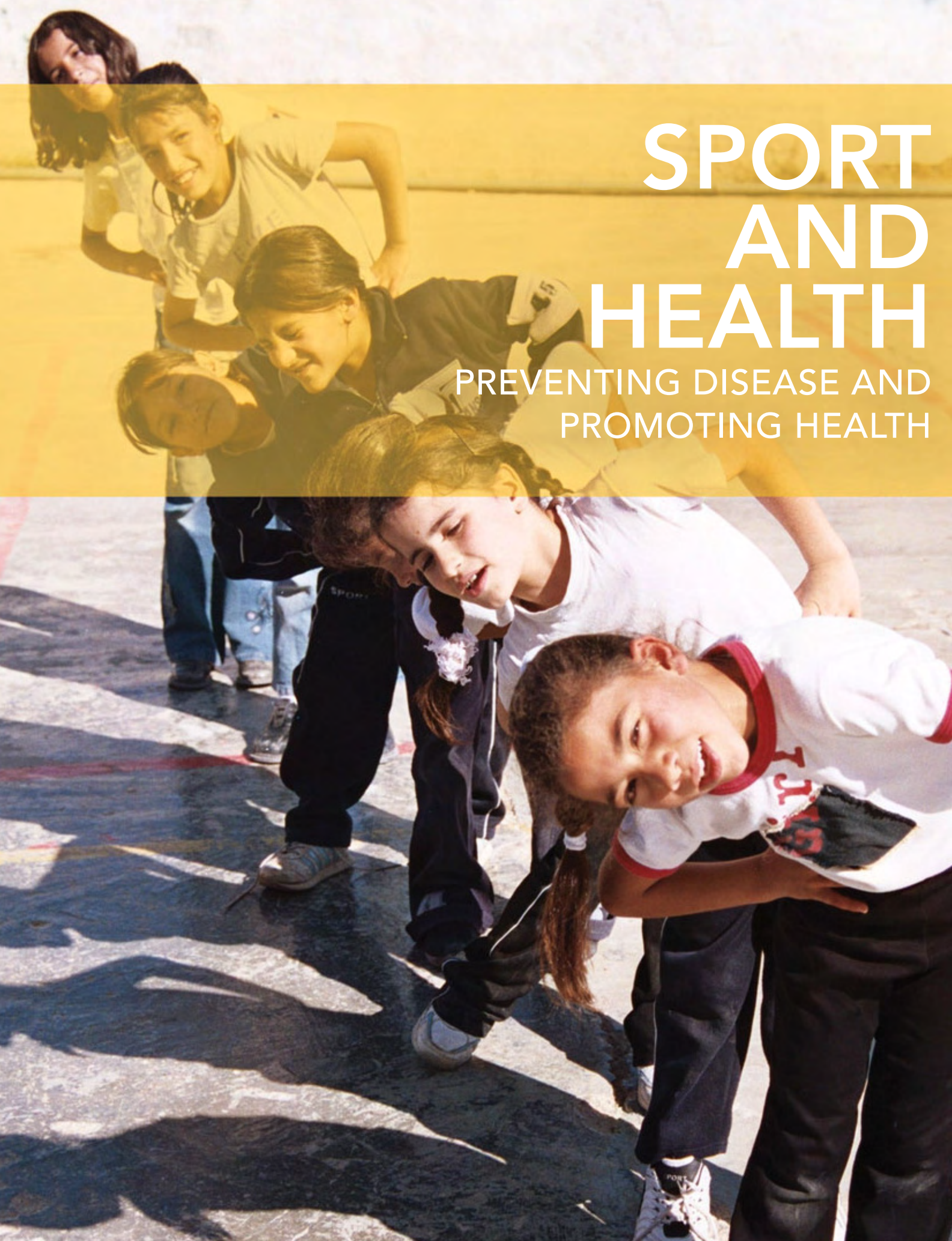


SPORT AND HEALTH

PREVENTING DISEASE AND PROMOTING HEALTH

CHAPTER 2

Left:
Fight for Peace participants receive training in boxing, wrestling and capoeira (a Brazilian martial art). These sports contribute to the health of young people and provide them with opportunities to earn respect from their peers in a safe and constructive environment, discouraging them from becoming involved in street gangs.

Fight for Peace, Brazil

Previous page:
School girls participate in a stretching game designed to ensure physical activity is healthy, safe and enjoyable.

Right To Play

1 CONTEXT: HEALTH, DEVELOPMENT AND SPORT

"Health is a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity. The enjoyment of the highest attainable standard of health is one of the fundamental rights of every human being without distinction of race, religion, political belief, economic or social condition."[1]

– Constitution of the World Health Organization (WHO), 1946

1.1 HEALTH AND DEVELOPMENT

The fundamental right to health articulated by the World Health Organization (WHO) in 1946 remains integral to development today. This right is strongly reflected in the Millennium Development Goals (MDGs), the guiding international development framework adopted by the United Nations (UN) in 2000, and the Human Development Index used to measure the progress of all nations against universal human development goals.

Healthy human development is a necessary foundation for all development progress. Without healthy populations, the achievement of development objectives will be out of reach. Good health is fundamental to the ability of individuals to realize their full human potential. It is also a crucially important economic asset. Low levels of health impede people's ability to work and earn a living for themselves and their families. When someone becomes ill, an entire family can become trapped in a downward spiral of lost income and high health-care costs.[2] On a national scale, poor population health diminishes productivity and impedes economic growth, while investment in better health outcomes is generally seen as an investment in economic growth.

The close relationship between health and development is responsible for the prominence given to health in the MDGs. Health is represented in three of the eight MDGs:

- MDG 4: Reduce child mortality;
- MDG 5: Improve maternal health; and
- MDG 6: Combat HIV and AIDS, malaria and other diseases.

Health is also understood to be a contributing factor to achieving the remaining five MDGs, particularly those related to education, gender equality and the eradication of extreme poverty and hunger. Achieving the MDGs, however, remains a daunting challenge. If the trends observed since 2000 continue, most low-income countries will require additional resources and assistance to meet their health-related MDGs.

As Table 2.1 shows, the key health issues affecting low- and middle-income countries include, but also extend beyond, those set out in the MDGs. Efforts to address non-communicable diseases, violence, and injuries — and their determinants — are also urgently needed.

TABLE 2.1 LEADING CAUSES OF MORTALITY AND DISEASE BURDEN (IN DISABILITY-ADJUSTED LIFE YEARS) AMONG ADULTS WORLDWIDE, 2002

MORTALITY – ADULTS AGED 15-59

Rank	Cause	Deaths (000)
1	HIV/AIDS	2279
2	Ischaemic heart disease	1332
3	Tuberculosis	1036
4	Road traffic injuries	814
5	Cerebrovascular disease	783
6	Self-inflicted injuries	672
7	Violence	473
8	Cirrhosis of the liver	382
9	Lower respiratory infections	352
10	Chronic obstructive pulmonary disease	343

MORTALITY – ADULTS AGED 60+

Rank	Cause	Deaths (000)
1	Ischaemic heart disease	5825
2	Cerebrovascular disease	4689
3	Chronic obstructive pulmonary disease	2399
4	Lower respiratory infections	1396
5	Trachea, bronchus, lung cancers	928
6	Diabetes mellitus	754
7	Hypertensive heart disease	735
8	Stomache cancer	605
9	Tuberculosis	495
10	Colon and rectum cancers	477

DISEASE BURDEN – ADULTS AGED 15-59

Rank	Cause	DALYs (000)
1	HIV/AIDS	68 661
2	Unipolar depressive disorders	57 843
3	Tuberculosis	28 380
4	Road traffic injuries	27 264
5	Ischaemic heart disease	26 155
6	Alcohol use disorders	19 567
7	Hearing loss, adult onset	19 486
8	Violence	18 962
9	Cerebrovascular disease	18 749
10	Self-inflicted injuries	18 522

DISEASE BURDEN – ADULTS AGED 60+

Rank	Cause	DALYs (000)
1	Ischaemic heart disease	31 481
2	Cerebrovascular disease	29 595
3	Chronic obstructive pulmonary disease	14 380
4	Alzheimer and other dementias	8569
5	Cataracts	7384
6	Lower respiratory infections	6597
7	Hearing loss, adult onset	6548
8	Trachea, bronchus, lung cancers	5952
9	Diabetes mellitus	5882
10	Vision disorders, age-related and other	4766

Source: World Health Organization, World Health Report 2003 – Shaping the Future [3]

Many countries are working to improve their health-care services, but better health services alone will not improve health outcomes. The health of individuals and populations is determined to a significant degree by social factors such as poverty, income inequality, education, employment, housing, gender and social connectedness. These social determinants of health produce widespread inequities in health within and between societies.[4] The poor and the disadvantaged experience worse health than the rich and powerful, have less access to services and die younger in all societies.[5] Social factors have a direct impact on health status and must be addressed as part of any comprehensive health strategy. Strategies also need to be tailored to the diverse and evolving needs of each country and its specific social, economic and cultural contexts. This includes giving attention to the conditions that account for the greatest current and anticipated burden of disease and mobilizing resources to confront them.

1.2 SPORT AS A TOOL TO PROMOTE HEALTH AND PREVENT DISEASE

Sport's unique and universal power to attract, motivate and inspire makes it a highly effective tool for engaging and empowering individuals, communities and even countries to take action to improve their health. Sport can also be a powerful means of mobilizing more resources in the global fight against disease, but this potential is only just beginning to be realized.

According to the WHO, experience and scientific evidence show that regular participation in appropriate physical activity and sport provides people of both sexes and all ages and conditions, including persons with disabilities, with a wide range of physical, social and mental health benefits. Physical activity and sport support strategies to improve diet and discourage the use of tobacco, alcohol and drugs. As well, physical activity and sport help reduce violence, enhance functional capacity, and promote social interaction and integration.[6]

Sport generates health benefits in two primary ways — through direct participation in sport itself, and through the use of participatory and spectator sport as a platform for communication, education and social mobilization. Well-designed sport for health initiatives often work on both levels.

Increasing physical activity levels

Because physical inactivity is a primary risk factor driving the global increase in chronic disease, sport can play a critical role in slowing the spread of chronic diseases, reducing their social and economic burden, and saving lives. While physical activity includes a broader range of activities than sport alone (people can be physically active at work or engaged in domestic tasks at home), direct participation in sport is one of the most enjoyable, and therefore powerful, means of motivating and mobilizing people to

become physically active. In addition to enhancing overall physical fitness, regular physical activity, active play and sports can have a positive impact on other major health risk factors, such as high blood pressure, high cholesterol, obesity, tobacco use and stress.[7]

Fostering social connection

A powerful social connector, sport can bring people together, expand and strengthen social ties and networks, link people to resources and provide them with a sense of belonging. These social relationships are a fundamental determinant of health but are often lacking for people who are marginalized by poverty, disease, discrimination or conflict. (Please see Chapter 6 for a more in-depth discussion of sport's role in promoting greater social inclusion of disadvantaged populations.)

Sport can also be used to reduce the social stigma experienced by marginalized groups, such as persons with disabilities, people with HIV and AIDS, and former child combatants. By engaging these individuals in sport activities with other community members, sport creates a shared space and experience that helps break down negative perceptions and enables people to focus on what they have in common. This is an important step in enhancing these individuals' self-concept and emotional health. (This idea is explored further in Chapter 5 in relation to persons with disabilities and in Chapter 6 in with regard to post-conflict reconciliation processes.)

Promoting healthy attitudes and behaviours

In disadvantaged communities and populations, where people are often defined in terms of their needs and deficits, sport provides a powerful counter-balance to these perceptions. Participating in sport draws on people's strengths and assets — energy, enthusiasm, natural and acquired skills, the desire to excel — and the universal capacity for fun and enjoyment. In this way, well-designed sport programs that are inclusive, fair, fun and promote excellence at all skill levels — help to empower participants and build self-esteem.

