Scientific position statement

Swiss Federal Office of Sports
Swiss Federal Office of Public Health
Swiss Council for Accident Prevention
Swiss National Accident Insurance Organisation (SUVA)
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Network HEPA Switzerland

Economic benefits of the health-enhancing effects of physical activity: first estimates for Switzerland

Summary

The importance of physical inactivity as a risk factor for a whole range of chronic diseases and the potential of physical activity as a versatile health resource are well documented in the scientific literature. Recent prevalence data for the Swiss population show that the proportion of people who are not sufficiently active is both substantial and growing. A study undertaken by the Department of Medical Economics of the Institute of Social and Preventive Medicine and the University Hospital of Zurich represents an initial attempt to investigate the economic benefits of the health-promoting effects of physical activity in the Swiss population. According to the resulting estimates the current physical activity of a majority of the Swiss population already prevents 2.3 million cases of disease, a good 3,300 deaths and saves direct treatment costs of 2.7 billion Swiss francs a year. According to these conservative assumptions, the inadequate physical activity prevailing amongst a good third of the population is responsible annually for 1.4 million cases, almost 2,000 deaths and direct treatment costs of 1.6 billion Swiss francs. The risks associated with activity and sport in particular can be expressed in economic terms as well: there are about 300,000 sporting accidents a year – affecting not only those who are sufficiently active but also those who are irregularly and insufficiently active – causing 160 deaths and incurring direct treatment costs of 1.1 billion Swiss francs. These figures and the less robust estimates of the indirect costs clearly demonstrate that the promotion of health-enhancing activity is of great importance not only for reasons of individual quality of life and health, but also on economic grounds. Measures aimed at risk control and accident prevention in sport should be continued and intensified according to the specific needs so that the desired result of increased activity and sport among the Swiss population does not also lead to higher accident figures.

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1. Physical inactivity in Switzerland

The findings of the Swiss Health Surveys of 1992 and 1997 impressively demonstrate the link between physical activity and well-being and health in the Swiss population and indicate that the increase in inactivity shows no signs of abating [1]. These data are supplemented by the findings of the HEPA (health-enhancing physical activity) Survey in 1999 [1, 2], in which 37% of the interviewees reported no activity corresponding to the level of the minimum recommendations for health-enhancing physical activity [3] and can therefore be regarded as insufficiently active (Figure 1).

A study conducted by the Department of Medical Economics of the Institute of Social and Preventive Medicine and the University Hospital of Zurich [4] was the first attempt to calculate the number of cases of illness and death and the associated costs which result from physical inactivity or which can be prevented through physical activity. The authors of this study also used comparable methods to analyse the accident statistics already collated and processed to date by accident insurers and the Swiss Council for Accident Prevention [5].

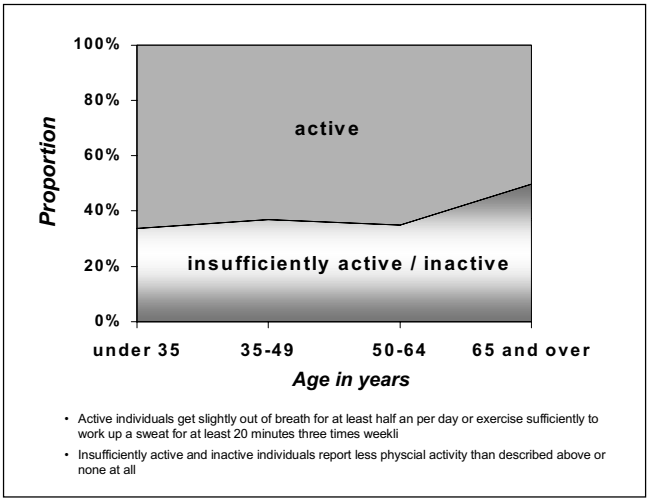

Figure 1: Proportions of insufficiently active and active individuals in the various age groups in the 1999 HEPA Survey [after 3].

2. Effects of health-enhancing physical activity and insufficient activity

The authors of this study [4] reviewed the international literature to allow assumptions about the relative risks of physical inactivity and the treatment costs for the following diseases (Table 1): cardiovascular disease, type II diabetes (maturity-onset diabetes mellitus), colon cancer, osteoporosis, breast cancer, recurrent brief depression, back pain, hypertension (high blood pressure).

