ANNEX FOUR

HIA Protocol

Implementation date: August 1, 2015

WORLD RUGBY HEAD INJURY ASSESSMENT (HIA) PROTOCOL

INTRODUCTION

Temporary replacement for head injury assessment was introduced permanently into Law in May 2015. This document titled, World Rugby Head Injury Assessment (HIA) Protocol has been developed to support Law 3.11 and Regulation 10 which are both relevant to this temporary replacement for head injury assessment (HIA) and the management of concussion.

Included within this document are:

1. Approval criteria for Tournament or Match Organisers requesting access to temporary replacement
2. Core (mandatory) Concussion Player Welfare Standards that apply to the access to temporary replacement to undertake a Head Injury Assessment (HIA)
3. Recommended Player Welfare Standards that are related to general concussion issues and other general medical issues
4. The Untoward Incident Review System
5. HIA history
6. HIA Process – explanation of HIA Procedures for Team Medical Staff and Match Day Doctors

1. APPROVAL CRITERIA FOR TOURNAMENT OR MATCH ORGANISERS

Tournament Organisers and Match Organisers wishing to access temporary replacement for head injury assessment (HIA) in games under their control must apply to World Rugby, confirming that:

- The Tournament or Matches in question are elite adult Tournament or Matches.
- The Core (mandatory) Concussion Player Welfare Standards outlined later in this document at Section 2 have been included in Terms of Participation or Tour Agreement documents signed by all participating Unions or Teams.
- They have facilitated the establishment of an Untoward Incident Review (UIR) system. An example of an UIR is outlined later in this document at Section 4.
- They have facilitated access to video to assist with the management of head impact events occurring during games.

Tournament Organisers or individual Match Organisers that satisfy the above criteria will be considered but not guaranteed approval for access to temporary replacement for head injury assessment.

2. CORE (MANDATORY) CONCUSSION PLAYER WELFARE STANDARDS

The following player welfare standards relate to concussion and **must** be included within the Tournament Terms of Participation or Tours Agreement and signed by participating Unions and or Teams in order to access temporary replacement for a Head Injury Assessment. These standards require that:

1. All team medical staff and Tournament match day medical staff have completed the following World Rugby education modules (available here):
    - Concussion Management for Elite Level Match Day Medical Staff
    - Medical Protocols for Match Day Medical Staff
2. All players and team management have completed a concussion education session within the year prior to commencement of the Tournament. This education session as a minimum must cover the essential information outlined in Appendix 1.
3. Each player has completed a baseline concussion assessment in the year prior to commencement of the Tournament and the results of this baseline are available to the Team Medical staff. As a minimum this baseline should be a SCAT 3 however it is recommended that teams also include a computer neurocognitive assessment as part of a player's annual baseline assessment.
4. A concussion risk stratification (see Appendix 1 for guidance) has been completed on all players, at least annually, to support concussion management on an individual basis.
5. All Team Medical staff, coaches and team management will comply with the World Rugby **permanent and temporary removal from field of play criteria** for head impact events (available in Appendix 1 and in the HIA Form 1).
6. All Team Medical staff, coaches and team management will comply with a Graduated Return to Play programme as approved by World Rugby (Appendix 2) and/or the Union in accordance with medical practice in the relevant jurisdiction.
7. All teams within the respective Tournament will participate in World Rugby HIA research and will confirm player consent has been obtained (Appendix 3, Player Information and Player Consent Form examples).
8. All team staff acknowledge that untoward incident review system has been established for potential medical mismanagement and specifically for incidents where criteria, identified in the HIA, for permanent and temporary removal from play following a head injury are not enforced. Also all team staff acknowledge that they will participate if requested in any untoward incident review and that a charge of misconduct can be applied following an untoward incident review.
9. All team staff acknowledge that the Match Day Doctor has the power under Regulation 15.2.1(c) to unilaterally remove an injured player from further game participation.
10. All teams agree to use the World Rugby current HIA Process, HIA Form 1, HIA Form 2 and HIA Form 3 during this temporary replacement for head injury unless exemption is provided by World Rugby

3. RECOMMENDED PLAYER WELFARE STANDARDS

The following Union and Team Responsibilities are recommended and relate to concussion and other general medical issues and should be completed and included or referenced within each Union's relevant medical policies, Tournament Terms of Participation or Tours Agreement and if included in these documents signed by participating Unions and or Teams.

Concussion

1. Unions should define within their Concussion Policy an "approved healthcare professional" as appropriate to their jurisdiction. This "approved healthcare professional" would be suitable for determining concussion return to play decisions

2. Unions should define, 'advanced level of concussion care', within their Concussion Policy. In addition, Unions may wish to identify practitioners within their jurisdiction who are capable of providing an 'advanced level of concussion care'. Advanced care is generally available within Professional Rugby teams and allows for a more individualised management of concussion. This level of care is essential for all adult elite players wishing to start a return to play programme without a week of physical rest. A definition guide to this 'advanced level of concussion care' is provided in Appendix 1.

General Medical Issues

3. Unions prior to all Tournament or Matches should confirm that all players have been assessed by appropriate medical staff as being medically, dentally and physically fit to attend and participate in a Tournament or Match.
4. Unions should confirm on a yearly basis that each player has completed the World Rugby cardiac screening questionnaire and cardiac examination as described in the World Rugby Cardiac Screening document available here. Each Tournament is responsible for deciding if an ECG is part of this cardiac screening process.
5. From August 1, 2015, World Rugby strongly recommends that at the elite level of the game that as a minimum, one team medical staff entering the field of play must have completed a Level 2 ICIR course or equivalent. From January 1, 2017, all team medical staff entering the field of play must have completed a Level 2 ICIR course or equivalent.
6. Confirmation that all team medical staff have completed:
   - Keep Rugby Clean or equivalent, anti-doping educational module available here
   - Keep Rugby Onside or equivalent, anti-corruption educational module available here

4. UNTOWARD INCIDENT REVIEW SYSTEM

The Tournament Organiser or Match Organiser will be responsible for facilitating the formation of an Untoward Incident Review (UIR) system and a UIR Management Group. This process may be coordinated by the Tournament / Match Organisers or the responsibility may be assigned to the Union in which jurisdiction the Tournament or Match is being played or to the Union of a participating team.

As a minimum the UIR Management Group must consist of a designated representative of the Tournament Organiser, at least one medical representative and a legal representative. It is strongly recommended that at least two members are independent representatives.

An UIR can be requested verbally or in writing by the Match Day Doctor, the Tournament Director, a member of the UIR Management Group, the Tournament Communications Manager, the Tournament Organiser, the World Rugby CEO or World Rugby CMO.

