Resource report

Overview of bio measures in longitudinal and life course research

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Summary

An MRC review has recently identified a gap in life course data on the generation currently in early middle-age, which may uniquely be filled by the 1970 British Cohort Study (MRC 2014). This document is the output of a scoping exercise carried out to inform the development of a proposal for a biomedical wave of BCS70 at age 46. The aim is to provide an overview of bio measures available in longitudinal studies that have received funding from MRC, in order to facilitate harmonisation. The six cohorts are described below. This scoping exercise was funded by an IOE/UCL Strategic Partnership Research Innovation Fund grant.

The bio measures collected in each cohort are summarised in nine sections: anthropometry, physical functioning (including physical activity), lung function, cardiovascular function, cognitive function, vision, hearing, tissue sampling and dietary patterns. For each topic, the table includes information on which waves collected data on this area, at which ages and the method of collection (if known). A link is provided to the method if available.

Cohorts

- **National Survey of Health and Development (NSHD 1946)**
    - Birth cohort: 1946
    - Website: NSHD 1946
    - Institution: MRC
    - Sample size at baseline: 5,362
- **National Child Development Study (NCDS 1958)**
    - Birth Cohort: 1958
    - Website: NCDS 1958
    - Institution: Centre for Longitudinal Study
    - Sample size at baseline: 17,416
- **British Cohort Study (BCS 1970)**
    - Birth Cohort: 1970
    - Website: BCS 1970
    - Institution: Centre for Longitudinal Study

  - Sample size at baseline: 17,287

- **Avon Longitudinal Study of parents (ALSPAC)**
  - Birth Cohort: April 1991- December 1992
  - Website: ALSPAC
  - Institution: University of Bristol
  - Sample size at baseline: 14,062
- **Whitehall II**
  - Cohort: 35–55 years working in the London offices of 20 Whitehall departments in 1985–88
  - Website: WHITEHALL II
  - Institution: UCL
  - Sample size at baseline: 10,308
- **UK Biobank**
  - Cohort: people aged between 40-69 years recruited between 2006-2010
  - Website: BIOBANK
  - Institution: UK Biobank
  - Sample size at baseline: 500,000

1) Anthropometry

Cohort	Measure	How many waves	Ages at which measures are made (indicated in years unless indicated)	Method	Link to method
NSHD 1946	Height	12	2,4, 6, 7, 11, 15, 20-26*[1], 36, 43, 53, 60-64	Stadiometer with the head in the Frankfort plane (60-64)	http://ije.oxfordjournals.org/content/40/1/e1/suppl/DC2
	Sitting Height	3	43, 53, 60-64	Stadiometer with the head in the Frankfort plane(60-64)	http://ije.oxfordjournals.org/content/40/1/e1/suppl/DC2
	Weight	11	0, 2, 4, 6, 7, 11, 15, 36, 43, 53, 60-64	On a portable scale(60-64)	http://ije.oxfordjournals.org/content/40/1/e1/suppl/DC2
	Upper arm circumference of	4	36, 43, 53, 60-64		
	Waist circumference	4	36, 43, 53, 60-64		
	Circumference of chest (+ expanded)	4	36, 43, 53, 60-64		

[1] All are measured except those *, which indicate self-reported.

	Hip circumference	3	43, 53, 60-64		
	Bone health	1	60-64	DXA (whole body scan and hip scan), QDR 4500 Discovery scanners (Hologic Inc, Bedford, MA). pQCT (XCT 2000 (Stratec, Pforzheim, Germany))	http://ije.oxfordjournals.org/content/40/1/e1/suppl/DC2
		1	60-64		
NCDS 1958	Height	8	7, 11, 16, 23*, 33*, 42*, 45, 50*		
	Sitting height	1	45		
	Weight	8	Birth, 7, 11, 16, 23*, 33*, 42*, 45, 50*		
	Waist circumference	1	45		
	Hip circumference	1	45		
BCS 1970	Height	8	5,10,16,26*, 30*, 34*, 42*		

