

Injury surveillance in multi-sport events - the IOC approach

**Junge A¹, Engebretsen L^{2,3}, Alonso JM⁴, Renström P², Mountjoy M^{2,5},
Dvorak J^{1,6}**

From

¹ FIFA Medical Assessment and Research Centre (F-MARC), Zurich, Switzerland
and Schulthess Klinik, Zurich, Switzerland

² International Olympic Committee (IOC) and

³ Oslo Sports Trauma Research Centre (OSTRC)

⁴ International Association of Athletics Federations (IAAF)

⁵ Fédération International de Natation (FINA)

⁶ Fédération International de Football Association (FIFA)

*Address correspondence and reprint requests to Dr. Astrid Junge, Schulthess Klinik,
Lengghalde 2, CH-8008 Zurich, Switzerland.

No author or related institution has received any financial benefit in connection with this
study. See "Acknowledgements" for funding information.

Abstract

Background: The protection of the athletes' health by preventing injuries is an important task for the international sports federations. Standardized injury surveillance provides not only important epidemiological information, but also directions for injury prevention, and the opportunity for monitoring long-term changes in the frequency and circumstances of injury. Numerous studies have evaluated sports injuries during the season, but only few have focused on injuries during major sport events such as World Championships, World Cups or the Olympic Games.

Methods: The International Olympic Committee (IOC) has decided to conduct an injury surveillance study during the Olympic Games 2008 in Beijing and asked a group of experienced researchers to review existing injury report systems and develop a scientific sound and practical injury surveillance system for large multi-sport events.

Results: A concise injury surveillance system for multi-sports events was developed based on established injury-reporting system developed for team sports tournaments. The injury report system has proven feasible for team sports during the 2004 Olympics and for individual sports during the IAAF World Championship 2007. The most important principles and advantages of the system are comprehensive definition of injury, injury report by the physician responsible for the athlete, all injuries reported on a single page and daily report irrespective of whether or not an injury occurred. The team physicians should report „All injuries (traumatic and overuse) newly incurred in competition or training during the Olympic Games regardless of the consequences with respect to absence from competition or training” on the provided report form. Implementation of the injury surveillance system, all definitions, the report form, the analysis and reporting of data are described in detail to enable other researchers to implement an injury surveillance system in any sports tournament.

Conclusion: The injury surveillance system has been accepted by the experienced team physicians and shown feasible for single and multi-sport events. It can be modified regarding the specific objectives of a certain sport or research question, however, a standardised use of injury definition and report forms will ensure the comparability of results.

Keywords: injury surveillance, sport, athletes, tournament, review

Introduction

The protection of the athletes' health by preventing injuries is an important task for the international sports federations. Standardized assessment of sports injuries provides not only important epidemiological information, but also directions for injury prevention, and the opportunity for monitoring long-term changes in the frequency and circumstances of injury.^{15,16,25,29,38,52} Finch et al¹⁵ stated that injury surveillance during sporting events should be a part of the duty of care to the participants to help make future events safer. Therefore, the International Olympic Committee (IOC) has decided to conduct an injury surveillance study during the Olympic Games 2008 in Beijing.

Injury surveillance studies have been reported for different sport events, but the results of these studies cannot be compared with one another due to heterogeneous injury definitions, methods of data collection, observation periods, study designs and sample characteristics.^{5,14,26,50} The need for an agreement on the definition and standards to be used in sports injury epidemiology has been expressed,^{4,26,38,54} and consensus statements for certain sports, such as football¹⁹, rugby²⁰ and cricket⁴⁵ have been published. These consensus statements provide detailed approaches for injury surveillance studies within specific sports but they may not be appropriate where several diverse sports are being compared. Whilst some variations in methodology might be necessary to address the specific objectives of a particular sport, a broad consensus agreement on the methodology of sports injury surveillance would not only improve the scientific value of the studies on sports injuries substantially, but also help to generalise conclusions and recommendations, and combine the effort in injury prevention across different sports.

Injury surveillance systems for major sports events have been published by Harrison and Price²², Finch et al¹⁵ and Junge et al^{29,30}, but only the latter proved its feasibility in different types of sports tournaments.^{10,18,27-30,33,57} It should not be neglected that several organisations have developed and implemented injury report systems to register injuries of specific groups of athletes during the season such as the Canadian Intercollegiate Sport Injury Registry (CISIR,³⁹) and the National Collegiate Athletic Association Injury Surveillance System (ISS,⁹). These systems include injuries during tournaments of the athletes surveyed but are not tailor-made to monitor injuries during major sports events. In major tournaments - such as World Championships, World Cups or the Olympic Games - several teams with different

background and diverse medical support participate and it is more difficult to obtain reliable information about the incidence, occurrence and characteristics of injury.

There are only few injuries surveillance studies during single sports tournaments, except for football and rugby, and even less for multi-sport events. Sports injury surveillance during major tournaments have been performed in football^{10,13,18,27-29,53,57}, rugby^{3,24,31,56}, volleyball⁴⁹, ice hockey^{47,48}, karate⁴¹, beach volleyball², handball³³ and athletics¹. For multi-sport events only eight studies were found in the literature, of which three focus on disabled athletes.^{37,43,55}

Martin et al³⁶ registered all medical contacts and encounters due to injuries and illnesses of 3028 athletes who participated in the 1985 Junior Olympics in 13 different sports. The injured athletes contacted first the athletic trainer who evaluated and treated the injury, and refer the athlete to a physician if necessary. Injury rates in different sports were reported per 100 participants.

Laskowski et al³⁴ analysed all medical contacts and treatment required by the 6243 participants in 21 sports at the 1994 Star of the North Summer Games. The numbers of injured athletes were related to the numbers of participants in the respective sport, but no exposure time or exposure-related injury rates were reported.

Cunningham and Cunningham⁶ (1996) surveyed the injuries of 5106 participants competing in 19 sports during the 1994 Australian University Games. Medical coverage was provide by doctors, physiotherapists, nurses, qualified sports trainers and Australian Red Cross first aid staff on-site at sports events, in the central medical clinics and the nearby public hospital. A recordable injury was defined as any incident occurring during warm-up or competition and which required medical attention, on-field management to enable continued participation, or removal from the playing field. Only the number and percentage of injured athletes with respect to the different sports, but no exposure time or exposure related injury rates were reported.

Greene and Bernhardt²¹ studied the injuries of 31580 athletes participating in ten sports of the Badger States Summer Games of three consecutive years 1994-96. An injury was recorded if (a) it disqualified or limited the athlete from participation, (b) transportation to a medical facility was necessary, or (c) first aid care, treatment or external support was given. The

numbers of injured athletes were related to the numbers of participants in the respective sport, but no exposure time or exposure-related injury rates were reported.

