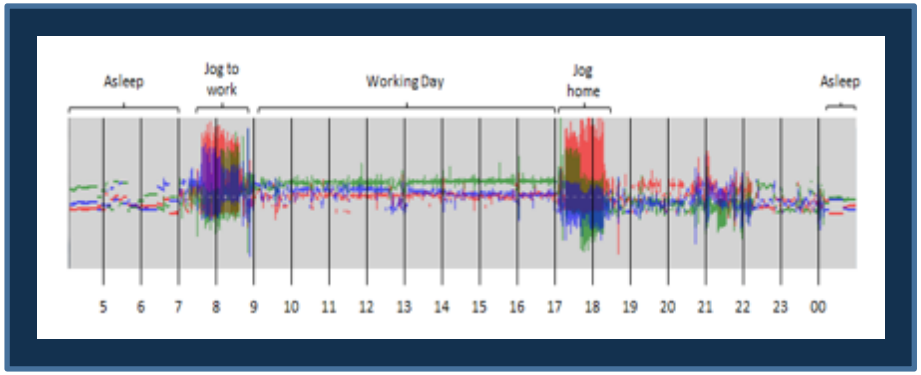
Progress with collection of seven day physical activity data.

Frontiers meeting

26.VI.14

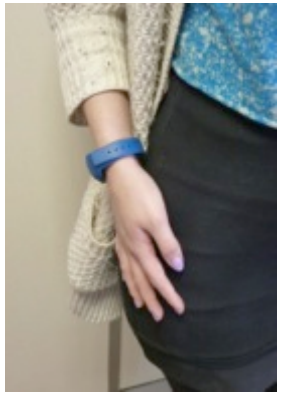


Background

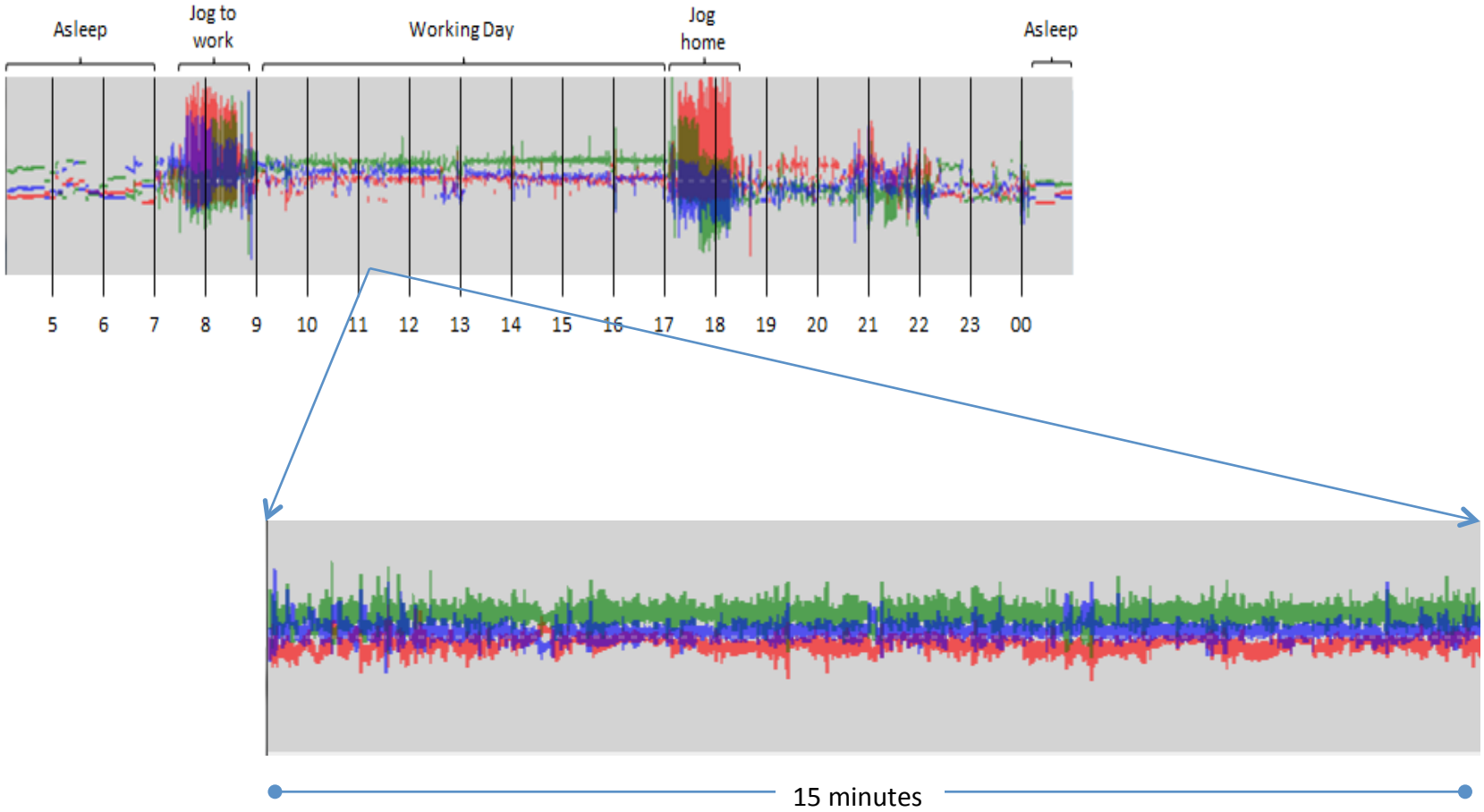
- Self-reported physical activity collected at baseline
- Funded as part of enhancements to the core.
- Previous methods to quantify the pattern and total volume of energy expenditure “are imprecise”.
- Association of activity and major chronic disease outcome demonstrated but may underestimate effect.
- Use new technology to more accurately estimate physical activity (and energy expenditure) using objective, non-invasive methods.
- Clarify dose-response between activity and outcomes
- Dimension – type, intensity, frequency, duration, total volume.

