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**Article:**
Brown, J.C., Cross, M., England, M. et al. (2019) Guidelines for community-based injury surveillance in rugby union. Journal of Science and Medicine in Sport, 22 (12). pp. 1314-1318. ISSN: 1440-2440

https://doi.org/10.1016/j.jsams.2019.08.006

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**Guidelines for community-based injury surveillance in rugby union**

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**Word count**

Abstract: 232

Main text: 2260

**Abstract**

*Objectives*

The vast majority of rugby union ('rugby') participants are community-based players; however, the majority of injury surveillance studies reported relate to the elite, professional game. A potential reason for this dearth of studies could be the perceived difficulty of using the consensus statement for injury recording at the community level. The aim of this study was to identify areas where the consensus statement could be adapted for easier and more appropriate implementation within the community setting.

*Design*

Round-table discussion

*Methods*

All community-based injury surveillance issues were discussed during a 2-day facilitated round-table meeting, by an 11-person working group consisting of researchers currently active in rugby-related injury surveillance, sports medicine and sports science issues. The outcomes from the meeting were summarised in a draft guidance document that was then subjected to an extensive iterative review prior to producing methodological recommendations.

*Results*

Each aspect of the rugby-specific consensus statement was reviewed to determine whether it was feasible to implement the standards required in the context of non-elite rugby and the resources available within in a community setting. Final recommendations are presented within a community-based injury report form.

*Conclusions*

It is recommended that whenever possible the rugby-specific consensus statement for injury surveillance studies be used: this paper presents an adapted report form that can be used to record injury surveillance information in community rugby if suitable medical support is not available.

**Keywords**

Consensus; epidemiology; injury risk; injury severity; injury causation

**Practical implications**

- This paper adapts the existing injury consensus statement for conducting injury surveillance studies in elite rugby union, for community settings that might be without qualified medical personnel.
- It is hoped that this simpler methodology will stimulate more surveillance within community rugby, as this level of play comprises the majority of the rugby playing population.
- Enhanced levels of information about injury risk at the community level will enable World Rugby, as the sports governing body, to better understand and manage risks at this level of the game

## Introduction

Exercise and sport offer short and long-term physical and mental health benefits to participants. [1–3] Rugby Union ('rugby') is one of the most popular team sports in the world, being played in 133 countries by over 9 million players. [4] As with any form of physical activity, however, involvement in rugby presents a risk of injury to participants; therefore, it is essential that the sport's international and national governing bodies implement a sport-wide injury risk management strategy. [5] In order to inform this strategy and to develop injury prevention programmes, it is necessary to conduct injury surveillance using accurate and consistent methodologies that enable valid comparisons to be made across countries, gender, age and performance levels. [6] In this context, World Rugby (previously the International Rugby Board) set up the Rugby Injury Consensus Group (RICG) in 2006 to develop an international consensus statement on definitions and data collection protocols for injury surveillance studies in elite rugby. [7] The resultant consensus statement provided guidance that has led to the

reporting of high-quality rugby-related injury data in peer-reviewed publications over the past 12 years.

Although the majority of the world's playing population are non-elite, [4] most published surveillance studies have been conducted at the elite level. [8] Indeed, a recent systematic review only found six studies at the non-elite level. [9] To encourage a more consistent approach to non-elite rugby injury surveillance studies and to make the aggregation of these data possible to enable comparison of injury risk across a range of settings, World Rugby convened a 2-day meeting with eleven rugby medicine and injury surveillance experts in 2017. While accepting that the current rugby-specific injury surveillance consensus statement [7]remains the essential methodology to be used for studies at the elite level and the preferred methodology for all other studies, the aim of the meeting was to identify areas where the consensus statement could be adapted for easier and more appropriate implementation within the community setting. This paper summarises the key discussions and conclusions from this meeting.

**Material and methods**

The methodological issues discussed in this paper focus on community level rugby, which relates to any form of rugby that is played by teams in which players do not have professional (paid) contracts and includes, but is not limited to, all age groups; male/female players; and all formats of the game, such as 15s, 7s and tag rugby.

