

# Physical activity across (adult) life

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CENTRE FOR  
LONGITUDINAL  
STUDIES



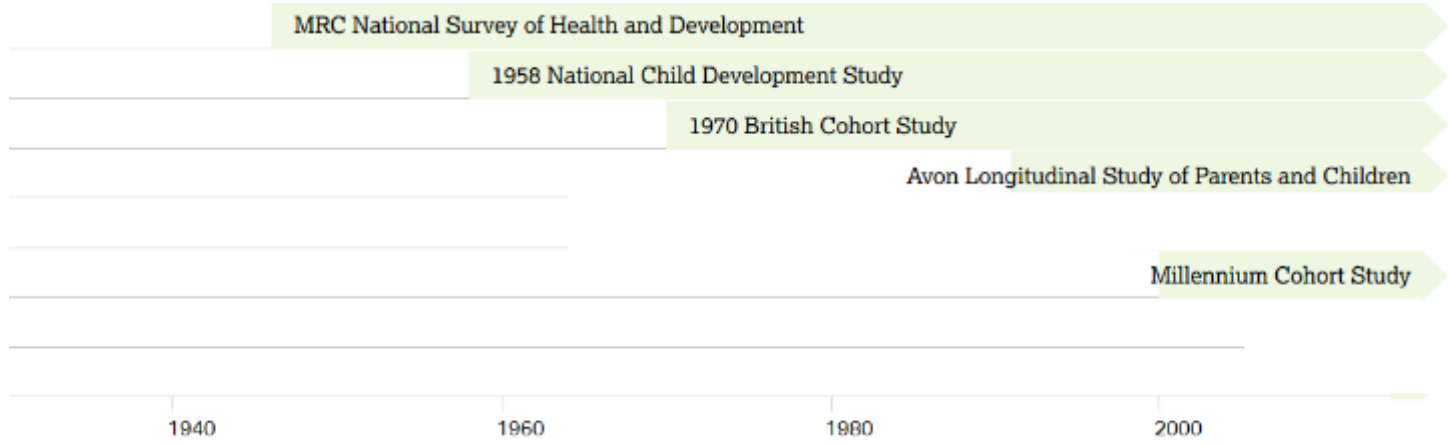
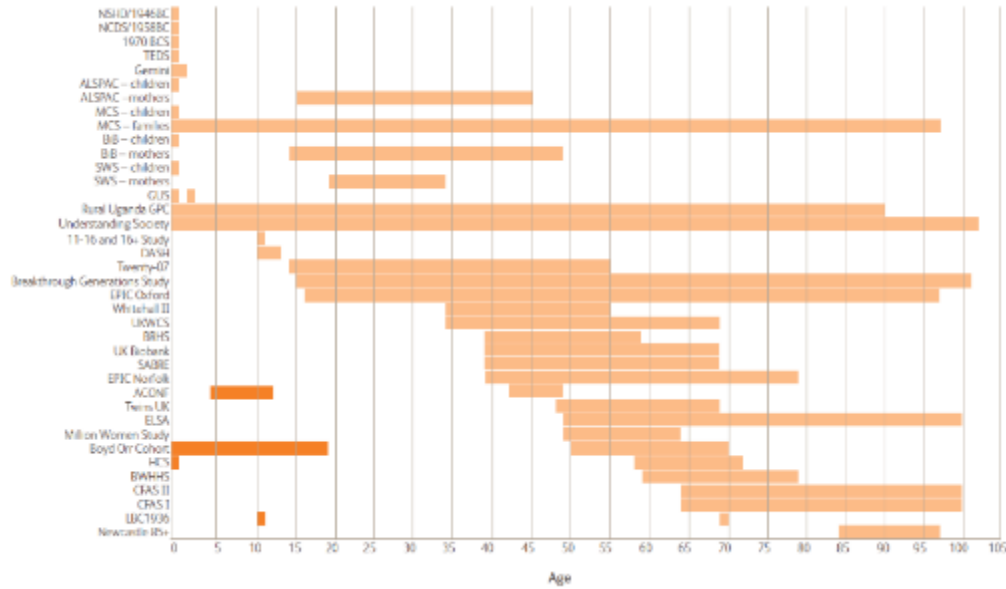
# Overview

## Birth cohort data (and PA data available)

Evidence:

1. Correlates/determinants of PA
2. SES inequalities in PA
3. Nature of health benefits of PA

# Longitudinal data in the UK



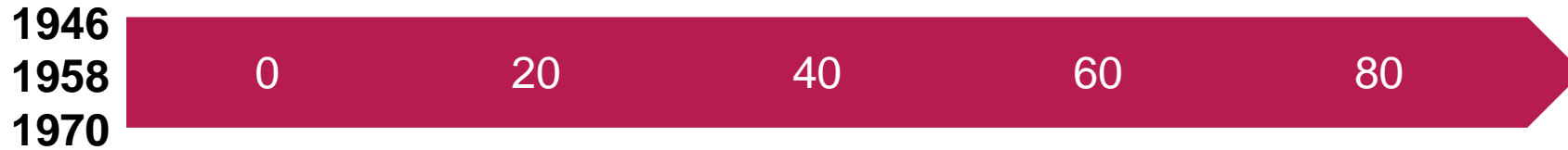
MRC Strategic Review (2015)



