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Effectiveness and Challenges for Promoting Physical Activity Globally

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Introduction

How do we know how to make a difference, and if we are making a difference? This is one of the central questions and challenges in determining the effectiveness of health promotion efforts aimed at increasing levels of participation in physical activity at the population level. Despite significant interest since the 1996 Surgeon General's Report on Physical Activity and Health, health promotion efforts aimed at physical activity remains a relatively new field. As such, this is one of many areas of research and practice where the evidence of health promotion effectiveness remains poor or at least insufficient.

Much of the evidence on physical activity interventions that exists, for example from systematic reviews, is derived from controlled studies with experimental or quasi-experimental research designs and using volunteer samples. Whilst these reviews are useful for generating one level of scientific evidence, it may not always provide the kind of field-based evidence required for population-level interventions carried out by health promotion practitioners.

One reason for this is that the scope of health-enhancing physical activity (often referred to as HEPA) interventions has broadened, to extend beyond the focus on only leisure-time physical activity outcomes. This is particularly true in developing countries, where effective interventions might focus on more prevalent domains such as the promotion of active transportation (such as walking or cycling for all or part of trips to destinations), and interventions to maintain active participation in cultural activities and settings. This increased range of settings for promotion of HEPA and related interventions also extends beyond simply working within the health sector; other agencies and partnerships need to be developed, including links to education, transport, urban planning and sport/recreation sectors.

Available physical activity data has mostly reported leisure-time physical activity, and points to generally flat trends, suggesting that in recent years the net sum of health promotion efforts has not made a notable impact on population-levels of leisure-time physical activity. Other domains of physical activity are infrequently measured in surveillance systems, but it is likely that total energy expenditure has declined due to reduced energy expended as part of daily living.

Since total physical activity in all forms, and sometimes total energy expenditure, is of interest, especially for obesity prevention, measurement and monitoring of physical activity remains a major challenge for health promotion. It also poses the challenge for developing broad-based interventions, to address HEPA in more than just the leisure time domain.

This article summarizes the history of efforts to promote physical activity and their effectiveness. It focuses on how the evidence base has developed around physical activity programs, and identifies the remaining challenges for achieving effective physical activity promotion globally.

Assessing the Effectiveness in Physical Activity Promotion

Health promotion has been defined as a combination of processes, including educational, organizational, economic and political actions, designed to affect changes in knowledge, attitude, behaviour and the environment that support and promote health. In addition optimal health promotion includes consumer and stakeholder participation, to enable individuals and communities to exert control over these processes and the determinants of health (WHO, 1986; WHO, 1997).

There are different approaches to identifying “best practice” in assessing health promotion effectiveness. These include rating evidence based on a scientific paradigm, that is the best research design, using the most reliable and valid exposure and outcome measurement and appropriate methods to minimize bias. Effectiveness is considered in the light of a methodological critical appraisal of the intervention: for example, was an experimental design used; was physical activity measured using objective measures; and will the results be generalisable to the source population? Another approach to effectiveness is “best practice” based on health promotion principles and values, which considers questions such as whether the intervention reached the desired population groups, [especially when these are marginalized or disadvantaged and in the case of physical activity interventions the “inactive” population] and whether the intervention is consistent with a health promotion approach. This approach is an appraisal of “best practice” and attempts to assess the potential effectiveness of interventions in achieving population- or community-wide measurable outcomes (Kahan & Goodstadt, 2002).

In the context of physical activity, health promotion interventions seek to increase population levels of physical activity by influencing personal, educational, social and environmental factors that contribute to physical activity behaviour. The determinants and antecedents of physical activity are diverse, and include awareness of the physical activity message and its benefits, attitudes and intentions towards being active, as well as supra-individual factors such as policies, environments and cultural norms that facilitate physical activity. To date, few studies have evaluated true multi-level and multi-strategy interventions using broader socio-ecological theoretical principles. In reality, much of the published research on interventions has been more narrowly focused, using selected (often single) intervention approaches, in defined settings with volunteer samples. Even

the most recent distillations of “evidence” (e.g., Kahn et al., 2002) have reported on the body of scientific evidence, and hence recommendations emanate from a review of published (peer reviewed) papers only, around interventions based on mostly educational approaches sometimes using mediated materials (such as telephone, internet or written delivery systems) and often theoretically grounded in individual-based behaviour change models and theories. This body of evidence has been evaluated to assess the overall effectiveness at changing behavior at the individual level but such reviews provide less insight into the effectiveness of implementation and dissemination at the community-wide, population level. And yet it is this question that challenges health promotion practitioners and decision makers on a daily basis!

In addition to reviews of the peer-reviewed scientific literature, there are numerous similar reports in the “grey literature” conducted by Government and non-Government organizations, often conducted by governments who want to know “what works” (Bull et al., 2004; Gebel et al., 2005). The World Health Organisation (WHO, 2006) has developed an implementation framework for the Global Strategy on Diet, Physical Activity and Health (DPAS) and this also provides principles to assess progress towards the implementation of DPAS. One of the key principles that emanates from DPAS is the need for population-level interventions, and the need to move beyond high-risk screening, detection of risk and brief advice; such approaches are not effective in the long term to promote physical activity, and reach only a selected few in the community (Bauman & Craig, 2005).

