

A SHORT REPORT ON OF MEASUREMENT, TRENDS AND ACTION ON PHYSICAL ACTIVITY: COUNTRY CASE STUDY EXAMPLES

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Introduction

There is strong evidence demonstrating the direct and indirect pathways by which physical activity prevents many of the major non communicable diseases (NCD) responsible for premature death and disability¹. Physical inactivity was identified as the 4th leading risk factor for the prevention of NCD², preceded only by tobacco use, hypertension and high blood glucose levels, and accounting for over 3 million preventable deaths globally in 2010.³ Despite these facts, and being identified nearly 20 years ago as the “best buy in public health”⁴ the level of global and national public health action on physical activity does not match the evidence of the importance and risk posed by physical inactivity. Why?

Eight possible reasons have been identified⁵:

1. The strength of the evidence is not known and/or is relatively new and not fully accepted;
2. Lack of consensus-based guidelines on how much activity is needed for disease prevention;
3. The behaviour of ‘physical activity’ is not understood, nor properly identified as a discrete ‘risk’ because it is a behaviour embedded within ‘everyday life’;
4. Physical inactivity cannot be measured reliably to provide valid estimates of risk;
5. Physical inactivity is not recognised as a problem for low and middle income countries;

¹ Physical Activity Guidelines Advisory Committee. Physical Activity Guidelines Advisory Committee Report, 2008. Washington, D.C.2008.

² World Health Organisation. 2008-2013 Action Plan for the Global Strategy for the Prevention and Control of Noncommunicable Diseases. Geneva: World Health Organisation2008.

³ World Health Organization. Global Status Report on non communicable disease 2010. Geneva: World Health Organization2011.

⁴ Morris JN. Exercise in the prevention of coronary heart disease: today's best buy in public health. *Medicine and Science in Sports and Exercise*. 1994;26(7):807-14.

⁵ Bull FC, Bauman AE. Physical Inactivity: The “Cinderella” Risk Factor for Noncommunicable Disease Prevention. *Journal of Health Communication*. 2011 2011/08/31;16(sup2):13-26.

6. Population-wide levels of participation in physical activity cannot be changed;
7. Lack of 'ownership' of the problem and control of the relevant solutions by any single government Ministry – integrated action and partnerships are required beyond the health sector; and
8. Insufficient use of advocacy and communications to make the case strongly and convincingly for physical activity.

Many of these reasons are, however, false or at the very least out of date, as over the last decade significant progress has been made to provide the necessary tools and materials to support national scale action on physical inactivity. The evidence in support of this position is provided below in brief:

- EVIDENCE OF HEALTH BENEFIT

Physical inactivity is well established as one of the four core risk factors for NCDs. It is *independently* associated with a reduction in risk of chronic disease and it has been estimated as being the principal cause for approximately 21–25% of breast and colon cancer burden, 27% of diabetes and approximately 30% of ischaemic heart disease burden.

- GLOBAL AND NATIONAL GUIDELINES

There is widespread consensus on the minimal optimal amount of activity needed to prevent disease and promote health. The dose response curve is sufficiently well known to allow countries (such as the USA, Canada, UK, Australia, many European countries) to develop national guidelines and in 2010 WHO released a set of global recommendations.⁶ There is now a clear mandate for how much of what types of physical activity should be encouraged and supported as part of a national public health response to physical inactivity.

- THE SCALE OF THE PUBLIC HEALTH PROBLEM OF PHYSICAL INACTIVITY

Physical inactivity has been identified as the fourth leading risk factor for global mortality causing an estimated 3.2 million deaths globally. A large share of these deaths, as well as a high burden of morbidity and disability attributable to physical inactivity, occurs in low- and middle-income countries.⁷

- MEASUREMENT

Surveillance of physical activity is an area where considerable progress has been made in the last decade. Since 2001 when only 35 countries were found to have usable national

⁶ World Health Organisation. Global Guidelines on Physical Activity for Health. Geneva: World Health Organisation 2010.

⁷ World Health Organisation. 2008-2013 Action Plan for the Global Strategy for the Prevention and Control of Noncommunicable Diseases. Geneva: World Health Organisation 2008.

data on physical inactivity in adult populations,⁸ there are now data available from over 120 countries – that is two thirds of Member States. These (mostly) national data provide baseline estimates of physical inactivity. The improved situation is a consequence of the development and testing of two physical activity instruments; namely the international physical activity questionnaire and the Global Physical Activity Questionnaire (GPAQ); the latter was developed specifically for the WHO STEPS surveillance system, and captures activity across three domains: leisure, work and transport.⁹

These instrument, particularly GPAQ, have proven evidence of feasibility and utility in LMIC.¹⁰ Most importantly, unlike measurement instruments for some other risk factors, these instruments have been tested for reliability and validity and been shown to be acceptable. Most importantly they have been analysed to assess sensitivity and specificity and been shown to be acceptable at detecting those adults who are inactive or insufficiently active. This evidence supports the use of self-report measures for detecting current levels and change in levels of physical inactivity.

- **EVIDENCE OF EFFECTIVE INTERVENTIONS – scalable and feasible in LMIC**

A growing body of evidence on effective and feasible public health interventions has been collected, assessed and made available to Member States by several recognized agencies. These include: WHO publications such as Best Investments and the WHO cost effectiveness work in 2011; WHO report on Population-based approaches to increasing levels of physical activity (2009), Review of Best Practice in Interventions to Promote Physical Activity in Developing Countries (2006), Physical Activity Interventions in Latin America:: A Systematic Review;¹¹ Implementing DPAS (2007); in the USA, the Centers for Disease Control and Prevention's Community Guide to Preventive Action; and in the UK the National Institute's for Health and Clinical Excellence (NICE) systematic reviews and national guidance documents on physical activity interventions. Collectively this evidence provides an extensive set of supporting literature for action across different settings (primary health care, schools, worksite, within the community, and at the level of individual education and skills, mass population awareness and education, program and services, environmental changes and urban design solutions and to a lesser extent policy levers).

