Medical encounters (including injury and illness) at mass community-based endurance sport events: An international consensus statement on definitions and methods of data recording and reporting

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ABSTRACT

Mass-participation endurance sports events are popular but a large number of participants are older and may be at risk of medical complications during events. Medical encounters (defined fully in the statement) include those traditionally considered ‘musculoskeletal’ (e.g., strains) and those due to ‘illness’ (e.g., cardiac, respiratory, endocrine). The rate of sudden death during mass endurance events (running, cycling and triathlon) is between 0.4-3.3 per 100 000 entrants. The rate of other serious medical encounters (e.g., exertional heat stroke, hyponatremia) is rarely reported; in runners it can be up to 100 times higher than that of sudden death, i.e. between 16-155 per 100 000 race entrants. This consensus statement has two goals. It (i) defines terms for injury- and illness-related medical encounters, severity and timing of medical encounters, diagnostic categories of medical encounters and (ii) describes methods for recording data at mass-participation endurance sports events and reporting results to authorities and for publication. This unifying consensus statement will allow data from various events to be compared and aggregated. This will inform athlete/patient management and thus, make endurance events safer.

INTRODUCTION

Protecting athlete health is a top priority for medical staff caring for thousands of participants at road running races and other endurance events held annually around the world. There is a notable increase in older (> 40 years) and female race participants [1]. Participant numbers in endurance running events from shorter races (5km to 21.1km) to ultra-endurance multi-day events are high, with similar high participant numbers across other endurance sports such as cycling, triathlon, swimming, cross-country skiing, and other events with varying environmental challenges (i.e. high altitude, extreme heat and cold). Despite high participant numbers, there are only limited data on race day medical outcomes at such events [2] [3] [4] [5-8].

There is a definite risk of adverse medical events during an exercise, including acute myocardial infarction and sudden cardiac death [9-13], particularly during prolonged high-intensity exercise [2, 14][15]. Previously sedentary individuals [1, 9, 16, 17] and patients with risk factors for chronic or underlying disease [10, 18] are at higher risk. The risk of sudden death during endurance sports events such as the half-marathon (21km) and the marathon (42km) is well described and varies between 0.25 to 3 per 100 000 race entrants for marathons [2, 13, 19-26]. In cycling, there does not appear to be an increased risk of sudden cardiac death in young/middle-aged participants with no previous cardiac conditions [27], but in recreational cyclists the occurrence of acute cardiac events increases with age and lower performance level [28]. Cycling is also associated with a risk of acute traumatic injuries [29]. In mass community-based endurance cycling events, both traumatic injuries of the musculoskeletal system and cardiovascular complaints are the most frequent medical encounters reported [5, 6]. Sudden death and cardiac arrests during triathlons have also been reported [30, 31], with a higher risk (per 100 000 participants) in male (male=2.40, female=0.74) and older age participants (18.6 for those 60 years and older), with most deaths occurring in the swim segment [31]. In other endurance sports such as cross-country skiing, an incidence of sudden death of about 2.2 per 100 000 has been also been reported [32].

However, sudden death and cardiac arrest represent only the “tip of the iceberg” of medical encounters at mass community-based endurance sport events [33]. The incidence of a serious

life-threatening medical encounter (e.g., myocardial infarction, exertional heat stroke, hyponatremia) at a distance running event, such as the marathon, varies between 16.7-155 per 100 000 race entrants [8, 33], and this is 50-100 times higher than the incidence of sudden death [33]. To date, non-fatal but serious medical encounters have not been well characterised across the majority of endurance events, and there is no current consensus on the definition of a "serious life-threatening" medical encounter on race day. The absence of a uniform definition for serious life-threatening and somewhat less-serious medical encounters, makes it difficult to compare incidence and prevalence between events.

Consensus statements with uniform definitions of injury or illness and consistent data collection procedures in many sports [34-37] have permitted accurate illness and injury data collection at major tournaments [38-43]. Similarly, in the field of research in endurance sports medicine, consensus is needed to standardise research methods for recording injury- and illness-related medical encounters at mass community-based endurance sport events.

OBJECTIVES OF THE CONSENSUS DOCUMENT

The aim of the expert group was to agree upon a set of standardised definitions of medical encounters (i.e. incidents, complications) and a standardised methodology to record and report medical encounters at mass participation community-based endurance sport events. Uniform collection of multi-centre data will make comparisons between races possible and inform illness and injury prevention strategies. In this way we aim to reduce medical encounters and facilitate safer participation in endurance events worldwide [44].

