

Remote collection of activity data:
The UK Biobank Activity Monitor Project

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The Activity Monitor Project

- Self-reported physical activity collected from participants at baseline recruitment
- New technology is able to more accurately record physical activity (and energy expenditure) using objective, non-invasive methods
- Association of activity and major chronic disease outcomes have been demonstrated but may underestimate effect

Measuring Activity

- Most activity assessed by researchers using questionnaires, rather than measured
- Limitations of pre-existing devices:
 - Do not store raw data on device
 - Sampling frequency is low
 - High cost (at scale)
- Significant joint development with University of Cambridge and Axivity, with development and production of device a cheap, re-usable device:
 - High frequency data acquisition (100Hz) with long battery life
 - Records and stores raw data in fundamental units of G
 - Capable of continual recording in a 'free living' environment

The Activity Monitor Device

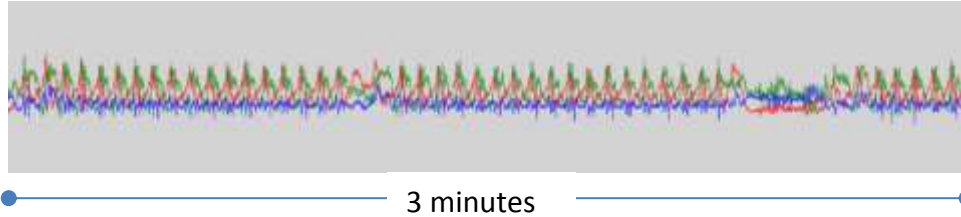


- Invite to take part sent to participants by email
- Wrist worn accelerometer sent by post with recording timed to start on arrival
- Device designed to be worn continuously on the participant's dominant hand
- Data recorded for 7 days
- Automated email prompt to return device after the 7 days have elapsed
- 2 week cycle time to dispatch, wear, return and download data

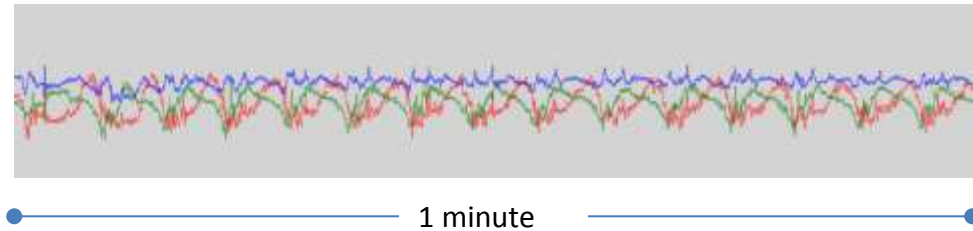
Example data traces

Testing undertaken by UKB staff wearing the devices during various activities:

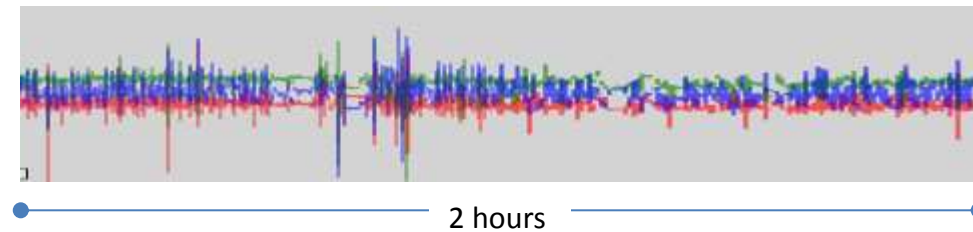
- Swimming



- Rowing

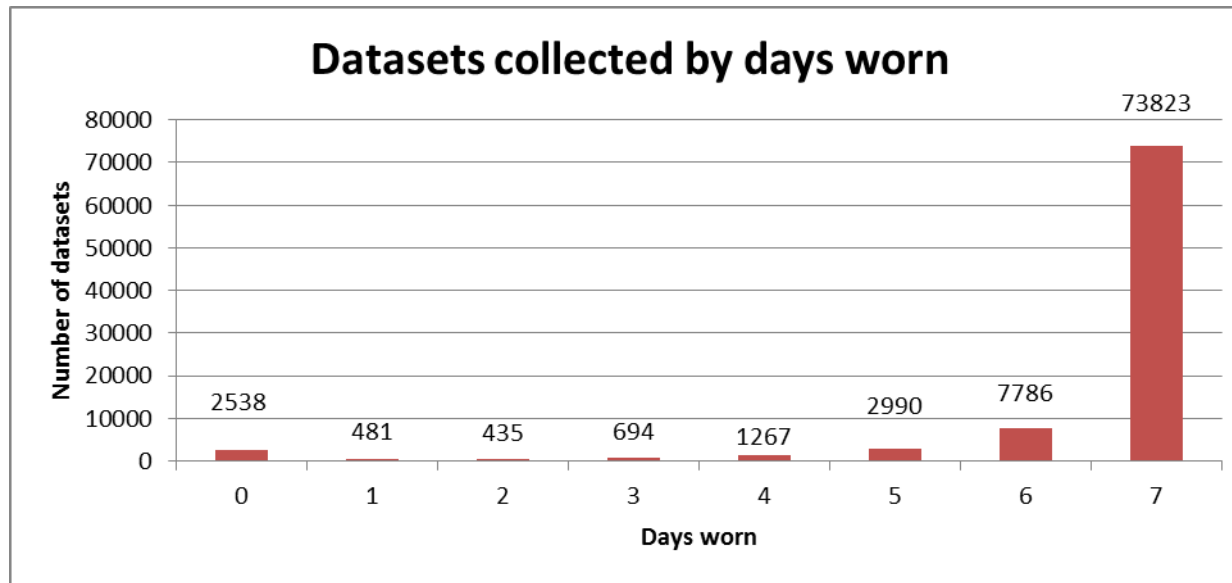


- Normal office working



Current progress in data collection

- 217,000 invites sent, with ~95,000 devices dispatched (51.7% acceptance rate)
- ~93,000 datasets obtained to date
- Vast majority of participants wearing for 7 days:



Progress with the data

- Group of experts in activity research led by Professor Nick Wareham (University of Cambridge) assisted UKB in the calibration and validation of raw data with the aim of creating summary derived variables of activity to assist future research
- Design of calibration and filtering algorithms completed, with the summary variables of activity for the first 70,000 datasets shortly to be released
- Acquisition of 100k datasets forecast to complete October/November 2015
- Paper on methodology of data analysis to be published early/mid 2016 alongside the complete data collection of 100,000 (both raw and summary data)

Questions?