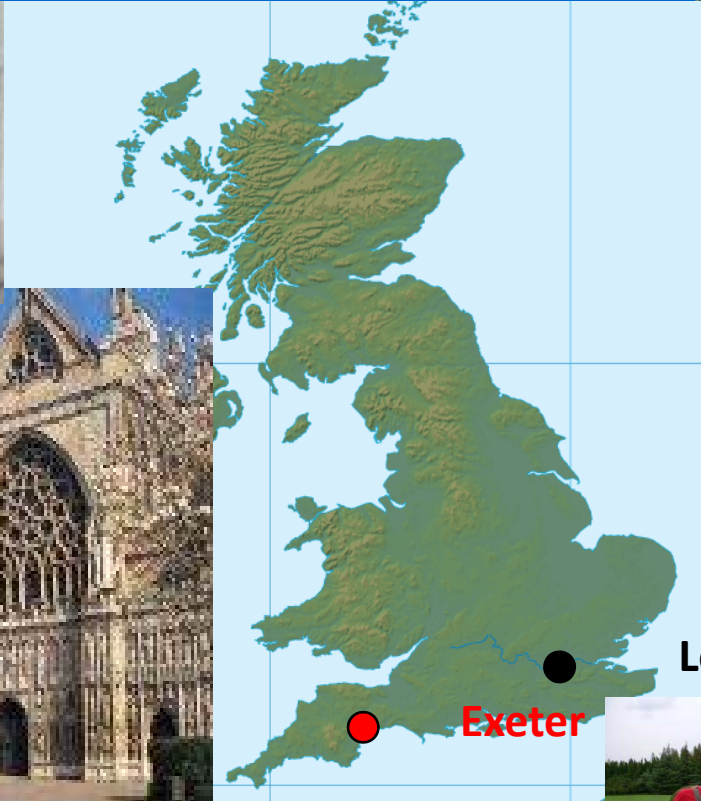


CHILDREN ARE ACTIVE – FACT OR FICTION ?



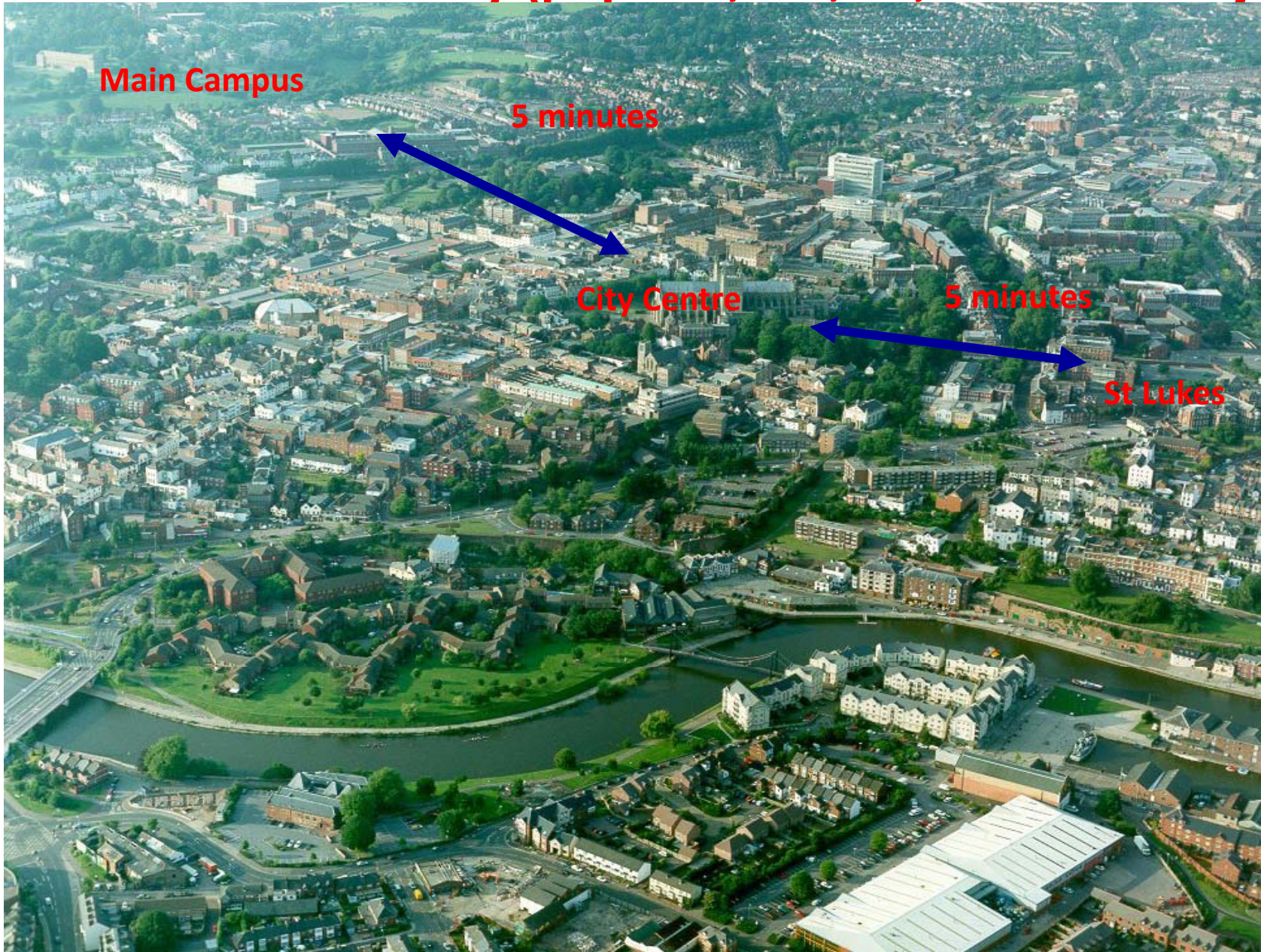
Where is Exeter?



London

Exeter

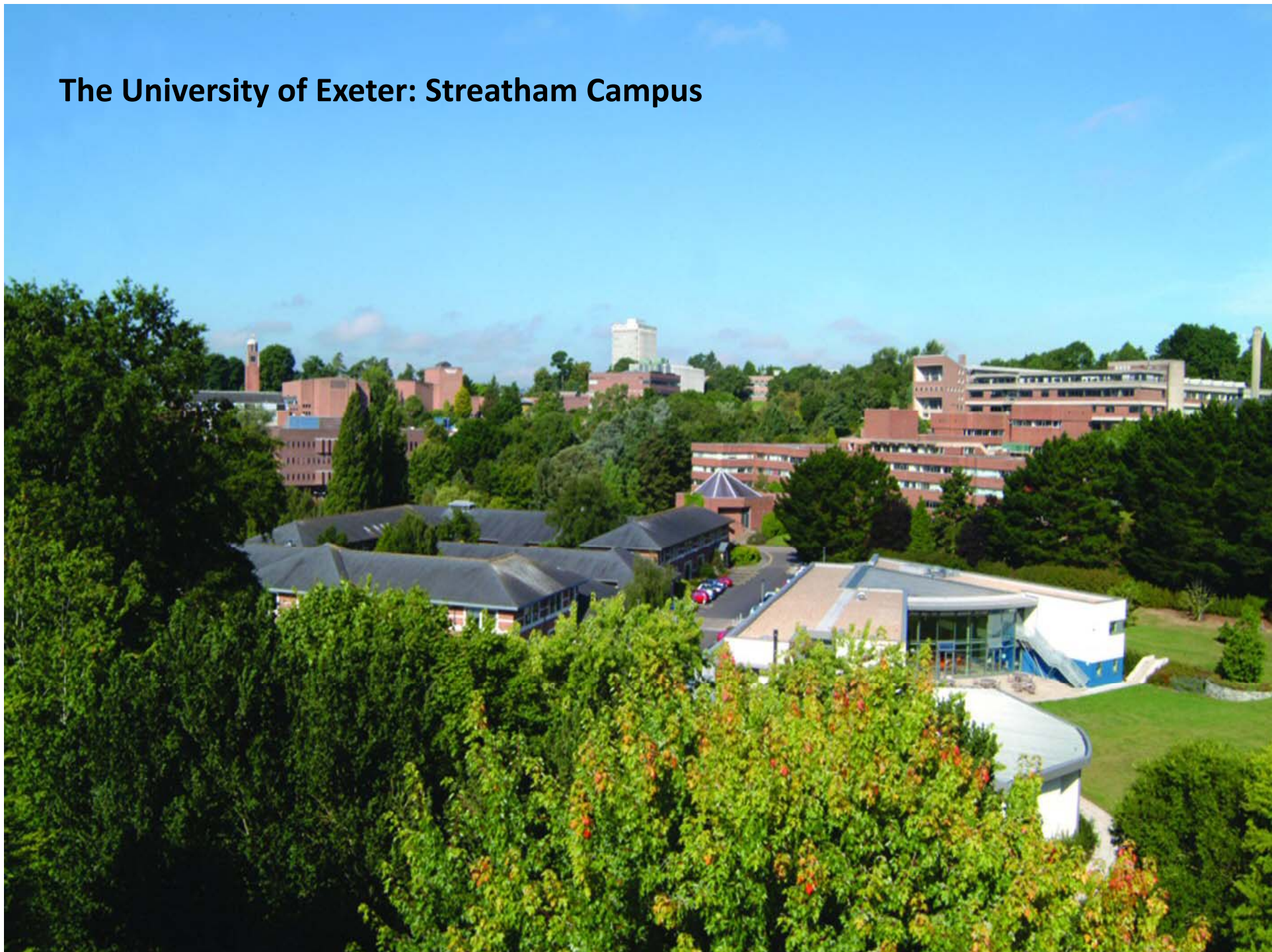
EXETER is a small city (pop 110,000; 20,000 students)



