THE DRAKE FOUNDATION

PROTECT THE BRAIN.

PROTECT THE GAME.

Safeguarding Players' Brain Health in Elite Rugby.



The Drake-Barclay Working Group

Co-Chaired by
James Drake and **Rt Hon Steve Barclay MP**

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About the Drake Foundation

The Drake Foundation is a not-for-profit organisation that has pioneered the application of neuroscience to elite rugby and football.

Founded in 2014 by James Drake, it has invested over £2 million in independent research with partners including UCL, Imperial College London and the London School of Hygiene and Tropical Medicine. It exists to build the evidence base on the link between the cumulative intensity of head impacts and long-term brain health.

Its studies include the Drake Rugby Biomarker Study, which used advanced brain imaging in elite players, and the BRAIN and HEADING studies of retired players. The Foundation is evidence-first, and every position it takes rests on published research.

The Drake-Barclay Working Group

James Drake (Co-Chair)	Founder and Chairman, The Drake Foundation
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Dr Michael J Grey	Reader in Rehabilitation Neuroscience, Loughborough University
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FOREWORD



James Drake
Founder and Chairman
The Drake Foundation

When I founded the Drake Foundation in 2014 to investigate the link between head impacts and long-term brain health in elite-level sport, the evidence that players, clubs and governing bodies needed did not yet exist.

As an avid watcher of rugby union, I had observed the game become faster and more physical since it turned professional in 1995, yet nobody could tell players what repeated blows to the head might mean for them in later life. Since then, I have invested over £2 million in research, yielding a series of peer-reviewed studies that have pioneered the application of neuroscience to elite rugby in the UK, contributed to a growing evidence base and advanced our understanding.

Collectively, these studies demonstrated evidence of changes in brain structure and white matter damage in active players, pointed to an elevated risk to player brain health since the professionalisation watershed, and highlighted the hitherto critically underweighted role of cumulative exposure to head impacts, not just concussions, in raising long-term risk.

Above all, with changes in brain function often taking decades to show up, the Foundation's research validated the requirement for establishing baselines and enacting long-term monitoring through advanced neuroimaging.

> **Evidence alone, however, has not led to the systemic changes needed to protect players. It is for this reason that I convened this Working Group, which I have been proud to co-chair with Rt Hon Steve Barclay MP.**

It is my firm view, formed over a decade of funding research in this area, that we cannot credibly claim to protect player welfare without looking inside the head. That is why I am delighted that the Drake-Barclay Working Group has achieved a broad consensus among fans, players, academics and clinicians around the need for a regular Brain Health Check with MRI as an integral component. Alongside an increase in mandated non-contact training weeks to materially reduce cumulative exposure to Head Acceleration Events (HAEs), I believe this offers the game a credible path to safeguarding its players for the long term.

Together, these recommendations set a minimum standard of care for every elite player at every club. They are practical and achievable, while leaving the match-day game we love untouched. I believe they also offer a model for other contact sports facing the same questions. I urge World Rugby, the RFU and the leagues to lead by example in responding with a clear timetable for putting them into practice.

FOREWORD



Rt Hon Steve Barclay MP
Member of Parliament for North East Cambridgeshire
Secretary of State for Health and Social Care, 2022-23

Rugby has been a part of my life for as long as I can remember. My dad was chairman and later president of Fylde RFC, where he coached the juniors for nearly 40 years, while my mum served on the Ladies' committee. I played my first game aged five and continued through my youth, making my first-team debut for Fylde during my second year at university.

These days, I find myself watching rugby rather than playing. But while my career took me into politics, I have remained a passionate supporter of the game that shaped my childhood. In raising my own children, and looking ahead to the next generation of players and supporters, I want to ensure that rugby remains a sport they can enjoy, and one that stays recognisable from my own experiences.

> **During my time as Health Secretary, I carried this commitment to rugby and player welfare into government. I was proud to accelerate the rollout of the £50 million funding pledge for motor neurone disease research, recognising that there is still much more to learn about neurodegenerative conditions if we are to prevent and treat them effectively.**

However, research must translate into tangible policy change. While welcome measures have been introduced in recent years, the Working Group found a clear consensus among players, fans, and clinicians that more can, and should, be done. Taking further action will not only protect players, but safeguard the long-term future of the game we love.

The Working Group brought together experienced and dedicated academics, clinicians, sporting representatives, and policymakers, and I am deeply grateful for their insights and contributions. My thanks also go to James Drake and the Drake Foundation for making this report possible.

This report is not about the past, but the future of rugby and what comes next. I hope that in putting forward these recommendations, rugby's governing bodies will use the opportunity to build on recent progress and work with players and clubs to implement practical reform and secure a thriving future for the game.

EXECUTIVE SUMMARY

- Since professionalisation, rugby has become faster and more physical, driving an increase in Head Acceleration Events and concussions.
- There is a growing evidence base of the impact that HAEs are having on elite rugby players, with landmark research including the Drake Rugby Biomarker Study finding structural changes to the brain.
- The Drake-Barclay Working Group has brought together academics, cross-party policymakers, player representatives, players, and fans, and found overwhelming support to build on recent changes in the game.

