	*N*	*%*	*N*	*%*	*N*	*%*	*N*	*%*
Total issued	10,452	100	1,001	100	703	100	36	100	12,192	100
Productive	7,299	70	674	67	456	65	22	61	8,451	69
Non-contact	478	5	65	6	56	8	1	3	600	5
Refusal	1,937	19	190	19	139	20	7	19	2,273	19
Other unproductive	193	2	14	1	23	3	-	-	230	2
Unknown Eligibility (no-contact)	464	4	51	5	23	3	1	3	539	4
Ineligible	81	1	7	1	6	1	5	14	99	1
Interviewer response	*74%*		*71%*		*68%*		*73%*		*73%*	
Survey response	*70%*		*68%*		*65%*		*71%*		*70%*	
Base: all productive interviews in mainstage										

8.2.3 Response by sweep of last interview

The table below shows a clear pattern that response increased the more recently the cohort member was last interviewed. Those last interviewed in 2012 had an 82% survey response, compared to 35% amongst those last interviewed in 2008. 182 interviews were achieved amongst cohort members that had last taken part before the year 2000.

Table 8:4 Response in mainstage by sweep of last interview

	Pre-2000		*2000*		*2004*		*2008*		*2012*		*Total*	
	N	*%*	*N*	*%*	*N*	*%*	*N*	*%*	*N*	*%*	*N*	*%*
Total issued	949	100	388	100	541	100	740	100	9,574	100	12,192	100
Productive	182	19	81	21	134	25	256	35	7,798	81	8,451	69
Non-contact	168	18	62	16	61	11	64	9	245	3	600	5
Refusal	381	40	157	40	224	41	327	44	1,184	12	2,273	19
Other unproductive	27	3	14	4	22	4	15	2	152	2	230	2
Unknown Eligibility (no-contact)	180	19	64	16	86	16	66	9	143	1	539	4
Ineligible	11	1	10	3	14	3	12	2	52	1	99	1
Interviewer response	24%		26%		30%		39%		83%		73%	
Survey response	19%		21%		25%		35%		82%		70%	

8.2.4 Response by interviewer/nurse

There was a slightly higher response rate amongst cases that were contacted first by an interviewer (71%) compared to those contacted initially by nurse (69%). This can be explained by interviewers being more experienced in making the first contact with cases. It was also thought that the shorter interview length offered by the interviewer may have been more appealing compared to the longer nurse only visit. Furthermore, cohort members who were concerned about the biomeasures may have been willing to do the interviewer visit but similar participants may have refused to take part in any of the nurse only visit due to the inclusion of the biomeasures.

Table 8:5 Response by whether first issued to an interviewer or nurse

	Interviewer		*Nurse*		*Total*	
	N	*%*	*N*	*%*	*N*	*%*
Total issued	5,924	100	6,268	100	12,192	100
Productive	4,182	71	4,268	68	8,451	69
Non-contact	280	5	320	5	600	5
Refusal	986	17	1,287	21	2,273	19
Other unproductive	128	2	103	2	231	2
Unknown Eligibility (no-contact)	289	5	250	4	539	4
Ineligible	59	1	40	1	99	1
Interviewer response	75%		71%		73%	
Survey response	71%		69%		70%	
Base: all productive interviews in mainstage						

8.2.5 Response by type of sample

Table 8:6	Response by whether sample was updated through HSCIC records before the start of fieldwork							
	Address updated before fieldwork through HSCIC tracing		*Address updated before fieldwork (not through HSCIC tracing)*		*No Update*		*Total*	
	N	*%*	*N*	*%*	*N*	*%*	*N*	*%*
Total issued	528	100	99	100	11,565	100	12,192	100
Productive	173	33	79	80	8,199	71	8,451	69
Non-contact	77	15	1	1	522	5	600	5
Refusal	154	29	12	12	2,107	18	2,273	19
Other unproductive	20	4	-	-	210	2	230	2
Unknown Eligibility (no-contact)	93	18	4	4	442	4	539	4
Ineligible	11	2	3	3	85	1	99	1
Interviewer response	*41%*		*86%*		*74%*		*73%*	
Survey response	*33%*		*82%*		*71%*		*70%*	
Base: all cohort members issued to mainstage								

8.3 Telephone contacts

For cohort members that had taken part in the 2012 sweep or had taken part in 2008 but had not refused in 2012, interviewers were instructed to attempt first contact by telephone, if a telephone number was available.