Junge et al³⁰ (2006) recorded and analysed the incidence, circumstances and characteristics of injuries in all 14 team sport tournaments (football, handball, basketball, field hockey, baseball, softball, water polo and volleyball) during the Olympic Games 2004 using an injury surveillance system already established in football^{10,18,27-29,57} and handball³³. All injuries (traumatic or overuse) incurred during a match that received medical attention were reported after each match by the team physician. Exposure-related injury rates were reported for the different team sports.

The aims of the present project are to present standards for injury surveillance during major single- and multi-sports tournaments, and specifically to provide the methodology that will be applied during the 2008 Olympic Games in Beijing.

METHODS

The feasibility and quality of an injury-report system is dependent on the definition of injury, the source of information, the characteristics of the injury documentation form and the availability of exposure data.^{5,14,26} In accordance with the guidelines of the Centers for Disease Control it should also be simple, flexible, acceptable, sensitive, representative and immediate/timely.³⁸

The IOC **injury surveillance system for multi-sports events** is based on an injury-reporting system well-established for top-level international football^{10,18,27-29,57} and handball³³ tournaments and already applied for all team sports tournaments during the Olympic Games 2004³⁰. This injury-reporting system can be briefly summarised as followed: The physicians of all participating teams take part in a pre-tournament instructional meeting and are informed about how to fill in the injury report forms. The team physicians are requested to report all injuries (or the non-occurrence of injuries) after each match on a specially designed, single page injury report form. The definition of injury and injury characteristics to be reported are based on the review of the literature and in agreement with a recent consensus statement on

data collection in football.¹⁹ The completed forms are collected after each match by a medical officer of the respective sport federation and passed on to the coordinator of the study. The acceptability of and compliance with the procedure was excellent, as demonstrated by the response rate exceeding 90% in almost all tournaments. The consistent findings in different studies demonstrated the high quality of the data obtained.³⁰

This injury-reporting system developed for team sports tournaments was modified to be applicable for both individual and team sports. The key **modifications** are:

What is reported: match injuries => all injuries due to competition and/or training
 Who reports injury: team physician => physician of the national team (and physicians of the medical centre, polyclinic)
 When injury is reported: after each match => daily
 Injury report form: info on consequences of injury => info about sport event.

While modifying the injury-reporting system, the most important principles and advantages of the established system, such as consensus definition of injury, injury report by the physician responsible for the athlete, report related to a time period independent of whether or not an injury occurred, one report form per team (not per injury) were preserved. The modified injury surveillance system was implemented and proven feasible during the World Championships of the International Association of Athletics Federations (IAAF) 2007 in Osaka.¹

Definition of Injury

In defining a sports injury, it is clear that the injury should be the result of participation in the relevant sport, but establishing the most appropriate threshold for reporting can be somewhat problematic.^{5,23,26,42,44} Previous studies have employed a variety of criteria: all physical complaints regardless of the consequences, injuries which lead to a restriction in participation or to time loss (on the same or a following day), and those injuries which require medical attention/treatment. Based on a recent international consensus on the definition and data collection procedures in studies of football injuries,¹⁹ an injury was defined as any musculo-skeletal complaint incurred due to competition and/or training that received medical attention regardless of the consequences with respect to absence from competition or training.

Consequently, for the Beijing Olympics, the responsible physicians are asked to report: “*All injuries (traumatic and overuse) newly incurred in competition or training during the Olympic Games regardless of the consequences with respect to absence from competition or training*”. This injury definition includes four aspects that can be modified in future studies: (a) all injuries that received medical attention (not only time-loss or reduced performance), (b) newly incurred (exclusion of pre-existing and not fully rehabilitated injuries), (c) in competition or training injuries, (d) during the period of the tournament and (e) exclusion of illnesses and diseases.

(a) All injuries that received medical attention: The advantage of this broad definition of injury is that it becomes possible to assess the impact of the full spectrum of injuries from mild contusions to fractures, as this might be of importance in assessing chronic injuries.²³ In fact, an analysis of injury sequences shows that minor injuries are often followed by moderate or major ones,¹² and acute complaints are a predictor of subsequent injuries¹¹. In addition, athletes sometimes compete despite of an injury, and a potential influence of the injury on performance is a subjective judgement. Finally, an “all-encompassing” injury definition²³ does not leave it up to the physician to judge which injuries should or should not be included. The availability of additional information regarding *time-loss* in sport (estimated duration of subsequent absence from sport) allows expression of the incidence of time-loss injury and the possibility of comparing the results with studies that used that definition.

(b) Newly incurred injuries: In agreement with the consensus statements for football¹⁹ and rugby²⁰, *re-injuries* (injuries of the same location and type) should only be reported if the athlete has returned to full participation after the previous injury; exacerbations of a (pre-existing) non-recovered injury should not be reported.

(c) Injuries in competition or training: In contrast to the injury-reporting system established for team sports, which requires the report of match injuries only, all injuries in *training* and in *competition* injuries that receive medical attention will be registered during the 2008 Olympic Games. Additional information concerning the event (e.g. competition, training, warm-up) will ensure that the data can be compared to previous studies.

Report by the responsible physician

Injuries should be diagnosed and reported by qualified medical personal (team physician, physiotherapist) to ensure valid information on the characteristics of injury and a comparable standard of the data. It is of advantage if each team has one designated contact person who takes part in the instructional meeting and is accessible for questions. In general, the national head team physician should be responsible for reporting injuries of their athletes. The team physicians should report all newly incurred injuries (or the non-occurrence of injuries) daily on the provided injury report form and to return it daily to the study centre in the stadium or headquarter. In case the diagnosis (or the duration of absence) is revised later when more information about the injury is available, the team physician should report the injury again (with the previous data and location of injury to indicate that this is a revised report) and state the corrected information.

In order to receive information about injured athletes of teams that do not have a physician or physiotherapist, injuries should additionally be reported by the medical centres (in the stadium/venues) and/or the polyclinic physicians of local organisers. The medical centres may use the same or a slightly modified injury report form.

The injury report form

A simple and concise injury report form was developed and tested according to the recommendations of Finch et al¹⁵. The standardised form comprises a single page on which all sports injuries that received medical attention from the team physician during the day or, if no athlete was injured, the non-occurrence of injury should be described in tabular form (see appendix 1). The injury report form requires documentation of the following information: accreditation number of the athlete, sport and event, round/heat/training, date and time of injury, injured body part, type of injury, cause of injury and an estimate of the expected duration of subsequent absence from competition and/or training. For some variables (“sports and event”, “round / heat or training”, “date and time of injury”) the requested information slightly differs between individual and team sports. Sports where two teams of athletes who can be substituted during a match play against each other are defined as *team sports* (football, handball, basketball, field hockey, baseball, softball, water polo, volleyball). All other sports (which do not allow the substitution of athletes during a match, heat or race) were considered as *individual sports*, even if some include team competitions. Definitions of all parameters to be documented are given on the back page of the injury report form (see appendix 2 for

individual and team sports, appendix 3 for individual sports only). The injury report form should be provided in the relevant languages.