Background

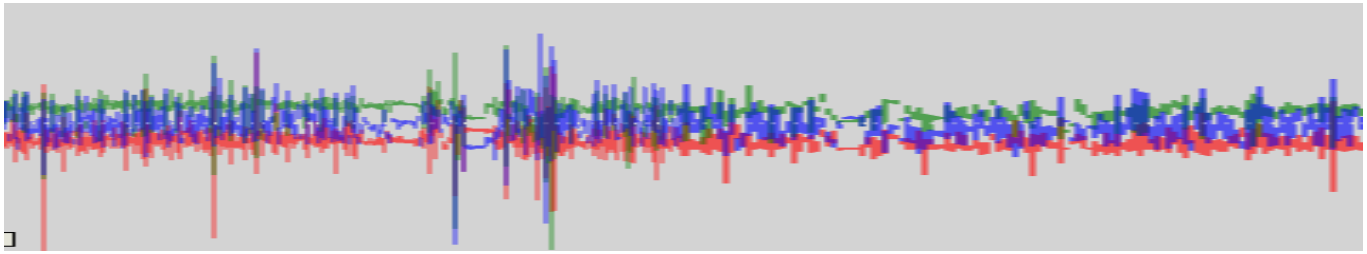
- Limitations of existing devices:
  - Do not directly measure acceleration.
  - Do not store raw data on device
  - Sampling frequency is low
  - Cost (at scale)
- Significant joint development with University of Cambridge.
- Development and production of device with Axivity/ University of Newcastle for scale
- Cheap, re-usable device:
  - Based on MEMS chip
  - High frequency data acquisition (100Hz) with long battery life
  - Records and stores raw data in fundamental units of G
  - Easy to administer



