

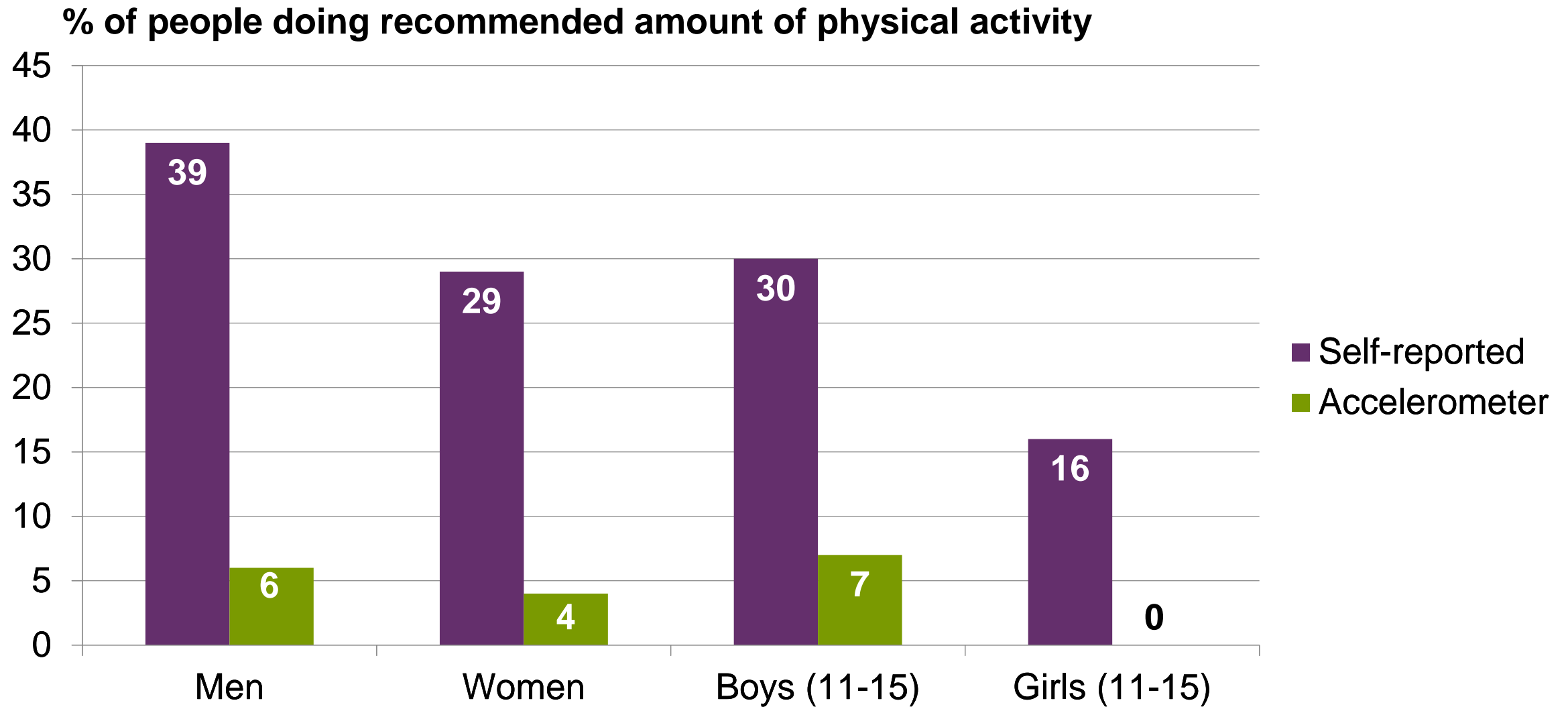
Using wearable technology to measure physical activity in BCS70 and MCS