	Weight	8	Birth, 10, 16, 26*, 30*, 34*, 42*		
	Head circumference	3	5, 10, 16		
ALSPAC[2]	Height	19	4m[3], 8m, 12m, 18m, 25m, 31m, 37m, 43m, 49m, 61m, 7, 8, 9, 10, 11, TF1, TF2, TF3, TF4		
	Weight	19	4m, 8m, 12m, 18m, 25m, 31m, 37m, 43m, 49m, 61m, 7, 8, 9, 10, 11, TF1, TF2, TF3, TF4		
	Arm circumference	16	4m, 8m, 12m, 18m, 25m, 31m, 37m, 43m,		

[2] Until age 7, 10% of the children were chosen at random from the last 6 months of ALSPAC births to be part of the Children in Focus Clinic, while from age 7 onwards, all children were eligible for the clinic sessions and participation was voluntary. A lot of the information collected is presented in the table, but more information and details can be found here at http://www.bris.ac.uk/alspac/researchers/resources-available/data-details/clinic/documents/children-in-focus-clinic-sessions.pdf and http://www.bristol.ac.uk/alspac/researchers/resources-available/data-details/data-tables/documents/focusclinicsessions.pdf

[3] M= month

			49m, 61m, 7, 9, 11, TF1, TF2, TF3[4]		
	Head circumference	11	4m, 8m, 12m, 18m, 25m, 31m, 37m, 43m, 49m, 7, TF3		
	Skinfold thickness	1	61m		
	Waist circumference	10	31m, 37m, 43m, 49m, 61m, 7, 9, 11, TF1, TF2		
	Sitting height	8	46m, 61m, 7, 9, 10, 11, TF2, TF3		
	Body fat measurement	1	TF3		
	Arm length	1	7	Upper and lower	
	Hip circumference	3	7, 9, 11		

[4] TF= teen focus. These are clinics which are open to all Alspac members and occur between around age 13 and 18. The sample size varies depending on the TF – details of when these clinics were run and sample size of each clinic can be found in the following link: http://www.bristol.ac.uk/alspac/researchers/resources-available/data-details/data-tables/documents/focusclinicsessions.pdf

	Hand and foot size	1	10		
	Scoliosis	5	7, 9, 10, 11, TF1		
	Bone Health	several	Between age 7 and TF4	DXA (whole body scan and hip scan), pQCT, Fractures questionnaire	
	Bio impedance	7, 9, 10	3	Bodystat and Tanita	
	Flexural dermatitis	3	7, 9, TF2		
	Photocopy of hands to establish ratio of length of second digit to fourth digit	1	11		
WHITEHALL II	Height	5	Mean ages: 45, 50, 55, 60, 65		http://www.ucl.ac.uk/whitehallII/data-sharing
	Sitting height	1	55		
	Weight	5	45, 50, 55, 60, 65		

	Waist circumference	4	50, 55, 60, 65	Weighted tape measure	
	Hip circumference	4	50, 55, 60, 65	Weighted tape measure	
	Bio impedance	1	60, 65		
BIOBANK	Weight	1	40-69		http://biobank.ctsu.ox.ac.uk/crystal/label.cgi?id=1006
	Sitting height	1	40-69		http://biobank.ctsu.ox.ac.uk/crystal/refer.cgi?id=100234
	Standing height	1	40-69		http://biobank.ctsu.ox.ac.uk/crystal/refer.cgi?id=100234
	Hip circumference	1	40-69		http://biobank.ctsu.ox.ac.uk/crystal/refer.cgi?id=100251
	Waist circumference	1	40-69		http://biobank.ctsu.ox.ac.uk/crystal/refer.cgi?id=100251
	Arm fat mass (left/right); Arm fat percentage (left/right); Arm fat-free mass; Arm predicted	1	40-69	Impedance measurement	

	mass (left/right)				
	Basal metabolic rate	1	40-69	Impedance measurement. Expressed in Kilo-Joules	
	Body fat percentage	1	40-69	Impedance measurement	
	Impedance of arms, legs and body	1	40-69	Impedance measurement	
	Leg fat mass (left/right); Leg fat percentage (left/right); Leg fat-free mass; Leg predicted mass (left/right)	1	40-69	Impedance measurement	
	Trunk fat mass; trunk fat-free mass; trunk predicted mass;	1	40-69	Impedance measurement	

