Ulster University

Promoting physical activity and reducing sedentary behaviour in young people

ulster.ac.uk

@MarieHMurphy

UK guidelines on PA and SB for children

How active are children in the UK & Ireland?

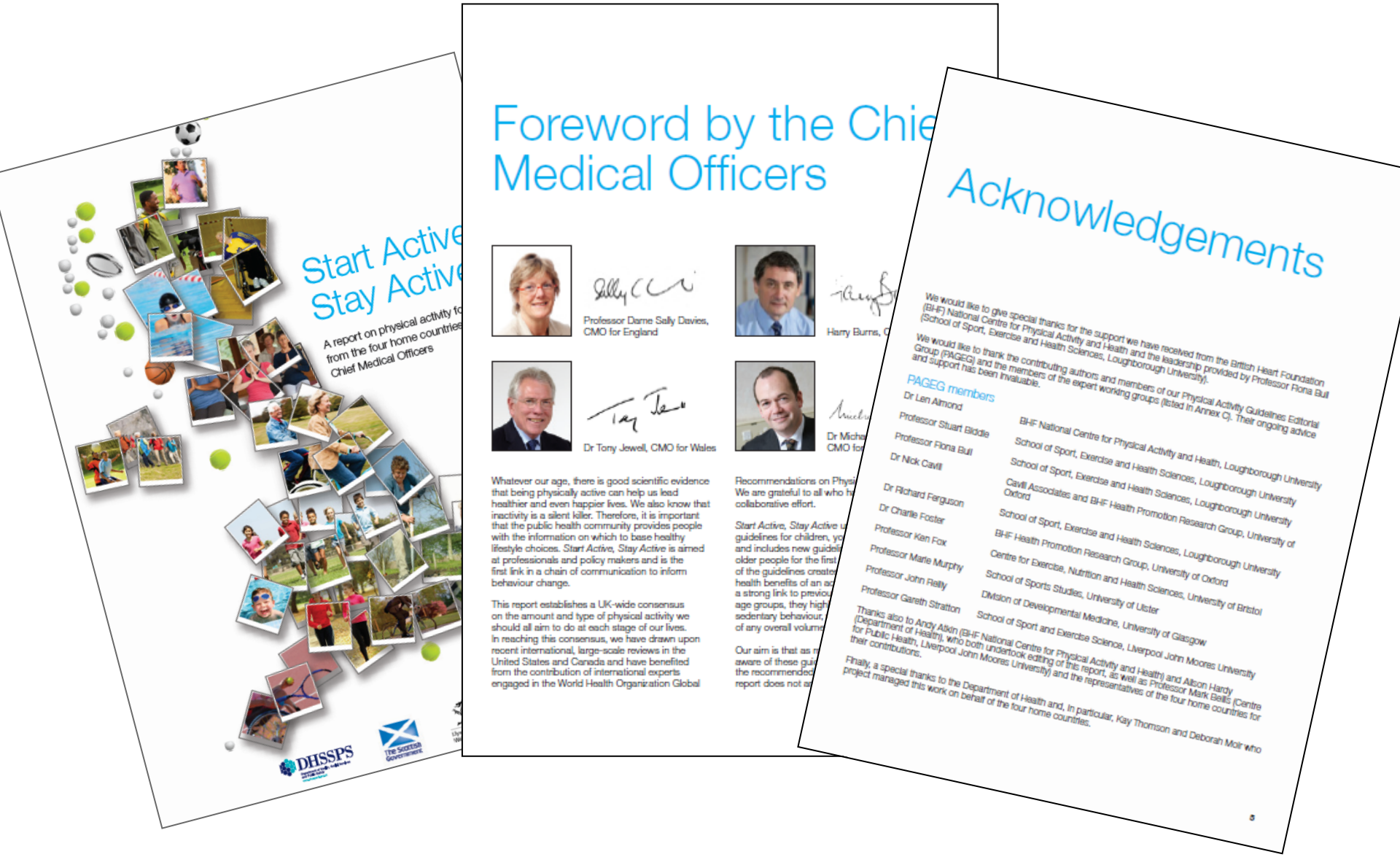
What type of interventions work best?

Snapshot of some PA/SB Interventions

Ireland's (north & south) PA Report Card

Ulster University

The UK Physical Activity Guidelines 2011



Department of Health (2011) Start active, stay active: a report on physical activity from the four home countries' Chief Medical Officers.

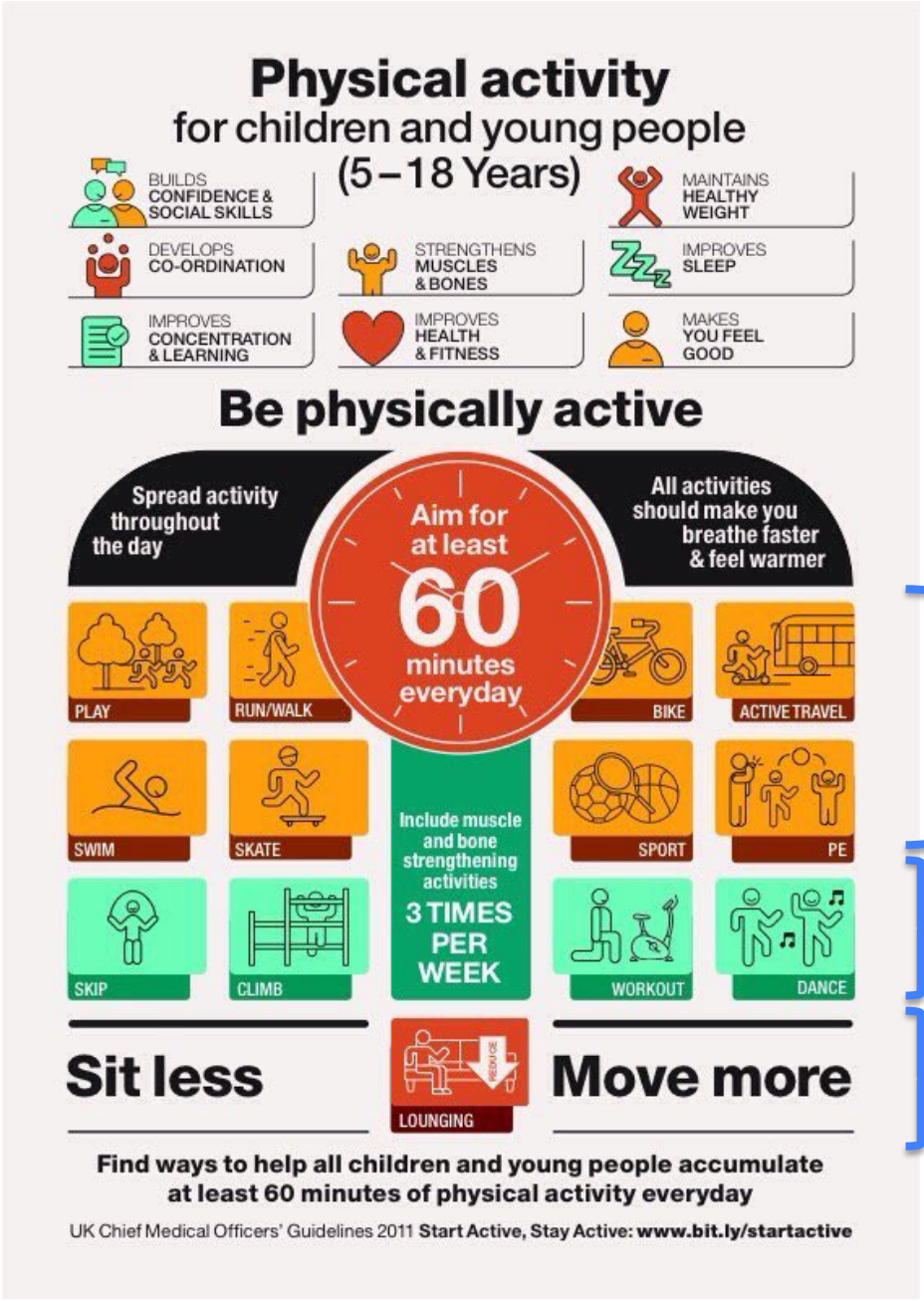
Available at http://www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH_128209