METHODS

A consensus "MEDICAL METHODS IN ENDURANCE SPORT" group, consisting of expert researchers and clinicians in the area of endurance race medicine, representing international community-based endurance sporting events, was convened. Our core group first met in Boston MA (May 2016) to develop a planning document for the consensus statement. Additional members with clinical and research experience in the field were identified by the core group, and

added to the consensus group. We developed the consensus document at in-person and conference call meetings over a 2-3-year period from May 2016 to November 2018. Draft versions of the consensus statement were circulated electronically during the development period and detailed additions, editing and comments were used to finalise the definitions and methodological recommendations. Representatives of three major sporting federations (athletics, cycling and triathlon) were included in the preparation of the manuscript for endorsement of the final consensus document. Agreement was achieved by consensus of a majority group members.

Three members of the consensus group identified source information papers by conducting a literature review (MS, JB, MB) in the electronic database PubMed. The methods and outcomes of this review process are described in Supplementary Table 1. This source information was reviewed, debated and included in draft versions of the document before final consensus was reached. More details and the references for specific definitions that were used from source information are listed in Supplementary Table 2.

CONSENSUS RECOMMENDATIONS

The consensus group recognised that standard definitions were required for the following: 1. sports "event", 2. medical encounters, 3. severity and timing of medical encounters, 4. diagnostic categories of medical encounters, and 5. standardising research methods, specifically the collection of data at events and the reporting format for the data.

1. Definitions of sports "event" and "medical team"

Mass community-based endurance sports event:
A mass community-based endurance sports event is defined as "*a planned and organised endurance sports event, usually with >1000 entrants (recreational and/or elite), at a specific location, for a specific purpose, and for a defined period of time (single day/stage or multiple stages/several consecutive days)*" [45, 46]. A "community-based" event is an event typically planned and organised by a community sports organisation with a committee that includes a race director, and may be under the auspices of a regional or national sports federation. "Mass

participation" is a mass-gathering of race participants with > 1000 race entrants [45, 46], but we also recognise that events of a smaller size (<1000 race entrants) can be managed and collect data using the consensus plan. "Endurance sports events" include one or more of the following sport types: distance running, cycling, swimming, triathlon, canoeing/kayaking, rowing, cross country skiing, mixed ultra-endurance events (e.g. biathlon, duathlon) and other similar activities that combine any of these disciplines or function with more than one athlete as a team of entrants.

Medical team

The medical team is defined as the "*officially designated team of medical staff (medical physicians, pre-hospital medical and basic first aid providers, registered nurses, physiotherapists, athletic trainers, and others) responsible for the medical care during the event, typically led by a medical director (or equivalent)*". Emergency medical services and medical staff of participating local hospitals can be part of the medical team or may collaborate with the medical team to provide clinical services and support event research.

2. Definitions of medical problems / medical encounters

We recognised that athletes who participate in endurance events may develop a "medical problem" during the event, and this "medical problem" may or may not be reported by the athlete to the event medical team. For the purpose of this consensus document, only "medical problems" that are reported to the event medical team will be considered as "medical encounters". The consensus group agreed to use "medical encounter" as the standardised term to define any reported "medical problem" at an event, including both illness- and injury-related encounters. We acknowledge and define a "non-reported medical problem" as "*a medical problem experienced by an athlete participating in an event, where the athlete decides not to seek assistance at all, or seeks assistance outside of the event medical team"*. We classified all reported medical problems as "medical encounters" to distinguish these from non-reported medical problems (Figure 1).

3. Severity and timing of medical encounters

The definition of a medical encounter as well as the definitions of medical encounters classified by severity (minor, moderate, serious / life-threatening, sudden cardiac arrest, sudden cardiac death and sudden death) (Table 1) are depicted in Figure 2. For purposes of clarity, we also offer examples of similar terminology from the published literature, with key references (Table 1).