These national and international documents provide an excellent guide for member states to the selection and implementation of a comprehensive set of actions on physical

⁸ Bull FC, Armstrong TP, Dixon T, Ham S, Neiman A, Pratt M. Physical Inactivity. In: Ezzati M, Lopez A, Rodgers A, Murray C, editors. Comparative Quantification of Health Risks: Global and Regional Burden of Disease Attributable to Selected Major Risk Factors. Geneva: World Health Organization; 2005.

⁹ Armstrong T, Bull F. Development of the World Health Organization Global Physical Activity Questionnaire (GPAQ). *Journal of Public Health*. 2006;14(2):66-70.

¹⁰ Guthold R, Louazani SA, Riley LM, Cowan MJ, Bovet P, Damasceno A, et al. Physical Activity in 22 African Countries: Results from the World Health Organization STEPwise Approach to Chronic Disease Risk Factor Surveillance. *American Journal of Preventive Medicine*. 2011;41(1):52-60.

¹¹ Hoehner CM, Soares J, Parra Perez D, Ribeiro IC, Joshu CE, Pratt M, et al. Physical Activity Interventions in Latin America:: A Systematic Review. *American journal of preventive medicine*. 2008;34(3):224-33. e4.

inactivity. Like the other three core NCD risk factors (smoking, diet, alcohol), there is not a single action solution to increasing participation in physical activity. National action must comprise a set of policy, regulatory, environmental and behavioral strategies, aimed at influencing and supporting different sectors of the population.

Most importantly, there are published examples of undertaking a multi-pronged approach towards physical inactivity at a large / national scale from Member States, including from Australia, Brazil, Canada, Finland, Scotland, Singapore, and Thailand. **Across these countries, the evidence of impact, as seen by a change in population prevalence of physical activity over time, suggests that physical inactivity can be changed by a magnitude of approximately 1% point a year.** It is for this reason that the proposed global target should aim for around 1% relative change per year.

Of particular importance is that fact that there is evidence from low and middle income countries. Two notable examples are the achievements of Brazil and Columbia with other Latin American countries also providing evidence of implementation of feasible actions as part of their efforts aimed at increasing physical activity. Over time, surveillance data will quantify and demonstrate the level of impact and effectiveness. However, data are already available to show that the transformation of the City of Bogota, Colombia to a place which encourages walking, cycling and public transit and the State of Sao Paulo, Brazil where a sustained social marketing approach *combined with* environmental and community-based initiatives have increased population levels of physical activity. Brazil is an example of a middle income country that has achieved a similar change with a 6% decline in inactivity over a 6 year period (2002-2008). Canada is an example of a high income country which has reported a 20% increase over 20 years (1982-2002). **A core feature of those countries showing improvements in rates of participation is the implementation of a combination of actions across multiple sectors including health, transport, sport and education.** Adaptation of interventions to the cultural setting, capacity and low resource contexts is possible.

Country level examples are often required to show which countries have measured physical activity, what these data show over time in terms of trends and whether action on physical activity can produce the desirable increases in population levels of participation. The appendix to this report provides 8 examples of country level change and one example of no change – this provide the counter factual argument and comes from the USA.

The **APPENDIX** provides country case study examples to demonstrate the available evidence where actions have taken place, changes in levels of physical activity are possible.

Caveats to these data include: the measure of physical activity is not the same in all case studies; the measures may only reflect leisure time physical activity in some examples; the dose (amount) and fidelity of policy, program and environmental actions vary and are not described in detail in this report.

APPENDIX 7 CASE STUDY EXAMPLES OF CHANGE IN PHYSICAL ACTIVITY OVER TIME
1 MULTI COUNTRY EXAMPLE OF INFRASTRUCTURE IMPROVEMENTS ON PA
1 COUNTERFACTUAL ARGUMENT: NO ACTION & NO CHANGE - USA

CASE STUDY BRAZIL

REFERENCE/SOURCE:

Matsudo V, Matsudo S, Araújo T, Andrade D, Oliveira L, Hallal P. **Time Trends in Physical Activity in the State of São Paulo, Brazil: 2002-2008.** Medicine and Science in Sports and Exercise. 2010;42(12):2231-6.

2010;42(12):2231-6.

Matsudo V, Matsudo S, Andrade D, Araujo T, Andrade E, de Oliveira LC, et al. Promotion of physical activity in a developing country: the Agita Sao Paulo experience. Public Health Nutrition. 2002 Feb;5(1A):253-61.

MEASUREMENT TOOL: IPAQ (modified)

MAIN PROGRAM ACTION Comprehensive multi strategy city wide (Sao Paulo) AGITA project

SUMMARY FINDINGS: [précis /extract taken directly from above source]

In Brazil, levels of physical activity are low and this is of particular concern because the country is experiencing very rapid epidemiological and nutritional transitions. Surveys conducted in the Dao Paulo state in the 1990s produced estimates of 46%, 50% and 69% of adults not meeting physical activity guidelines. Recent data show the proportion of adults not meeting the 150-min threshold increased from 41% in 2002 to 52% in 2007.

Figure 1 shows time trends in physical activity for the proportion of inactive subjects declined from 9.6% in 2002 to 2.7% in 2008 (3.5 times decrease).

For the same period, the prevalence of very active subjects doubled from 7.0% to 15.7%. An increase in proportion of active subjects and a reduction in the prevalence of irregularly active individuals were also evident. Changed in the prevalence of physical activity practice according to cutoff points of 0 and 150 min.wk⁻¹ were also seen.