... close to the beach



The University of Exeter: Streatham Campus



University of Exeter St Luke's Campus



View from Postgraduate Centre



CHILDREN ARE ACTIVE – FACT OR FICTION ?



PHYSICAL ACTIVITY

- **PHYSICAL ACTIVITY** – consists of behaviours which contribute to total energy expenditure and involve bodily movements produced by skeletal muscles
- **HABITUAL PHYSICAL ACTIVITY** – usual physical activity carried out in normal daily life in every domain and any dimension



HABITUAL PHYSICAL ACTIVITY

- **Habitual Physical Activity (HPA)**- consists of a complex set of behaviours
- **Dimensions**— frequency, duration, intensity, type
- **Domains**- leisure-time, sports-time, school-time, school break time, home-time
- **HPA**- free-living PA for a defined length of time –minimum 3 days; but 4-9 days incl. 2 weekend days has been recommended



MEASUREMENT OF HABITUAL PHYSICAL ACTIVITY

- Observation studies have shown that children's PA consists of short (3-22 sec), intermittent bouts of activity.
- The measurement of children's HPA is therefore complex and no single method assesses HPA in all domains.
- Subjective and Objective Techniques
- Correlations between methods are low to moderate



MEASUREMENT OF HABITUAL PHYSICAL ACTIVITY

SUBJECTIVE METHODS

Questionnaires
self-report
proxy-report (parents/teachers)
Interviews
Activity diaries

Children:

- are less time conscious than adults
- less able to recall specific events
- engage in less planned activity
- moderate PA is less memorable than vigorous PA
- vigorous PA is often over estimated

Self-Report :

- Provides descriptions of HPA at a population level



MEASUREMENT OF HABITUAL PHYSICAL ACTIVITY

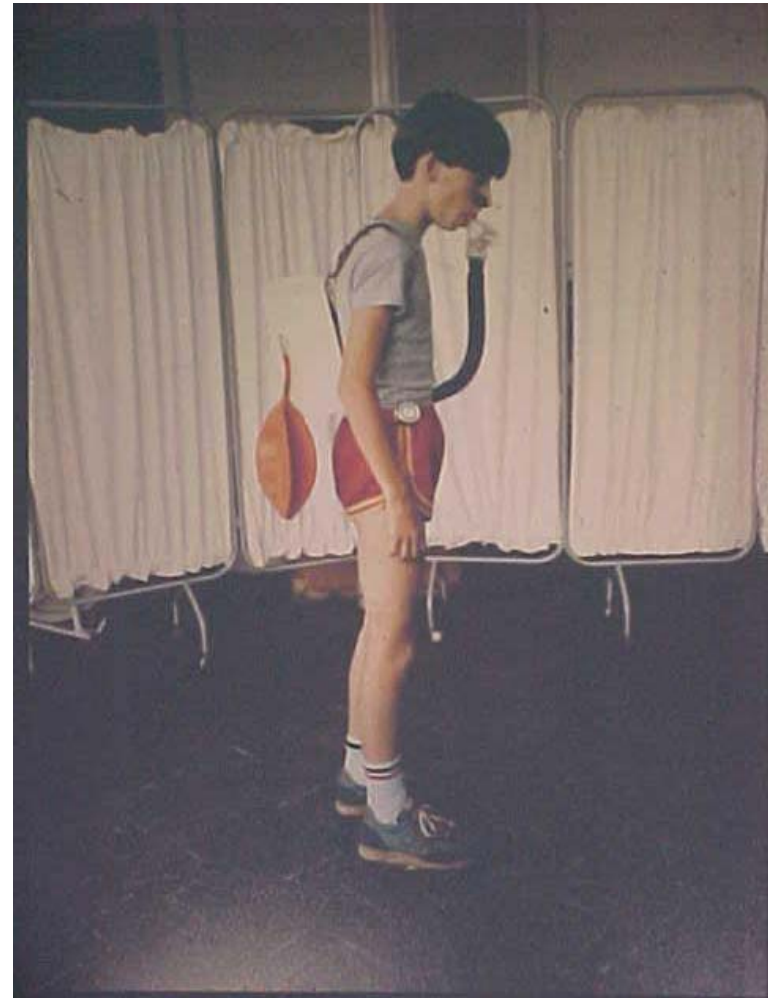
OBJECTIVE METHODS

Pedometers: simple motion sensors normally used to detect and record number of steps taken over a period of time:

- Not expensive and non-reactive;

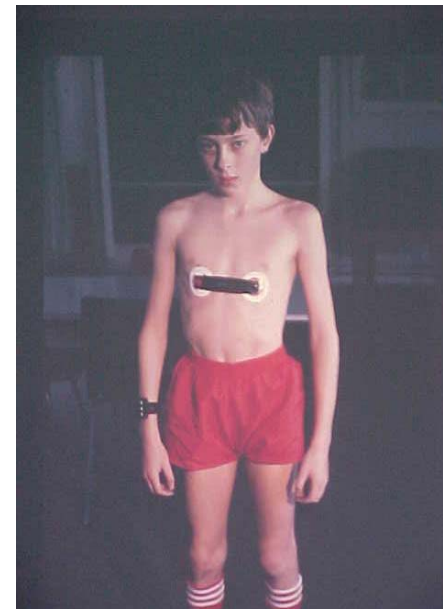
But,

- Unable to record intensity, duration or frequency of PA.
- Problematic with children of different sizes, stride length etc

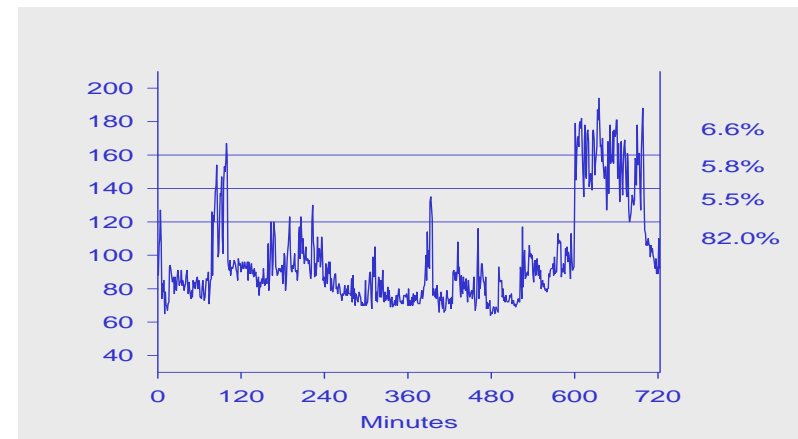


MEASUREMENT OF HABITUAL PHYSICAL ACTIVITY

Physiological Sensors: do not directly measure PA but the physiological responses derived from PA may offer more clinically relevant data with which to evaluate relationships between PA and health



Heart rate monitors: very popular measurement tools in the 1990s



MEASUREMENT OF HABITUAL PHYSICAL ACTIVITY

Accelerometers: measure the acceleration of different parts of the body in one or more dimensions for a specific time period (epoch). Data are expressed as activity counts per minute.