In the last decade there has been a rapidly evolving body of knowledge and evidence that has shifted in focus from “exercise science” to “health promotion” effectiveness. Early research focused on the necessary dose of activity required to gain health benefits, but more recently there is a keen interest in applied research with a focus on testing and developing an evidence base on intervention effectiveness. This has led to a rapid increase in the number of reviews of the literature. One attempt to distill an evidence base was developed by the U.S. Taskforce on Community Preventive Services, and the interventions reviewed were recommended for implementation based on the level and quality of evidence available. Eight categories of interventions have been classified in recent years as having a “strong” or “sufficient” evidence of effectiveness and these are shown in Table 7.1. The US Centers for Disease Control (CDC) Community Guide provides a useful systematic review and recommendations based on evidence of tested interventions that promote physical activity. These recommendations are a starting point for interventions in developed and developing countries while accounting for their local needs and capabilities (Kahn et al., 2002; Heath et al., 2006; www.thecommunityguide.org/pa/).

One of the clear limitations of the current evidence base is the limited transferability of findings to developing countries. It is only more recently that attempts have been made to specifically identify and integrate evidence from developing countries and consider the transferability of findings. For example, recent efforts in 2005 have developed a framework to describe “good examples”

TABLE 7.1. Summary of recommendations for effective population-based interventions from the U.S. guide to community preventive services

Intervention	Recommendation
Informational approaches	
• Community-wide campaigns	Recommended (strong evidence)
• Point of decision prompts	Recommended (Sufficient evidence)
Behavioral and social approaches to increasing physical activity	
• School-based physical education	Recommended (strong evidence)
• Non-family social support	Recommended (strong evidence)
• Individually adapted health behaviour change	Recommended (strong evidence)
Environmental and policy approaches to increasing physical activity	
• Creation and/or enhanced access to places for physical activity combined with informational outreach activities	Recommended (strong evidence)
Subsequent to the Community Guide, Health and colleagues (2006) examined studies investigating the influence of urban design and land use policies, and concluded two further areas where there was evidence of effectiveness.	
• Community-scale urban design and land use policies and practices (zoning regulations, street connectivity, residential and employment density)	Recommended (strong evidence)
• Street-scale design and land use policies and practices (lighting, ease and safety of crossing streets, continuity of footpaths, traffic calming measures and aesthetic enhancements).	Recommended (strong evidence)

of physical activity health promotion, describing principles for assessing the effectiveness of national level programs (WHO, 2005). The evaluation of physical activity programs in developing countries needs to take account of differences in the physical activity domains, the socio-economic and socio-cultural characteristics, and different issues related to the built environment infrastructure and climate, and their impact on everyday “active living” (Gomez et al., 2005; Hallal et al., 2003). The rapid urbanization in developing country cities provides a unique opportunity to evaluate the effects of “natural experiments” in these environments, such as evaluating physical activity impacts of transportation policy changes (Parra et al., 2006).

For example, in developing countries, interventions could have a larger impact if transport-related physical activity is prioritized compared with the focus on leisure-time or recreational physical activity because, in at least some developing countries, physical activity in the transportation domain is more prevalent than leisure-time physical activity (Gomez et al., 2005). Furthermore, it has been observed in developing countries that when socioeconomic conditions improve, the prevalence of car usage increases and physical activity as part of transportation (cycling and walking) will decrease (Bell et al., 2002). Within this context, interventions in developing

countries that reinforce benefits of active forms of transport and the maintenance of cultural forms of expression that involve physical activity are likely to be effective ways of maintaining physical activity levels.

It is unlikely that country-or even region-specific systematic reviews will be possible in the near future, or that sufficient evidence exists to develop formal research syntheses at a such levels; thus adapting work carried out through the Community Guide and other organisations (WHO, 2005) through the developing country schemata are the best currently available frameworks. Nonetheless, compiling even a few interventions from different countries and conducting analyses that account for their effects and describe their differences could help in developing the evidence base in the developing world.

One approach to an evidence base, in both developed and developing countries is to use established criteria for effective public health programs and policies, and apply them to physical activity programs. These are suggested as necessary for at least “good practice” in promoting physical activity [adapted from Bull et al., 2004].

Eleven Criteria for Good Practice in Physical Activity Promotion

1. **Consultation** with relevant stakeholders during development of physical activity policy and action plans
2. Adoption of a comprehensive approach to physical activity promotion using **multiple strategies** (e.g., individual-oriented as well as environmental focused interventions) targeting different population groups (e.g. children, adolescents, women, older adults, disabled people, indigenous people)
3. Working at **different levels** (local, state and national as well as individual, whole community and physical environmental level)
4. Development and implementation of the policy and action plan across multiple agencies and settings by **working through coalitions, alliances and partnerships** (e.g. involving cross government, non government as well as relevant private sector partners)
5. **Integration** of physical activity policy within other health and non-health related agendas (e.g. in the field of health, nutrition, transport, environment)
6. **Stable base of support** and resources to implement the policy and action plan (e.g. from politicians and government with or without support from other supporting organisations)
7. Development of an **Identity** for the physical activity program by means of a logo, branding and/or slogan. This may include identifying and cultivating a spokesperson or “champion” for the initiatives as well as an advocacy / communication plan;
8. A clear statement of the **Timeframe** for implementation of the physical activity plan;
9. Specific plans and resources for **Evaluation** of the efforts to promote physical activity

10. Development and/or maintenance of physical activity ***Surveillance or Monitoring Systems*** which includes suitable population-level measures of levels of physical (in)activity and related factors;
11. Statement of recognition of existing ***National guidelines / recommendations on physical activity*** or intent to develop them.