Figure 2 presents a significant ($p < 0.001$) reduction in proportion of individuals scoring <150 min.wk⁻¹ from 43.7% in 2002 to 11.6% in 2008.

For comparison, the only other published data available on time trends of physical activity in Brazil come from Pelotas, a southern Brazilian city. Using exactly the same instrument the authors detected an 11% point increase in the proportion of adults below the 150-min threshold during a 5-year period (2002-2007).

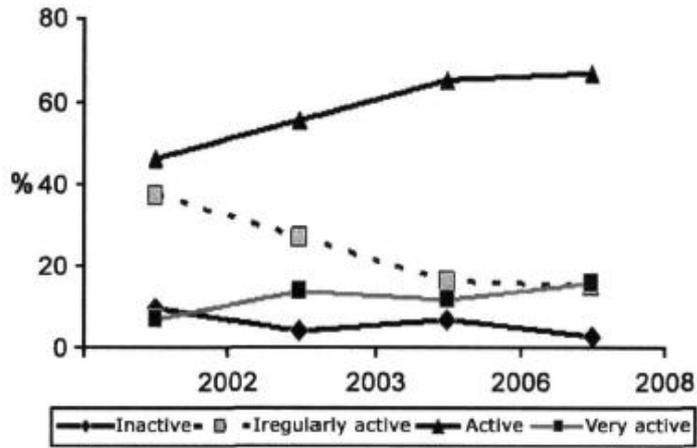


FIGURE 1—Trends of physical activity categories in the state of São Paulo, Brazil (2002, 2003, 2006, and 2008).

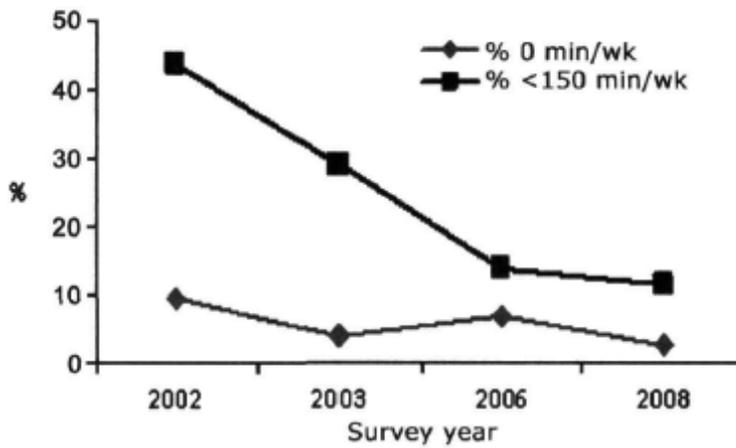


FIGURE 2—Trends of inactive people and insufficiently active people in the state of São Paulo, Brazil (2002, 2003, 2006, and 2008).

CASET STUDY" COLUMBIA

SOURCES

Montezuma R. Promoting active lifestyles and healthy urban spaces: the cultural and spatial transformation of Bogotá, Colombia. SCIENTIFIC AND TECHNICAL PUBLICATION-PAN AMERICAN HEALTH ORGANIZATION. 2005;612:161.

Muévete Bogotá: promoting physical activity with a network of partner companies Rocio Gámez, Diana Parra, Michael Pratt and Thomas L. Schmid
Promotion & Education 2006 13: 138. DOI: 10.1177/10253823060130020109

Montezuma R. The transformation of Bogota, Colombia, 1995-2000: investing in citizenship and urban mobility. *Global Urban Development Magazine*. 2005;1(1).

Hunt S. Citizenship's place: the state's creation of public space and street vendors' culture of informality in Bogota, Colombia. *Environment and Planning D: Society and Space*. 2009;27(2):331-51.

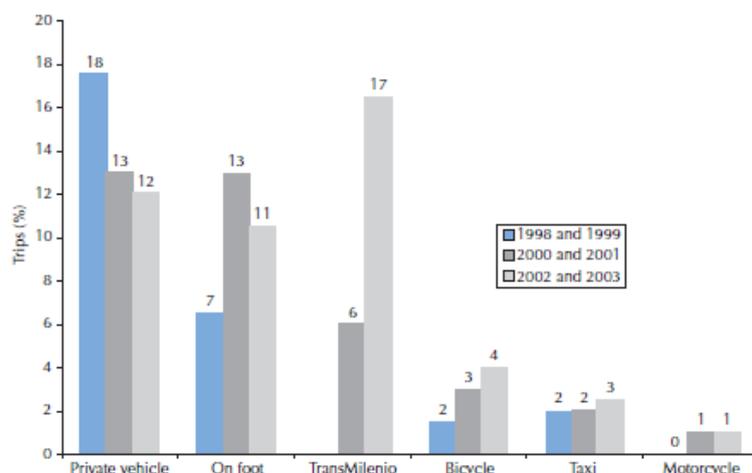
Berney RE. The pedagogical city: How Bogota, Colombia, is reshaping the role of public space: ProQuest; 2008.

MAIN PROGRAM ACTION

In 1998 the mayor's office and the District Institute for Sports and Recreation created **Muevete Bogota**, a physical activity and health promotion programme for the capital city of Colombia. Muevete means to move or to be active, and this campaign to promote physical activity was designed to improve the health and quality of life of the citizens of Bogota through regular physical activity. The programme was developed in close consultation with the Agita Sao Paulo programme in Brazil (Matsudo et al., 2003). Muevete Bogota couples a mass media campaign with programmes targeted to change physical activity behaviour. The interventions, which are conducted at work sites, schools, health care centers and in community settings rely on partnerships created among professionals in areas of education and health, business officials and personnel, and community members, to deliver the programmes in each of these settings and populations.