Below is an example of the processes around an Untoward Incident Review (UIR) System:

STEP 1

- Untoward incident identified and reported to a Group member

STEP 2 – Untoward Incident Review (UIR) identified

1. All members of UIR Management Group notified
2. Video of incident reviewed by UIR Management Group (if relevant and available)

3. Agreement amongst UIR Management Group that further investigation is required
4. UIR Management Group Chairperson requests a written report from the offending party(ies). The content of the Report should include but not be limited to – description of event, explanation why actions were taken, post-injury information relevant to UIR, summary and recommendations
5. UIR Management Group request any relevant related information and evidence
6. UIR Management Group to review formal report and additional information regarding next steps
7. Verbal discussion with offending person regarding incident by UIR Management Group Member(s) if indicated

STEP 3

UIR Management Group determines if potential misconduct has occurred based on the criteria below.

According to the conditions in the Terms of Participation, the following without limitation shall constitute Misconduct:

(a) Failure to ensure that the HIA Protocols (or equivalent) and/or blood protocol (including as contained in Law and Regulation 15 is/are fully complied with shall constitute Misconduct on a strict liability basis by the Team Medical Staff, head coach and Team Manager, whose direct responsibility it is to ensure compliance therewith by all Members of their Team, and by any other persons who fail to comply fully with the HIA guidelines (or equivalent) and/or blood protocol.

(b) Failure to ensure that a direction(s) and/or instruction(s) of the Match Day Doctor and/or if relevant WR CMO is immediately (or within the stipulated time period, as applicable) fully complied with shall constitute Misconduct on a strict liability basis by the Team Medical Staff, head coach and Team Manager and by any other persons who fail to comply immediately (or within the stipulated time period, as applicable) with such direction(s) and/or instruction(s). For the avoidance of doubt, it is the responsibility of the Team Medical Staff, head coach and Team Manager to ensure that they have processes in place such that they are all informed of any such direction(s) and/or instruction(s) immediately upon being issued and to ensure compliance by all Team Members with such direction(s) and/or instruction(s).

(c) The participation or attempted participation of any player in a Match who has sustained a confirmed concussion and who has not fully complied with the Graduated Return to Play protocol shall constitute Misconduct on a strict liability basis by the Team Medical Staff, head coach and Team Manager, whose direct responsibility it is to ensure compliance therewith, and by any other person who fails to comply with the Graduated Return to Play protocol where required.

(d) Verbal and/or physical abuse and/or the use of insulting, intimidating and/or offensive language and/or conduct towards the Match Day Doctor, WR CMO, Match Day Medical Team and/or any other person shall constitute Misconduct.

(e) Failure to comply with the provisions of Clause 6.20.10 (including without limitation any request and/or direction made thereunder) in relation to a WR CMO investigation shall constitute Misconduct.

(f) Any act and/or omission which may constitute a breach of prevailing medical and/or health professional regulations and/or similar applicable in the United Kingdom and/or in the home country of the relevant Team Medical Staff member shall constitute Misconduct.

STEP 4

UIR Management Group determine if a misconduct should apply and if so the case would be referred to the Tournament Disciplinary Program which would apply any sanctions if deemed appropriate. If the UIR identifies a HIA process or procedural issue this should be referred to World Rugby Chief Medical Officer for consideration.

5. HIA HISTORY

At the 2011 IRB Medical Commission Conference (MCC), it was identified that the management of pitch-side concussion at the elite level of the Rugby was sub-optimal. This opinion was supported by the following evidence:

1. during Rugby World Cup (RWC) 2011 team doctors were undertaking an 'on the run and on the field' assessment of head injuries, taking on average 68 seconds to complete this assessment
2. on-field assessments during RWC 2011 were not employing a multimodal assessment (symptom check, cognitive evaluation and balance test) for head injuries as recommended by the Zurich Concussion in Sports Group
3. Injury surveillance research completed by both World Rugby and RFU (English Rugby Union) identified that 56% of players with confirmed concussion were remaining on the pitch following their head injury

As a result, the IRB MCC agreed that a Pitch Side Concussion Assessment (PSCA) Working Group should be formed and charged with developing a process that would improve pitch side management of head injuries at the **elite level** of the Game.

This Working Group consisted of medical representatives from Tier 1 and Tier 2 Unions, northern and southern hemisphere representatives, non-English speaking representative, representatives with extensive recent Team Doctor experience, a player representative and two independent subject experts.

The outcome of this group's work was the development of the PSCA Tool and Process (now known as HIA Tool and Process).

In mid-2012 the PSCA Tool and Process was introduced into elite adult Rugby and the development phases of this Tool and Process are shown below.

Phase 1 – August 2012 – July 2013

- Introduction of PSCA into selected elite adult Rugby tournaments
- Version 1 of the PSCA Tool plus a 5 minute temporary replacement used from August 2012
- Phase 1, **Official Report** delivered in late July 2013 by Working Group, resulted in development of Version 2 of the PSCA Tool and more rigid post game follow up processes

Phase 2 – August 2013 – May 2014

- Version 2 of the PSCA Tool introduced from August 2013. This Version 2 had alteration to "immediate and permanent removal" criteria (increased from 3 to 5 criteria) with the 5 minute temporary replacement retained.
- Version 2 also included the introduction of a more rigid and standardised post game follow up procedure with the introduction of the PSCA 2 (post-game, same day assessment) and PSCA 3 (a 36-48 hour assessment)
- The Phase 1 **Scientific Report** published in BJSM in January 2014 by Dr Gordon Fuller
    - Confirmed the Phase 1 **Official Report** findings. Both reports confirmed a positive impact for temporary replacement with the number of players with confirmed concussions returning to play following their injury dropping from 56% to 12% following the introduction of the PSCA process.
    - Identified areas for improvement in the PSCA Tool and Process
- In May 2014 the Phase 2 **Official Report** was developed by Paris University confirming similar results to those obtained in Phase 1 **Official and Scientific Reports**.

Phase 3 – August 2014 – August 2016

- Results from the Phase 1 **Scientific Report** and the Phase 2 **Official Report** underpinned changes in the name, content and time allowed for the temporary replacement.
- Phase 3 changes introduced in August 2014 included:
    - Name change from PSCA (pitch side concussion assessment) to HIA (head injury assessment) – name change reflects that the assessment is an assessment of a head injury to identify a confirmed or suspected concussion not an assessment of concussion
    - Expansion of immediate and permanent removal criteria (increased from 5 to 11 criteria)
    - Clarification of temporary removal criteria
    - Change in HIA Tool content – cognitive evaluation component increased, tandem balance test replaced by the tandem gait test.
    - Time for temporary replacement increased from 5 minutes to 10 minutes due to increased activities required to be undertaken with the new HIA Tool
    - Board approval for increase in temporary replacement time received in May 2014

- Phase 3 research commenced in August 2014 led by Dr Gordon Fuller and Prof Philippe Decq through Paris University.
- Format changes of HIA Forms 1, 2 and 3 were completed in early 2015. These changes were not content changes and were introduced to improve compliance in responding to research questions

Temporary replacement for head injury has been a Law trial within Rugby Union since May 2012. Positive outcomes confirmed by independent research, has underpinned the move of this Law from a trial Law to a permanent Law from May 2015.