All members of the World Rugby working group were purposively sampled for their specific expertise and experience and had no relevant conflicts of interest. Five members (CWF, KQ, MR, RT, SK) were part of World Rugby's Scientific Committee. A further four members (MC, ME, JB, KS) worked primarily in rugby research. Two members (CFF, EV) were established injury prevention researchers in a variety of sports. GF was a trauma specialist, with a variety of research interests. In total, the members represented five countries – Australia, New Zealand, South Africa, The Netherlands and the United Kingdom. Only two members were contracted by World Rugby (MR, RT). Four of the group (CWF, SK, KQ, MR) were members of the 2006 Rugby Injury Consensus Group (RICG) that

developed and published the "*Consensus statement on injury definitions and data collection procedures for studies of injuries in rugby union*". [7] For convenience in the subsequent discussion, this document is referred to as the 'consensus statement'. The following 12 variables are recommended for collection by the consensus statement:

1. Date and time of injury
2. Date of return to full participation
3. Playing position at time of injury
4. Injured body part (e.g head/face, low back, foot/toe, etc)
5. Side of body injured
6. Type of injury (e.g. concussion, sprain/ligament injury, tendon injury, etc)
7. Diagnosis of injury (text or code)
8. Has the player had a previous injury of the same type at the same site (i.e. is this injury a recurrence?)
9. Was the injury caused by overuse or trauma?
10. Did the injury occur during match or training?
11. Was the injury caused by contact? (If yes, specify activity)
12. Did the reference indicate that the action leading to the injury was a violation of the Laws or dangerous splay (Law 10.4)?

The group discussed each variable presented in the rugby consensus statement in order to determine whether it was a necessary and appropriate parameter for community-level rugby. A summary of the adaptations for the community environment are included as a Supplementary Excel file. The meeting was run as a facilitated round-table discussion rather than as a consensus group, as the aim was to develop guidelines that would assist researchers in implementing the recommendations, presented in the existing rugby consensus statement, within a community setting. The meeting followed a pre-defined 12-point agenda and was chaired by an independent academic with substantial experience in implementing community-based rugby injury epidemiology studies (KS) and who, for added objectivity, was deliberately not a member of the original 2006 RICG. The 12 points included in the meeting agenda were:

1. Purpose of community injury surveillance
2. Desired outcomes
3. Definitions and terminology
4. Methodology and reporting
5. Adapting methods to address specific research questions
6. Cohort ownership
7. Barriers to successful surveillance
8. Use of video analysis
9. Collaboration
10. Specific reporting of concussions, catastrophic injuries and fatalities
11. Study funding
12. Procedures manual

Most agenda items were initially discussed in two five or six-member groups, followed by feedback sessions under the guidance of the meeting chairperson. A designated scribe within the group (JB) took notes on each of the discussed agenda items, with special focus paid to what the group deemed was important for a manuscript summarising the meeting. If there was any disagreement during discussion of these points, these were noted as such. A draft manuscript was subsequently distributed to all authors who were asked to provide their input. The initial responses from all authors were discussed by a lead group (JB, KS, MR, CF). Once agreement was reached amongst the lead group, the revision was distributed to all authors for their input. Again, authors' responses to the revision were discussed by the lead group and a further revision produced: in total, seven rounds of document review were undertaken.

**Results**

It was recognised that most community-based teams did not employ qualified medical support staff, therefore these guidelines were developed on the assumption that injuries in community-based teams would be recorded by, for example, coaching staff and/or team volunteers, albeit that some

of these may have first aid or similar qualifications and/or experience. [10] Group discussions also considered the "building blocks" of injury surveillance described by WHO. [6] Based on these discussions, an injury report form was developed, which can be used as a paper-based (Figure 1) method of recording injury surveillance data. It should be noted that each injury result from an event should be reported as a separate injury, using a separate form.

**Discussion**

The discussion presented below justifies, where necessary, the items included in this community-level injury report form. It should be emphasised, however, that those research teams with access to appropriately qualified medical support should, whenever possible, continue to use the consensus statement for conducting injury surveillance studies in rugby.

