

Fact sheet

Safety in Sport: why it is time to act

What is at stake?

Sport and physical activities are most beneficial for health. Regular exercise and training up to a certain workload lead to a higher levels of physical fitness and health. It is widely acknowledged that physical activity contributes to health and well-being, and in particular to the prevention of obesity, diabetes and cardio-vascular diseases. Sport brings also a great array of other societal and economic benefits to society.

However, a substantial amount of these health benefits gets lost due to sport related injuries and more health gains can be obtained by a wider application of proven effective measures to increase safety in sport and thus preventing sport related injuries. The two public health strategies of promoting physical activities and promoting safety need to become more strongly interconnected in order to provide maximum health gains. Promoting physical activity and improving safety in sport and physical activities are two sides of the same coin of public health promotion and should better be combined in policy and actions.

While the societal benefits of sport - such as enhanced level of fitness, reduced disease risk, positive recreational and educational effects and increased opportunities for integrating marginalised groups - the unwanted side-effects and societal costs due to injuries are less well acknowledged. For the sport sector itself, it should be taken into account that sport injuries can damage directly its investments in players and their results in competitions. At amateur level, sport injuries may deter people to engage into physical activities and it is one of the reasons for people to stop in an early stage their sportive activities. Although a certain level of injury risk is inherent to every sportive activity, the risk can be lowered by appropriate prevention measures, which results in a better balance of health gains due to exercise and health losses due to injuries, and higher chances of motivating people to stay or to become active.

The purpose of this factsheet is to make policy makers at EU-level, in national governments, in particular in the sport and the health sector, and decision makers in sport organisations aware of the impact of sport related injuries and of the benefits of making better use of evidence based strategies to increase safety and health of those actively engaged in sport and physical activities.

In this factsheet, sport is being defined broadly as an activity that requires energy expenditure and is being performed with an athletic and/ or health promoting intention (sportive activity). This includes a variety of physical activities which can also be performed at a rather low level of ambition, e.g. just for fun or relaxation like hiking, recreational bicycling, inline-skating, ice-skating, boating or swimming. Explicitly excluded are other not sportive forms of physical activities like walking, gardening, etc. This factsheet addresses all physical activities which are frequently practised for the purpose of increasing bodily fitness and for the fun of sporting, irrespective of type, setting and performance level.

Benefits of sport are evident

Sport is one of the most common forms of leisure activities and an important social and economic phenomenon. Therefore, sport is distinct policy sector in most EU-countries, with a minister or state secretary for sport in charge who shares responsibility with other departments such as those related to economic, environmental and health affairs.

Health and well-being

Regular sportive activity contributes to reduce the risk of cardiovascular diseases by about half and the risk of diabetes type II and obesity by one third. Moreover, sport plays an important role in preventing skeletal disorders, in particular the onset of porous bones, back pain and joint disorders. In addition, physical activities that enhances balance and muscle strength in older adults are effective measures for preventing falls and consequent injuries such as hip and long bone fractures.
Regular sportive activity also enhances well being, as it stabilizes mood, reduces stress, enhances self confidence and ameliorates sleep. It enhances some brain functions like planning, decision making, short time mem-





ory and the ability to concentrate, thus may mitigate or prevent the onset of dementia. The prevention of these health problems will help to lower health system expenditures and increase quality of life among large segments in the population of Europe.

Thus, physical exercise is seen as a promising strategy for improving public health in the general population as well as among specific risk groups. Any kind of physical activity may contribute to enhanced health, but for achieving a measurable impact a person needs to be active at least for half an hour a day. The type of physical activity to recommend depends on the desired health goals to be obtained. For instance, endurance training has a positive effect on cardiovascular function but weight training helps against obesity and loss of bone density.

According to a recent Eurobarometer study, 8 out of 10 European citizens say that health enhancement is their major motive for being more active. But there are also other motives in play such as having a nice time with friends, enjoying physical performance and loosing weight. However, perceived lack of time, lack of personal discipline or failing social support still are important barriers for adopting a more active lifestyle.