Accreditation number of the athlete: The accreditation number of the athletes should only be used (a) to avoid double reporting of an injury by the team physician and the medial centre / policlinics, (b) to recognize reports which provide revised information about an injury already reported and (c) to receive additional information about the injured athlete. Usually the organisers of the tournament (e.g. national/international sports federation or IOC) have a database with information on accreditation number, sex, date of birth, sport, event and country (sometimes also height and weight) of all registered athletes. Based on the accreditation number, this information can be added to the injury database. The great advantage is that the team physician does not need to document all these data, the injured athletes can be described more detailed and injured athletes can be compared to the uninjured one. Furthermore, it enables to identify the injury on video coverage of additional analysis.

The accreditation number of the athletes will not be entered into the injury database, and all data will subsequently be made anonymous. If it is not possible to document the accreditation number of the athletes for legal reasons in some countries, the injury report form has to be modified, and the team physicians and medial centre / policlinics need to also report the age, sex and nationality of the injured players.

Sport and event: A slightly different documentation is required depending on whether the athlete participate in team or individual sport. For injuries in *team sports* only the sport needs to be named (e.g. football, handball, basketball), for *all other sports* the sport and event should be stated (e.g. swimming - 4x 100m freestyle relay, track - 110m hurdles; Decathlon - high jump; Taekwondo - under 58kg, cycling - team sprint).

Round / heat or training: If the injury occurred during competition, the physician should report the match number or opponent team for *team sports*, for *all other sports* the round (e.g. first round, quarter-final, qualification, final) and heat or group (e.g. first heat, second run, first semi-final, qualifying group A). If the injury occurred at another occasion, the circumstances should be specified (e.g. training, warm-up).

Date and time of injury: The physicians should provide the date and the time when the

injury was incurred. For *team sports*, the minute in the match should be stated or calculated from the provided information in order to analyse the frequency of injury during the course of a match.

Injured body part: The physician should describe the location of injury in words and give the respective code(s) of the 24 injury locations (each eight of head and trunk, upper extremity and lower extremity) specified on the backside of the form. The selection of injury locations is based on the review of other injury reporting systems (e.g.^{8,30,35}), and the consensus statements for football¹⁹ and rugby²⁰, and allows comparison with other established coding systems such as Orchard Sports Injury Classification System⁴⁶, Sports Medicine Diagnostic Coding System⁴⁰. The locations can be summarised under main heading (head, trunk, upper and lower extremity), or might be in future studies subdivided in more detailed categories (e.g. m. quadriceps, m. adductor, m. abductor and hamstrings).

Type of injury: The physician should describe the type of injury in words and give the respective code(s) of the 19 injury types stated on the backside of the form. The selection of injury types is based on the review of other injury reporting systems^{8,22,30,35} and the related consensus statements for football¹⁹ and rugby²⁰, and allows comparison with other established coding systems such as Orchard Sports Injury Classification System⁴⁶, Sports Medicine Diagnostic Coding System⁴⁰. The types of injury can be summarised under main heading (muscle and tendon, joint and ligament, bone, skin, brain / spinal cord / peripheral nervous system and others), or might be in future studies subdivided in more detailed categories (e.g. concussion with and without loss of consciousness). In future studies other medical problems, such as illnesses, diseases, or mental complaints can be included as separate categories.

Cause of injury: The physician should describe the mechanism or cause of injury in words and give *one or more* of the respective codes for the twelve causes stated on the backside of the form. The selection of injury mechanism and causes is based on the review of the literature (e.g.^{15,35,40} and focus mainly on extrinsic risk factors. Since cause of injury is important information for injury prevention, the selected causes cover a wide spectrum, of which some (e.g. rule violation, foul play) might only apply for team sports. The main injury mechanisms are defined as follows: An *overuse* injury refers to an injury resulting from repeated micro-trauma without a single, identifiable event responsible for the injury and a *traumatic injury* to one caused by a specific, identifiable event. Overuse injuries are divided

in two groups based on the onset of symptoms. A *non-contact trauma* is defined as a traumatic event without contact to another athlete or object, such as a fall. The definition and recording of recurrent injury in injury surveillance studies has been outlined in detail by Fuller et al¹⁷. In agreement with recent consensus statements^{19,20} a *recurrent injury* (re-injury) is defined as an injury of the same location and type which occurs after an athlete's return to full participation from the previous injury. *Contact* events categorised in contact with another player, moving (e.g. ball, puck, racket) and stagnant objects (e.g. hurdles, net, goalpost). If apply, it should be indicated whether or not the injury was caused by a violation of the rules of the respective sport. *Playing field conditions* (e.g. uneven ground) include alterations of the playing field by the *weather* (e.g. slippery ground.); in such a cases both codes should be provided.

Absence in days: The team physician is asked to provide an estimate of the number of days that the athlete will not be able to undertake their *normal* training programme or will not be able to compete. A follow-up of the injured players could improve the validity of the data, but might be impractical because some athletes participating in the Olympic Games have no associated physician or physiotherapist. In future studies, a follow-up of athletes estimated to be out of competition for more than seven days should be arranged with the responsible physician. The duration of absence from sport is regarded as an indicator for the severity of the injury.^{19,52}

Insert table 1 here or as appendix 2

IMPLEMENTATION

Beside the methodological issues outlined above, sufficient funding and ethics approval are pre-requisites for implementation of an injury surveillance project. The sports federations and medical representatives of all participating countries/teams should be informed prior to the championship and be requested to participate in the study. The athlete's informed consent to the injury surveillance project should be included in his/her registration for the tournament. The team physicians should receive a booklet with detailed information about the study approximately one month before the event and should be invited to an instructional meeting one or two days prior the start of the event. They should be motivated to comply with the

study and should be informed about how to fill in the injury report forms by the leader of the project. During the meeting they should sign an informed consent form, stating their willingness to participate in the study. The team physicians should report all newly incurred injuries (or the non-occurrence of injuries) daily on the provided injury report form and to return it daily to the study centre in the stadium or headquarter. In addition, the physicians working in medical centre in the stadium and/or involved policlinics should report daily all sports injuries of athletes examined or treated there. If the diagnosis (or the duration of absence) is revised later, the injury should be reported the injury again with the updated information. During the tournament the returned injury report forms should be checked on a daily basis (for details see below) and the leader of the study should be available for questions and motivation of the team physicians. Personal contact and good relationships between the staff conducting the injury surveillance and the physicians providing the injury data is of invaluable importance for the success of the project. It is recommended to pay special attention to team physicians with the most participating athletes. After some days all team physicians should receive a feedback of the completeness of reports and first results to increase their compliance with the study. The team physicians, the physicians of the medical centre, all participating sports federation and involved organising committees (e.g. National Olympic Committee) should receive a formal report of the study in adequate time after the end of the tournament.