Physical activity guidelines for children and young people

All children and young people should engage in **moderate to vigorous** intensity physical activity for **at least 60 minutes** and up to several hours **every day**. (MVPA)

Vigorous intensity activities, including those that strengthen muscle and bone, should be incorporated **at least three days a week**. (VPA)

All children and young people should **minimise the amount of time spent being sedentary** (sitting) for extended periods. (SB)



MVPA

VPA

SB

https://www.gov.uk/government/publications/start-active-stay-active-infographics-on-physical-activity

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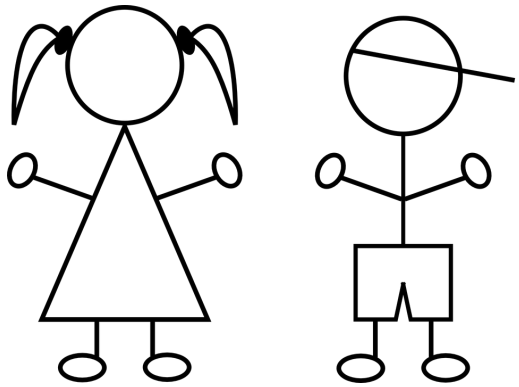
Millennium Cohort Study (NI)

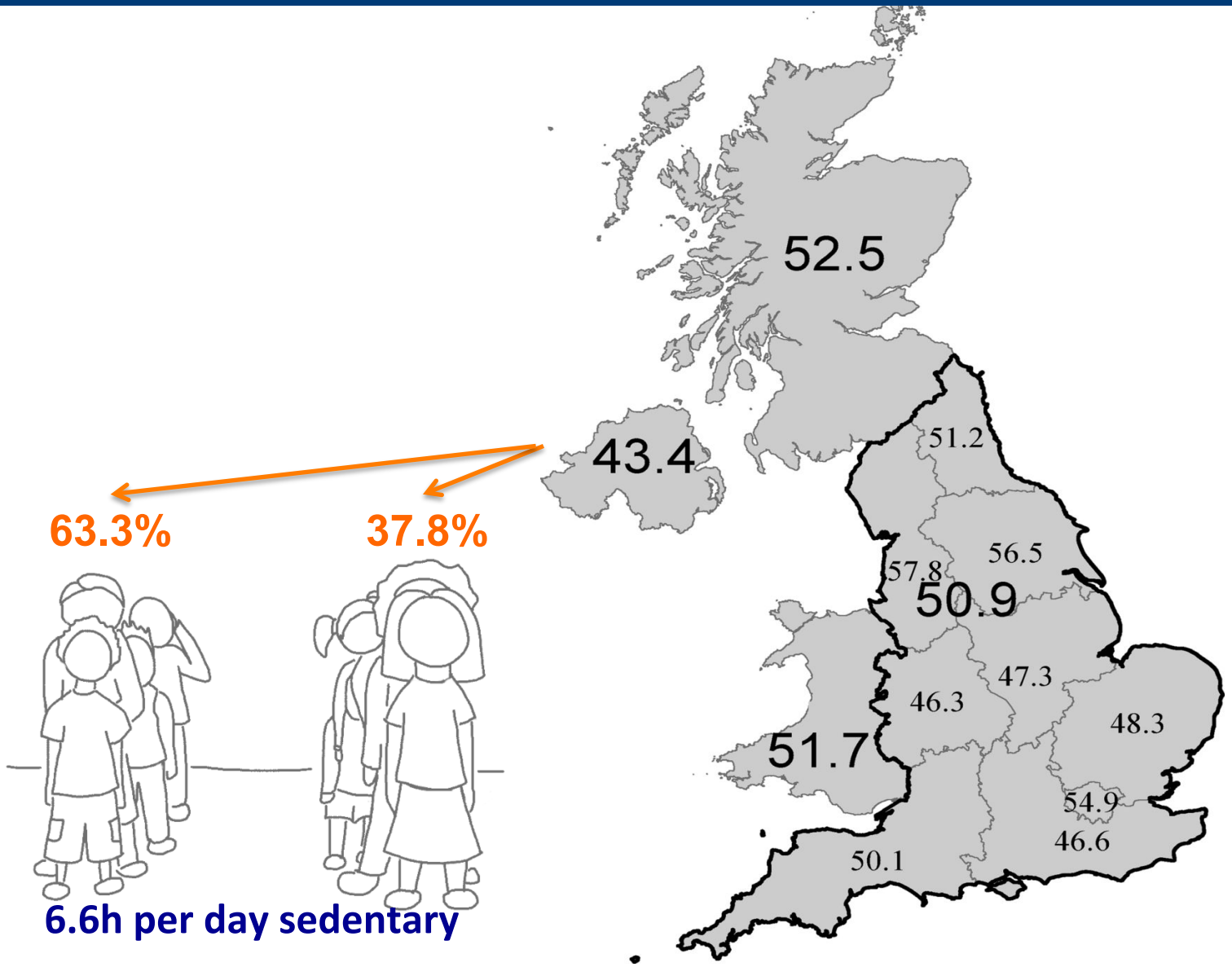
18,818 children (born in 2000 & 2001)
Data collected at 9 mos, 3, 5, 7, 11, 14 years



At age 7-
PA objectively measured in 6497 children
(including 634 children from NI)

Accelerometer worn for 7 days- light, moderate and vigorous physical activity measured to determine proportion meeting guidelines (i.e. ≥60 mins MVPA per day)

Proportion of children (age 7) meeting current physical activity recommendations



BMJ Open

Griffiths et al (2013) How active are our children? Findings from the Millennium Cohort Study BMJ Open 2013;3:e002893.

	KLT Primary 7	YLT Age 16
Number of respondents	5,194	1,156

Self-reported estimates of meeting guidelines

"How many times during a normal week would you spend at least 60 minutes during a day playing sports or doing some physical activity?"

http://www.ark.ac.uk/klt/

http://www.ark.ac.uk/ylt/

% Self-reporting meeting guidelines (60 mins per day)

	KLT (P7)		YLT (Age 16)	
	Boys	Girls	Boys	Girls
Never	9	9	8	10
Up to 4 times a week	31	39	37	63
4 – 6 times a week	24	26	32	20
7 times a week	37	27	13	5

Self-reported "meeting guidelines" low at age 11 and declines even further from childhood to adolescence

Perception Versus Reality

Awareness of Physical Activity Levels of British Children

Kirsten Corder, PhD, Esther M. F. van Sluijs, PhD, Alison M. McMinn, PhD, Ulf Ekelund, PhD, Aedin Cassidy, PhD, Simon J. Griffin, MBBS, DM

Background: Interventions to increase children's physical activity have had limited success. One reason may be that children and their parents overestimate children's levels of physical activity, although there is a small amount of data on this topic.

Purpose: This study aims to assess awareness of physical activity levels among British school children aged 9–10 years and their parents.