Self-esteem can be defined as a person's overall self-appraisal and feeling of self-worth. Self-esteem is critical to health because it motivates self-care and can contribute to healthy lifestyle behaviours. The acquisition of sport skills and life skills, the acceptance and friendship of others, the attention and guidance of coaches, and the examples set by them and other positive sport role models, all encourage sport participants to believe in themselves, in others, and in their future. For individuals deeply affected by poverty, disease, disability or conflict, the development of self-esteem can be a profound psychological shift that enables and motivates them to adopt healthier lifestyle behaviours.

Sport as a platform for communication, education and social mobilization

Sport can play a valuable role as a communication, education and social mobilization vehicle. Sport's entertainment appeal, amplified by global telecommunications, has made it one of the most powerful communication platforms in the world. By engaging and mobilizing high-profile elite athletes and professional sport clubs and federations, this communication's power can be harnessed to deliver critical health information and messages, to model healthy lifestyle behaviours, and to marshal resources for health initiatives. At the community level, popular sport events offer local platforms to deliver health information and education, and can serve as a starting point for community mobilization to support health promotion, vaccination, and disease prevention and control efforts.

1.3 LIMITATIONS OF SPORT IN ACHIEVING HEALTH OUTCOMES

The positive values, physical activity, social connection and communication dimensions of sport, and their careful application in well-designed programs, hold enormous potential to help achieve health goals. However, sport alone cannot prevent or treat disease. Instead, sport is a highly effective tool in a broader kit of development practices. Only when it is applied in a holistic and integrated manner can sport achieve development results.

It is important to recognize that society's ills can be found in sport environments, as in all other social domains. Behaviours such as exclusion, tolerance of violent rivalry among opposing teams and their supporters, and emphasizing winning at any cost, can discourage sport participation. These behaviours can also undermine the positive values of sport, offer negative role models to young people, rob sport of its power to connect and strengthen individuals and communities, and undermine attempts to use sport to communicate important health messages. Sport for health programs must therefore be carefully designed to guard against these risks.

Sport and physical activity can have associated health risks. These risks can include injury from overexertion, unsafe playing conditions, lack of appropriate training and safety equipment, sport violence on the field, and violence at mass sport events. In high-performance sport, the use of illegal performance-enhancing substances (doping) poses additional health risks. Prolonged exercise can also increase risk of upper respiratory tract infections and negatively affect people who are not accustomed to such activity.[8] Risk from exercise arises when people of all fitness levels engage in heavy exertion, but is greatest when inactive people suddenly become highly active.[9]In some cases, therefore, additional physical activity may not be recommended and may even prove detrimental to health.

These risks can be minimized by ensuring that sport for health initiatives are driven by heath objectives, and are informed by an in-depth knowledge of the participants and

their socio-cultural context. Sport and physical activity-based health initiatives should take into account participants' access to adequate nutrition, their health status, and the degree to which they may already be engaged in physically demanding activities associated with work and domestic responsibilities. Sport initiatives must also be carefully incorporated with other program components in a combined, holistic approach, to elicit the best that sport can offer.

1.4 SPORT, HEALTH AND THE MILLENNIUM DEVELOPMENT GOALS

Health and development are fundamentally linked and mutually reinforcing. As the leading framework for all development efforts, the Millennium Development Goals explicitly outline a number of important health objectives. Table 2.2 summarizes the contribution that sport can make to the health objectives outlined in the MDGs.

Initiated by the Secretary of Sport in 2007, Community Sports Days are organized by individual towns to promote the health benefits of physical activity. The town with the largest number of participants receives a prize from the Secretary.

Deportes Argentina - National Social Sport Program

TABLE 2.2 SPORT, HEALTH AND THE MILLENNIUM DEVELOPMENT GOALS

MILLENNIUM DEVELOPMENT GOAL	CONTRIBUTION OF SPORT
1. Eradicate extreme poverty and hunger	• Reduced risk of diseases that can cause or aggravate poverty by preventing people from working and/or imposing health care costs, through: - Increased physical activity levels - Sport-based public education and social mobilization campaigns in support of prevention and vaccination initiatives - Sport programs successful in reducing health risk behaviours
2. Achieve universal primary education	• Increased health and physical fitness of primary school children, reducing school absenteeism through: - Increased physical activity - Sport-based health and disease prevention education for children and families
3. Promote gender equality and empower women	• Improved health and well-being for girls and women through physical activity and access to health information through sport-based programs
4. Reduce child mortality	• Reduction in child deaths and disability from measles, malaria and polio as a result of sport-based vaccination and prevention campaigns
5. Improve maternal health	• Increased access to reproductive and sexual health information, discussion and services for women and girls • Reduced risk of adolescent pregnancy in sport participants in some contexts
6. Combat HIV and AIDS, malaria, and other diseases	• Reduced risk of HIV infection as a result of sport programs aimed at prevention education and improving health risk behaviours • Reduced stigma and improved health for some people living with HIV and AIDS, contributing to their increased social and economic inclusion • Increased vaccination rates for measles and polio • Increased reach and effectiveness of malaria, TB and other education and prevention campaigns
7. Develop a global partnership for development	• Global partnerships to leverage elite and mass sport events and high-profile athletes to promote positive health messages

1.5 INTERNATIONAL FRAMEWORKS FOR SPORT AND HEALTH

Article 12 of the UN Convention on Economic, Social, and Cultural Rights[10] sets out the fundamental right of all peoples to "the highest attainable standard of physical and mental health."[11] This is the basis for all UN efforts to advance health.

There are no UN conventions, however, that explicitly recognize the use of sport as a tool for health and no UN instruments such as the *Millennium Declaration*[12] and the *Declaration of Commitment on HIV and AIDS*[13] that explicitly reference sport and physical activity. However, in 2003, the WHO report *Health and Development Through Physical Activity and Sport* highlighted the important role that sport, as well as

physical activity, can play in advancing health goals. This was followed, in 2004, by the 57th World Healtsport ch Assembly's endorsement of the World Health Organization *Global Strategy on Diet, Physical Activity and Health*,[14] which addresses physical inactivity as one of the two major risk factors for non-communicable diseases.

Despite the lack of formal international frameworks advancing the use of sport to attain health goals, regional inter-governmental bodies have begun to focus on this objective. The Commonwealth Advisory Body on Sport (CABOS) report, presented to Ministers of Sport in 2006, demonstrated how an help "promote health by tackling obesity, increasing awareness of HIV and AIDS, and promoting healthy diets, well-being and quality life expectancy."[15]

More recently, the European Commission released its White Paper on Sport,[16] explicitly referencing the role of sport in advancing public health, stating that:

> *"As a tool for health-enhancing physical activity, the sport movement has a greater influence than any other social movement. Sport is attractive to people and has a positive image. However, the recognized potential of the sport movement to foster health-enhancing physical activity often remains under-utilized and needs to be developed."*[17]

This view is consistent with the mission of the Americas Council of Sports *(Consejo Americano del Deporte)*. The Council, comprising Sport Ministers from participating governments, aims to "support projects and programs fostering sport as an effective instrument that contributes to physical, psychological and social health in the Americas."

These statements underscore the growing recognition among governments of sport's potential to advance national and international health goals. The following sections further explore sport's benefits in relation to the key global challenges of non-communicable disease, infectious disease, and mental illness, and provide recommendations to governments based on evidence gleaned from sport for health efforts to date.

2 EVIDENCE: USING SPORT TO PROMOTE HEALTH AND PREVENT DISEASE

2.1 PREVENTING AND MANAGING NON-COMMUNICABLE DISEASE

Non-communicable disease — global challenges

Globally, the most prevalent non-communicable or chronic diseases include heart disease and stroke, cancer, chronic respiratory disease, and diabetes.[18] These and other chronic diseases are the major cause of death (60%) and disability worldwide, taking the lives of

over 35 million people in 2005, including many young people and those in middle age. The total number of people dying from chronic diseases is double that of all infectious diseases, including HIV and AIDS, tuberculosis and malaria.[19]

Contrary to the perception that chronic diseases primarily affect high-income countries, 80% of chronic disease deaths occur in low- and middle-income countries. These countries are experiencing a rapid upsurge, especially in urban settings. Cardiovascular disease alone will kill five times as many people as HIV and AIDS in these countries. Without action to address the causes, deaths from chronic disease will increase a further 17% between 2005 and 2015.[20]

New estimates from the World Health Organization indicate that chronic disease place a grave economic burden on countries. In 2005, the estimated losses in national income from heart disease, stroke and diabetes (reported in international dollars)[21] were $18 billion in China, $11 billion in the Russian Federation, $9 billion in India, and $3 billion in Brazil. These losses will continue to accumulate if no action is taken.[21] Investment in chronic disease prevention programs is therefore essential for many low- and middle-income countries struggling to reduce poverty. In response to these challenges, several countries have already adapted their MDG targets and indicators toinclude chronic disease.[23]

The global increase in chronic disease is driven largely by globalization, urbanization, and the rapid aging of populations. These determinants contribute to the three primary risk factors common to most chronic disease — unhealthy diet, physical inactivity, and tobacco use. These risk factors are the same around the world and they are modifiable.[24] The WHO estimates that 80% of all cardiovascular disease and type 2 diabetes, and 40% of all cancer cases can be prevented by eliminating these risk factors.[25]

Physical activity — effective prevention

Because developing countries have relatively limited resources to devote to health care for people with chronic disease, prevention is the most cost-effective and sustainable way to address this health challenge.[26]

Physical inactivity is the most common of all cardiovascular risk factors across countries. After tobacco use, inactivity is the greatest contributor to mortality and morbidity from all causes.[27] Physical activity is, therefore, increasingly viewed as the least expensive and most effective preventive "medicine" for combating the increasing worldwide problem of obesity[28] and, with physical fitness, may represent the most effective strategy to prevent chronic disease.[29]

The benefits of physical activity in relation to non-communicable disease are irrefutable. These include the primary and secondary prevention of chronic diseases, such as cardiovascular disease, diabetes, cancer, hypertension, obesity, depression and osteoporosis,[30] as well as individual and societal economic benefits such as reduced

health-care costs and increased productivity.[31] This is reflected in the WHO's 2004 *Global Strategy for Diet, Physical Activity and Health,*[32] which aims to "encourage the development, strengthening and implementation of…policies and action plans to improve diets and increase physical activity...".[33]

Despite this and other efforts, more than 60% of adults and over two-thirds of young people globally are not sufficiently active to protect their health.[34] This trend is exacerbated by diminishing levels of physical activity and education in schools worldwide.[35] Governments are gradually moving to address this issue. In 2003, Argentina's Ministry of Health conducted a national survey and found that 46% of the population was physically inactive (i.e., engaged in less than 150 minutes of moderate activity per week).[36] In response, the Government of Argentina established the National Social Sport Program to boost physical activity, particularly among children and youth. The program is based on the premise that young people who build sport and physical activity into their daily lives will be more likely to grow into active adults at lower risk for chronic illnesses such as diabetes, obesity and heart disease. The Ministry also views sport as a vehicle for social change and the promotion of social inclusion — another fundamental determinant of health. The Ministry works closely with schools and Argentina's system of almost 8,000 local sport clubs. The program has helped to build the capacity of thousands of primary and secondary school teachers and sport club staff members and to reawaken awareness and interest in sport for youth on a national basis.[37]

What kind of physical activity and how much?

As more governments start to work on increasing physical activity levels, the question of what constitutes an appropriate level of physical activity arises. Providing simple recommendations to the public is difficult because of the variety of exercise that can be undertaken and the number of possible health outcomes. Prescriptions are further complicated by genetic differences between individuals which affect their physiological response to exercise and yield substantial variations in fitness-related benefits.