One of the difficulties in establishing an evidence base around physical activity interventions has been the issue of measurement of physical activity. This is an ongoing source of debate and academic discourse globally because the measurement of activity is complicated by the multidisciplinary nature of the behaviour and the multiple dimensions and related environments in which activity can occur. A recent review of physical activity measurement for health promotion may assist in the identification of commonly used physical activity and related measures (Bauman et al., 2006a).

The physical activity field has been limited by relatively imprecise measures of the behaviour, predominantly self-reports, and by studies that are mostly cross-sectional in nature. Although self-report measures are reasonably reliable and show “moderate” levels of agreement with objective measurements, self-report measures may overestimate levels of physical activity. In addition, cultural and educational differences make comparisons within and between regions difficult. Effectiveness will be more accurately established when interventions can be assessed by agreed and possibly objective measurement techniques and tools.

There are a vast range of outcomes that might reflect effectiveness as shown in Figure 7.1. This shows a hierarchy of health promotion outcomes. Many of the health outcomes such as mortality, chronic disease incidence and risk factor changes are long-term associations, and may be far removed from physical activity

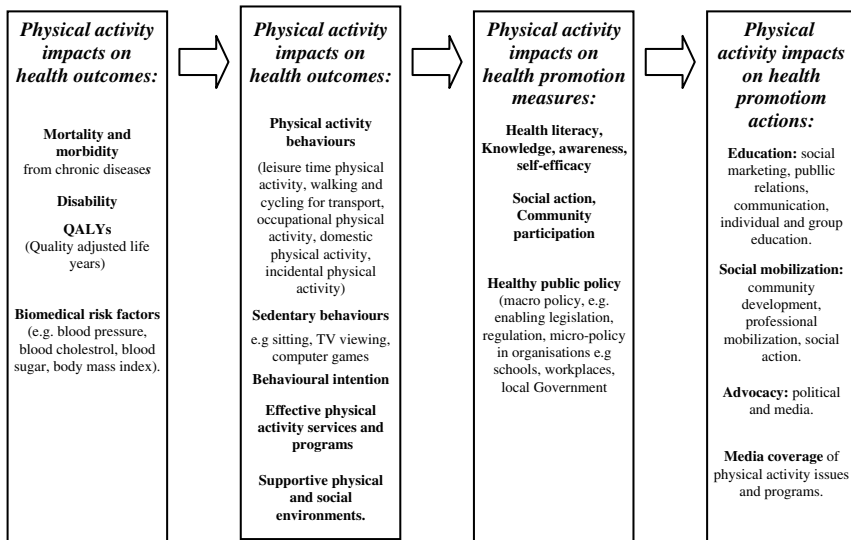


FIGURE 7.1. Hierarchy of indicators of physical activity effectiveness (Adapted from Nutbeam & Bauman, 2006).

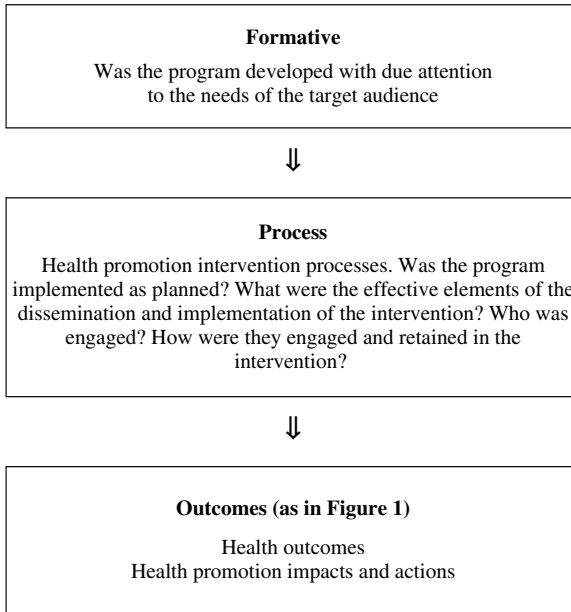


FIGURE 7.2. Formative, process and impact measures of effectiveness.

promotion interventions. Intermediate outcomes such as physiologic measures and fitness may also be measures that could provide challenges for attributing changes to health promotion interventions. Yet a more appropriate evidence framework for physical activity effectiveness would include demonstration of changes in proximal health promotion impacts and outcomes, such as individual, social and environmental attributes that relate directly to the intervention and modifiable determinants for physical activity intervention (Kahn et al., 2002).

In addition to careful measurement, attention should always be paid to implementing appropriate program evaluation in order to generate the best information possible about program development [formative evaluation], program implementation and reach [process evaluation] and short term program impact and effects. These are illustrated in Figure 7.2, and the principles underpinning good evaluation in health promotion practice are described elsewhere (Nutbeam & Bauman, 2006).

Chronology of Physical Activity Practice and Health Promotion

The Emergence of Inactivity as an Important Risk Factor for Health

The Global Burden of Disease is now dominated by the common chronic diseases, notably heart disease, stroke, cancers, type 2 diabetes and mental health.