6. HIA PROCESS – EXPLANATION

Recognising that concussion may have a variable natural history, with transient, fluctuating, delayed and evolving signs or symptoms, World Rugby promotes a three stage approach to assessment, diagnosis and monitoring of head injuries.

The Head Injury Assessment (HIA) process reinforces review of injured players a specific points in time in order to increase the recognition of concussion:

- Stage 1 – pitch side assessment using the HIA Form 1.
- Stage 2 – post-game, same day assessment using the HIA Form 2.
- Stage 3 – a 36-48 hours post injury assessment using the HIA Form 3.

World Rugby recommends that players with a head injury should be regularly monitored for evolving signs and symptoms between these identified timeframes.

Stage 1 – pitch side

Stage 1 utilizes the HIA Form 1 and occurs pitch side. It consists of 2 elements:

i. Immediate on-pitch evaluation of head injured players. This evaluation is supported by World Rugby **immediate and permanent removal** criteria (Appendix 1).

ii. Pitch side (off field) head injury assessment. This evaluation is indicated when criteria (Appendix 1) identify that a player **must** be assessed off field using the HIA 1 Tool. This HIA 1 is a multi-modal tool developed by World Rugby and based on the SCAT 3.

The HIA 1 Tool has NOT been developed to diagnose a concussion. An abnormal result from a HIA 1 identifies a suspected concussion. ALL players who have had a HIA 1 irrespective of the HIA 1 result must be followed up and complete a HIA Form 2 and 3.

The HIA Form 1 evaluation content **must not** be altered without approval from World Rugby as this HIA Process has been confirmed as underpinning an improved player welfare and safety standard.

Failure of medical staff to apply HIA 1 immediate and permanent removal criteria may result in an untoward incident review.

Stage 2 – post-game, same day

The HIA Form 2 used post-game same day is the SCAT 3 document. The World Rugby HIA Form 2 provides baseline normative data identified following review of over 700 individual Rugby player's SCAT 2 and 3 baseline results. As part of the Player Welfare Standards an annual baseline HIA Form 2 (SCAT 3) should be completed.

If a player has a post-game HIA Form 2 **negative variation** from baseline, in one or more mode(s) this should be considered strongly in favour of concussion.

If no baseline exists the following results are strongly in favour of concussion:

1. Total SAC 26 or below
2. Immediate Memory – score 12 or less
3. Concentration score (digits backwards) – 2 or below
4. Delayed recall – 3 or less words

5. Balance – Tandem stance – 3 or more errors, Single leg stance - 3 or more errors.
6. Tandem gait unable to be completed with 14 seconds in one Trial of four.
7. Any athlete with any symptom declared in the symptom list which is not usually experienced by the player following a Rugby match or training is strongly in favour of concussion.

Players with baseline assessments below the above scores should be scrutinized to confirm that the baseline testing has not been manipulated by the player.

Stage 3 – 36-48 hour assessment
The HIA Form 3 should be used as the support tool for the 36-48 hour post injury assessment. This follow up stage encourages the use of a computer neurocognitive tool as part of the overall HIA 3 assessment. If a computer neurocognitive assessment is not available a repeat of the HIA Form 2 (SCAT 3) is recommended in combination with the symptom checklist in the HIA Form 3.

The symptom checklist in the HIA Form 3 provides a retrospective assessment of symptom numbers, intensity and duration combined with point in time assessment of symptom number and intensity.

Diagnosing a Concussion
Within the World Rugby HIA process a diagnosis of a concussion is made if any one or more of the following apply:
1. A player has any sign or symptom listed in the immediate and permanent removal criteria
2. The post-game, same day clinical assessment supported by the HIA Form 2 is deemed abnormal
3. The 36-48 hour assessment clinical assessment supported by the HIA Form 3 is deemed abnormal
4. The treating practitioner deems the player to have a concussion

The content of HIA Form 2 and HIA Form 3 **must not** be altered without approval from World Rugby.

The above 3 Stage approach adopted by World Rugby has lowered the diagnostic threshold for concussion within elite Rugby and improved player safety and welfare.

Further information related to HIA forms and procedures is available within the Concussion Management for Elite Level Match Day Medical Staff education module available here.

7. HIA PROCEDURES FOR TEAM MEDICAL STAFF AND MATCH DAY DOCTORS

KEY MESSAGES
- The HIA has been developed for adult players at the elite level of the Game where teams are supported by experienced health care professionals.
- Clinical suspicion should always overrule a 'normal' result from any concussion support tool including all HIA Tools.
- The responsibility for return to play decisions rests solely with the doctor or the approved healthcare professional.
- Players who have a head injury (example facial laceration or contusion) and have concussion excluded should always be monitored for deterioration or an evolving concussion. This applies to all players returning to play following a negative HIA.
- World Rugby will continue to support research and auditing of the HIA tool and process to improve the validity and sensitivity of this tool and process.

The table below outlines which Tool applies in different circumstances.

	During match	Post-match	36-48 hours post-match
Confirmed Concussion (player removed permanently)	HIA 1 completed (for research purposes only)	HIA 2 completed	HIA 3 completed
Head Injury – HIA positive (player removed permanently from match)	HIA 1 completed	HIA 2 completed	HIA 3 completed
Head Injury – HIA negative (player returns to play and monitored)	HIA 1 completed	HIA 2 completed	HIA 3 completed
Concussive symptoms post-match at ground		HIA 2 completed	HIA 3 completed
Concussive symptoms after leaving ground			HIA 3 completed
Team Doctor (TD) video review confirms HIA should have been undertaken or on questioning player post-video review TD confirms had or has suspicious signs or symptoms			HIA 3 completed

HIA 1 TOOL – SIDE LINE SUPPORT TOOL

Below are definitions, explanations and procedures that will assist the person(s) who will be responsible for undertaking an HIA pitch side. The Team Doctor will complete an HIA on a player when indicated UNLESS the Team Doctor assigns this responsibility to the Match Day Doctor (MDD).

Permanent removal from field of play - on-field indications

Section 1 of the HIA 1 form.
A player **must be immediately and permanently removed** from further participation in a match if they have any of the following on-field signs or symptoms:

- Confirmed loss of consciousness
- Suspected loss of consciousness
- Convulsion
- Tonic posturing
- Balance disturbance / ataxia
- Clearly dazed
- Player not orientated in time, place and person
- Definite confusion
- Definite behavioural changes
- Oculomotor signs (e.g. spontaneous nystagmus)
- On field identification of signs or symptoms of concussion

Section 2 of the HIA 1 form.
A player must NOT return to play if any of the above are identified and if the following applies:

- Any Column 1 (abnormal) answer.

The doctor performing the HIA and neurological examination suspects a concussion despite a negative HIA test and examination.