Scientific evidence indicates that physical activity of moderate intensity (e.g., brisk walking) is sufficient to produce many health benefits in large portions of populations.[38]

Experts suggest that 30–60 minutes of moderate-intensity activity, 3–5 times a week benefits blood pressure and hypertension, blood lipids and lipoproteins, blood coagulation, cancer, depression and anxiety. More activity is necessary to reduce all-cause mortality,[39] cardiovascular disease, obesity, and type 2 diabetes. Optimal benefits for diabetes, overweight and obesity require 50–80 minutes of daily moderate-intensity activity.[40]

A physical activity "prescription" can be divided into three categories. *Activation* involves getting people moving on a regular basis, accumulating at least 30 minutes of any

activity in minimum ten-minute blocks most days of the week. This results in the greatest health benefit for time spent to individuals and populations overall, reducing mortality in males from 64 to 25 deaths per 10,000 persons/year.[41] Additional health gains can be obtained through *fitness exercise*, daily moderate to vigorous physical activity of longer duration, used to maintain cardiovascular fitness. For children and young people, this requires an additional 20 minutes of vigorous physical activity three times a week. For weight control, individuals require at least 60 minutes every day of moderate to vigorous physical activity.[42] *Competition training* is for maximizing athletic performance for one's age. It is more than what is necessary for health purposes and it increases the risk of injury. In addition to cardiovascular exercise,[43] strength training,[44] done every other day with progressively increasing loads, helps to improve balance, fitness and health.

Reducing health-care costs and improving workplace productivity

Physical activity can also help reduce health-care costs and increase productivity, key issues in emerging economies.[45] Workplace physical activity programs in the United States have been shown to reduce short-term sick leave by 6%–32%, reduce health care costs by 20%–55%, and increase productivity by 2%–52%. In Canada, companies with employee physical activity programs and initiatives have been shown to save US$513 per worker annually through improvements in productivity, absenteeism, turnover and injury.[46]

Similarly, data from developed countries indicates that the direct costs of inactivity are enormous. Inactivity was estimated to contribute as much as US$75 billion to the United States' medical costs in 2000 and to be responsible for 6% of Canada's total health care costs.[47] While there is limited data available on these costs from the developing world, it is likely that they are lower. However, they are anticipated to be increasing and, given limited resources, reducing these kinds of avoidable costs is a highly desirable goal.[48]

Preventing and managing cardiovascular disease

Cardiovascular diseases (CVD) are diseases of the heart and blood vessels and the number one cause of death globally. An estimated 17.5 million people died from CVD in 2005, representing 30% of all deaths globally. Over 80% of these deaths were in low- and middle-income countries, affecting men and women equally.[49]

Even small incremental increases in physical fitness can reduce an individual's risk of cardiovascular-related death.[50] According to a 1996 report by the US Surgeon General,[51] cardiovascular health benefits occur at moderate levels of physical activity and increase at

higher levels of physical activity and fitness. People who participate in regular physical activity are at much less risk of suffering a major coronary event such as a heart attack.[52] Similarly, people with established cardiovascular disease can reduce their risk of negative outcomes by over 60% by participating in regular physical activity.[53] Evidence also suggests that physical activity benefits children's cardiovascular health and can help to lower blood pressure in children and adolescents.[54] Epidemiological research suggests there may be a direct relationship between physical activity and HDL-C levels (levels of beneficial cholesterol) in children, and that children at high risk of developing coronary heart disease may benefit from physical activity.[55]

Preventing and managing diabetes

Worldwide, over 180 million people live with diabetes.[56] In 2005, an estimated 1.1 million people died from it.[57] Almost 80% of these deaths occurred in low- and middle-income countries and almost half involved people below 70 years of age.[58] Seven of the ten countries with the highest levels of diabetes are low- and middle-income countries.[59]

Current research indicates that both aerobic and resistance (strength) exercise are associated with a decreased risk of type 2 diabetes,[60] which affects an estimated 5.9% of the world's adult population.[61] Exercise helps to reduce the likelihood of developing the disease among populations at high risk due to being overweight.[62] Exercise interventions also help manage diabetes by stabilizing blood sugar levels,[63] however this protective effect is more pronounced for those with type 1 diabetes.[64] While both aerobic and resistance training help to control diabetes, resistance training provides greater benefits for blood sugar control than aerobic training.

Appropriate physical exercise, combined with diet or drug therapy, can be the most effective means of controlling type 2 diabetes in persons who have a mild form of the disease.[65] However, patients with diabetes can also experience adverse effects from participating in sport and physical activity, such as hypoglycemic (low blood sugar) and hyperglycemic (high blood sugar) episodes. More research is needed to understand why these effects sometimes occur, so that involvement in sport and physical activity can remain healthy and enjoyable.[66]

Preventing cancer

Cancer includes over 100 diseases involving the rapid growth of abnormal cells that invade the body and spread to other organs, causing death.[67] The WHO estimates that 7.6 million people died from cancer worldwide in 2005, with 70% of these deaths occurring in low- and middle-income countries.[68] It is estimated that 40% of all cancers can be prevented by a healthy diet, physical activity, and not using tobacco.[69] Physical inactivity is a distinct risk factor,[70] while routine physical activity can help reduce the risk of specific types of cancer,

such as breast and colon cancer.[71] Physically active men and women exhibit a 30%–40% reduction in the risk of developing cancer, relative to those less active.[72] Moderate levels of activity offer a greater protective effect than lower levels of activity.[73] There is little published evidence regarding the effectiveness of exercise as a means of improving the health of patients with cancer, therefore it is difficult to draw any conclusions about physical activity's value as a secondary form of prevention.

Tackling obesity and reducing accompanying health risks

Obesity is defined as the abnormal and excessive accumulation of fat that may impair an individual's health.[74] In 2005, it was estimated that 400 million people in the world were obese. By 2015, this figure is expected to rise to 700 million.[75] This trend is largely due to a shift in diet (to energy dense foods low in vitamins) and decreased physical activity.[76]

While the measurement of obesity is the subject of ongoing scientific debate, there is strong evidence that excessive weight increases the relative risk of several chronic diseases. Obesity and inactivity have similar links with health risk indicators such as elevated blood pressure, fasting plasma glucose levels, and inflammatory markers. However, the majority of studies examining obesity and health have not adequately taken into account physical activity.[77] Research has found that obese individuals with moderate cardio-respiratory fitness have lower rates of cardiovascular disease than normal-weight unfit peers, and an all-cause death rate 50% lower than the individuals in the unfit category.[78]

Social factors, such as limited access to highly nutritional foods and a sedentary lifestyle, make addressing obesity particularly challenging.[79] However, the above finding reinforces the beneficial effects of an active lifestyle in individuals who otherwise might be at relatively higher risk for chronic diseases due to excessive weight.

Preventing osteoporosis and improving bone health

Osteoporosis is the deterioration of bone tissue leading to loss of bone mass and a higher risk of bone fractures. Women are at higher risk for osteoporosis than men. The global lifetime risk of bone fracture in 50-year-old women is 40%, similar to the risk of coronary heart disease.[80] In 1990, 1.7 million people worldwide experienced hip fractures. This number is expected to increase to six million by 2025.[81]

Physical activity, in combination with calcium and vitamin D, helps build bone mass. Physical activity increases force on bones and bones respond by increasing their mass so that the force is spread over a larger area. Physical activity has a positive effect on bone

health across the age spectrum, but this effect is greatest in previously inactive individuals. Weight-bearing exercise, particularly resistance exercise, is the most effective form of physical activity for achieving this effect.[82]

Regular physical activity is also an effective secondary prevention strategy.[83] Research indicates that exercise training is effective in improving bone density in older women (75–85 years) with low bone mineral density and slowing the rate of bone loss (osteopenia) in early post-menopausal women.[84]

Physical activity also helps to improve balance and coordination. Several studies[85] have found that exercise training significantly reduces the risk and number of falls. Improved strength, flexibility and posture also help reduce pain and allow older individuals to carry out daily tasks more easily.

2.2 PREVENTING AND MANAGING INFECTIOUS DISEASE

Infectious disease — global challenges

Despite medical advances in prevention and treatment, infectious diseases remain a pressing health challenge in developing nations. As well, the advent of multi-drug resistant strains of infectious pathogens (such as staphylococcus, tuberculosis, pneumonia and others) has created a resurgent health challenge for developed countries.

More than 90% of deaths from infectious diseases worldwide are caused by a handful of diseases such as lower respiratory tract infections, HIV and AIDS, diarrheal diseases, tuberculosis, malaria and measles. Beyond the natural causes present in many developing countries, a number of social and economic factors contribute to high rates of infectious disease.[86] Poverty, lack of access to health care, antibiotic resistance, evolving human migration patterns, new infectious agents, and changing environmental and development activities, are all contributing factors.[87] Overcrowded living conditions, poor nutrition and compromised immune systems make those living in poverty more susceptible to infectious disease. In addition, their limited access to drugs and heath care mean that treatable diseases like HIV and AIDS, malaria and tuberculosis are often fatal.[88]

Developing countries face a range of infectious disease challenges — HIV is one of the most pressing. Globally, 33.2 million people are estimated to be living with HIV, most of them in developing countries.[89] An estimated 68% percent of those affected live in sub-Saharan Africa.[90] HIV and AIDS are often accompanied by tuberculosis (TB), which kills nearly two million people every year — more than 90% of whom live in

developing countries.[91] Even more widespread than HIV and AIDS, malaria poses a serious health threat to approximately 40% of the world's population, mostly people living in the poorest countries, with over 500 million people affected annually. Among young children, measles remains a leading cause of death. An estimated 345,000 people, the majority of them children, died from measles in 2005.[92] Polio also remains a significant threat in a handful of countries and millions of people still suffer illness and disability caused by the disease. Routine polio immunization and associated health care cost an estimated US$1.5 billion a year worldwide.[93]

Infectious diseases present an ongoing challenge to development efforts, afflicting children and young adults, causing severe illness, depleting scarce health-care resources, and undermining productivity and economic growth. While sport represents a new and emerging approach to combating infectious disease, its popularity is spreading rapidly as new initiatives spring up around the globe.

The role of sport in preventing infectious disease

Sport's universal popularity, its power and reach as a communication platform, and its particular appeal to children and youth make it an ideal vehicle to inform, educate and mobilize populations to fight disease. While research has not yet caught up with current practice, and while evidence of sport's impacts on health outcomes is only just emerging, sport's capacity to attract and engage is undisputed, as is its communication power.

While sport is equally well-positioned to inform and educate people about infectious and non-infectious disease, it is currently used most often in connection with infectious disease. The discussion that follows highlights the different ways in which sport is being used to this end and some of the early lessons emerging from the field.