(WHO, 2004) Physical activity is a central risk factor for many of these conditions, alongside hypertension, lipid levels and tobacco usage. Physical inactivity is both an independent risk factor for these health outcomes and an important contributor to hypertension, blood cholesterol and obesity (Bouchard et al., 2006). For most of these conditions, accumulating half an hour of at least moderate-intensity physical activity on most days of the week is sufficient to achieve these preventive benefits (US DHHS, 1996). Therefore, increasing physical activity and reducing sedentariness has significant potential to deliver substantial health benefits. Physical activity can also reduce the risk of depression, deliver social support to participants and prevent falls in the elderly, and may enhance cognitive function, delay the onset of dementia and improve academic performance in children (Katzmarzyk & Janssen, 2004).

The overall impact of physical inactivity on disease burden is accentuated by its high and increasing prevalence – it is the most prevalent among risk factors in the population, leading to physical activity contributing the largest share of population-attributable risk for chronic disease (Bauman & Miller, 2004). Although much of the current evidence on the benefits of physical activity was in place by 1990, [as we learned from tobacco control] it can take decades to translate an evidence base into public health policy. Physical activity promotion is still in its early development and remains to be developed as a major priority area for health promotion policy action.

The “health case” for Governments and community agencies to give greater priority to increasing physical activity is compelling. However, physical inactivity is not just a health sector issue. Increasing physical activity can also provide benefits by reducing health costs, stimulating economic growth in the sport and recreation sectors, and improving social capital, community safety and cohesion. In these ways, physical activity can contribute to individual and community levels of wellbeing and quality of life. Furthermore, the promotion of different types of physical activities in different settings, particularly for example walking and cycling, can link with other agendas such as cleaner air and reduction in traffic.

The Relationship between Changing Scientific Evidence and Health Promotion Policy and Practice

Before the 1996 US Surgeon General’s Report on Physical Activity (USSG, 1996), the primary focus of physical activity promotion emphasized twenty minutes of vigorous-intensity exercise on three days per week to offer health benefits (ACSM, 1978). This more intensive recommendation was grounded in leisure-time physical activity, and offered little chance of adoption by completely sedentary or older adults. However, the evidence was re-appraised during the 1990s, and revised recommendations indicated that “at least half an hour of any form of moderate-intensity physical activity, on most days of the week was sufficient to accrue health benefits” (USSG, 1996). These revised “moderate-intensity” guidelines enabled governments, including agencies other than health and sport sectors, to engage with a component of the physical activity promotion

agenda. Examples of this broader approach include programs and campaigns that promoted walking in multiple settings, such as for short transport trips; the promotion of physical activity as part of everyday activities, often referred to as “active living”; and the recommendation of accumulating even short bouts of incidental physical activity, such as using the stairs instead of the elevator.

A transformation in the global burden of disease to a state where chronic diseases dominate has heightened interest in effective methods for chronic disease prevention. Similarly, the emergence of physical inactivity as a central risk factor for chronic disease and a developing science about health-enhancing physical activity has impacted on approaches taken to promote population physical activity. In parallel, the emerging science of health promotion has led to new paradigms of thinking about and approaching chronic disease prevention.

Overall, contemporary efforts around the promotion of physical activity are more consistent with the original intent of the 1986 Ottawa Charter, namely the focus of interventions has shifted emphasis to a balance of approaches recognizing the behavioral, policy, environment and structural determinants of health behavior (WHO, 1986). Moreover, the promotion of physical activity is a particularly good example of the need for developing interagency partnerships as outlined in the Jakarta health promotion conference (Jakarta Declaration WHO, 1997). The chronology of the events described above are summarised in Table 7.2.

Translation of Evidence, Dissemination and Workforce Development and Training

In recent years there has been an increase in the avenues for dissemination of research findings of effective practices in physical activity. In particular, there has been an increase in published research in peer reviewed journals including dissemination of examples of evaluated programs. There has also been the development of publications dedicated to the topic such as the *Journal of Physical Activity and Health*, which publishes original research and review papers examining the relationship between physical activity and health, as well as the *International Journal of Behavioural Nutrition and Physical Activity*. In addition other journals have dedicated special Issues to focus on physical activity; these include the *American Journal of Health Promotion*, the *American Journal of Preventive Medicine*, and the IUHPE *Journal Promotion & Education*.

Until recent times there have been few conferences, or training opportunities directed at the physical activity workforce. However, with the increase in interest in physical activity there has been a renewed interest in providing training and professional development for those working in the field. There have been several efforts at capacity building through the development of international training courses in Physical Activity and Public Health (PAPH). These started with annual PAPH courses in the USA (hosted by the University of South Carolina and the CDC since 1995) and has developed into short courses being conducted in developed and developing countries, including Australia, Brazil,