Educational and social effects

Sport also appeals to needs for socialising. For young people as well as for older adults, meeting with others is an important reason to do sport. Sport helps to develop team spirit, friendship and a shared responsibility in obeying rules of the game and fair play. Sport is a field in which people can learn to contribute to their community by engaging in voluntary work such as assisting in training of pupils. Especially for young people it offers opportunities to involve themselves into society and to become active citizens. Sport is also the biggest provider of voluntary work, especially for youngsters aged from 15-24.

Sport offers also an opportunity to minority groups for positive social interaction and more rapid integration in host society.

Box: Playing sport in the EU

- *Almost 4 out of 10 Europeans aged 15 years and over participate in sport once a week (170 out of 420 million).*
- *Health improvement, e.g. against obesity, is perceived to be the main benefit of sport (by 8 out of 10 persons).*
- *The main reasons for not participating in any sport are lack of time (34%) and a general dislike of sports (25%).*
- *Men exercise more than women: 41% of men interviewed claim they participate in sport at least once a week, while the proportion of women is less (35%).*
- *While 60% of the 15-24 old category participate in sport at least once a week, the proportion decreases to only 28% for the 55 + category.*

Source: Eurobarometer

Economic importance of sport

Sport related business activities are growing rapidly and account for an estimated 2% of the GNP in EU countries. This includes public spending for facilities and events, expenditures of sport clubs and federations, expenditures of facility providers and consumer expenditures e.g. for sport equipment, clothing and travelling. In addition large sums are poured into the economy through sport sponsoring, sport related advertising and media contracts.
The share of sport sector related paid workers within the total work force varies between countries and ranges between 2 and 5 percent. This variation is due to the different traditions in countries as to the share of voluntary workers in sport organisations. There is a need to enhance good governance in sport and to ensure that sport associations and clubs continue to develop in a professional and efficient manner.

Why we need to act

There is no life without risk. Thus also in sport and physical activities the possible risks of accidents resulting into moderate or even severe injuries of even death should be well anticipated and controlled.



Most of the available evidence as to the magnitude and the severity of the injury issue is based on injuries that are serious enough to require medical attention, in particular treatment in emergency departments at hospitals. Emergency departments provide relevant information as they receive the most severe injuries, in sufficiently large volumes of patients to make proper analysis possible including the calculation of national estimates of incidence rates.

Injury is defined as the physical damage that results when a human body is suddenly and unexpectedly subjected to intolerable levels of external energy or forces. The time between exposure to the external energy or forces and the appearance of an injury is relatively short. However, in sport a substantial proportion of injuries result from longer term exposure to external forces, the so-called overuse injuries. The difficulty is that, due to the longer term exposure effect, the cause-effect relation in overuse injuries is not always obvious and therefore these injuries are not accurately reported in medical records as to be linked to a sporting or physical activity.

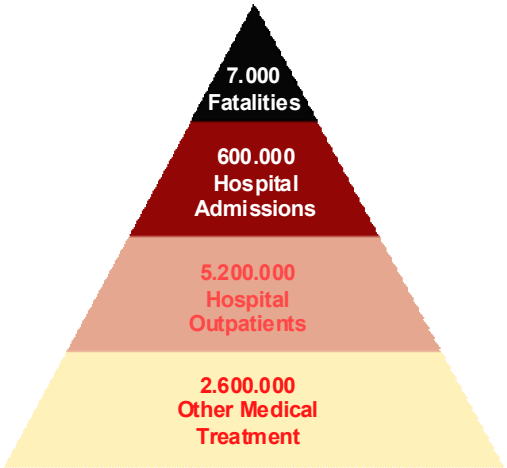
The injury risk is commonly being defined as the product of the probability that an adverse event occurs within a specified period of time (injury incidence) and the average consequence of such adverse events (severity of injury). Incidence can be defined as the number of new injuries within a given time in a given population. For guiding public health actions the entire population or population segments (of a country) are taken as denominator. For these purposes those activities that are related to the greatest risks in terms of number of casualties and average severity of injuries has to be identified. For comparing the relative risk levels of various sportive activities, risk is usually expressed as the number of injuries per 100.000 participants or per 1000 hours or days of participation.

