

# BIG DATA INSTITUTE

Li Ka Shing Centre for Health Information and Discovery



## Reproducible machine learning of wearables in healthcare

**Aiden Doherty**

Nuffield Department of Population Health

NIHR Oxford Biomedical Research Centre

British Heart Foundation Centre for Research Excellence

Sleep and Circadian Neuroscience Institute

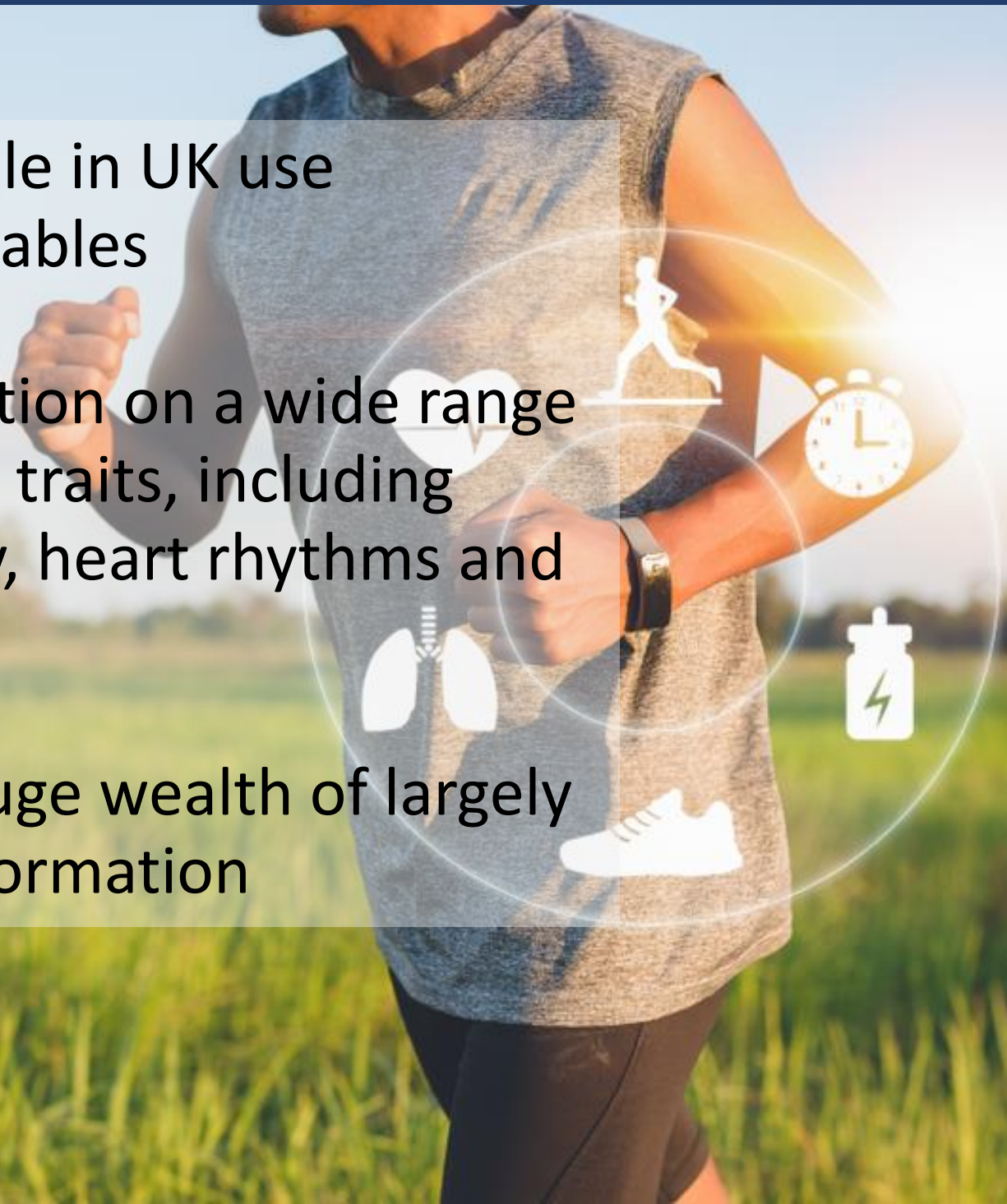
Health Data Research UK

Reuben College



# Wearable sensors in health

- ~8 million people in UK use consumer wearables
- Collect information on a wide range of physiological traits, including physical activity, heart rhythms and sleep patterns
- Represents a huge wealth of largely unexploited information