In addition, Bogota has implemented **extensive physical and social environmental changes** over the last decade, which has increased opportunities for physical activity, but sedentary lifestyle continues to be a significant public health problem in the city. Muevete Bogota provides an example of successful implementation of a comprehensive multi-sectoral approach to physical activity promotion in a large metropolitan area. This model may be used as an exemplary effort elsewhere in Latin America and in urban areas in developing countries around the world.

FIGURE 1. Evolution of functional changes in transportation modes during rush hour in Bogotá, 1998–2003.



Source: Encuesta Anual de Percepción Ciudadana del Proyecto "Bogotá, Cómo Vamos", 2004.

COST EFFECTIVENESS DATA

SOURCE:

Do Health Benefits Outweigh the Costs of Mass Recreational Programs? An Economic Analysis of Four Ciclovía Programs. Felipe Montes, Olga L. Sarmiento, Roberto Zarama, Michael Pratt, Guijing Wang, Enrique Jacoby, Thomas L. Schmid, Mauricio Ramos, Oscar Ruiz, Olga Vargas, Gabriel Michel, Susan G. Zieff, Juan Alejandro Valdivia, Nick Cavill, and Sonja Kahlmeier

Journal of Urban Health: Bulletin of the New York Academy of Medicine. 2011 doi:10.1007/s11524-011-9628-8

This study reports an analysis of the cost–benefit ratios of physical activity of the Ciclovía programs of Bogotá and Medellín in Colombia, Guadalajara in México, and San Francisco in the USA. The data of the four programs were obtained from program directors and local surveys. The annual cost per capita of the programs was: US \$6.0 for Bogotá, US \$23.4 for Medellín, US \$6.5 for Guadalajara, and US \$70.5 for San Francisco. The cost–benefit ratio for health benefit from physical activity was 3.23–4.26 for Bogotá, 1.83 for Medellín, 1.02–1.23 for Guadalajara, and 2.32 for San Francisco. For the program of Bogotá, the cost–benefit ratio was more sensitive to the prevalence of physically active bicyclists; for Guadalajara, the cost–benefit ratio was more sensitive to user costs; and for the programs of Medellín and San Francisco, the cost–benefit ratios were more sensitive to operational costs. From a public health perspective for promoting physical activity, these Ciclovía programs are cost beneficial.

Details on one site: Bogotá's Ciclovía Program: For Bogotá, the results are presented as a range because the number of adult users ranged from 516,600 to 1,205,635. The total annual costs ranged from US \$4,057,651 to US \$7,182,797. The annual cost per capita of the programs was US \$6.0. The cost–benefit ratio ranged from 3.23 to 4.26 (Table 3). Thus, the savings in direct medical costs ranged from US \$3.2 to US \$4.3 for every dollar invested in the Ciclovía program. These calculations also accounted for gender differences because men participated approximately three times more often than women. Therefore, the cost–benefit ratio for men ranged from 2.12 to 2.80 versus 1.11 to 1.46 for women.

CASE STUDY Australia: NSW

REFERENCE/SOURCE:

Chau J, Smith BJ, Bauman A, Merom D, Eyleson-Annan M, Chey T, et al. Recent trends in physical activity in New South Wales. Is the tide of inactivity turning? Australian and New Zealand Journal of Public Health. 2008;32(1):82-5.

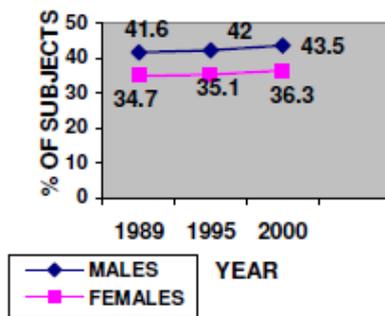
MEASUREMENT TOOL: Active Australia Physical Activity measure

MAIN PROGRAM ACTION Various state level programs across different sectors, mass media campaigns on physical activity

SUMMARY FINDINGS:

National data show median total physical activity minutes *increased* from 190 min/wk [interquartile range 60, 450 minutes] in 1998 to 240 minutes [60, 540 minutes] in 2004 (p<0.0001) and 210 minutes [60, 510 minutes] in 2005 (p<0.0001). The increase in the median total physical activity between 1998 and 2005 was due to an increase of 30 min/wk in median minutes walked,

**TRENDS IN
PROPORTION OF
SUBJECTS ACHIEVING
ADEQUATE PA TO
BENEFIT HEALTH**



CASE STUDY Australia: Western Australia (WA)

SOURCE: Rosenberg M, Mills C, McCormack G, Martin K, Grove B, Pratt S and Braham R. Physical Activity Levels of Western Australian Adults 2009: Findings from the Physical Activity Taskforce Adult Physical Activity Survey. Health Promotion Evaluation Unit, The University of Western Australia, Perth, 2010.

MEASUREMENT TOOL: Active Australia Physical Activity measure

MAIN PROGRAM ACTION Cross government task force on PA; state level strategy for 10 years; various programs across different sectors, strong focus on walking; mass media campaigns on physical activity