Table 1: Definitions of medical encounters and medical problems

Terminology	Definition
Non-reported medical problem	A medical problem experienced by an athlete participating in an event, where "*the athlete decides athlete decides not to seek assistance from the event medical team, or seeks assistance outside of the event medical team"*
Medical encounter	A reported medical problem that is an "*interaction between the medical team and a race participant requiring medical assistance or evaluation [7, 8], taking place from the official start of the event, up to 24 hours after the official cut-off time of the event"*
Minor medical encounter	A medical encounter that: *1. is not significant or severe enough to result in withdrawal of the athlete from the event following assessment by the medical staff,* **or** 2. *does not require admission and supervised medical care at race medical facilities (on the race course, or at the end of the event) or transfer to a hospital for supervised medical care*
Moderate medical encounter	A medical encounter that: *1. is significant (severe) enough to result in withdrawal of the athlete from the event following assessment by the medical staff,* **or** *2. is non-life threatening but requires medical assessment and admission to the event medical facilities with supervised medical care,* **or** 3. *is non-life threatening but requires referral or transfer to a hospital*
Serious / life-threatening medical encounter	A medical encounter that is known to be life- threatening and requires immediate emergency medical treatment with *1. either admission to a high-care (intensive care and observation) medical area at the event,* **or** 2. *transport (with or without admission) to a hospital*
Event related sudden cardiac arrest (SCA)	A medical encounter (cardiac arrest) that requires immediate cardiopulmonary resuscitation (including defibrillation), where the medical problem resulting in cardiac arrest was: *1. deemed to be directly related to the event,* **and** 2. *the onset of the medical problem occurred during the event or within 1-24 hours of the finish time [47] [48, 49]* *
Event related sudden cardiac death (SCD)	A medical encounter that resulted in sudden cardiac death (SCD) from a SCA, where the medical problem resulting in SCD was: *1. deemed to be directly related to the event,* **and** 2. *the onset of the medical problem occurred during the event or within 1-24 hours of the finish time [47] [48, 49]**
Event related sudden death	A medial encounter that resulted in sudden death from non-cardiac causes, where the medical problem resulting in death was: *1. deemed to be directly related to the event,* **and** 2. *the onset of the medical problem occurred during the event or within 1-24 hours of the finish time [47] [48, 49]**

*In order to compare sudden cardiac arrest (SCA) , sudden cardiac death (SCD) and event related sudden death data to previously reported data it is critical to record, the timing of the cardiac arrest or death in one of three possible time periods as follows: a) during the event, b) immediately after finishing and up to 1 hour after the event, and c) between 1 and 24 hours after the event.

Timing of the medical encounters

We recognised that a medical encounter at a sports event can occur at different times during or following the event and that documenting the timing of the encounter is clinically important. There is also a need to clarify which encounters are related to a specific event, to make comparisons possible. We did not include any medical encounter that occurred before the official start of the event, e.g. during a warm-up period. The consensus group defined the following three time periods for the timing of a medical encounter:

i. *during the event (from the official start to completion of the event by the individual athlete)*
ii. *immediately post-finish (from the time an athlete completes the event to 1 hour after the athlete completes the event)*
iii. *delayed presentation (between 1 and 24 hours after the athlete completes the event to record serious / life-threatening medical encounters, SCA, SCD, and event related death that may present as a delayed clinical presentation (e.g. hyponatremia).*

The time period in which a medical encounter occurs should be recorded in the participant's medical encounter report form. For example, a 3-hour finisher of a marathon that starts at 08h00 would be classified as "*during the event*" from 08h00 to 11h00, "*immediately post-finish"* from 11h00 to 12h00, and "*delayed presentation*" from 12h00 to 11h00 the following day.

4. Diagnostic categories of medical encounters

Medical encounters at mass community-based endurance sports events can be broadly classified into two main diagnostic categories: illness-related and injury-related medical encounters. Illness-related medical encounters are usually classified by major organ system affected, while injury-related encounters are usually classified by major anatomical regions affected. The consensus group did consider a number of potential diagnostic coding systems including the International Classification of Diseases (ICD, version 10) and the International Classification of Primary Care (ICPC) codes. However, in the discipline of Sport and Exercise Medicine these coding systems have some limitations, as there are a number of specific exercise-related injuries and illnesses that are not coded in these systems. The Orchard Sports Injury Classification

System (OSICS) was developed in 1992 as a specific sports injury classification system, was tested for reliability in 2004 [50], and in one study, was superior to the ICD-10 coding system with higher intercoder agreement and being statistically significantly faster to use [51]. The original OSICS coding system underwent revisions, mainly by including diagnoses that were not covered in previous versions and is one of the world's most commonly used systems for coding injury in sports injury surveillance [52]. For this consensus, diagnoses of medical encounters at mass community-based endurance sport events were reviewed extensively by the consensus group, and deficiencies in all the coding systems (including the OSICS) were identified, particularly for illness-related diagnostic codes. Therefore, for the purposes of this consensus, modified versions of the OSICS 10.1 medical and injury diagnostic classifications of more common medical encounters (illness and injuries) were used [50, 52].