Confidentiality

It is of utmost importance that confidentiality of all information is ensured. Regardless whether the accreditation number or the date of birth and sex of the athlete is documented, this information will identify the injured athlete and must therefore be treated strictly confidential. All injury report forms should be stored in a locked filing cabinet and made anonymous (or destroyed) after the tournament. The accreditation number of the athletes should not be entered into the injury database, and all data files should be anonymous. All analysis and the reports should be either for groups of athletes, or in a way that no individual athlete or team can be identified.

Quality control and response check

During the championship the returned injury report forms should be checked on a daily basis.

First, it should be controlled if all participating team physicians have returned at least one daily form, secondly the forms should be scanned for missing values. In case of double reporting by the team physician and the medical centre, the data should be compared and discrepancies should be clarified. It might be important to analyse the number of injuries reported from different countries in relation to the number of registered athlete of the respective country to check if the injury rates are as expected. It is of great advantage to control the completeness and quality of the injury documentation during the championship, since the team physicians can immediately be contacted, open questions clarified and missing information added. Furthermore, the involved physicians learn during the process, the injury documentation becomes a routine procedure and prompt feedback increases the compliance with the system.

ANALYSIS OF DATA

Preparation of data

Before analysing the data, double reporting of injuries by the team physician and medical centre/polyclinic must be controlled for. If discrepancies between the reports cannot be clarified, the report of the medical centre should be excluded. Only injuries incurred in competition or training during the period of the championships should be included in the analysis. If an athlete injures two body parts (e.g. ankle sprain and abrasion of the knee) or incurs two types of injury in one body part (contusion and laceration of the calf) in one incident, this is counted as one injury with two diagnoses. If the same injury of an athlete is again reported with the same date of injury but a different diagnosis and/or duration of absence, this should be regarded as a corrected up-date of the injury report. If an athlete incurs the same type of injury at the same body part more than once during a championship this should be regarded as a recurrence and should not be counted as a new injury. Fuller et al¹⁹ defined a recurrent injury as: „An injury of the same type and at the same site as an index injury and which occurs after a player’s return to full participation from the index injury.“ If an injury was reported for the first time during a championship but the physician refers the cause as „recurrence of previous injury“, this injury is counted as an injury, since no details about recovery from the previous injury are available, and it is assumed that the athlete are able to compete at the beginning of the tournament. Because of the complexity of judging the injuries, it is recommended that the input of the data is prepared and supervised by a person

experienced in sports medicine.

Response rate and coverage

First the total number of team or countries and athletes participating in the championship should be ascertained. Since not all teams have a team physician, the response rate can be determined by dividing the number of team physicians participating in the injury surveillance project by the number of teams with a team physician. Subsequently, the number of received injury report forms and its percentage out of the expected forms should be calculated. While the numbers of athletes vary between teams, the coverage of athletes by the team physician's reports can be best estimated by multiplying for each team the number of athletes and the number of returned report forms, and relating the sum to the total number of athletes multiplied with the days of the championship. In addition the number of injury reports from the medical centres should be determined and related to the number of athletes without a team physician. Finally, a comparison of the proportion of injuries reported by the team physicians and the medical centres in relation to the number of athletes in teams with and without team physician might indicate the completeness of injury reports.

Frequency and characteristics of injury

It is important to distinguish between number of injuries and number of injured athlete, since an athlete can incur more than one injury during a tournament. It should be reported how many athletes incurred no, one and more than one injury. If an athlete has an unexpectedly high number of injuries, the data should be carefully inspected. Injuries in competition and training should be analysed and reported separately. It is recommended to present the frequency of different diagnosis (best in tabular form), instead of reporting the number of injuries for body part and type of injury unconnectedly. Concerning the cause of injury at least the rate of overuse and traumatic injuries should be reported. However, for the development of preventive interventions, it is of interest to know how many athletes suffered a re-injury and how many injuries were caused by contact with another athlete or an object, by violation of rules, by equipment, playing field or weather condition.

All injuries that result in the athlete being unable to undertake his or her normal training programme or not being able to compete at least the day after injury are classified as *time-loss*

injuries. In accordance with Fuller et al¹⁹ the severity of an injury is defined as the number of days the athletes will not be able to undertake their normal training programme or will not be able to compete. *Injury severity* is usually classified as minor (1 to 7 days, some studies further divide into 1-3 and 4-7 days), moderate (8 to 28 days), severe (>28 days), and career-ending injuries. The characteristics, circumstances and causes of severe and career-ending injuries should be described in detail together with information about the athlete (age, gender, type of sport).

Population at risk and exposure

The importance of exposure data in injury surveillance has been frequently stated.^{5,7,51} Similar to injuries, exposure should be analysed and reported separately for competition and training. Exposure can be expressed in different ways: in relation to the population at risk (total number of athletes), in relation to the number of exposing situations (training session, match or competition) or in relation to exposure time (hours spent in competition or matches). While information about the population at risk and the number of competing athletes is usually available from the schedule and start lists of the championship, training exposure must be either documented for each individual athlete or can only be estimated by assuming the average athlete trains daily (which results in at least one training exposure per athlete per day). Exposure time in competition is difficult to determine for most sports (except for team sports with a fixed duration of the match), and it can be questioned if exposure time is the best basis for a comparison of risk exposure in multi-sport events.³⁰

Registered athletes (population at risk): All athletes officially registered for the tournament by the governing body (entry list), independent of whether or not they participate in any competition.

Competing athletes (athletes exposed to competition): For *individual sports*, the number of competing athletes is defined as all athletes who start at least once in an event, irrespective of whether or not he/she finishes the event. Athletes who do not finish (DNF), who are disqualified (DQ) or whose result is not measured (NM) are counted as having started. If an individual athlete participated in more than one event, the athlete is counted in each event. Thus, the total number of competing athletes is not identical (but slightly higher) than the sum of individual athletes. For *team sports*, the number of competing athletes is the number of

players plus the maximum number of substitutes to be used in a match (as defined in the rules).

Participations (athletes' exposure in competition): For *individual sports*, the number of athletes starting in all heats, rounds, qualifications and finals are added up to the number of participations in a particular event or the championship. If an athlete starts more than once in the same or a different event, each start was counted. For *team sports*, the number of players (as defined in the rules) multiplied by the number of teams and matches determines the number of participations (equivalent to player matches) in a particular event or the championship.

Exposure hours: For *team sports* with a fixed duration of the match, the total exposure hours can be calculated by multiplying the number of players per match and duration of a match in hours with the number of matches.³⁰ For *all other sports* and for *training* the exposure time must be documented individually.