Methods: Physical activity was measured using an accelerometer in a cross-sectional study of 1892 children (44% male; M age=10.3 years, SD=0.3) from 92 Norfolk schools (Sport, Physical Activity and Eating Behavior: Environmental Determinants in Young People [SPEEDY] study). Data were collected between April and July 2007 and analyzed in 2008. *Inactive* was defined as <60 minutes/day of moderate and vigorous physical activity. Agreement between physical activity perception (child- and parent-rated) and objective physical activity was assessed. Associations between biological (height, weight, fat mass

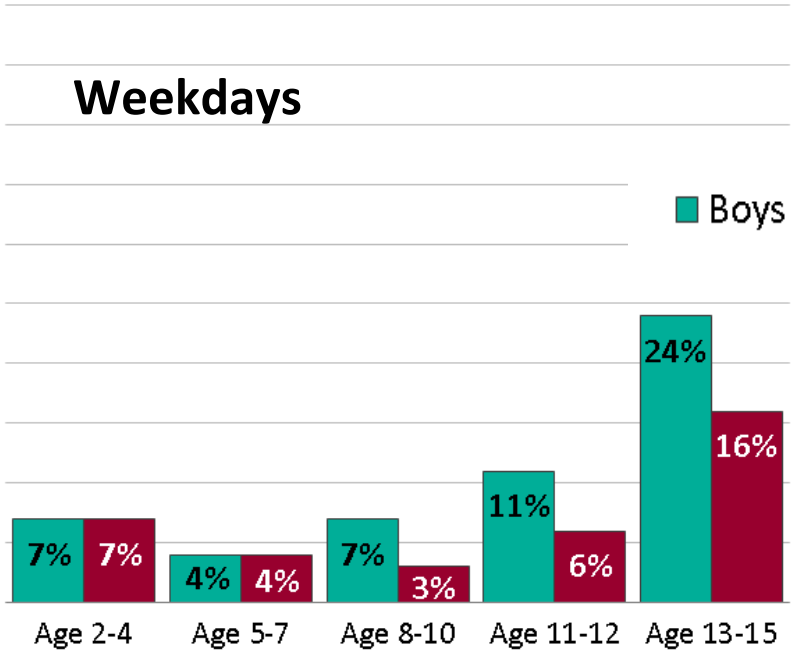
80% of parents of inactive children thought their child was sufficiently active

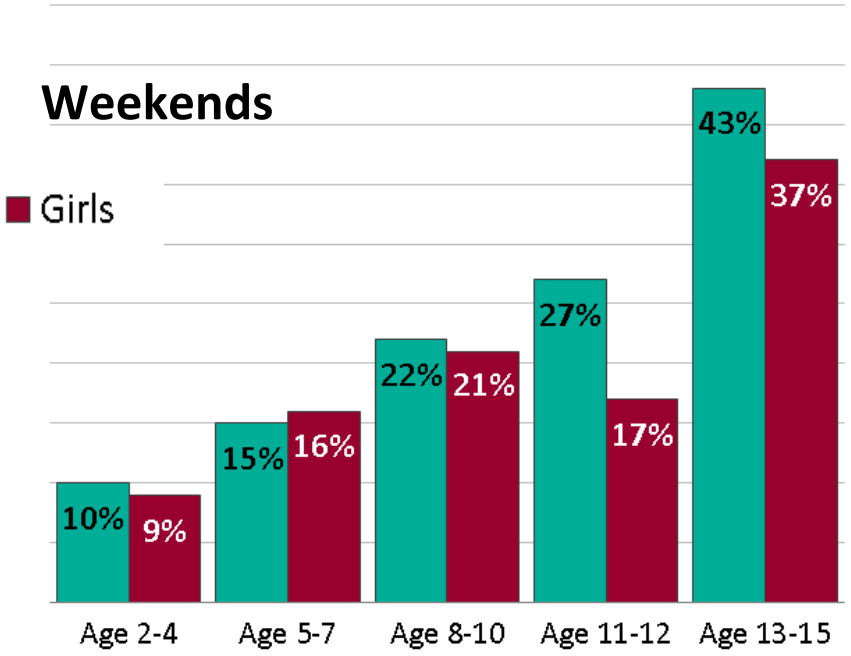
40% of inactive children over-estimated their physical activity

Corder, K., van Sluijs, E. M., McMinn, A. M., et al. (2010). Perception versus reality: awareness of physical activity levels of British children. American Journal of Preventive Medicine, 38(1), 1-8.

Time spent sedentary in leisure time

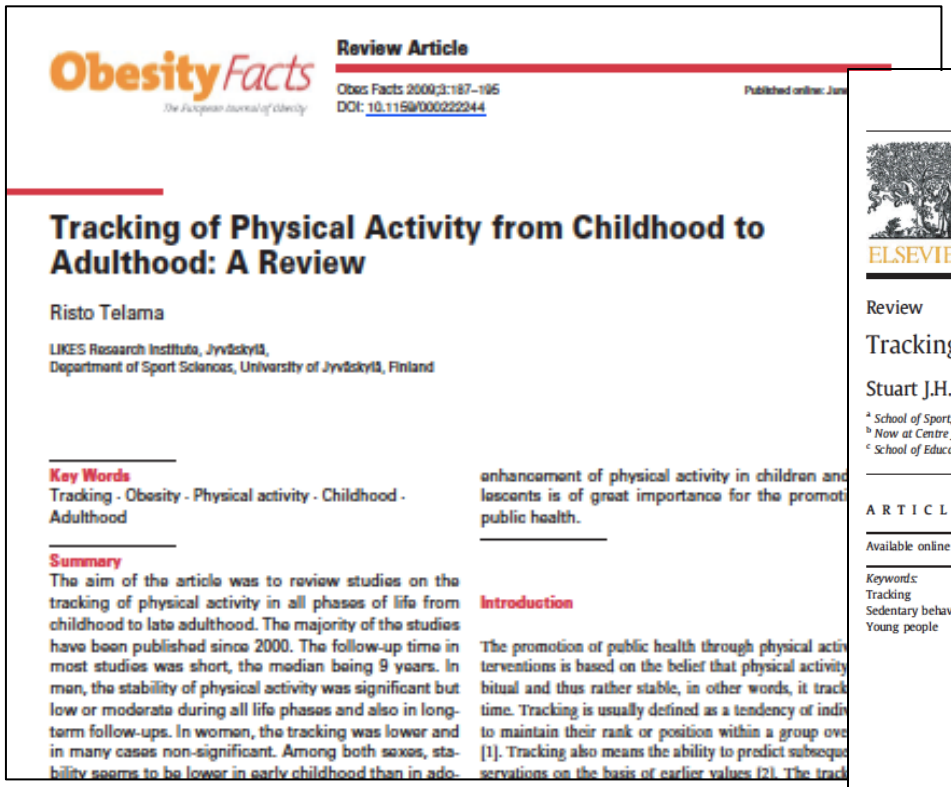
Health Survey for England 2012
Proportion of children who spent 6+ hours being sedentary per day





Public Health England 2012 http://content.digital.nhs.uk/catalogue/PUB13218

Do these behaviours 'track' from childhood to adulthood?



