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*Institute for Economic Research*

**REVIEW OF PHYSICAL ACTIVITY  
PREDICTORS AND POPULATION  
GROUPS AT RISK OF POOR HEALTH**

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## **Abstract**

The paper offers a literature review aimed at identifying the determinant factors of an individual's physical activity and thus the population groups at risk of a lower health-related quality of life. It provides the explanation of several variables that appear to influence an individual's decision to be active. These variables include features such as age, gender, and health status, as well as descriptors of the general economic and social environment in which an individual's physical activity is carried out. These factors should be taken into account at least as control variables in the studies aiming at explaining and contextualizing physical activity. The paper provides evidence that responsible governance needs concrete, targeted policy measures for the least active groups of citizens to promote regular physical activity and thus reduce health risks.

**Keywords:** leisure-time physical activity, predictors, health-related quality of life, population groups at risk, policy measures

**JEL classification:** I14, I18, I38, D63.



## **1. Introduction**

The importance of an active lifestyle in achieving strategic goals relating to quality of life and the competitiveness of society have globally been subject to increasing debate. Physical inactivity is seen as a major factor in numerous diseases of modern society and is the fourth leading risk factor for global mortality (WHO 2010). Increasing physical activity therefore presents a challenge to authorities wanting to reduce non-communicable diseases, through preventive action and promoting health. The goals of leisure-time physical activity and broadening the Sport for All concept, which this paper covers are to maintain and improve people's health, to humanise people's lives, reduce the negative, primarily health-related risks of modern patterns of life and work, and prevent a reduction in the public's general wellbeing.

Physical activity and participation in sport vary considerably between different nations and societies. The proportion of adults that claim to take part in some form of exercise at least once a week ranges between 37% and 85% in different EU countries, with a union average of 65% (Eurobarometer 72.3 2010). In the United States, 61% adults participated in some leisure-time activity at least once a month (Ham, Kruger, and Tudor-Locke 2009). The World Health Organization estimates that 31% of the world's population is not physically active and this causes an estimated 3.2 million deaths globally each year (WHO 2010).

Both the physically active and the inactive are very diverse population groups, and physical activity is influenced by a multitude of determinants (e.g., Commonwealth of Australia 2006). The purpose of this paper is to identify what leads individuals to decide to be active, including the key factors in such decisions. The review and synthesis of the academic literature in the field of physical activity, health and quality of life offers a preliminary scheme of variables that are seen as predictors of physical activity and hence health-related quality of life. The literature review enables (a) a search for the characteristics of the most vulnerable groups of citizens, i.e. those with a permanent level of physical activity that is too low, and hence at risk of poor health, (b) the drawing up of a list of variables that should be taken into account in studies addressing sporting activity and health risk factors, and (c) the link-up of measures to increase the physical activity of groups of citizens and a healthier life.

Following this introductory section, Section 2 describes the research set-up, data and summary statistics. The results, a review of physical activity predictors and population groups at risk of lower health-related quality of life, are presented in Section 3. The paper concludes with a discussion and policy implications.

## **2. Literature Review Method, Data and Summary Statistics**

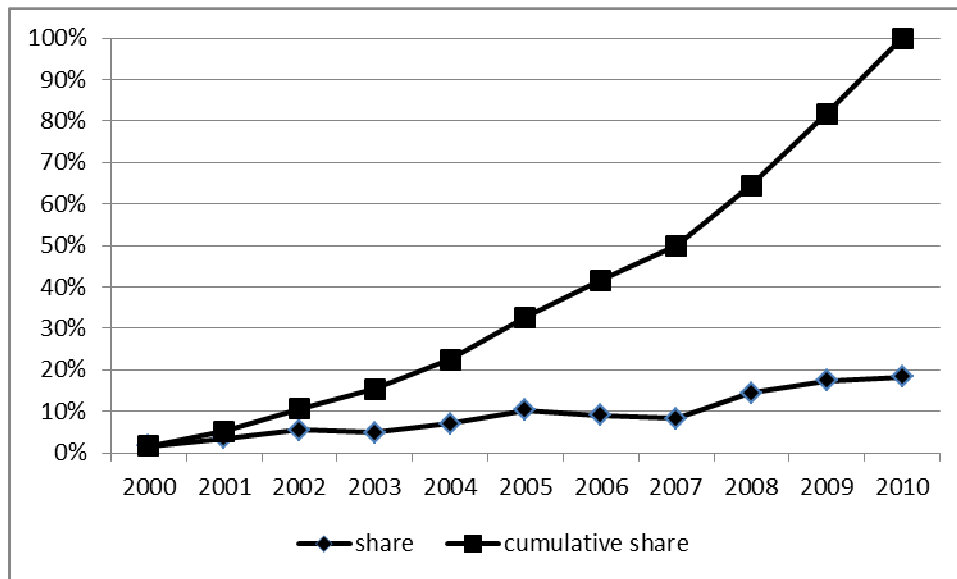
The analysis comprises a review of globally significant research articles in the field. An impartial and comprehensive review of secondary sources provides an insight into critical points of current knowledge and key findings. The literature review method focuses directly on the research questions. It synthesises results, summarises known and unknown aspects of the research field, identifies areas in which the literature is not in agreement, and produces questions that require further research (Taylor 2009).