Calculation of incidence of injury

In a statistics primer on epidemiological concepts in sports medicine Kuhn et al³² defined incidence as the „number of new cases that developed over a specific period of time“ and distinguished between whether this figure is related to the population at risk or the exposure time. In studies on sports injury, the incidence of injury is usually expressed as (a) number of injuries per 100 or 1000 athletes, (b) number of injuries per 100 or 1000 athletes exposures or (c) number of injuries per 1000 hours training and/or competition. It has been stressed that injury rates should be calculated separately for training and competition.^{19,26} The injury rates can be calculated as follows:

(a) number of injuries per 1000 athletes:

For training injuries: $\text{number of training injuries} * 1000 / \text{registered athletes}$

For injuries in competition: $\text{number of injuries in competitions} * 1000 / \text{competing athletes}$

(b) number of injuries per 1000 athletes exposures:

Estimate for training injuries: $\text{number of training injuries} * 1000 / (\text{registered athletes} * \text{days of the championship})$

For injuries in competition: $\text{number of injuries in competition} * 1000 / \text{participations}$

(c) number of injuries per 1000 hours exposure:

For training injuries: number of training injuries *1000 / athlete-training hours

For injuries in competition: number of injuries in competition *1000 / athlete-hours of competition

Junge et al³⁰ has previously described a methodological dilemma in comparing the incidence of injury in different sports. The number of injuries per athlete ignores that a tournament comprised different numbers of competitions for each sport. An exposure-time related incidence (number of injuries per 1000 hours exposure) seems to be the most accurate way, but it can be questioned if a comparison of “one hour football”, “one hour 100m sprint” and “one hour archery” makes any sense in the context of sports injury surveillance. Thus, in agreement with Junge et al³⁰ we recommend that an athlete’s individual risk of injury in multi-post events should be best expressed and compared as “injuries in competition per 1000 athlete’s participations”.

PRESENTATION AND REPORTING OF THE PROJECT

First the championship should be briefly described including the location and duration, involved type of sports, number of participating team and athletes should be stated. Preparation, instruction and motivation of cooperating physicians, modification of injury definition and injury report forms should be reported. Problems during the implementation and data collection should be outlined. The response rate is important information, if it is below 80%, data should be checked for representativity and systematic bias. Results on injuries should be described in detail for the entire group as well as for specific sub-groups. Epidemiological research is the first step to injury prevention,⁵² therefore, conclusions with respect to injury prevention should be drawn from the study. The work of the team physicians who provided the injury data should be acknowledged in all reports and publications. If possible reprints of the publications should be (e)mailed to the team physician and the involved sports organisations.

CONCLUSION AND RECOMMENDATION

An injury surveillance system for multi-sports events was developed based on established injury-reporting system developed for team sports tournaments. The injury report system has

proven feasible for team sports during the 2004 Olympics and for individual sports during the IAAF World Championship 2007. It will be applied during the 2008 Olympic Games in Beijing and should serve as a role model for future studies in single and multi-sport events. Implementation of the injury surveillance system, all definitions, the injury report form, analysis and reporting of data are described in detail to enable the other researcher to implement the injury surveillance system in any sports tournament. The system can be modified to regard the specific objectives of a certain sport or research question, however, a standardised use of injury definition and report forms will ensure the comparability of results.

What is already known on the topic?

Numerous studies have evaluated sports injuries during the season, but only few have focused on injuries during major sport events such as World Championships, World Cups or the Olympic Games.

What this study adds?

A concise injury surveillance system for multi-sports events was developed, has proven feasible for team sports and for individual sports. It will be applied during the 2008 Olympic Games in Beijing and should serve as a role model for future studies in single and multi-sport events. Standardised use of injury definition and report forms will ensure the comparability of results.

ACKNOWLEDGEMENT

The authors gratefully acknowledge the International Olympic Committee (IOC) and the Fédération Internationale de Football Association (FIFA) for their support and the funding of the study. We highly appreciate the International Association of Athletics Federations (IAAF), for conduction of the pilot study during the IAAF World Championship 2007 in Osaka.

Tables 1 – or appendix 2:

Examples of how to record injuries

1. A male high jumper sustained a hamstring injury during the early morning qualifying round that required immediate rest and treatment. The estimated time of recovery will be 30 days rehabilitation before he could return to full training.

athlete's accreditation no. uvg 34765		sport and event High Jump (men)		round / heat or training Qualification		date and time of injury 10th, 08:00 am	
injured body part hamstring	Code 23	type of injury strain	Code 11	cause of injury Overuse (sudden onset)	code 2	absence in days 30	

2. A male football player suffered groin pain during the semi-final, which the team physician decided did not warrant immediate treatment; the athlete continued to take full part in training and competition.

athlete's accreditation no. TAM 345672		sport and event Football (men)		round / heat or training Semi-final		date and time of injury 24th Aug; 2nd half	
injured body part groin	Code 22	type of injury strain	Code 11	cause of injury Overuse (gradual onset)	code 1	absence in days 0 days	

3. A decathlete sustained an ankle sprain during competition but continued to compete; the athlete received medical attention following the competition. The athlete completed full competition using ankle taping (with some pain) but aggravated the injury during the following day; the athlete then required rehabilitation and stopping from training. Estimated duration of treatment is two weeks.

First Incident should be recorded as an injury:

athlete's accreditation no. gdfo25674		sport and event Decathlon - high jump		round / heat or training competition		date and time of injury 21th; 18:00	
injured body part ankle, left	Code 27	type of injury sprain	Code 9	cause of injury non contact trauma	code 3	absence in days 0	

Second Incident should also be recorded as a new injury:

athlete's accreditation no. gdfo25674		sport and event Decathlon - 1500 m		round / heat or training competition		date and time of injury 21thAug; 18:00	
injured body part left ankle	Code 27	type of injury sprain	Code 9	cause of injury recurrence of injury	code 4	absence in days 14	

4. A male swimmer slipped on wet ground and sustained a laceration to the leg during a morning training session; the physician sutured the cut but the swimmer missed the afternoon training session. The swimmer was able to take full part in competition on the following day.

athlete's accreditation no. nfd1-35874367		sport and event swimming 200m backstroke, men		round / heat or training Training		date and time of injury 10thAug; 7:00 am	
injured body part calf	Code 25	type of injury cut	Code 15	cause of injury slipped on wet ground	Code 3, 13,21	absence in days 0	

5. A female 100 m runner suffered from an Achilles tendinopathy, the pain increased during the second heat of the quarter final. She was able to run in the semi-final after treatment and with a brace.

athlete's accreditation no. fglh45270634		sport and event athletics 100 m (women)		round / heat or training Quarter final, Second heat		date and time of injury 12th Aug; 18:00	
injured body part Achilles tendon	Code 26	type of injury tendinosis	Code 13	cause of injury overuse (gradual onset)	code 1	absence in days 0	

6. A female beach volleyball player sprained her left ankle on the 9th of August during training. She received treatment by the NOC PT, and then was taken to the Polyclinic for MRI and secondary treatment.