*Definition of injury*

The definition of injury used in the consensus statement is retained; however, there is recognition that, at the community level, injuries impact critically on both the player's rugby and non-rugby activities:

*Any condition sustained by a player during a rugby match or training activity caused by a transfer of energy which exceeds the ability of the human body to maintain its structural/functional integrity and which results in time-loss from or impaired participation in future rugby, scholarly or occupational activities*.

This definition does not include medical-attention injuries, as recording this type of injury would be inherently dependent on the level of medical support available within the club. Due to the wide variations in the numbers and qualifications of medical support staff available within community clubs, including this type of injury would give rise to large variations in the recorded number of injuries and hence would lead to inconsistencies in the reported levels of injury incidence. This definition includes both acute injuries resulting from a single transfer of energy and gradual onset injuries resulting from the accumulation of multiple exposures to low levels of energy.

*Severity of injury (section 1)*

Although the >1 day time-loss definition used in the consensus statement [7] is also recommended for injury severity reporting in community studies, because it allows direct comparisons to be made between settings, it is recognised that this definition might be too difficult to achieve in some community settings without access to qualified medical support staff. It is accepted, therefore, that a >7 day time-loss definition will provide a more reliable and consistent definition to use in community settings when it is not possible to employ the >1 day time-loss definition. It is recommended, however, that if this higher baseline severity value is used for recording injuries that this is clearly highlighted when reporting results, as it will reduce the number of injuries recorded and hence the incidence of injury reported.

Moreover, for a community player, missing academic/occupational work might be as or even more important than missing sport: the report form, therefore, enables both rugby-based and academic/occupational time losses to be recorded. Additional measures of severity are included on the injury form that capture the medical treatment required for the injury (match day or post-match day treatment). [6]

*Factors contributing to the injury (Section 2)*

Essential factors contributing to the injury are recorded in this section. These factors include injury onset (acute, gradual), activity (match, training), rugby format (7s, 15s, etc), cause (contact/non-contact), and activity at time of injury (tackling, running, etc).

*Location and type of injury (Section 3)*

Along with the location categories used in the consensus statement, the community report form includes a body figure, in line with previous surveillance forms, so that non-qualified staff can mark the location and side of injury, [11] where appropriate. This enables study coordinators to provide a more consistent definition of the injury locations, at a later date.

It was recognised that providing a consistent and reliable description of injury type was the most challenging aspect of community-based studies, in the absence of qualified medical staff. The categories included in the report form were therefore kept as simple as possible, while still delivering meaningful value for the study.

*Playing position at time of injury (Section 4)*

Identifying the injured player's position at the time of injury in 15-a-side rugby is straight-forward: for other formats of rugby, it is sufficient to identify whether the injured player was a forward or back.

*Reporting exposure information*

It is usually of little value simply to compare the number of injuries recorded in injury surveillance studies across different rugby settings (e.g. professional and community) and different sports due to differences in the level and type of exposure. It is essential, therefore, to record match and training exposures to risk for each setting so that rates of injury can be calculated separately. Exposure is the denominator to the number of reported injuries (numerator) in the calculation of incidence, which together with injury severity enables risk comparisons to be made through the reporting of injury burden. [13] Exposure can be quantified in terms of the time and/or the number of players exposed to risk.

*Comparing injury risk based on prevalence: total number of players at risk of injury*

For example, if Club A has a squad of 60 players for a particular season, and 15 of these players report match injuries in this season, then risk can be described as a match injury incidence proportion (season-prevalence) of 25% (i.e. 25% of Club A players sustained at least one injury in the season). By comparison, if Club B has a squad of 100 players and 20 of these players report match injuries during the season, this represents a match injury incidence proportion of 20% (i.e. 20% of Club B players sustained at least one injury in the season). Despite having more injuries over a season, the Club B players actually have a lower injury risk than Club A players, which is due to the difference in squad sizes.