Calibration in relation to PA intensity: no real consensus on appropriateness of cut-off points of activity counts or length of epoch



INTERPRETATION OF HABITUAL PHYSICAL ACTIVITY

- **ACSM (1988)**: 20-30min of vigorous exercise each day
- **ICC (1994)**: in addition to being physically active daily, engage in 3 or more sessions per week of activities that last 20 min or more and that require moderate to vigorous levels physical activity (MVPA) (at least equivalent to brisk walking)
- **UK HEALTH EDUCATION AUTHORITY (1998); STRONG et al. (2005)**: participate daily in 60 min or more of MVPA that is developmentally appropriate, enjoyable and involves a variety of activities

WHAT IS THE SHAPE OF THE RELATIONSHIP BETWEEN PA AND HEALTH OUTCOMES ?

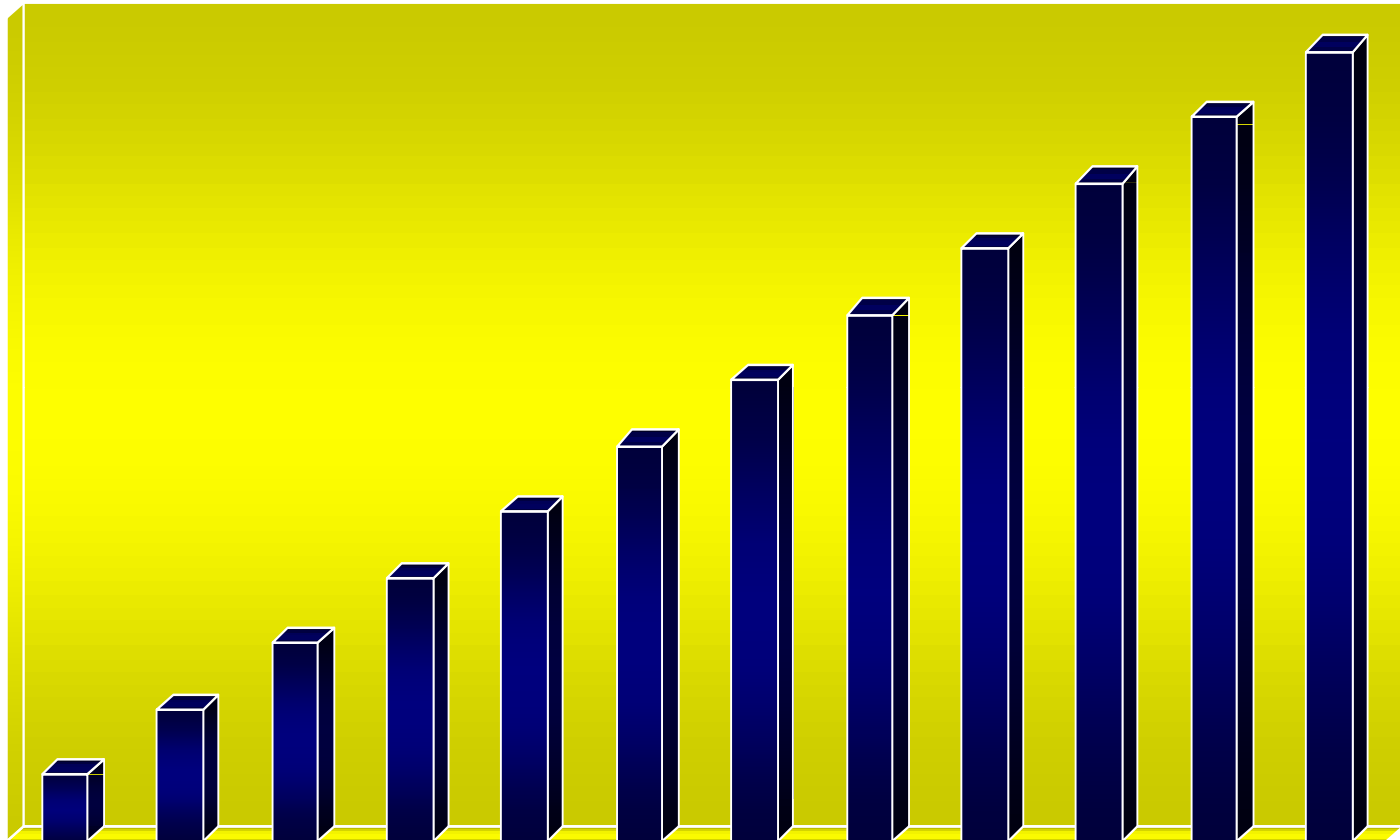
Does it comply with :

ACSM Recommendations ?

ICC Recommendations ?

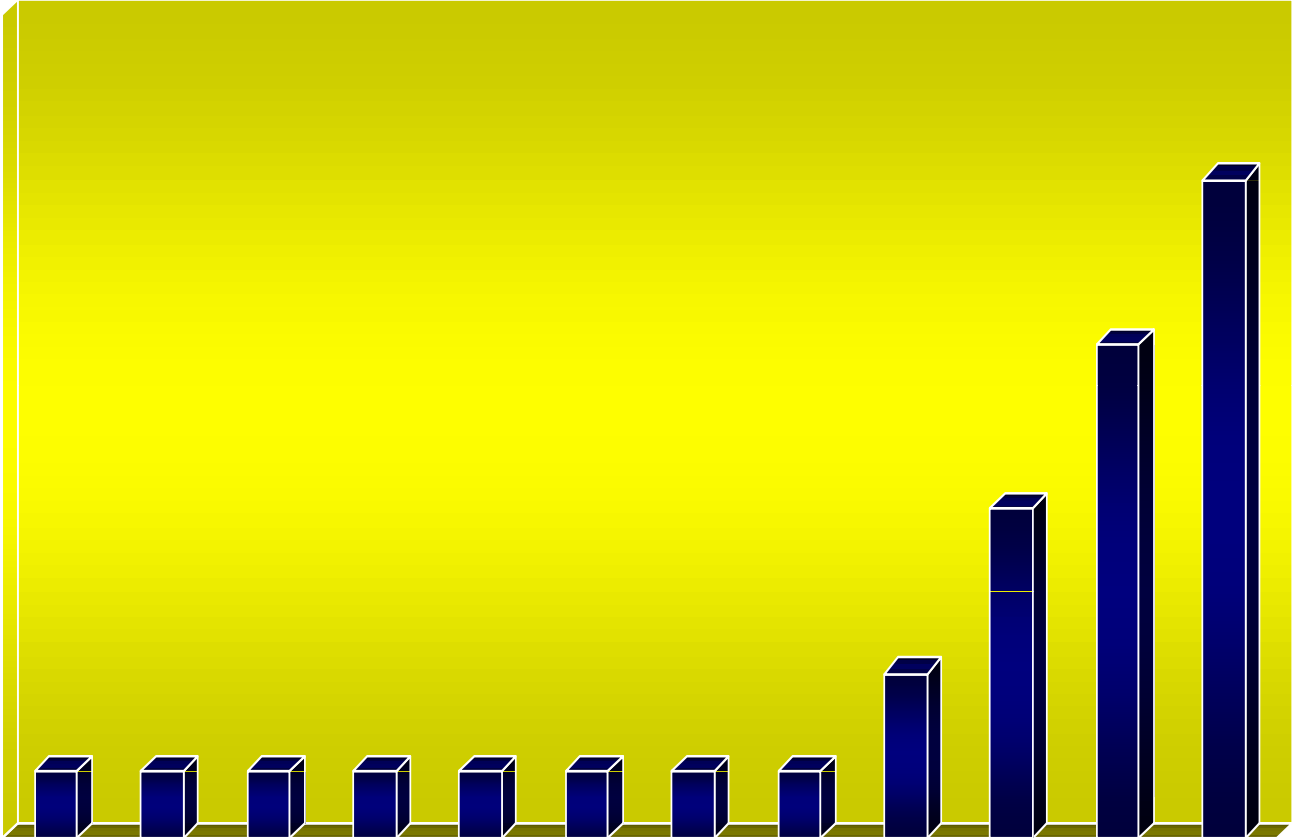
UKHEA/STRONG Recommendations ?

