

UK Biobank Prospective Cohort

- 500,000 UK men and women aged 40-69 years when recruited and assessed during 2006-2010
- General consent for all types of health research, as well as for re-contact for particular purposes
- Extensive baseline questions and measurements, with biological samples stored for future assays
- Follow-up of health outcomes through linkage to health records and direct contact with participants

Available for academic and commercial researchers worldwide, with no preferential or exclusive access

UK Biobank: 500,000 participants aged 40-69 recruited in 2006-10

Age	40-49	119,000
	50-59	168,000
	60-69	213,000
Gender	Male	228,000
	Female	270,000
Deprivation	More	92,000
	Average	166,000
	Less	241,000

Generalisability (not representativeness): Heterogeneity of study population allows associations with disease to be studied reliably

Baseline questionnaire: assessing a wide range of socio-economic, lifestyle and environmental factors

Touch-screen: topics	Median time (minutes)	Interview: topics	Median time (minutes)
Socio-demographics	1.7		
Ethnicity	0.1	Medical history/medication	3.1
Work-employment	1.4	Occupation	0.4
Physical activity	4.4	Other	0.6
Smoking (non-smokers)	0.5	Total time	4.1
(past/current smokers)	1.5		
Diet (food frequency)	4.5		
Alcohol	1.1		
Sleep	1.2		
Sun exposure	1.3		
Environmental exposures	1.0		
Early life factors	0.8		
Family history of common diseases	1.6		
Reproductive history & screening (women)	2.4		
(men)	0.8		
Sexual history	0.4		
General health	2.1		
Past medical history & medications	1.6		
Noise exposure	1.0		
Psychological status	4.5		
Cognitive function tests	10.0		
Hearing speech-in-noise test	8.0		
Total time	52.5		

Touchscreen and interview questions (plus extra enhancement questions) available at www.ukbiobank.ac.uk

Baseline assessment: standard physical measures (with enhanced measures made in large subsets)

Standard baseline measures

All 500,000 participants

- Blood pressure & heart rate
- Height (standing/seated)
- Waist/hip circumference
- Weight/impedance
- Spirometry
- Heel ultrasound

Enhanced baseline measures

Subset: 175,000 participants

- Hearing test
- Vascular reactivity

Subset: 120,000 participants

- Visual acuity, refractive index & intraocular pressure

Subset: 85,000 participants

- Retinal images & optical coherence tomograms
- Fitness test & ECG limb leads

Baseline sample collection: different types of biological sample allowing a wide range of different assays

Sample collection tube	Fractions collected	Potential assays
Na ⁺ EDTA	<ul style="list-style-type: none"> • Plasma • Buffy coat • Red cells 	<ul style="list-style-type: none"> • Plasma proteome and metabonome • Assays of genomic DNA • Membrane lipids and heavy metals
Lithium Heparin (PST)	<ul style="list-style-type: none"> • Plasma 	<ul style="list-style-type: none"> • Plasma proteome and metabonome (without haemolysis)
Silica clot accelerator (SST)	<ul style="list-style-type: none"> • Serum 	<ul style="list-style-type: none"> • Serum proteome and metabonome (without haemolysis)
Acid citrate dextrose	<ul style="list-style-type: none"> • Whole blood 	<ul style="list-style-type: none"> • Assays of DNA extracted from EBV immortalised cell lines • B-cell transcriptome
EDTA	<ul style="list-style-type: none"> • Whole blood 	<ul style="list-style-type: none"> • Standard haematological parameters
Tempus RNA stabilisation	<ul style="list-style-type: none"> • Whole blood with lysis reagent 	<ul style="list-style-type: none"> • Blood transcriptome • Representative transcriptomes of other tissues
Urine	<ul style="list-style-type: none"> • Urine 	<ul style="list-style-type: none"> • Urine proteome and metabonome • Gut microbiome
Saliva	<ul style="list-style-type: none"> • Mixed saliva sample 	<ul style="list-style-type: none"> • Salivary proteome and metabonome • Salivary microbiome • (Mucosal proteome and metabonome)

Enhancements of participant phenotyping

- Web-based questionnaires completed by subsets of 100-200,000 participants: diet diaries, life-time occupation, cognitive function, mental health, etc
- Wrist-worn accelerometers worn for 1 week by 100,000 participants to assess activity (2013-16)
- Genotyped 500,000 participants (2013-16) with bespoke array (GWAS; candidate SNPs; exome)
- Standard panel of assays (e.g. lipids; metabolic) on samples from 500,000 participants (2014-17)
- Imaging (brain/heart/body MRI; bone/joint DEXA) plus repeat of baseline assessment (2015-2022)