## Birth cohorts:

- Large ~nationally representative
- Data across life
- Complementary epidemiological evidence to HSE
  - Distribution & determinants of health

# Physical activity measures – largely in adulthood



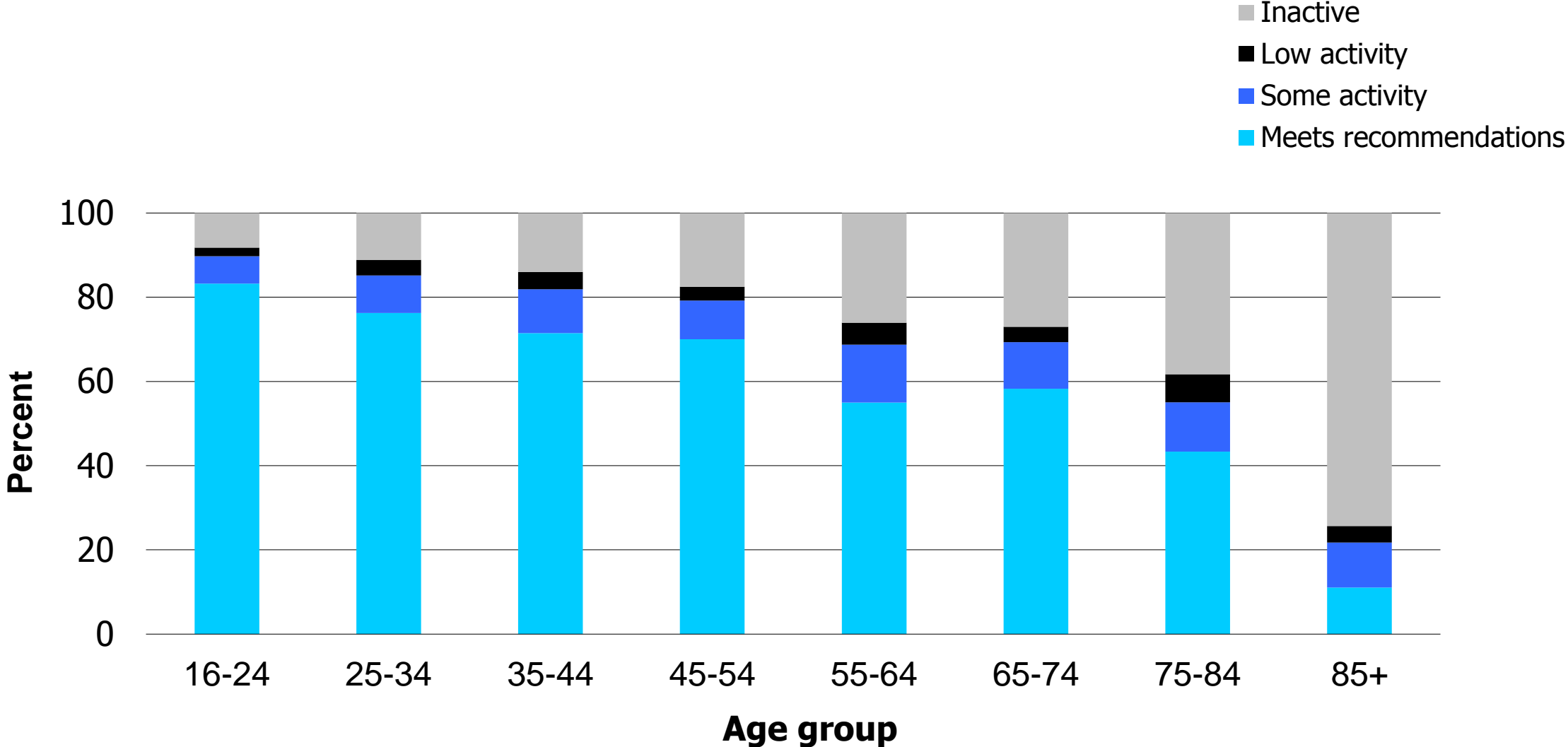
## Portable devices ('objective')

- Relatively recent, rapidly changing
- 1946c: 60-64y (Actiheart), 69y (GCDC X15-1c for impact)
- 1958c: (not currently funded, next follow-up 60y)
- 1970c: 46y (ActivPal; data collection ongoing)