health



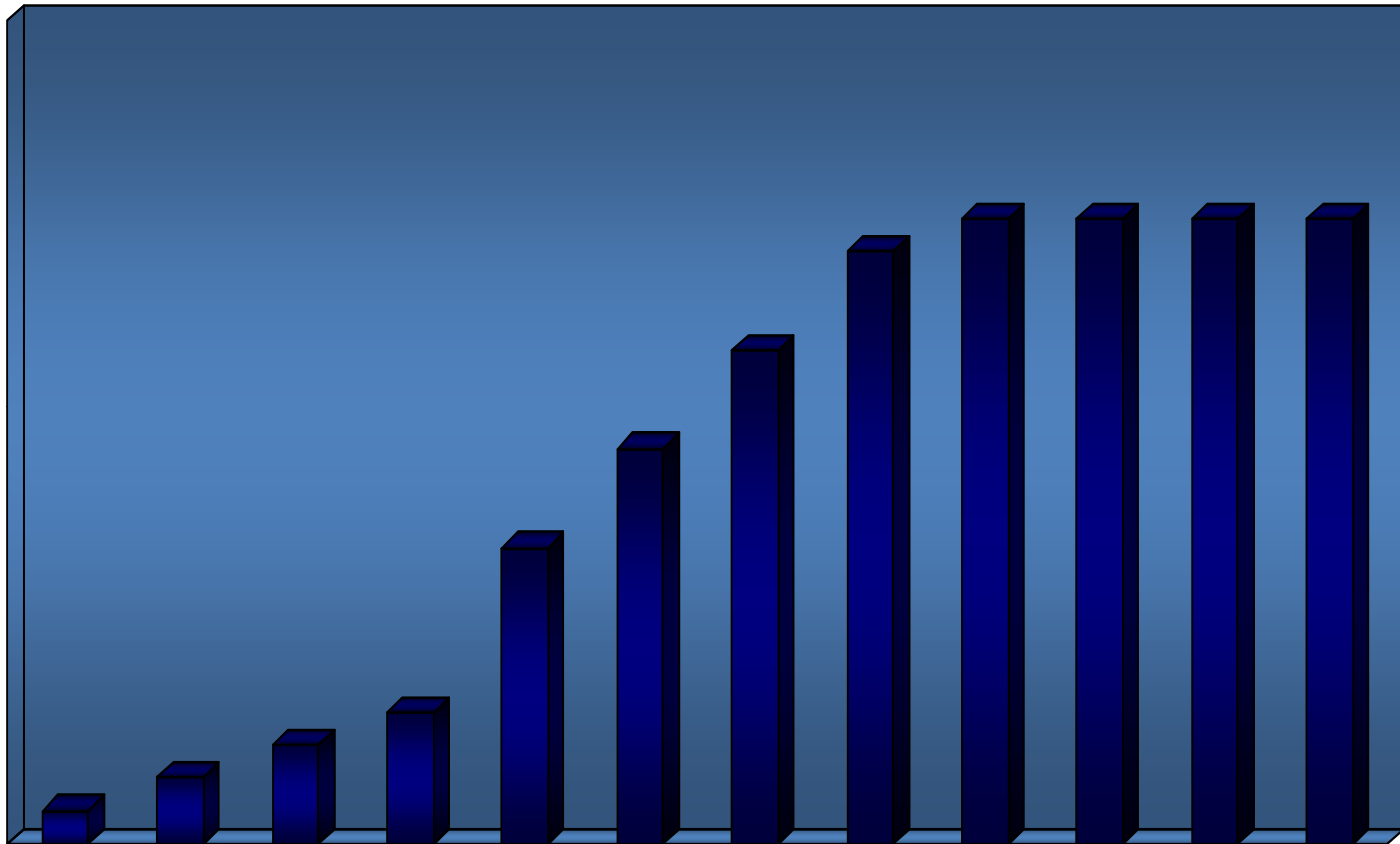
activity (time/intensity)

health



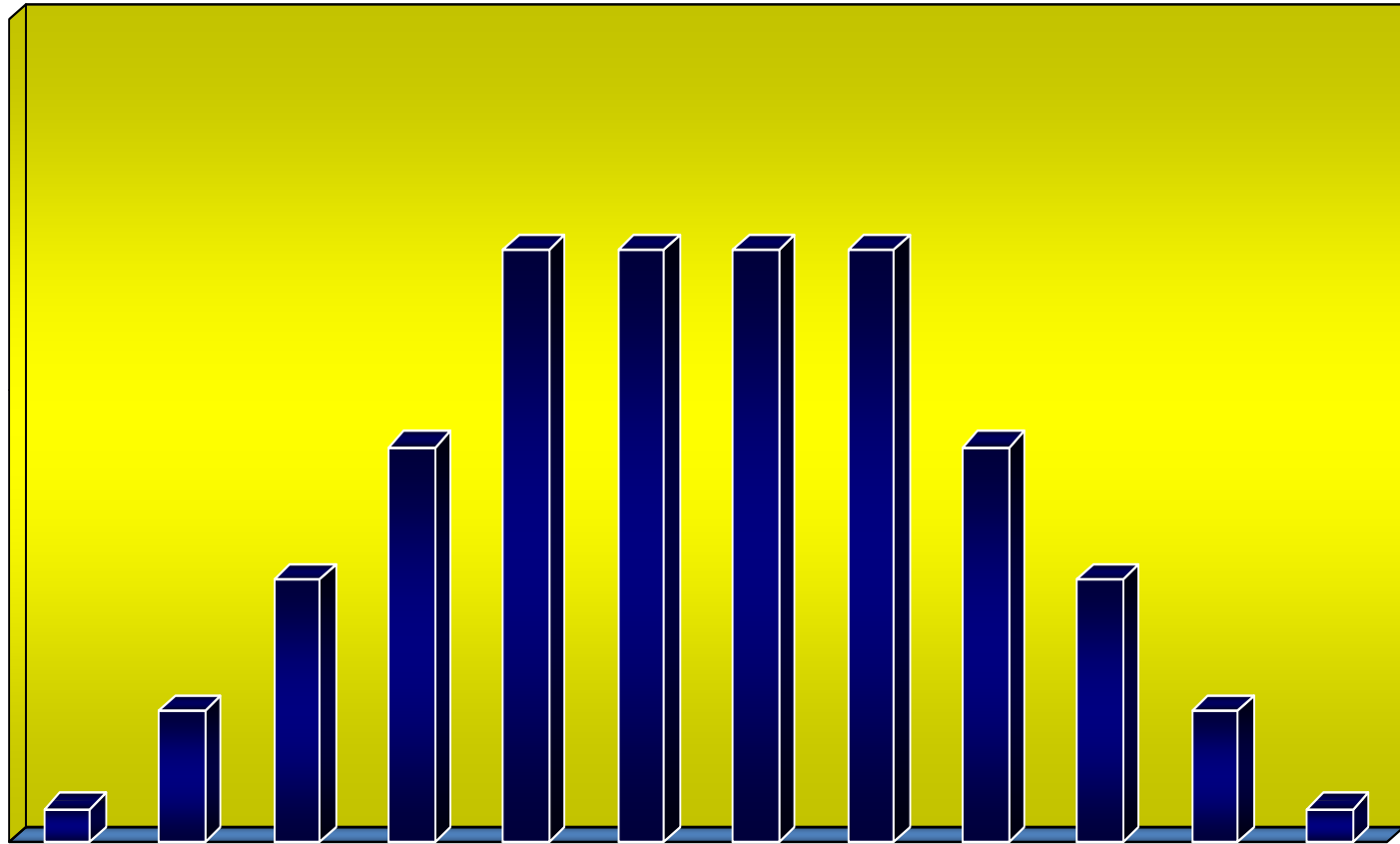
activity (time/intensity)

health



**activity
(time/intensity)**

health



**activity
(time/intensity)**

ARE PA GUIDELINES EVIDENCE-BASED?

