The UK Biobank Imaging study

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www.ukbiobank.ac.uk
MRI – brain, heart and body

Carotid ultrasound – measures of large artery

DXA – low dose X-ray of bones and joints
Scientific value of imaging

Imaging extends the description of diseases

Imaging can extend usefulness of other data by integrating with other data (e.g. lifestyle, biochemical, genetic) that have already been collected

Can be used to study how diseases develop

Large population size allows investigation of associations between imaging and non-imaging measures and many health outcomes

Can be used to compare with other data (e.g., body fat, bone density)
Study overview

Pilot phase – 5,000 in Stockport (2014-15)

Main phase – 95,000 in Stockport, Reading, Newcastle and Bristol (2016-23)

18 people each day, 7 days per week

Attendance co-ordinated by Participant Resource Centre (PRC) in Cardiff

Emailed invite, phone PRC if interested, pre-screening and book attendance date
Brain

Structural

Functional

Task

Diffusion

Resting

Heart

Can measure heart anatomy and function of blood flow

Novel approaches such as 3D models constructed from 2D scans

Extract novel features

5.86 litres of internal fat

1.65 litres of internal fat

Green = subcutaneous fat

Yellow = internal fat

Also liver and pancreatic MRI

Images from MRC Clinical Sciences Centre, Imperial College London and Wilman et al (2017), Plos One
Carotid ultrasound

- Thickness of major carotid arteries
- Volume of arteries
- Measures plaque volume
- Other features of carotid artery
DXA – bones and joints

Measures bone density of the spine, hip and knee
Can identify osteoarthritic changes (hip, knee) and fractures
Detailed measures of body composition (under the skin and around the organs)
To detect irregular heart beats (subclinical heart arrhythmias)

Important as these may be related to future risk of heart attack and stroke and are asymptomatic

We’d like to measure electrical activity of the heart continuously for 2 weeks for 20,000 participants

Is water resistant, does not interfere with day to day activities and does not need charging

Some shaving possibly involved….
By far the largest imaging study ever
Plans for repeat in 10,000 participants

Re-invite 10,000 participants 2-3 years after their initial scan

Image from Sperling et al (2011), Alzheimers & Dement
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Improving the health of future generations

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Participants scanned so far - help us make it to 100,000!

Get in touch