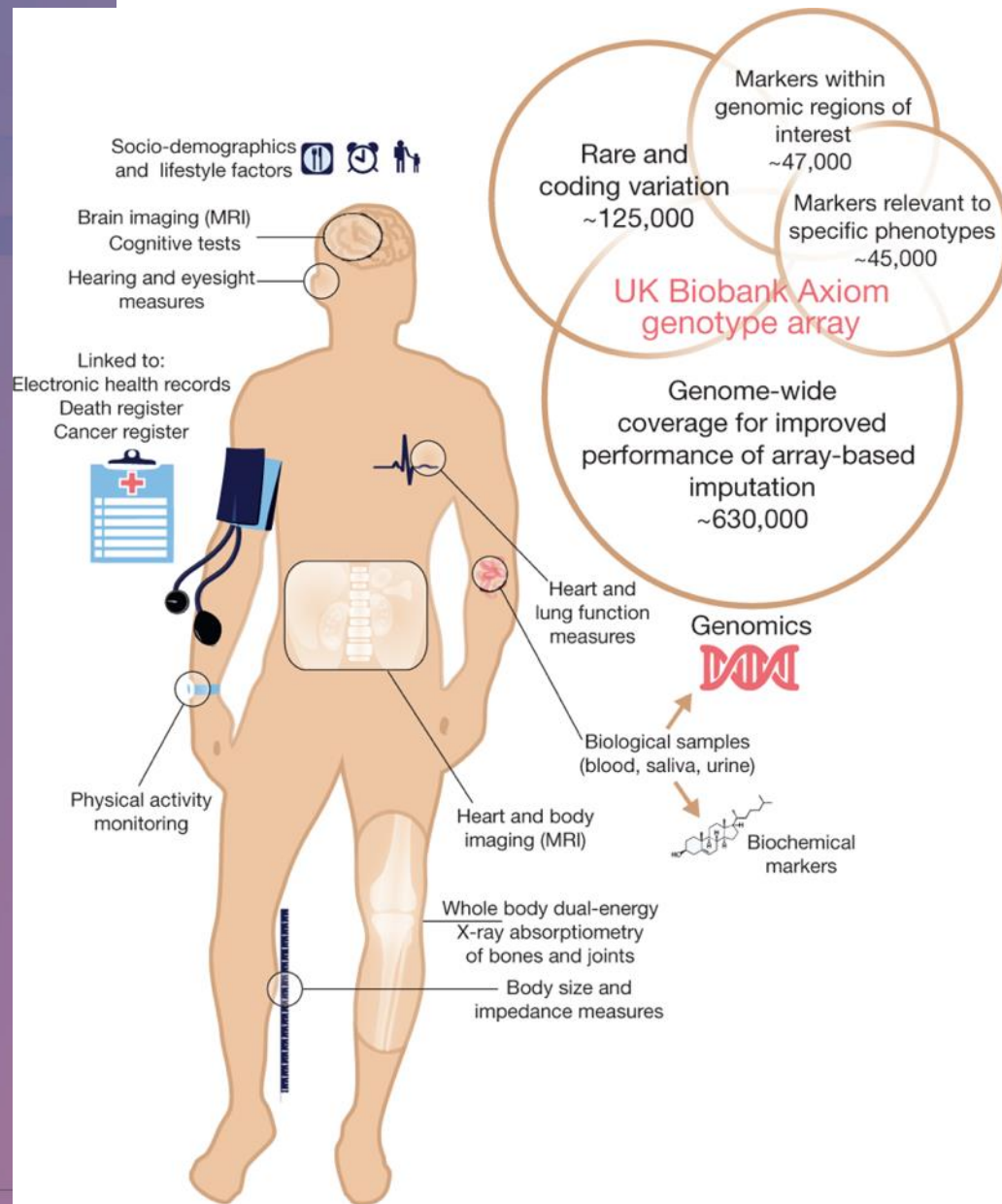




## UK BIOBANK

Genetic and health data  
from half a million people  
in the United Kingdom

PAGES 194, 203 & 210



**TECHNOLOGY**

### TIME TO THINK SMALL

Fleets of tiny satellites could change space exploration

PAGE 185

**OPTOELECTRONICS**

### TURNING UP THE LIGHT

Boost in performance for perovskite LEDs

PAGES 197, 245 & 249