*Comparing injury risk based on total time at risk*

A more challenging but preferred denominator to use, which allows more detailed comparisons of injury risk between settings, is the total player match and training times at risk. This method is described in detail in the consensus statement. For the purposes of community level reporting, the total time at risk for match injuries can be approximated over a season as long as one knows (i) the total number of matches played by each team, (ii) the duration (in hours) of a match, and (iii) how many players were on the field for a typical match (e.g. fifteen players in 15s rugby, seven in 7s rugby). For example, Club C recorded 10 match injuries from their two teams who each played 20 matches (i.e. 40 matches in total). Club C's matches were 15-a-side and each match was 70 minutes in length. This equates to: 23.3 match-hours per team (20 matches x 70 minutes/60) over the season. The total player-time at risk for Club C is 30 players (two teams) x 23.3 hours = 700 player-match-hours/season. This represents an injury incidence rate of 0.014 match injuries per hour (10/700) or 14 match injuries per 1000 player-match-hours. Alternatively, the same information could be reported as 0.25 injuries per match (10 injuries/40 matches); or as 4 matches per injury (40 matches/10 injuries). The risk of injury for an individual player would be reported as {(40 matches x 15 players)/(10 injuries)} – 60 player-games/injury or 1 injury every 3 seasons (assuming the player takes part in every game for the whole period of each game).

Incidences of injury should be reported separately for match and training exposures: reporting combined values does not provide a meaningful evaluation and can be misleading, as the risks associated with these activities differ considerably and the combined value depends on the ratio of match to training exposure. [14,15]

All the information required for exposure could be collected, at the start and end (as a check) of a rugby season/tournament using Table 1.

***TABLE 1 ABOUT HERE***

*Ethical considerations*

In terms of the Declaration of Helsinki, it is important that players are asked permission to use their de-identified data for research purposes. [16] Should players not consent to their data being used for research, their data can still be recorded for clinical or medical reasons by the team, but the data cannot be analysed for research purposes.

## Conclusion

Conducting injury surveillance studies in community-based rugby settings with limited medical and sports science support presents challenges. This document provides guidance and an injury reporting form for use ***where resources are limited and where it is not possible to meet the higher standards presented in the consensus statement for professional rugby.*** [7] These community-based guidelines should not, however, be adopted as the *de facto* standard for all studies as they provide different information to the consensus statement. In reports of studies using this community-based protocol, it is essential to present the reasons for not being able to use the consensus statement. It would also be of great value to rugby stakeholders if those researchers who have the resources to implement injury surveillance studies in a community-based setting using the consensus statement procedures also record the variables and categories proposed in this document, as this would provide valuable cross-matching criteria to be established between the two protocols. These guidelines for community-based epidemiological studies should be readily adaptable to community-based settings in other team sports, such as rugby league, football and field hockey.

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**Tables**

Table 1. Prompts to collect exposure information to calculate injury rates. Use one table per format.

| **Format (circle):**<br>**15s/10s/7s/Tag/ Other:**<br>**_____** | **Data collected at start of season / tournament** | **Data collected at end of season / tournament** |
|---|---|---|
| Number of matches (excluding play-offs) | | |
| Number of matches (including play-offs) | | |
| Number of minutes per match | | |
| Average number of players on the field for each team (excluding yellow/red cards and injuries) | | |

**Figure Legend**

Figure 1. Printable form for injury recording. To be used in conjunction with exposure table (Table 1).

The authors would like to thank Ms Deidre Keating and Dr Martin Raftery for co-ordinating the meeting that led to this article.

# Community Injury Surveillance Form

**Injury Surveillance**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Team | | Player ID/Name | | Sex: ☐ Male ☐ Female | | Date of Birth (dd/mm/yy) | |
| Injury Date (dd/mm/yy) | | Venue | | Date of return to school/work (dd/mm/yy) | | Date of return from injury to matches /training (dd/mm/yy) | |
| Role of person completing this form | ☐ Coach ☐ Player ☐ Manager ☐ Medical Support ☐ Other (Describe) | | | | | Contact Number | |

**As a result of an injury incurred during a rugby match or rugby training...**

1(a) Was a player catastrophically or fatally injured? ☐ Yes ☐ No (if 'YES', please also submit this information to World Rugby's catastrophic injury report online)

1(b) Did the player miss school/work?
- ☐ No
- ☐ Yes: 1 day
- ☐ Yes: > 1 day, but ≤1 week
- ☐ Yes: > 1 week, but ≤ 4 weeks
- ☐ Yes: > 4 weeks
- ☐ Unknown