Temporary removal from field of play – on-field indications

A HIA should be requested by the On-Field Medical Staff, Match Day Doctor or the referee if any of the following are witnessed:

- Head impact event where diagnosis is not immediately apparent
- Possible behaviour change
- Possible confusion
- Injury event witnessed with potential to result in a concussive injury
- Other (identify)

The time allowed for this off field assessment as identified in Law 3 is 10 minutes.

Definition 1 - Confirmed loss of consciousness

Can be made by a medically trained person or approved healthcare professional following a neurological assessment using the following definition - “a player has a confirmed loss of consciousness if he/she is not responding to orders and not moving apart from reflex movement such as tonic posturing and convulsions or is not orientated in time, place or person”.
Note: This is an equivalent to a player being assessed as P (pain) or U (unresponsive) on AVPU scale (A - equals Alert, V - equals responds to vocal stimulus, P - equals responds to painful stimulus, U - equals unresponsive.
Note: In order to score A for alert, the participant need to be orientated in time, place and person. If this cannot be demonstrated, they score V for responds to vocal stimulus)

Definition 2 – Suspected loss of consciousness

Is identified by one of the following:

- Cervical hypotonia observed immediately following impact
- The player stays on the ground, without movement until first support arrives on scene
- Reported loss of consciousness as witnessed by own team players or match officials

Definition 3 – Balance disturbance / ataxia
If an athlete is unable to stand steadily unaided or walk normally and steadily without support in the context of a possible concussive mechanism of injury, he/she should be considered to have balance disturbance / ataxia.

Match Day Doctor (MDD) responsibilities in this HIA process

PRE-MATCH DUTIES OF MDD

- Identify and confirm with Team Doctors, Match Officials (referees) and Match Commissioner where the HIA is to be performed.
- Confirm with both Team Doctors who will be undertaking the HIA (Team Doctor can assign responsibility and decision making for HIA to MDD).
- Confirm with Team Doctors answers to Maddocks Questions - opposition in last match and win/loss result for last match for all players in the match day squad.
- Confirm with Match Officials and Team Doctors, the hand signal indicating that a player is leaving the field with a head injury - head touched on 3 occasions.
- Confirm HIA Forms and pens are available or alternatively a tablet or a computer system is available.
- Request baselines for completion of HIA 1 from Team Doctors.

MATCH DUTIES OF MDD

- Identify via direct view or video view any potential incidents or signs not identified by the Team Doctor or Referee and request if identified using established criteria a HIA or an immediate and permanent removal of a player. In all circumstances a discussion with the Team Doctor must precede any action.
- Identify players who exhibit any of the on-field indications for permanent removal (see above) and enforce immediate and permanent removal from further participation in the match.
- The MDD will observe the Team Doctor undertaking an HIA unless assigned responsibility by the Team Doctor to perform the HIA.
- If MDD disagrees with a decision to return a player to play this MUST be raised with the Team Doctor. The MDD does have the power under Regulation 15.2.1 (d) to unilaterally remove an injured player from further participation in a game. It is strongly recommended that this be done only following consultation with the Team Doctor.
- Identify on HIA 1 Form, the Team Doctors decision regarding return to play.

POST-MATCH DUTIES OF MDD

- Confirm that all players who have undergone an HIA during a match irrespective of the result have completed a post-match, same-day assessment using the World Rugby HIA Form 2.
- The MDD should complete the HIA 2 Form if requested by the Team Doctor or observe completion of the HIA 2 Form by the Team Doctor.
- The MDD must confirm that the Team Physician has identified his/her diagnosis at the bottom of page 3 in the HIA 2 Form.
- If assigned by the Team Doctor, the MDD will complete the HIA 2 Form on player(s) who have undergone a match HIA. The MDD in this situation will not be responsible for the remaining neurological assessment or clinical diagnosis.

HIA procedures

1. What are the indications for immediate and permanent removal from play following a head injury?
   - Confirmed loss of consciousness
   - Suspected loss of consciousness
   - Convulsion
   - Tonic posturing
   - Balance disturbance / ataxia
   - Clearly dazed
   - Player not orientated in time, place and person
   - Definite confusion
   - Definite behavioural changes
   - Oculomotor signs (e.g. spontaneous nystagmus)
   - On field identification of signs or symptoms of concussion

2. What are the indications for an HIA?
   - Head impact event where diagnosis is not immediately apparent
   - Possible behaviour change
   - Possible confusion
   - Injury event witnessed with potential to result in a concussive injury
   - Other (identify)

3. Are the immediate and permanent removal criteria confirmed during an on-field assessment?
   No these signs are identified from the side-line or on-rout to attend the injured player. They are “what you see” and “what you hear when you first arrive at the scene of the injury”.

4. What assessment is required to identify an “oculomotor” signs?
   An oculomotor sign is immediately apparent it does not require a formal ocular assessment. Examples of an oculomotor signs are spontaneous nystagmus and asymmetry in eye movement. Whilst not a common sign of concussion if present following a head injury they are indicators or immediate and permanent removal from further game participation.

5. Who can request an HIA?
   The On-Field Medical Staff (as defined by each Union), the Referee or the MDD are allowed to request an HIA. A member of the opposition’s On-Field Medical Staff is NOT allowed to request an HIA on an opposing player nor are they allowed to make comments on incidents involving opposition players.

6. Who completes the HIA?
   The Team Doctor will complete an HIA on a player when indicated UNLESS the Team Doctor assigns this responsibility to the Match Day Doctor (MDD) prior to the commencement of the match. The Team Doctor in cases of emergency can assign HIA responsibility to the MDD during a match.

   In Sevens, the HIA will be completed by the Team Physician, Match Day Doctor or World Rugby Tournament Team Physician.

7. When does a player fail an HIA or have a positive HIA?
   A player fails the HIA or has a positive HIA and must NOT return to play, if the player:

   - answers ‘Yes’ to one or more symptoms OR
   - answers incorrectly to one or more memory questions OR
   - scores below baseline or below identified Rugby norms for SAC assessment OR
   - fails the Balance Test (unable to complete within 14 seconds) OR
   - exhibits an abnormal sign as observed by the Team Doctor OR
   - if the Doctor performing the HIA has any clinical suspicion of a concussion even if the HIA is negative

   Any clinical suspicion of concussion by the Doctor performing the HIA for any reason should see the player removed permanently from the match **even if the HIA is negative**.

   If a player reports a positive answer to any part of the HIA test that can be explained by an alternate reason rather than a head injury, the team doctor does retain the ability to over-rule the positive HIA 1 in

consultation with the Match Day Doctor. In this case an explanation must be recorded on the HIA 1 form identifying the reason for this over-ruling decision.

8. What is the role of the MDD (independent doctor) and what role does the MDD play in the decision on fitness to return to play?
The MDD will observe the HIA with the Team Doctor delivering the HIA unless assigned this responsibility by the Team Doctor. If the MDD is assigned the responsibility for undertaking an HIA by the Team Doctor the MDD will complete the HIA and be responsible for deciding return to play.

