



# Rethinking Our Approach to Physical Activity

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Head Physical Activity and Health Unit, Institute of Social and Preventive Medicine

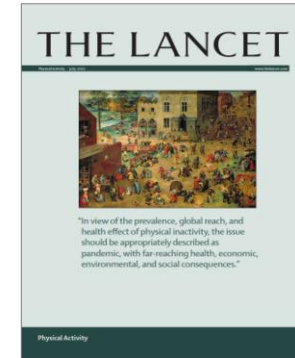
FEND Conference, Barcelona, 20.09.13

Panel 2: From evolution

## „From evolutionary biology to societal determinants“

An evolutionary perspective assumes that many components of our physiology are adapted to a range of expected behaviour. Is there evidence that people became physically active out of necessity and biological adaptation, and then had to reduce activity because of mechanisation and culturally and technologically induced decreases in the need for energy expenditure?

Physical activity level can be calculated as the ratio of total energy expenditure to basal metabolic rate. Ancestral foragers—of larger body size on average than are contemporary foragers—had estimated mean physical activity levels of roughly 1.7 (range 1.5-2.1),<sup>11</sup> which is little different from those in industrialised populations with moderate activity levels.<sup>12</sup> Non-human primates do less activity than do human beings (1.2-1.5),<sup>13</sup> suggesting that our species adapted to increased physical activity for foraging. Subsistence farmers have variable levels of activity, with a mean of about 1.9 in men and 1.8 in women, but ranging up to roughly 2.5.<sup>14</sup> However, in urban populations, the most sedentary individuals do little activity (about 1.5).<sup>17</sup> Overall, people could be encouraged to achieve levels of about 1.75, as was recommended by WHO and the Food and Agriculture Organisation for health in 2004,<sup>18</sup> but this value is much higher than is that of sedentary populations.<sup>17</sup>



Bauman A, Reis R, Sallis JF, Wells J, Loos R, Martin BW, for the Lancet Physical Activity Series Working Group. Physical Activity 2 - Why are some people physically active and others not? Understanding the Correlates of Physical Activity. Lancet. 2012 Jul 21;380(9838):258-71.

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• „Physical activity level can be calculated as the **ratio of total energy expenditure to basal metabolic rate.**“

• „**Ancestral foragers** had estimated mean physical activity levels of roughly **1.7 (...)**“

• **Non-human primates** do less activity than do human beings (**1.2-1.5**), suggesting that our species adapted to increased physical activity for foraging.

• **Subsistence farmers** have variable levels of activity, with a mean of about 1.9 in men and 1.8 in women, but ranging **up to roughly 2.5**.

• However, in urban populations, the **most sedentary individuals** do little activity (**about 1.5**).“

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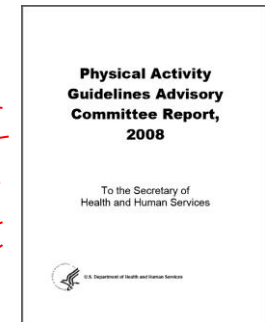
## Panel 1: Health benefits of physical activity in adults<sup>3-5</sup>

Strong evidence of reduced rates of:

- All-cause mortality
- Coronary heart disease
- High blood pressure
- Stroke
- Metabolic syndrome
- Type 2 diabetes
- Breast cancer
- Colon cancer
- Depression
- Falling

Strong evidence of:

- Increased cardiorespiratory and muscular fitness
- Healthier body mass and composition
- Improved bone health
- Increased functional health
- Improved cognitive function



Recommendations  
USA 2008      WHO 2010

Lee IM, Shiroma EJ, Lobelo F, Puska P, Blair SN, Katzmarzyk PT, for the Lancet Physical Activity Series Working Group. Effect of physical inactivity on major non-communicable diseases worldwide: an analysis of burden of disease and life expectancy. Lancet. 2012 Jul 21;380(9838):219-29.

**Panel 1: Health benefits of physical activity in adults<sup>3-5</sup>**

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**Strong evidence of:**

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conservative assumptions  
↓  
calculation of burden of disease ← physical inactivity

- 6% to 10% of cases for these diseases worldwide
- 9% of premature mortality worldwide (5.3 million deaths)
- ~ comparable to worldwide effects of smoking or obesity

Lee IM, Shiroma EJ, Lobelo F, Puska P, Blair SN, Katzmarzyk PT, for the Lancet Physical Activity Series Working Group. Effect of physical inactivity on major non-communicable diseases worldwide: an analysis of burden of disease and life expectancy. *Lancet*. 2012 Jul 21;380(9838):219-29.