	Whole body fat mass; whole body fat-free mass; whole body water mass	1	40-69	Impedance measurement	
	Ultrasound bone densitometry	1	40-69	Sahara Clinical Bone Sonomete to assess bone density of the calcaneus. Vox is used to assess left/right heel	http://biobank.ctsu.ox.ac.uk/crystal/refer.cgi?id=100248

2) Physical functioning (including physical activity)

Cohort	Measure	How many waves	Ages at which measures are made	Method	Link to method
NSHD 1946	Balance	4	36, 43, 53, 60-64	By the longest time, up to a maximum of 30s, that a one legged stance could be maintained, first with eyes open and then with eyes closed (60-64)	http://ije.oxfordjournals.org/content/40/1/e1/suppl/DC2
	Chair rises	2	53, 60-64	the time taken to rise from a sitting to a standing position, and then to sit down again 10 complete times (60-64)	http://ije.oxfordjournals.org/content/40/1/e1/suppl/DC2
	Grip strength	2	53, 60-64	Isometrically using an electronic handgrip dynamometer (60-64)	http://ije.oxfordjournals.org/content/40/1/e1/suppl/DC2
	Assessment of free-living physical activity	1	60-64	5 continuous days by combined heart rate and movement sensor with individual calibration (Actiheart CamNtech, Cambridge UK). The actiheart is a light-weight	http://ije.oxfordjournals.org/content/40/1/e1/suppl/DC2

				(8g) sensor that clips onto two ECG electrodes and measures acceleration, heart rate, heart rate variability and ECG amplitude for a predetermined epoch (15s, 30s, 60s).	
	Examination of hands and knees for Osteoarthritis	1	53		
	Get up and go test	1	60-64	Timed rising from a chair, walking at a normal pace for 6 metres and sitting back in the chair (60-64)	http://ije.oxfordjournals.org/content/40/1/e1/suppl/DC2
NCDS 1958	Motor co-ordination	2	11,16	Walking backwards (11) Standing on one leg (11) Standing heel to toe (15 seconds) (11,16) Hopping (16) Catching a ball (left and right hand) (11,16) Marking squares (left and right	

				hand) (11) Picking up matches (left and right hand) (11)	
BCS 1970	Motor co-ordination	2	10,16	Throwing and catching a ball (10, 16) Sorting matches (10) Figure drawing on palm of hand (Graphestheisa) (10, 16) Standing on one leg (30 seconds, eyes open) (10, 16) Walking backwards (10 – 20 steps, 16 – 10 steps)	
ALSPAC	Activity monitors	4	11, TF2, TF3, TF4	Children are asked to wear accelerometers	
	Child uses a bike while his/her heart rate is monitored	3	9, TF2, TF3		
	Activity diaries	1	10		

	Activity questionnaire	1	TF3	Computer session on activities throughout the day	
	Coordination	2	7, TF1	Balance, manual dexterity, ball skills, motor ability tested, assessing static and dynamic	
	Hand grip strength	1	11		
	Bike drawing	1	11		
	Scoliosis	1	7		
	Tympanomet, static and dynamic balance assessed	1	11		
	Dental observations	3	31m, 43m, 61m, TF4		
	Allergy testing	2	61m, 7		
	Ligamentous laxity	1	TF2		
	Sebutape	1	10		

	Liver Scan	1	TF4		
	Moles	1	TF3	A questionnaire was sent in advance asking for the presence of large and small moles. They were then validated on a sub-set at visit	
WHITEHALL II	Hand grip strength	2	Mean ages: 60, 65	Dynomanometer	http://www.ucl.ac.uk/whitehallII/data-sharing
	Balance	1	65	Tandem to standing on one leg (EPESE protocol)	
	Chair rises	1	65	EPESE	
	Walking speed	2	60, 65	8ft course	
	Actigraphy	1	70	Geneactive	
BIOBANK	Hand grip strength	1	40-69	Jamar J00105 hydraulic hand dynamometer	http://biobank.ctsu.ox.ac.uk/crystal/refer.cgi?id=100232