Sport injuries in the EU

Mortality and hospitalisation statistics often lack information on the type of sport that caused the injury or on the place of occurrence like type of sporting ground. Only rough indications of the size and nature of sport injuries can be derived from health and death statistics. Fortunately, the hospital based injury surveillance system IDB (European Injury Database) provides a little bit more information, in particular on the circumstances of the injury event, the activity involved, the place of occurrence and products involved. The IDB register on treatments in hospital emergency departments has been introduced in order to guide targeted prevention and it is intended to have it being expanded to all member states by 2015. Although, in 2010, only 12 countries were collecting IDB data, the sample is sufficiently large to extrapolate these figures for the European Community as a whole. Regarding other forms of medical treatment, e.g. in doctor's offices, rough estimates can be made through national health interview survey.

Based on the Eurostat and WHO mortality database, the number of fatal sport injuries can be estimated at 7.000 fatalities per year (Fig. 1). Based on IDB it is estimated that annually almost 6 million persons need treatment in a hospital due to an accident related to physical or sportive activity, of whom 10% require hospitalisation for one day or more.

Figure 1: The Sport Injury Pyramid for the European Union (EU27)



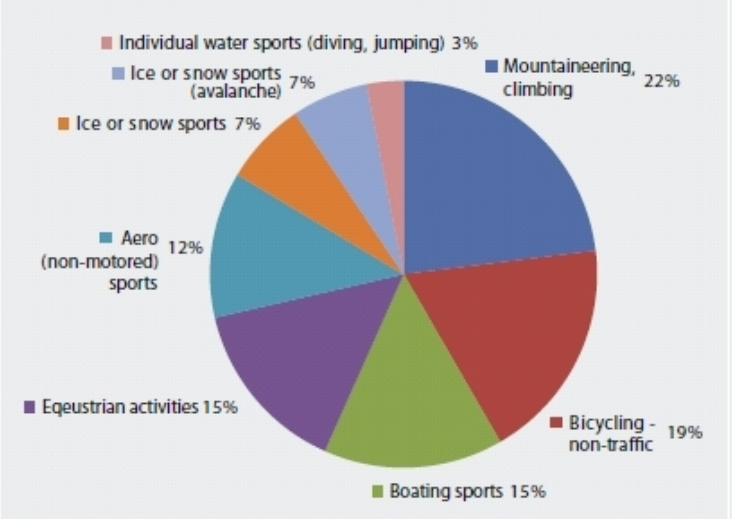
Source: Eurostat 2005-2007; EU IDB 2005-2007



The *fatal accidents* in sport may relate to various categories of sport, like rock climbing, boating sport, horse riding, drowning in natural bodies of water and swimming pools and non-traffic bicycle accidents (Figure 2). But most sport related fatalities are due to drowning in open water (about 6000 out of 7000), and only about 1000 are due to other sport related activities. In general, fatalities are relatively rare in sport compared to other activities as moving from one place to another by car or other vehicle.

While accidental deaths are rather exceptional events in for instance team sport or gymnastics, a few sporting activities seem to have an above average fatality rate: in particular water sport, aviation sport, motor sport, bicycling and mountaineering. Adolescents between 15 and 24 years of age are over-represented in the fatal cases particularly in 'individual water sport', mainly by jumping into shallow water, and 'Ice or snow sport'. Older people above the age of 60 account for 30% of all swimming related fatalities.