Obesity Facts

Review Article

Obes Facts 2009;3:187–195

DOI: 10.1159/000222344

Tracking of Physical Activity from Childhood to Adulthood: A Review

Risto Telama

LIKES Research Institute, Jyväskylä,
Department of Sport Sciences, University of Jyväskylä, Finland

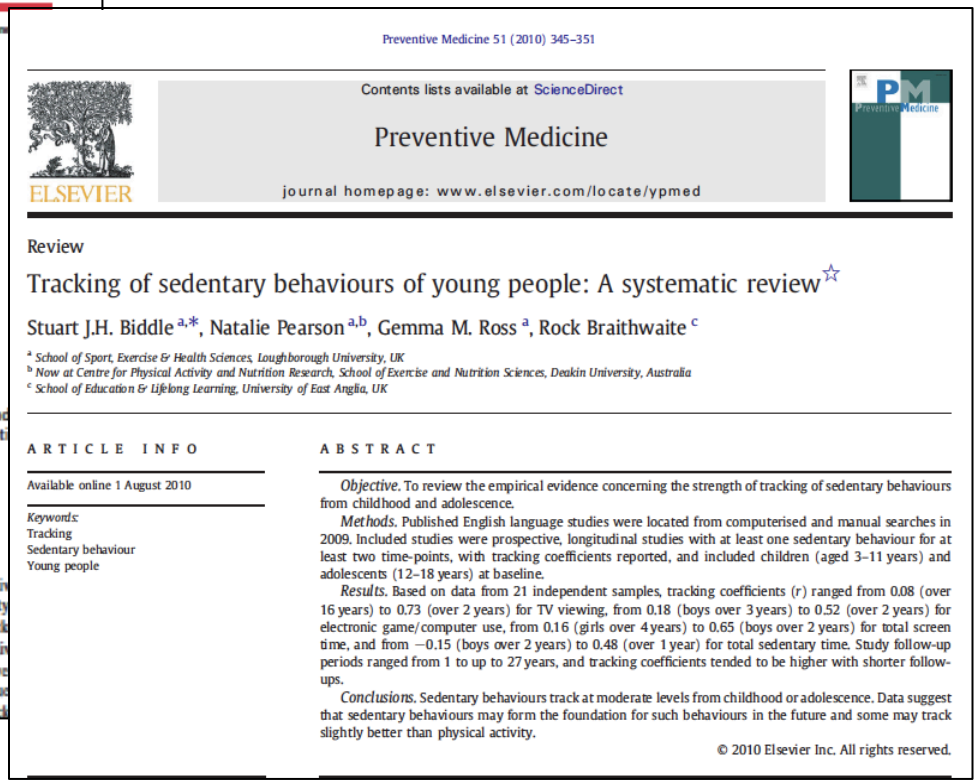
Key Words
Tracking - Obesity - Physical activity - Childhood - Adulthood

Summary
The aim of the article was to review studies on the tracking of physical activity in all phases of life from childhood to late adulthood. The majority of the studies have been published since 2000. The follow-up time in most studies was short, the median being 9 years. In men, the stability of physical activity was significant but low or moderate during all life phases and also in long-term follow-ups. In women, the tracking was lower and in many cases non-significant. Among both sexes, stability seems to be lower in early childhood than in ado-

enhancement of physical activity in children and
lescents is of great importance for the promoti
public health.

Introduction

The promotion of public health through physical acti
terventions is based on the belief that physical activity
bitual and thus rather stable, in other words, it track
time. Tracking is usually defined as a tendency of indiv
to maintain their rank or position within a group ove
[1]. Tracking also means the ability to predict subseque
servations on the basis of earlier values [2]. The track



Preventive Medicine 51 (2010) 345–351

Contents lists available at ScienceDirect

Preventive Medicine

journal homepage: www.elsevier.com/locate/ypmed

Review

Tracking of sedentary behaviours of young people: A systematic review ☆

Stuart J.H. Biddle [a,*], Natalie Pearson [a,b], Gemma M. Ross [a], Rock Braithwaite [c]

[a] School of Sport, Exercise & Health Sciences, Loughborough University, UK
[b] Now at Centre for Physical Activity and Nutrition Research, School of Exercise and Nutrition Sciences, Deakin University, Australia
[c] School of Education & Lifelong Learning, University of East Anglia, UK

ARTICLE INFO

Available online 1 August 2010

Keywords:
Tracking
Sedentary behaviour
Young people

ABSTRACT

Objective. To review the empirical evidence concerning the strength of tracking of sedentary behaviours from childhood and adolescence.

Methods. Published English language studies were located from computerised and manual searches in 2009. Included studies were prospective, longitudinal studies with at least one sedentary behaviour for at least two time-points, with tracking coefficients reported, and included children (aged 3–11 years) and adolescents (12–18 years) at baseline.

Results. Based on data from 21 independent samples, tracking coefficients (r) ranged from 0.08 (over 16 years) to 0.73 (over 2 years) for TV viewing, from 0.18 (boys over 3 years) to 0.52 (over 2 years) for electronic game/computer use, from 0.16 (girls over 4 years) to 0.65 (boys over 2 years) for total screen time, and from −0.15 (boys over 2 years) to 0.48 (over 1 year) for total sedentary time. Study follow-up periods ranged from 1 to up to 27 years, and tracking coefficients tended to be higher with shorter follow-ups.

Conclusions. Sedentary behaviours track at moderate levels from childhood or adolescence. Data suggest that sedentary behaviours may form the foundation for such behaviours in the future and some may track slightly better than physical activity.

- **Physical activity tracks moderately from adolescence to adulthood**
- **Sedentary behaviour tracks well from adolescence to adulthood**

Telama, R., et al (2005). Physical activity from childhood to adulthood: a 21-year tracking study. American Journal of Preventive Medicine, 28(3), 267-273.

Biddle, S. J., et al. (2010). Tracking of sedentary behaviours of young people: a systematic review. Preventive Medicine, 51(5), 345-351.

Scope of the problem- Rationale for Intervention

A majority of children and adolescents in UK & Ireland are insufficiently active for optimal health

Children spend significant proportions of their day engaged in sedentary behaviours

PA declines and SB increases with increasing age, (with gender and SEC differences)

The transition from primary to secondary school (11-12y) is a time of rapid decline in PA (particularly in girls)

Both behaviours track (moderately+) into adulthood – so interventions to change PA and SB have potentially long-term consequences