The Working Group makes three practical recommendations:

1

Introduce a regular Brain Health Check, including an MRI scan, to empower players with more information about their brain health.

2

Increase the number of non-contact weeks for players across the calendar year to limit cumulative exposure and ensure proper enforcement.

3

Enhance data sharing into a central research dataset, to facilitate research into understanding the link between the game and players' brain health.

Elite rugby union faces a dilemma. Since professionalisation, the sport has become faster and more physical. Players are generally stronger, larger, more powerful, potentially play more matches, and there are more collisions. But it is these qualities that make the sport unique, and why people enjoy both taking part and spectating.

However, this has consequences for players. Professionalisation has led to more head impacts and more concussions, with a 2021 parliamentary inquiry concluding that the rise in contact exposure is the main cause of concussion risk in rugby union.[1]

1 Digital, Culture Media and Sport Select Committee report, Concussion in Sport, 22 July 2021



“Head injuries are not just affecting the individual players... Families, friends and loved ones also suffer”
Retired female player

Yet the short- and long-term risks of playing elite rugby are not fully understood. There is a growing body of evidence linking both concussions and cumulative sub-concussive impacts to poorer brain health outcomes.

For example, the Drake Rugby Biomarker Study, published in 2021, found that 23% of the elite adult rugby players tested had abnormalities in their brain structure, and half of the players in the longitudinal subgroup showed an unexpected change in brain volume.[2]

> **"Long term is what we're all worried about… Not necessarily concussions, but just repeated head knocks that wouldn't even count as a concussion, just the repetitive nature of it is what people are scared of"**
> **Current Prem player**

Meanwhile, two 2025 studies from Imperial College London, University College London, the Institute of Sport, Exercise and Health and the UK Dementia Research Institute of 200 former elite players found early signs of brain changes often associated with neurodegenerative disease. Around one in four players in the cohort had elevated blood markers associated with Alzheimer's-type brain changes, and longer careers were linked with lower brain volume in areas important for memory and thinking. While the research also found that cognitive testing did not significantly differ from controls and no players fulfilled criteria for early-onset dementia, the researchers observed that the changes detected warranted further investigation and long-term follow-up to monitor their brain health.[3]

However, the impact of repeated head injury in professional sport is a highly complex area and it remains unclear both as to why some people are affected and not others, and how best to mitigate these risks whilst playing.

In recent years, high-profile cases of brain disease in retired professional players have shone a spotlight on elite rugby and the long-term impact that concussive and sub-concussive impacts can have on the brain. More research is taking place to understand causation, whilst new protocols have improved the treatment and management of suspected and confirmed concussions, supported by increased data collection during both training and matches.

> **"I think it gives both players and their families a bit of assurance"**
> **Engaged female fan aged 55–64**

However, concussions are only the tip of the iceberg when it comes to how players' brains are affected by the sport. While most Head Acceleration Events (HAEs) do not cause a concussion, repetitive hits can have a cumulative impact, potentially risking long-term consequences including chronic traumatic encephalopathy (CTE) and other neurodegenerative conditions.

2 Karl A Zimmerman, Etienne Laverse, Ravjeet Samra, Maria Yanez Lopez, Amy E Jolly, Niall J Bourke, Neil S N Graham, Maneesh C Patel, John Hardy, Simon Kemp, Huw R Morris, David J Sharp, White matter abnormalities in active elite adult rugby players, Brain Communications, Volume 3, Issue 3, 2021, fcab133, https://doi.org/10.1093/braincomms/fcab133

3 Parker TD, Hain JA, Rooney EJ, Zimmerman KA, Lee Y, Del Giovane M, Graham NSN, Patel M, Hampshire A, Wilson MG, Friedland D, Sharp DJ, Sylvester RJ. Brain health concerns in former rugby players: clinical and cognitive phenotypes. Brain. 2025 Aug 1;148(8):2698-2713. doi: 10.1093/brain/awae416; Graham NSN, Zimmerman KA, Hain J, Rooney E, Lee Y, Del Giovane M, Parker T, Wilson MG, Malhotra P, David MCB, Kolanko M, Patel M, Veleva E, Swann O, Heslegrave A, Zetterberg H, Friedland D, Sylvester R, Sharp DJ. Biomarker evidence of neurodegeneration in mid-life former rugby players. Brain. 2025 Aug 1;148(8):2684-2697. doi: 10.1093/brain/awaf152

Historically, research has typically focused more on diagnosed concussions rather than the impact of repetitive HAEs, meaning that medical and scientific understanding of the effect of rugby training and matches on long-term brain health is less developed.

There is even less understanding about how female rugby players are affected relative to men, with many studies having few, or no, female participants. Consequently, the evidence base for women remains limited. Nonetheless, the available findings point towards meaningful risks associated with concussion and repetitive head impacts, supporting the need for precautionary action despite ongoing uncertainties.

Both rugby fans and the elite playing community raised concerns about the risk of head injuries in the sport. In polling commissioned by the Working Group, when presented with different challenges facing rugby, **90% of fans viewed head injuries and their consequences as problematic**, rating the issue well ahead of all other concerns, including financial pressures and other types of injuries. Across the wider public, 76% believe that more can be done to protect players.