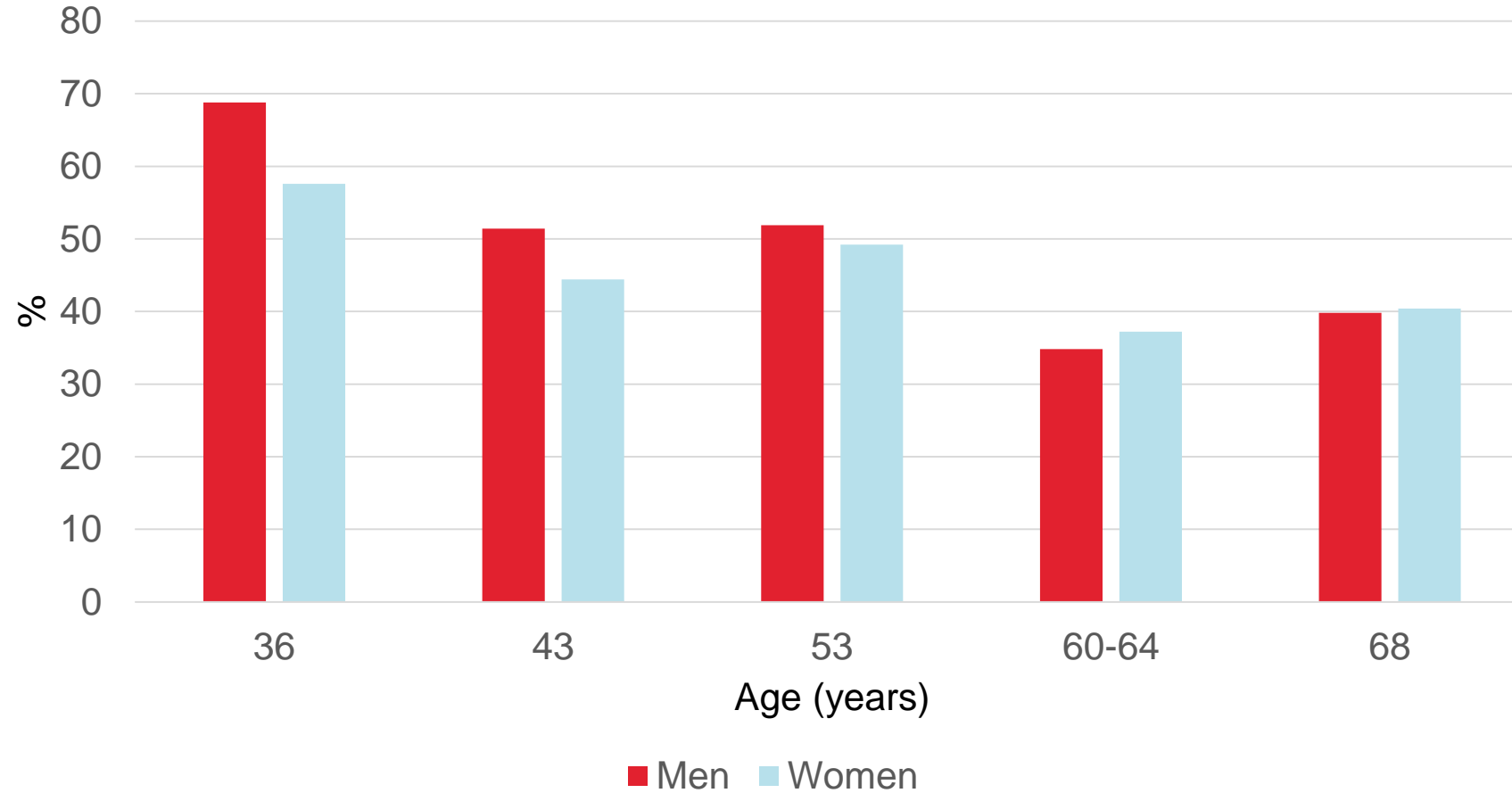
## Self-report: capturing domain/context