- Is there a valid threshold between PA and health-related outcomes?
- Are dose-response relationships the same for different PA:health-related outcomes?
- **Are current PA Guidelines evidence-based or evidence-informed?**

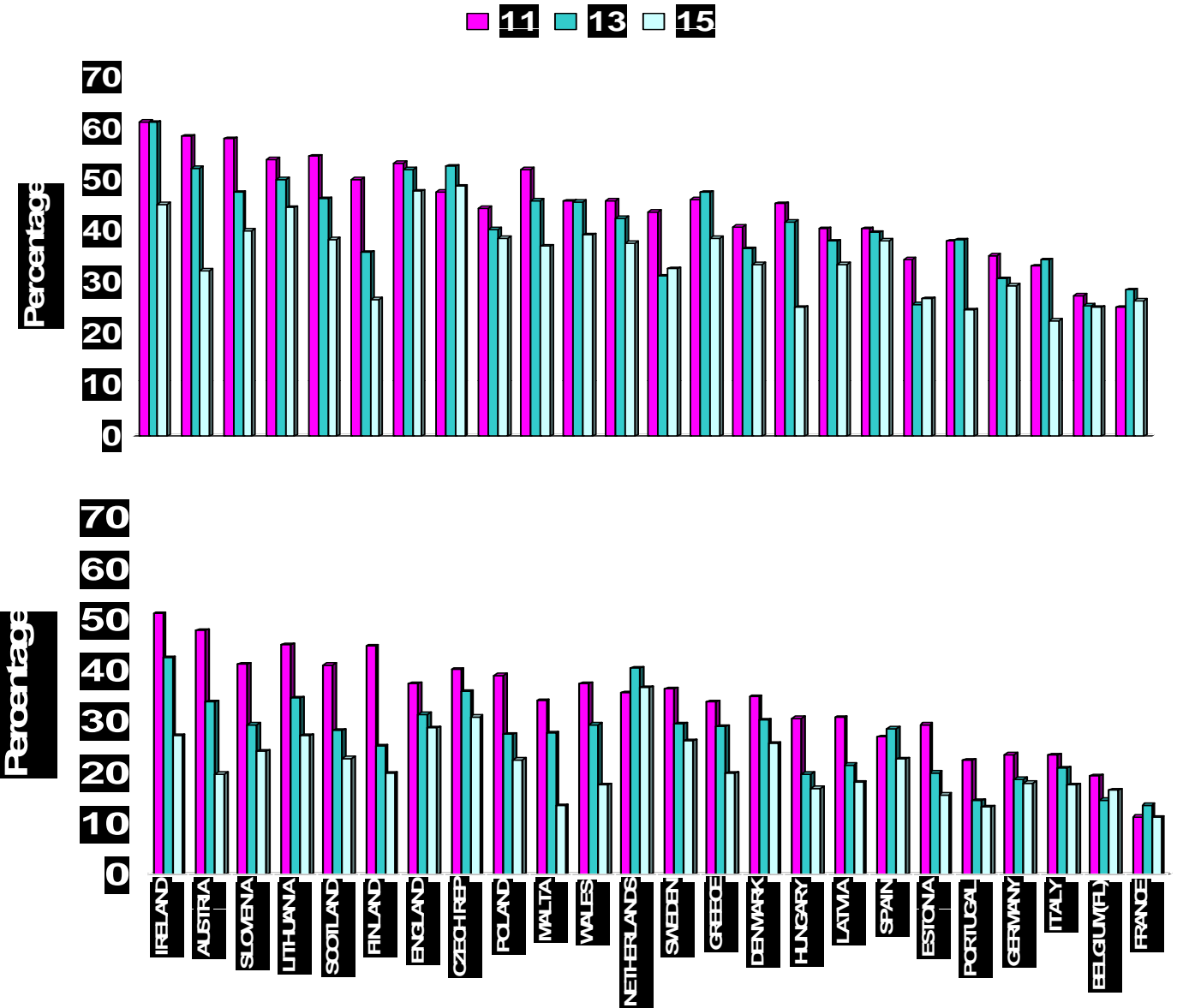
ARE CHILDREN ACTIVE ?

SELF-REPORT STUDIES

CURRIE et al.- 22 EU countries and 115,981 11,13 and 15 year-olds:

‘any activity that increases your heart rate and makes you get out of breath some of the time. PA can be done in sports, school activities, playing with friends, or walking to school. Some examples of PA are running, briskwalking, rollerblading, biking, dancing, skateboarding, swimming, basketball, soccer, and surfing’

Percentage of young people reporting 60 min of daily moderate physical activity



ARE CHILDREN ACTIVE?

SELF-REPORT STUDIES

- HPA is consistently reported to be lower in girls than boys with fewer girls satisfying current PA Guidelines than boys.
- HPA decreases with age in both genders.
- Levels of HPA in developing countries are lower than those from Europe and north America.

ARE CHILDREN ACTIVE?

SELF-REPORT STUDIES

Recent data from Self-Report studies suggest that between **30%** and **40%** of young people satisfy current PA Guidelines

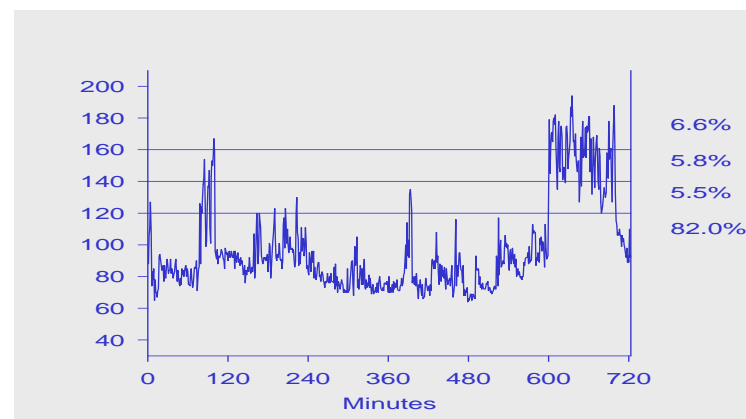
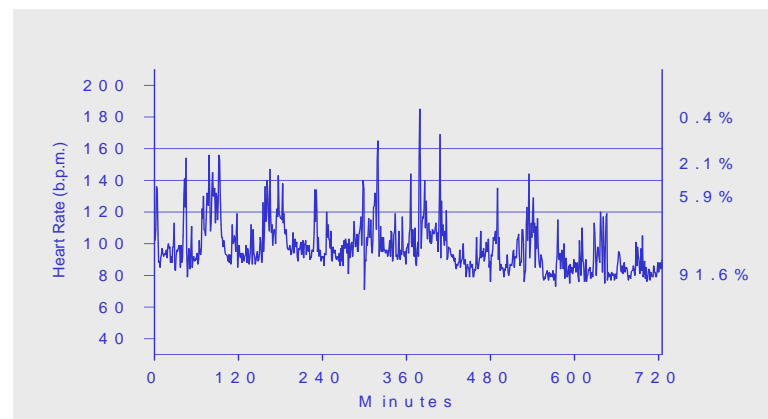


ARE CHILDREN ACTIVE?