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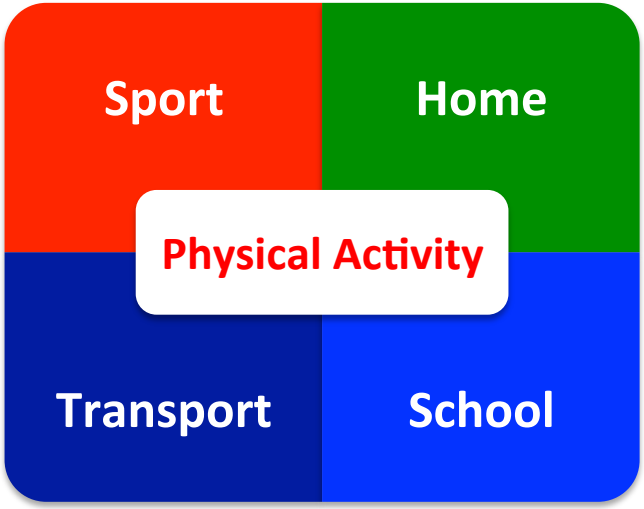
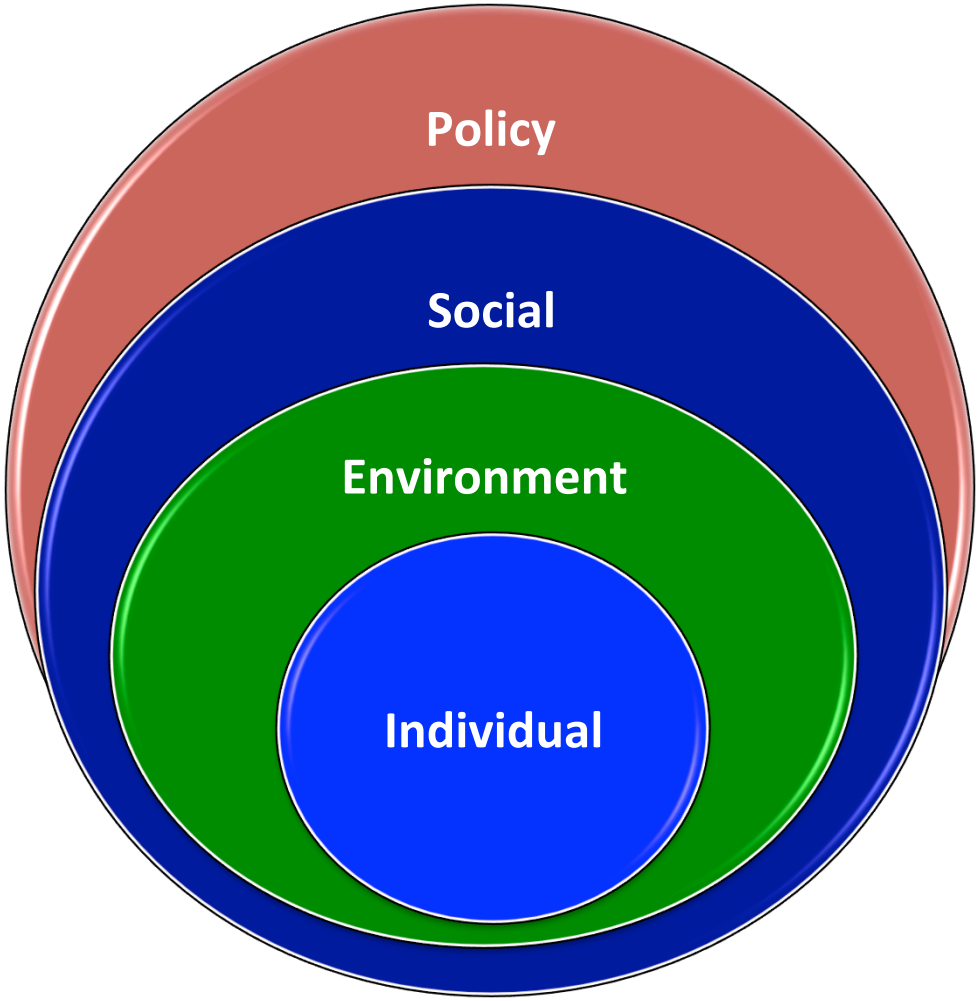
Snapshot of some PA/SB Interventions

Ireland's (north & south) PA Report Card

Ulster University





PA interventions – traditionally:

- Single component/domain
- Aimed at the individual level
- Focused on Sport and PE

Enjoying sport/activity (YLT)

	PE (%)		Sport outside school (%)		Adventure activities (%)	
	KLT	YLT	KLT	YLT	KLT	YLT
A lot	82	37	77	48	57	46
A little	15	26	17	24	22	21
Not at all	2	15	2	7	4	7
I don't do this	1	22	4	21	16	27

School-based interventions

- **School is compulsory – maximum reach**
- **Significant proportion of waking hours spent at school**
- **Inclusive- involves all children irrespective of SEC**
- **Good curricular fit with focus on preparing children for their future**
- **Sedentary behaviour increases from start of formal education**

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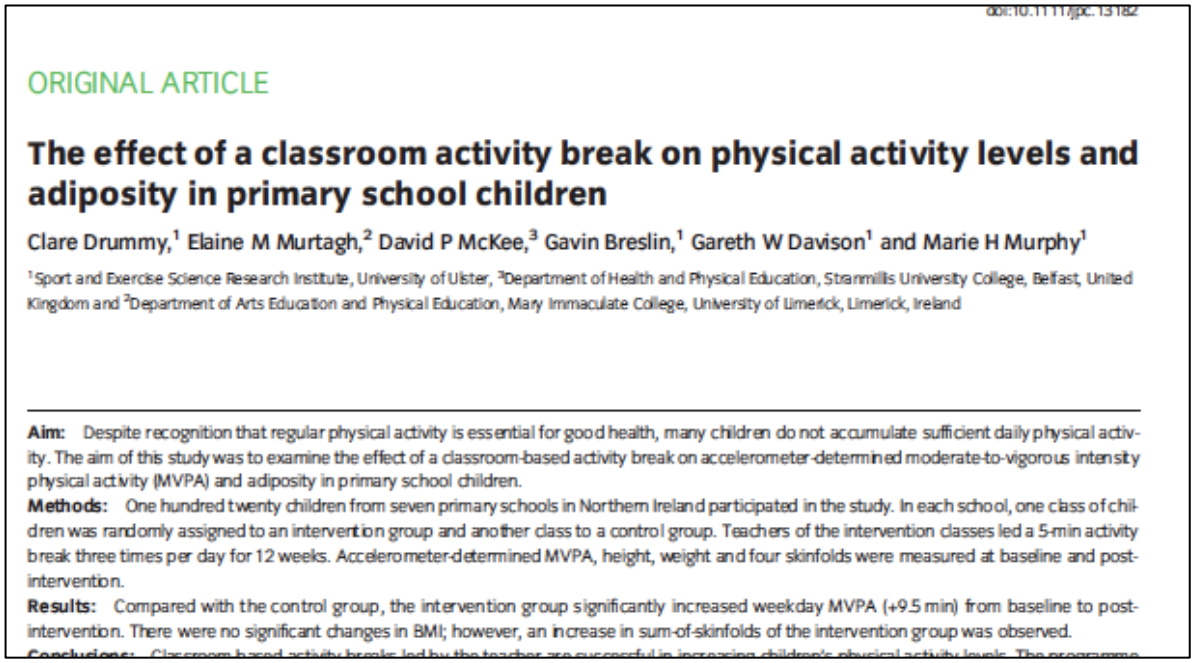
Ulster University



doi:10.1111/jpc.13182

ORIGINAL ARTICLE

The effect of a classroom activity break on physical activity levels and adiposity in primary school children

Clare Drummy,[1] Elaine M Murtagh,[2] David P McKee,[3] Gavin Breslin,[1] Gareth W Davison[1] and Marie H Murphy[1]

[1]Sport and Exercise Science Research Institute, University of Ulster, [2]Department of Health and Physical Education, Stranmillis University College, Belfast, United Kingdom and [2]Department of Arts Education and Physical Education, Mary Immaculate College, University of Limerick, Limerick, Ireland

Aim: Despite recognition that regular physical activity is essential for good health, many children do not accumulate sufficient daily physical activity. The aim of this study was to examine the effect of a classroom-based activity break on accelerometer-determined moderate-to-vigorous intensity physical activity (MVPA) and adiposity in primary school children.

Methods: One hundred twenty children from seven primary schools in Northern Ireland participated in the study. In each school, one class of children was randomly assigned to an intervention group and another class to a control group. Teachers of the intervention classes led a 5-min activity break three times per day for 12 weeks. Accelerometer-determined MVPA, height, weight and four skinfolds were measured at baseline and post-intervention.

Results: Compared with the control group, the intervention group significantly increased weekday MVPA (+9.5 min) from baseline to post-intervention. There were no significant changes in BMI; however, an increase in sum-of-skinfolds of the intervention group was observed.