Illness-related diagnostic categories

We recommend the use of a diagnostic classification system of illness-related medical encounters by main organ system, followed by more specific diagnostic codes for the more common illness-related medical conditions during endurance sports events (Supplementary Table 3). We retained the broad main organ system categories in the OSICS 10.1 illness classification system, but found the system to be deficient for many common specific illness types that are seen at endurance sports events e.g. exercise associated muscle cramps (EAMC), exercise associated postural hypotension (EAPH), dehydration and hyponatremia. The group therefore added specific illness types, and this resulted in a substantial modification of the OSICS 10.1 illness classification system [50, 52]. The severity of illness-related medical encounters was classified as minor, moderate, serious / life-threatening, and sudden cardiac arrest / death using the definitions described above.

For illness-related medical encounters, additional information related to the location of the illness on the course (e.g. related to hills, course conditions), pre-race medical history (e.g. pre-race acute illness, use of medications prior or during the event), and other factors possibly contributing to the illness (e.g. weather conditions, equipment failure, athlete inexperience) can also be collected (Supplementary Table 4).

Injury-related diagnostic categories

We recommend the use of an injury-related medical encounter classification by the main anatomical region affected by the injury, followed by more specific diagnostic codes (Supplementary Table 5). More specifically, the OSICS 10.1 injury classification system was slightly modified to include some additional injuries, mainly chronic (or "overuse") injury codes that were not present in the OSICS 10.1 injury classification system. The severity of injury-related medical encounters was classified as minor, moderate, serious / life-threatening, or death using the definitions described above.

For injury-related medical encounters, additional information related to the location on the course where the injury occurred (e.g. related to hills, course conditions, distance from the start, nearest distance marker), onset of the injury (acute injury, chronic injury, acute exacerbation of a chronic injury), mechanism of the injury (e.g. traumatic, non-traumatic, contact or non-contact, nature of the contact), and other factors contributing to the injury (e.g. violation of rules, weather conditions, equipment failure, athlete inexperience) could also be collected (Supplementary Table 6).

Data collection

Research methods related to event data collection, athlete demographics, sport code, sport participation history, medical incident data collection procedures and reporting of the data are critical for quality of any scientific studies in this field. Data collection would ideally occur in a prospective cohort study design, but data collected using a retrospective cohort are also very valuable, provided data collection was accurate, comprehensive and that standardised terminology and definitions were adopted.

The consensus group recommends that general race data and medical encounter data at mass community-based endurance sport events should be collected in a standardised format. The data collection forms should be translated for use around the world, that data collection manuals be

developed, and that training of data collectors take place. International federations and organizations that endorsed this consensus are encouraged to implement these data collection procedures.

General race data collection

The following categories of general race data should be collected: race day data, athlete demographics, athlete race performance, geographical data of the course, environmental conditions on race day, and medical team data (Table 2). We recognise that not all race organisers, medical staff and researchers are able to collect detailed general race data in all the categories. Therefore, the consensus group classified general race data as “minimum / essential data”, and “additional data”.

Table 2: Data collection (essential and additional data) on race day, athlete demographics, athlete race performance, course geography, and environmental conditions on race day