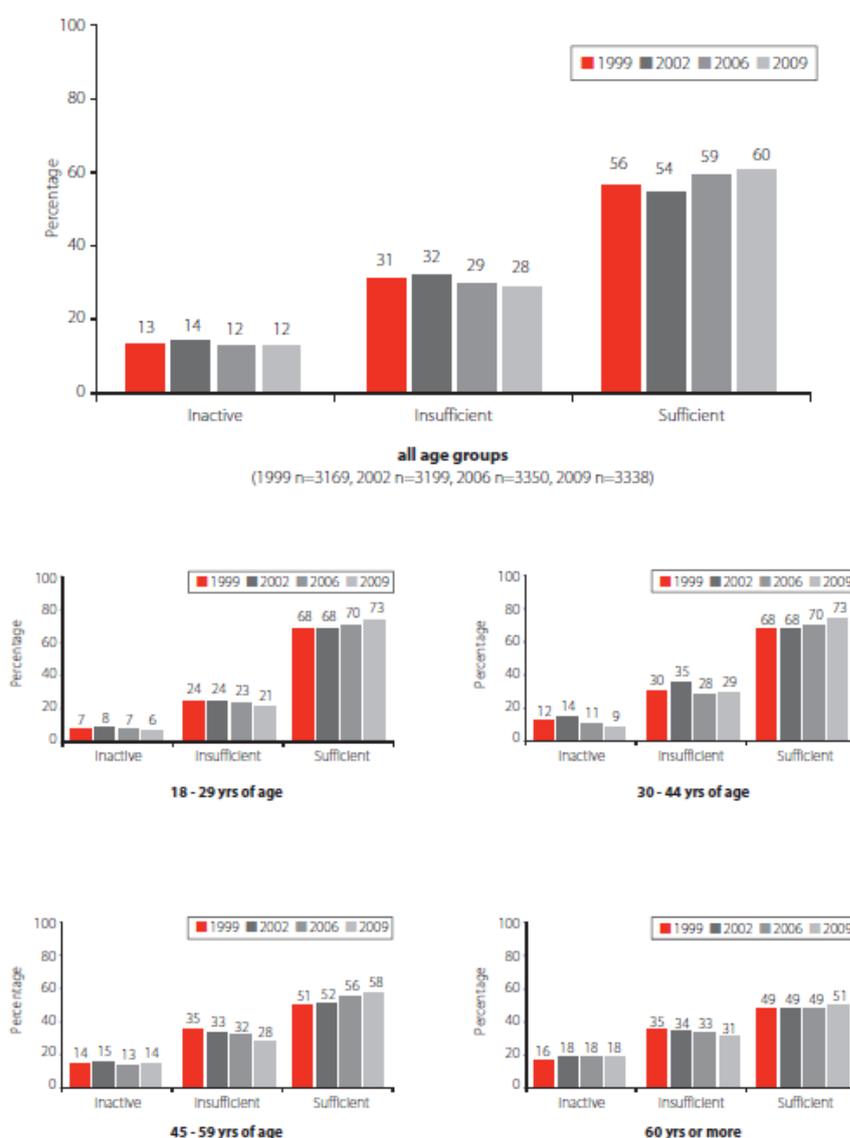


Figure 3.3: Prevalence of inactivity, insufficient and sufficient physical activity by survey year and age group

CASE STUDY ENGLAND, UK

REFERENCE/SOURCE:

Stamatakis E, Ekelund U, Wareham NJ. **Temporal trends in physical activity in England: The Health Survey for England 1991 to 2004**. Preventive Medicine. 2007;45(6):416-23.

MEASUREMENT TOOL: Health Survey for England

MAIN PROGRAM ACTION:

Live for Life national health education campaign on physical activity; investment in capacity building for physical activity programs in different settings such as worksite, primary health care and schools through the British Heart Foundation National Centre for Physical Activity; increased policy attention at Government level in health and sport sectors

SUMMARY FINDINGS:

Increases in mean time spent in sports of moderate to vigorous intensity in all age groups (adjusted for SES and age; $p < 0.0001$) and particularly for older groups. For example participation in 35-49 years rose from 26% in 1991/2 to 42% in 2004 in men ($p < 0.001$) and from 25% to 35% in women ($p < 0.001$).

Total moderate to vigorous PA for both men and women increased significantly between 1999-2004. For adults there was a 1.7 percentage point increase in meeting recommended levels of PA (46.8% to 48.5%).

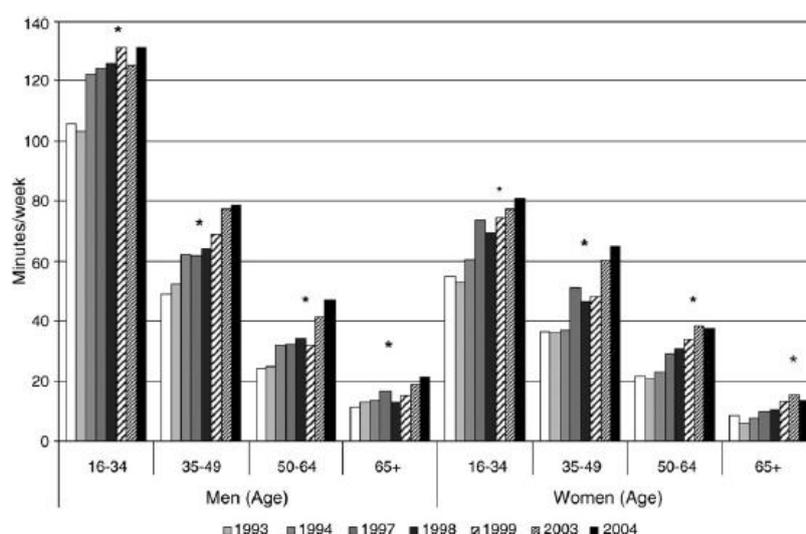


Fig. 2. Mean weekly time spent in moderate to vigorous-intensity sport activities lasting for at least 15 min. Health Survey for England 1991/2 to 2004. *Occupational class-adjusted p for trend < 0.001 .