athlete's accreditation no. TAM45 48753		sport and event Beach volleyball (women)		round / heat or training Training		date and time of injury 9.Aug – 18:05	
injured body part ankle, left	Code 27	type of injury sprain	Code 11	cause of injury non-contact	code 3	absence in days 2 days	

Revised diagnosis (after MRI) should also be provided on the injury report form

athlete's accreditation no. TAM45 48753		sport and event Beach volleyball (women)		round / heat or training Training		date and time of injury 9.Aug – 18:05	
injured body part ankle, left	code 27	type of injury ligament rupt. no instability	Code 8	cause of injury injury already reported	code	absence in days > 20	

7. A basketball player caught his finger in the opponents' jersey and sustained an injury to the 2nd MCP joint right hand.

athlete's accreditation no. TAM 345126		sport and event basketball (men)		round / heat or training match no. 7		date and time of injury 20.Aug, 37 min	
injured body part thumb, right	Code 18	type of injury MCP I sprain	Code 9	cause of injury contact with other player	code 11	absence in days 7	

8. A male handball player sustained a trauma to his right knee during rotation in the 17. minute of the match. He was seen by the team PT who recorded the injury and treated the patient acutely. The player was then sent to the polyclinic where an MRI was carried out and the final diagnosis made which was a grade III tear of the MCL with appositive valgus grade III test at 20 degrees.

athlete's accreditation no. TAM 53487		sport and event handball (men)		round / heat or training match against Ger		date / time of injury 11.Aug – 17min	
injured body part knee, right	Code 24	type of injury sprain	Code 9	cause of injury non-contact	code 3	absence in days 7-10 days	

Revised diagnosis (after MRI) should also be provided on the injury report form

athlete's accreditation no. TAM 53487		sport and event handball		round / heat or training match against Ger		date and time of injury 11.Aug – 17min	
injured body part knee, right	code	type of injury ligament rupt with instability	Code 7	cause of injury reported	code	absence in days >180 days	

9. A weightlifter fell to the floor during a lift and screamed due to pain in the left thigh. She was taken to the clinic at the venue where an Ultrasound made the diagnosis of a quadriceps tear.

athlete's accreditation no. TAM 3474239		sport and event weightlifting 69kg, women		round / heat or training qualifying		date and time of injury Aug 10, 14:30	
injured body part quadriceps	Code 23	type of injury rupture	Code 11	cause of injury overuse, sudden	code 2	absence in days >30 days	

10. A male steeplechaser fell off the bus step and sprained his ankle while being dropped off at the stadium for his event.

Incident should not be recorded as an injury as defined for this study.

References

1. Alonso JM, Junge A, Renström P, et al: **Athletes' Injuries During the IAAF World Championships 2007**. *Internal report; publication in preparation 2007*
2. Bahr R, Reeser JC: Injuries among World-Class Professional Beach Volleyball Players. The Federation Internationale De Volleyball Beach Volleyball Injury Study. *Am J Sports Med* 31: 119-125, 2003
3. Best JP, McIntosh AS, Savage TN: Rugby World Cup 2003 Injury Surveillance Project. *Br J Sports Med* 39: 812-817, 2005
4. Best T, Shrier I: From Study Design and Analysis to Conclusion: New Horizons for Epidemiological Rigor in Sport Medicine. *Clin J Sport Med* 17: 175-176, 2007
5. Brooks JH, Fuller CW: The Influence of Methodological Issues on the Results and Conclusions from Epidemiological Studies of Sports Injuries: Illustrative Examples. *Sports Med* 36: 459-472, 2006
6. Cunningham C, Cunningham S: Injury Surveillance at a National Multi-Sport Event. *Aust J Sci Med Sport* 28: 50-56, 1996
7. de Loes M: Exposure Data. Why Are They Needed? *Sports Med* 24: 172-175, 1997
8. Dick R, Agel J, Marshall SW: National Collegiate Athletic Association Injury Surveillance System Commentaries: Introduction and Methods. *Journal of Athletic Training* 42: 173-182, 2007
9. Dick R, Putukian M, Agel J, et al: Descriptive Epidemiology of Collegiate Women's Soccer Injuries: National Collegiate Athletic Association Injury Surveillance System, 1988-1989 through 2002-2003. *J Athl Train* 42: 278-285, 2007
10. Dvorak J, Junge A, Grimm K, et al: Medical Report from the 2006 Fifa World Cup Germany. *Br J Sports Med* 41: 578-581; discussion 581, 2007
11. Dvorak J, Junge A, Chomiak J, et al: Risk Factor Analysis for Injuries in Football Players. Possibilities for a Prevention Program. *Am J Sports Med* 28: S69-74, 2000
12. Ekstrand J, Gillquist J: Soccer Injuries and Their Mechanisms: A Prospective Study. *Med Sci Sports Exerc* 15: 267-270, 1983
13. Elias SR: 10-Year Trend in USA Cup Soccer Injuries: 1988-1997. *Med Sci Sports Exerc* 33: 359-367, 2001
14. Finch CF: An Overview of Some Definitional Issues for Sports Injury Surveillance. *Sports Med* 24: 157-163, 1997
15. Finch CF, Valuri G, Ozanne-Smith J: Injury Surveillance During Medical Coverage of Sporting Events--Development and Testing of a Standardised Data Collection Form. *J Sci Med Sport* 2: 42-56, 1999
16. Fuller C, Drawer S: The Application of Risk Management in Sport. *Sports Med* 34: 349-356, 2004
17. Fuller C, Bahr R, Dick R, et al: A Framework for Recording Recurrences, Reinjuries, and Exacerbations in Injury Surveillance. *Clin J Sport Med* 17: 197-200, 2007
18. Fuller CW, Junge A, Dvorak J: A Six Year Prospective Study of the Incidence and Causes of Head and Neck Injuries in International Football. *Br J Sports Med* 39 Suppl 1: i3-9, 2005
19. Fuller CW, Ekstrand J, Junge A, et al: Consensus Statement on Injury Definitions and Data Collection Procedures in Studies of Football (Soccer) Injuries. *Clin J Sport Med* 16: 97-106, 2006
20. Fuller CW, Molloy MG, Bagate C, et al: Consensus Statement on Injury Definitions and Data Collection Procedures for Studies of Injuries in Rugby Union. *Br J Sports Med* 41: 328-331, 2007
21. Greene JJ, Bernhardt D: Medical Coverage Analysis for Wisconsin's Olympics: The