The critical literature review is based on work available in the Web of Science, and the SCI-EXPANDED and SSCI databases. An emphasis was placed on research into factors that have an impact on physical activity and research into population groups at risk due to inactivity. Technically the method of searching information sources requires the use of appropriate syntax for search terms and a method of combining search sets. In terms of content, there was a need to specify search terms and content areas (categories) in order to refine results.

The literature review focused on articles published in English from 2000 to 2010 in the following fields: sport sciences, sociology, hospitality, leisure, sport and tourism, education, scientific disciplines, education, educational research, psychology multidisciplinary, psychology social, economics, public, environmental and occupational health, health policy and services, women's studies, history, management, behavioural sciences, political sciences, planning and development, urban studies, family studies, public administration, social sciences and interdisciplinary sciences. The described method was used to review over 500 secondary sources. A total of 374 publications were selected based on assessments of whether their content was directly linked to the research.

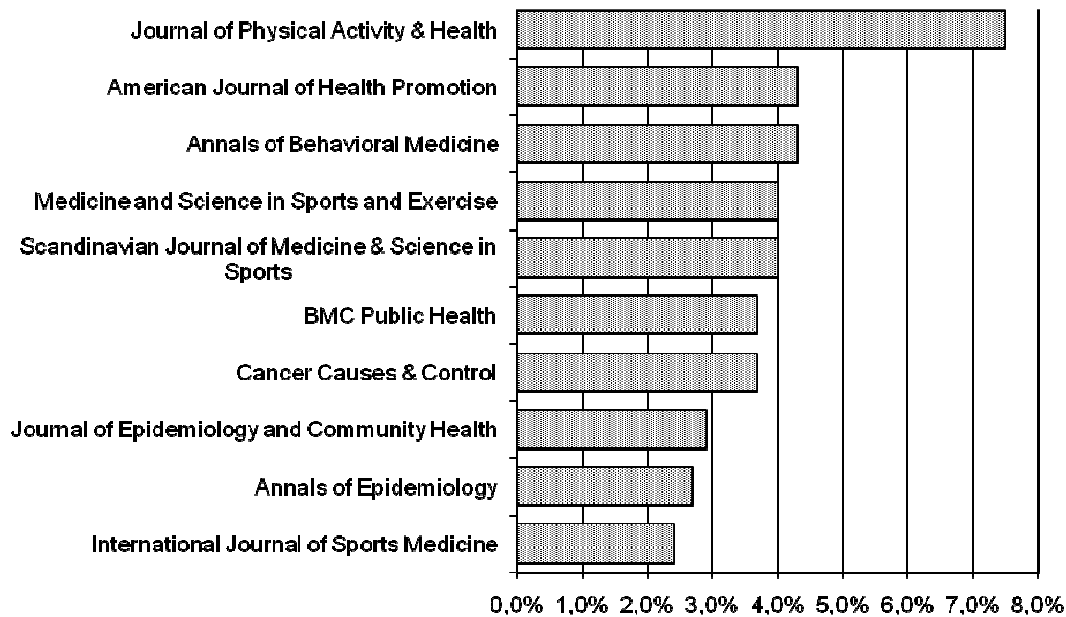
The volume of publications on the factors influencing physical activity and their relationship with quality of life, primarily health, is increasing. The number of publications that were included in the initial selection for the purposes of this paper increased by more than tenfold from 2000 to 2010 (Figure 1). This supports the view that the potential of physical activity to improve quality of life is a topical issue.