**THE LANCET**

**BBC NEWS**

**TOP STORIES**

**Inactivity 'as deadly as smoking'**

18. Juli 2012 10:14

Effect of physical inactivity on major non-communicable diseases worldwide: an analysis of burden of disease and life expectancy

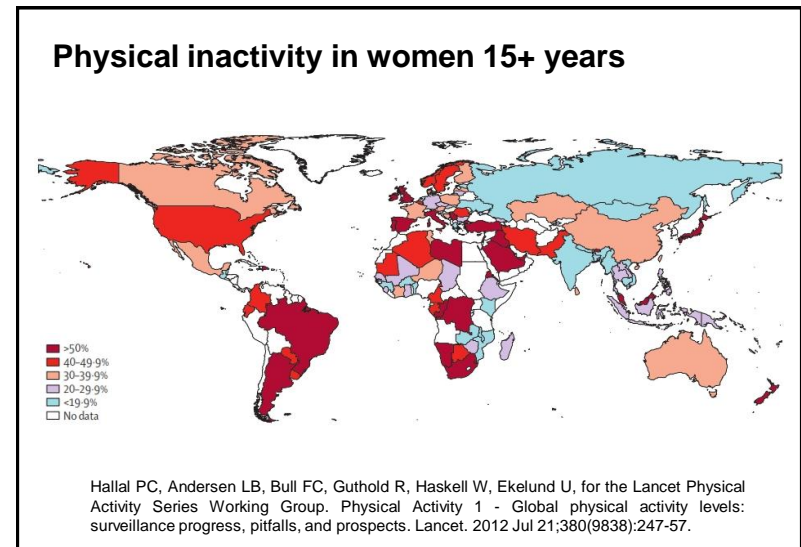
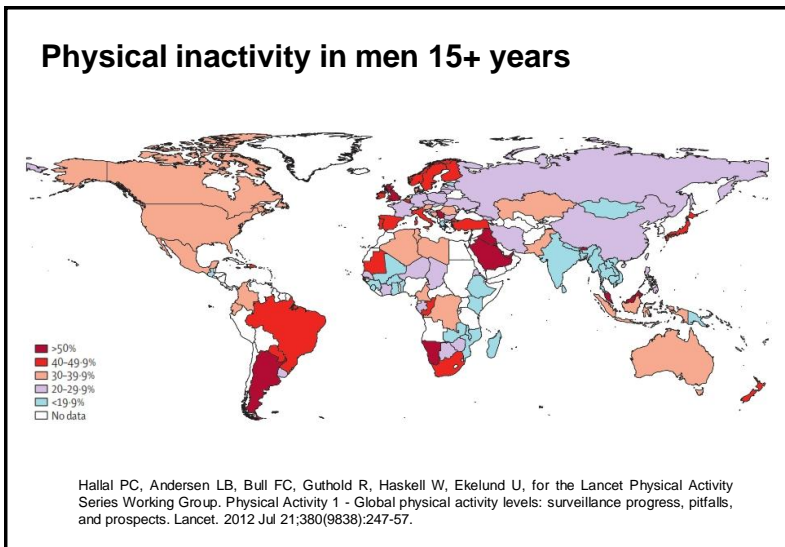
By Nick Trigg  
Health correspondent, BBC News

A lack of exercise is now causing as much smoking across the world, a study suggests.

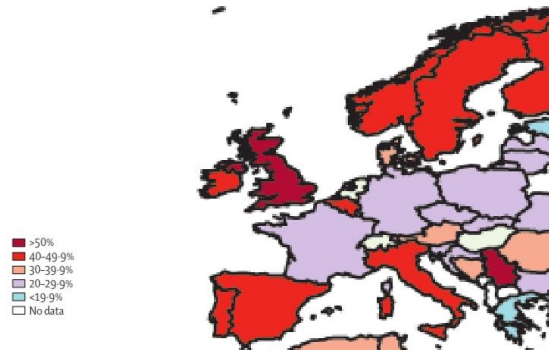
The report, published in the *Lancet* to the build-up to the Olympics, estimates that about a

"In view of the prevalence, global reach, and health effect of physical inactivity, the issue should be appropriately described as pandemic, with far-reaching health, economic, environmental, and social consequences."

Min Lee, Eric Shiroma, Felipe Lobelo, Pekka Puska, Steven N Blair, Peter T Katzmarzyk, for the Lancet Physical Activity Series Working Group\*

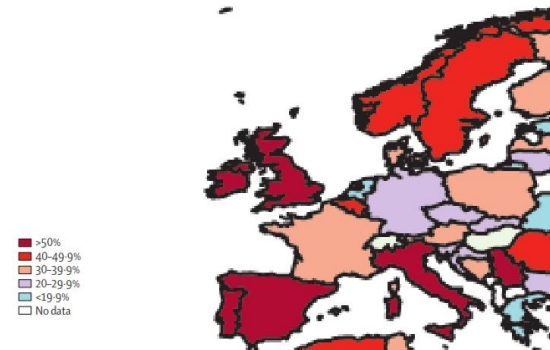


## Physical inactivity in men 15+ years



Hallal PC, Andersen LB, Bull FC, Guthold R, Haskell W, Ekelund U, for the Lancet Physical Activity Series Working Group. Physical Activity 1 - Global physical activity levels: surveillance progress, pitfalls, and prospects. *Lancet*. 2012 Jul 21;380(9838):247-57.