Category	Minimum / essential data	Additional data
Race day data	• Location (nearest city) • Date of the race (dd:mm:yyyy) • Official starting time (hh:mm:ss) • Official cut-off (finish) time (hh:mm:ss) • Number of registrants (entrants): The number of athletes who register to participate in the event. • Number of starters: The number of registered athletes who start the event. • Number of finishers: The number of registered starting athletes who finish the event	
Athlete demographics (individual athlete data)	• Age (on registration day) • Sex	• Height (cm) • Body weight (kg)
Athlete race performance (individual athlete data)	• Race discipline (if applicable – different sporting codes) • Race registered for (if applicable – different race distances) • Race starting time (hh:mm:ss) • Race finishing time (hh:mm:ss) • Calculated total race time (hh:mm:ss)	• Previous participation in this event type (number of previous races in this event type) • No. of times previously participated in this race (number) • Personal best time for this race (hh:mm) • Qualifying time for this race (if applicable: event and time - hh:mm:ss) • No. of races participated in, in previous year (number) • Date of last race participated in (dd:mm:yyyy) • Personal best time for this event in the last 12 months year (hh:mm:ss) • Average regular training in the last 12 months (h/w)? Split times [distance (km) from the start line should be recorded in conjunction with the split time (hh:mm:ss)]
Geographical data of the course	• Total course distance (m) • Individual course sections (if applicable e.g. triathlons) (m) • Altitude (m) (mean, range) • Total elevation of the event course (m) • Change in elevation (m)	• Type of surface of the event course (if applicable) (tar, asphalt, off-road, grass/, gravel, sand etc.) • Nature of the event course surface (wet, dry)
Environmental conditions on race day	• Ambient temperature (ºC) • Relative humidity (%) • Wind speed (km/hr) • Wind direction (degrees) • Cloud cover (%) • Precipitation (mm) • Wet Bulb Globe Temperature (WBGT) Index (ºC) (at the start and finish of the race)	• Wet Bulb Globe Temperature (WBGT) Index (ºC) (continuously recorded during the race) • Pollution (air quality index) (numeric air quality index (AQI) or ppbv/ppmv or $mg.m^{-3}$/$\mu g.m^{-3}$ for PM_{10}, $PM_{2.5}$, $PM_{0.1}$) (e.g. NO_2, O_3) • Pollen count (grains/m^3) • Ultraviolet (UV) Radiation Index

		• PET (Physiological Equivalent Temperature) index. The PET utilizes i.e. air temperature, air humidity (relative humidity, specific humidity or any other measure of air humidity), wind speed, global radiation and geographical information (latitude, longitude and elevation, sky view factor (SVF) and ground surface characteristics).
Medical team data	• Size of the medical team (total number of staff) • Physicians or qualified medical doctors(number) • Number of allied health professionals (number) • Number of nursing staff (number) • Number of first aiders (number) • Number of fixed medical stations on route (number) • Number of mobile medical stations on route (number) • Medical station at finish (yes / no) • Number of AED's on route • High care / intensive care facility at finish (yes / no)	• Medical race director / deputies (number) • Medical doctor (Sport and Exercise Medicine specialist) (number) • Medical doctor (Emergency Medicine / Intensive Care specialist) (number) • Medical doctor (Cardiologist) (number) • Medical doctor (Other specialist) (number) • Medical doctor (General Practitioner / Family Physician) (number) • Physiotherapist (number) • Athletic trainer(number) • First Aider (Advance Life Support) (number) • First Aider (Basic Life Support) (number)

Race medical encounter data collection

The consensus group recommends a uniform data collection procedure at the event medical facilities to record all medical encounters. For this purpose, the consensus group recommend using a standardised **R**ace **M**edical **E**ncounter **D**ata (R-MED) form for illness-related medical encounters (Supplementary Table 4) and injury-related medical encounters (Supplementary Table 6). The R-MED forms were developed not only as a research tool but also as a simplified standardised clinical data record form, where most data are entered by ticking "boxes" so that forms can easily be used in a busy medical tent situation. Consensus group members are also developing electronic versions of these forms for widespread implementation.

We suggest that international federations, national federations, event organisers and race medical directors adopt this consensus, and utilise at least the minimum race day data collection format (Table 2) and the **R**ace **M**edical **E**ncounter **D**ata (R-MED) forms (Supplementary Tables 4 and 6) to collect data at all events, wherever possible.

Data reporting

We recommend that the following are reported routinely for all athletes (including sub-groups e.g. by age groups and sex).

Individual athlete data

It is acknowledged that athletes could participate in multiple events, or the same event over a number of years. Therefore, documentation of individually coded, de-identified athlete data is recommended so that the number of athletes who participated in multiple events or in the same event over a number of years can be counted.

Incidence of medical encounters

The incidence of all medical encounters is reported as the number of encounters (numerator) per race starters (denominator). In addition, the incidence of medical encounters should be reported by sub-categories of severity of medical encounters (minor, moderate, serious / life-threatening),

organ system (illness-related), anatomical region (injury-related) and final diagnosis (illness or injury type).