**Figure 1:** Shares of selected publications on physical activity factors and their relationship to health-related quality of life, 2000-2010



Analysing the selection by source indicates that the top three journals by number of selected articles were the Journal of Physical Activity and Health, American Journal of Health Promotion, and Annals of Behavioral Medicine. All are publications that focus primarily on health (Figure 2).

**Figure 2:** Most frequent sources for publications included in review



### 3. Results

Over the past 40 years, epidemiological, pathological and clinical experimental studies have convincingly demonstrated that physical inactivity or poor physical condition contribute significantly to exposure to the chronic non-communicable diseases that predominate in industrial societies (Blair et al. 1996). However, the issue has become increasingly topical in recent years. Since 2008 in particular, there has been a considerable amount of research into new findings on the link between physical activity and health. This research can be placed into two main groups: (i) research that studies physical activity in relation to physical health (Batty et al. 2010; Davidson, Tucker, and Peterson 2010; Holtermann et al. 2010; Li et al. 2010; Savela et al. 2010) and (ii) research that studies physical activity in relation to mental health (Burton, Pakenham, and Brown 2009; Taylor-Piliae et al. 2010; Yang et al. 2010). Both groups are complementary as mental and physical health are linked, and physical activity has a positive influence on both (Bernaards et al. 2006).

What dimensions of health are most frequently linked to physical activity? The research confirms that physical activity reduces the risk of high blood pressure (James et al 2009), forms of cancer, especially breast and colon cancer (Heath 2009; Littman, Kristal, and White 2006; Slattery et al. 2007), cardiovascular disease and heart attacks (Holtermann et al. 2009; Lovasi et al. 2007), metabolic syndrome (Cho et al. 2009; Metzger et al. 2010; Misra, Endemann, and Ayer 2005), diabetes (Heath 2009; Li et al. 2010), increased cholesterol



(Zhang et al. 2010), and osteoporosis (Morseth et al. 2010; Shedd et al. 2007). Insufficient physical activity is also frequently linked to obesity (Calise and Martin, 2010; Heath 2009; Heath and Brown 2009; Seo and Li 2010). All the research found a positive correlation between leisure-time physical activity and lower risk of the diseases mentioned. There are also studies that did not find such impact on individual forms of cancer, e.g. ovary or prostate (Colbert et al. 2003; Hannan et al. 2004).

Numerous studies have found a connection between regular physical activity and mental disorders or the psychological state experienced by individuals engaged in physical activity (i.e. emotions, perceptions, motivation, communication) (Bortoli, Bertollo, and Rombazza 2009; Goodwin 2003).

### ***3.1 Population groups at risk and physical activity predictors***

Research indicates that the most vulnerable groups in terms of consistently insufficient physical activity are females, particularly girls (Blomstrand et al. 2009; Dollman and Lewis 2010; Dunton, Schneider, and Cooper 2007a, 2007b; Misra, Endemann, and Ayer 2005), people in lower social strata (Dagkas and Stathi 2007; Frisby and Hoerber 2002), the elderly (Hughes et al. 2009; Taguchi et al. 2010; Thogersen-Ntoumani 2009), children and adolescents (Godin et al. 2005; Kjonniksen, Anderssen, and Wold 2009; Luszczynska et al. 2004; Molnar et al. 2004; Osler et al. 2001; Sanchez-Lopez et al. 2010), smokers (Kirjonen et al. 2006; Leino-Arjas et al. 2004; Martinez-Gonzalez et al. 2001; Osler et al. 2001), people in sedentary professions and sedentary young people (Blomstrand et al. 2009; Osler et al. 2001; Sanchez-Lopez et al. 2009), and ethnic and religious minorities and immigrants (Benett et al. 2006; Guinn et al. 2007; Hosper, Deutekom, and Stronks 2008; Kandula and Lauderdale 2005; Misra, Endemann, and Ayer 2005; Sagatun et al. 2008; Seo and Li 2010). Some research relates to the sick population and how physical activity affects their problems. Studies indicate that physical activity within the recommended levels has a positive influence on quality of life for people with arthritis (Abell et al 2005; Heesch and Brown 2008) and the overweight (Heath and Brown 2009).