## Physical inactivity in women 15+ years



Hallal PC, Andersen LB, Bull FC, Guthold R, Haskell W, Ekelund U, for the Lancet Physical Activity Series Working Group. Physical Activity 1 - Global physical activity levels: surveillance progress, pitfalls, and prospects. *Lancet*. 2012 Jul 21;380(9838):247-57.

## Mortality reductions already with 15 min PA/day in Taiwanese cohort study with n=416'175

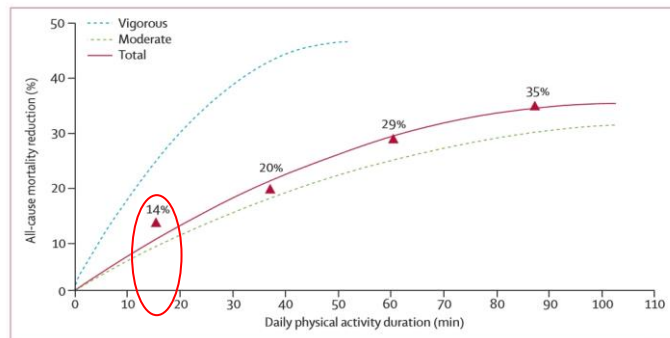


Figure 2: Daily physical activity duration and all-cause mortality reduction

Wen CP, Wai JP, Tsai MK, Yang YC, Cheng TY, Lee MC, Chan HT, Tsao CK, Tsai SP, Wu X. Minimum amount of physical activity for reduced mortality and extended life expectancy: a prospective cohort study. *Lancet*. 2011 Oct 1;378(9798):1244-53.

## Mortality reductions in all population subgroups in Taiwanese cohort study with n=416'175

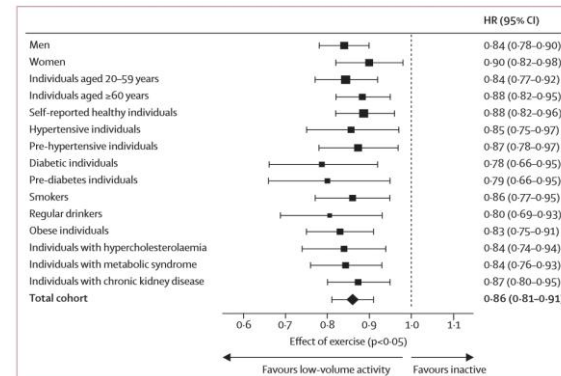
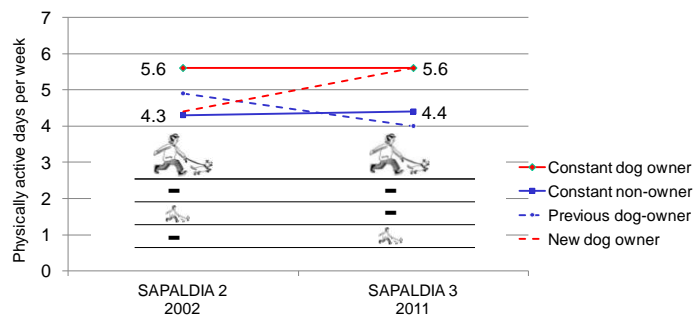


Figure 3: Adjusted all-cause mortality hazard ratio for individuals in the low-volume activity group compared with individuals in the inactive group, by participant characteristic. All hazard ratios (HR) are relative to health outcomes in individuals in the inactive group.

Wen CP, Wai JP, Tsai MK, Yang YC, Cheng TY, Lee MC, Chan HT, Tsao CK, Tsai SP, Wu X. Minimum amount of physical activity for reduced mortality and extended life expectancy: a prospective cohort study. *Lancet*. 2011 Oct 1;378(9798):1244-53.

## Role of dog ownership for physical activity behaviour



Martin BW, Bauman A, Wanner M, Probst-Hensch, Kriemler S. Are dog owners more active than non dog owners: cross sectional and longitudinal data from the Swiss Sapaldia cohort. Poster ISBNPA 2013

Curr Cardiovasc Risk Rep (2011) 5:340-349  
DOI 10.1007/s12170-011-0180-6

## Public Policy Actions Needed to Promote Physical Activity

Bill Bellew · Adrian Bauman · Brian Martín ·  
Fiona Bull · Victor Matsudo

Bellew B, Bauman A, Martin B, Bull F, Matsudo V. Public policy actions needed to promote physical activity. Curr Cardiovasc Risk Rep 2011; 5: 340-349

## Evidence-based settings to promote physical activity

- Policy and environment
- Mass media
- School setting
- Workplace
- The community
- Primary health care

Bellew B, Bauman A, Martin B, Bull F, Matsudo V. Public policy actions needed to promote physical activity. Curr Cardiovasc Risk Rep 2011; 5: 340-349

**Investments that Work**

Physical inactivity has been identified as the 4th leading risk factor for mortality in the world

2011 was an important year for physical activity, with many activities taking place locally, nationally, regionally and globally.