3) Lung function

Cohort	Measure	How many waves	Ages at which measures are made	Method	Link to method
NSHD 1946	PEFR	1	36, 43, 53, 60-64	Micro Medical MicroPlus Spirometer MS03 (60-64)	http://ije.oxfordjournals.org/content/35/1/49 http://ije.oxfordjournals.org/content/40/1/e1/suppl/DC2
	FEV1	3	36, 43, 53, 60-64	Micro Medical MicroPlus Spirometer MS03(60-64)	http://ije.oxfordjournals.org/content/40/1/e1/suppl/DC2
	FVC	3	36, 43, 53, 60-64	Micro Medical MicroPlus Spirometer MS03(60-64)	http://ije.oxfordjournals.org/content/40/1/e1/suppl/DC2
	MRC chronic bronchitis	3	36, 43, 53	Questionnaire	
NCDS 1958	FEV1	1	45	Vitalograph Micro hand-held spirometer	
	FVC	1	45	Vitalograph Micro hand-held spirometer	
	PEF	1	45	Vitalograph Micro hand-held spirometer	

BCS 1970	N/A				
ALSPAC	Lung function and fitness	1	61m		
	Lung function	1	TF3	A measurement of nitric oxide in the lung was taken as an indicator of inflammation/Measures of lung function were taken before and after administration of Salbutomol	
	Lung function	1	8	Methacholine challenge	
WHITEHALL II	PEF	2	Mean ages: 60, 65	Spirometer – but different ones at each wave	http://www.ucl.ac.uk/whitehallII/data-sharing
	FEV	2	60, 65		
	FVC	2	60, 65		
	ratio	2	60, 65		

BIOBANK	FEV1	1	40-69	Pneumotrac 6800	http://biobank.ctsu.ox.ac.uk/crystal/refer.cgi?id=100246
	FVC	1	40-69	Pneumotrac 6800	http://biobank.ctsu.ox.ac.uk/crystal/refer.cgi?id=100246
	PEF	1	40-69	Pneumotrac 6800	http://biobank.ctsu.ox.ac.uk/crystal/refer.cgi?id=100246

4) Cardiovascular function

Cohort	Measure	How many waves	Ages at which measures are made	Method	Link to method
NSHD 1946	Diastolic and systolic and blood pressure	4	36, 43, 53, 60-64	OMRON HEM-705 (60-64)	http://ije.oxfordjournals.org/content/40/1/e1/suppl/DC2
	Resting pulse	3	36, 43, 53, 60-64		
	Rose and Blackburn questions	3	36, 43, 53, 60-64	Questionnaire	
	carotid intima-medial thickness (cIMT) and arterial distensibility (GE Vivid-I),	1	60-64	GE Vivid-i.	http://ije.oxfordjournals.org/content/40/1/e1/suppl/DC2
	Pulse Wave Analysis (PWA) and Pulse Wave Velocity (PWV)			PWA – Sphygmocor (AtCor Medical) PWV – Vicorder (Smart Medical)	
	Echocardiography	1	60-64	GE Vivid-i	
	12 lead ECG	1	60-64	Burdick Eclipse 850i	

	Heart rate variability	1	60-64	Six-minute supine resting 3-lead electrocardiogram	
	Cardio-respiratory fitness	1	60-64	Heart rate response to an incremental step test.	http://ije.oxfordjournals.org/content/40/1/e1/suppl/DC2
NCDS 1958	Resting pulse	1	45		
	Diastolic and systolic blood pressure	1	45		
BCS 1970	Resting pulse	2	11, 16		
	Diastolic and systolic blood pressure	2	11,16	Sphygmomanometer	
ALSPAC	Blood pressure	9	37m, 49m, 61m, 7, 11, TF1, TF2, TF3, TF4		
	Arteries	2	10, TF4	Flow mediated dilation, Inter-medial thickness, pulse wave analysis	
	Pulse rate	4	7, 11, TF3, TF4		
	Blood pressure resting and active	1	TF3		