Using elite sport as an educational platform

Moving beyond its traditional entertainment role, sport is now recognized as having enormous potential as an informational and educational platform for health and development messages targeted to youth and adults alike.[94]

Sport is unusually powerful in this regard. No other activity approaches the popularity sport enjoys, receives more intense media attention, or reaches more people on a global, regional or local level.[95] Sport's advantages as a communication medium stem from the fact that it appeals to people on an emotional and personal level in a largely positive way (there are exceptions — sport-based racism, hooliganism and violence). [96] Sport also possesses an unsurpassed ability to reach broad sectors of populations, including marginalized groups which are difficult to reach by other means.[97]

High-performance sport events have the ability to attract huge audiences. In 2002, more than one billion people worldwide were transfixed by a live broadcast of the final match of the FIFA World Cup between Brazil and Germany — the largest audience for a single event at that point in time.[98]

Because of their global celebrity, high-performance athletes also wield enormous influence. Celebrated football player, Pélé, middle-distance runners Maria Mutola and Haile Gebrselassie, tennis stars Roger Federer and Boris Becker, and many other athletes are increasingly using their popularity to advance development causes, as goodwill ambassadors or through their own aid activities. Regardless of where they live — in Brazil, Kenya, Bhutan or the Ukraine — children, in particular, identify with local and national sport heroes and strive to be like international stars such as Ronaldinho, David Beckham and Michael Jordan, whose popularity transcends cultural and political borders.[99]

The potential health impact of involving such athletes is perhaps best illustrated by the case of Earvin "Magic" Johnson, one of the world's top basketball players and a hero to millions of youth worldwide. On November 7, 1991, Johnson told a news conference in Los Angeles that he had HIV and that he was withdrawing from active sport. Johnson's announcement was a milestone in the fight against HIV and AIDS because it was the first time a sport superstar admitted openly to having HIV. The effects of Johnson's announcement were profound. He helped break the taboo in sport against speaking openly about HIV and AIDS. He also helped to challenge the stigma surrounding HIV and AIDS, which can feed discrimination and impede prevention efforts.[100] Perhaps most importantly, his actions changed peoples' perceptions about HIV and its prevention.

As a result of Johnson's announcement, awareness and accurate knowledge of HIV increased,[100,102,103] as did people's desire to obtain more information about HIV and AIDS[104,105] Calls to AIDS hotlines,[106] and the number of people getting tested for HIV also increased.[107,108,109] In addition, studies showed an increased understanding of vulnerability to HIV among adults [110] and changes in high-risk behaviours.[111] In a survey administered to adolescent clinic attendees aged 12–19 in four U.S. cities, 60% of respondents reported that Magic Johnson's announcement had increased their awareness of AIDS, 65.4% reported increased self-efficacy in a sexual situation, 37.2% reported that they had changed their perceptions around AIDS risks, and 37.8% described increased resistance to peer pressure for sexual intercourse.[112]

This is just one example of the potential impact of celebrity athletes who serve as health spokespeople and role models. Fortunately, many athletes today are participating in international and national programs to help communicate health messages and combat stigma.

Using sport as an educational platform at the community level

Sport can be an equally powerful medium for education at the community level, particularly when used to reach out to children and youth.

The calamitous effects of HIV in Africa and elsewhere demand new approaches to early prevention that focus on youth. For example, the Grassroot Soccer Foundation (GRSF) launched an HIV and AIDS education program in Bulawayo, Zimbabwe, using trained adult soccer players to help prevent the spread of HIV and AIDS among at-risk youth. The program was implemented in nine schools, targeting seventh grade students. Fourteen local and nationally known soccer players were trained and helped to educate approximately 3,000 students who completed the program.[113]

Independent research[114] by the GRSF showed that students in intervention classrooms demonstrated significant increases in knowledge and attitudes concerning HIV and AIDS relative to non-participants. Participants also demonstrated significantly higher understanding of the stigma around HIV and AIDS and of prevention methods.[115] As a result of the program, the percentage of students who:[116]

- Could list three people they could talk to about HIV increased from 33% to 72%;
- Knew where to go for help for HIV-related problems increased from 47% to 76%;
- Said they would feel comfortable providing emotional support for an HIV-positive classmate increased from 52% to 73%; and
- Believed condoms were effective in HIV prevention increased from 49% to 71%.

Despite this and other compelling examples of sport for health initiatives, research on what makes these efforts effective is relatively rare. Experience shows that communications through sport have the greatest impact when used in the context of comprehensive development and communication strategies and are complemented by social, economic and political measures. Because media play a decisive role as partners and disseminators in these efforts, programs and initiatives must be designed with media needs in mind. Finally, in developing sport-related information programs, special attention must be paid to communication with women and girls, because sport typically addresses men and boys.[117]

Using sport to reduce health risk behaviours

Sport can be an effective way to reach out to people, especially youth, and to encourage healthy lifestyle behaviours that will help protect them against HIV and other diseases. Sport can be used to empower children and youth by conveying appropriate prevention messages, teaching the skills necessary to establish and sustain healthy behaviour patterns, and increasing their resilience in the face of life challenges.

Prominent athletes and local coaches can be powerful role models in this respect, exerting a strong positive influence on the children and youth they reach. Research has shown that regular interaction with a caring, non-related adult can help to protect youth against risk factors that might otherwise negatively influence their health and their future.[118] This is particularly important in communities where war, disease, or the need for parents to leave to find work, have left few positive adult role models in place. Caring, well-trained coaches can help fill a critical gap in this respect.

Well-designed sport programs that educate, support and empower youth can also encourage positive behaviour change by enhancing self-perception, imparting self-esteem,[119] and promoting more conscious care and respect among youth for their own bodies.[120] These critical dimensions of properly designed sport programs with health education components can help reduce the vulnerability of young people to substance abuse; premature, unprotected, or unwanted sexual activity; and the transmission of infectious disease through these activities.

For more than ten years, the Center for Communication Programs at Johns Hopkins Bloomberg School of Public Health has designed, implemented, and evaluated behaviour change interventions centred around soccer programs, first under the *Caring Understanding Partners* (CUP) initiative and now under the *Sports for Life* program.[121] *Sports for Life* has been implemented in various communities in Ethiopia, Namibia, Lesotho, and the Ivory Coast with exciting outcomes. Program administrators report success in breaking down barriers between generations, enhancing youth self-efficacy with regard to safe sex, developing leadership among youth, and challenging social norms. For instance, while soccer was once considered "boys' business," girls are also now participating — even in more traditional communities in rural Africa where girls are expected to remain in the home.[122]

While empirical research pertaining to behaviour change is limited, in general, youth who are active in sports are less susceptible to the consumption of legal and illegal drugs, although this varies by sport activity.[123] US research on the links between sport participation and adolescent sexual activity and pregnancy shows that adolescent girls who participate in sport are less likely than their non-athletic peers to participate in sexual activity and/or report a pregnancy.[124] In a broader study of health risk behaviours of adolescents in organized sports, athletes and non-athletes differed in specific health risk behaviours.[125] While athletes were more likely to put themselves at risk for accidental injuries, they were less likely to smoke cigarettes or marijuana, more ikely to eat a healthy diet, and less likely to feel bored or hopeless. At a psychological level, young people's confidence levels and their tendency to behave in more sexually responsible

ways are closely linked. Sport may, therefore, be used as a tool to build confidence, thereby helping to reduce sexual risk behaviour.[126]

These results cannot automatically be generalized across cultures and development contexts, but they do indicate the potential for sport to have a positive effect in reducing youth health risk behaviour. This is important because there is strong evidence to suggest that, where the spread of HIV and AIDS is subsiding or even declining, it is primarily because young people are becoming equipped with the information and skills they need to adopt safer behaviours.[127] In designing programs and interventions to maximize sport's potential in this respect, governments can draw on more general lessons from the broader research literature on health behaviour change and building resilience in youth.

Resilience is the inner strength, responsiveness, and flexibility that individuals possess that enables them to withstand stress and to recover quickly to a healthy level of functioning after a traumatic event.[128] Research on resilience has identified key protective factors that help to reduce the effects of risk factors in the lives of children and youth. These protective factors include:[129]

- Community support in the form of caring interactions between adults and children who are not related;
- Unconditional acceptance of a young person by an older person;
- The development and promotion of healthy peer relationships; and
- Youth opportunities to help others and make a contribution to their community.

Organizations using sport to advance child and youth health should seek ways to build these dimensions into their programs to further reduce health risk behaviour. This can be done through the coach-child relationship, peer-to-peer teaching and support, youth leadership and coach training, and child-centred approaches that place the development needs of participating children and youth ahead of winning.

Preventing the spread of HIV and AIDS

Countering the spread and impact of HIV and AIDS has become a significant focus of the Sport for Development movement worldwide. Due to poverty, the consequences of HIV and AIDS in developing countries are more serious than in the developed world. Although prices have gone down considerably in the last ten years, the average cost for life-extending antiretroviral (ARV) treatments for AIDS patients can be up to $400 a year per patient. As a result, treatment is out of reach for all but a minority in many developing nations.[130] In December 2006, it was estimated that only 28% of people living with HIV and AIDS in low- and middle-income countries were receiving ARV medication.[131] Among children, this rate was only 15%.[132] While this represents a significant increase from prior years,

it means that over 70% of people in need of life-saving treatment are not receiving it. As a result of adult deaths, an estimated 15 million children have lost one or both parents to AIDS.[133] Thanks to all-out efforts to stop the virus globally, new HIV infection rates appear to be falling.[134] Still, UNAIDS predicts that the epidemic will continue to grow, as the global number of persons living with HIV continues to increase due to ongoing accumulation of infections, coupled with longer survival times, measured over a continuously growing general population.[135]

Sport is particularly well suited to HIV and AIDS education and prevention because it:

- Is popular, enabling it to connect with and engage hard to reach groups;
- Is fun and appealing to youth — a primary prevention target group;
- Attracts public and media attention through the use of elite athletes and major sport events;
- Provides a safe environment to discuss sensitive issues and information with trusted adults (coaches or teachers);
- Can be used to build protective factors into the lives of youth through the coach-child relationship, provision of social support, sport skill acquisition, and leadership development opportunities; and
- Possesses a natural convening power that can bring together different groups within communities and help to mobilize shared prevention efforts.

Sport, by itself, however, cannot effectively address HIV and AIDS. Sport-based initiatives should never be stand-alone, but integrated with other prevention strategies and efforts to ensure they are mutually reinforcing and do not deplete scarce resources through overlapping or competing efforts.

Integrated approaches that combine sport training with life skills and HIV education are becoming more common in all parts of the world. The Caribbean *Healthy Lifestyle Project*, developed in cooperation by Commonwealth Games Canada, the Organization of Caribbean Administrators of Sport and Physical Education, and the Caribbean Netball Association, combines sport and personal development to encourage healthy lifestyle choices. The program is based on three principles:

- Participation in sport and physical activity gives young people positive and empowering experiences;
- Mentors/trainers can help young people, especially girls, to recognize the benefits of healthy lifestyles; and
- Leadership attitudes and capacity can be shaped through sport.

The program identifies and trains youth leaders to implement *Healthy Lifestyle* workshops in their communities. The workshops help youth acquire the skills to make healthy choices

through interactive presentations and group activities on topics such as HIV and AIDS education and prevention, self-esteem, conflict resolution, decision-making, leadership, nutrition, substance abuse, sexuality, and teenage pregnancy. Young people are involved in planning and delivering all aspects of the program.

Sport's popularity and convening power means it can be used to bring people together to talk openly about sensitive issues such as safer sex, stigma, and discrimination. In Africa, the Mathare Youth Sport Association (MYSA), based in Nairobi, Kenya, has been training coaches and leaders to share HIV and AIDS education in sport event forums, while building a community engagement model centred on sport. In 1992, MYSA developed a girls' program to address the vulnerability of young Kenyan women to poverty, illiteracy, and HIV and AIDS. Since then, the program has grown to encompass 3,500 girls playing on 250 teams in 40 MYSA girls' leagues with access to coaches trained in HIV and AIDS peer education.

By involving people living with HIV and AIDS in sport-based prevention initiatives, sport for health programs are helping to reduce HIV-related stigma and discrimination. Sport-based initiatives can also play a broader role in improving the health of people living with HIV and AIDS. Several literature reviews on exercise training and HIV infection undertaken before the introduction of highly active antiretroviral therapy (HAART), found exercise to be beneficial.[136] The reviews found that engaging in physical activity three or more times per week is associated with slower progression of AIDS.[137] An inverse relationship between viral load and physical activity level has also been shown.[138] Later research indicates that aerobic exercise is safe and improves cardiopulmonary fitness in adults living with HIV and AIDS.[139] Research also shows that progressive resistance exercise, or a combination of progressive resistance exercise and aerobic exercise, appear to be safe and may be beneficial for adults living with HIV and AIDS.[140]

Because people living with HIV in developing nations, however, may also be experiencing poverty, insufficient diet, and additional health issues, interventions must be sensitive to individual capacity to participate in activities and adapt where necessary to make activities truly inclusive.