Figure 2: Fatal sport injuries by category of sport, excluding swimming



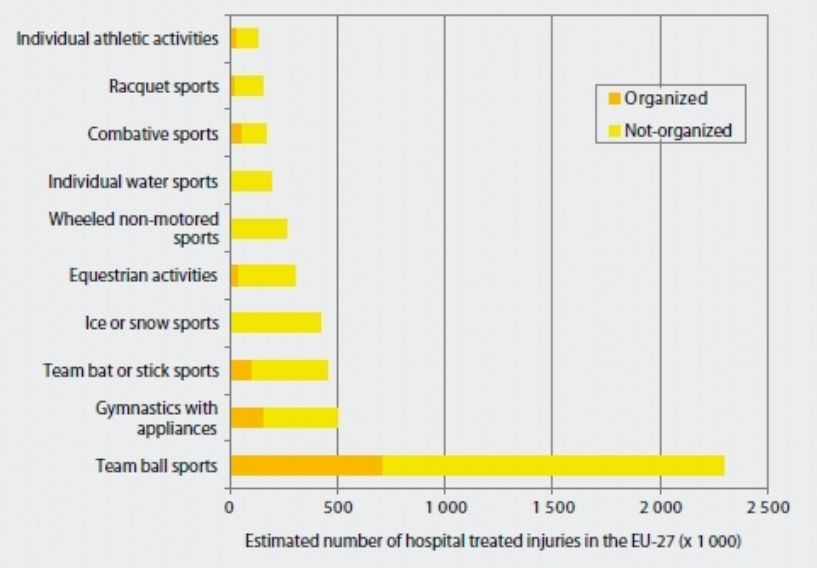
Source: WHO MDB 2004-2007

As to the *non-fatal injuries* related to physical activities and sport, each year about 4.5 million people aged 15 years and above are being treated in hospital for a sport injury. 25% of the sport injuries affect young people in the age of 15 to 24 years. When children under the age of 15 are included, the estimate is 5.8 million sport injuries annually.

'Team ball sport' account for about 40% of all hospital treated sport injuries. By specific type of ball sport the ranking order in team ball sport is: soccer (74%), basketball (8%), volleyball (7%), handball (3%). The majority of sport injuries result from participation in non-organized sport according to the EU IDB records (Figure 3).

For most types of sport, due to gender differences in participation rates, more men are injured than women (67% overall); notable exceptions are gymnastics (57% women) and horse riding (88% women). This of course reflects gender preferences of sport to engage into. The share of women injured in sport injuries has been steadily increasing in the last 10 years (from 26% in 1998 to 33% in 2007), which also reflects the noticeable increase of women participation in sport and physical activities.

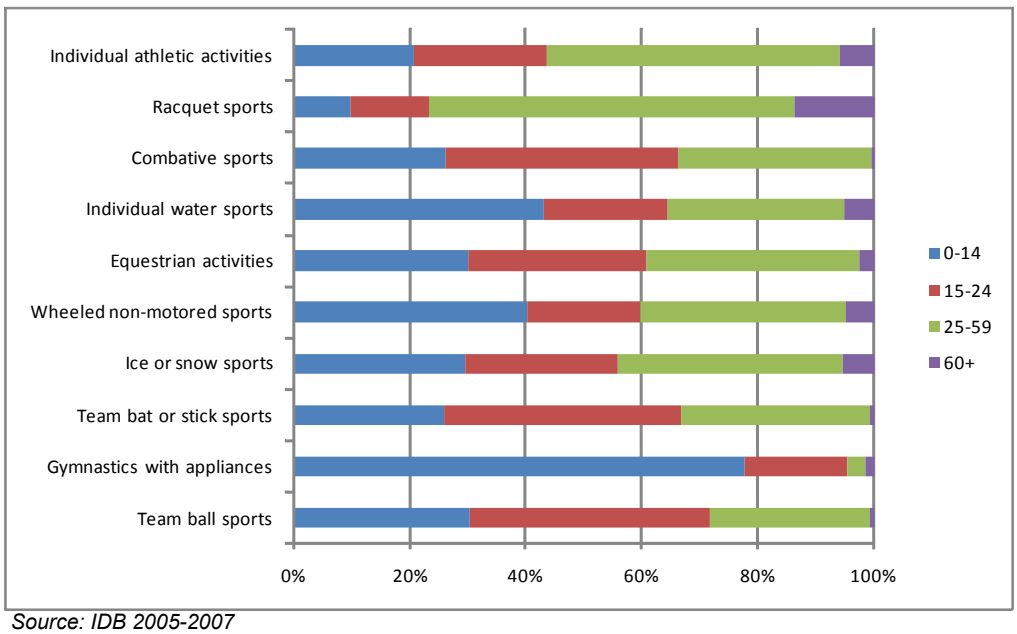
Figure 3: EU estimates of hospital treated sport injuries by type of sport, participation (organized / not organized)