Telephone-first contact was attempted with 88% of the sample and contact was made by telephone with 70% of the sample (80% of the cases with which telephone-first contact was attempted. An appointment was made over the phone with 59% (85% of the cases where contact was made by telephone).

Waves 6 and 7 had the highest level of telephone contact and appointments by telephone. This is again, due to a lower number of “difficult” cases being allocated in these later waves so a higher proportion of cases were allocated to initial telephone contact.

Table 8:7 Telephone contact

	Total
A. Total Sample	12,192
B. Telephone contact attempted	10,685
C. Telephone contact made	8,584
D. Telephone appointment made	7,254
Telephone contact attempted (as % of A)	88
Telephone contact made (as % of B)	80
Appointment made (as % of C)	85
Overall % sample where appointments were made by tele.	59
Base: all mainstage issued sample	

8.4 Number of calls to achieve an interview

Interviewers were required to log all contact attempts (including posting letters, making telephone calls, making personal visits, sending texts and emails). This data has been examined to see how many contact attempts were required to achieve an interview. The mean number of telephone calls required to achieve an interview was 3 whilst the modal average was 2.

Table 8:8 Number of telephone calls to achieve an interview

	N	*%*
0	187	2
1	1,763	21
2	1,831	22
3	1,515	18
4	1,027	12
5	671	8
6	476	6
7	330	4
8 or 9	338	4
10 to 14	255	3
15 or more	58	1
Total	*8,451*	*100*
Base: all productive interviews in mainstage		

It is also possible to look at the number of face-to-face visits required to achieve an interview. As interviewers and nurses attempted to arrange most appointments by telephone, this is much lower. The mean number of face-to-face calls required to achieve an interview was 2 and the modal average was 1.

Table 8:9 Number of face-to-face calls to achieve an interview

	N	*%*
1	3,191	38
2	2,715	32
3	1,250	15
4	582	7
5	310	4
6	169	2
7	91	1
8 or 9	98	1
10 to 14	43	1
15 or more	2	0
Total	*8,451*	*100*
Base: all productive interviews in mainstage		

When looking at all types of call required to complete an interview, the mean total number of calls was 6, and the modal average was 4.

Table 8:10 Number of total calls to achieve an interview		
	N	*%*
0	0	0
1	43	1
2	1,356	16
3	1,116	13
4	1,236	15
5	1,204	14
6	850	10
7	672	8
8 or 9	881	10
10 to 14	828	10
15 or more	265	3
Total	*8,451*	*100*
Base: all productive interviews in mainstage		

8.5 Movers and tracing

Amongst the cases issued to mainstage, 20% had moved from the issued address. Of the total issued sample, 6% of cases were traced by CLS and sent to NatCen as sample updates. 10% of the sample were traced by the interviewers and 4% were returned to the office as untraced movers.