WHITEHALL II	Diastolic and systolic blood pressure	5	Mean ages: 45, 50, 55, 60, 65	Manual sphygnomanometry (45, 50). OMRON (55, 60, 65)	
	Heart rate variability	2	55, 60	Five-minute supine resting 12-lead electrocardiograms using SEER MC recorders	
	IMT	2	55 (n=250) 60 (n=~3,000)	High- resolution ultrasound system (Aloka 5500 with a 7.5 MHz transducer)	
	Flow mediated dilatation	1	60	High- resolution ultrasound system (Aloka 5500 with a 7.5 MHz transducer)	
	Vascular distensibility	1	60	High- resolution ultrasound system (Aloka 5500 with a 7.5 MHz transducer)	
BIOBANK	Diastolic and systolic and blood pressure	1	40-69	Omron	
	Pulse	1	40-69	Measured during arterial stiffness measurement and blood pressure measurement	
	Pulse wave Arterial	1	40-69	The time between peaks of	

	Stiffness index			the waveform (the peak-to-peak time) is divided into the persons height to obtain the Stiffness Index (this was computed outside of the assessment center)	
	Exercise ECG	1	40-69	The Cardio test uses a stationary bicycle in conjunction with a 4-lead electrocardiograph (ECG) device to record ECGs at pre-test (15 seconds); during activity (6 minutes) and in recovery (1 minute). The participant‟s Risk Category is first calculated to determine whether they should perform the activity or have only a resting ECG	

5) Cognitive function

Cohort	Measure	How many waves	Ages at which measures are made	Method	Link to method
NSHD 1946	Short-term verbal memory	3	43, 53, 60-64	15-item word learning task using three learning trials each with immediate free recall, and with delayed recall separated by a different test	http://ije.oxfordjournals.org/content/40/1/e1/suppl/DC2
	Laterality	2	43, 53		
	Manual dexterity	2	43, 53		
	Co-ordination	1	43		
	Non-verbal ability	3	8, 11, 15		
	Verbal ability and fluency	5	8, 11, 15, 43, 53		
	Search speed and concentration	3	43, 53, 60-64	Dual-target timed letter search where the score represented the number of targets scanned within a matrix of non-target letters in one minute (maximum score: 600)	http://ije.oxfordjournals.org/content/40/1/e1/suppl/DC2
	Simple and choice	1	60-64		

	reaction time				
	National Adult Reading Test	1	53		
NCDS 1958	Visual motor functioning	1	7	Copying Designs (age 7)	
	Reading	3	7, 11, 16	Southgate Reading Test (age 7) Reading comprehension test (NFER) (age 11, age 16)	
	Conceptual maturity	1	7	Human Figure Drawing Test (age 7)	
	Arithmetic	2	7, 11	Problem Arithmetic Test (age 7) Arithmetic Test (NFER) (age 11, age 16)	
	Verbal and non-verbal reasoning	1	11	General Ability Test (age 11)	
	Short term verbal memory	1	50	Immediate and delayed word-recall task (10 words)	
	Verbal fluency	1	50	Animal naming task	
	Attention, mental speed and visual	1	50	Letter cancellation task	

	scanning				
BCS 1970	Visual motor functioning	1	5	Copying designs	
	Vocabulary	4	5, 10, 16, 42	English Picture Vocabulary Test (age 5) Pictorial language comprehension test (age 10) Vocabulary test (age 16, age 42)	
	Conceptual maturity	1	5	Human Figure Drawing Test (age 5) Complete a profile test (age 5)	
	Reading	3	5, 10, 16	Schonell Graded Reading Test (age 5) Shortened Edinburgh Reading Test (age 10) Reading Test (age 16)	
	Arithmetic	2	10, 16	Friendly Maths Test (age 10) Applied Psychology Unit (APU) Arithmetic Test	
	Spelling	2	10, 16	Dictation task (age 10), Spelling test (age 16)	