- Each cohort: Repeated questions on leisure time activity, detail varies

# Changes across life: cross-sectional evidence

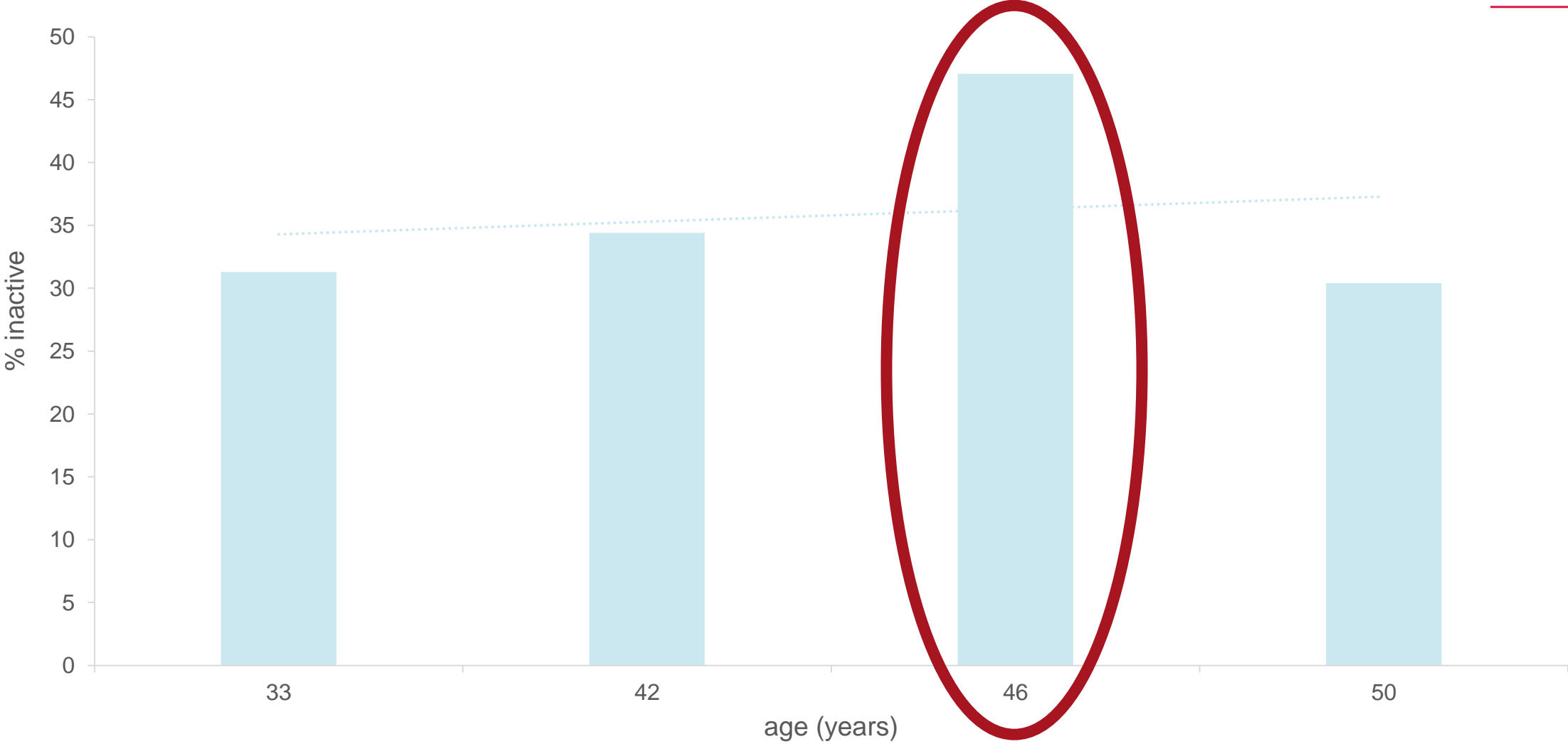


# Change across life: longitudinal evidence (1946c)



*Participated in the previous 4 weeks in any sports, vigorous leisure-activities or exercise.*

# Change across life: longitudinal evidence (1958c)



*Participated <1 per week in LTPA (including walking)*

# Overview

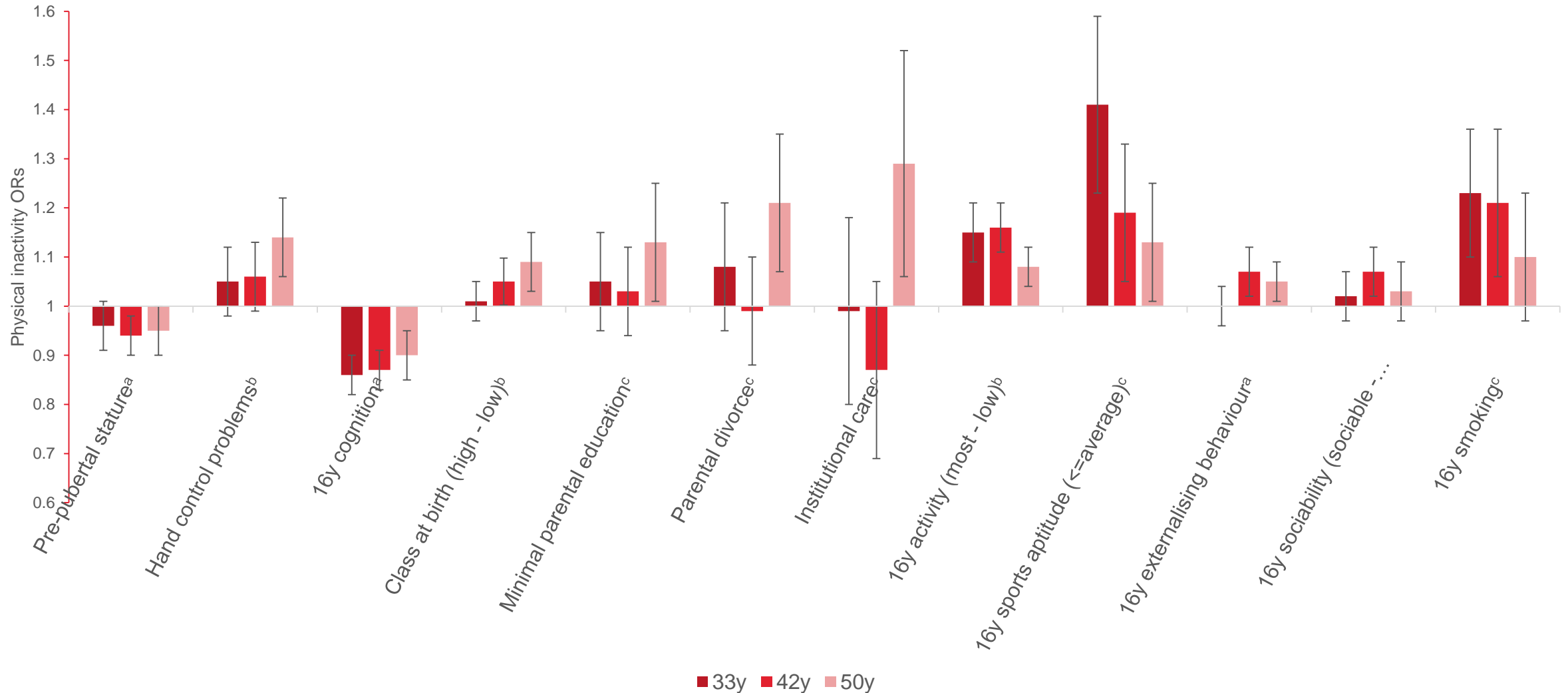
PA data available across life

Evidence:

## 1. Correlates/determinants of PA



# Predictors of inactivity at 33, 42y and 50y: Physical, social, behavioural (1958c)

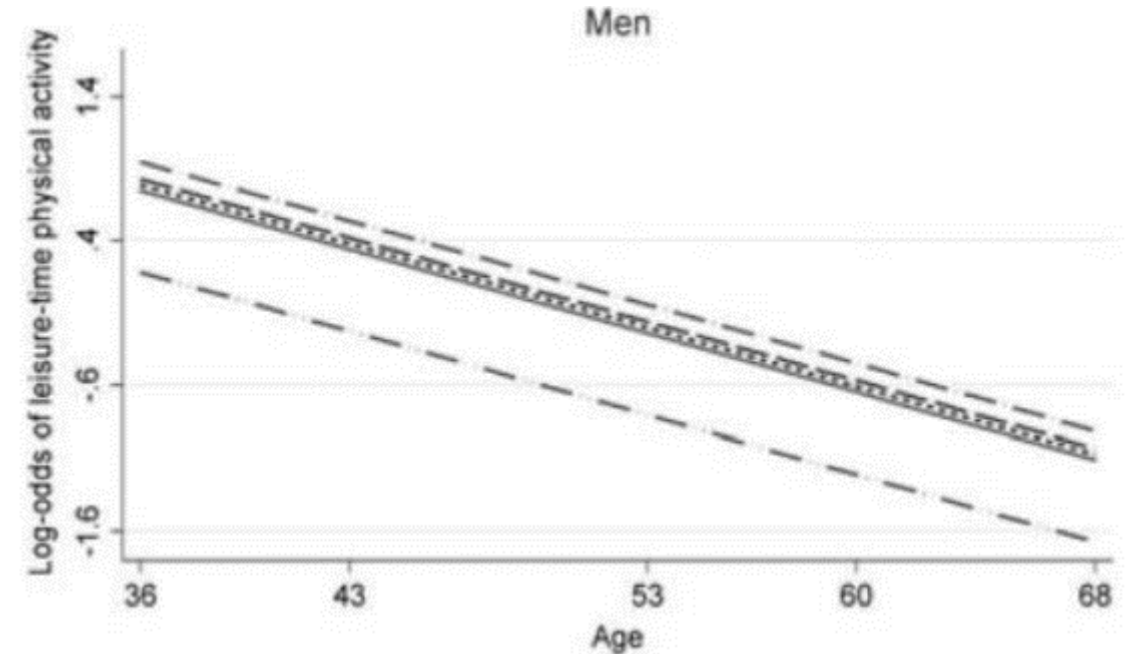


<sup>a</sup> Per 1SD increase; <sup>b</sup> Per increase in scale; <sup>c</sup> Those with vs those without the attribute

# Birth weight, school sports ability & leisure time PA from 36-68y (1946c)

OR (95% CI) of Above Average or Average Ability in Sports vs Below Average Ability

	Model 1	Model 2
Birth weight group (kg)		
≤2.50	1.00 (reference)	1.00 (reference)
2.51–3.00	1.97 (1.19–3.25)	1.91 (1.15–3.16)
3.01–3.50	2.01 (1.26–3.19)	1.91 (1.20–3.05)
3.51–4.00	1.82 (1.14–2.89)	1.66 (1.04–2.66)
>4.00	1.60 (0.95–2.72)	1.41 (0.82–2.42)



- Low BW: ~prenatal growth
  - Motor deficits, body comp, function, health
  - Yet no assoc. in 1958c

# Overview

PA data available across life

Evidence:

1. Correlates/determinants of PA
2. **SES inequalities in PA**

# SES inequalities in PA

## A systematic review of the relationship between socio-economic position and physical activity

Christopher Gidlow<sup>a</sup>, Lynne Halley Johnston<sup>b</sup>, Diane Crone<sup>c</sup>, Naomi Ellis<sup>a</sup> and David James<sup>c</sup>

Scholes et al. *BMC Public Health* 2012, **12**:129  
<http://www.biomedcentral.com/1471-2458/12/129>

### RESEARCH ARTICLE

### Open Access

## Persistent socioeconomic inequalities in cardiovascular risk factors in England over 1994-2008: A time-trend analysis of repeated cross-sectional data

Shaun Scholes<sup>1\*</sup>, Madhavi Bajekal<sup>1</sup>, Hande Love<sup>2</sup>, Nathaniel Hawkins<sup>3</sup>, Rosalind Raine<sup>1</sup>, Martin O'Flaherty<sup>3</sup> and Simon Capewell<sup>3</sup>

### REVIEW

### Open Access

## Childhood socioeconomic position and adult leisure-time physical activity: a systematic review



Ahmed Elhakeem<sup>1\*</sup>, Rachel Cooper<sup>1</sup>, David Bann<sup>2</sup> and Rebecca Hardy<sup>1</sup>