Table 8:11 Movers by sample origin								
	Address updated before fieldwork through HSCIC tracing		*Address updated before fieldwork (not through HSCIC tracing)*		*No update*		*Total*	
	N	*%*	*N*	*%*	*N*	*N*	*N*	*%*
Base: Total issued sample	*528*	*100*	*99*	*100*	*11,565*	*100*	*12,192*	*100*
Non-movers	7	1	25	25	9,715	84	9,747	80
Traced by CLS	364	69	52	53	276	2	692	6
Traced by interviewer	69	13	18	18	1,144	10	1,231	10
Total traced movers	*433*	*82*	*70*	*71*	*1,420*	*12*	*1,923*	*16*
Untraced movers	88	17	4	4	408	4	500	4
Total Movers	*521*	*99*	*74*	*75*	*1,828*	*16*	*2,423*	*20*
Base: all issued mainstage sample								

Table 8.12 shows the outcomes for traced movers, broken down by whether these were traced by interviewers, or traced by CLS. As the table shows, where cohort members were traced by interviewers, a much higher response rate was achieved than where cohort members were traced by CLS.

Table 8:12 Outcomes for traced movers								
	Mover (traced by CLS)		*Mover (traced by field)*		*Mover (address updated through HSCIC)*		*Total*	
	N	*%*	*N*	*%*	*N*	*%*	*N*	*%*
Productive	244	88	788	78	224	36	1,256	65
Unproductive - non-contact	4	1	40	4	153	24	197	10
Unproductive - refusal	26	9	147	14	202	32	375	20
Unproductive - other	1	0	25	2	27	4	53	3
Unknown eligibility	1	0	2	0	12	2	15	1
Ineligible	2	1	13	1	12	2	27	1
Total	*278*	*100*	*1,015*	*100*	*630*	*100*	*1,923*	*100*

8.6 Response to individual survey elements

In total, 8581 fully productive interviews with cohort members were achieved – 8451 at mainstage and 130 at the dress rehearsal. This next section shows the total response to each of the survey elements at both mainstage and dress rehearsal combined.

8.6.1 Paper self-completion questionnaires

Cohort members were sent a paper self-completion questionnaire in advance of the interview. They were asked to complete this prior to their interview appointment so it could be collected by the interviewer/nurse. In a minority of cases respondents were not given the questionnaire in advance but were given it at the time of their interview and encouraged to complete it then and there if possible. Out of 8,581 fully productive interviews with cohort members, 8,039 paper questionnaires were completed and returned to the office (94%).

Table 8.13 shows whether questionnaires were collected by interviewers/nurses or left with respondents to post back, broken down by whether a completed questionnaire was received or not.

Table 8:13 Completion of paper self-completion questionnaire		
	N	*%*
Total	8,581	100
Self-completion completed before visit, collected by interviewer/nurse	6,013	70
Self-completion completed during visit, collected by interviewer/nurse	1,105	13
Self-completion left with respondent to post back	921	11
Total paper self-completions received	*8,039*	*94*
Paper self-completion collected by interviewer/nurse - Not received	80	1
Paper self-completion left with respondent - Not received	412	5
Self-completion refused/unable to complete	50	1
Total paper self-completions not received	*542*	*6*
Base: all respondent (dress rehearsal and mainstage)		

Eighty three percent of the received questionnaires were collected by the interviewers and completed either before the visit (70%) or during the visit (13%). Eleven percent of the received questionnaires were posted back by the respondents.

Of the paper self-completion questionnaires that were not received, a minority were collected by interviewers but went missing or turned out to be blank. In the majority of cases (76%) the questionnaire was left with the respondent and was not returned (or was returned blank).

8.6.2 Computer assisted self-completion

Towards the end of the interview there was a CASI (Computer Assisted Self Interviewing) section which took around 10-15 minutes to complete. In total, 99% of respondents were willing to do the self-completion section, 96% completed it by themselves and 3% completed it with help from the interviewer/nurse.

Table 8:14 Completion of computer assisted self-completion (CASI)		
	N	*%*
Total	*8,581*	*100*
CASI completed by respondent	8,257	96
CASI completed by respondent, but interviewer/nurse helped to complete some questions	111	1
Interviewer/nurse completed all CASI with the respondent	123	1
Refused to complete CASI	81	1
Base: all respondent (dress rehearsal and mainstage)		

8.6.3 Cognitive assessments

The cognitive assessments were completed during the interview, and results were entered into CAPI. The cooperation rate for all four of the cognitive assessments was very high. Ninety nine percent of those completing the interview also completed the word recall, animal naming and delayed word recall. The letter cancellation test had a slightly lower response of 98%.