Researchers have proved the significance of physical activity to female health, particularly for stressed or overworked mothers, and in reducing the possibility of a risky pregnancy. A low frequency of physical exercise is positively correlated to the emotional state and absence of depression in women aged between 18 and 45 (Kull 2002). Furthermore, perceptions of control over time, fatigue, social support and childcare were demonstrated as critical factors in distinguishing between women that remained physically active after

entering motherhood and those who did not (McIntyre and Rhodes 2009). Moderate physical activity adapted to pregnancy has a favourable impact on mothers' health and post-parturition weight (Fell et al. 2009). Leisure-time physical activity and physical activity at work during pregnancy can also reduce the risk of pre-eclampsia (Saftlas et al. 2004). The results thus emphasize the importance of targeting measures at women entering motherhood.

Plenty of attention has been devoted to research on physical activity among young people. Insufficiently active students experience a lower level of mental wellbeing and feel fatigued and lacking in strength. Such students are twice as likely as sufficiently active students to consult a doctor about health problems (Bray and Kwan 2006). Adequate physical activity can improve quality of life among children affected by juvenile idiopathic arthritis, haemophilia, asthma and cystic fibrosis (Philpott et al. 2010). The positive effects of a half-hour daily programme of physical training were recognised by children and adolescents who participated in a study carried out in North Carolina. The participants reported that their studying improved and they cooperated more in the educational process, that they had improved their awareness of healthy habits, and found it easier to stay awake and generally felt better (Evenson, Ballard, and Lee 2009).

The development of policies aimed at increasing physical activity among adolescents presents a specific set of challenges, since some authors point out the significantly different understandings of the concept among people within this population. Some groups of students understand physical activity primarily in the sense of socialising in public spaces such as parks and night clubs (Shores and West 2010). The behaviour of young people also depends on the behaviour of key social groups, primarily parents and peers, which is a major factor to consider when creating policies to promote sport among young people (Luszczynska et al. 2004; Osler et al. 2001; Seabra et al. 2008). Activities for children must therefore be adapted to their development and psychological characteristics, and should emphasis game-playing and fun.

Research specifically aimed at the male population is rarer. A low level of leisure-time physical activity by males is correlated to low self-assessment of health and poor socio-economic status, primarily in labourers, the unemployed, people on low incomes or with low education (Woitak-Slubowska 2008), while leisure-time activity has a positive impact on the health of middle-aged employed men (Okano, Miyake, and Mori 2003). Socio-economic status has a weaker impact among former sportsmen than among men who were not involved in competitive sport in the past. For the latter group, living in a rural area is an additional factor in low leisure-time physical activity. Moderately intense to intense leisure-time

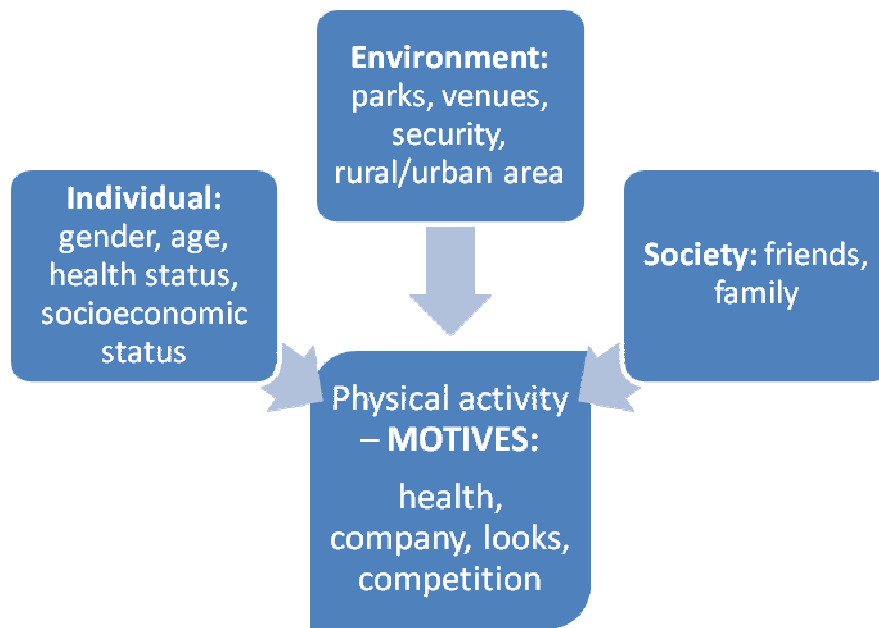
physical activity and hence greater cardio-respiratory capacity are also inversely related to the phenomenon of hopelessness in middle-aged men, which is a major determinant of subjective feelings of wellbeing (Valtonen et al. 2009).