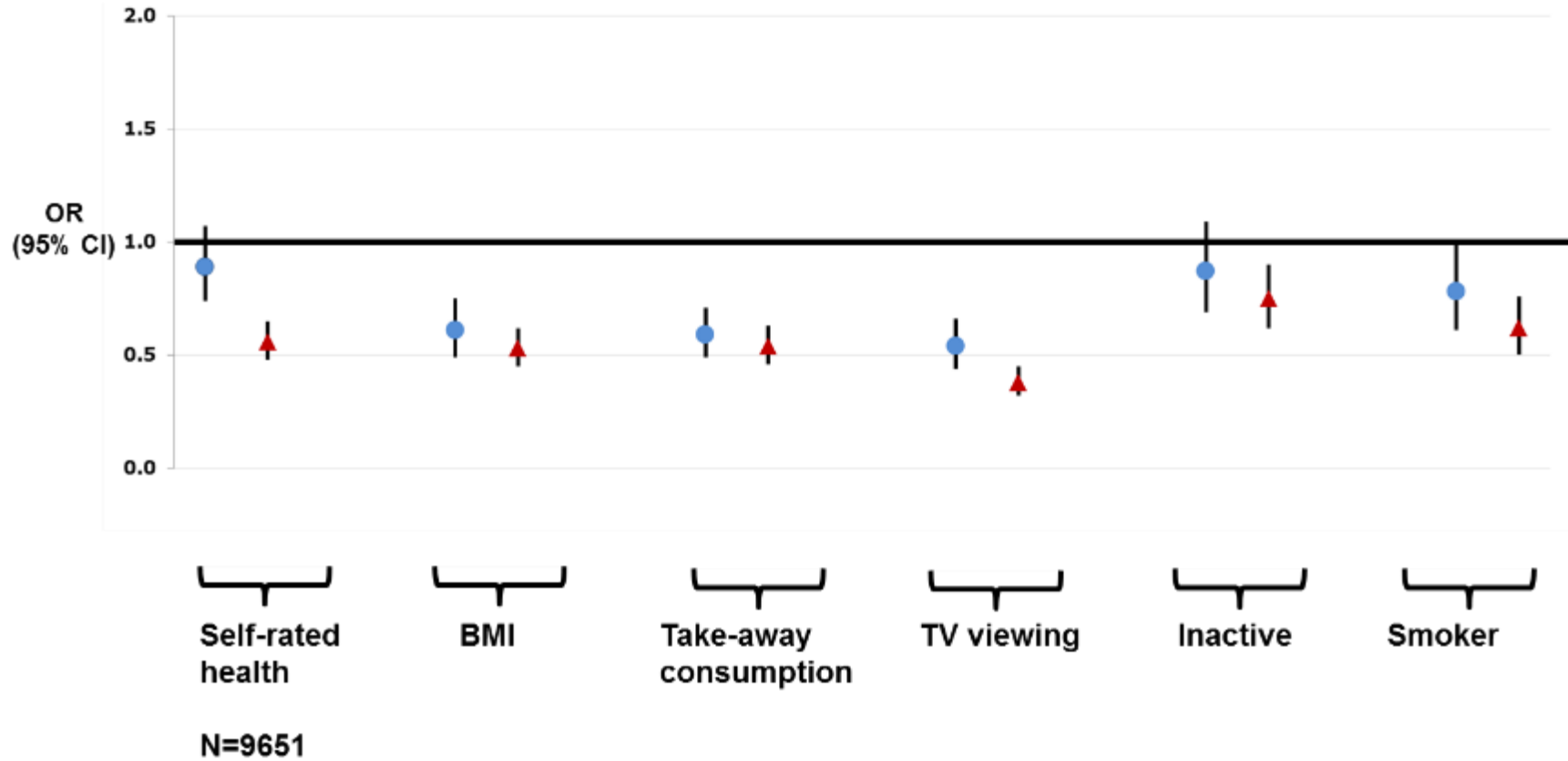
## Intergenerational social mobility and leisure-time physical activity in adulthood: a systematic review

Ahmed Elhakeem,<sup>1</sup> Rebecca Hardy,<sup>1</sup> David Bann,<sup>2</sup> Rishi Caleyachetty,<sup>1</sup> Theodore D Cosco,<sup>1</sup> Richard PG Hayhoe,<sup>3</sup> Stella G Muthuri,<sup>1</sup> Rebecca Wilson,<sup>1</sup> Rachel Cooper<sup>1</sup>

# High school attended related to reported health and behaviours at 42 years

## Sex adjusted

Ref: Comp. ● Grammar ▲ Private school



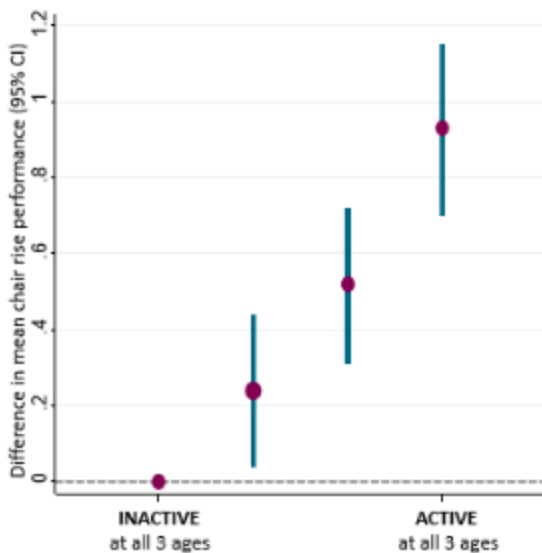
# Overview

PA data available across life

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3. **Nature of health benefits of PA**