If a MDD completes an HIA because there are two players requiring an HIA at the same time, then the Team Doctor will retain the decision making responsibility regarding return to play.

If a player is cleared to return to play or returns to play but the MDD is concerned or notices signs or the player complains of symptoms suggestive of concussion, a discussion between the Team Doctor and MDD should be undertaken. If a dispute persists, the MDD has the right to request another HIA independent of the Team Doctor or to unilaterally remove the player from the field.

If the player has any indication for permanent removal from the field of play (as listed above) then there is no dispute, the player MUST be removed from field of play.

9. Where will the HIA be completed?
The HIA will be completed in the medical room. If the HIA cannot be completed in the medical room because the medical room is too distant from the field of play for an HIA to be performed within 10 minutes the MDD, with the Team Doctors, will identify an agreed and appropriate area prior to the commencement of the match.

10. Can a player undergoing an HIA be replaced or substituted?
A player undergoing an HIA can be temporarily replaced for up to 10 minutes whilst the HIA is completed. If the player undergoing this HIA does NOT present to the Match Official within 10 minutes, the temporary replacement becomes a permanent replacement.

11. How long is available to complete the HIA?
The HIA, must be completed within 10 minutes (actual time not playing time). This period commences when the player leaves the field of play (crosses side line) and finishes when the player presents to the Match official cleared to return to play. The Match Official will have control of the player's entrance to the field of play.

If a player is cleared to play within the 10 minute time period, enters the field of play, they must present to the Match Official immediately. Delaying return to play after entering the field is not permitted.

12. What happens if a player has a head impact event just prior to half-time and requires a HIA?
The HIA still must be completed within 10 minutes of leaving the field. The HIA cannot be delayed. The player must present to a Match Official prior to commencement of the second half or they will be considered a permanent replacement.

13. What happens if a player will not co-operate with an HIA?
A player failing to co-operate with an HIA will be assumed to have concussion and be removed permanently from the match.

14. If the player has a head injury requiring further off field assessment and a co-existing blood injury how long is available to complete the HIA and control the bleeding?
In this scenario, control of bleeding will be the priority however the HIA must be completed as soon as possible. If bleeding can be controlled, suturing should be completed after the HIA. The total time available is **15 minutes** to complete both the HIA and control the bleeding.

15. If a player has a second HIA requested during a match, does this mean automatic removal from the match?
No, a second HIA is not an automatic indication for permanent removal from the match. However, if a definitive diagnosis was not identified following the first HIA or the second assessment arises due to a low force impact incident then caution should be applied and that player removed from further match participation.

16. What are the instructions for the tandem gait test?
Participants are instructed to stand with their feet together behind a starting line (the test is best done with footwear removed). Then, they walk in a forward direction as quickly and as accurately as possible along a 38mm wide (sports tape), 3 metre line with an alternate foot heel-to-toe gait ensuring that they approximate their heel and toe on each step. Once they cross the end of the 3m line, they turn 180 degrees

and return to the starting point using the same gait. A total of 4 trials are allowed. If the player completes a trial within 14 seconds this is considered normal assessment and no further trial is necessary. The best time should be identified on the HIA 1 Form.

Athletes should complete the test in 14 seconds. Athletes fail the test if they step off the line, have a separation between their heel and toe, or if they touch or grab the examiner or an object. In this case, the time is not recorded and the trial repeated, if appropriate.

17. Are there any restrictions applied to the temporary replacement?
Yes. The temporary replacement may not take a penalty kick for goal or conversion except in Sevens Rugby where the replacement can take penalty kicks for goal and conversion. If the temporary replacement is given a red or yellow card this penalty will apply to the player undergoing the HIA (subject to the Front Row Rule, see Law 3.10).

18. What happens if a player undergoing an HIA does not return to the match?
The injured player will be considered to have been replaced for an injury and the temporary replacement will become a permanent replacement. As a permanent replacement, this player can now take penalty kicks for goals and conversions.

19. If a player is removed from play for an HIA and that team have exhausted all of its substitutions, is a temporary replacement allowed?
This scenario is managed as a blood injury would be managed. The team would be allowed to replace the player who is having the HIA with a player already removed as a tactical substitute. If the player having the HIA does not return to play, this temporary replacement becomes a permanent replacement.

20. What is the role of the opposition medical team in the HIA process?
Medical and non-medical staff from opposing teams cannot request an HIA on players that are not within their team. Suggestions or comments regarding an HIA for another team's member should not be made.

21. What is the role of non-medical team staff in the HIA process?
Non-medical staff can alert their respective team medical staff that an HIA should be undertaken or if a player should be removed permanently from the field of play but they are not permitted to order an HIA. Non-medical staff cannot overrule or question a call for an HIA requested by the On-Field Medical Staff, MDD or referee.

22. What happens if the player has a simultaneous injury?
Apart from a blood injury the assessment of a simultaneous injury and the HIA must be completed within the 10-minute period allowed for the HIA or the replacement will become permanent.

23. Should smelling salts be used in any head injury?
If a head injury occurs where the diagnosis is unclear an HIA should be completed. Smelling salts are traditionally used when there is 'a disturbance in neurological function following a head impact injury'. The use of smelling salts is NOT allowed. A player must be removed if there is confirmed disturbance in neurological function following a head impact injury.

24. What are the follow up processes for the HIA?
All players who have an HIA 1 completed during a match irrespective of the outcome MUST have:

- A post-match, same-day assessment using the HIA 2; and
- Follow up assessment using the HIA 3 which incorporates a computer neuro-cognitive assessment is completed between 36-48 hours following the injury.

Research into the validity of the HIA 1 Tool will be undertaken by comparing diagnoses obtained from the HIA 2 and HIA 3 Tools and the outcome of the HIA 1.

25. Can the HIA 1 Tool be used to diagnose a concussion?
No, the HIA 1 Tool is not a diagnostic tool. The HIA 1 Tool is used pitch side to assist the doctor in determining if a player should be removed from further participation in a match. The HIA Form 1 is used to assist the doctor identify a suspected concussion.

To diagnose a concussion, a Doctor must provide a clinical diagnosis which may be supported by a concussion support tool such as HIA 2 or other computer neurocognitive assessments.

26. Are there any additional changes to the HIA planned?
The pitch side assessment of head injury will remain under review with changes to the Tool and Process implemented in response to research.

27. What is the role of World rugby video analysts?
World Rugby video analysis department will be reviewing each match from the commencement of the Phase 2 Trial (August 2013) and will identify incidents where:

- a HIA has been undertaken
- a head injury is thought to occur but the analyst cannot clearly identify if a HIA has been completed

Head injury video clips will be sent to Team Doctors to confirm that a HIA was completed or to obtain feedback on head injuries that have not had a HIA. This intervention should assist Competition Coordinators to maximise compliance and to avoid missing injuries that should have had a HIA. Relevant information is collected in an email shown below. This process forms part of Phases 2 and 3 research.