	Relative risk for the disease	Relative risk for mortality	Direct treatment costs	Indirect costs
Cardiovascular disorders	1.84	1.43	2239	2556
Type II diabetes	1.88	3.00	3508	636
Colon cancer	1.90	1.68	52165	0
Osteoporosis	2.00	-	630	0
Breast cancer	1.39	1.00	28490	0
Depression	3.15	-	1983	0
Back pain	1.36	-	739	1126
Hypertension	1.47	1.00	693	0

Table 1: Relative risks for insufficiently active or inactive individuals compared to active individuals and respective costs (in Swiss francs per case per year) for the analysed diseases [after 4].

	Prevented cases of disease		Costs (in Sfr millions)		
			direct	indirect	total
Cardiovascular disorders	29%	85,537	192	219	410
Type II diabetes	29%	160,394	563	102	665
Colon cancer	30%	1,330	69	0	69
Osteoporosis	31%	188,473	119	0	119
Breast cancer	17%	772	22	0	22
Depression	43%	267,636	531	0	531
Back pain	17%	927,663	686	1,045	1,730
Hypertension	20%	716,460	497	0	497
Total		2,348,266	2,677	1,365	4,042

Table 2: Disease prevented by physical activity as a proportion of the hypothetical cases in a Swiss population with no active individuals, in numbers of cases and in prevented costs per year. The estimations assume that the proportion of physically active individuals is 62.9% [after 4].

	Caused illnesses		Costs (in Sfr millions)		
			direct	indirect	total
Cardiovascular disorders	24%	50,452	113	129	242
Type II diabetes	24%	94,604	332	60	392
Colon cancer	25%	785	41	0	41
Osteoporosis	27%	111,166	70	0	70
Breast cancer	12%	456	13	0	13
Depression	44%	157,858	313	0	313
Back pain	12%	547,159	404	616	1,020
Hypertension	15%	422,586	293	0	293
Total		1,385,066	1,579	805	2,384

Table 3: Proportion of diseases attributable to insufficient physical activity and inactivity as a percentage of actually observed cases (population-attributable risk), in numbers of cases and in incurred costs per year. The estimations assume that the proportion of insufficiently active and physically inactive individuals is 37.1% [after 4].

Based on the known total number of corresponding disease cases and deaths in the Swiss population and on the available prevalence data for physical activity, estimates were produced concerning the number of disease cases illnesses and corresponding costs that were either prevented by physical activity or caused by insufficient activity (Tables 2 and 3).

It must be taken into account that the same individual can be suffering from more than one of the considered conditions simultaneously. Furthermore for some diseases no information is available in the literature on the increase in mortality, so only cardiovascular illnesses, type II diabetes and colon cancer have been included in the mortality figures. According to the same assumptions concerning the level of physical activity, an annual 3311 fatalities are prevented (cardiovascular disease: 1928; type II diabetes: 1032; colon cancer: 351) and 1953 fatalities are caused (1137; 609; 207) by insufficient activity or inactivity.

3. Assumptions and their effects on the results

While the direct treatment costs for the various diagnoses are well known, assumptions that affect the result have to be made about the other calculation criteria.

No international standards currently exist for the assessment of physical activity, neither in studies investigating the effect of activity on health nor in population surveys. The results presented are based on the assumption that the proportions of insufficiently active and inactive individuals are the same in all age groups of the Swiss population and that the threshold between active and inactive is based on the minimum recommendations for health-enhancing physical activity used in the 1999 HEPA Survey [2]. In fact, the proportion of insufficiently active individuals in the older population groups, which are particularly affected by the investigated diseases, is higher compared to the rest of the population. Furthermore, over half of the 62.9% in the active group practise sporting activity in the form of endurance training [2] and can therefore expect to receive even greater benefit from the protective effects of physical activity than that specified, for example, for cardiovascular diseases in Table 1. Consequently, our calculations can be considered rather conservative and probably tend to underestimate the negative effects on health due to insufficient activity and inactivity. To investigate the possible extent of this underestimation, a sensitivity analysis was conducted using the definition of physical activity prevailing prior to the current minimum recommendations [6, 7]. Based on otherwise identical assumptions, the resulting calculated proportion of 73.1% of insufficiently active and inactive individuals produces figures of 3178 fatalities, a good 2.3 million disease cases and costs of 4.0 billion Swiss francs (2.6 billion direct, 1.4 billion indirect) caused annually in Switzerland as a result of insufficient physical activity or inactivity [4].