# Nature of association: cumulative benefits

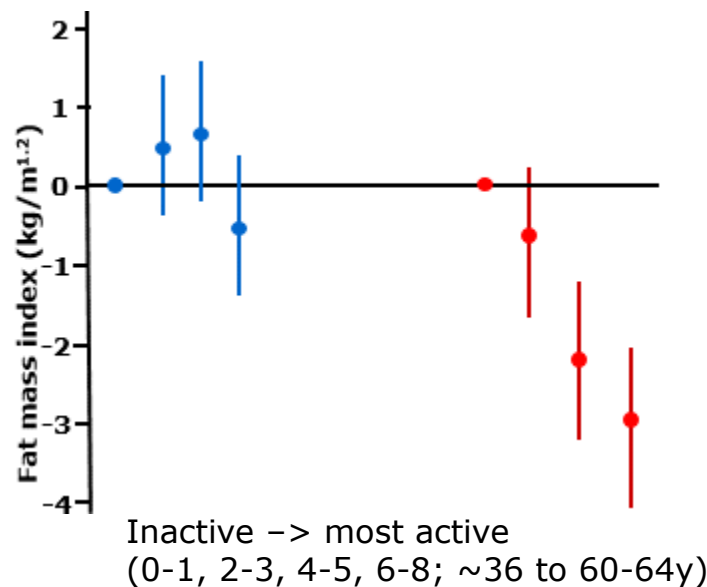


## Physical activity score:

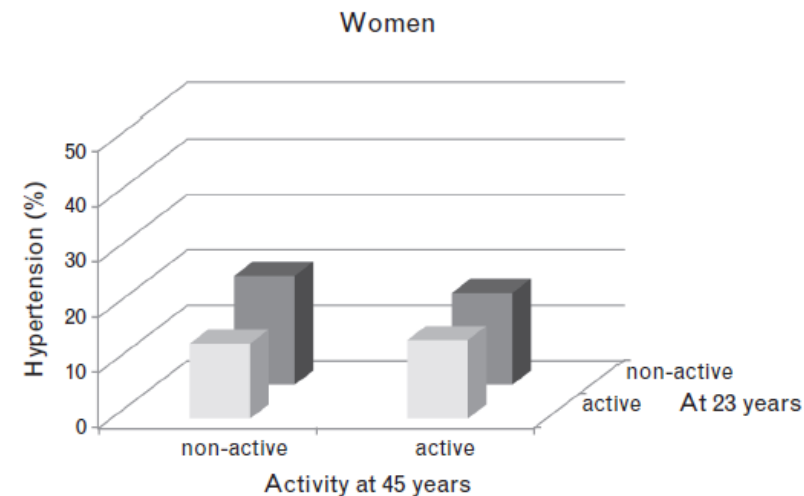
At each age physical activity level scored as:  
Inactive=0; Less/Moderately active=1; Most active=2  
Sum of scores from 3 ages = lifetime physical activity score

MRC LHA @ UCL

## Physical function (1946c)



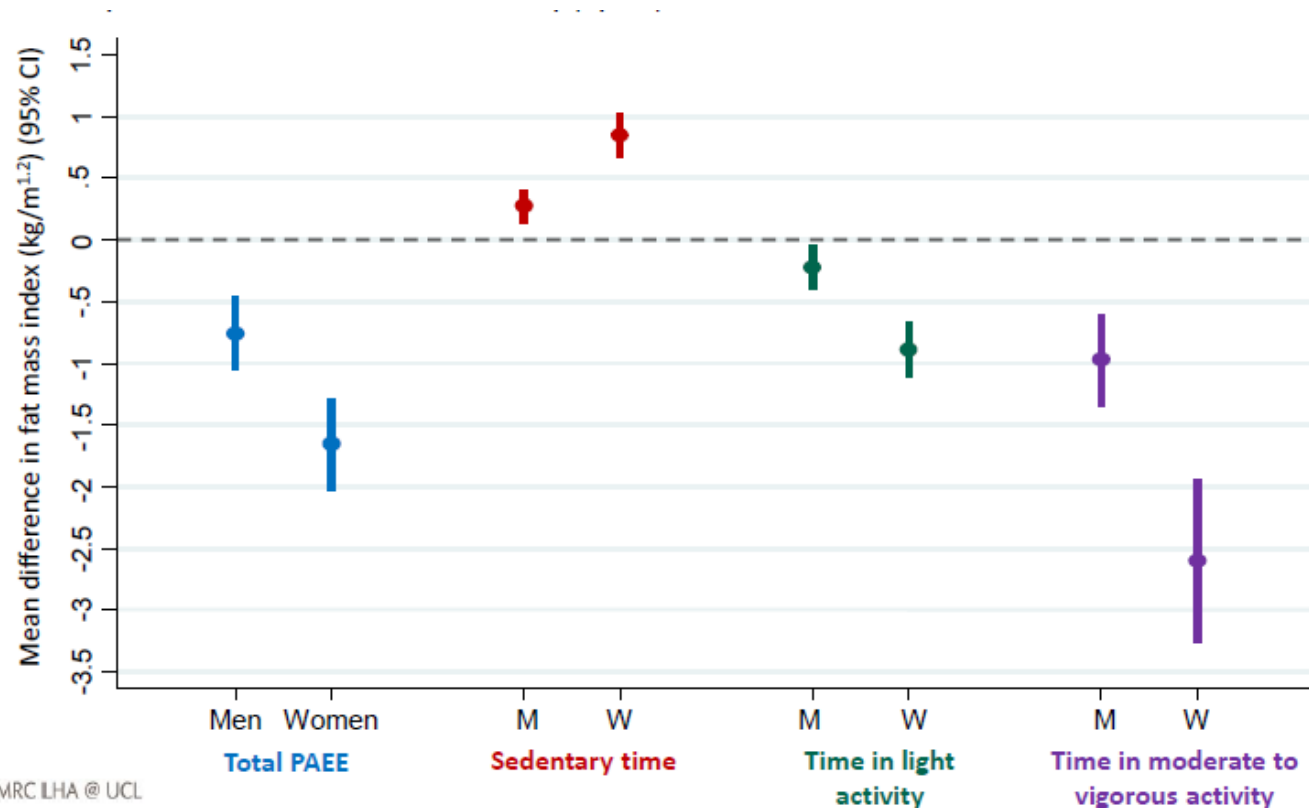
## Body composition (1946c)