Video clip URL: http://	
HIA completed. If 'Yes', please forward all HIA documents to Competition Coordinator	YES / NO
HIA should have been completed*	YES / NO
Head injury event, but no obvious neurological signs or symptoms	YES / NO
Not a head injury event	YES / NO
Player presented with concussive symptoms after the match*	YES / NO
Comment:	

* HIA 3 requires completion

28. How can a HIA 2 be interpreted if the player does not have baseline data?
World Rugby has reviewed over 700 Rugby player baseline SCAT results and provides guidance within the HIA Form 2 for Rugby players where a high degree of suspicion for concussion exists. **Clinical suspicion should always override a normal HIA Form 1, HIA 2 or HIA 3 result.**

29. How should I interpret the HIA Form 2 result?
The HIA Form 2 is the SCAT 3 with the addition of normative data derived from 800 Rugby players. This tool is used to support the clinical diagnosis of the Team Doctor at that point in time. Any negative deviation from baseline data or normative data should be considered supportive of a diagnosis of concussion.

A normal HIA 2 and clinical assessment (post game, same day) does not exclude a concussive episode. It is possible for players to develop delayed symptoms and signs related to concussion, day or days after a head impact incident. The HIA process requires a normal HIA 3 and clinical assessment at 36-48 hours to completely exclude a concussion.

Interpretation of the HIA 2 is traditionally done through comparison with a baseline test. In the absence of baseline testing any one of the following should be considered strongly in favour of a diagnosis of concussion:

- Total SAC 26 or below
- Immediate Memory – score 12 or less
- Concentration score (digits backwards) – 2 or below
- Delayed recall – 3 or less words
- Balance – Tandem stance – 3 or more errors, Single leg stance - 3 or more errors.

- Tandem gait unable to be completed with 14 seconds in one Trial of four.
- Any athlete with any symptom declared in the symptom list which is not usually experienced by the player following a Rugby match or training is strongly in favour of concussion.

Players with baseline assessments below the above scores should be scrutinized to confirm that the baseline testing has not been manipulated by the player.

30. If an HIA is called by a team's on-field staff, can this be cancelled by other on field staff?
Once the team's on-field medical staff member calls an HIA and it is acknowledged by the referee, then it must be completed. To be clear, a requested HIA by a team's on-field medical staff cannot be cancelled.

31. Which players are required to undertake a Graduated Return to Play (GRTP) programme?
Players diagnosed with concussion during the match, after the match whilst at the ground or at the 36-48 hour follow up MUST go through a Graduated Return to Play (GRTP) programme that commences once the player is asymptomatic and must be started at least 24 hours after the injury.

32. How do I manage a player who presents after the match with concussive symptoms? What HIA form should be used and should I send information about these players to the Competition Coordinator?
If a player does not have a HIA during the match but has signs or presents with symptoms suggestive of concussion after the match and at the stadium a HIA 2 Form should be completed before leaving the stadium. This should then be followed up at 36-48 hours with an HIA 3 Form including the usual team concussive support tool such as CogSport®, ImPACT®, SCAT 3, HeadMinderTM, etc. All paperwork should be forwarded to the Competition Coordinator.

If a player does not have a HIA during the match but presents with symptoms suggestive of concussion after leaving the stadium but within 48 hours of the match, this player should be assessed using the HIA 3 Form and the usual team concussive support tool such as CogSport®, ImPACT®, SCAT 3, HeadMinderTM, etc. All paperwork should be forwarded to the Competition Coordinator.

In these two instances, if a concussion is confirmed the player has a concussion with delayed symptom onset.

33. How does a delayed concussion differ from an evolving concussion?
An evolving concussion presents with signs or symptoms immediately after or shortly (within minutes) after a head injury and these signs and or symptoms evolve or deteriorate over time.

A delayed concussion presents with symptoms or signs at a distance from the injury. As an example a player who presents the next day with symptoms suggestive of a concussion and clinical assessment confirms a concussion then this player has a delayed concussion.

34. Shouldn't the assessment of concussion be undertaken 15-20 minutes after a head injury?
There is no clear evidence to support this recommendation. The Zurich Consensus documents refer to two different times when recommending a concussion assessment.

The first is in the Zurich Consensus Statement and this states, "*It is recommended that these latter steps be conducted following a minimum 15 min rest period on the side-line to avoid* ***the influence of exertion or fatigue on the athlete's performance****. Although it is noted that this time frame is an ARBITARY one, the expert panel agreed nevertheless that a period of rest was important prior to assessment*."

The second reference to timing of the assessment is in Putukian paper titled, **on-field assessment of concussion in the adult athlete**. This paper states, "*Side-line concussion assessment tools should include a symptom checklist, balance assessment and cognitive assessment as an absolute minimum, with the assessment performed* ***as soon as possible after the injury****, with the understanding that the research related to the timing of the exam is not yet clear and that concussion signs and symptoms evolve over time*."

There is no agreed or confirmed time after an injury when a concussion assessment should be completed. The recommendation to delay the assessment for 15-20 minutes is not related to detecting an evolving or delayed concussion but to confirm that the impact of fatigue from athletic participation does not result in an abnormal assessment, that is, a false positive result.

The scientific paper by McCrea et al in 2002 confirmed a higher sensitivity for the SAC score if performed immediately after the injury compared with a delay of 15 minutes.

On field follow up of players cleared of a suspected concussion is essential.

35. What is the role of the HIA 2 and HIA 3 in diagnosis of concussion?
The HIA 2 and HIA 3 are tools used to **support** the clinical diagnosis of a doctor. It is recommended by Zurich 2012 that assessment of a suspected concussion should include a symptom checklist, cognitive evaluation and balance test. HIA 2 and HIA 3 Forms incorporate this multi modal approach.

Clinical suspicion of concussion should **always** overrule a negative HIA 1, HIA 2 or HIA 3 assessment.

The doctor undertaking any HIA has responsibility for all return to play decisions and should not rely solely on any supportive tool.

36. How do I interpret the HIA 2 Form?
Results from this post-match assessment should be compared with the baseline HIA 2 (SCAT 3) results. Each mode, that is, symptom check, cognitive evaluation (SAC) and balance test should be compared with that respective mode's baseline. Any variation in one or more mode(s) is strongly in favour of concussion.

It should be noted that any symptom declared in the symptom list which is not usually experienced by the player following or during a Rugby match or training is strongly in favour of concussion.

37. How do I interpret the HIA 3 Form?
The HIA 3 Tool is a combination of the symptom assessment and each team's normal follow up concussion assessment tool e.g. CogSport®, ImPACT®, SCAT 3, HeadMinderTM, etc.

The symptom assessment form is the symptom checklist used in the HIA 2 Form that collects not only symptoms present at the 36-48 hour review but also symptoms previously present, their duration and also their severity.

38. I have a player who sustains a head and neck injury and the player has an emergency evacuation. What HIA Form should be completed on this player in conjunction with a clinical assessment?
In this instance, a HIA Form 1 is not necessary as the player has been permanently removed from play. A HIA 2 Form should be used to support the clinical diagnosis in this instance.