**DEVELOPMENTAL BIOLOGY**

### TWO WAYS TO GROW

A second source for the cells that line blood vessels

PAGES 195 & 223

# AI to learn functional activities from wearables



Sitting



Walking

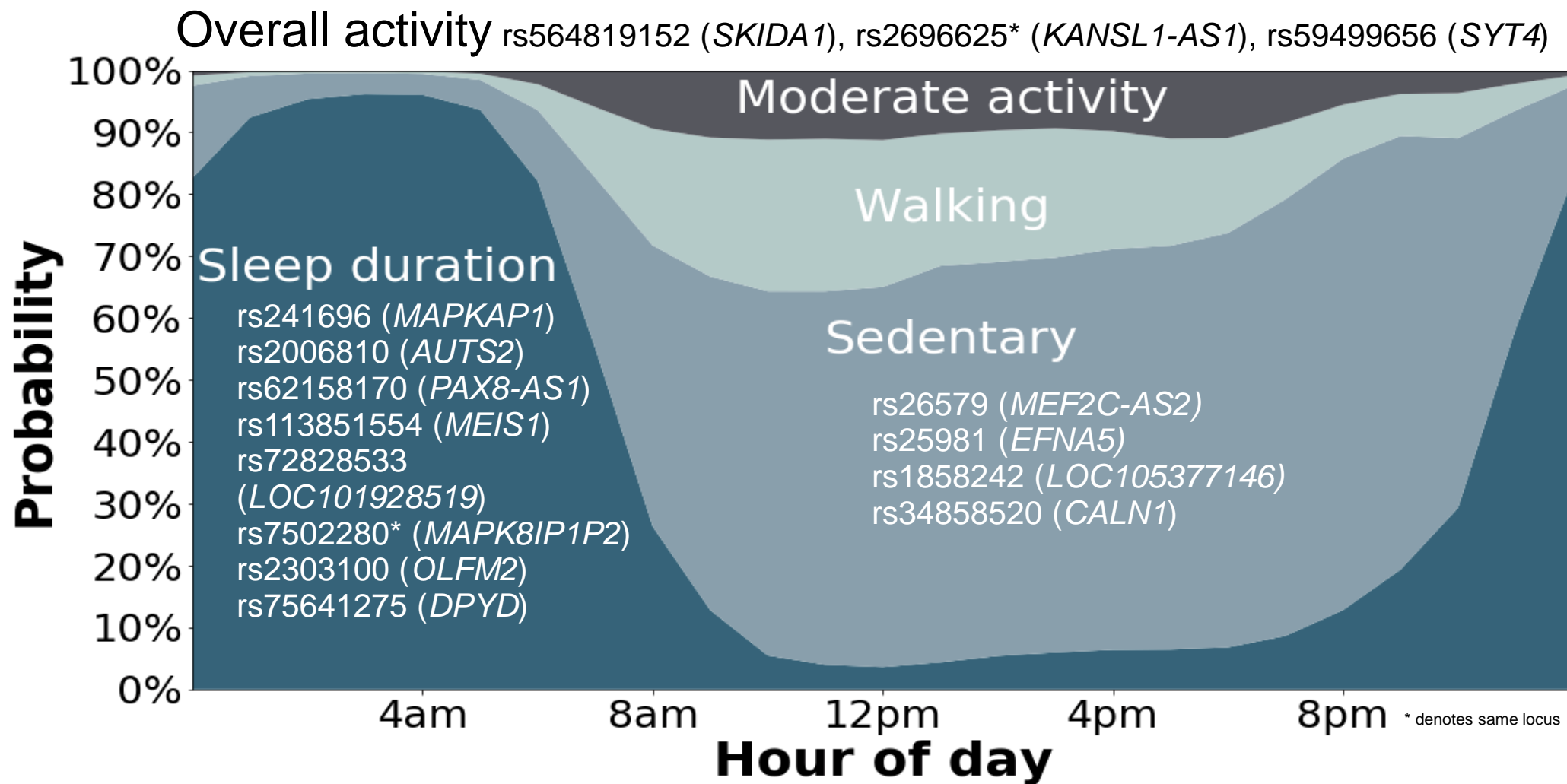


Driving

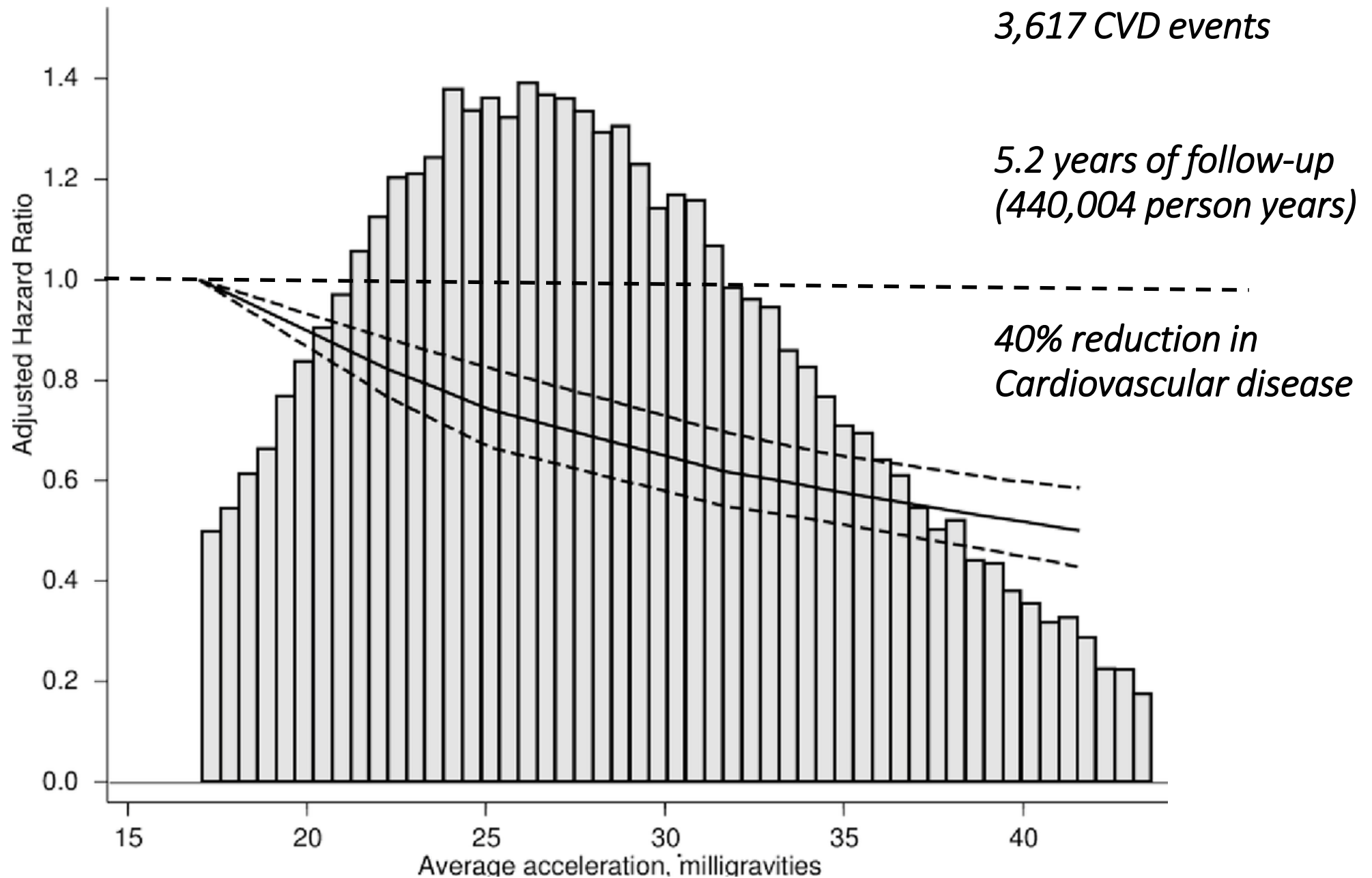
# Machine learning of behaviours from acc data

150 people – activity monitors + cameras

# Unique behavioural & genetic insights (n=91,105)



# Physical activity & incident Cardiovascular Disease



## Opportunities for collaboration

- Data: Wearables in large biobanks across nations  
*e.g. Our Future Health (UK), FinnGen (Finland), HUNT (Norway)*
- Methods: Reproducible machine learning to ensure trustworthy insights
- Industry partnership: Combine wearables & genomics to identify new therapeutic targets