GAPA, a council of the International Society for Physical Activity and Health ISPAH  
[www.globalpa.org.uk](http://www.globalpa.org.uk)

**7 Best Investments for Physical Activity**

1. „Whole-of-school“ programmes  
 2. Transport policies and systems  
 3. Urban design regulations and infrastructure  
 4. Primary health care systems  
 5. Public education  
 6. Integrated community-wide programmes  
 7. „Sport for all“ systems and programmes

GAPA, a council of the International Society for Physical Activity and Health ISPAH  
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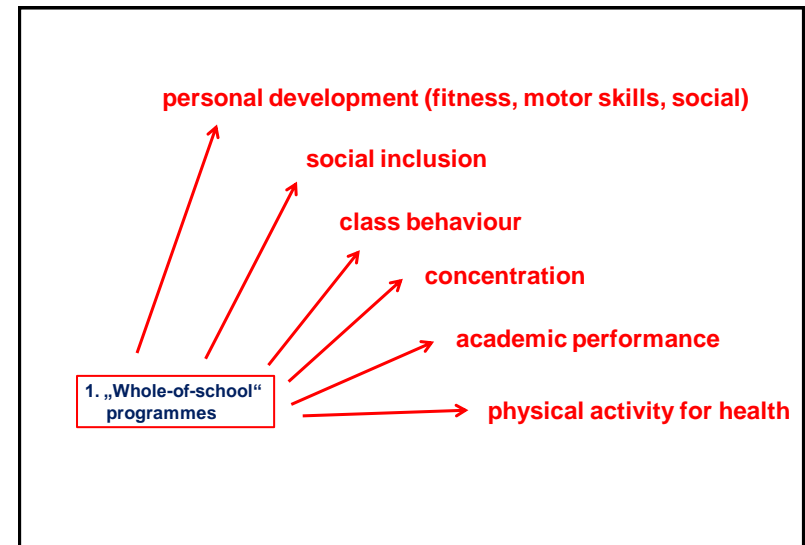
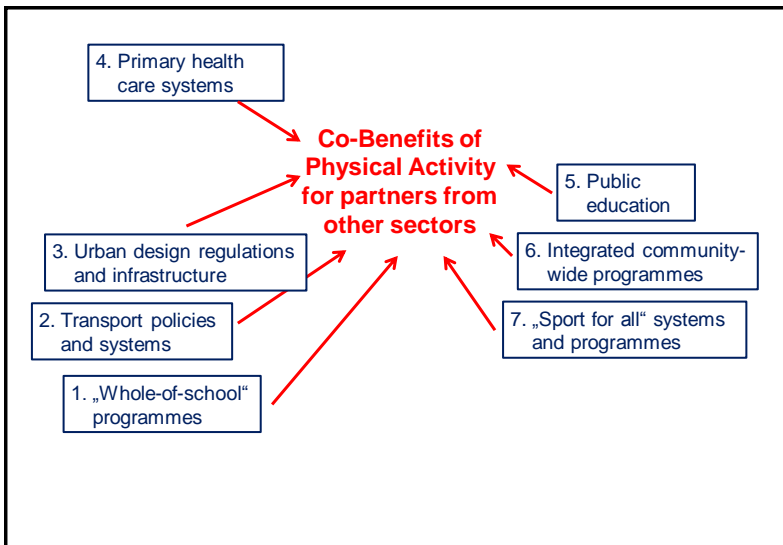
**4. Primary health care systems**

**5. Public education**

**6. Integrated community-wide programmes**

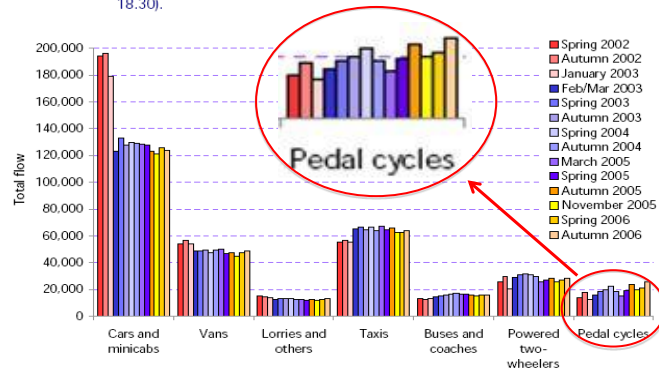
**7. „Sport for all“ systems and programmes**

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## London Congestion Charge

Figure 2.1 Traffic entering the central London charging zone during charging hours (07.00-18.30).