HEART RATE MONITORING STUDIES

Armstrong et al.(1980-90s) : 1227
5-16 year olds monitored for 3
days

- Boys spent more time in MVPA than girls
- The amount of time spent in MVPA decreased with age



ARE CHILDREN ACTIVE ?

SUSTAINED PERIODS OF PA OVER 3 WEEKDAYS

20 min at 160bpm

%Boys

%Girls

0	84.5	93.3
1	8.7	6.7
2	4.9	0
3	1.9	

10 min at 140bpm

%Boys

%Girls

0	35.9	51.5
1	26.2	20.9
2	14.6	15.3
3	23.3	12.3

ARE CHILDREN ACTIVE ?

SUSTAINED PERIODS OF PA ON SATURDAY

20 min at 160bpm

%Boys

%Girls

0	93.4	98.3
1	5.4	0.8
2	1.1	0.8
3	0	0

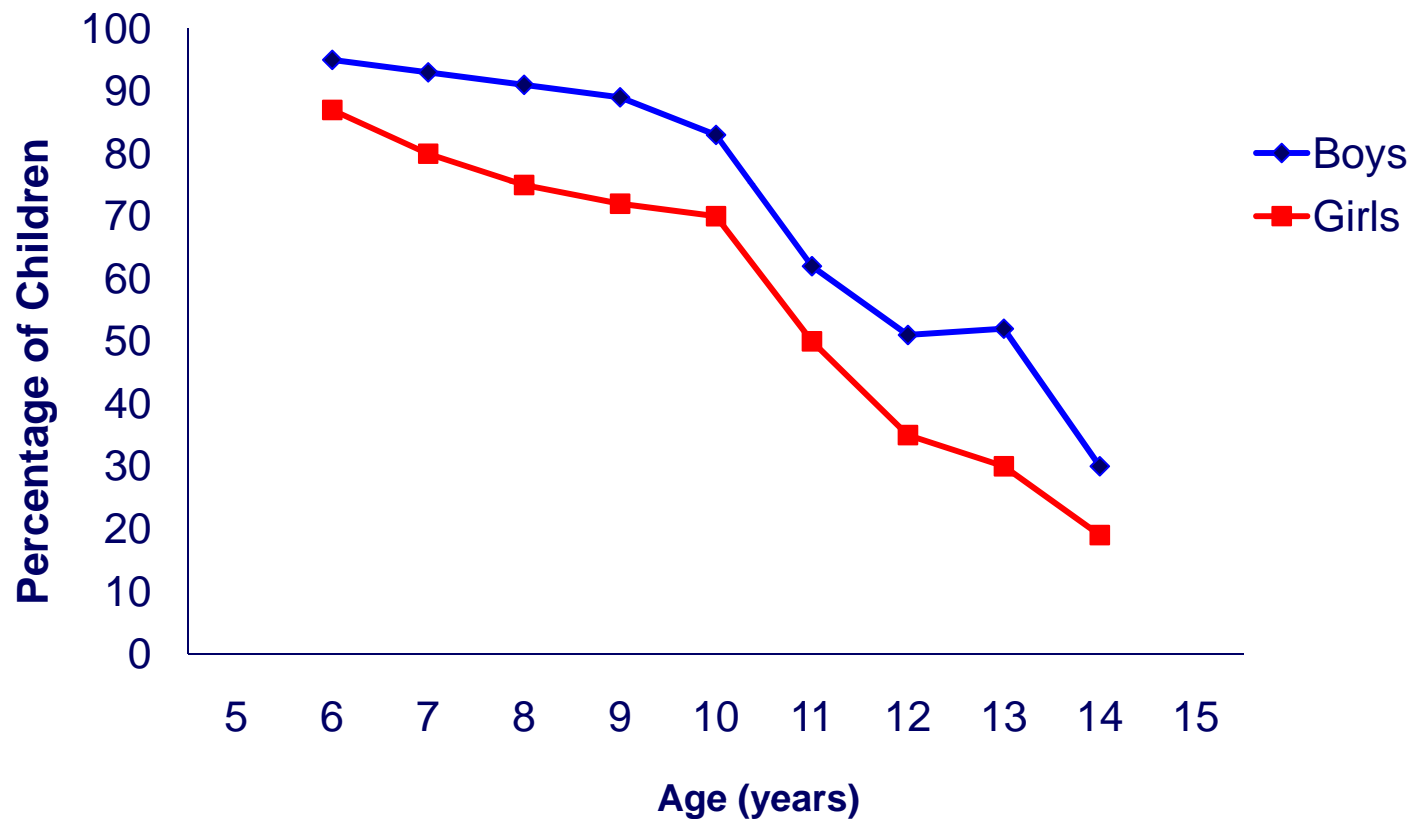
10 min at 140bpm

%Boys

%Girls

0	70.7	93.3
1	5.4	0.8
2	1.1	0.8
3	0	0

PERCENTAGE OF CHILDREN ACHIEVING GUIDELINE LEVELS OF PHYSICAL ACTIVITY



ARE CHILDREN ACTIVE ?

ACCELEROMETRY STUDIES

- The % of children who meet PA Guidelines depends on the cut-off point and epoch length used with a range of 1%-100% meeting PA Guidelines.
- Using a cut-off point of 3000cpm **<25%** of children meet PA Guidelines.
- Boys are more active than girls particularly if a more vigorous threshold is used.
- There is a tendency for HPA to decrease with age but it is less strong than in self-report studies



ARE CHILDREN ACTIVE?

COMPARISON BETWEEN SELF-REPORT and ACCELEROMETRY STUDIES

- **Riddoch et al. (2004)** – collected data on 2,185 children, aged 9 and 15 years from 4 European countries
- PA data were obtained using accelerometers which were worn over 3 or 4 days including at least 1 weekend day.
- **Cut-off points of 1,000 cpm for 9 year-olds and 1,500 cpm for 15 year-olds were used**
- Boys more active than girls :
 - at 9 y (21% more active)
 - at 15 y (26% more active)
- 9 year-olds more active than 15 year-olds : boys by 27% ; girls by 36%

**PERCENTAGE OF CHILDREN DAILY EXPERIENCING 60 MIN OF
MODERATE PHYSICAL ACTIVITY**

(Portugal, Estonia, Norway, Denmark)

	Riddoch et al. (2004)		Currie et al. (2004)	
	<u>boys</u>	<u>girls</u>	<u>boys</u>	<u>girls</u>
9 y	97.4	97.6		
11y			36.9	28.0
13y			31.9	21.3
15 y	81.9	62.0	27.9	18.5

ARE CHILDREN ACTIVE?

SUMMARY

- HPA is consistently found to be **lower** in girls than boys
- HPA **decreases** with age in both genders
- Self-report data suggest that **60%-70%** of children do **not** meet PA guidelines



ARE CHILDREN ACTIVE?

SUMMARY

- Accelerometry data suggest that **>75%** of children do **not** meet PA guidelines
- Heart rate data show that **very few** children experience sustained periods of MVPA



WHY ARE GIRLS LESS ACTIVE THAN BOYS ?