39. When can a player return to play after a diagnosed concussion?
As per Regulation 10: Any ADULT Player with concussion or suspected concussion:

- must be immediately and permanently removed from training or the field of play; and
- should be medically assessed by an appropriately qualified person (as applicable in the relevant jurisdiction); and
- must not return to play in the same Match; and
- must rest for at least 24 hours and must not return to play or train until symptom free; and
- must undertake a graduated return to play program, which must be consistent with World Rugby's GRTP Protocol applicable to adults

40. How is a player diagnosed with concussion?
The 2012 Zurich Consensus Statement confirms that, "*The final determination regarding concussion diagnosis and/or fitness to play is a **medical decision based on clinical judgement***".

The HIA Tools provide guidance for Team Doctors in this difficult diagnostic area recognising that the Team Doctor's clinical decision is ultimately responsible for diagnosis and return to play.

41. What are the graduated return to play protocols described in the World Rugby Concussion Guidance?
The HIA only applies to adult elite players in HIA approved Competitions and the following information regarding GRTP applies to this elite player group.

A player with a diagnosed concussion must rest for a minimum of 24 hours and only if symptom free and cleared by a medical practitioner or approved healthcare professional (as defined by each Union), commence a GRTP.

The GRTP protocol as per Zurich 2012 provides a "*stepwise progression, the athlete should continue to proceed to the next level if asymptomatic at the current level. Generally, each step should take 24 hours so that an athlete would take **approximately** 1 week to proceed through the full rehabilitation protocol once they are asymptomatic at rest".*

"If any post-concussion symptoms occur while in the stepwise programme, then the patient should drop back to the previous asymptomatic level and try to progress again after a further 24 hour period of rest has passed."

The following is an overview of the 24 hour stages:

Stage 1 - No activity - physical and cognitive rest
Stage 2 - Light aerobic activity - walking, swimming, cycling keeping intensity < 70%
Stage 3 - Sports specific drills - passing, kicking, low level resistance training
Stage 4 - Non-contact training drills - team training, special skills
Stage 5 - Full contact training
Stage 6 - Return to play

42. What is meant by 'rest'?
During the Zurich 2012 Consensus meeting, rest was discussed in two situations.

- Rest after an acute concussion and within 24 hours of the injury. In this situation rest is more complete physical and cognitive rest.
- Rest related to delayed recovery. In this instance, rest was defined as being, "*activity below the level at which physical activity or cognitive activity provokes symptoms*".

43. Is there any evidence from research that the pitch side interventions have had a positive impact?
Prior to the introduction of temporary replacement for head injuries and standardization of pitch side head injury assessment, evidence confirmed that 56% of players with a confirmed concussion were returning to play following their injury. Research has confirmed that since introducing a formal pitch side assessment this number has reduced to 12%.

APPENDIX 1

Education – minimum content

The following are minimum issues that should be included when developing an annual concussion education program for players, coaches and team management:

- What is concussion
- What are the common symptoms and signs
- How is a concussion managed
- What is a graduated return to play
- What is a Head Injury Assessment (HIA)
- How to treat concussion – what is meant by rest
- Protect yourself, protect your team mate

World Rugby has developed an education presentation appropriate for players, coaches and team management that is appropriate for Unions to deliver as their pre-tournament education session.

Risk Stratification – Example

When developing a concussion risk stratification system for players the following factors may be considered as part of the concussion risk stratification:

1. Players over the age of 30
2. Players under the age of 18
3. Players with a two or more concussions within the preceding 12 months
4. Players with a history of multiple concussion
5. Players with a history of multiple concussion with each subsequent concussion occurring with less force.
6. Players with unusual presentations or prolonged recovery

When undertaking a concussion risk stratification, medical staff are advised to consider all potential risk factors that may identify a high risk athlete for both a concussion and a slow recovery.

Criteria for Immediate and Permanent Removal following a Head Impact Event

The immediate and permanent removal criteria are identified during the observational phase of a head injury assessment. Identification does not require a formal side line or pitch side assessment of the injured athlete. These criteria are identified by the doctor and based on ‘what they see’ and ‘what they hear’ prior to arriving to the injured player and on arrival at the scene.

The immediate and permanent removal criteria listed in the HIA Form 1 and in use since June 2014 are:

- Confirmed loss of consciousness
- Suspected loss of consciousness
- Convulsion
- Tonic posturing
- Balance disturbance / ataxia
- Clearly dazed or dinged
- Not orientated in time, place and person
- Definite confusion
- Definite behavioural changes
- Oculomotor signs (e.g. spontaneous nystagmus)
- On field identification of signs or symptoms of concussion

Definitions clarifying these criteria are available within the HIA 1 Form.

Criteria for Temporary Removal following a Head Impact Event

The temporary replacement criteria are also identified during the observational phase of a head injury assessment. The following criteria indicate the necessity for an off pitch assessment using the HIA pitch side tool (embedded within HIA Form 1).

The time allowed for this off field assessment as identified in Law 3 is 10 minutes. The criteria for temporary replacement for head injury are:

- Head impact event where diagnosis is not immediately apparent
- Possible behaviour change
- Possible confusion
- Injury event witnessed with potential to result in a concussive injury
- Other (identify)

Advanced Level of Concussion Care

The highest level of concussion care is supplied in an advanced care setting that would include at least each of the following:

- medical doctors with training and experience in recognising and managing concussion and suspected concussion; and
- access to brain imaging facilities and neuroradiologists; and
- access to a multidisciplinary team of specialists including neurologists, neurosurgeons, neuropsychologists, neurocognitive testing, balance and vestibular rehabilitation therapists

An Advanced Level of Concussion Care are generally available within Professional Rugby teams and allow for a more individualized management of concussion.

APPENDIX 2

Graduated Return to Play (GRTP) Programme

A Graduated Return to Play (GRTP) programme incorporates a progressive exercise program that introduces a player back to contact training an play in a step wise fashion. This should only be started once the player has completed their physical rest period and is symptom free and off treatments that may mask concussion symptoms, for example drugs for headaches or sleeping tablets.

If a player has symptoms prior to the concussive event, these must have returned to the pre concussion level prior to commencing a GRTP.

World Rugby recommends the Zurich Concussion Consensus Statement GRTP programme which contains six distinct stages with each Stage being a minimum of 24 hours.

- The first stage is a complete rest period and must be for a minimum of 24 hours
- The next four stages are training based restricted activity
- Stage 6 is a return to play

It is critical that all concussion symptoms have settled prior to commencing the GRTP programme. The player must only start a GRTP or proceed to the next stage **if there are no symptoms** of concussion during rest and at the level of exercise achieved in the previous GRTP stage.

World Rugby recommends that a medical practitioner or approved healthcare professional confirm that the player can take part in full contact training before entering Stage 5.