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less traffic congestion → productivity

less air pollution

less noise

less injuries

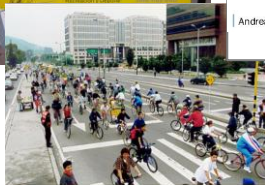
2. Transport policies and systems

→ physical activity for health



## The Ciclovía and Cicloruta Programs: Promising Interventions to Promote Physical Activity and Social Capital in Bogotá, Colombia

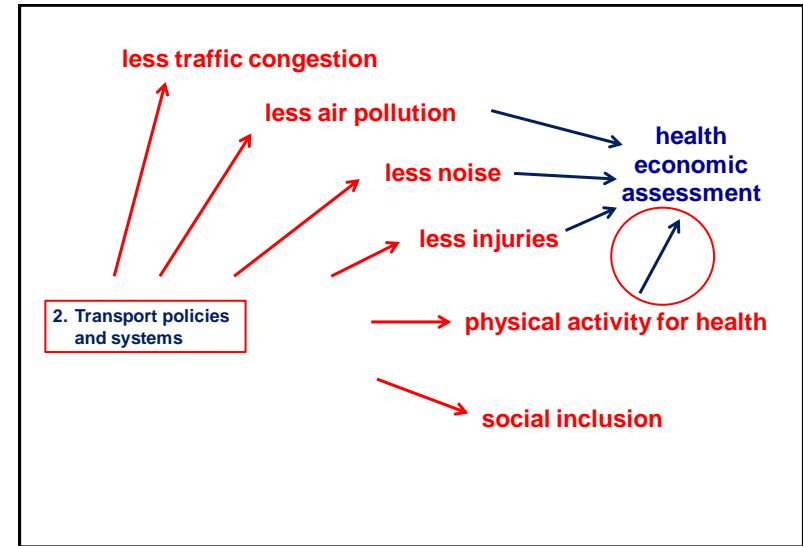
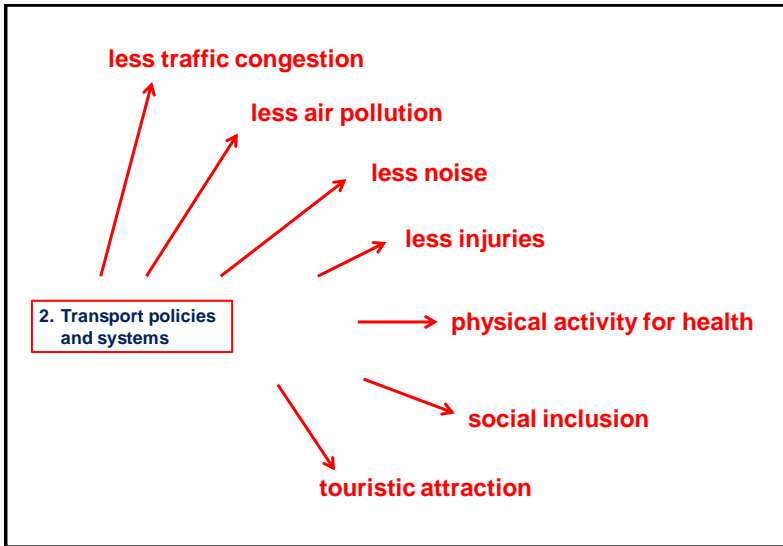
Andrea Torres, MPH, Olga L. Sarmiento, MD, PhD, Christine Stauber, PhD, and Roberto Zarama, PhD  
Am J Public Health. 2013 Feb;103(2):e23-30.



## SwitzerlandMobility



[www.switzerlandmobility.ch](http://www.switzerlandmobility.ch)



## HEAT Health Economic Assessment Tool for Cycling and for Walking

HEAT Health Economic Assessment Tool

Welcome to the WHO/Europe Health Economic Assessment Tool (HEAT).

This tool is designed to help you conduct an economic assessment of the health benefits of walking or cycling by estimating the value of reduced mortality that results from specified amounts of walking or cycling.

The tool can be used in a number of different situations, for example:

- when planning a new piece of cycling or walking infrastructure.
- HEAT estimates a value for the estimated total of cycling or walking when the new infrastructure is in place. This can be compared to the costs of implementing different alternatives to produce a benefit-cost ratio and help to make the case for investment.
- to value the reduced mortality from past and/or current levels of cycling or walking, such as to a specific workplace, across a city or in a country. It can also be used to estimate economic consequences from a potential future change in levels of cycling or walking.
- to provide input into more comprehensive economic, appraisal, exercises, or prospective health impact assessments.

For example, to estimate the mortality benefits from achieving targets to increase cycling or walking, or from the results of an intervention project.