Conclusions: Classroom-based activity breaks led by the teacher are successful in increasing children's physical activity levels. The programme

Clustered RCT

Classroom PA breaks (3 x 5 mins per day for 12 weeks)

Teachers choice of 40 exercises performed on the spot beside/ behind desk

Weekday PA objectively measured pre and post 12 week intervention

107 pupils completed pre and post assessment (54 intervention 53 control)

MVPA increased by 9.5 mins/day in intervention group

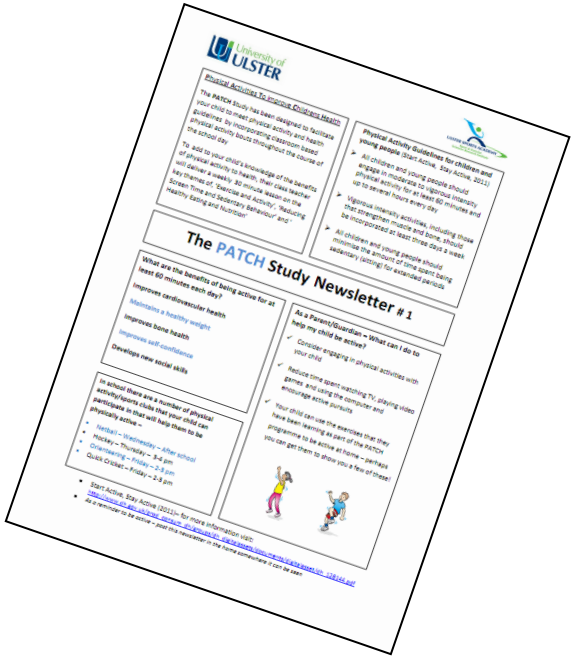
Drummy, C., Murtagh, E. M., McKee, D. P., Breslin, G., Davison, G. W., & Murphy, M. H. (2016). The effect of a classroom activity break on physical activity levels and adiposity in primary school children. Journal of Paediatrics and Child Health, 52(7), 745-749.

Physical Activity To improve Children's Health

12 week multicomponent intervention delivered in primary schools

99 P6 & P7 pupils (3 intervention 2 control classes)

- Curriculum component – 12 lessons (3 themes)- 30 min
- PA breaks
- Parental Outreach -Monthly newsletter
- Daily PA Homework



Cunningham C (2014) School-based interventions to increase physical activity and reduce cardiometabolic risk in children. PhD Ulster University

Physical Activity To improve Children's Health

Feasible intervention but requires teacher input and training

Total PA and school time MVPA increased by 27 mins and 14 mins per from pre to mid intervention (week 6) – not sustained post intervention

No differences in the magnitude of this increase between girls and boys

No changes in body composition, bone mineral density or content, blood pressure or self-perception (body adequacy, competence, physical self-worth, global self-esteem)

Lack of PA feedback to pupils, parents and teachers may have decreased maintenance

Cunningham C (2014) School-based interventions to increase physical activity and reduce cardiometabolic risk in children. PhD Ulster University

Proceedings of the Nutrition Society (2014), **73 (OCE2)**, E110 doi:10.1017/S0029665114001414

Irish Section Meeting, 18–20 June 2014, Changing Dietary Behaviour: Physiology Through to Practice

Exploring the attitudes of 11–14 year olds to physical activity: a focus group study

A. Carlin[1], M. H. Murphy[2] and A. M. Gallagher[1]

[1]*Northern Ireland Centre for Food and Health, University of Ulster, Coleraine, BT52 1SA and*
[2]*Ulster Sports Academy, University of Ulster, Jordanstown, BT37 0QB*

A. Carlin awarded NS Irish Section Best Overall Student Oral Communication prize

The prevention and management of obesity is a major public health priority, with almost one third of children in Northern Ireland now classified as overweight or obese(1). The promotion of physical activity is often a key focus of public health efforts to reverse such trends in childhood obesity(2). The aim of this study was to gain an insight into the attitudes and thoughts of young people (aged 11–14 years) in relation to physical activity and to explore what approaches this age group would find most helpful in encouraging them to increase or maintain their current levels of physical activity.

180 pupils were recruited from 3 post-primary schools. All participants completed the PAQ-C(3) and underwent measurements of height and weight. A sub-sample ($n = 64$; 39 females; 25 males) of participants were selected to take part in focus group discussions, with groups formed based on physical activity scores derived from the PAQ-C (i.e. low or high active groups). 9 focus groups with five to eight participants in each group were conducted; 3 groups of 'highly active' participants and 6 groups of 'low active' participants.

Carlin, A., Murphy, M. H., & Gallagher, A. M. (2014). Exploring the attitudes of 11–14 year olds to physical activity: a focus group study. Proceedings of the Nutrition Society, 73(OCE2), E110

Main Influences

- Friends and Peers
- Family and Others
- Consequences of not taking part (obesity, poor health etc)

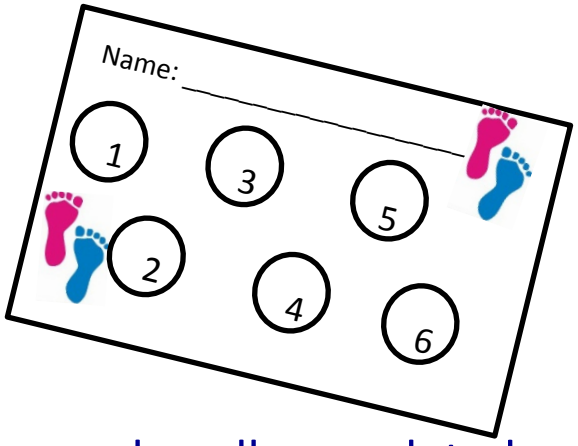
Main Barriers:

- Changing priorities
- Transition to secondary school
- More commute, homework and study time
- Costs and reliance on parental transport
- Weather

What would encourage more PA?

- Try new activities- things you don't have to be good at
- Activities you can do with friends
- Activities you can do within school – breaks and lunchtimes
- Walking
- Include technology (Apps, trackers, Social Media)
- Rewards and incentives for being active

The *WISH* Study: Peer-led Walking In ScHools



- Feasibility trial based on qualitative study
- 190 participants in 6 schools. (101 intervention 98 control)
- Short walks (<15min) delivered during school day
- Facilitated by trained 'Walk Leaders' (aged 16-18)
- Incentivised via school rewards system and reward stamps for each walk completed
  - **Increased total PA**
  - **Decreased sedentary behaviour**
  - **No change in MVPA (i.e. guidelines)**

Interventions may be feasible and can elicit (compensatory?) changes in PA and sedentary behaviour

Self-selected walking speeds may not be sufficient to achieve MVPA in this age group

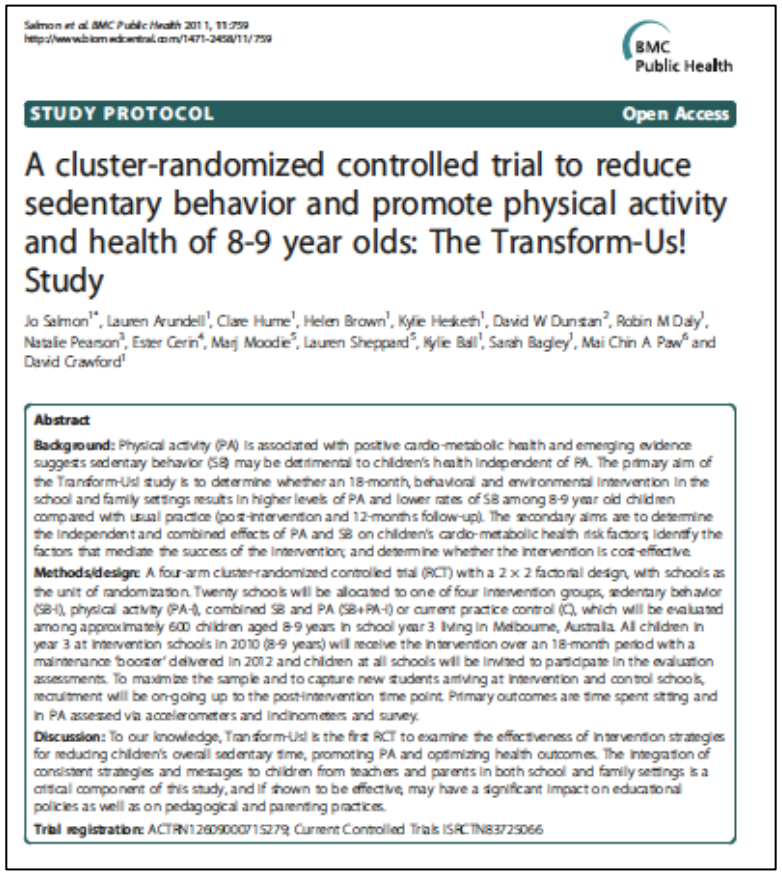
Carlin A, Murphy MH and Gallagher AM The WISH study: Peer-led Walking In ScHools to improve physical activity in adolescent females. International Society of Behavioural Nutrition and Physical Activity Conference, Edinburgh June 2015