Enrolling footballers to fight malaria

The enormous popularity of sport events makes them a powerful communication and mobilization platform for raising awareness, promoting prevention and strengthening vaccination campaigns targeting infectious diseases.

Malaria is caused by a parasite transmitted through the bite of an infected mosquito. The disease afflicts 300 million people annually, and is fatal in over one million of these cases.[141] Children and pregnant women are less likely to recover than adults who have built up some immunity to the disease.[142] Malaria disproportionately affects people living in poverty. Most cases are in sub-Saharan Africa where malaria is a leading cause of death for children under five and a major contributor to adult morbidity.[143] Adults who survive malarial attacks face significant social and economic consequences, including low productivity and depression.[144]

In many parts of the world, in particular Africa, endemic malaria poses an ongoing health threat to millions of people. Because of this, combating malaria is an important poverty reduction strategy. Malarial disease can be prevented with prophylactic anti-malarial drugs and those infected with the malaria parasite can be treated with relatively inexpensive anti-malarial drugs, where available and affordable. However, drug resistance to key anti-malarial drugs has rendered them virtually ineffective in some regions.[145] Transmission may still be prevented, however, through the use of insecticide-treated nets and indoor spraying with insecticides. Promotion of these prevention measures is required.

In October 2006, the Roll Back Malaria Partnership, with The Global Fund to Fight AIDS, Tuberculosis and Malaria, and Sumitomo Chemical, manufacturer of anti-mosquito bed nets, announced an Africa-wide public information campaign about the risks of malaria, the benefits of prevention and the proper use of insecticide-treated nets. Building on the broad-based appeal of sport — football in particular — this television campaign, broadcast free across Africa, featured 12 top international African footballers. Participating athletes — including Chelsea striker Ivorian Didier Drogba and Marseille's Nigerian player Wilson Oruma — urged immediate malaria protection for young children and pregnant women, the most vulnerable groups. Each TV spot combined action packed clips from Premier League matches and strong messages in French, English, and several African languages. Public service clips were available free of charge for unlimited television and radio broadcast all over Africa. Each clip contained an eight-second space at the end for the addition of local malaria campaign messages.[146]

Running to raise global tuberculosis awareness

As previously noted, high-profile sport events can provide ready-made and highly visible platforms for health awareness and education. As such, they can help to raise awareness and dispel myths surrounding diseases such as tuberculosis.

Pulmonary tuberculosis, the most common and infectious form of TB, causes progressive and irreversible lung destruction. HIV-positive individuals with compromised immune systems and other risk factors have more than a 30% risk of catching TB.[147] Tuberculosis can be treated effectively through widely available drugs, but 50% of people left untreated will die of the disease.[148] Despite this, TB prevention and control efforts typically suffer from low visibility in donor countries and a lack of mobilization in high-burden developing countries. The emergence of multi-drug resistant TB has raised concern in expert circles, and more visibility and action is still needed.

The potential for sporting events to serve as a platform for health education was not lost on TBTV.org, a global TB-patient NGO that took advantage of the high-profile Paris Marathon to deliver its awareness-raising messages around the globe. In 2004, TBTV.org created the *Run for Life* campaign, entering runners in the April 2005 Paris Marathon, while initiating simultaneous mini-marathons in two developing countries, involving about 300 runners in each. Twelve runners with tuberculosis and their supporters ran the Paris Marathon in a relay, while one runner ran the entire race. Their participation was recorded by the Stop TB Partnership Secretariat and a French television crew. The result was extensive media coverage including a five-minute program the following day on Cinquième, a state TV broadcaster; one-on-one interviews with journalists; and transmission on TV and radio programs in France and francophone African countries through Radio France International. In countries that sent participants to the race, other TB patients acted as focal points for communications and advocacy work, using the event in Paris to mobilize support in their communities.

The success of the Paris Marathon initiative led the Stop TB Partnership to initiate a co-production with TBTV to further develop this strategic tool. The *Run for Life* team plans to participate in marathons in each of the G8 capital cities, leveraging the millions of spectators and tens of millions of television spectators for these events to raise awareness, resources and support along the way.[149]

Sport heroes combating measles

Measles is a highly contagious viral infection that kills more children than any other vaccine-preventable disease. In 1999, measles killed an estimated 873,000 people globally. Most of these deaths — 791,000 — were among children under the age of five. Children who survive measles can have permanent disabilities, including brain damage, blindness and deafness.[150]

Mass vaccination campaigns are critical to reducing measles deaths in countries where routine immunization campaigns do not succeed in reaching their goal of 90% of the

target population (the percentage needed to stop transmission of the disease). Focusing on children in the targeted age range in hard-to-reach communities, campaigns are carried out for several days. Follow-up campaigns occur three to four years after the initial mass campaigns to reach children who were born after the first mass campaign.[151]

From 2000 to 2005, more than 360 million children globally received measles vaccines through supplementary immunization activities. These efforts have had a major impact on measles deaths, reducing mortality by 60% between 1999 and 2005. The largest gains occurred in Africa where measles cases and deaths decreased by nearly 75%. Despite these advances, however, and the availability of a safe and effective vaccine for the past 40 years, measles remains a leading cause of death among young children. An estimated 345,000 people, mostly children, died from measles in 2005.[152]

In Zambia, measles is one of the five major causes of childhood illness and is a leading cause of childhood mortality. In the period leading up to Zambia's decision to mount a major vaccination campaign in 2003, sporadic outbreaks had resulted in an estimated 40,000 deaths.[153] The 2003 campaign aimed to vaccinate five million Zambian children between the ages of six months and 15 years.

International humanitarian organization Right To Play was invited to participate in the 2003 measles campaign through the Global Measles Initiative. Its approach was to use the convening and influencing power of sport to reach and mobilize children and communities not yet reached by the campaign. Right To Play organized one-day *Sport Festivals* in three districts of Zambia to attract children and their families. Vaccination stations were also set up at the festival sites to educate community members about the importance of vaccinations and to immunize the children.

Thousands of posters featuring Zambian football star and Right To Play Athlete Ambassador, Kalusha Bwalya, were distributed beforehand to promote the week-long National Measles Campaign. Oversized ten-metre high posters dotted billboards throughout the capital city of Lusaka, reminding parents and caregivers across the country to have their children vaccinated.

A star team of Zambian sport heroes including Kalusha Bwalya (football), Ellen Hight (swimmer), Samuel Matete (hurdler), Lango Sinkamba (wheelchair marathoner), and Kennedy Kanyanta (boxer) helped attract children to the events. During the festivals, thousands of children gathered to play sports and games specifically designed to teach

health messages. Children rotated through different sport and play stations, ending up at vaccination stations where they received their shot and collector-style "Kalusha Cards," with "Fight Measles, Get Vaccinated" inscribed on the back.

Local volunteers from Edusport, Right To Play, Sport In Action, and the YMCA were trained to facilitate the festivals. They were also responsible for running workshops to train local community leaders and members of the District Health Management Team on the use of sport for social mobilization. These partnerships were key to the success of the sport festivals, which resulted in the vaccination of nearly 18,000 children in one week. These events proved that sport is a simple way of mobilizing communities for mass vaccination purposes and can be used as a tool for conveying key health messages.

Eradicating polio

Poliomyelitis (polio) is a highly infectious viral disease that mainly affects children under five years of age. The virus invades the nervous system, causing paralysis and sometimes death.[154] There is no cure for polio but it can be prevented through vaccination.

The *Global Polio Eradication Initiative* was launched in 1988. Since then polio cases have decreased by over 99%, from over 350,000 cases in more than 125 endemic countries, to 1,997 reported cases in 2006.[155] In 2005, more than 400 million children were immunized in 49 countries.[156] While the world is now only a few years away from eliminating polio altogether, the wild poliovirus is still present in a handful of countries, mainly in Africa, including Angola, Egypt, Ethiopia, Niger, Nigeria, and Sudan.[157]

In 2002, the WHO and UNICEF Somalia joined forces in an ongoing nationwide polio eradication campaign. In an effort to raise awareness of this effort, Peace Runs were organized in Mogadishu and Merkah promoting the campaign.[158] Building on the success of these efforts, in 2004, Right To Play established the GAVI Cup,[159] a tournament that made use of football's popularity to increase vaccination rates in Ghana. Previous polio vaccination efforts in Ghana's capital city, Accra, had identified a number of districts with low participation rates. The first GAVI Cup was promoted as a competition in sport and knowledge to reach out to these districts and promote awareness of the 2004 National Immunization Days.

The event was attended by sport heroes such as Ghanaian Olympians Vida Anim and Eric Nkansah and cyclist Emmanuel Yeboah. Special guests included representatives from UNICEF, the WHO, Ghana's Ministry of Health, and the President of the Association of Sports Broadcasters of Ghana. Youth sported T-shirts proclaiming "Let's Kick Polio out of Ghana," a clear message that was repeated on tournament handouts and banners.

Thousands of children took home health-related paraphernalia (provided by UNICEF) to their parents, and hundreds of community members showed up to watch the grand finale. The story of the GAVI Cup was also reported throughout Ghana in the media, allowing others to learn from the event and its messages. In total, the tournament equipped almost 5,000 youth and their families with knowledge about the importance and safety of vaccinations and immunizations, creating fertile ground for the actual vaccination campaign that followed.

2.3 ENHANCING MENTAL HEALTH

Global mental health challenges[160]

Mental health is defined by the WHO as a state of well-being in which every individual realizes his or her own potential, can cope with the normal stresses of life, can work productively and fruitfully, and is able to contribute to her or his community.

Mental, neurological and behavioural disorders are common to all countries and cause immense suffering. In 2002, the WHO estimated that globally 154 million people suffered from depression, 25 million from schizophrenia, 91 million from alcohol use disorders, and 15 million from drug use disorders. A more recent WHO report shows that 24 million people suffer from Alzheimer's disease and other dementias. A further 877,000 people die by suicide every year, 86% of these in low- and middle-income countries. More than half of those who kill themselves are aged 15–44. Mental disorders are one of the most prominent and treatable causes of suicide and are among the risk factors for communicable and non-communicable diseases. They can also contribute to unintentional and intentional injury and can affect, and are affected by, chronic conditions such as cancer, heart and cardiovascular diseases, diabetes and HIV and AIDS.

People with mental health disorders often experience social isolation, poor quality of life and increased mortality. These disorders are also the cause of enormous economic and social costs. Cost-effective treatments exist for most disorders and, correctly applied, could enable most of those affected to become functioning members of society. However, most middle- and low-income countries devote less than 1% of their health expenditure to mental health.

In emergencies (war, genocide, terrorism, disaster, and population displacement), the number of people with mental disorders is estimated to increase 6%–11%. Beyond mental disorders, people in emergency situations also often experience psychosocial problems that cannot be quantified. Many humanitarian agencies now assert that well-designed sport programs can address such problems.

Links between sport and mental well-being

Exercise and, by extension, sport have long been known to produce beneficial effects on mental health,[161] enhance self-esteem,[162] help to manage stress and anxiety,[163] and alleviate depression.[164] In patients with psychiatric disorders, physical exercise has been shown to diminish clinical symptoms, especially for depression.[165] More recently, breakthrough research has shown that exercise may also improve brain functions such as memory and learning[166] and reduce the risk of cognitive loss through Alzheimer's and small strokes.[167]

It is not surprising, given its clear benefits, that sport is also increasingly being used as a tool to reduce trauma in post-conflict and post-disaster settings. While there is not yet any scientific evidence on the impact of these efforts, qualitative examinations of current practices and results indicate that this is a fruitful new direction. Research is required to determine what impact sport can have and how best to achieve it. (This topic is addressed more fully with respect to children and youth in Chapter 3.) The following sections explore the mental health and cognitive benefits of sport and exercise in greater detail.