More information is available at <http://www.euro.who.int/hepat>

- Start using HEAT for walking
- Start using HEAT for cycling

www.euro.who.int/HEAT

## The Health Economic Assessment Tool HEAT for Cycling

Health Economic Assessment Tool for Cycling

Fill in the two fields in Step 1 with values for your study. Then decide whether to use the default parameters supplied in Step 2 or adjust them according to your needs. Results are then presented in Step 3. The population parameters used to calculate the results are displayed at the bottom of the sheet.

**Step 1: enter your data (all values must fit in the red fields)**

Number of days per day:

Mean top height (km):

**Step 2: check the parameters**

Maximum annual benefit: EUR 7,109,986

Savings per km cycled per individual cyclist per year: EUR 10

Savings per individual cyclist per year: EUR 13

Mean annual benefit: EUR 7,109,986

Present value of mean annual benefits: EUR 7,109,986

Population parameters used to calculate results

Population (EU28)	750	Based on number of individual cyclists calculated from data in Step 1 and Step 2.
Mean population of walking population who do a year per year	1000000	This number is the number of all of users of the tool. The population of walking population who do a year per year.
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www.euro.who.int/hepa

## The Health Economic Assessment Tool HEAT for Cycling

**Step 1: enter your data** (all users must fill in the red fields)

Number of trips per day	10'000
Mean trip length (km)	4

**Step 2: check the parameters**

Mean number of days cycled per year	124
Proportion of trips that are one part of a return journey (or 'round trip')	0.9
Proportion undertaken by people who would not otherwise cycle	0.5
Mean proportion of working age population who die each year	0.005847
Value of life (in Euros)	EUR 1'500'000
Discount rate	5.0%

**Population parameters used to calculate results**

Population that stands to benefit	2750
Mean proportion of working age population who die each year	0.005847
Expected deaths in the local population	16.08
Protective benefit, according to actual distance traveled	0.17
Lives saved	2.81

## The Health Economic Assessment Tool HEAT for Cycling

**Step 1: enter your data** (all users must fill in the red fields)

Number of trips per day	10'000
Mean trip length (km)	4

**Step 3: read the economic savings resulting from reduced mortality**

<b>Maximum annual benefit</b>	EUR 4'209'000
Savings per km cycled per individual cyclist per year	EUR 0.81
Savings per individual cyclist per year	EUR 765
Savings per trip	EUR 3.39

**Mean annual benefit:** EUR 3'136'000

**Present value of mean annual benefit:** EUR 2'283'000

Based on the following assumptions (see user guide for details)

5% discount rate  
5 year build-up of benefit and 1 year build-up of uptake, averaged over 10 years

## HEAT Applications

- Since May 2011:
  - over 2.500 visits
  - from almost 60 countries
- Part of official transport assessment toolbox:
  - in 2 countries (Sweden, England)
  - under consideration in 1 more (France)
- Applied in project evaluations, status quo and scenario analyses



[www.euro.who.int/HEAT](http://www.euro.who.int/HEAT)



## Comparison of inhabitants' physical activity behaviour in Zermatt (Community 1), Crans-Montana und Verbier

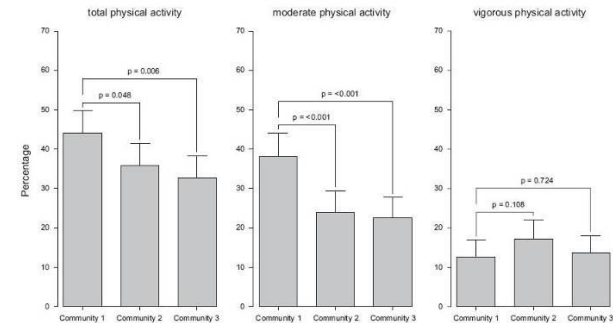
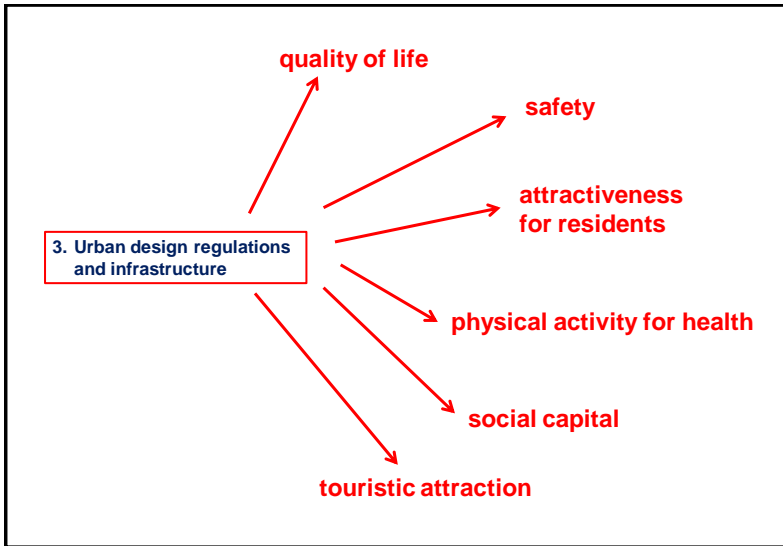


Fig. 1. Age- and sex-adjusted prevalence of sufficient total, moderate and vigorous physical activity by community.