## Hypertension (1958c)

- Longitudinal design aids but doesn't guarantee causal inference
- Prospectively measured early life confounders (yet residual or reverse causality)

# Nature of association: different intensities and types (1946c)



## Physical Activity and Mental Well-being in a Cohort Aged 60–64 Years

Stephanie V. Black, MSc, Rachel Cooper, PhD, Kathryn R. Martin, PhD, Soren Brage, PhD, Diana Kuh, PhD, Mai Stafford, PhD



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# Acknowledgments

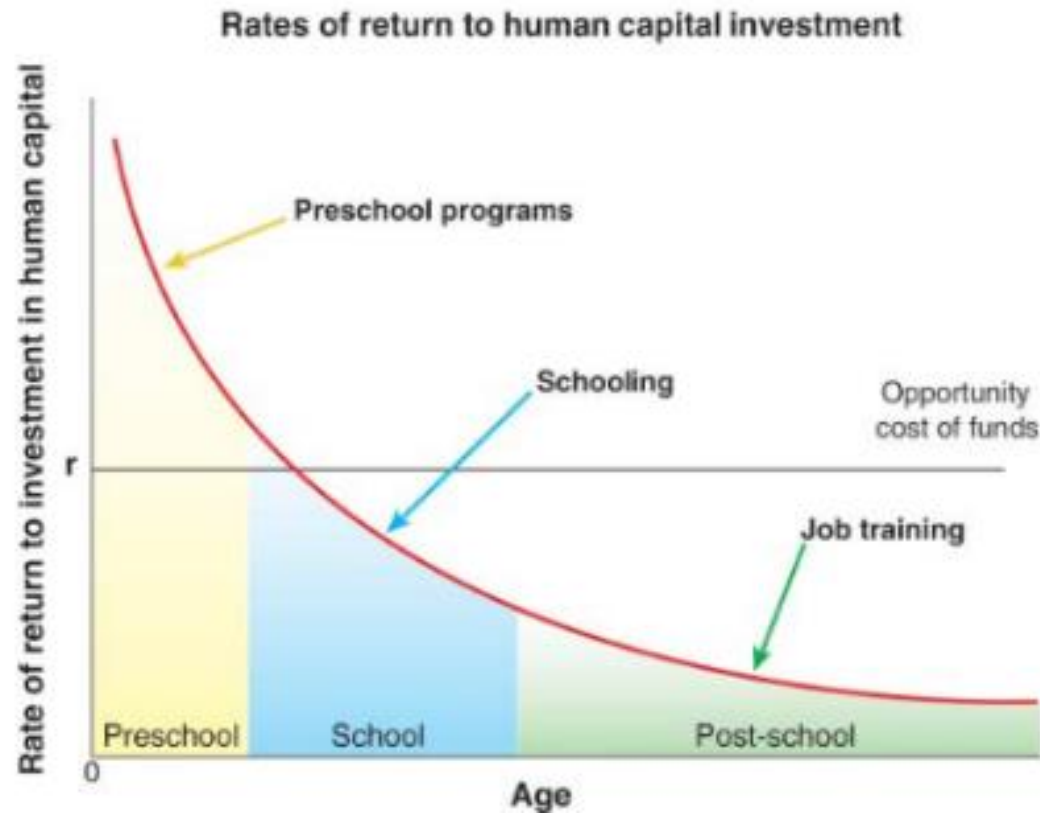
- Colleagues for slides/figures:
  - Rachel Cooper
  - Snehal Pinto Pereira
  - Ahmed Elhakeem
  - Mark Hamer
  
- Colleagues at the Centre for Longitudinal Studies
  - Cross-Cohort Research Program (PI George Ploubidis)
  
- ESRC & MRC funding



# Appendix

# Potential Implications

- Causal inference caution: bias, context, evidence synthesis, multiple outcomes
- Most optimal period of life to intervene?
  - Early life given direct + indirect (eg, tracking) effects
  - Consistent with broader literature on value of early intervention



Knudsen, Heckman et al *PNAS* 2006

# Potential Implications

- Multiple early life correlates/determinants of adult PA
  - Socioeconomic, physical (growth & co-ordination), behaviours/traits
    - Potential targets to identify those for PA support
    - Targets for intervention themselves
- SES inequalities appear persisting & multidimensional
  - eg, childhood SES net of adult SES
  - To understand inequalities & policy impacts:
    - Document multiple dimensions of SES inequalities across time

Do we have the data/resources to do this?