Exemplar data acquired during testing

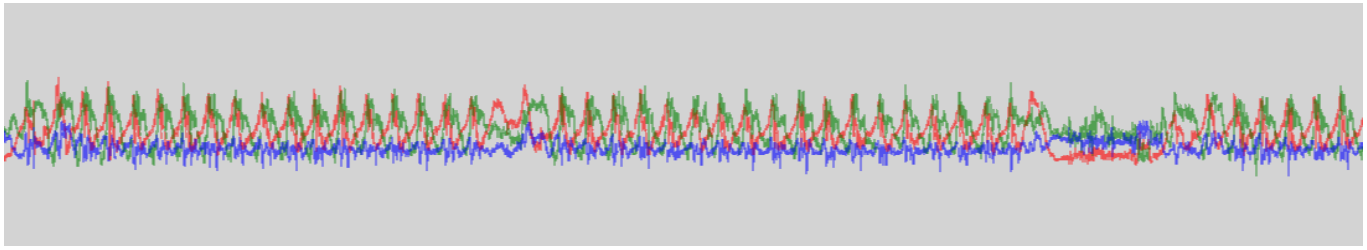


Exemplar data acquired during testing



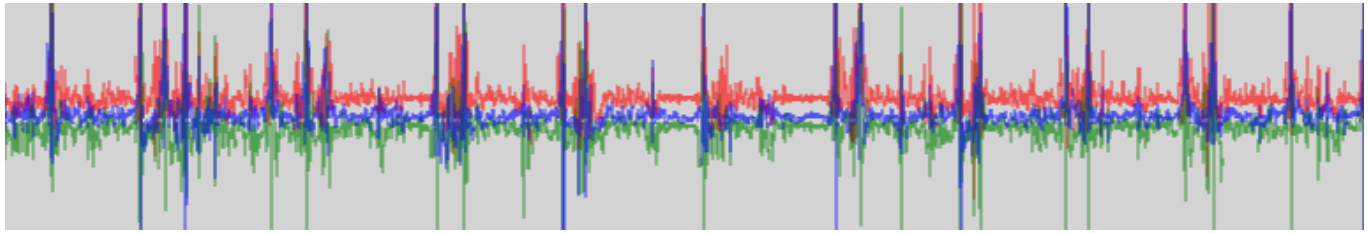
Wear around office

2 hours



Swimming

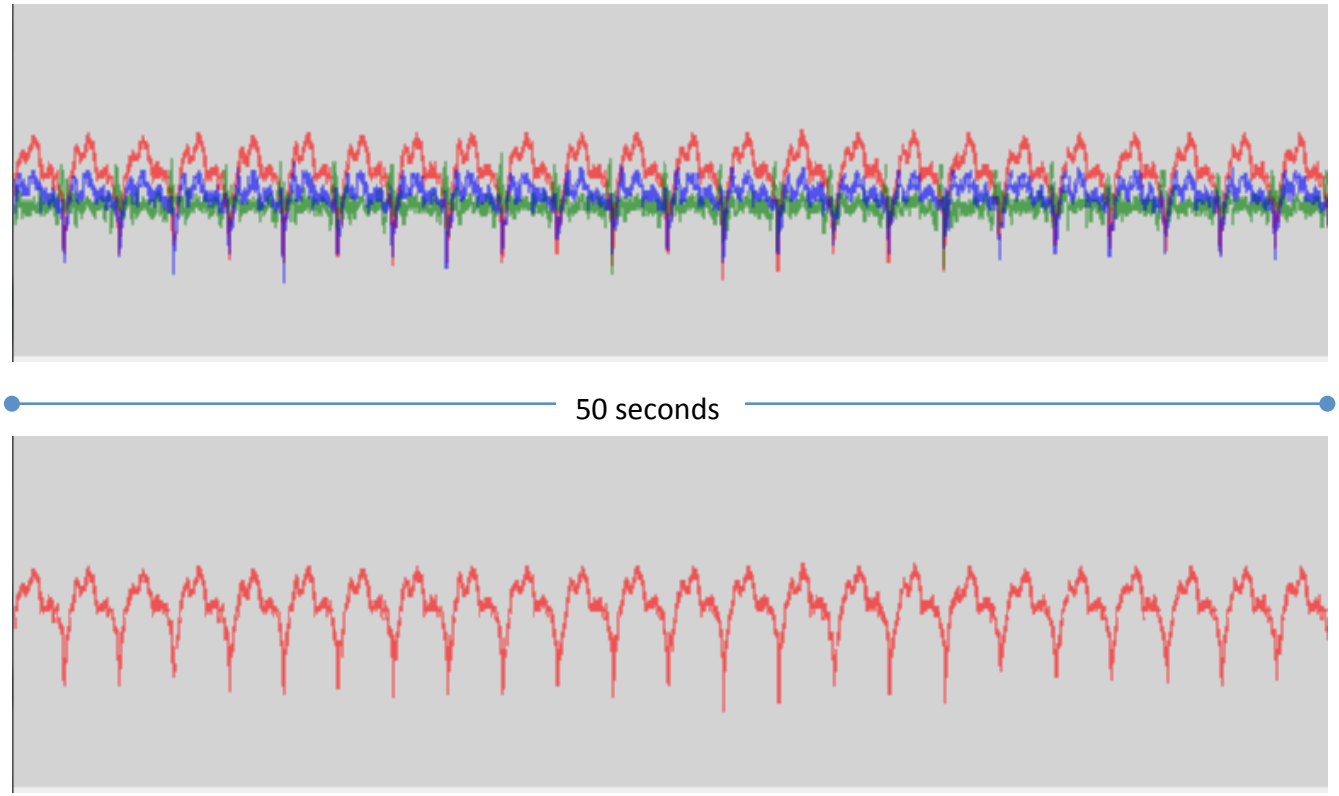
3 minutes



Squash

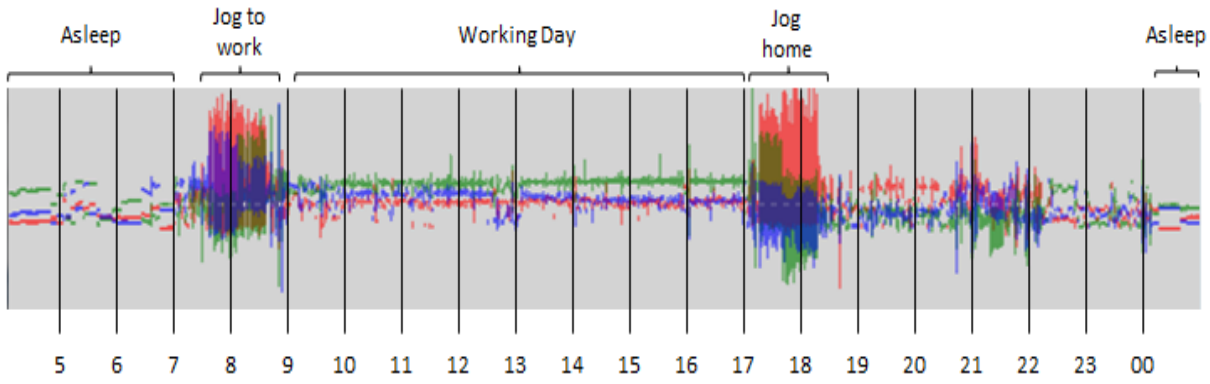
2 minutes

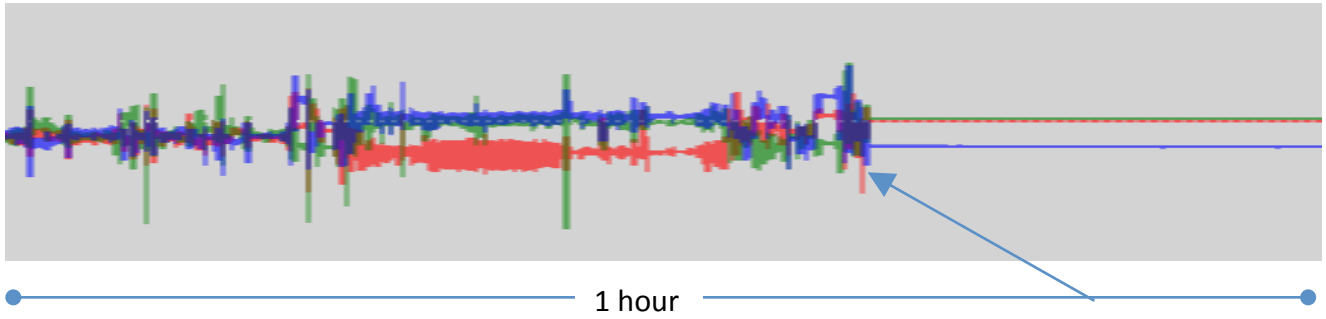
Exemplar data acquired during testing



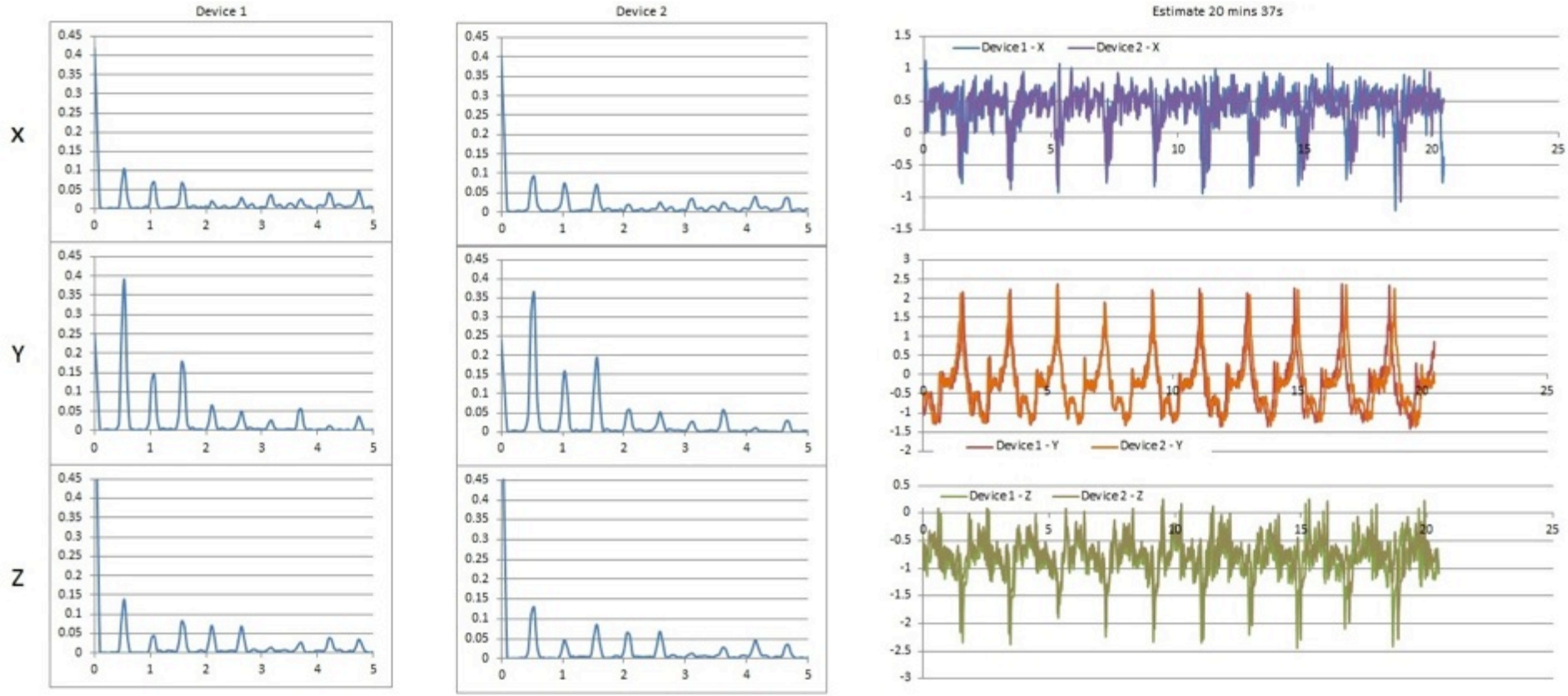
Static Ergo
rowing machine

Sleep-wake cycle