Transform- Us Study

A four-arm cluster-randomized controlled trial

Twenty schools allocated to:

- sedentary behavior intervention
- physical activity intervention
- combined SB and PA intervention
- current practice control



Salmon et al. BMC Public Health 2011, 11:759
http://www.biomedcentral.com/1471-2458/11/759

BMC Public Health

STUDY PROTOCOL Open Access

A cluster-randomized controlled trial to reduce sedentary behavior and promote physical activity and health of 8-9 year olds: The Transform-Us! Study

Jo Salmon[1*], Lauren Arundell[1], Clare Hume[1], Helen Brown[1], Kylie Hesketh[1], David W Dunstan[2], Robin M Daly[3], Natalie Pearson[3], Ester Cerin[4], Marj Moodie[5], Lauren Sheppard[5], Kylie Ball[1], Sarah Bagley[1], Mai Chin A Paw[6] and David Crawford[1]

Abstract

Background: Physical activity (PA) is associated with positive cardio-metabolic health and emerging evidence suggests sedentary behavior (SB) may be detrimental to children's health independent of PA. The primary aim of the Transform-Us! study is to determine whether an 18-month, behavioral and environmental intervention in the school and family settings results in higher levels of PA and lower rates of SB among 8-9 year old children compared with usual practice (post-intervention and 12-months follow-up). The secondary aims are to determine the independent and combined effects of PA and SB on children's cardio-metabolic health risk factors, identify the factors that mediate the success of the intervention, and determine whether the intervention is cost-effective.

Methods/design: A four-arm cluster-randomized controlled trial (RCT) with a 2 × 2 factorial design, with schools as the unit of randomization. Twenty schools will be allocated to one of four intervention groups, sedentary behavior (SB-I), physical activity (PA-I), combined SB and PA (SB+PA-I) or current practice control (C), which will be evaluated among approximately 600 children aged 8-9 years in school year 3 living in Melbourne, Australia. All children in year 3 at intervention schools in 2010 (8-9 years) will receive the intervention over an 18-month period with a maintenance 'booster' delivered in 2012 and children at all schools will be invited to participate in the evaluation assessments. To maximize the sample and to capture new students arriving at intervention and control schools, recruitment will be on-going up to the post-intervention time point. Primary outcomes are time spent sitting and in PA assessed via accelerometers and inclinometers and survey.

Discussion: To our knowledge, Transform-Us! is the first RCT to examine the effectiveness of intervention strategies for reducing children's overall sedentary time, promoting PA and optimizing health outcomes. The integration of consistent strategies and messages to children from teachers and parents in both school and family settings is a critical component of this study, and if shown to be effective, may have a significant impact on educational policies as well as on pedagogical and parenting practices.

Trial registration: ACTRN12609000715279; Current Controlled Trials ISRCTN83725066

IPAN INSTITUTE FOR PHYSICAL ACTIVITY AND NUTRITION

DEAKIN UNIVERSITY

Salmon, J., et al (2011). A cluster-randomized controlled trial to reduce sedentary behavior and promote physical activity and health of 8-9 year olds: The Transform-Us! Study. BMC Public Health, 11(1), 759.

Multicomponent – across multiple settings

Classroom

Key messages
9 x p/year (18 total)

Standing lesson
1 x 30min/day

Active break
1 x 2min/30mins class time

Physical environment

Sports/circus equipment

Promotional signage

Playground line markings

Standing easels

Class set of pedometers

Family setting

9 newsletters p/year
(matched to key messages)

Active homework

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Main Findings

After 2.5 years, children had significantly increased their physical activity at recess and lunchtime by 33 minutes per week and significantly reduced their sitting time by 196 minutes per week.

Lower BMI z-scores, waist circumference, LDL cholesterol, systolic BP and higher Vitamin D levels than children in usual practice

Preliminary cost analysis shows that Transform-Us! cost on average $30.08 per child per year ($0.08 per child per day).

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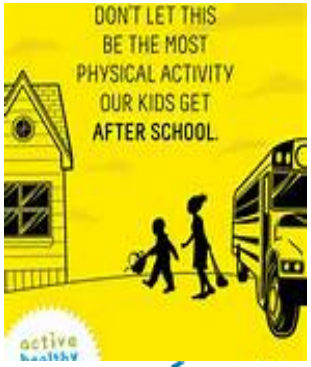
Ulster University

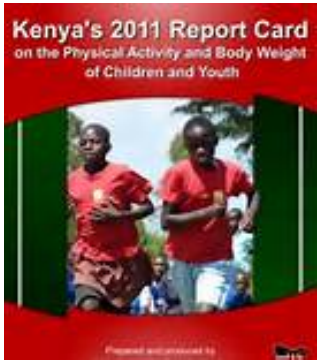
The 2016 Ireland North and South Report Card on Physical Activity for Children and Youth

Harrington, DM., Murphy, MH., Carlin, A., Coppinger, T., ... & Woods, C. (2016). Results From Ireland North and South's 2016 Report Card on Physical Activity for Children and Youth. Journal of physical activity and health, 13(11 Suppl 2), S183-S188.

What is the Report Card ?

- An assessment of the current state of physical activity among children and youth
- The link between research and practice
- Advocacy tool
- Started in Canada in 2004





Ireland's report card on physical activity in children & youth

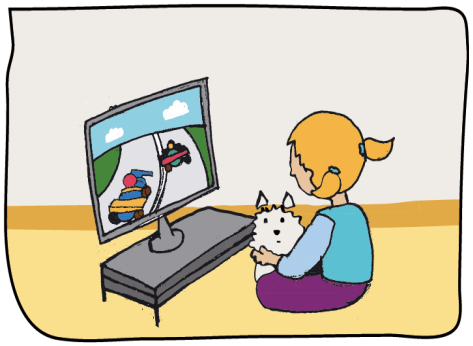
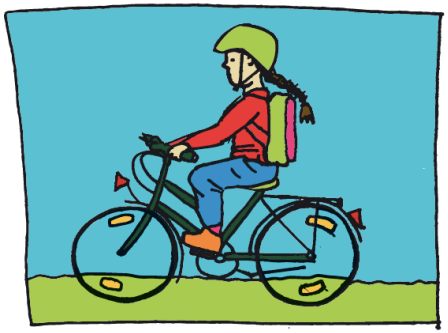
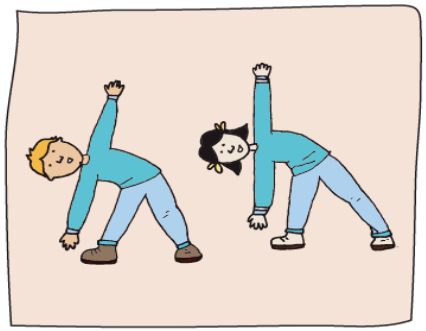
2014 Ireland (NI and RoI) joined

What is the Report Card ?