1(c) Did the player miss rugby training?
- ☐ No
- ☐ Yes: 1 day
- ☐ Yes: > 1 day but ≤ 1 week
- ☐ Yes: > 1 week but ≤ 4 weeks
- ☐ Yes: > 5 weeks
- ☐ Unknown

1(d) Did the player miss any rugby matches?
- ☐ No
- ☐ Yes; 1 match
- ☐ Yes; 2, 3 or 4 matches
- ☐ Yes; 5 matches or remainder of season
- ☐ Unknown

1(d) Was medical treatment required for this injury?
- ☐ No
- ☐ Yes: Minor match-day treatment
- ☐ Yes: Post-match treatment by team doctor or healthcare professional
- ☐ Yes: Post-match treatment by another medical professional or hospital emergency
- ☐ Unknown

2(a) How was the injury noticed/felt?
- ☐ Suddenly (acute)
- ☐ Gradually/progressively
- ☐ Unknown

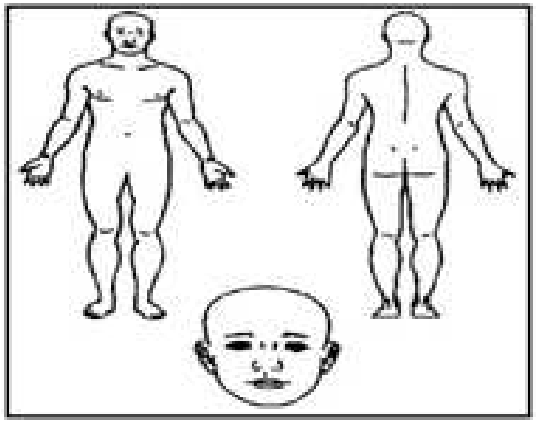
2 (b) When did the injury happen?
- ☐ Match – first half
- ☐ Match – second half
- ☐ Training session
- ☐ Unknown

2(c) In which format did the injury occur?
☐ 15s ☐ 10s ☐ 7s ☐ Tag

2(d) Injury cause:
☐ Contact ☐ Non-contact ☐ Other

2(e) Activity at time of injury?
- ☐ Accidental collision
- ☐ Being tackled
- ☐ Deliberate collision
- ☐ Lineout
- ☐ Maul
- ☐ Ruck
- ☐ Running
- ☐ Scrum
- ☐ Tackling
- ☐ Other
- ☐ Unknown

3(a) Mark the location of the injury (X) and identify the body region injured



- ☐ Head/face
- ☐ Neck/cervical spine
- ☐ Chest/ribs/upper back
- ☐ Abdomen
- ☐ Low back
- ☐ Sacrum/pelvis
- ☐ Shoulder/collar bone
- ☐ Upper arm
- ☐ Elbow
- ☐ Forearm
- ☐ Wrist
- ☐ Hand/finger/thumb
- ☐ Hip/groin
- ☐ Anterior thigh
- ☐ Posterior thigh
- ☐ Knee
- ☐ Lower leg/achilles tendon
- ☐ Ankle
- ☐ Foot toe

# Community Injury Surveillance Form

Injury Surveillance

| 3(b) Type of injury | | 4 Position at time of injury | | |
|---|---|---|---|---|
| ☐ Concussion (including suspected) | ☐ Strain of muscle or tendon | If injured playing 15's rugby, select specific position | ☐ Forward | ☐ Back |
| ☐ Bruise/contusion (muscle cork) | ☐ Dental injury | | ☐ Prop (1,3) | ☐ Scrum-half (9) |
| ☐ Cut/abrasion/laceration | ☐ Organ injury (e.g. eye, kidney) | | ☐ Hooker (2) | ☐ Fly-half (10) |
| ☐ Fracture of bone | ☐ Other | | ☐ Lock (4,5) | ☐ Centre (12, 13) |
| ☐ Dislocation of joint | ☐ Unknown | | ☐ Back row (6,7,8) | ☐ Wing (11, 14) |
| ☐ Sprain of joint or ligament | | | | ☐ Full back (15) |

Using one sentence, please describe the circumstances that led to the injury