TABLE 7.2. Chronology of physical activity practice and health promotion

Physical activity scientific development	Key physical activity scientific papers and documents	Year	Physical activity Health Promotion development	Key physical activity health promotion documents
First published evidence of health benefits of physical activity	Morris 1953	Pre 1980	Health education. Individual behaviour focus. Exercise focus. Focus on fitness change.	
American College of Sports Medicine recommendations 1978 that 'aerobic and vigorous' exercise is required for health	ACSM, 1978			
Landmark research indicates the health benefits of moderate intensity PA	Paffenbarger Blair 1989	1980s	Focus on health promotion models started but not well developed for PA until later	1986 Ottawa Charter on Health promotion
Continued research confirms benefits of moderate-intensity PA, walking		1990–1995	Evidence for the Health benefits of physical activity 'conclusive'	1993, AHA Statement elevates PA as a risk factor
Shift towards recognizing community based approaches as well as previously, where 'exercise training in clinical settings' was the norm.	1996 US Surgeon Generals Report on Physical Activity and Health	1995–1999	Acknowledgement of individual, environmental and policy influences on physical activity Growing interest in ecological models of physical activity Growing partnerships with sectors outside health	1997, Jakarta Declaration on Health Promotion 1997, AHA Plan for a strategic approach to PA
Growing Research focus on the physical and built environments and their relationship to physical activity in leisure time, in active transport and in other settings	Active Living Research Special issues of AJHP Special issue on AJPH Several issues of AJPM	2000–2005	Formation of Regional and International Physical activity networks Risk of obesity distracting from the physical activity focus and medicalizing it.	CDC Community Guide published to summarize program effectiveness [2002]
Obesity epidemic gives new impetus to the PA movement and a new focus for research and advocacy	2004, WHO Global Strategy on Diet, Physical Activity and Health			Formation of RAFA/PANA, HEPA and AP-PAN networks Agita Mundo (Move for Health) movement Joint statement of AHA, ACS, and DA on PA
Increased focus on PA and environments				
Focus on upstream thinking and underlying determinants.				

First International Congress on Physical Activity and Public Health

2006

First International Congress on Physical Activity and Public Health, Atlanta formation of the Global Alliance for Physical Activity (GAPA)

Likely future directions in physical activity scientific development.

Likely future directions in physical activity health Promotion development.

The future

Understanding measurement and impacts of:

- Inactivity (sitting less)
- Socio-demographic variations
- Physical activity variations among and within countries from the developed and developing world
- Economic impacts
- Environments and perceptions
- Advocacy processes
- Policy change
- Cultural norms
- Relationship of PA to cognitive function and decline.
- How to balance physical activity for transport and for leisure in rapidly urbanizing populations of the developing world.

Increased focus on

- Global Network development
 - Implement Global and national Physical activity Plans around the global strategy on Diet, Physical Activity and Health (WHO 2004)
 - Develop Cross sector development and partnerships, especially with transport, urban planning and Education sectors
 - Interventions that address inequity and diversity
 - Continued focus on developing evidence base through trialing interventions that influence physical and social environments
 - Increased focus on advocacy and policy focused interventions
 - Advocacy for recognition of physical activity as a whole-of-Government policy priority
 - Prioritizing physical activity within overweight and obesity programs, and independently of them
 - Interventions to reduce the adverse effects on transport-related physical activity as car ownership increases and walkability decreases in developing countries.
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Canada, Chile, Colombia, Costa Rica, Mexico and Scotland. Most recently a course has been implemented in the Asia-Pacific region (Malaysia) and others are planned for the African region and elsewhere in Latin America, Europe and the Asia-Pacific.

In addition, in 2006, the CDC auspiced the first International Congress on Physical Activity and Public Health held in Atlanta. This congress celebrated 10 years of progress since the US Surgeon General's Report on Physical Activity and Health in 1996. The congress was attended by over 900 delegates representing 44 countries. There has also been an increase in physical activity content of international health promotion conferences such as those conducted by the IUHPE in 2004 and 2007.

A further development that can assist in communicating and disseminating best practice is the development of international, trans-national and national movements to promote physical activity. Global and regional network development has occurred through the WHO's *Move for Health*, the *Agita Mundo* movement in South America, RAFA/PANA in Latin America (RAFA, 2006), regional networks for physical activity promotion in Europe (<http://www.euro.who.int/hepa>) and in the Asia-Pacific region (<http://www.ap-pan.org>). In addition, the Global Alliance for Physical Activity (GAPA) is providing a coordinating and linkage function across global efforts to promote physical activity. Communication networks have also been established at the country level in both developed and developing countries. For example, in Colombia, the Colombian Physical Activity Network has been established (or REDCOLAF: *In Spanish* Red Colombiana de Actividad Fisica) (REDCOLAF, 2006). A further development in Australia is the establishment of a national web and e-communication-based information dissemination network *The Australian Physical Activity Network (or AusPAnet)*. These initiatives hold promise for the increased dissemination and implementation of best practices and may facilitate the replication and in some cases institutionalization of effective health promotion practices. This would improve the current situation where the dissemination of good practice physical activity programs has been haphazard, little studied or understood, and often driven by factors other than evidence (Bauman et al., 2006b).

Case Studies of National-Level / Regional-Level Interventions

Emerging from the physical activity literature are examples of programs that show promise. Table 7.3 presents case studies from developed and developing countries of key programs, and demonstrates their setting and their effective components. It should be noted that the evidence to promote physical activity sometimes emanates from cross-sectional studies which really do not provide strong evidence of "effectiveness". Therefore much of the current evidence might be regarded as weak from a scientific "methodological" perspective, and the need to build better research designs into these projects is a critical aspect for the future evidence base.