CASE STUDY Canada

REFERENCE/SOURCE:

Canadian Fitness and Lifestyle Research Institute [CFLRI] Ottawa 2010]

MEASUREMENT TOOL:

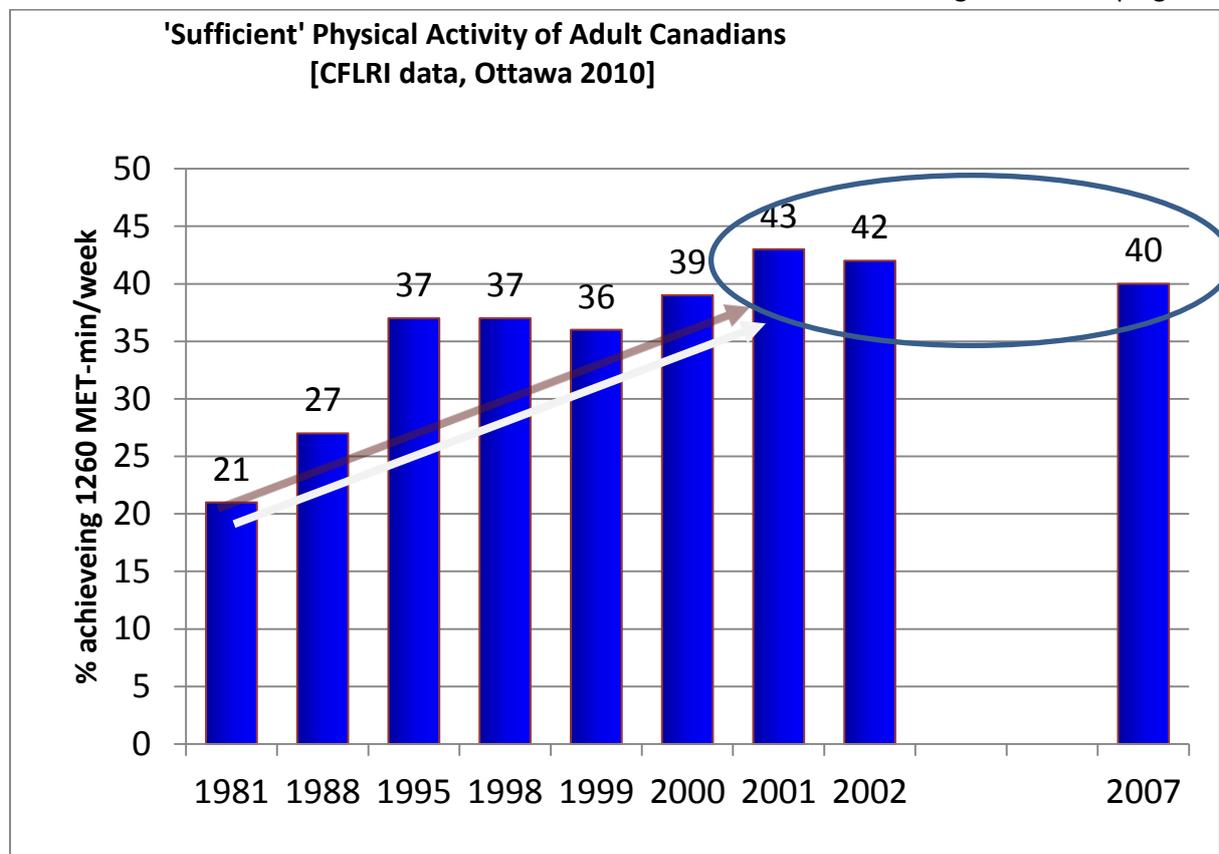
Canadian monitoring tool - PAMS

SUMMARY FINDINGS:

Sustained increases in population levels of physical activity seen across decades

MAIN PROGRAM ACTION:

National PARTICIPAction campaign involving national social marketing strategy and integrated strategies at the Provincial level over last three decades. Decrease and absence of data seen between 2002 and 2007 was due to the cut in funding for the Campaign.



CASE STUDY Singapore

REFERENCE/SOURCE:

Ministry of Health Singapore (2004). National Health Survey: Personal communication.
 Statistics Singapore (2005): *National Health Survey 2004* [newsletter]. [Available at www.singstat.gov.sg/pubn/papers/people/ssnsep05-pg19-20.pdf Accessed 5/9/08]

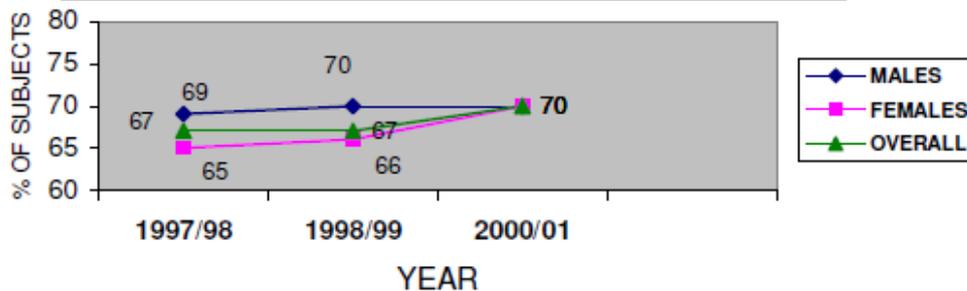
MEASUREMENT TOOL: Singapore National Health Survey

SUMMARY FINDINGS:

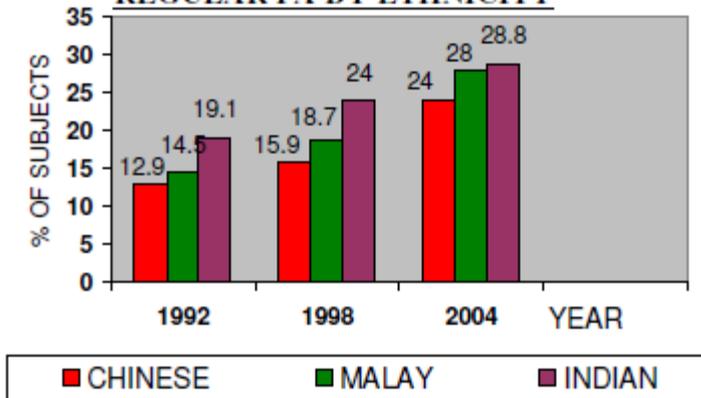
Increases in PA seen after national programs in last 5 years