Thommen Dombos O, Braun-Fahrlander Ch, Martin-Diener E. Comparison of adult physical activity levels in three Swiss alpine communities with varying access to motorized transportation. *Health & Place*, 2007; 13(3): 757-66



BMJ  
 BMJ 2012;344:e1389 doi:10.1136/bmj.e1389 (Published 26 March 2012) Page 1 of 17

**RESEARCH**

**Effectiveness of physical activity promotion based in primary care: systematic review and meta-analysis of randomised controlled trials**

OPEN ACCESS

Gillian Orrow *academic clinical fellow in general practice*, Ann-Louise Kinmonth *foundation professor of general practice*, Simon Sanderson *senior clinical research associate*, Stephen Sutton *professor of behavioural science*

**“CONCLUSIONS:** *Promotion of physical activity to sedentary adults recruited in primary care significantly increases physical activity levels at 12 months, as measured by self report (...).”*

„Barriers to counseling – (...) most important ones: lack of time, competition between the different topics of health promotion and preventive medicine, lack of reimbursement, lack of clear guidelines, lack of knowledge about downstream structures, lack of structural support to facilitate behavioral changes in patients (architectural and in town planning), or physician’s fear to be perceived as a «health moralist» (...)“

Opinions and Attitudes of a Sample of Swiss Physicians about Physical Activity Promotion in a Primary Care Setting

Schweizerische Zeitschrift für «Sportmedizin und Sporttraumatologie» 55 (3), 97–100, 2007

**Attitudes towards Physical Activity Promotion in Primary Care**  
 HEPA survey Switzerland 2004, n=811

„Would you rather welcome or disapprove of your GP addressing your individual physical activity behaviour?“

**Desire for advice**

<b>Much welcomed</b>	<b>47.5 %</b>
<b>Rather welcomed</b>	<b>32.0 %</b>
<b>Indifferent</b>	<b>7.1 %</b>
<b>Rather disapproved</b>	<b>5.9 %</b>
<b>Clearly disapproved</b>	<b>7.5 %</b>

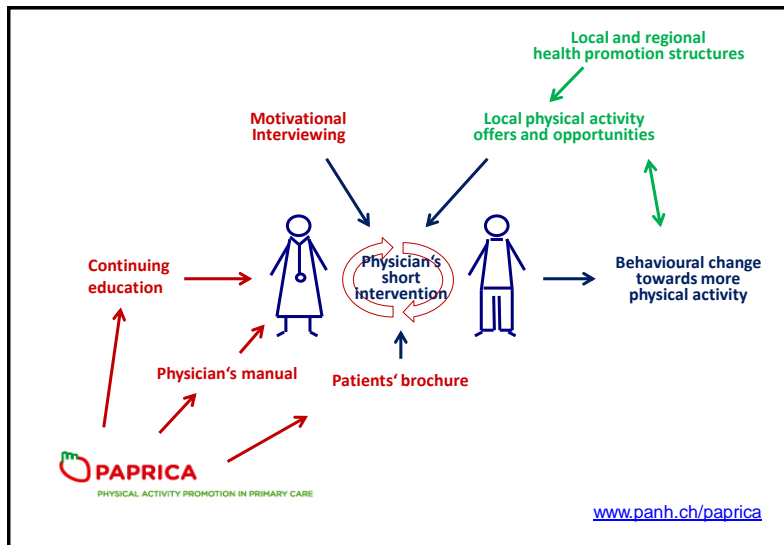
Bize R, Surbeck R, Padlina O, Peduzzi F, Cornuz J, Martin B. Promotion of physical activity in the primary care setting: The situation in Switzerland. *Schweiz Z Sportmed Sporttraumatol* 2008; 56 (3), 112–116.

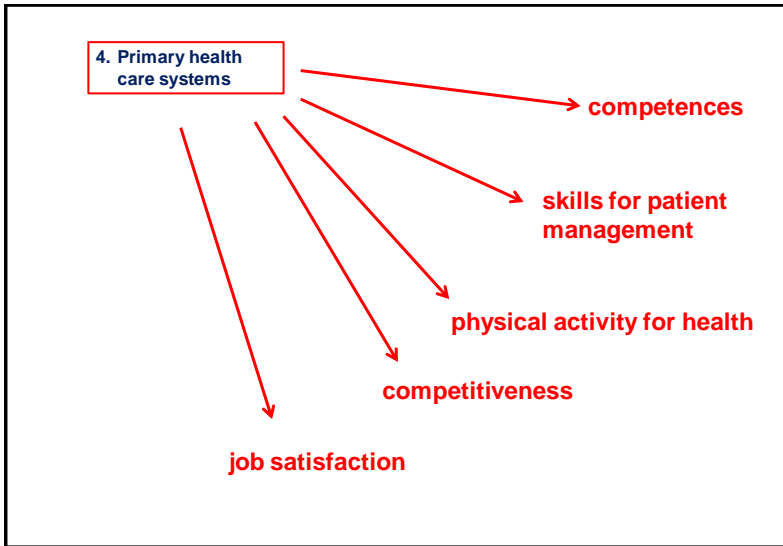
## Attitudes towards Physical Activity Promotion in Primary Care HEPA survey Switzerland 2004, n=811