More research has focused on the impact of social and demographic factors on physical activity of individuals of both genders. The factors that most influence physical activity are the following: psychosocial factors in general and within the framework of workload, employment status, education level, support from the family, body mass index, perceived health, environmental factors and infrastructure including parks and facilities, safety of surroundings or neighbourhood, material and social status, negative habits, etc. (Ali and Lindstrom 2006; Martinez-Gonzalez et al. 2001; Pedersen et al. 2009; Thorgensen-Ntoumani 2009; Van Tuyckom and Scheerder 2010).

A considerable amount of research has been carried out, primarily in the past two years, by authors studying the impact of infrastructure on physical activity, such as traffic regimes and cycle paths, and parks and green spaces primarily intended for non-organised exercise (Amorim, Azevedo, and Halle 2010; Brownson et al. 2010; Cohen et al. 2009; Gomez et al. 2010; Sarmiento et al. 2010; Stanis, Schneider, and Pereira 2010; Wicker, Breuer, and Pawlowski 2009). This research all proved that environmental factors are positively correlated with leisure-time physical activity. In contrast, according to the model of Lindstrom, Moghaddassi, and Merlo (2003), environmental factors only explain a 5% variance in physical inactivity, with personal factors such as ethnic identity, education and social inclusion having the greatest influence. Humbert and others (2006) also found that the significance of environmental factors was not very high. Environmental factors such as proximity, costs, equipment and safety are primarily significant for young people with lower socio-economic status, while social factors (friends, support from adults) were significant regardless of socio-economic status (Humbert et al. 2006).

The review of research findings relating to groups that are vulnerable as a result of habitually insufficient physical activity and to physical activity factors has allowed the creation of a conceptual predictor model for leisure-time physical activity (Figure 3). The quality of life offered by participation in sport can be found in concepts such as health, appearance and socialising. The main factors influencing individuals' activity are demographic characteristics such as age, gender and health. Individuals' decisions are also influenced by the society in which they live or work and by environmental features. It is particularly in this area that opportunities arise to make policies to promote and enable increased movement and better quality of life.

**Figure 3:** Predictors of physical activity



### ***3.2 Measures to increase physical activity***

Given the health contexts set out above and the health risks arising from inactivity and based on theories of health behaviour, the need for appropriate policies on information provision must also be mentioned (Dunton, Cousineau, and Reynolds 2010). These are particularly beneficial for individuals who have not yet started or have only recently started to think about becoming more physically active, as well as those who still have not been able to find appropriate forms of physical activity. A national or local policy using relevant communication approaches can promote a healthy lifestyle and increase levels of health awareness (Stamatakis, McBride, and Brownson 2010). Numerous authors have confirmed the effectiveness of using written, electronic and telephone channels to promote physical activity and health (Albright et al. 2005; Ball et al. 2005; Plotnikoff et al. 2010; Spittaels et al. 2007).

It is very important that campaigns and actions to increase physical activity are targeted at the least active groups (Steffen et al. 2006). The academic and professional literature primarily offers recommendations aimed at increasing the activity of women and young people, with men and the elderly targeted less often. Measures aimed at the female population have an emphasis on recognising social factors such as the support of friends and family and aiding an understanding of personal ability to control one's own healthy lifestyle (Lorentzen et al. 2009; Sharma, Sargent, and Stacy 2005; Skowron, Stodolska, and Shinew 2008).

Targeted measures are essential for women entering motherhood (McIntyre and Rhodes 2009). The decisive factors for physical activity among men are different. To increase leisure-time physical activity among men, it is necessary to promote organised sport among boys and male adolescents and to eliminate socio-economic obstacles to participating in sport. Past sporting experience has a positive impact on physical activity in later years (Woitak-Slubowska 2008).