Improving self-concept, self-esteem and self-confidence

Regular participation in sport and exercise programs can play an important role in supporting the formation of self-concept in adolescents[168] and building self-esteem and self-confidence in people of all ages.[169] While investigations of the short-term effects of sport show that it largely results in positive mood changes, ongoing physical activity results in the same improvements to well-being, and improved perception of one's health status and a higher satisfaction with one's health.[170] All these effects are important determinants of health because they influence individuals' perceptions of their self-worth and their ability to respond to life's challenges.

Regardless of cultural context, adolescence involves developmental risks and opportunities. Successful development largely depends on whether youth have access to personal and social resources and on the quality of the supports available to them.[171] Multiple studies show positive associations between sport and diverse aspects of adolescent development.[172] In particular, sport has been shown to give adolescents greater self-confidence,[173] and to build self-esteem in girls.[174] Age-specific analysis has also shown a striking stability of self-concept (personal identity) in youth who are physically active throughout their adolescence. Analysis also shows that the physical self or "body image" is important in developing self-concept, especially in early adolescence, although this diminishes over time in the process of development.[175]

Sport can also negatively affect adolescent self-esteem and self-confidence for youth who are overweight, unfit or lack sport ability, and consequently feel excluded or even

humiliated by their sport experience. Properly designed sport programs that prioritize child and youth development over competition and emphasize personal progress in skill and fitness development can prevent these negative effects. (The role of sport in adolescent development and risk behaviour is explored more fully in Chapter 3.)

Regular participation in an exercise program is also associated with measurable increases in self-esteem in children and adults[176] and with the maintenance of positive self-esteem in older age.[177] There are few studies examining the impact of sport and exercise on the mental well-being of persons with disabilities. However, one study of wheelchair-mobile individuals participating in tennis found that they were more confident about performing tennis skills and general wheelchair mobility tasks than non-participants.[178] Self-esteem and self-confidence are believed to arise from the accomplishment of maintaining a long-term exercise or sport habit and the mastery of related skills.

Coping with stress and reducing anxiety

The role of physical activity as a therapeutic treatment for stress and anxiety has received considerable research attention in recent years. The concepts of stress and anxiety are often used interchangeably in exercise research literature. The notion of stress, however, places more emphasis on the role of the environment in creating physiological arousal and emotional distress. Anxiety refers more to an individual's predispositions or enduring personality characteristics in response to perceived stresses.[179]

A 1998 report defines stress as "a relationship between the person and the environment that is appraised by the person as taxing or exceeding his or her resources and endangering his or her well-being."[180] Coping means using different strategies and behaviour to manage specific demands that a person feels are taxing or exceeding their resources.[181]

A review of 45 studies conducted over 15 years strongly supports the benefits of physical activity as a coping strategy for stress.[182] Most of the studies used aerobic exercise programs involving vigorous activities of 20–60 minutes, three or more times a week, over an 8- to 10-week period. Results from all studies, regardless of their design, were positive, demonstrating psychological improvement and fitness gains. Significant associations linking fitness with decreases in life stress were also apparent. However, exercise does not need to be aerobic to provide psychological benefits. Other activities providing positive results included yoga, flexibility, and light resistance training.

Besides acting as a coping strategy, physical activity may help to prevent anxiety in the first place. One expert has proposed that "the benefits of regular exercise may reside in its ability to reduce anxiety on a daily basis and, hence, prevent the development of

chronic anxiety."[183] Separate analyses of the exercise-anxiety literature for state anxiety, trait anxiety, and other physical and psychological markers of anxiety, support the claim that exercise is linked to reductions in anxiety.[184] This is true regardless of participants' age and health status.

The mechanisms by which exercise reduces anxiety are unclear. However, it is likely it works in a number of ways:

- Promoting relaxation;
- Acting as a time out;
- Providing a psychological distraction;
- Changing mood;
- Enhancing personal resources such as self-esteem and self-efficacy;
- Providing time and an opportunity to work through a problem (as when running for example); and
- Generally regulating emotional and physiological reactions to a stressful event.

Research on anxiety suggests that engaging in aerobic sessions lasting 20–40 minutes can result in reduced anxiety lasting 2–4 hours.[185] Programs lasting at least ten weeks and preferably longer than 15 weeks lead to the greatest reductions in anxiety.[186] Exercise may not have to be highly vigorous to provide benefits. A number of studies have shown significant reductions in anxiety with low-intensity activities like walking. In some instances, moderate-intensity activities reduced anxiety levels more than vigorous activities.[187]

To get the most relaxation and stress relief out of exercise, individuals should be active several times a week, choosing activities they enjoy and that fit comfortably into their daily life. These activities should continue over the long term. Programs promoting exercise are encouraged to ensure that the types of sport or exercise offered are appealing to the target population, designed to fit into their lifestyles, and can be run frequently and long enough to offer real benefits to participants.

Preventing and managing depression

Depression is characterized by sustained sadness along with psychological, behavioural and physical symptoms. It is ranked as the seventh most important cause of disease burden in low- and middle-income countries, as it tends to be disabling, recurring or long-lasting, and often remains untreated. Depression is the leading cause of disease burden in Brazil and the second leading cause among women in Chile.[189]

Research has shown a positive association between exercise and decreased levels of mild to moderate depression.[190] Adolescents with higher levels of sports involvement have

lower levels of depression, while physical activity and lifelong physical exercise prevent symptoms of depression in older age as well.[191] Symptom relief achieved by chronic exercise is comparable to psychotherapy and, in some cases, may offer an even better prognosis.[192] Exercise can also be a useful accompaniment to professional treatment for severe depression.[193]

As with other mental health effects, studies have shown a positive association between exercise and alleviating depression, but not the nature of the causal relationship. As a result, it is difficult to quantify an effective "dosage" or the most appropriate types of exercise. In the absence of more specific prescriptions, the current physiologic guidelines of the American College of Sports Medicine — large muscle rhythmic activity for 20–60 minutes, 3–5 days per week at 60%–80% of age-adjusted maximal heart rate or a weekly caloric use of 2,000 kcal — are generally believed to be effective with little medical risk. [194]

Improving brain function

While sport and exercise have long been linked to improved mental health, only recently have researchers realized that the mental effects of exercise are far more profound and complex than they once thought.

Aerobic exercise helps the heart pump more blood to the brain, increasing the flow of oxygen and nourishment to brain cells. At the same time, as muscles work, they send chemical signals to the brain that trigger the production of brain-derived neurotrophic factor (BDNF). With regular exercise, the body builds up BDNF and the brain's nerve cells start to branch out, join together and communicate with each other in new ways. This is the fundamental physiological process underlying all learning — every added connection between brain cells signifies a new fact or skill that has been learned and saved for future use. BDNF makes this learning process possible. Consequently, brains with more BDNF have a greater capacity for knowledge, while brains that are low in BDNF have difficulty absorbing new information.[195]

BDNF levels remain fairly constant in adulthood but, as people begin to age, their individual neurons slowly start to die off. Scientists used to think this loss was permanent, but animal studies over the last decade have shown that the replacement of nerve cells can be triggered quite easily by exercise. A study published in March 2007 in the Proceedings of the US National Academy of Sciences,[196] extended this finding to humans for the first time, showing that it is possible to grow new nerve cells in the brain through exercise. After placing participants on a three-month aerobic exercise program, researchers found that all the subjects appeared to grow new neurons in the brain, with those who experienced the greatest cardiovascular fitness gains showing the most nerve cell growth.[197]

Other experiments have shown that this growth is concentrated in the brain's hippocampus, in the area that controls learning and memory, as well as the frontal lobes where executive functioning — higher-order thought such as decision-making, multi-tasking, and planning — resides.[198] Exercise has been found to restore the hippocampus to "a healthier, younger state" and to cause the frontal lobes of the brain to increase in size. In numerous studies of men and women in their 60s and 70s, brisk walking and other aerobic workouts have yielded improvements in executive functioning. Subjects have fared better on psychological tests, answering questions more accurately and quickly. According to one study, "It's not just a matter of slowing down the aging process. It's a matter of reversing it."[199] Early studies also suggest that people who exercise at least a few times a week tend to develop Alzheimer's less often, and later in life, than their more sedentary counterparts.[200]

As far as scientists know, new neurons cannot grow in other parts of the brain, but these regions benefit from exercise in other ways. Blood volume, like brain volume, increases with exercise. As a result, active adults have less inflammation in the brain. They also have fewer small, barely perceptible cerebrovascular strokes that can impair cognition without the person even knowing.[201] Dopamine, serotonin, and norepinephrine levels in the brain are also all elevated after exercise, creating greater focus and calm and reducing impulsivity. [202]

The effects of physical exertion on the brain are even more potent when it comes to children, because their brains are still developing. Until about the age of 20, children and youth don't have fully developed frontal lobes, so they engage other parts of the brain to perform necessary functions, including those involved in learning. In a study of third- and fifth-grade physical education students, exercise accelerated not just executive functioning, but a broad variety of skills ranging from math to logic to reading.[203] Based on this research, many educators are now advocating for strengthened physical education in public schools, arguing that longer physical education classes can help to ensure students' success in other subjects.[204] This is consistent with a number of studies conducted over the past half century that show that significant periods of daily physical activity in school do not impair academic achievement and, in fact, can improve it.[205]

Questions remain about why some forms of exercise affect the brain far more than others. Most researchers have focused on aerobic exercise. The few studies that have examined stretching, toning and weightlifting have found little or no effect on cognition. [206] Researchers also don't have a clear idea of how much exercise is too much. Caution is recommended with children, because they are generally not developmentally ready to engage in extended periods of high-intensity exercise. (For more information on exercise guidelines for children and youth, please see Chapter 3.)

Alleviating trauma in post-conflict and post-disaster situations

Sport can play an important role in restoring and sustaining mental health. In regions affected by natural disasters or war, where trauma is widespread, sport can be a highly effective means of helping to normalize life. Through regularly scheduled activity, children and adults can begin to regain a sense of security and normalcy and enjoy periods of respite from the often overwhelming challenge of reconstruction. Sport and play have proven extremely therapeutic in helping children overcome trauma.[207] Recognizing this, UNICEF developed a kit of materials for children displaced by war and natural disaster. The kit allows children to participate in team sport in a supportive, non-competitive environment under the guidance of a teacher or trained volunteer.[208] (For more information on this topic, readers are referred to the discussion of children and youth in post-conflict and post-disaster settings in Chapter 3.)

3 RECOMMENDATIONS TO GOVERNMENTS

Global trends reflect some key health challenges shared by many countries. The reality is that these challenges are often experienced in very different ways in different places due to the diverse social, economic, demographic, political and environmental contexts in which they unfold. Even within countries, different populations may experience unique heath challenges or experience the same challenges but with very different levels of individual and societal resources to meet them.

As a result, Sport for Development policies and programs aimed at influencing heath outcomes are most effective when they are firmly rooted in an empirical, gender and culturally sensitive analysis. This analysis should consider the challenges that the policies and programs intend to address, the ways in which these challenges can be addressed, and how key efforts can reinforce other governments, as well as external parties, to achieve the same goals.

Individual and population health is strongly influenced by social determinants such as poverty, income inequality, employment, housing, education and social connectedness. Investments aimed at reducing social and economic inequality, by helping individuals and groups to enhance their human capital, are highly effective in improving health outcomes at a population level. The recommendations that follow, while quite general, are not intended to supersede such efforts, but to complement and reinforce them.

