Application of wrist-worn raw accelerometry in large-scale population-based studies: challenges and field-work innovations
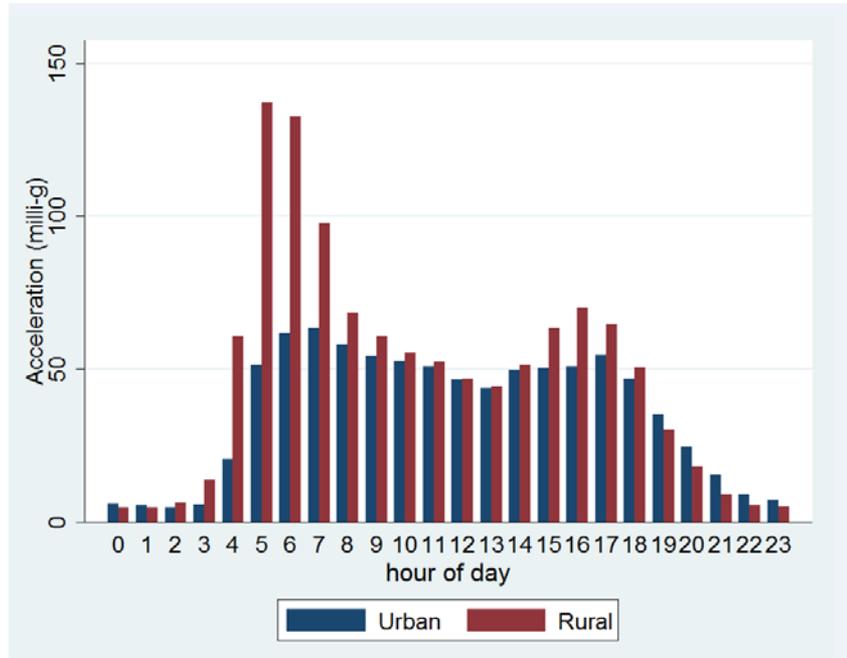
Kirsten Rennie, Kate Westgate, Katrien Wijndaele & Soren Brage

NIHR Cambridge Biomedical Research Centre – Diet, Anthropometry and Physical Activity Group

MRC Epidemiology Unit, University of Cambridge

Objective measure of physical activity in large-scale studies

Diurnal activity profile
by urban-rural

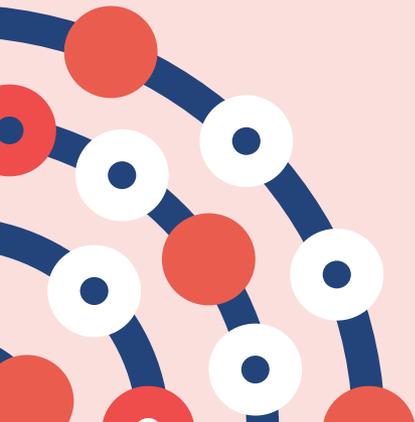Challenges and solutions are rarely in academic publications
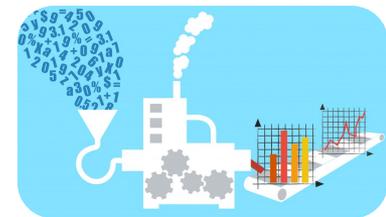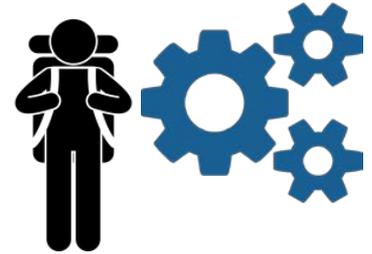
How to translate protocols into action

Focus on adapting and implementing in LMICs

Challenges and some solutions

Challenges

- Infrastructure
- Fieldwork Practicalities
- Data Handling and Processing
- Cultural Perceptions
- Training

Infrastructure

- Customs
- Electricity supply to charge devices
- Internet access
- Deploying and retrieving devices

Training

- Large number of staff
- Limited training time allocated
- Non-specialist
- Key champions
- Standard set up of monitors
- Teaching technical quickly