Compared to the calculation of direct costs, the estimation of indirect costs poses a particular problem. These calculations use the human capital approach, which calculates the indirect costs based on the value of lost productivity but which cannot take into account all the services provided outside the work situation, not to mention the loss of quality of life. Moreover, since no information is available concerning some endpoints, the indirect costs of breast cancer conditions, for example, have had to be set to zero. These assumptions mean that the estimate of indirect costs is slightly less accurate than that for the direct costs and tend to underestimate the total costs incurred as a result of insufficient activity or inactivity.

4. Accidents as a risk of activity and sport

As well as preventing disease and death, activity and sport are associated with risks of their own. Of prime importance in numerical terms are sports accidents. Their extent and consequences are systematically recorded and evaluated by accident insurers and the

	Injury	Invalidity	Death	Costs (in Sfr millions)		
				direct	indirect	total
Sports accidents	298,638	410	161	1,123	2,330	3,458
All accidents	968,072	3,012	1,875	4,572	8,607	13,217

Table 4: Injuries expected to occur each year in Switzerland as a result of sports accidents and all accidents, and their consequences [after 4]. Not listed separately: disability pension payments of 5 million Swiss francs for the sports accidents and 38 million Swiss francs for all accidents.

Swiss Council for Accident Prevention [5], who then develop specific preventive measures on the basis of this information. The authors of this study have evaluated these data for sports accidents by comparable statistical methods and placed the results in relation to all accidents (Table 4).

The near 300,000 injuries resulting from sports accidents, with associated direct treatment costs of 1.1 billion Swiss francs and total costs of 3.5 billion Swiss francs annually, account for a considerable proportion of all accidents. These figures also highlight the need for the continuing development of targeted accident prevention measures. Referring the accidents observed to insufficiently active or active individuals has not been possible to date. However, there is some preliminary evidence from Switzerland supporting the hypothesis that individuals not regularly active or out of practice, and thus poorly prepared for sporting activity, are at higher risk for sport accidents [8].

Any apparent contradiction between the aspects of activity promotion and accident prevention is also countered by the fact that, from the health standpoint, activities associated with a particularly low risk for accidents (e.g. walking, cycling, endurance sports and fitness training), are specifically recommended for inactive individuals [8, 9]. Good preparation, risk control and practising the right sports way are the goals of both accident prevention and health promotion.

Conclusions

The latest figures from the study undertaken by the Department of Medical Economics of the Institute of Social and Preventive Medicine and the University Hospital of Zurich show that, in addition to their positive effects on well-being, quality of life and performance, regular physical activity and sport have important public health implications in Switzerland, with some 2.3 million cases of disease and at least 3,300 deaths prevented each year. Moreover, the economic potential of regular exercise is still not adequately exploited. The annual direct treatment cost savings of 2.7 billion Swiss francs already achieved by regular activity, plus the indirect savings of 1.4 billion Swiss francs (though these should be interpreted with caution since they only take into account loss of income), are impressive figures. On the other hand, the cautious estimates of an annual 1.4 million disease cases, almost 2,000 deaths and direct and indirect costs of 1.6 and 0.8 billion Swiss francs, respectively, caused by insufficient activity, clearly indicate, both for reasons of public health and expenditure, that any further increase in inactivity is unacceptable and that a high priority should be given to attempts to increase the proportion of the population physically active.

An important component of health promotion through activity and sport is the control and reduction of associated risks. Of prime importance are the almost 300,000 sports accidents in Switzerland suffered by the insufficiently active and active alike. These cause around 160 deaths and incur direct treatment costs of 1.1 billion Swiss francs and indirect costs of 2.3 billion Swiss francs. It is self-evident, for economic reasons too, that measures aimed at risk control and accident prevention in sport should be continued and intensified according to the specific needs, so that the desired result of increased activity and sport among the Swiss population does not also lead to higher accident figures.

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* These documents and further information on this subject can be found on the website of the Network HEPA Switzerland (www.hepa.ch)

° These documents can be ordered from the Swiss Council for Accident Prevention bfu via their website: www.bfu.ch