Table 8:15 Completion of cognitive assessments						
	Completed test		*Completed test and form returned*		*Did not complete test*	
	N	*%*	*N*	*N*	*N*	*%*
Word recall test	8,501	99	-	-	80	1
Animal naming	8,498	99	-	-	83	1
Letter cancellation	8,411	98	8,242	96	170	2
Delayed word recall	8,494	99	-	-	87	1
Base: all productive cases (mainstage and dress rehearsal), 8581						

8.7 Response to biomeasures

8.7.1 Response to biomeasures

There were 4,529 productive interviews that were worked in the interviewer first model. At the end of the interview, each of these cohort members was asked if they would consent to a nurse follow-up visit to take a number of biomeasures. Interviewers were encouraged to get cohort members to consent, even if they were unsure, so that the nurse could contact them to explain in more detail about the visit.

Of those that completed the interview, 94% consented to a nurse contacting them to arrange a follow-up visit. All of these cases were then issued to a nurse. Of the 4,429 cases that were issued to nurses to arrange a follow up visit, the response rate was 86%.

Table 8:16 Response to follow-up nurse visit		
	N	%
Base: all productive cases in the "interviewer first" model	*4,529*	*100*
Interviewer modules productive, case not to be sent to nurse (biomeasure visit refused to interviewer)	282	6
Cases eligible for nurse follow-up	4,247	94
Base: all cases eligible for nurse follow-up	*4,247*	*100*
Fully productive nurse follow-up (bio-measures)	3,633	86
Interview productive, bio-measures unproductive	601	14
Partially productive nurse follow-up (bio-measures)	10	0
Base: all productive cases (including dress rehearsal)	*8,581*	*100*

Total number of fully productive biomeasure interviews completed (interviewer first and nurse only)	7,673	89

In the nurse only model there were 4,040 fully productive interviews, meaning that in total (including in the dress rehearsal), biomeasures were collected from 7,673 respondents (89% of the total number of cohort members interviewed).

8.7.2 Response to each biomeasure

Most of the individual biomeasures were obtained from over 98% of respondents who had a nurse visit. The blood sample had a slightly lower response of 86% of eligible respondents.

Table 8:17 Response to follow-up nurse visit

Biomeasure	*At least 1 full measure obtained*	*Response (%)*
Grip strength	7,535	99
Leg raise	7,373	99
Blood pressure	7,559	99
Height	7,570	99
Weight	7,408	98
Body fat	7,304	99
Waist	7,486	98
Hip	7,465	98
Blood sample	6,234	86
Consent to blood storage for future analysis, and blood sample obtained	6,095	79
Consent to DNA extraction and storage, and blood sample obtained	5,963	78
Base: total fully productive biomeasure interviews, for which cohort member was eligible to complete the particular measurement		

Of those that completed the biomeasures part of the interview, 95% agreed to complete the online dietary questionnaire. 3% refused to complete the questionnaire and 2% were unable to do so. Most of the respondents who were unable did not have access to the internet on the assigned days.

Table 8:18 Response to online dietary questionnaire

	N	%
Yes	7,303	95
Not willing	221	3
Willing but unable to complete it	149	2
Total	*7,673*	*100*
Base: all productive cases with biomeasures collected		

Of those cohort members that were eligible and agreed to complete the online dietary questionnaire, 81% completed it on at least one day, and 66% completed it on two days, although some of these respondents completed it on different days to the ones they were assigned.
Of those that were eligible and agreed to complete the questionnaire, 46% completed it on the correct two days they were randomly allocated. Of those who were eligible and

agreed, 72% completed the diary on at least one correct day. Table 8.19 shows a more detailed breakdown of this.