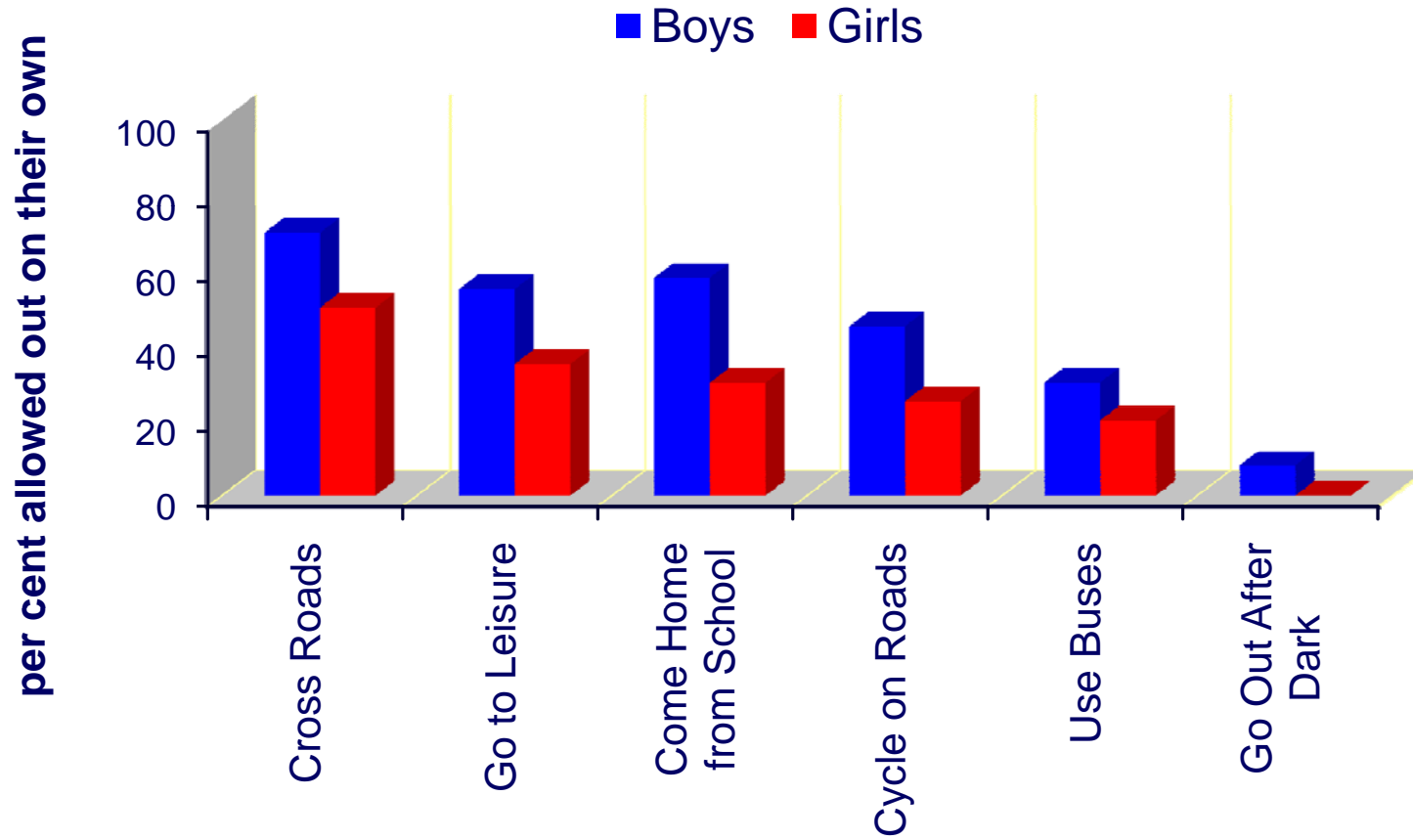
PHYSIOLOGICAL REASONS ?



SOCIO-CULTURAL REASONS ?



WHY ARE GIRLS LESS ACTIVE THAN BOYS ?



ARE TODAY'S CHILDREN LESS ACTIVE THAN PREVIOUS GENERATIONS ?

- Large surveys from Europe, Australia and the USA have concluded that there is no evidence of children being less active now than 20 years ago
- These data are supported by studies using pedometers, HR monitoring and accelerometers which have reported no change or an increase in HPA over time.
- The IOC 'expert group' concluded that '**although data on temporal trends in PA should be interpreted cautiously young people's PA levels seem to have stabilised at least over the last two decades**'
[Br J Sports Med 2011;45:11,839-848]

IS HABITUAL PHYSICAL ACTIVITY RELATED TO AEROBIC FITNESS [PEAK VO₂]?

- PA is a behaviour and peak VO₂ is a physiological variable
- Numerous *cross-sectional studies* have consistently shown that HPA is **NOT**, or at best, is only weakly related to aerobic fitness as expressed by peak VO₂
- In their daily lives young people very rarely if ever experience PA of sufficient intensity and duration to enhance or even maintain aerobic fitness



IS HABITUAL PHYSICAL ACTIVITY RELATED TO AEROBIC FITNESS [peak VO₂] ?

- **Kemper and Koppes (2004):** reported that analysis of data using autoregression over a period of 23 years resulted in no significant relationships between HPA and peak VO₂ being detected
- **Armstrong and Welsman (2000):** used multilevel modelling to examine age, gender and maturation on influences on the HPA of 200 11-13 year olds. With the primary variables controlled for peak VO₂ was introduced as an additional variable and a non-significant parameter was observed



CHILDREN ARE FIT AND ACTIVE – FACT OR FICTION ?

- Most children are (aerobically) fit but not physically active
- Both HPA and aerobic fitness have stabilised over the last 20 years
- **The low levels of HPA and the marked decline over time in aerobic performance involving the transport of body mass remain major issues in the promotion of youth health and well-being**



THE CHALLENGE

- HOW CAN WE PROMOTE FIT AND ACTIVE LIFESTYLES THAT CAN BE SUSTAINED INTO ADULT LIFE ?



HOW DO WE PROMOTE PHYSICAL ACTIVITY ?

- REQUIRES CONSISTENT MESSAGES ACROSS A VARIETY OF SETTINGS:
- THE COMMUNITY
- THE FAMILY
- THE SCHOOL



PHYSICAL EDUCATION and SCHOOL SPORT

FIRST or PRIMARY SCHOOL

Should we focus on:

Competitive team games

or

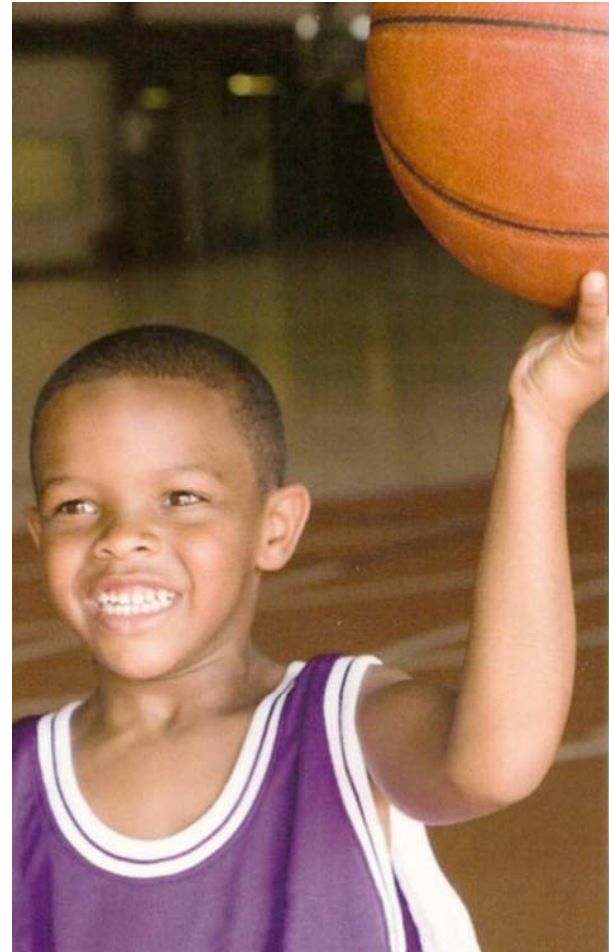
**The complex movements needed
for success in sports:**

running; skipping; hopping;
jumping; catching; throwing;
kicking; balancing etc



PHYSICAL EDUCATION

HAVE FUN !



SECONDARY SCHOOL PHYSICAL EDUCATION

- **Activity content of lessons:** how active are children during PE lessons ?
- **Curriculum content:** do we help children to develop an understanding of health-related activity ?