GRTP programme**: Adults**

Stage	Rehabilitation stage	Exercise allowed	Objective
1	Minimum rest period	Complete body and brain rest without symptoms	Recovery
2	Light aerobic exercise	Light jogging for 10-15 minutes, swimming or stationary cycling at low to moderate intensity. No resistance training. Symptom free during full 24-hour period	Increase heart rate
3	Sport-specific exercise	Running drills. No head impact activities	Add movement
4	Non-contact training drills	Progression to more complex training drills, e.g. passing drills. May start progressive resistance training	Exercise, coordination, and cognitive load
5	Full contact practice	Normal training activities	Restore confidence and assess functional skills by coaching staff
6	Return to play	Player rehabilitated	Fully recovered

APPENDIX 3

World Rugby Head Injury Assessment Study: Player Consent Form

Title of Project: **World Rugby Head Injury Assessment Study**

Name of Chief Researcher: **Professor Philippe Decq**

Please initial all boxes

1. I confirm that I have read and understand the information sheet dated **9th December 2014** (version **1.1)** for the above study. I have had the opportunity to consider the information, ask questions and where necessary have had these answered satisfactorily.	Please Initial: ☐
2. I give my consent for doctors to supply medical information to World Rugby. I acknowledge that such information will only be used for research purposes and that reference to individuals shall not be made in any report or other published material.	Please Initial: ☐
3. I understand that my participation in the study is voluntary and that I am free to withdraw at any time without giving any reason, without my medical care or legal rights being affected.	Please Initial: ☐
4. I understand that all the information provided on my injuries and training will be treated in strict confidence and will remain anonymous.	Please Initial: ☐
5. I agree to take part in the above study.	Please Initial: ☐

Name of Participant [BLOCK CAPITALS]	Date	Signature
Name of Person responsible for obtaining consent. [BLOCK CAPITALS]	Date	Signature

Consent form date of issue: **9th December 2014**
Consent form version number: **VERSION 1.1**

World Rugby Head Injury Assessment Study
Player Information Sheet

Dear player,

The health and safety of players is a top priority for World Rugby.

Head injuries are an important problem and World Rugby is constantly aiming to improve their management.

We would therefore like to ask if you would allow your information to be used in a research study evaluating World Rugby's Head Injury Assessment Process.

Please could you read this information sheet carefully and then decide if you are happy for us to use your anonymous information to investigate how well the Head Injury Assessment process is working.

If so, please complete the attached consent form and return it to the World Rugby Head Injury Assessment Competition Coordinator.

Why are head injuries important?

Head injury is an important problem in elite rugby. Very rarely a serious head injury resulting in structural brain damage will occur that needs immediate emergency treatment. A milder form of head injury, termed concussion, occurs more often. A concussion is a brief disturbance in brain function, without causing any structural brain damage. Symptoms of concussion, which include headaches and loss of concentration, memory and coordination, are usually temporary and typically resolve within 7 days. Concussion can lead to a number of short-term consequences relevant to Rugby:

1. Decrease player performance which can lead to physical and tactical errors,
2. Decreased attention and reduced anticipation may lead to an increased risk of further injuries,
3. Further concussions may increase symptoms and delay recovery
4. Rarely, the occurrence of a second concussion, shortly after an initial concussion, may lead to very serious brain swelling, called 'second impact syndrome'.

To avoid these problems it is important to identify any players with suspected concussion, stop them playing, and have them leave the field.

How are suspected head injuries managed in elite Rugby?

Any player who suffers a blow (either directly or indirectly) with the potential for causing a head injury will be managed by World Rugby's Head Injury Assessment protocol. The Head Injury Assessment process was introduced as a Global Law Trial in 2012. The process has been designed to improve the management of head injuries, including concussion, during elite Rugby matches and will identify 3 groups of players:

1. **Concussion obviously or clearly suspected**: Players exhibiting clear signs of head injury, such as unconsciousness or seizures, will receive the necessary emergency treatment and will be immediately and permanently removed from play.
2. **Head injury diagnosis not immediately obvious**: Players suffering head trauma where the diagnosis is not immediately obvious, will undergo a short off-field medical assessment. Testing will consist of brief assessments of symptoms, balance, memory and orientation. Assessment will be undertaken in a quiet place and will last up to 10 minutes. During the assessment a temporary player substitution is allowed. Positive findings on any of the tests result in concussion being suspected and the player will be removed from play for the rest of the match. Players may also be removed if the tests show no signs of concussion but the doctor conducting the assessment suspects the player may be concussed. If a doctor decides that the player is definitely not concussed, the player can return to the match.
3. **Development of concussive symptoms after the match**: The signs and symptoms of concussion may appear soon, or even up to 24-48 hours after the match. If this happens, the player will need to take a standard assessment to

confirm the diagnosis. The players identified in 1 and 2 above will also undertake the standard follow up assessments given to players who show symptoms soon after the match and 24-48 hours after the match.

There is no change to the usual post-head injury return to play protocols.

What is the Head Injury Assessment Study?

This study will investigate how well the Head Injury Assessment process is working and to identify any areas where management of concussion can be improved.

We would like to use information that is routinely collected as part of the Head Injury Assessment process. As well as the assessments usually completed by the team doctors, the World Rugby Game Analysis Department will identify incidents where players may have suffered a head injury during the game. These incidents will be brought to the attention of team doctors and they will be asked to give feedback on the incident. This may result in the player undergoing an assessment for concussion after the game.

This information will be used to determine how good the off-field assessment is at identifying concussion, and whether the Head Injury Assessment Process works as planned.

The Head Injury Assessment study will not change your management following a head injury in any way; and will not result in any extra information being collected.

The study has been independently reviewed by an expert committee to ensure that all research procedures are safe and ethical.

How would my information be used?

Only information routinely collected as part of the Head Injury Assessment process will be used. All information will be completely anonymous.

All information collected by team doctors will be submitted to a competition coordinator, who is a person independent from World Rugby who has been assigned to gather the information for individual competitions or areas. The competition coordinator will enter information collected into a database where it will be stored securely. The database will not include any information which can be used to determine the identity of a player. Only competition coordinators will have access to specific player information, Project personnel will not have any access to it.

Who is in charge of this study?

The person with overall responsibility for this study is Dr Martin Raftery, the World Rugby Chief Medical Officer. The research study is being conducted by a team with expertise in Sports medicine, statistics, and concussion. The chief investigator is Professor Philippe Decq, an experienced Rugby doctor, neurosurgeon, and expert in concussion. Further information on the study is available from your competition coordinator or Professor Decq (philippe.decq@bjn.aphp.fr)

What do I do now?

If you are happy for your information to be used please complete the attached consent form. Your participation in this research is optional. You have the right to withdraw from the study at any time without consequences. To do this you only have to report your withdrawal to Dr Martin Raftery.

Please complete the study consent form to confirm your agreement to submit data to the Head Injury Assessment Study.

Consent form date of issue: 9th December 2014
Consent form version number: VERSION 1.1