Some authors favour measures targeted at the working population, such as regular exercise programmes for specific occupations, nutritional advice, relaxation techniques and occupational healthcare (Schneider and Becker 2005). Others have reservations about individual measures, such as advice on physical activity in the workplace, since they are not cost-effective in the short term (Proper et al. 2004).

Measures targeted at young people also have a range of specific features. For example, within the education system measures based on a perceived autonomy support approach from teachers has proved effective (Chatzisarantis and Hagger 2009; DeVahl, King, and Williamson 2005). Physical activity among young people can also be encouraged, either through the involvement of families and peers or through a mix of different measures (van Sluijs, McMinn, and Griffin 2008). Also of interest is the recommendation that measures to promote physical activity among students focus on socialising (activities in public parks, bars and night clubs) and not strictly on promoting movement as such (Shores and West 2010). In socially disadvantaged neighbourhoods, measures to promote adult physical activity that engage with the physical and social environment are recommended (Annear, Cushman, and Gidlow 2009; Molnar et al. 2004).

#### **4. Discussion and Conclusion**

According to ISSP data (2007), almost 45% of respondents took part in regular sport recreation every day or several times a week. This is more than ever before; however, the proportion of those who are rarely active or completely inactive remains high. The health risks of physical inactive people are proven to be higher than those of active people, and physical activity is of general benefit to health. A large number of factors affect the extent of these benefits. It should be mentioned that an insufficient amount of exercise is ineffective, while too much exercise can also carry risks. Furthermore, not every form of activity is suitable for everyone.

The goal of this research has been to identify factors that define individuals' physical activity, by looking for the least active population groups overall. The literature review revealed the following major predictors that should be taken into account when developing a range of models to predict physical activity: age, gender, health status, sociability, education, income, rural or urban residence, maternity, social status, employment status, level of self-control, features of environment. The research allows us to outline the typical profile of population groups at risk of a lower quality of life. In general this involves women with young children, sedentary adolescents and people in sedentary jobs, people with poor health habits and self-control problems (e.g. smokers), people with low income and low levels of education, people in rural areas and the unemployed. Recognising vulnerable groups and the factors that affect physical activity and health also forms the theoretical basis for preparing effective measures. Physical activity among the general population, reduced health risk and improved quality of life are in the interest of every state, since they reduce the costs of diagnosing and treating patients, while a feeling of wellbeing also has a positive impact on the productivity of the workforce and pupils and students. The decision by a state to systematically promote physical activity among different population groups is both responsible and beneficial in the long term; but there must be recognition that any strategy requires start-up costs in terms of finance and human resources. The reasons for individual physical inactivity are usually multifaceted. The measures needed to activate these individuals will therefore probably be designed to meet the requirements of small groups or even single individuals: mass action will yield little or no result. This should not deter policymakers and officers implementing these policies from trying; in fact, the inactive are often in that situation as a result of obstacles preventing them engaging in exercise that policy can address. Their quality of life will probably increase as soon as the problem is tackled, even before the positive outcomes of increased physical activity further enhance it.

The research results indicate that policy has to emphasise the public interest of a healthy and satisfied society. Specific measures to enhance regular physical activity have to be targeted at the most deprived groups. Promoting recreation for health and relaxation also requires enhanced cooperation in the field of sport among actors in areas such as health, education and tourism, sustainable city programmes including organised and social sport, and at the local political level. Currently, the opposite seems to be true as sport traditionally operates very independently of the rest of civil society.

Since this paper is intended to provide an overview, it offers a broad-brush approach to coverage of factors relating to physical activity and at-risk population groups. Physical activity factors, of course, differ in significance according to geographical region and the at-risk population groups may be narrower than those identified above. Future research will probably be directed towards a search for new factors and an analysis of variables that at present feature limited empirical validation, such as the role played by infrastructure. In future it would also be worth researching the relationships between individual factors and the causality of relationships between different factors and physical activity and quality of life. As Kline (2005) noted, to eliminate the possibility of reverse causality, longitudinal research is needed to determine the direction of causality of the relationships and to detect possible reciprocal causation.

It would make sense to upgrade the study with assessments of the cost effectiveness of measures to increase leisure-time physical activity, and their comparison with the costs of physical inactivity. It appears that the costs that occur within the active working population due to non-participation in sport are higher than those associated with participation in sport. However, it must be recognised that knowledge of the components of cost effectiveness and equity in healthcare and sport is still very limited.

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