TABLE 7.3. Examples of national-level and regional level interventions that show promise

Program	Description	Effective elements	How demonstrated
Ciclovía and RecreoVía programs. Bogotá Colombia. (Gomez et al., 2004; Gómez et al., 2006)	Ciclovía: 117 kilometers of main avenues are dedicated exclusively to recreational and sports activities on Sundays and Holidays from 7 am to 2 pm. On average about 1.4 million people participate per month. Cost for year 2006 was 1.5 million US dollars.	<ul style="list-style-type: none"> - Women who frequently participate in the Ciclovía are more likely to meet CDC recommendations (Gomez et al. 2004) - 20% of Ciclovía participants meet CDC recommendations during leisure time - Adults who use the Ciclovía are more likely to report biking as a means of transport. - 2005 creation of the Bicycle Network of the Americas (In Spanish: Ciclovías Unidas de las Américas) including 9 countries and 14 cities. (http://www.ciudadhumana.org/cicloviasunidas/red.htm) 	Case studies and cross-sectional studies
Active transport in Bogotá, Colombia	<p>RecreoVía: Aerobic classes in 20 points of the Ciclovía</p> <p>Transmilenio: The new bus rapid transit system with fixed stations</p> <p>Ciclo-Rutas: Network of 320 km of bike paths</p>	<ul style="list-style-type: none"> - Adults who live in blocks near Transmilenio stations are more likely to walk as a means of transport - Men who perceived that Ciclorutas were closer were more likely to use bicycles as a means of transport 	cross-sectional studies
Community mobilization in Agita Sao Paulo	Multilevel intervention to promote physical activity in Sao Paulo. Since 1996 – present	<p>Mass awareness raising through clear identified program logo and brand, developed multi-channel social marketing, and mass interventions targeting multiple sectors and populations, especially in Sao Paulo city; the development of regional plans and networks, and a Manifesto written for PA. (Matsudo SM et al. 2006b)</p>	<p>Various designs for different elements, including qualitative and quantitative research methods; serial cross section population based surveys, cohorts, and clinical exercise measures in small sub-samples</p>

(Continued)

TABLE 7.3. (*Continued*)

Program	Description	Effective elements	How demonstrated
Cross Government PA Taskforces in Australia	Examples include the state based intersectoral taskforces around physical activity established in New South Wales [1996–2004] and in Western Australia [2001 onwards]	Clear mandate for inter-agency partnership to promote physical activity; these coalitions mainly of government agencies, but partners including NGOs such as the Heart Foundation, physicians societies, and the private sector	Demonstrated initially through process evaluation, with clear work plans, accountable agencies, and monitoring of the implementation of state level PA plans; overarching monitoring through PA surveillance as part of state health surveys
Active living programs funded by the RWJ Foundation in the USA	Programs of research and practice around active communities, ageing and physical activity, and the environment and PA funded through the philanthropic group, Robert Wood Johnson Foundation	Building through careful research and practice, the evidence base for measurement, action and policy in these areas, especially the physical environment and PA; three groups funded to lead this program of work	Better evidence base; optimal methods used for each funded project

The programs in Table 7.3 are diverse however there are a number of characteristics that have added to their effectiveness. These include:

- Theoretical underpinning of program design, with clearly articulated logic models
- Scientific underpinning of moderate intensity physical activity, with a population focus for promotion
- Well defined and feasible program goals
- Partnerships and inter-agency collaboration well defined and developed, with clear partner accountabilities
- Comprehensive methodology employed using multiple strategies
- Well evaluated, with measures of success well matched to goals and intervention.

Remaining Challenges in Demonstrating Physical Activity Effectiveness

Despite significant progress, physical activity promotion remains a “new” field. It is still dominated and dwarfed by other areas, including traditional ones [tobacco control], and new areas, such as obesity prevention, where the evidence and population burden may be smaller than that attributed to physical inactivity, but the funding and political interest is much larger. There are many areas of physical activity research and practice where the evidence of effectiveness is insufficient, or can only at best be described as “promising”. In this last section we discuss remaining challenges for physical activity promotion. These challenges reduce the capacity for physical activity to be promoted in countries and regions, act as barriers to health promotion action and have inhibited political interest in physical activity. First, physical activity is not resourced commensurate with its potential to promote health. This requires ongoing advocacy to foster political commitment and policy development. Optimal physical activity promotion works within and outside the health sector, and interagency partnerships, co-funding and joint planning are needed, but slow to establish. These issues are particularly difficult in developing and rapidly urbanizing countries. Those who plan and build our built environments and transport systems are critical future partners in addressing physical inactivity. So too, policy makers in key settings such as schools, workplaces and local Government preside over policy decisions with significant impact on physical activity. The cross-disciplinary nature of the field also presents methodological challenges, including engaging with researchers, policy makers and practitioners outside the health sector. This will require working in different ways and in entirely different paradigms.

Our understanding of “inactivity” or “sedentariness” is limited. The changing workplace and economies, transport systems and lifestyles have lead to increased hours of inactivity and sitting time, both at work and at home. In this area, we have little understanding of effective health promotion approaches to encourage people to “sit less and move more”. Given the increasing cultural predilection for sedentary recreation and occupations, it is likely that influencing sedentariness

will require well-funded social marketing campaigns, to re-frame “active living” and persuade populations to spend less time sitting.

Physical activity needs differ throughout the life cycle. Our understanding of the specific elements of effective practices that work with different age groups and sub populations is not well developed. In addition, socio-demographic inequalities are important drivers of ill-health and chronic disease. A disproportionate burden of inactivity is experienced in poorer and less educated populations. Despite this, evidence is limited regarding effective physical activity interventions for targeting minorities, low socio-economic status (SES) groups and marginalized sub-populations at highest risk.

Predominant technology and social changes in recent decades have been to the detriment of physical activity. We have engineered physical activity out of our lives and out of our culture. How do we reverse this process? How do we better understand the successful cases of “bucking the trend”, e.g. continued prevalence and cultural norm of cycling in The Netherlands, and the success of the *Ciclovia* (Montezuma et al., 2006) in Bogotá in reclaiming the streets.