It is conventional that the incidence of medical encounters is reported as the Patient Presentation Rate (PPR) (medical encounters per 1000 race starters) [53]. In data analysis from earlier studies that predate electronic chip timing, the incidence can be reported per 1000 race entrants or finishers [8]. In cases where small numbers of specific encounters are reported (e.g. serious / life-threatening medical encounters or SCD), the denominator can be 10 000 or 100 000 race starters [53]. For comparison between different incidences of illness- or injury-related medical encounters illness or injury rate ratios (IRR) could be determined.

Did-not-start (DNS) rate

The DNS is the percentage (%) of athletes who registered, but did not start the event calculated as follows: [(the number of athletes who entered or registered for the event - the number of athletes who started the event) / the number of athletes who entered or registered for the event] * 100.

Did-not-finish (DNF) rate

The DNF is the percentage (%) athletes who started the event, but did not finish the event calculated as follows: [(the number of athletes who started the event – the number of athletes who finished the event) / the number of athletes who started the event)] * 100.

Overall medical encounter (ME) rate and severity-based encounter rates; Minor (MinME), Moderate (ModME), and Severe / life-threatening (SME)

The ME rate is the proportion of athletes (usually per 1000 athletes) who started the event and had a medical encounter or severity-based encounter, calculated as follows: [(the number of athletes who had a medical encounter / the number of athletes who started the event) * 1000)]. In older studies, the denominator is often entrants or finishers and these rates can also be calculated for events [8].

Sudden cardiac arrest (SCA) and sudden cardiac death (SCD) rate

The SCA or SD rate is the proportion of athletes (usually per 100 000 athletes) who started the event, and who had a sudden cardiac arrest with or without successful resuscitation (including defibrillation) during or within 1-24 hours after the event calculated as follows: [(number of athletes who had a sudden cardiac arrest / number of athletes who started the event) * 100 000)]

Sudden Death (SD) rate

The SD rate is the proportion of athletes (usually per 100 000 athletes) who started the event, and who died from any cause during or within 1-24 hours of finishing the event and deemed to be directly related to the event calculated as follows: [(number of athletes with sudden death / number of athletes who started the event) * 100 000)].

CLINICAL IMPLICATIONS AND FUTURE RESEARCH

Standardising definitions of medical encounters and methodology for data collection will help calculate more accurate incidence rates of medical encounters during endurance sport events. High quality data collection will also allow dependable comparisons among different endurance events. Data collection as outlined in this consensus statement will allow more detailed study of intrinsic and extrinsic risk factors, environmental conditions, and pre-race medical disorders associated with endurance events. If those who organise mass community-based endurance sports events adopt these guiding principles it will (i) guide the direction of future preventive strategies to reduce medical encounters, and (ii) allow better allocation of medical resources (equipment, personnel etc) for endurance events of all sizes. This consensus will form the basis of expanding the SAFER (**S**trategies to reduce **A**dverse medical events **F**or the **E**xercise**R**) studies [2] [3] [4][54] to a SAFER **I**nternational **M**illion+ **A**thlete **P**rogram (SAFER-IMAP). Ultimately, the aim for research in this field is to protect athlete health in all endurance race participants around the world.[44].

ENDORSEMENTS

International Institute for Race Medicine (IIRM)
International Association of Athletics Federations (IAAF)
Union Cycliste Internationale (UCI)
International Triathlon Union (ITU)

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Patient involvement

No. Participants were not involved with the planning of the consensus.

SUPPLEMENTARY MATERIAL

Supplementary Table 1: Consensus methodology

Supplementary Table 2: Additional comments and examples Definitions

Supplementary Table 3: Diagnostic categories of illness-related medical encounters by main organ system and more common specific types / diagnosis of medical encounters

Supplementary Table 4: Race Illness-Related Medical Encounter Data (R-MED) form

Supplementary Table 5: Diagnostic categories of injury-related medical encounters by main anatomical region and more common injury types / diagnosis

Supplementary Table 6: Race Injury-Related Medical Encounter Data (R-MED) form

Figure legends

Figure 1: Classification of all medical problems at endurance sports events, including reported medical problems (medical encounters - not shaded) and non-reported medical problems (shaded)

Figure 2: Classification of medical encounters by severity

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