	Verbal ability	1	10	British Ability Scales – Word definitions, Word similarities (age 10)	
	Non-verbal ability	1	10	British Ability Scales – Digit recall, Matrices (age 10) Matrices (age 16)	
	Basic skills (Literacy and Numeracy)	1	34	Literacy and numeracy assessments developed previously for an age 21 follow-up of BCS70 where 10% assessed – plus multiple choice questions from 'Skills for Life' survey	
ALSPAC	IQ	3	4, 8, TF3	WISC: Wechsler Intelligence Scale for Children. More information on administered tests can be found at: http://www.bristol.ac.uk/alspac/researchers/resources-available/data-details/data-tables/documents/focusclinicsessions.pdf	
	Short term memory	2	49m, 61m	Digit Span test	

	Developmental assessment	1	18m	The Griffiths Test	
	Laterality	2	37m, 10	Hand, foot, eyes. At age 10, two tests are undertaken and both are a repetition of those used in the NCDS 1958 cohort	
	Habituation task	1	4m		
	Speech and language assessment	1	25m	Clinical assessment	
	Literacy/Numeracy	several	Between age 7 and TF4	Different tests and details can be found at: http://www.bristol.ac.uk/alspac/researchers/resources-available/data-details/data-tables/documents/focusclinicsessions.pdf	
	Working memory	3	10, 11, TF4		
	Self perception for reading and mathematics	1	9		

	TOWRE	1	TF1		
WHITEHALL II	Short term memory	3	Mean ages: 55, 60, 65	Written responses	http://www.ucl.ac.uk/whitehallII/data-sharing
	Executive functioning AH4, Verbal fluency	3	55, 60, 65	Timed written responses Naming animals Words beginning with 's'	
	Crystallised function	3	55, 60, 65	Mill Hill	
BIOBANK	Fluid intelligence test	1	40-69	Answer as many questions as possible in 2 minutes	http://biobank.ctsu.ox.ac.uk/crystal/refer.cgi?id=100231
	Pairs matching test	1	40-69	This category contains data on two 'pairs' matching tests. Participants are asked to memorise the position of as many matching pairs of cards as possible. The cards are then turned face down on the screen and the participant is asked to touch as many pairs as possible in the fewest tries. The first test includes 3 pairs of cards, the second 6 pairs of cards. The test is	http://biobank.ctsu.ox.ac.uk/crystal/field.cgi?id=399

				then repeated twice with 6 pairs of cards. This category includes data on the number of columns (i.e. 3 or 4), number of rows (i.e. 2 or 3) and the number of correct and incorrect matches.	
	Prospective memory result	1	40-69	Participants were allowed up to 2 attempts to correctly recall the colour/shape shown to them earlier in the touchscreen section	http://biobank.ctsu.ox.ac.uk/crystal/field.cgi?id=20018
	Reaction time test	1	40-69	This field is the mean duration to first press of snap-button summed over rounds in which both cards matched. It gives a crude measure of the raw processing/reaction speed of a participant.	http://biobank.ctsu.ox.ac.uk/crystal/field.cgi?id=20017

6) Vision

Cohort	Measure	How many waves	Ages at which measures are made	Method	Link to method
NSHD 1946	Questionnaire	9	6, 7, 11, 15, 26, 43, 53, 60-64	Doctor or self report	
NCDS 1958	Distance vision	4	7, 11, 16, 45	Snellen chart at ages 7, 11 and 16 LogMAR crowded test card at age 45	
	Near vision	3	11, 16, 45		
	Colour vision	1	11	Ishihara plates	
	Stereo-vision	1	45	Lang stereo test card	
	Refractive error	1	45	Retinomax 2 handheld autorefractor	
BCS 1970	Distance vision	2	10, 16	Snellen chart	
	Near vision	2	10, 16	Sheridan Gardner chart	
ALSPAC	Vision	Several	Different tests	Many tests administered. See details at:	