Economic analyses of the cost of physical inactivity, cost effectiveness of interventions and cost benefits of increasing physical activity is an important driver of policy decisions by Governments. Therefore developing a better understanding of the economics of inactivity is likely to be a powerful political advocacy lever. Economic justifications for investing in physical activity interventions are poorly developed (Pratt et al., 2004; Sturm, 2005).

Despite the increased profile of physical activity, most national Governments still do not have a formal and specific National Physical Activity Plan. Currently, physical activity doesn't exist in health plans, or is subsumed under obesity or non-communicable disease prevention plans. Since many of the effector arms and partnerships around promoting physical activity are outside the health sector, then whole of Government integrated physical activity plans are required. Such formal plans can increase the profile and visibility of physical activity, and act as a rallying point for action. When Governments take the lead on developing such plans, this will allow non-Government agencies to focus their attention on disease-specific, or strategy specific interventions.

National plans and policies have the potential to have cross-community population impact, and relative to individual behavioral approaches have greater opportunity to be sustained over time. Policy approaches are frequently inexpensive as they may apply existing resources. An example of a policy approach would be to ensure that the education sector to provide all children with increased time (30 mins/day) and increased quality of physical education classes throughout their schooling.

For all of the above challenges, physical activity needs to be better positioned and therefore, physical activity advocacy should be a priority strategy. A continued lack of high priority afforded to physical activity by national governments has attenuated health promotion efforts to promote physical activity, and despite the WHO's Global Strategy on Diet, Physical Activity and Health (2004), physical activity has become subservient to the obesity and nutrition agendas.

TABLE 7.4. Recommended advocacy approaches to better position physical activity in relation to government, media and community agendas

Community issues	Advocacy opportunities for physical activity
Economy	Articulate the economic burden of inactivity and benefits of increased physical activity
Environment	Relate physical activity targets to clean air, decongested roads and livable communities as well as health benefits
Crime and safety	Position physical activity, especially increased walking in neighborhoods, as a strategy to increase community safety and lower crime
Fuel	Position walking and cycling as 'solutions', healthy, green and inexpensive transport modes
Children	Inactivity threatens the health of our next generation, with dire consequences for health, productivity, economy and even national security. Our children are our future
Grass roots culture	Link physical activity to local political issues and target local representatives accordingly

Physical activity professionals need to better understand the science and the art of advocacy and apply these talents more effectively. This will require better articulation of the evidence arguments, a better articulated physical activity agenda (best buys) and a strategic approach to advocacy (Shilton, 2006). These approaches need to be applied to elevate the political status of physical activity. The status of physical activity can be advanced by advocacy around the health issues and benefits. However, in addition opportunities exist for advocates to align physical activity with the “big issues” that capture political, public and media spotlight. Examples of this are outlined in Table 7.4.

Conclusion

We have examined the meaning of effectiveness in the context of physical activity and described the advances that have resulted in physical activity effectiveness being demonstrated. In addition we have identified some of the recent approaches to disseminating effective practice and developing and distributing evidence-based recommendations to the field. Physical activity has become better recognised in recent years, but there is much that we still don't understand. Remaining challenges include understanding effective practice in developing countries and in sub-populations with increased needs. While the epidemiological evidence for the health of physical activity are strong, this has not yet translated into prioritisation of physical activity initiatives, nor the development and implementation of national physical activity action plans and policies. This discrepancy between the evidence and the commitment points to a need to prioritise and resource strategic approaches to physical activity advocacy (Shilton, 2006).

If our ultimate measure of our effectiveness is increased population levels of physical activity, then clearly we have a long way to go. However, there is much from which we can take encouragement. A challenge is to identify why some programs have been able to demonstrate effectiveness, and how they have demonstrated effectiveness. The most significant challenge is one of advocacy, to ensure that global and national commitments are made to advancing physical activity action plans, mobilizing resources and affording priority to implementation of those plans.