While quite general, specific recommendations may not be appropriate to every context. Governments must weigh sport's potential to advance health objectives against their own in-depth understanding of the opportunities and challenges involved.

3.1 POLICY RECOMMENDATIONS

Implement comprehensive strategies to increase physical activity levels in populations.

Given the growing global burden of non-communicable diseases, and the proven benefits of physical activity in reducing this burden and improving mental health, governments and concerned stakeholders have a strong incentive to work together to integrate sport and physical activity into broader health and development strategies, policies, and programs.

Develop evidence-based strategies and take a holistic approach to understanding and promoting physical activity.

Increasing physical activity levels requires more than simply convincing individuals to become more active. Physical activity is conditioned by a broad range of individual, societal and environmental factors. Many of these factors are beyond the individuals' control but will influence whether or not they become active. Changing physical activity levels in populations requires a comprehensive analysis of these factors and broad-based, multisectoral strategies involving policy, legislative, and regulatory change. Changing activity levels also requires public education and investments in workplace, school-based and community-level physical activity programs.

Incorporate clear goals and targets in all strategies.

National physical activity initiatives should be planned and coordinated with clear and realistic objectives (short- and long-term). Initiatives should target increased population participation in physical activity and sport over specific periods of time. Planning should be integrated with other national efforts to prevent chronic diseases, promote health, and advance sustainable social and economic development.[209]

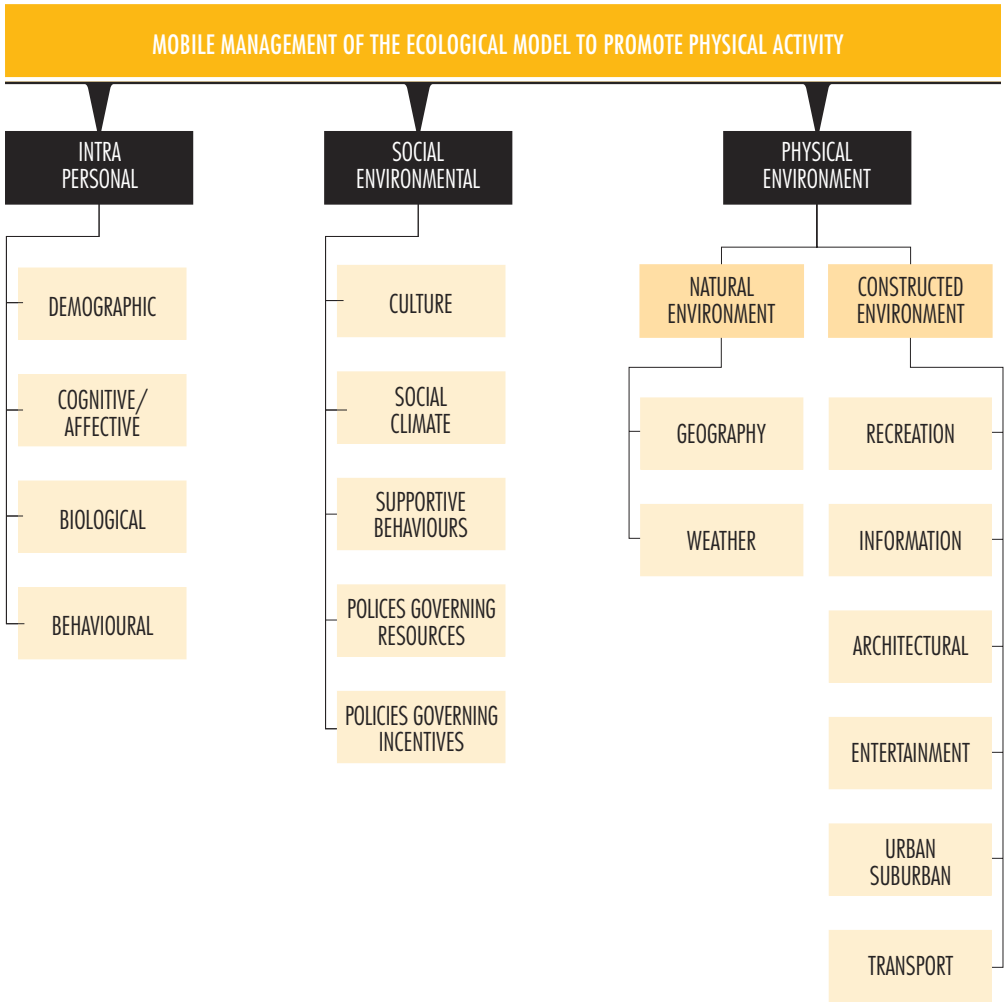
Collaborate with key stakeholders to assess current physical activity and sport participation levels, trends and determinants when developing strategies.

Effective strategies require general and population-specific baseline data on physical activity levels, trends, and the factors influencing them. This information is critical to the initial design of effective strategies and to measuring their impact. Supportive coalitions and partnerships can be formed within government and with relevant external sport, health, media and other organizations. These partnerships can help ministries to collect relevant data, contribute diverse perspectives and expertise to the strategy design process, and enable governments to leverage national and local resources (information, human, financial and logistical) for their implementation.[210]

Incorporate lessons learned from successful experiences elsewhere.

The *Agita São Paulo* program in Brazil provides an example of a successful sport for health initiative. *Agita São Paulo* was launched in December 1996 as a program to promote physical activity among the 40 million inhabitants of the state of São Paulo. The "mobile management" ecological model[211] in Figure 2.1, based on a similar model developed by *Agita São Paulo*, identifies a range of intra-personal, social and environmental factors that affect physical activity levels.

FIGURE 2.1 "MOBILE MANAGEMENT" ECOLOGICAL MODEL OF FACTORS INFLUENCING PHYSICAL ACTIVITY



Adapted from source: V. Matsudo et al., "Policy Intervention: The Experience of Agita Sao Paulo in Using 'Mobile Management' of the Ecological Model to Promote Physical Activity" (2004).

By systematically taking into account each of these factors, and working to change factors where necessary, *Agita São Paulo* successfully decreased the number of sedentary São Paulo inhabitants from 14.9% of the population in 1999 to 11.2% in 2004.[212] Strategic partnerships were critical to this success, with over 350 organizations from all sectors engaged in coordinated and integrated action to address each of the areas identified in the model.

There is only limited evidence about what works when it comes to changing the physical activity levels of populations, particularly in low- and middle-income countries. However, the *Agita São Paulo* example offers important lessons, in part because a rigorous approach was taken to evaluating all of its initiatives.

Agita São Paulo's success was due in part to the close attention given to understanding different local conditions and their impact on physical activity levels. Because each city or locale is unique in this respect and approaches must be rooted in, and address, local circumstances, there is no single optimal formula for increasing physical activity.

Cost-effectiveness studies undertaken by the US Centers for Disease Control and the World Bank (2005) concluded that the program resulted in public cost savings of US$310 million.[213] Agita's success has inspired the creation of a similar program nationally, *Agita Brasil*, and the Physical Activity Network of the Americas. Internationally, an Agita Mundo Network has been established, linking over 200 institutions from 58 countries, to build capacity, support research and evaluation, and undertake social mobilization through over 2,000 events worldwide celebrating the annual *World Day for Physical Activity* (Agita Mundo's *Move for Health Day*).

Make coordinated use of the full range of instruments available to promote physical activity.

Knowledge alone is not enough to produce desired changes in individual behaviour when it comes to physical activity. In general, successful approaches to increasing population physical activity levels are likely to include some, or all of, the following:

- Laws and regulations;
- Tax and price interventions (e.g., to influence the use of transport, access to sport activities);
- Improvement of the built environment (e.g., to enable or cause greater everyday physical activity);
- Specific community-based initiatives (e.g., workplace and school-based physical activity programs); and
- Use of mass-media campaigns (to help raise awareness and generate support for other measures).

Give priority to strengthening national policies for physical education, physical activity and sport for all in schools.

One of the most effective means of promoting physical activity is by integrating it into universal public education systems. Schools have unique opportunities to provide adequate physical activity for all young people through compulsory physical education programs, school sport programs, and after-school leisure-time physical activity initiatives.[214]

There is conflicting evidence as to whether physical activity levels in childhood and youth predict physical activity throughout life.[215] However, ample participation in play, games and other physical activities, in school and during free time, is essential for the healthy development of every young person. Access to safe places, opportunities and time, and positive examples set by teachers, parents and friends are all part of ensuring that children and young people move for health.[216]

Despite evidence of its value, school-based physical education is declining worldwide.[217] Strengthening national policies related to physical education, physical activity and sport for all in schools is critical. This means integrating physical education and activity into the school curriculum so that children are active on a daily basis, ensuring adequately trained teachers, and providing access to safe, adequate playgrounds and sport facilities.

The MDGs call for universal primary education in all countries. Where this goal has not yet been achieved, complementary community-based sport and physical activity programs and opportunities need to be made available to out-of-school children and youth.

Target physical activity policies and initiatives to specific populations and tailor initiatives to respond to population needs.

Relevant multisectoral policies and initiatives are needed to motivate and involve people in appropriate sport and physical activities within supportive environments. These policies need to specifically target populations that are not sufficiently physically active, particularly those in urban areas. They should give high priority to children and young people, boys and girls, in and out of school, and aim to develop a lifelong habit of physical activity as the basis for healthy and independent living.[218] Policies and initiatives must be culturally sensitive and take into account other factors such as socio-economic circumstances, gender norms, education levels, etc. that can influence their design and ultimate impact.

Develop strategies that address physical, social and environmental barriers to greater physical activity.

The physical and social environments of cities have a major impact on physical

activity levels. Crowding, crime, traffic, and poor air quality, coupled with a lack of parks, sidewalks, and sports and recreational facilities make physical activity and sports a difficult choice for many people. The challenge for governments is to foster sustainable environments that encourage the regular practice of physical activity and sport in the community.[219] Key issues include access to open spaces, playgrounds, gymnasiums, stairwells and road networks, as well as social factors such as levels of crime and the local sense of community.[220]

Successful examples of urban planning and policy choices include:[221]

- Developing parks and open space where people can practice enjoyable physical activities in clean and safe environments;
- Facilitating public/community use of existing sport facilities;
- Promoting active transport initiatives (walking, cycling, greater use of public transport, etc.), including ensuring plenty of safe sidewalks and cycling paths;
- Strengthening efforts to reduce traffic speed, congestion, and pollution in cities; and
- Providing support to municipal/local authorities to implement these choices.

Evidence from São Paulo shows that these approaches result in increased physical activity. In small cities, construction of walking and biking paths resulted in a 33% increase in physical activity among those using them. Walking has increased 2% per year in the population, with 520,000 adults starting to walk on a regular basis (30 minutes, five times a week).[222] In one city with a large network of recently constructed walking paths, hospitalizations due to type 2 diabetes declined by 57% and hospitalizations due to stroke declined by 50%.[223] Similarly, a community that introduced an open-school program on weekends experienced a 46% decline in incidents of physical aggression and a 34% decline in robberies, among other benefits.[224]

3.2 PROGRAM RECOMMENDATIONS

Take specific measures to raise awareness — within the government itself, among key sectors, and in the population — of the diverse benefits of physical activity and the risks and costs of inactivity.

One of the main problems in promoting physical activity is the low priority health, education, and sport authorities assign to this issue. To get the attention of all parties, an increased social understanding of the risks of physical inactivity, from both an epidemiological and community perspective is required.[225] *Agita São Paulo* attributes its success, in part, to improved societal awareness of its aim (63% of the population could recall the program and 31% demonstrated knowledge of its purpose).[226]

There is an equally crucial need to raise societal awareness of the broad range of health, social and economic benefits of physical activity and well-designed sport programs.