			between 4 and 61 months, and between 7 and TF3	http://www.bris.ac.uk/alspac/researchers/resources-available/data-details/clinic/documents/children-in-focus-clinic-sessions.pdf	
WHITEHALL II	None				
BIOBANK	Acuity	1	40-69	Log Mar chart	http://biobank.ctsu.ox.ac.uk/crystal/refer.cgi?id=100250
	Retinal image	1	40-69	TOPCON 3D OCT 1000 Mk2	http://biobank.ctsu.ox.ac.uk/crystal/refer.cgi?id=100237
	Intra ocular pressure	1	40-69	Reichert Ocular Response Analyser	http://biobank.ctsu.ox.ac.uk/crystal/refer.cgi?id=100236
	Auto-refraction	1	40-69	Tomey RC – 5000	http://biobank.ctsu.ox.ac.uk/crystal/refer.cgi?id=100242

7) Hearing

Cohort	Measure	How many waves	Ages at which measures are made	Method	Link to method
NSHD 1946	Questionnaire	9	6, 7, 11, 15, 26, 36, 43, 53, 60-64	Doctor or self reports	
NCDS 1958	Questionnaire	8	7, 11, 16, 23, 33, 42, 46, 50	Parental or self-reports	
	Clinical hearing test	3	7, 11, 16	Words read to child from 10 feet away	
	Audiometry	2	11, 45	Audiogram at age 11 Siemens Audiometer MA25 at age 45	
BCS 1970	Questionnaire	8	5, 10, 16, 26, 30, 34, 38, 42	Parental or self-reports	
	Audiometry	2	10, 16	Sweep and Pure tone audiogram	
ALSPAC	Hearing	3	31m, 43m, 61m		

	Tympanometry	8	8m, 12m, 18m, 25m, 31m, 37m, 43m, 49m		
	Different tests administered	Several	Between 7 and TF3	See details at: http://www.bris.ac.uk/alspac/researchers/resources-available/data-details/clinic/documents/children-in-focus-clinic-sessions.pdf	
WHITEHALL II	Questionnaire	Phase 5	Aged 55	Self report	http://www.ucl.ac.uk/whitehallII/pdf/S5_HSQ.pdf
BIOBANK	Audiometry	1	40-69	Speech in noise test	

8) Other tissue sampling

Cohort	Measure	How many waves	Ages at which measures are made	Method	Link to method
NSHD 1946	Blood sample	1	53, 60-64	At age 53: cholesterol, HDL cholesterol, triglyceride, glycosolated haemoglobin, red cell folate, plasma folate, plasma B12, plasma ferritin DNA extraction	Summary of blood assays collected at 60-64 is available from: http://ije.oxfordjournals.org/content/40/1/e1.long
	Urine sample	1	60-64	Dipstick, spun and unspun aliquots stored at –80C and –20C.	
	Saliva sample	1	60-64	Starstedt salivette (the collection of saliva was introduced after the feasibility study)	http://ije.oxfordjournals.org/content/40/1/e1/suppl/DC2
	Lymphoid cell lines	1	53		Stored biological specimen
	Metabochip	1	60-64		
NCDS 1958	Urine sample	1	7	Uristix test for protein and glucose	
	Saliva sample	1	45	Measurement of cortisol	
	Blood sample	1	45	Glycosylated haemoglobin	

				Triglycerides, total and HDL cholesterol Insulin-like growth factor (IGF-1) Immunoglobulin E Fibrinogen Tissue plasminogen activator antigen (t-PA) and von Willebrand factor antigen (vWF) C-reactive protein DNA extraction	
BCS 1970	N/A				
ALSPAC	Blood sample	7	12m, 18m, 31m, 43m, 61m, TF3, TF4		Summary of blood assays collected is available can be found in the data dictionary, which can be accessed here: http://www.bristol.ac.uk/alspac/researchers/resources-available/data-details/bio-resource/
	Urine sample	4	7, 10, TF3, TF4	Initial and midstream samples	
	Child nails	3	6-18m, 3, 4		