Table 8:19 Number of online dietary questionnaire days completed correctly		
	N	%
2 days completed, both correct	3,339	46
2 days completed, one correct	1,062	15
2 days completed, none correct	345	5
1 day completed, correct	803	11
1 day completed, incorrect	389	5
0 days completed	1,365	19
Total	*7,303*	*100*
Base: cohort members who agreed to complete the online dietary questionnaire		

Activity monitors were placed with 85% of those who had a nurse visit. 12% of cohort members refused to wear the monitor and 3% were ineligible because they had an allergy to plasters or the dressing or because they had a skin condition which prevented them from wearing the monitor. For a further 1% of cases the nurse was unable to place the monitor for another reason, such as not being able to connect or initialise the device.

Table 8:20 Consent to wear activity monitor		
	N	*%*
Activity monitor placed	6,485	85
Ineligible to wear activity monitor	230	3
Activity monitor refused	887	12
Unable to place activity monitor for other reason	71	1
Total	*7,673*	*100*
Base: all productive cases with biomeasures collected		

The return rate for the activity monitors was 91%. 87% of activity monitors placed were returned to the office and the data was successfully downloaded. In some cases, the activity monitor was placed upside-down. In 109 cases (2%) where the monitor was worn upside-down, the data was successfully inverted. In 1% of monitors placed, the data was unable to be downloaded due to the data being corrupted, not being able to connect the monitor or the monitor being damaged in some way.

A small proportion of monitors (2%) had minimal activity recorded on them, and 1% had unusable data.

Table 8:21 Activity monitor returns		
	N	*%*
Received and data downloaded	5,508	85
Received but could not download data: data corrupt	11	<1
Received but could not download data: connected – no data	39	1
Received but could not download data: would not connect	19	<1
Received but could not download data: unusable (damaged; wet etc.)	7	<1
Received and data downloaded: minimal activity recorded	149	2
Received and data downloaded: successfully inverted	109	2
Received and data downloaded: unusable	52	1
Activity monitor not received	591	9
Total	*6,485*	*100*
Base: all activity monitors placed		

Table 8.22 shows those cohort members who reported removing the monitor earlier than the seven days they were supposed to wear it. 23% of those who completed a sleep diary reported removing the monitor before seven days.

Table 8.22 Number of days activity monitor removed before being worn for the full 7 days, as reported in sleep diary data		
	N	*%*
Same day as placed	13	0
1	87	1
2	129	2
3	162	3
4	206	3
5	229	4
6	531	9
Total removed before 7 days	1,357	23
Total sleep diaries received	*5,908*	*100*
		Base: Total sleep diaries received

8.8 Module timings

The mean length of the interviewer modules (household grid to contact information) was 51 minutes, 26 seconds. The longest module was the health module which had a mean length of 11 minutes 49 seconds. The mean length of the biomeasures modules was 48 minutes, 20 seconds. The longest module was blood sample with a mean length of 10minutes, 16 seconds. The overall length of both the interview and biomeasures combined was 1 hour and 40 minutes.

The timings was capped at the higher end of the distribution, to take into account where interviewers may have left screens open for a long time (e.g. if they paused the interview and came back to it later). The timings was also capped at the lower end of the distribution, based on a conservative estimate on the minimum time it would take to move through the interview with all items refused.