„For you, how relevant is your GP's advice concerning your individual physical activity behaviour?“

	Desire for advice	Importance of advice	
<b>Much welcomed</b>	47.5 %	50.5 %	<b>very relevant</b>
<b>Rather welcomed</b>	32.0 %	30.8 %	<b>rather relevant</b>
<b>Indifferent</b>	7.1 %	10.5 %	<b>moderately relevant</b>
<b>Rather disapproved</b>	5.9 %	4.2 %	<b>of little relevance</b>
<b>Clearly disapproved</b>	7.5 %	4.0 %	<b>not relevant at all</b>

Bize R, Surbeck R, Padlina O, Peduzzi F, Comuz J, Martin B. Promotion of physical activity in the primary care setting: The situation in Switzerland. *Schweiz Z Sportmed Sporttraumatol* 2008; 56 (3), 112–116.





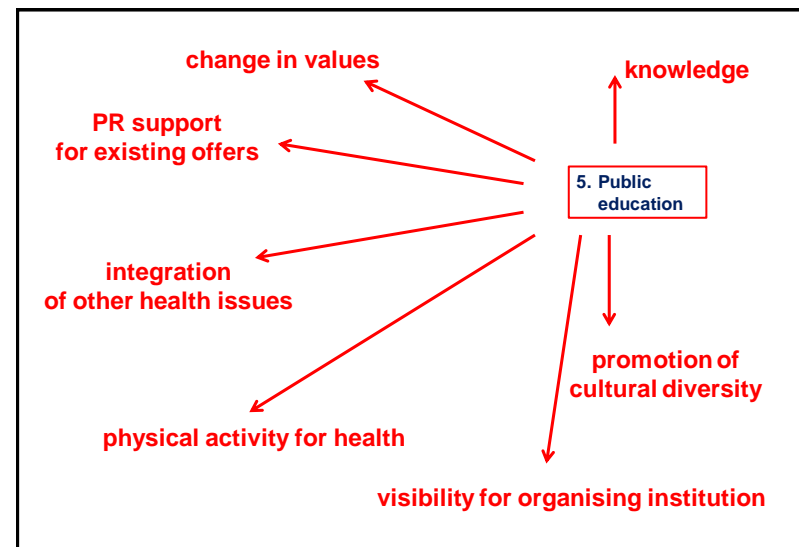
### Potential of population wide campaigns

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HEALTH EDUCATION RESEARCH Vol.22 no.3 2007  
Pages 406-413  
Advance Access publication 13 September 2006

**Twelve-month effects of Canada on the Move:  
a population-wide campaign to promote  
pedometer use and walking**

C. L. Craig<sup>1,2\*</sup>, C. Tudor-Locke<sup>1,3</sup> and A. Bauman<sup>4</sup>



## Time Trends in Physical Activity in the State of São Paulo, Brazil: 2002–2008

VICTOR K. R. MATSUDO<sup>1</sup>, SANDRA M. MATSUDO<sup>1</sup>, TIMÓTEO L. ARAÚJO<sup>1</sup>, DOUGLAS R. ANDRADE<sup>1</sup>, LUIS C. OLIVEIRA<sup>1</sup>, and PEDRO C. HALLAL<sup>2</sup>

<sup>1</sup>Physical Fitness Research Center, CELAFISCS, São Caetano, BRAZIL; and <sup>2</sup>Federal University of Pelotas, Pelotas, BRAZIL

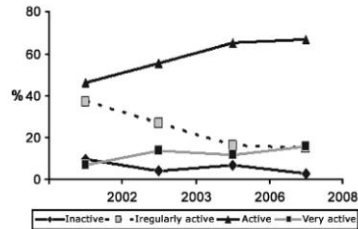


FIGURE 1—Trends of physical activity categories in the state of São Paulo, Brazil (2002, 2003, 2006, and 2008).

Med Sci Sports Exerc. 2010 Dec;42(12):2231-6.



## Bike to work

„Try something new“

Surbeck R, Martin-Diener E, Grize L, Spoerri A, Braun-Fahrländer C. Swiss bike-to-work campaign: Did we reach the intended population? Schweiz Z Sportmed Sporttraumatol, in press.

48

International Congress on Soldier's Physical Performance  
May 18-22, 2005, Jyväskylä, Finland