PHYSICAL EDUCATION - A BALANCED PROGRAMME OF ACTIVITIES

CO-OPERATIVE

COMPETITIVE

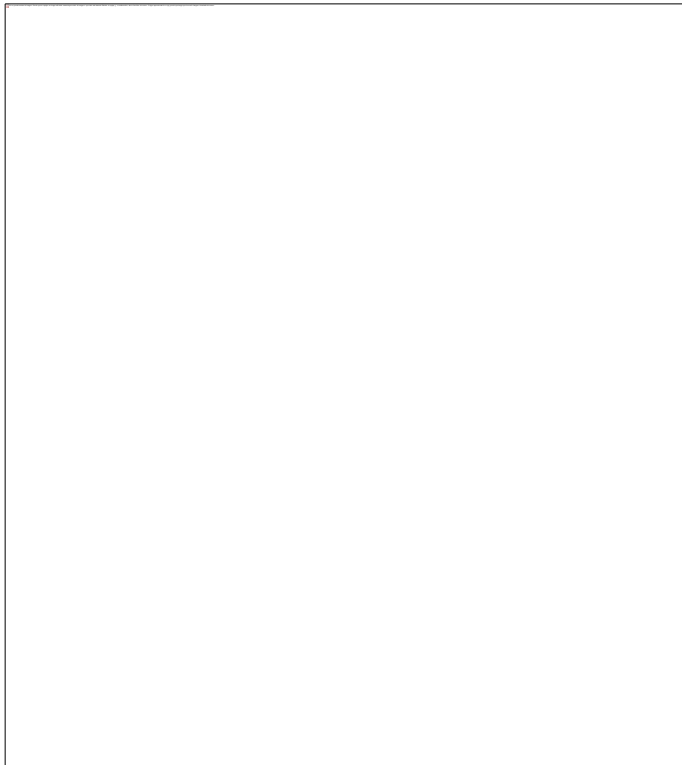
INDIVIDUAL

PARTNER

TEAM

SCHOOL SPORT

Many young people gain great pleasure from elite youth sport and natural talent must be nurtured so that the gifted few fulfil their potential

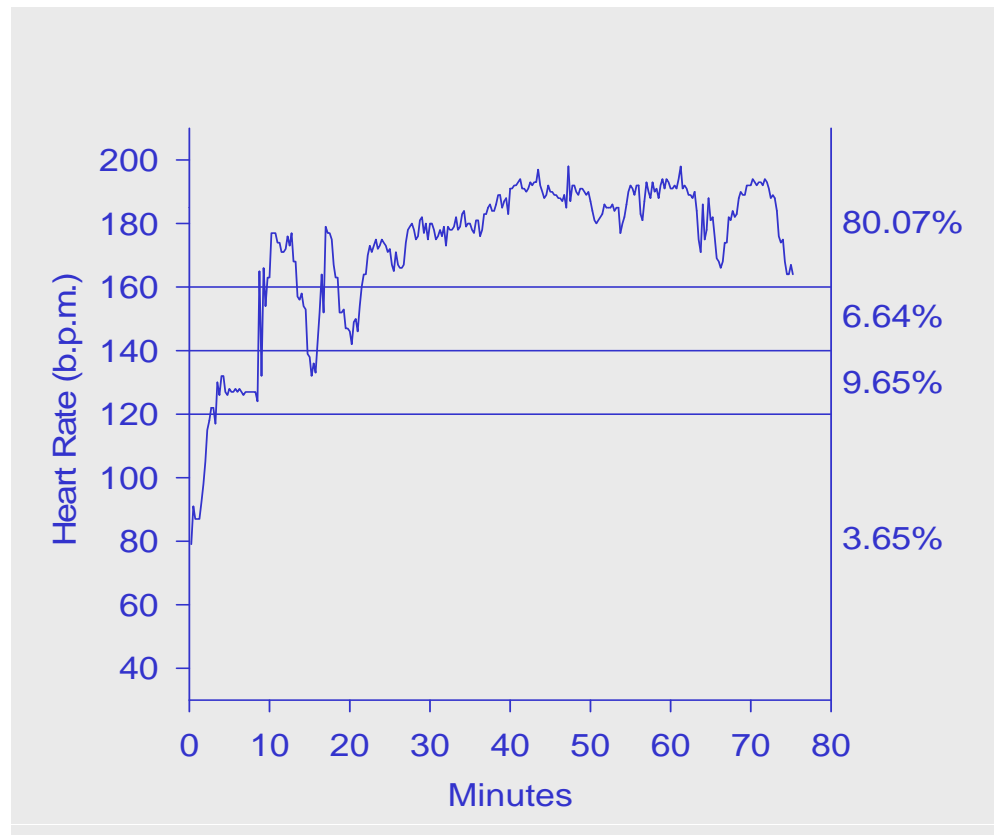


BUT too many youngsters are discouraged from participating in physical activity through lack of success in competitive sport



DEVELOP AN UNDERSTANDING OF THE IMPORTANCE OF PHYSICAL ACTIVITY IN MAINTAINING A HEALTHY LIFESTYLE

- Running
- Jogging
- Cycling
- Swimming
- Skipping
- Skating
- Disco Dancing



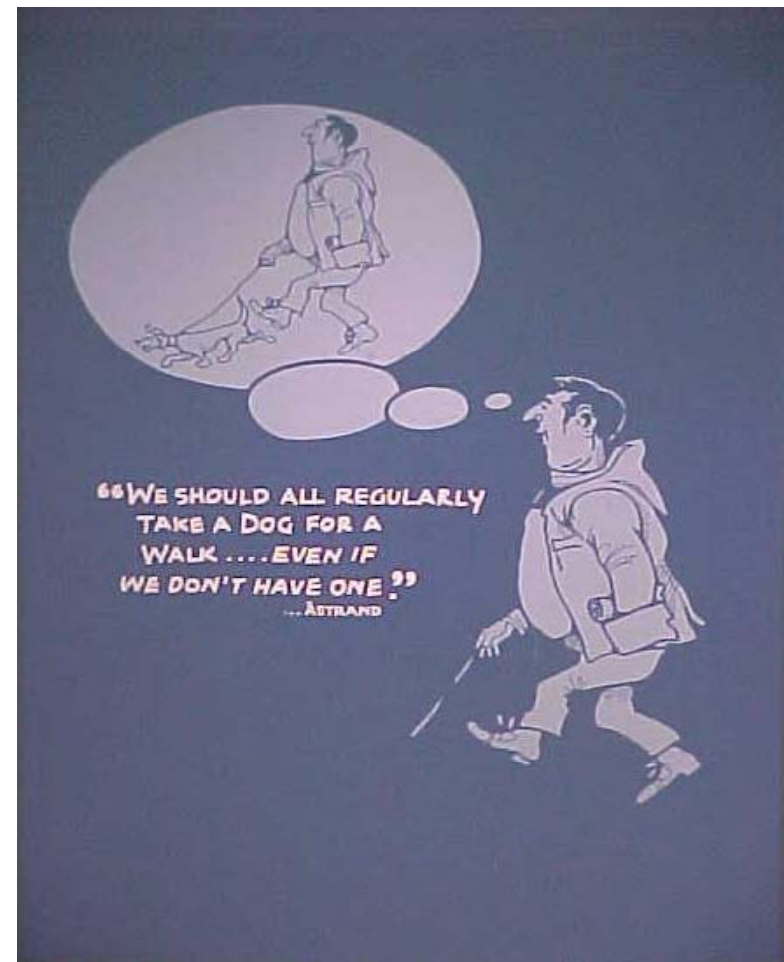
EXERCISE FOR LIFE ?

COMEDIAN
EDDIE MURPHY

OR

SCIENTIST
P.O. ASTRAND

EXERCISE IS A COP
OUT FOR THOSE
WHO CAN'T TAKE
THE RIGOURS OF
SMOKING AND
DRINKING



Mind your heart - make more love



- It's good exercise!*
- You can't eat or smoke while doing it!*
- You only get stress, if it isn't with your wife!*



Vejle Amt - et hjerteamt