Matt Brown, Emily Gilbert, Lisa Calderwood

Measuring physical activity

- Physical activity levels are strongly associated with many other outcomes – obesity, cardio-vascular health, well-being etc.
- Much concern about low levels of physical activity in both childhood and adulthood
- Been a focus of all of the cohort studies for a long time
- Typically measured by self-reporting BUT:
 - Social desirability
 - Recall bias
 - Intensity of exercise is subjective

Self-report vs objective measure



Health Survey for England (2008)

MCS and BCS70

	BCS70	MCS
Sample	c. 17,000 born in one week in 1970 in Great Britain	c. 19,000 born between 2000 and 2002 in the UK
Previous waves	Birth, 5, 10, 16, 26, 30, 34, 38, 42	9 months, 3, 5, 7, 11
Focus	Multi-disciplinary studies covering all aspects of development	
Current / latest wave	Age 46 Nurse visit (interview, cognitive assessments and full series of biomeasures and placement of activity monitor)	Age 14 Interviewer visit (interview plus saliva collection, physical measurements, placement of time use diary and activity monitor)

Measuring physical activity in the MCS Age 14 Survey

- Used the wrist-worn GENEActiv Original activity monitor.
- Measures movement on three axes, and provides a measure of time spent in light, moderate and vigorous physical activity.
- Some evidence to suggest compliance is higher with wrist-worn devices
(Freedson & Dinesh, 2013; Fairclough et al. 2016).



MCS protocol

- Young people were asked to wear the activity monitor on two randomly-selected days, one a weekday and one a weekend day.
- Interviewers explained the task to young people during the household visit, told them which two days had been selected, and left them with written information.
- Text message and email reminders were sent to young people and parents the day before each selected day.
- Young people were asked to post the monitor back in pre-paid envelope after the second day.

Compliance and return

	%
Agree to wear	80% (of eligible)
Return rate	72% (of those who agreed)
Compliance	% of returned devices
0 days	16%
1 day	11%
2 days	63%



Measuring physical activity in the BCS70 Age 46 Survey

- Used the thigh worn ActivPal device
- Accelerometer and also measures postural allocation to accurately distinguish between different types of sedentary activity (standing, sitting, sleeping) and transitions between