Source: IDB 2005-2007

As to age (Figure 4), it is clear that the figures reflect the differences in sport participation between the respective age groups. In particular people above the age of 60 seem to be rarely engaged in formal sport activities while in most formal sport the age group under 25 represents half of the total number of reported injuries. Especially in gymnastics this age group is over represented, with children between the age of 0-14 having a 80% share in all gymnastics related injuries.

Figure 4: Top 10 type of sport by age-group of injury victims)



Source: IDB 2005-2007



Health care costs of sport injuries in the EU

In calculating the economic burden of diseases and injuries one has to take into account the direct costs as well as the indirect costs. In injury cost analysis, direct costs comprises both costs related to the injury (e.g. medical treatment) as well as to the event (e.g. material damage). Indirect (socioeconomic) costs are other economic losses, mainly the loss of productivity due to sick-leaves, impairments, and years of live lost.

For sport injuries, there are no comprehensive and comparable estimates available at EU-level. In practice only the number of days of in-hospital treatments is available as cost indicator and so, on the average costs of a day in hospital, one can produce an estimate for the economic burden taking into account the relative severity of the injuries. For all other treatments, one may relate a price tag to certain types of injuries or estimate for instance an average cost of an injury treated by a general practitioner.

The EuroCost study performed the latest cost calculation analysis for countries in the EU, that could provide more detailed cost information related to a selection of sport categories. The study used an incidence-based approach, calculating the medical costs of injuries occurring in a specific year. The incidence-based approach multiplied the incidence of specific patient groups (defined by injury type and severity level, age and sex) with the average costs of that patient group. Subsequently, the costs of all patient groups are summed up. Two primary data sources used to estimate the incidence of injuries were the Emergency Department based surveillance systems (IDB) and the Hospital Discharge Registers (HDR). Therefore, it does not cover cost of direct non-medical costs and indirect costs (Table 1).

Table 1 The medical costs of sport injuries in the European Union (EU27)

	Cases per year	Average costs per case in €	Total average costs per year in €
Fatalities	7.000	1.950	7.000.000
In-patients	600.000	2.040	1.224.000.000
ED-patients	5.200.000	90	468.000.000
GP-patients	2.600.000	90	234.000.000
Total			1.933.000.000

These calculations led to the following estimated annual direct medical related costs for hospital treatment of injuries for a selection of ball-sport:

Soccer:	290 million Euros
Basketball:	27 million Euros
Handball:	19 million Euros
Volleyball:	32 million Euros
American Football	13 million Euros
Field Hockey	30 million Euros
Other team-sport	410 million Euros



To sum up

While the societal benefits of sport are widely known, the unwanted side-effects or societal costs such as loss of quality of life due to injuries are less well acknowledged. These benefits and disbenefits can be summarised as presented in Table 2.