References

- ACSM (1978), American College of Sports Medicine position statement on the recommended quantity and quality of exercise for developing and maintaining fitness in healthy adults. *Medicine and Science in Sports*, 10(3), vii–x.
- Bauman AE & Craig CL. (2005). The place of physical activity in the WHO Global Strategy on Diet and Physical Activity. *International Journal of Behavioural Nutrition and Physical Activity*, 2, 10.
- Bauman AE & Miller Y. (2004). The public health potential of health enhancing physical activity (HEPA), in *Health enhancing physical activity, Vol 6, Multidisciplinary Perspectives of Physical Education and Sport Science*, Eds: Oja P, Borms J Meyer and Meyer Sport publishers, Oxford UK, 2004, pp 125–149.
- Bauman AE, Nelson DE, Pratt M, Matsudo V & Schoeppe S. (2006a). Dissemination of physical activity evidence, programs, policies, and surveillance in the international public health arena. *American Journal of Preventive Medicine*, 31(4 Suppl), 57–65.
- Bauman AE, Phongsavan P, Schoeppe S & Owen N. (2006b). Physical activity measurement – a primer for health promotion. *Promotion & Education*, 13, 92–103.
- Bell AC, Ge K & Popkin BM. (2002). The road to obesity or the path to prevention: Motorized transportation and obesity in China. *Obesity Research*, 10(4), 277–283.
- Bouchard C, Blair SN, Haskell WL. (eds) (2006). *Physical activity and Health*, Human Kinetics Publishers, Illinois.
- Bull FC, Bellew B, Schöppe S & Bauman AE. (2004). Developments in National Physical Activity Policy: An international review and recommendations towards better practice. *Journal of Science and Medicine in Sport*, 7,1(Suppl), 93–104.
- Cicloviás Unidas d las Américas. <http://www.ciudadhumana.org/cicloviásunidas/red.htm>. Accessed on October 2006.
- Gebel K, King L, Bauman A, Vita P, Gill T, Rigby A, Capon A. *Creating healthy environments – a review of links between the physical environment, physical activity and obesity*. Sydney. NSW Health Department and NSW Centre for Overweight and Obesity. 2005. [monograph, <http://www.coo.health.usyd.edu.au/publications/reports.shtml#CH>].
- Gomez LF, Mateus JC & Cabrera G. (2004). Leisure-time physical activity among women in a neighborhood in Bogotá, Colombia: Prevalence and socio-demographic correlates. *Cad Saude Publica*, 20(4), 1103–1109.
- Gomez LF, Sarmiento OL, Lucumí D, Espinosa G & Forero R. (2005). Prevalence and factors associated with walking and bicycling for transport among young adults in two low-income localities of Bogotá, Colombia. *Journal of Physical Activity and Health*, 2, 445–459.
- Gomez LF, Sarmiento OL, Mosquera J, Jacoby E. (2006). Influence of the built environment on physical activity and quality of life in Bogotá Colombia. *International*

- Congress on Physical Activity and Public Health*, 17–20, April 2006. Atlanta, Georgia USA.
- Hallal PC, Victora CG, Wells JC & Lima RC. (2003). Physical inactivity: Prevalence and associated variables in Brazilian adults. *Medicine and Science in Sport and Exercise*, 35(11), 1894–1900.
- Heath G, Brownson R, Kruger J, Miles R, Powell K, Ramsey L. and the Task Force on Community Preventive Services (2006). The effectiveness of urban design and land use and transport policies and practices to increase physical activity: A systematic review. *Journal of Physical Activity and Health*, 1, S55–S71.
- Kahan B & Goodstadt M. (March, 2002). *IDM Manual for using the Interactive Domain Model approach to best practices in health promotion*, Centre for Health Promotion, University of Toronto, Toronto.
- Kahn EB et al. (2002). The effectiveness of interventions to increase physical activity – A systematic review. *American Journal of Preventive Medicine*, 22(4S), 73–107.
- Katzmarzyk PT, Janssen I. (2004). The economic costs associated with physical inactivity and obesity in Canada: An update. *Canadian Journal of Applied Physiology*, 29, 90–115.
- Matsudo SM et al. (2006b). Evaluation of a physical activity promotion program: The example of Agita Sao Paulo. *Evaluation and Program Planning*, 29, 301–311.
- Montezuma R, Neiman AB, Jacoby ER. (2006). Ciclovías de Las Americas. *International Congress on Physical Activity and Public Health*. 17–20, April 2006, Atlanta, Georgia USA.
- Nutbeam D & Bauman A. (2006). *Evaluation in a Nutshell: A practical guide to the evaluation of health promotion programs*, McGraw-Hill, Sydney.
- RAFA (2006), Physical Activity Network of the Americas. Available at <http://www.rafapana.org/> Accessed on October 2006.
- REDCOLAF (2006), Red Colombiana de Actividad Física REDCOLAF. Available at <http://www.redcolaf.org/> Accessed on October 2006.
- Parra D, Gómez LF, Pratt M, Sarmiento OL & Triche E. (2006). Urban changes in Bogotá and their possible influence with physical activity levels. *Active Living Research Meeting*, San Diego February 16–18, 2006.
- Pratt M, Macera CA, Sallis JF, O'Donnell M, Frank LD. (2004). Economic interventions to promote physical activity: Application of the SLOTH model. *American Journal of Preventive Medicine*, 27,3(Suppl), 136–145.
- Shilton TR. (2006). Advocacy for physical activity – from evidence to influence. *Promotion & Education*, 13(2), 118–126.
- Sturm R. (2005). Economics and physical activity: A research agenda. *American Journal of Preventive Medicine*, 28,2(Suppl 2), 141–149.
- U.S. Department of Health and Human Services. (1996). *Physical Activity and Health: A Report of the US Surgeon General*, National Centers for Disease Control, Atlanta, Georgia.
- U.S. Department of Health and Human Services. (Accessed October 2006). www.thecommunityguide.org/pa/ U.S. Taskforce on Community Preventive Services, US Centers for Disease Control (CDC).
- World Health Organization. (1986). *Ottawa Charter for Health Promotion*, World Health Organization, Geneva.
- World Health Organization. (1997). *The Jakarta Declaration on Health Promotion in the 21st Century*, World Health Organization, Geneva.

- World Health Organization. (2004). *The WHO Global Strategy on Diet Physical Activity and Health*, World Health Organization, Geneva.
- World Health Organization. (2005). *Review of best practice in interventions to promote physical activity in developing countries. A report prepared by Bauman A, Schoeppe S, Lewicka M with technical assistance by Armstrong T, commissioned by WHO Headquarters/Geneva and funded by the WHO Centre for Health Development Kobe/Japan*, World Health Organization, Geneva.
- World Health Organization. (2006). *Implementation framework for the global strategy on diet, physical activity and health*, World Health Organization, Geneva.