- Badger State Games. *Wis Med J* 96: 41-44, 1997
22. Harrison EL, Price CJ: Sports Injury/Illness Reporting at Major Sporting Events: Development and Implementation of a Data Collection System. *Physiother Can* 44: 19-22, 1992
 23. Hodgson L, Gissane C, Gabbett TJ, et al: For Debate: Consensus Injury Definitions in Team Sports Should Focus on Encompassing All Injuries. *Clin J Sport Med* 17: 188-192, 2007
 24. Jakoet I, Noakes TD: A High Rate of Injury During the 1995 Rugby World Cup. *S Afr Med J* 88: 45-47, 1998
 25. Janda DH: Sports Injury Surveillance Has Everything to Do with Sports Medicine. *Sports Med* 24: 169-171, 1997
 26. Junge A, Dvorak J: Influence of Definition and Data Collection on the Incidence of Injuries in Football. *Am J Sports Med* 28: S40-46, 2000
 27. Junge A, Dvorak J: Injuries in Female Football Players in Top-Level International Tournaments. *Br J Sports Med* 41 Suppl 1: i3-7, 2007
 28. Junge A, Dvorak J, Graf-Baumann T: Football Injuries During the World Cup 2002. *Am J Sports Med* 32: 23S-27S, 2004
 29. Junge A, Dvorak J, Graf-Baumann T, et al: Football Injuries During Fifa Tournaments and the Olympic Games, 1998-2001: Development and Implementation of an Injury-Reporting System. *Am J Sports Med* 32: 80S-89S, 2004
 30. Junge A, Langevoort G, Pipe A, et al: Injuries in Team Sport Tournaments During the 2004 Olympic Games. *Am J Sports Med* 34: 565-576, 2006
 31. King DA, Gabbett TJ, Dreyer C, et al: Incidence of Injuries in the New Zealand National Rugby League Sevens Tournament. *J Sci Med Sport* 9: 110-118, 2006
 32. Kuhn JE, Greenfield ML, Wojtys EM: A Statistics Primer. Prevalence, Incidence, Relative Risks, and Odds Ratios: Some Epidemiologic Concepts in the Sports Medicine Literature. *Am J Sports Med* 25: 414-416, 1997
 33. Langevoort G, Myklebust G, Dvorak J, et al: Handball Injuries During Major International Tournaments. *Scand J Med Sci Sports* 17: 400-407, 2007
 34. Laskowski ER, Najarian MM, Smith AM, et al: Medical Coverage for Multievent Sports Competition: A Comprehensive Analysis of Injuries in the 1994 Star of the North Summer Games. *Mayo Clin Proc* 70: 549-555, 1995
 35. Lindenfeld TN, Noyes FR, Marshall MT: Sports Injury Research. Components of Injury Reporting Systems. *Am J Sports Med* 16 Suppl 1: S69-80, 1988
 36. Martin RK, Yesalis CE, Foster D, et al: Sports Injuries at the 1985 Junior Olympics. An Epidemiologic Analysis. *Am J Sports Med* 15: 603-608, 1987
 37. McCormick DP, Niebuhr VN, Risser WL: Injury and Illness Surveillance at Local Special Olympic Games. *Br J Sports Med* 24: 221-224, 1990
 38. Meeuwisse WH, Love EJ: Athletic Injury Reporting. Development of Universal Systems. *Sports Med* 24: 184-204, 1997
 39. Meeuwisse WH, Love EJ: Development, Implementation, and Validation of the Canadian Intercollegiate Sport Injury Registry. *Clin J Sport Med* 8: 164-177, 1998
 40. Meeuwisse WH, Wiley JP: The Sport Medicine Diagnostic Coding System. *Clin J Sport Med* 17: 205-207, 2007
 41. Muller-Rath R, Bolte S, Petersen P, et al: [Injury Profile in Modern Competitive Karate--Analysis of 1999 Wkc-Karate World Championship Games in Bochum]. *Sportverletz Sportschaden* 14: 20-24, 2000
 42. Noyes FR, Lindenfeld TN, Marshall MT: What Determines an Athletic Injury (Definition)? Who Determines an Injury (Occurrence)? *Am J Sports Med* 16 Suppl 1: S65-68, 1988
 43. Nyland J, Snouse SL, Anderson M, et al: Soft Tissue Injuries to USA Paralympians at the

- 1996 Summer Games. *Arch Phys Med Rehabil* 81: 368-373, 2000
44. Orchard J, Hoskins W: For Debate: Consensus Injury Definitions in Team Sports Should Focus on Missed Playing Time. *Clin J Sport Med* 17: 192-196, 2007
 45. Orchard J, Newman D, Stretch R, et al: Methods for Injury Surveillance in International Cricket. *J Sci Med Sport* 8: 1-14, 2005
 46. Rae K, Orchard J: The Orchard Sports Injury Classification System (Osics) Version 10. *Clin J Sport Med* 17: 201-205, 2007
 47. Roberts WO, Brust JD, Leonard B: Youth Ice Hockey Tournament Injuries: Rates and Patterns Compared to Season Play. *Med Sci Sports Exerc* 31: 46-51, 1999
 48. Roberts WO, Brust JD, Leonard B, et al: Fair-Play Rules and Injury Reduction in Ice Hockey. *Arch Pediatr Adolesc Med* 150: 140-145, 1996
 49. Schafle MD, Requa RK, Patton WL, et al: Injuries in the 1987 National Amateur Volleyball Tournament. *Am J Sports Med* 18: 624-631, 1990
 50. van Mechelen W: Sports Injury Surveillance Systems. 'One Size Fits All'? *Sports Med* 24: 164-168, 1997
 51. van Mechelen W: To Count or Not to Count Sports Injuries? What Is the Question? *Br J Sports Med* 32: 297-298, 1998
 52. van Mechelen W, Hlobil H, Kemper HC: Incidence, Severity, Aetiology and Prevention of Sports Injuries. A Review of Concepts. *Sports Med* 14: 82-99, 1992
 53. Walden M, Hagglund M, Ekstrand J: Football Injuries During European Championships 2004-2005. *Knee Surg Sports Traumatol Arthrosc* 15: 1155-1162, 2007
 54. Watkins: The Need for Agreed Procedures in Sports Injury Epidemiology. *New Zealand Journal of Sports Medicine* 23: 34-37, 1995
 55. Webborn N, Willick S, Reeser JC: Injuries among Disabled Athletes During the 2002 Winter Paralympic Games. *Med Sci Sports Exerc* 38: 811-815, 2006
 56. Wekesa M, Asembo JM, Njororai WW: Injury Surveillance in a Rugby Tournament. *Br J Sports Med* 30: 61-63, 1996
 57. Yoon YS, Chai M, Shin DW: Football Injuries at Asian Tournaments. *Am J Sports Med* 32: 36S-42S, 2004

Appendix 1: DAILY INJURY REPORT FOR THE OLYMPIC GAMES



Nation _____ Physician's name _____ Day of report _____

Contact details _____ tel./fax or e-mail _____

Please report: **All injuries (traumatic and overuse) newly incurred in competition or training during the Olympic Games regardless of the consequences with respect to absence from competition or training.**
The information provided is for medical and research purposes and will be treated confidentially.