It might be interesting to draw an macro-economic balance of all relevant benefits and disbenefits related to physical activities and sport, but that seems to be a daunting tasks as a large part of the societal consequences such as social integration, can hardly be monetarised. Somewhat easier is to balance health gains and losses, as for health the same indicators as medical treatments, days of hospital care, life years or health life years can be estimated. A few studies have been done so, focusing on health gains and losses, and indicate that sport injuries do not entirely annihilate the positive health effects of sport, but reduce the health benefit significantly by an estimate of 40-50%.

Therefore it is time to address the challenge of improving health and safety of physical activities and sport and start by tackling those activities that are related to the greatest risks in terms of number of casualties and average severity of injuries sustained.

Table 2 Summary of benefits and disbenefits of physical activities and sport

Beneficiaries	Benefits of sport	Disbenefits due to sport injuries
Health	Improvement of health, reduced risk for certain dideases, gain of healthy life years, reduction of costs for health care and welfare, reduction of sick-leaves, increased sense of well-being	Health problems due to acute and chronic injuries, loss of healthy life years, additional costs for health care and welfare, and lost productivity.
Community	Positive educational effects (e.g. teamwork, community spirit, self-discipline), integration of marginalized groups	Perceived injury risk deters people from considering to participate in sport
Sport clubs	Income from members and sponsors, increase in jobs in sport clubs, scale of economy	Losses by drop-outs, reduction of chances for success in competition, increased insurance fees. Perceived injury risk deters people to participate in sport
Sport-related business	Income and jobs in commercial sport service providers, sport good industry and trade, media, advertisement, tourisms	Negative image due to unacceptable risks involved in certain sports.

Who needs to act?

In most countries there are national policies in place as to the promotion of sport and physical activities, jointly endorsed by national and local authorities and the sport sector. However, only a few counties seem to have an explicit national programme in place for promoting safety in sport.

It is evident that governing bodies of sport organisations have a major responsibility for identifying and managing the risks associated with the respective type of sport and for implementing the latest state of art in measures to control them.

However, sport organisations vary hugely in professionalism at amateur level of play in particular, therefore there are huge differences between the sport sectors in their appreciation of the importance of the safety issue in sport and their taking responsibility to act.

In some countries, in particular in the German speaking region, private and also public insurance companies have taken up a role in supporting sport organisations in raising awareness among athletes and in promoting the use of safety of equipment. Besides that, manufacturers and retailers in sport gear,



equipment and other services have a role to play in ensuring safety of the products and services provided. And last but not least, the various professionals that are active in the world of sport, such as those active in health promotion, sport medicine, physiotherapy and sport science, have to increase their efforts in awareness raising and in supporting take up of evidence based prevention measures. In Table 3 a list is being provided of relevant stakeholders and their role in the promotion of safety in sport.

Table 3 Non-exhaustive list of stakeholders and their role in the promotion of safety in sport

Stakeholder	Stakeholders benefit	Potential impact	What can stakeholders do?
European Commission	- Political interest in promoting health enhancing physical activities (HEPA) - Ensure physical integrity of sport participants - Council recommendation on Injury prevention - Reduce the negative effect of injuries on promo physical activities	- EC is important for initiating EU-wide discussion on safety in sport - Strong impact sport and youth organisations	- Increase awareness of preventability of injuries in sport in the MSs by benchmarking - Continue to provide statistical information on health and economic burden of sport injuries - Stimulate sport organisations in taking up safety management programmes as part of good governance - Exchange of good practices (e.g. the inclusion of safety management in the overall policy of associations)
WHO-Europe	- Reduce the negative effect of injuries on promo physical activities - Strong interest in injury prevention and HEPA promotion	- Authority in Europe for national governments - Capable in forging European wide exchange and actions	- Identifying good practices - Dissemination of technical guidelines and tools - Networking with practitioners
National Governmental Departments for Public Health and for Sports	- The health sector has a limited interest in sport but growing interest in promoting 'sports for all' - Most sport departments have prime focus on top sport instead of amateur sports.	- Ministries have a limited influence on sports organizations (who profile themselves often as 'trade unions') - MoH may well energize the medical field in profilling need for sport injury control	- Initiating national collaboration and exchange on sport safety - Stimulate initiatives from sport organisations to include safety management as part of good governance in sport - Use current financing and licensing systems for making safety requirements mandatory
Regional Sport Councils	- Focused on promo physical activities, less active in injury prevention	- Advisory role, but in some counties/ regions also have an important financial stake in sport	- Assistance in raising awareness among local clubs and associations - Use licensing and/or financing schemes for mandatory safety requirements for clubs