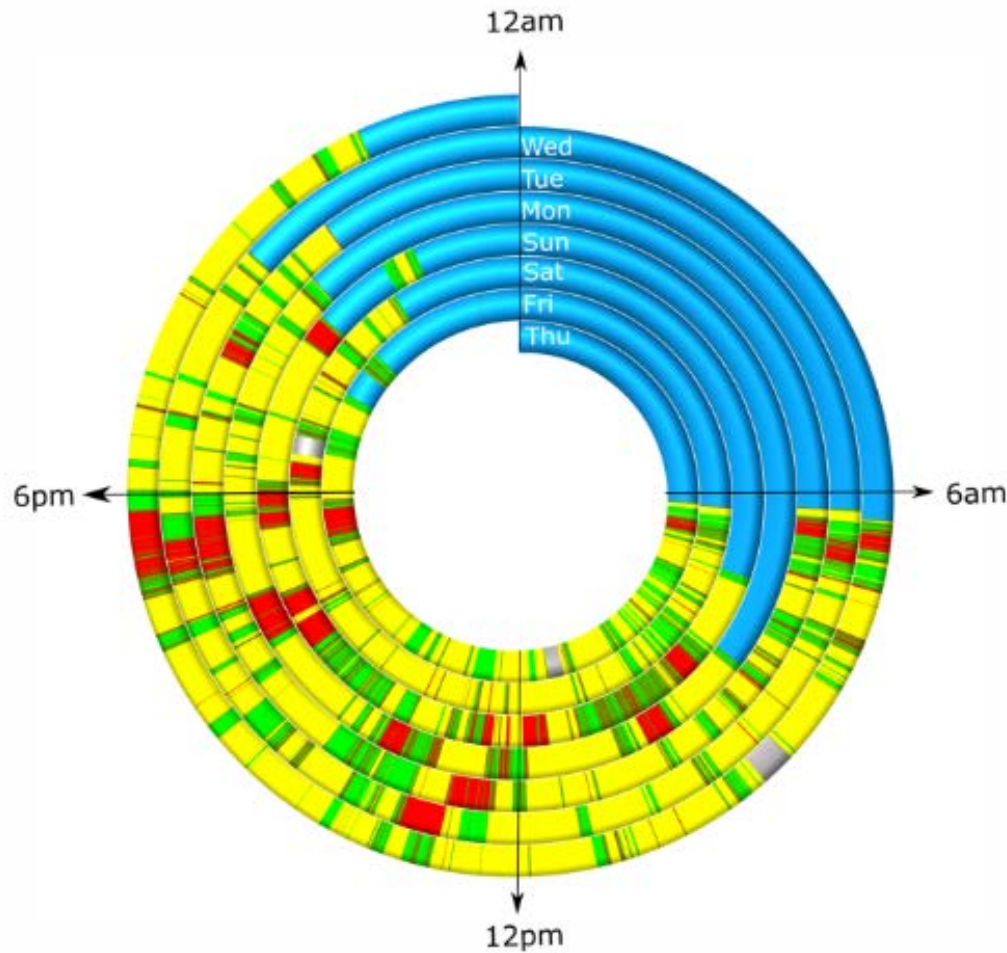
BCS70 protocol

- Participants asked to wear the device for the seven days following their visit
- A leaflet is provided in advance, then nurses explain further at end of home visit
- Nurses vacuum-seal the device in the home (to make waterproof) and affix to thigh using a medical dressing.
- Participants asked to post the monitor back (with 7 day sleep diary) in pre-paid envelope after 7 days – reminders by email and text
- Summary feedback provided

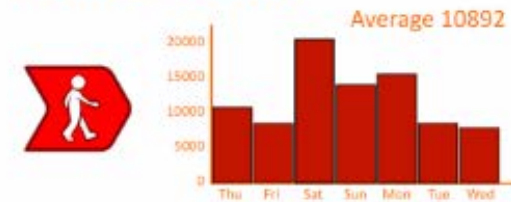
Feedback

activPAL

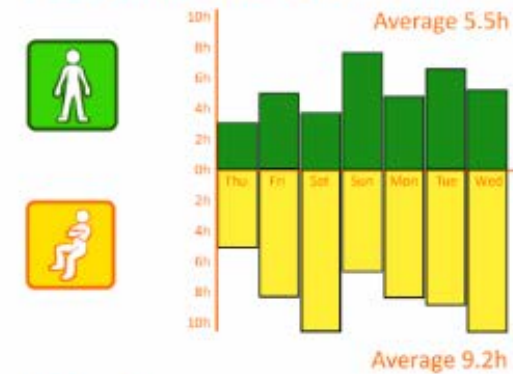
Thurs 21st June 2012 - Wed 27th June 2012



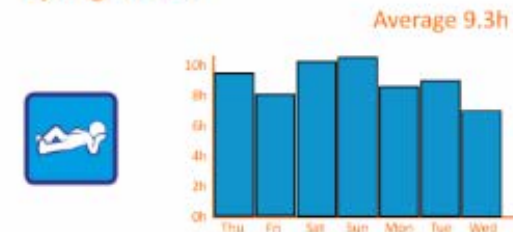
Number of Steps



Sedentary and Upright time



Lying time



Compliance and return

	%
Agree to wear	87% (eligible)
Return rate	92% (of those who agreed)
Compliance	% of returned devices
0	3%
1	3%
2	3%
3	5%
4	5%
5	5%
6	14%
7	62%

Lessons learned

- **Successful – good compliance rates (especially with adults)**
- **However....**

Lessons learned

- Costly!
 - Devices (ActivPal - £125 per device, GENEActiv - £120)
 - Interview time (fitting the ActivPal – 10 minutes)
 - Device management – fieldwork agency costs
 - Staff time
 - Planning
 - Protocol development / dealing with issues
- Technical issues
- Complex data management