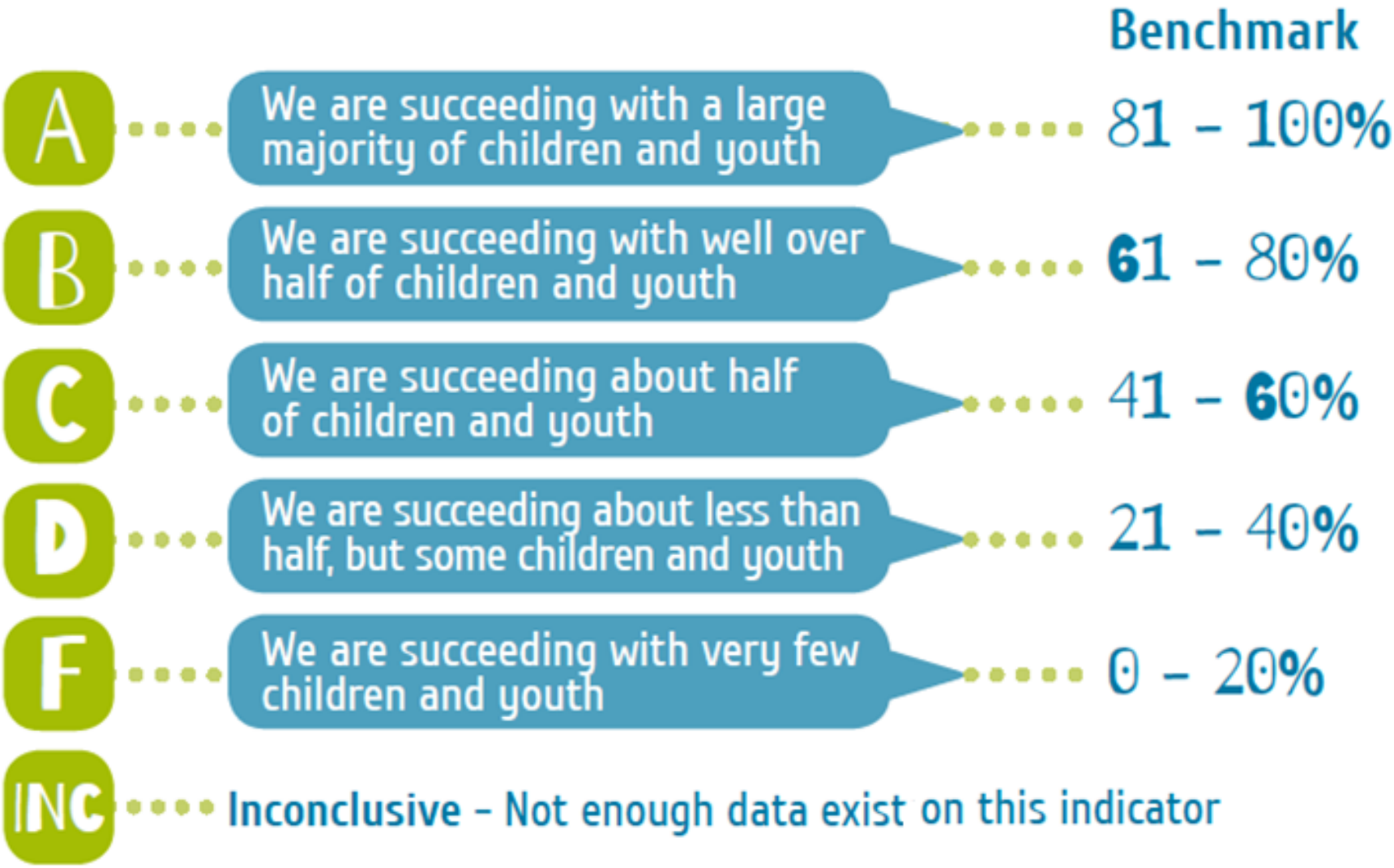
Assessment of child and youth physical activity across 9/10 indicators

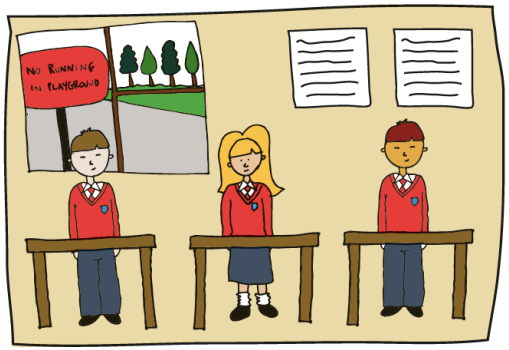
- Physical Activity
- Sedentary Behaviour
- Active Transportation
- Physical Education
- Organised Sport Participation
- Active Play
- Home (family)
- School
- Community & Built Environment
- Government

- Using best available evidence
- Agreed grades according to international standardized grading scheme
- Stakeholder consultation for evidence gathering and grading

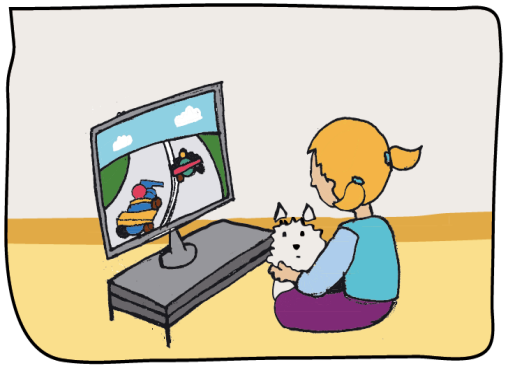




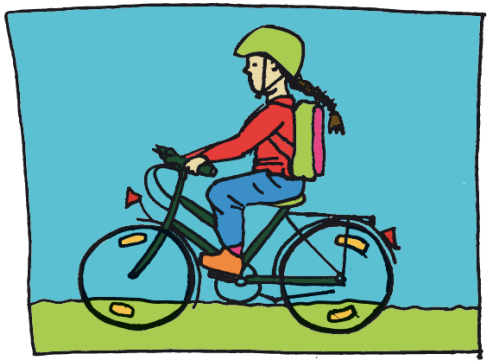

International Standardised Grading Scheme





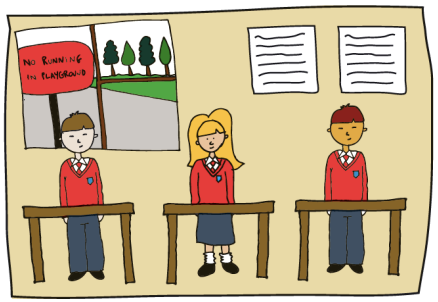
INDICATOR	2016	2014
Overall Physical Activity	D	D-
Sedentary Behaviour (TV viewing)	C-	C-
Active Transportation	D	D
Physical Education	D-	D-
Organised Sport Participation	C- RoI C+ NI	C-
Active Play	INC	INC
Home (family)	INC	INC
School	D	C-
Community and Built Environment	B+	B
Government	INC	INC



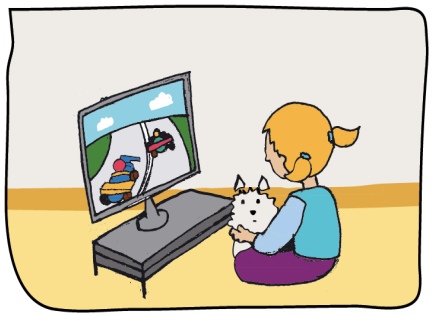


Take home messages

- Many children in UK & Ireland are insufficiently active and spend too much time in sedentary behaviours
- All domains of PA and SB should be targeted to maximise impact.
- Interventions implemented across multiple settings have modest but important effects on current and future levels of PA and SB







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Promoting physical activity and reducing sedentary behaviour in young people

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