Continued Table 3 Non-exhaustive list of stakeholders and their role in the promotion of safety in sport

Stakeholder	Stakeholders benefit	Potential impact	What can stakeholders do?
European non-governmental sport organizations ENGSO (i.e. national Olympic Committees in EU)	- Reduce the negative effect of injuries on promo physical activities - Increase sport participation by making sporting safer	- Have impact on national sport clubs and associations (strategic and operational) - Have expertise available in sport medicine and sport injury control measures	- Assist in raising awareness in national associations as to injury risk in sport and their prevention - Provide sport medical expertise and authority in communication to local sport organisations - Provide platforms for exchange of experiences (e.g. capacity building network, conferences)
European and National Federations	- Focused on sport as entertainment (media and sponsoring) - Enhance appeal of respective category of sport toward members and potential new members - Reduce drop out of members due to injuries sustained - Improve reputation of their sport, if considered as very risky (e.g. team sport)	- Strong influence on organization and management at national level and local level	- Regular information to national members on project, highlighting the work done by pilot clubs - Coordinate actions as to the full integration of safety management scheme in standard procedures for education and training of coaches in all local clubs
European Scientific Networks (Federation of Sport medicine/College of sport scientists/ Federation of Sport physiotherapists)	- Interested in scientific aspect of project and the results	- Great impact on education and training of professional staff in sport organisations	- Include safety management in curriculum and continuous education programmes - Consistent advise to sportsmen in line with evidence from science
Manufacturers	- Risk assessment and ways to promote new products - Corporate communications and PR	- Powerful in communication towards sportsmen - Some have financial influence on clubs due to sponsorship	- Assist in disseminating available evidence based programmes for injury reduction - Assistance to national and local clubs in implementing recommendations and tools
Insurers	- Some interest in promo physical activities, less in injury prevention - Interested in accident prevention at large and sport injury prevention in particular	- Weak impact on individual sportsmen, unless financial incentives are being used - In case of collective policies, insurers may demand proper safety management programmes to be in place	- Help in awareness raising among the general population and costumers - May include incentives in premium policies - Active dissemination of general prevention principles



In the Treaty of Lisbon, Member States agreed to coordinate their policies and programmes in order to improve public health, prevent physical illness, and obviate sourcesof danger to physical health. The Treaty also provides that the Union shall strengthen the European dimension of sport by amongst others protecting the physical and moral integrity of sportsman and women. Thus, the Treaty provides the Commission substantial powers to take any useful initiative to promote such coordination, in particular initiatives aiming at guidelines and indicators, the organization of exchange of good practices and the preparation of periodic monitoring and evaluation.

Finally the Council Recommendation on the prevention of injury and the promotion of safety clearly earmarks sport injuries as a priority for more action and identify the need for better information for decision and policy makers in the area of sport on the burden of sport injury as well as on the opportunities to reduce these risks effectively.

Time to act now

Considering the uncontested overall positive aspects of sport, people should be encouraged to maintain, and if necessary increase, their participation in sport and physical activities. When exercising, injuries may be unavoidable to a certain extent, but there are plenty of options to reduce the injury risk, such as promoting the use of personal protective equipment, better training methods, modification of rules, and better standards for sport facilities and fields.
Unfortunately, only few decision makers in the area of sport are aware of the size of the problem, its negative effect on the “productivity” of sport, and the opportunities for tackling the injury problem. Better information on the burden of sport injuries on one side and opportunities for increasing the health benefits by injury prevention on the other side, is necessary.