Disseminating information to policy-makers and opinion leaders in the health, education, social and sport sectors is crucial. Fostering cross-sectoral debates on this issue can improve collective awareness and facilitate policy support.[227] This requires an ongoing, concerted effort to generate, update and disseminate knowledge about the benefits of physical activity and sport, and best practices.

Evidence of program effectiveness alone, however, is insufficient to drive public health policy and programs. Public leaders must allocate scarce resources to address a wide range of competing health priorities, particularly in developing countries with a double burden of infectious and chronic diseases. Reallocating resources to new issues such as physical inactivity may be difficult in these circumstances. Cost-effectiveness analysis can contribute additional information to aid in making these decisions.[228]

With support from the World Bank, the US Centers for Disease Control and CELAFISCS, *Agita São Paulo* developed a model to assess the cost-effectiveness of its community campaign targeting adults. Employing a decision analysis framework and a societal perspective, the model found the intervention cost of the *Agita São Paulo* program to be approximately US$300 per year, with a resulting increase in physical activity of 132 MET-minutes[229] per week, per person for each year of program delivery.[230]

Interventions with cost-effectiveness ratios less than $50,000/QALY (quality adjusted life year[231]) are considered especially good public health investments. Many widely accepted public health interventions have cost-effectiveness ratios of up to $200,000/QALY.[232] Comprehensive community campaigns to promote physical activity appear to be generally cost effective and may be especially well suited for large cities in developing countries. A combination of proven intervention strategies adapted to the culture and conditions of São Paulo, economies of scale, creative management, extensive use of partnerships and volunteer networks, and the relatively low cost of materials and labour in Brazil may explain the cost effectiveness of *Agita São Paulo*.

Develop guidelines on optimal physical activity levels and communicate them publicly.

Current public health guidelines suggest that a minimum of 30 minutes per day of moderate physical activity (at 50%–70 % of maximum heart rate) is optimal. These guidelines are broadly endorsed by the biomedical community but are less popular in the broader health community where they are seen as unrealistic for many people. There is a strong consensus, however, that any activity is better than no activity[233] and community programs should include a strong activation focus for this reason.

Facilitate and invest in the development of culturally relevant, community-level, physical activity and sport programs as an important means of encouraging more active healthy living.

Programs and activities (e.g., periodic walking, cycling and leisure sport campaigns, support for indigenous sport and games, etc.) should involve population groups of all ages. Special targeted efforts are needed to ensure the equal participation of women, older adults, persons with disabilities, indigenous peoples and other socially excluded groups.[234]

Provide persons with disabilities with opportunities and support to participate in sport and physical activities adapted to their physical and mental condition.

The goal is to help persons with disabilities improve their physical health, psychological well-being and quality of life. This can be achieved by increasing their ability to perform daily living activities, giving them opportunities to acquire life skills and leadership experiences, and enhancing their social inclusion.[235] Providing such opportunities requires training sport and education personnel in adaptive sports, making adapted sport equipment available at low cost, and removing barriers preventing persons with disabilities from accessing, and travelling to and from, public sport and recreation facilities.

Ensure that initiatives are sensitive to relevant local beliefs, in particular those on diet, physical activity, and body shape.

In many parts of the world, what is medically defined as overweight or obese is considered a sign of good health, and walking or cycling can be viewed negatively as a sign of poverty.[236] These and other perceptions can impede physical activity promotion unless they are identified and adequately addressed.

Be aware of cultural norms with regard to gender that may, in some cases, prevent women and girls from being more active.

Programs must also be designed with the specific interests and needs of girls and women in mind, and involve them in decisions concerning the kinds of programs offered and how they are delivered. Remember that in rural and low income peri-urban areas of developing countries, women and girls may already be engaging in physically demanding occupational activities in and outside the home. These women may need a balanced set of supports such as adequate nutrition, income generating initiatives, advice on physical activities appropriate to their context, and possibly adapted leisure pursuits.[237]

Incorporate monitoring and evaluation processes into all initiatives from the outset to assess their effectiveness, continuously improve them, and help make resource allocation decisions.

The evaluation of *Agita São Paulo* shows that it is possible to evaluate the process and the impact of diverse strategies used to increase physical activity in populations. Planning and implementation of evaluation measures will be more successful if built into the program at the initial strategic planning stage, with a budget set aside for this purpose. Partners and stakeholders should be involved in the evaluation process. Evaluation should be an essential part of all program components and should be designed to obtain feedback and improve interventions.[238]

Maximize the effectiveness of programs to increase sport and physical activity participation by observing guidelines derived from successful programs:[239]

- Make it fun (e.g., ensure enjoyable group activities with a social atmosphere);
- Make it effective (provide supervision, training and feedback);
- Use sports that are culturally relevant and require fewer resources (such as running, soccer, basketball, baseball and other activities) to promote lifelong fitness;[240]
- Address obstacles to sport and exercise (e.g., need for safe areas, timing, darkness, extreme temperatures, need for child care, cultural mores); and
- Promote physical activity and related healthy behaviours in the workplace.

Target public messages aimed at increasing physical activity levels and tailor them for specific audiences.

Targeted public education messages are more effective than general messages. Targeted messages are culturally specific and emphasize consistency (focusing on accumulated exercise). Messages can foster inclusion through the use of terms like "active" instead of using fitness and sport terminology that can be off-putting to groups who do not see themselves in these terms.[241] Messages focused on moderate activity and walking are particularly effective with older adults.[242]

Make use of sport's potential as a communication and public education platform to influence health risk behaviour and prevent disease and in doing so, build on the lessons learned from programs to date.

While the systematic assessment of experiences and guidelines for successful projects is still in its infancy, a few preliminary guidelines can be drawn from program experiences to date:[243]

Use sport to launch social mobilization efforts: Sport is an ideal launch site when it comes to appealing to people on an emotional level and mobilizing them for specific development goals.

Provide positive role models: Studies show that athletes are seen as positive role models and can favourably influence youth behaviour. In choosing athletes for information and mobilization campaigns, governments and their partners must ensure that selected athletes embody the values they are meant to communicate.

Develop a coherent strategy: Sport-based health initiatives work best when they are integrated into a broader, coherent overall strategy. HIV and AIDS prevention messages communicated by athletes, for example, will only have a sustained impact if they are supported by other measures such as widely available counselling services, provision of additional information, and integration of the issue into school instruction. Without coordinated supports, isolated actions are likely to have little effect.

Deliver clear messages: Sport is a neutral vehicle that can convey any kind of message. Because of its nature, sport is particularly well suited to communicating health information and reinforcing social values such as teamwork and integration of outsiders. Messages must be clear, simple, aimed at specific target groups, and tailored to resonate with these audiences.

Encourage media involvement: Close cooperation with the media can help ensure that awareness-building campaigns get wide exposure. When choosing athletes and preparing messages, keep media opportunities, requirements and appeal in mind. Whenever possible, a wide range of communications avenues should be used (TV, radio, print, Internet).

Include women and girls: Sport institutions, practices and communication are traditionally more oriented to men than women in most societies. Consider this when planning an information campaign and take additional measures to reach women and girls and to sensitize male participants (athletes, coaches, teachers and community members) to gender issues and their relationship to women's health and well-being.

Increase the impact of sport programs aimed at HIV and AIDS prevention by ensuring that they incorporate existing best practices.[244]

These may include:

- Actively engage community members in planning, design, delivery and evaluation;
- Include sports and games that offer opportunities for everyone to play;

- Focus on prevention for the uninfected;
- Reduce stigma against those affected by HIVand AIDS and invite their participation;
- Convey accurate, up-to-date HIV and other health information in mutually agreed on age-appropriate and culturally appropriate ways;
- Deliver a quality sport experience that builds skills, self-confidence, and mutual supportamong participants;
- Provide appropriate referrals for HIV testing and counselling and other sexual and reproductive health issues; and
- Work closely with NGO, government, and private sector HIV prevention efforts.

3.3 HARNESSING THE CONTRIBUTION OF ALL SECTORS OF GOVERNMENT AND SOCIETY

Take advantage of existing events, partnerships and networks to leverage public attention and resources for promoting physical activity.

Institutional and intellectual partnerships are a significant contributing factor in successful large-scale programs promoting physical activity.[245] The annual Global Move for Health Day initiative provides an ideal opportunity to develop and strengthen global, national and local partnerships in support of physical activity and sport. This global, high profile initiative provides a platform on which to build cross-sectoral activities and events in communities.

Work with health care providers to integrate physical activity promotion into health services.

Research has shown that motivation and encouragement from physicians and health workers improves compliance with physical activity prescriptions.[246] Health care providers can play an active role in increasing physical activity by:[247]

- Designing and integrating regular physical activity programs into health services and interventions that include healthy diet and lifestyle guidance as part of prevention and rehabilitation measures;
- Educating health professionals on physical activity counselling and program development; and
- Organizing specific physical activity programs in health services.

Engage as many sectors as possible in developing and implementing physical activity promotion strategies.

The WHO has identified actions that a broad range of sectors (including health) can take to promote participation in regular physical activity and healthy sports, ensure equitable access to these activities, and foster supportive environments. The list of sectors below is not exhaustive, but is offered as a starting point for institutions and communities interested in cross-sectoral partnerships to increase physical activity:[248]

The health sector can:

- Undertake nationwide evidence-based advocacy to inform the public and policy-makers of the health, social and economic benefits of physical activity.
- Develop action-oriented networks with other relevant sectors and stakeholders on physical activity.
- Promote integrated, cross-sectoral, public policy development.
- Promote community-based physical activity programs with family-based activities.
- Support the teaching of basic sport skills to children in schools and community programs.
- Address barriers to providing a safe and welcoming environment for sport participants (e.g., abuse, harassment, racism, sexism).
- Secure start-up investment and mobilize resources for physical activity initiatives.
- Participate in global actions to promote physical activity.

The sport sector can:

- Initiate and strengthen programs for physical activity and sport for all, promoting the concept that sport is a human right for all individuals regardless of race, social class, gender and disability.
- Make community use of local sport facilities easy and convenient.
- Allocate a proportion of sport funds to promoting physical activity.
- Include education on the benefits of physical activity in sport sector training programs.
- Advocate for physical activity and sport for all at professional, amateur and school sporting events.
- Organize physical activity events in the community.
- Support the use of physical activity and sport to promote healthy lifestyles, reduce violence and foster social integration, development and peace.

The education and culture sectors can:

- Make school sport facilities available for public use when not in use by students.
- Commit to physical education as an integral part of the school curriculum.
- Ensure all schools have one teacher trained in physical education.
- Provide opportunities for students to engage in sport and physical activity during and after school.
- Increase physical activity in cultural and leisure programs and events.
- Contribute significantly (through colleges, universities and research institutes) to the data collection, research, evaluation, knowledge dissemination, and training dimensions of broad-based strategies to improve physical activity levels and mobilize sport as a communication and public education platform.

The media can:

- Disseminate positive messages/information about the benefits of physical activity.
- Organize regular programs to promote physical activity.
- Ensure journalists (e.g., sports, health or science journalists) are knowledgeable about, and can advocate for, physical activity.

Local governments can:

- Develop local legislation and policy to support physical activity.
- Allocate safe indoor and outdoor spaces for physical activity, play and sports.
- Organize community programs.
- Support physical activity initiatives initiated by various sectors and actors.
- Help strengthen national public policy in support of physical activity through local action.

National financial/economic policy-makers can:

- Look seriously at the health, social and economic benefits of physical activity.
- Take measures to allocate resources to relevant sectors and initiatives.
- Encourage public and private sectors to invest in physical activity.
- Support physical activity programs.
- Earmark funds through dedicated taxes (e.g., tobacco, alcohol, soft drinks, etc.) for physical activity and other health promotion programs.

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