Inter-device reproducibility and impact of orientation and position



Test condition – rowing (30 strokes per minute, L and R hand, and reversed puck)

Process overview – 2 week cycle time from dispatch

biobank uk

E-mail invitation sent to participant

Confirmation by phone or e-mail

Configuration of device – PID and start/stop

Dispatch of mailing pack

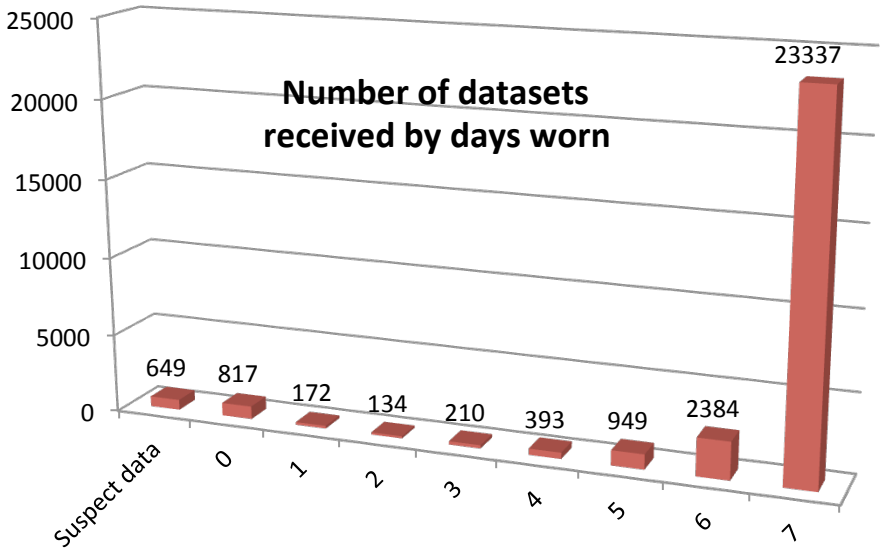
Device worn and returned to PRC

Automated e-mail prompt

Serial data download and re-configuration

Progress to date

- 72,000 invitations sent.
- Positive acceptance rate of 45%
- 1,200 (1,500-1,700) devices are being sent each week
- 28,500 datasets obtained to date
- 14 day cycle time (from dispatch to participant to return and data uploaded)
- 95% of participants wearing for > 5 days (82% for 7 days)



At 14.6.14

Next steps

- Continue data collection to 100,000 participants (est. June 2015)
- Establish a working group under Prof. Nick Wareham to agree short and medium term priorities:
  - What derived data can be extracted from the raw data?
  - Requirement for data cleaning?
  - Establishment of anonymised test data set
  - Validation studies
  - Exemplar projects – e.g. sleep/wake cycle
  - Identification of discrete activities in the data set
  - Others

Funding bodies:

Supported by:

wellcome trust

MRC Medical Research Council

DH Department of Health

British Heart Foundation

DIABETES UK
CARE. CONNECT. CAMPAIGN.

The Scottish Government

Llywodraeth Cymru
Welsh Government