Better injury data needed

The research literature on sport related injuries is quite extensive, however also characterised by fragmented interests in specific types of sports and/or limbs affected. Most countries have no comprehensive set of data sources available that allow a complete picture of the magnitude and severity of sports-related injuries and the risk factors involved. This hinders a sound assessment of:

- the relative burden of individual types of sports vis-à-vis the total burden of sport injuries, with a view to identify sports which the strongest needs for improvement;
- groups of participants with above average injury risk, in order to identify target groups with the strongest needs of protection;
- trends in incidence rates in order to monitor the development of risks over the years; and
- variability between countries, to identify the impact of different traditions in training, coaching and applications of rules and regulations.

In order to amend these deficiencies in injury data provision the following recommendations are to be made:

- The recording of deaths and hospital admissions, in all countries currently done on the base of the WHO-International Classification of Diseases (ICD-10), needs extended by a consistent use of the "fourth” and the “fifth digit” classification options within the set of 'external cause'-codes which specify the setting of an injury (sporting area) and the activity related to an injury (sporting activity).

- All Emergency Departments should register patients in accordance with the so-called Minimum Data Set for injuries that has been developed by the EU-expert group on injury surveillance, complemented with the full data set to be implemented in a representative sample of 'sport injury reference hospitals'.

- As a huge number of injuries are treated



in centres detached from hospitals, e.g. the surgeon's office or by physiotherapist, additional sources of information need to be explored to complete the entire picture of sports related injury incidence in a given population. Household surveys, e.g. the European Health Interview System, may give some indications as to the magnitude of the injuries that did not enter into a hospital. Unfortunately, such surveys lack specificity as to the exact nature of the injury and the circumstances due to the limitations inherent to interview surveys.

As most of the data sources are embedded in the health system, the Ministries of Health should ensure that provision of the minimum set of data is made mandatory from Emergency departments and the full ICD-classification for the severe injuries that require hospital admission and for fatal injuries.

Clubs and service providers should systematically report on injury events

Most sports facilities are provided either by not-for-profit clubs (e.g. in team sports) or by commercial service providers (e.g. in fitness training or skiing). It is clear that these institutions providing facilities, equipment, instructions have an important responsibility also for the safety of the members or costumers. Often, these service providers have the best knowledge of and the authority and power to control injury risks, e.g. by instructing costumers, by offering facilities and equipment that meet safety standards, by ensuring appropriate training levels among players/ costumers and by making them obeying rules and regulations.

Sport clubs and sport service providers should take their responsibility and the first thing to do is to have every injury event that happens within their activity domain being reported and evaluated as to the need for further safety measures and precautions to take. Without information about the causes and circumstances of injury events no appropriate measures can be developed, without valid data comparable over the time no monitoring of the developments is possible, and without information about types of injuries and persons at risk no targeted prevention is possible.

The health benefits of sports should be optimised

Unfortunately, a considerable share of health gains due to sport, and consequent savings of expenditures for the treatment of diseases due to lack of activity, get lost due to injuries and consequent increase in the expenditures for treating these injuries. Therefore, more health gains can be obtained by a wider application of proven effective measures to increase safety in sport and thus preventing sport related injuries.

In order to achieve maximum health benefits, a dual strategy needs to be followed by promoting health enhancing sports as well as the prevention of injuries. Future programmes for promoting health enhancing physical activities should include a substantial injury prevention component.

As national and local authorities have an important stake in financing sports activities and the licensing of commercial sports facilities, they should use their powers to require the respective entrepreneurs, in profit as well as non profit sector, to have dedicated safety management schemes in place that safeguards people from unwanted side effects from exercising sports and physical activities. If necessary, such requirements



Read also:



Acknowledgements

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For references to sources of information presented in this fact sheet and for further references, readers are advised

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