MAIN PROGRAM ACTION: National policy on physical activity

TRENDS IN PERCENTAGE OF SUBJECTS ATTAINING SUFFICIENT LEVELS OF PA TO BENEFIT HEALTH BY GENDER, 1997-2001



TRENDS IN PARTICIPATION IN REGULAR PA BY ETHNICITY



CASE STUDY Thailand**REFERENCE/SOURCE:**

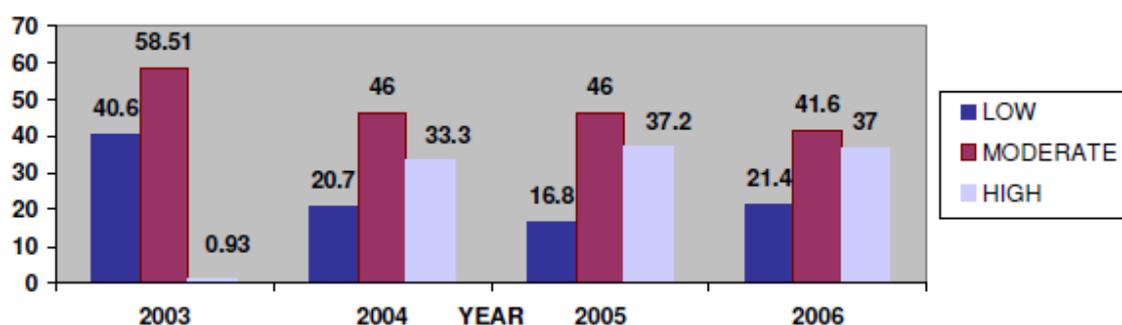
Asia Pacific Physical Activity Network [AP-PAN]. Regional Physical activity prevalence in the Asia Pacific Region: www.ap-pan.org2008.

MEASUREMENT TOOL: Adapted IPAQ long

SUMMARY FINDINGS:

Increases seen in high levels of physical activity between 2004 and 2005 with a plateau between 2005 and 2006. Large reductions in low levels of activity seen between 2004 and 2006. The differences observed between 2003 and later years is however in part explained by a change in the measurement methods employed.

MAIN PROGRAM ACTION: National level policy and programs

TRENDS IN LEVEL OF PA, 2003-2006**CASE STUDY FINLAND**

SOURCE: How to develop local physical activity promotion programmes with national support: the Finnish experience ..., O Paronen, P Oja - Patient Education and Counseling, 1998.

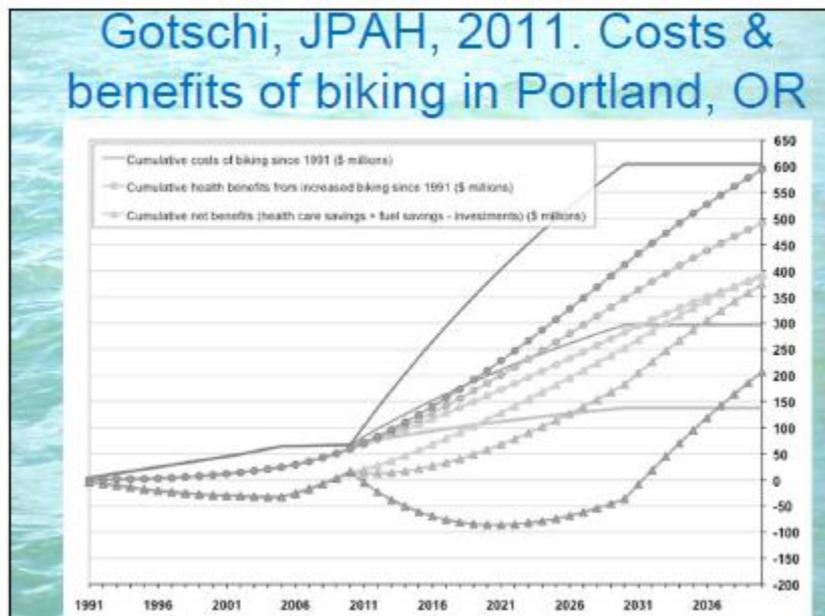
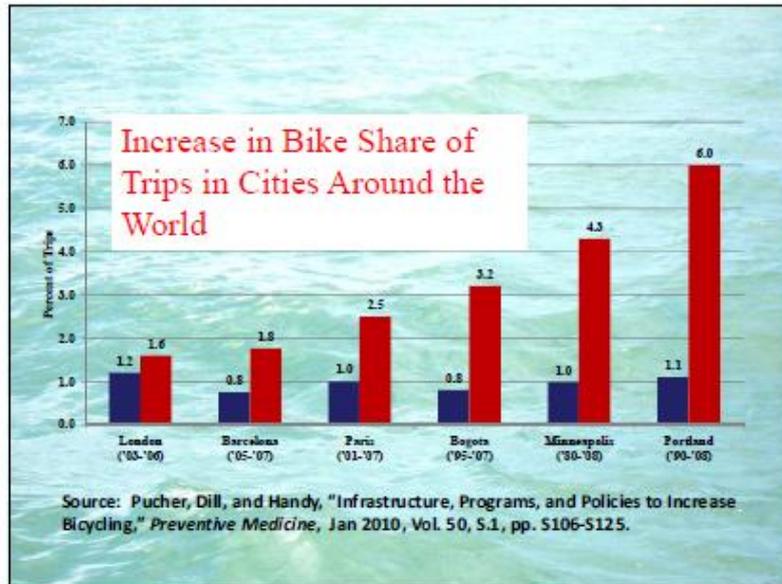
PROGRAM ACTIVITY

Extensive policy development for sports and for health took place in Finland in the early 1990s resulting in two national programmes. The 'Finland on the Move' programme stimulated new local projects by financial support, training and consultation services, and media promotion. The ongoing 'Fit for Life' programme is based on the experience gained from the previous programme, and utilises a more intensive mass media approach. It is concluded that the two programmes have been successful in creating plenty of new local initiatives and increasing population participation related to physical activity. The Finnish experience demonstrates that deliberate efforts to communicate scientific knowledge can lead to a better acceptance of physical activity on the national level and that well-planned and sensitive state-level support of grassroots activities can succeed.