Table 8:23 Module timings	
	Mean length (hours: minutes: seconds)
Household grid	0:5:19
Family	0:1:25
Housing	0:1:25
Employment	0:7:15
Income	0:3:36
Education	0:0:54
Health	0:11:49
CASI	0:8:16
Cognitive assessment	0:7:39
Contact information	0:3:44
Interview length	*0:51:26*
Anthropometry	0:8:12

Blood pressure	0:10:14
Grip strength	0:3:58
Leg raise	0:2:57
Blood sample	0:10:16
Activity monitor	0:8:51
Online dietary questionnaire	0:2:06
Check block	0:2:01
Biomeasures length	*0:48:20*
Total interview length	*1:40:01*

9 Coding, editing and data preparation

9.1 Editing CAPI data

The need for editing CAPI data was minimal as the route through the questionnaire was controlled by the CAPI script, so respondents were asked all relevant questions and interviewers had to enter an answer before moving on to the next question. There were also consistency checks included in the CAPI script. This enabled interviewers to clarify and query data discrepancies directly with the respondent during the interview. Consistency checks are either “soft” or “hard”. Hard checks must be resolved by the interviewer at the time of the interview before they can move to the next question, whereas soft checks can be suppressed by the interviewer.

Data was checked after fieldwork to ensure that all questions that should have been answered did have a response, and questions that should not have been answered did not have a response. This checking found some responses at questions where there should not be. This was the result of a respondent giving a particular answer at one question, which caused another question to be asked, answered this second question but then changed their mind and gave a different answer to the first question which meant the second question should not have been asked. In cases such as this the second question was edited as “not applicable”.

9.2 Coding open-ended and ‘other specify’ questions

The CAPI interview included a number of questions where the responses were recorded verbatim and were then coded in the office after the interview. These were questions where the interviewer or nurse was either unsure how to code a particular response within the existing code frame or the full range of responses could not be predicted before the interview.

Most of the questions that required coding were “other-specify” questions, where the interviewer or nurse entered a text response because they believed the answer did not fit into any of the pre-specified responses. In many cases it was possible for these answers to be coded back into the existing code frame (back coding). However, in some cases a new response category was created when there was a sufficient number of similar responses given which did not fit into the existing code frame.

In some cases it was not possible for responses to be allocated to an existing code. In these instances, coders assigned these cases to an ‘other’ code.

9.3 Editing paper questionnaire data

The self-completion paper questionnaire was scanned and the resulting data was imported into a database. This data was then checked in a similar way to the CAPI data. Some editing was conducted included editing out instances where cohort members had ticked more than one response to a question where only one response was required, and editing out instances where a cohort member had entered an invalid response to one of the numeric questions.

The sleep diary was also scanned and processed in a similar way to the paper questionnaire data.

9.4 Combining dress rehearsal data with main stage data

Although very little editing was undertaken on the main stage survey data, some editing of the dress rehearsal data was required in order to merge it with the main data. This was due to changes being made to the questionnaire between the dress rehearsal and main fieldwork. Changes included:

- Minor wording changes to questions;
- More significant changes to questions that changed their meaning;
- Changing the pre-coded answer options;
- Moving questions from the paper questionnaire to the CAPI interview (or CASI section) and vice versa;
- Questions added or deleted.

Where questions were semantically the same (even if small changes had been made) the data was merged. However, if questions had changed in meaning or the response options had changed, then the data could not be merged and a separate dress rehearsal version of the question was included in the combined dataset.
Where a question was removed from the questionnaire after the dress rehearsal, the dress rehearsal data has not been included in the dataset.

9.5 Problems with the CAPI data

There was a problem with the small number of numerical variables which allowed answers starting at zero. When the fieldwork model moved to the interviewer and nurse model all answers coded at zero in these variables were erroneously exported as missing. This issue was fixed globally in the data, by selecting cases with productive outcome codes and recoding system missing values to zero.

10 Appendix A: Documents

Documents in this appendix.

1. Pre-notification letter
2. Standard advance letter (wave 5b onwards)
3. Interviewer leaflet
4. Appointment / self-completion letter
5. Nurse follow-up letter
6. Nurse leaflet
7. Cognitive assessment booklet
8. Generic nurse consent booklet
9. Tracing occupier letter
10. Tracing letter
11. Tracing stable contact letter
12. Change of address card
13. Measurement record card
14. Online dietary questionnaire leaflet
15. Thank you letter
16. Activity monitor example results