Example:

athlete's accreditation no. 1234569587979		sport and event swimming / 800m freestyle		round / heat or training quarter final / 1 st heat		time of injury 12.8. - 2:35 pm
injured body part wrist left	Code 15	type of injury sprain	code 10	cause of injury slipped and felt	code 8	absence in days 10

athlete's accreditation no.		sport and event		round / heat or training		date and time of injury
injured body part	code	type of injury	code	cause of injury	code	absence in days

athlete's accreditation no.		sport and event		round / heat or training		date and time of injury
injured body part	code	type of injury	code	cause of injury	code	absence in days

athlete's accreditation no.		sport and event		round / heat or training		date and time of injury
injured body part	code	type of injury	code	cause of injury	code	absence in days

athlete's accreditation no.		sport and event		round / heat or training		date and time of injury
injured body part	code	type of injury	code	cause of injury	code	absence in days

athlete's accreditation no.		sport and event		round / heat or training		date and time of injury
injured body part	code	type of injury	code	cause of injury	code	absence in days

athlete's accreditation no.		sport and event		round / heat or training		date and time of injury
injured body part	code	type of injury	code	cause of injury	code	absence in days

athlete's accreditation no.		sport and event		round / heat or training		date and time of injury
injured body part	code	type of injury	code	cause of injury	code	absence in days

athlete's accreditation no.		sport and event		round / heat or training		date and time of injury
injured body part	code	type of injury	code	cause of injury	code	absence in days

Appendix 1: DAILY INJURY REPORT FOR THE OLYMPIC GAMES



no injury in any athlete of our team today

DEFINITIONS AND CODES (for individual and team sports)

Sport and event

Please state for *team sports*: the sport only (e.g. football, handball, basketball),
for *all other sports*: the **sport and** event (e.g. swimming - 4x 100m freestyle relay; track - 110m hurdles; Decathlon - high jump; Taekwondo - under 58kg; cycling – team sprint).

Round / heat or training

If the injury occurred during **competition**, please state:
for *team sports*: the match number or opponent team,
for *all other sports*: the **round** (e.g. first round, quarter-final, qualification, final) and **heat or group** (e.g. first heat, second run, first semi-final, qualifying group A).
If the injury occurred at **another occasion**, please specify e.g. training, warm-up.

Date and time of injury

Please state **date** and **time** when the injury was incurred:
for *team sports*: date of injury and minute in the match,
for *all other sports*: date of injury and time of day.

Injured body part - Location of injury

Head and trunk	Upper extremity	Lower extremity
1 face (incl. eye, ear, nose)	11 shoulder / clavicle	21 hip
2 head	12 upper arm	22 groin
3 neck / cervical spine	13 elbow	23 thigh
4 thoracic spine / upper back	14 forearm	24 knee
5 sternum / ribs	15 wrist	25 lower leg
6 lumbar spine / lower back	16 hand	26 Achilles tendon
7 abdomen	17 finger	27 ankle
8 pelvis / sacrum / buttock	18 thumb	28 foot / toe

Type of injury - Diagnosis

1 concussion (regardless of loss of consciousness)	11 strain / muscle rupture / tear
2 fracture (traumatic)	12 contusion / haematoma / bruise
3 stress fracture (overuse)	13 tendinosis / tendinopathy
4 other bone injuries	14 bursitis
5 dislocation, subluxation	15 laceration / abrasion / skin lesion
6 tendon rupture	16 dental injury / broken tooth
7 ligamentous rupture with instability	17 nerve injury / spinal cord injury
8 ligamentous rupture without instability	18 muscle cramps or spasm
9 sprain (injury of joint and/or ligaments)	19 others
10 lesion of meniscus or cartilage	

Cause of injury

1 overuse (gradual onset)	11 contact with another athlete	21 field of play conditions
2 overuse (sudden onset)	12 contact: moving object (e.g. ball)	22 weather condition
3 non-contact trauma	13 contact: stagnant object (e.g. net)	23 equipment failure
4 recurrence of previous injury	14 violation of rules (foul play)	24 others

Estimated duration of **absence from training or competition** (in days)

Please provide an estimate of the number of days that the athlete will not be able to undertake their normal training programme or will not be able to compete.		
0 = 0 days	14 = 2 weeks	> 30 = more than 4 weeks
1 = 1 day	21 = 3 weeks	>180= 6 months or more
2 = 2 days	28 = 4 weeks	
7 = 1 week		

DEFINITIONS AND CODES (for individual only)

Sport and event

Please state the event (e.g. 100m hurdles; shot put; 4x 400m relay; Decathlon – long jump).

Competition / training / warm-up

If the injury occurred during **competition**, please state the **round** (first round, quarter-final, qualification, final, etc.) and **heat or group** (first heat, first semi-final, qualifying group A, etc.).

If the injury occurred at **another occasion**, please specify the event (e.g. training, warm-up).

Date and time of injury

Please state the **date** and the **time** of day when the injury was incurred.

Injured body part - Location of injury

Trunk	Upper extremity	Lower extremity
1 face (incl. eye, ear, nose)	11 shoulder	21 hip
2 head	12 upper arm	22 groin
3 neck / cervical spine	13 elbow	23 thigh
4 thoracic spine	14 forearm	24 knee
5 sternum / ribs	15 wrist	25 lower leg
6 lumbar spine	16 hand	26 Achilles tendon
7 abdomen	17 finger	27 ankle
8 pelvis / sacrum	18 thumb	28 foot / toe

Type of injury - Diagnosis

1 concussion (regardless of loss of consciousness)	11 strain / muscle rupture / tear
2 fracture (traumatic)	12 contusion / haematoma / bruise
3 stress fracture (overuse)	13 tendinosis / tendinopathy
4 other bone injuries	14 bursitis
5 dislocation, subluxation	15 laceration / abrasion / skin lesion
6 tendon rupture	16 dental injury / broken tooth
7 ligamentous rupture with instability	17 nerve injury / spinal cord injury
8 ligamentous rupture without instability	18 muscle cramps or spasm
9 sprain (injury of joint and/or ligaments)	19 others
10 lesion of meniscus or cartilage	

Cause of injury

1 overuse (gradual onset)	11 contact with another athlete	21 weather condition
2 overuse (sudden onset)	12 contact with object (eg.hurdles)	22 insufficient warm-up
3 non-contact trauma	13 field of play conditions	23 others
4 recurrence of previous injury	14 equipment failure	

Estimated duration of absence from training or competition (in days)

Please provide an estimate of the number of days that the athlete will not be able to undertake their normal training programme or will not be able to compete.

0 = 0 days	14= 2 weeks	> 30 = more than 4 weeks
1 = 1 day	21= 3 weeks	>180= 6 months or more
2 = 2 days	28= 4 weeks	
7 = 1 week		

DEFINITIONS AND CODES (for individual only)