	Child hair	5	6-18m, 3, 4, TF3, TF4		
	Teeth	1	5-7		
	Saliva sample	1	TF3		
	Saliva sampling	4	10, 11, TF1, TF4		
	Blood taking	7	7, 9, 10, 11, TF2, TF3, TF4		
	Cell lines sample	1	TF3		
	Chlamydia and Gonorrhoea testing	1	TF4		
	Sebutape	1	TF3		
WHITEHALL II	Hair	1	Mean ages: 70	Cortisol, steroid panel	http://www.ucl.ac.uk/whitehallII/data-sharing
	Saliva sample	2	60, 65	Cortisol	

	Urine sample	1	50 (subset)	Catecholamine metabolites, steroid metabolites	
BIOBANK	Blood sample	1	40-69	Information that was collected through blood samples http://biobank.ctsu.ox.ac.uk/crystal/label.cgi?id=100081	http://biobank.ctsu.ox.ac.uk/crystal/refer.cgi?id=100227
	Saliva sample	1	40-69		http://biobank.ctsu.ox.ac.uk/crystal/refer.cgi?id=100243
	Urine sample	1	40-69		

9) Dietary patterns

Cohort	Measure	How many waves	Ages at which measures are made	Method	Link to method
NSHD 1946	Diet diary	3	36, 43, 53	There is a daily diet diary where respondents have to report (for 4, 5 or 6 days depending on the wave) what they eat before breakfast, at breakfast, between breakfast, lunch, between lunch time and evening meal, evening meal, later evening. Respondents have also space to write in between meals snacks, vitamins and minerals. Respondents also get asked general questions on their diet in their last week (e.g. type of milk, butter, type of bread etc).	
NCDS 1958	Brief diet questionnaires	3	33, 42, 45	Age 33 – Brief food frequency questionnaire (fried foods, fresh fruit, salads/raw vegetables, chips, sweets/chocolate, biscuits) Age 42 – Brief food frequency questionnaire (fruit, eggs, salad, vegetables, fried food, chips, sweets/chocolate, cakes/biscuits, bread, meat, fish, pulses. Special diets – including vegetarianism.	

				Age 45 – Brief diet questionnaire – consumption of milk and dairy products, fish, salt	
BCS 1970	Diet diary plus questionnaires	3	16, 30, 42	Age 16 – 4 day dietary diary (Friday to Monday) plus diet questionnaire covering food consumed day prior to interview. Maternal questionnaire included food frequency questionnaire and additional questions re: food consumed by study member in prior 4 weeks. Age 30 – Brief food frequency questionnaire (fruit, eggs, salad, vegetables, fried food, chips, sweets/chocolate, cakes/biscuits, bread, meat, fish, pulses. Special diets – including vegetarianism. Age 42 – consumption of home-cooked meals, ready-meals, take-aways, convenience foods. Frequency of eating breakfast	
ALSPAC	Dietary investigations	7	4m, 8m, 18m, 25m, 37m, 43m, 61m		

	Diet questionnaires	7	25m, 37m, 43m, 61m, 7, 10, TF2	3 or 5 days	
	Other nutritional information	3	7, 10, TF2	See details: http://www.bristol.ac.uk/alspac/researchers/resources-available/data-details/data-tables/documents/focusclinicsessions.pdf	
	Diet diaries	1	TF2		
WHITEHALL II	Diet questionnaire	3	50, 55, 60	Age 50: 7 day diet diary and food frequency questionnaire. Age 55: Food frequency questionnaire Age 60: Food frequency questionnaire	
BIOBANK	Diet	1	40-69	24-hours dietary recall questionnaire of what was eaten and drank. Most often, individuals were presented with a main yes/no question on the screen (e.g. did you eat any bread or crackers yesterday?). The online questionnaire was developed to take advantage of computer technology in such a way that a positive answer would result in the screen expanding to reveal an additional set of questions. Participants were then required to select the amount of each food consumed during the previous day using standard	http://biobank.ctsu.ox.ac.uk/crystal/refer.cgi?id=118240 See method section to see what information was collected

				categories to indicate the amount consumed (e.g. four slices of bread during the day). For foods without a standard measure (e.g. cheese, rice), a portion size was specified as a ‘serving’ and a description of that particular serving size could be found in the help section of the questionnaire. If participants’ serving of the food item is twice the specified amount, they are asked to double it.	

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