Case study Multi country comparison

Source: Courtesy of Professor Jim Sallis, San Diego State University

Data show across several countries that cities, starting from very low levels of cycling can make changes to infrastructure and provide programs to increase frequency of cycling.
 Additional example of one City (Portland USA) undertaking a cost benefit analysis and identifying achieved cost benefits and projected future cost benefits



THE COUNTER FACTUAL ARGUEMENT:
THE ABSENCE OF ACTION CAN ALSO SHOW THAT NO ACTION LEADS TO NO CHANGE IN PA

CASE STUDY USA

REFERENCE/SOURCE:

- Carlson SA, Densmore D, Fulton JE, Yore MM, Kohl 3rd H. **Differences in physical activity prevalence and trends from 3 US surveillance systems: NHIS, NHANES, and BRFSS.** Journal of physical activity & health. 2009;6:S18.
- www.cdc.gov/brfss

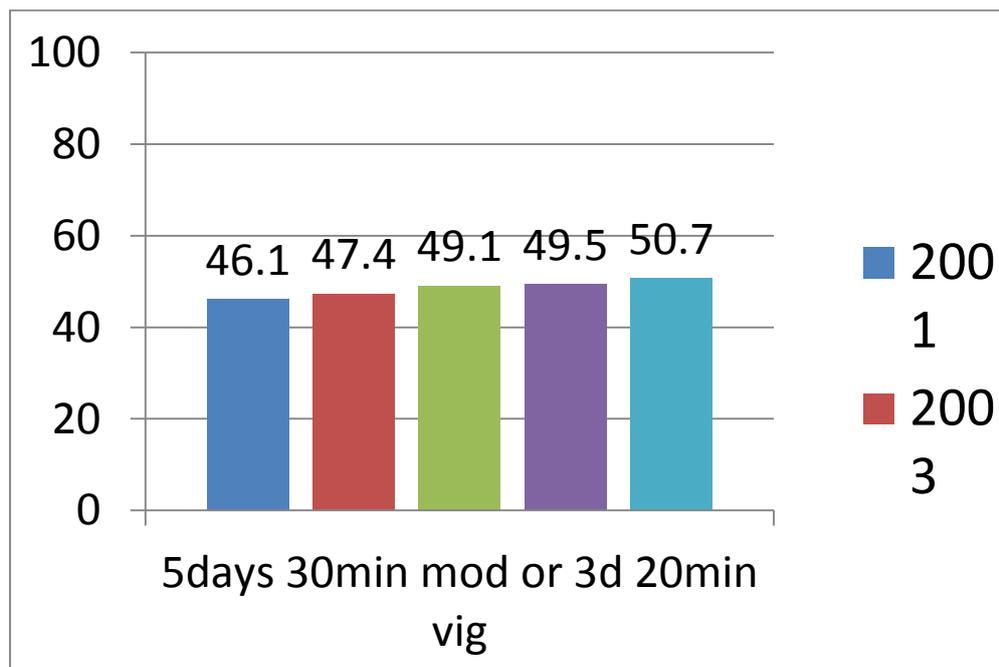
MEASUREMENT TOOL: BRFSS

SUMMARY FINDINGS:

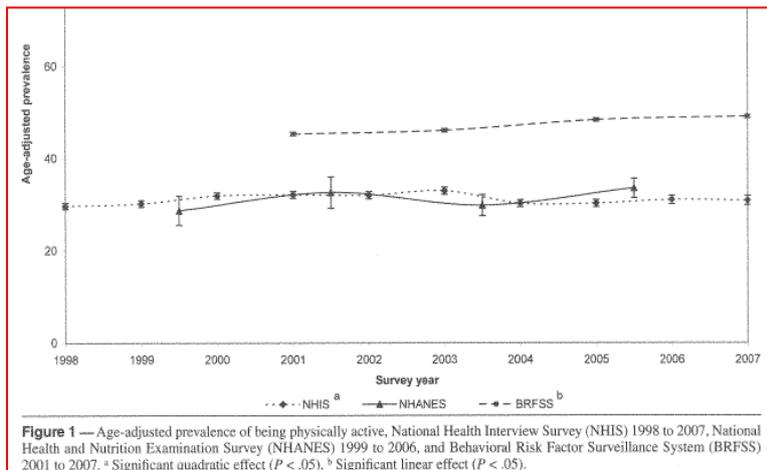
Two graphs below show sustained monitoring of physical activity over the last decade through several population surveillance systems. There has been no nationally coordinated action in the USA on physical activity and the data show that only modest, if any real change has occurred.

- In BRFSS trends in self-report PA prevalence 2001-2007 : slight increase
- NHIS 1998 to 2007: mostly flat line prevalence
- NHANES 1999 to 2006: mostly flat, slight increase

MAIN PROGRAM ACTION No National policy or plan on physical activity until 2010; however state level policy and programs have been implemented and in some States have been sustained over time



Source: www.cdc.gov/brfss



Source: Carlson et al 2009