Cultural Perceptions

- Tracking or monitoring for other reason

- Identify sensitivities early on before study begins

- FAQs adapted for local settings

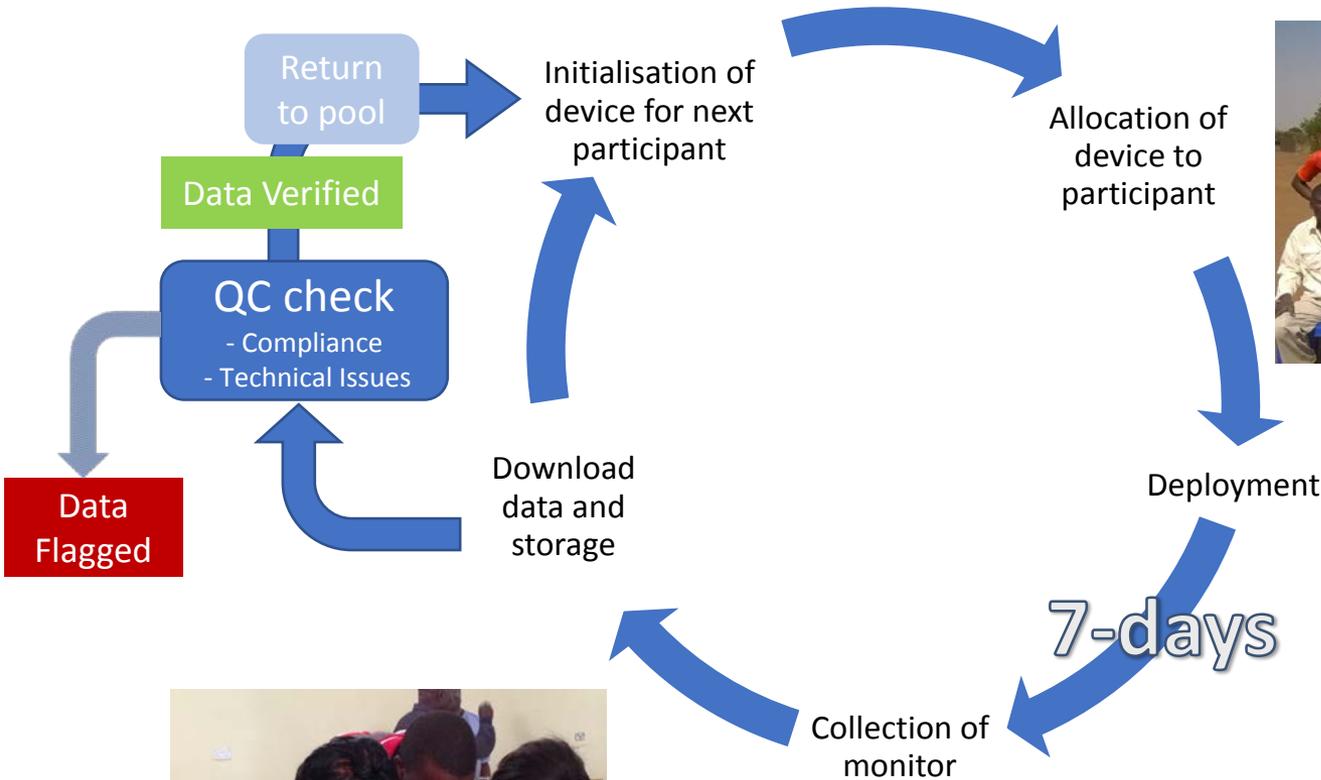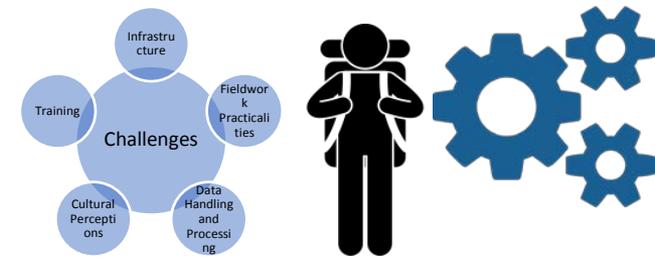NIHR | Cambridge Biomedical Research Centre
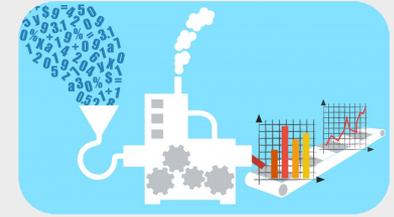
Fieldwork Practicalities

- Acceptability and compliance
- Wearing continuously
- Straps fitting
- Health & Safety work regulations
- Lost monitors
- Stolen monitors

Fieldwork practicalities

Challenges:
- Infrastructure
- Training
- Fieldwork Practicalities
- Cultural Perceptions
- Data Handling and Processing

Return to pool → **Initialisation of device for next participant** → **Allocation of device to participant** → **Deployment**

Data Verified

QC check
- Compliance
- Technical Issues

Data Flagged

Download data and storage

7-days

Collection of monitor

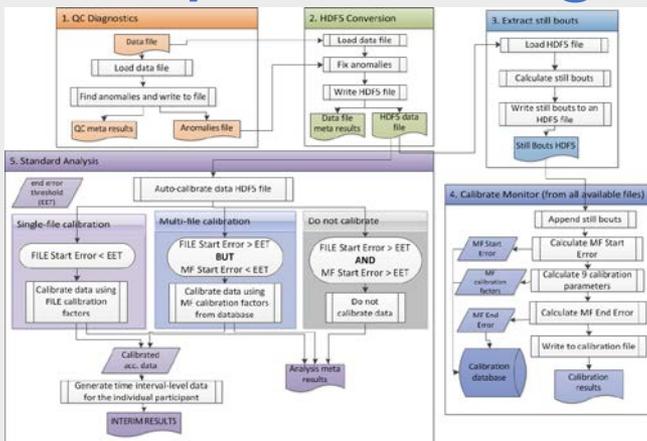# Data handling

StudyID1234a

- Linking device to participant
- Download of data

  e.g. if collecting at 100Hz for 7 days that is 60 million rows of data to download

- Data transfer and storage

Challenges
- Infrastructure
- Training
- Fieldwork Practicalities
- Cultural Perceptions
- Data Handling and Processing
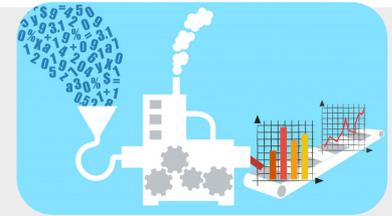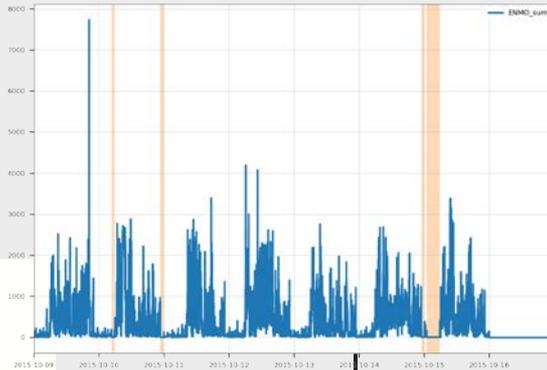
Data processing

- Ensuring high quality data
- Detecting anomalies
- Processing large datasets
- Bespoke pipeline
- Post-processing methods

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