Similarly, in the playing community of current and retired elite rugby players, **nearly 8 in 10 surveyed feel the game is doing more now on head injuries than it was five years ago, yet 92% feel more can be done**.

Over the past decade, World Rugby and the Rugby Football Union (RFU) have introduced several measures to improve player welfare in England, including:

- More developed head injury management protocols that include:
    - the introduction of World Rugby's Independent Concussion Consultant reviews for all players looking to return to play post-concussion in under 10 days, and for those concussed players identified as high risk for a complicated recovery or recurrence;
    - changes to the Graduated Return to Play process resulting in longer stand-down periods;
- Training load guidance;
- Graduated Return to Contact training protocols in England;
- The growing utilisation of technology, such as mandatory use of instrumented mouthguards in matches;
- Enhanced data collection to identify when a concussive hit or HAEs above a certain threshold may have taken place. The most recent development is World Rugby's HAE Outlier Process, which uses instrumented mouthguards to identify elite players who accumulate significantly higher head impact exposure than their peers;
- The Advanced Brain Health Clinic for the brain health assessment and associated research programme for retired male and female elite players, funded by the RFU and the Prem; and
- Mandatory concussion education for the elite game has been in place since 2014.

These measures are welcome, with nearly half of fans and 80% of the playing community recognising that the sport is doing more than five years ago. But both the public and players agree that this must not be the end of the road.

Building on the existing momentum, further measures should be introduced to protect players. This should include:

- Introducing a regular Brain Health Check, including an MRI scan, to ultimately provide players with more information about their brain health so they can make informed decisions about their careers.
- Increasing the number of non-contact weeks for players across the calendar year to limit cumulative exposure and ensuring proper enforcement.
- Enhancing data sharing into a central research dataset, to facilitate research into understanding the link between the game and players' brain health.

The player's voice must be at the heart of any changes. While a Brain Health Check would be encouraged to provide players with a baseline against which future changes can be measured, it would not be a mandatory requirement if any players choose not to know. Likewise, players would fully own their own data and could opt out of sharing their information into the central dataset.

The Drake-Barclay Working Group brings together rugby representatives, academics, clinicians, and cross-party policymakers to review the existing evidence and action to date, and make a series of recommendations to improve player welfare without harming the game. The group were also pleased to hear from four current elite rugby union players – two in the Prem and two in the Premiership Women's Rugby – at an evidence session to learn about their experiences to date and what changes players would like to see. The group also undertook opinion polling of rugby fans, and current and retired elite rugby union players, to ensure that they had a strong voice and were supportive of the recommendations.

> **"Because to have all the information, is to empower a player to understand their current situation with regards to their brain health. This is a cultural change that needs to happen, open, honest, and with all the facts available to players to enable them to make adjustments, or take decisions regarding their health"**
> **Retired male player aged 40+**

Although the Terms of Reference limited the Working Group's scope to the men's and women's elite games in England (Prem and PWR), it is hoped that the devolved governing bodies in Scotland, Wales, Ireland and around the world, as well as the URC league, will also consider the recommendations made.

Rugby carries an inherent risk, and positive steps have already been taken. However, without continued, collaborative and sufficient action by rugby's governing authorities, players continue to be at risk of significant but uncertain harm that may not show for years or decades after retirement. This potentially puts the future of the game itself at risk. Only by continuing to take proactive steps that improve player welfare without affecting the matchday experience will it be possible to safeguard the sport's future for generations of fans and players alike.

BACKGROUND

Risk to Players

Rugby is widely accepted as a sport that carries significant risk of injury. A 2018 study from Cardiff Metropolitan University found that on average, a male professional rugby union player is more likely than not to sustain a concussion after 25 matches.[4] Meanwhile, a 2021 meta-analysis of concussion studies between 2001 and 2019 found that rugby has the highest concussion risk of any sport, with 28.25 concussions per 10,000 athlete exposures, followed by American Football, ice hockey, and wrestling.[5]

The most commonly discussed head injury in rugby is a concussion, which is described as a mild traumatic brain injury that affects brain function. Symptoms can last for days, weeks or even longer, and can include headaches and trouble with concentration, memory, balance, mood and sleep. Some concussions can cause loss of consciousness, although this is not often.[6]

However, concerns are increasingly being raised about the impact of cumulative sub-concussive impacts, which still cause the brain to shift or rotate inside the skull but without producing immediate, overt clinical symptoms like dizziness, confusion, or loss of consciousness like a concussion might.

One of the main areas identified is evidence supporting an association between repeated head impacts in contact sport and an elevated risk of long-term neurodegenerative changes, including chronic traumatic encephalopathy (CTE). However, there remains uncertainty around the exact relationship between elite rugby, neurodegenerative diseases such as CTE, and other neurological conditions, including its prevalence, causes, clinical presentation, and relationship to later-life cognitive or mental health difficulties.

While a definitive CTE diagnosis currently requires post-mortem examination of brain tissue, there is a growing body of evidence linking the sport to structural changes to the physical brain and neurodegenerative conditions.

The 2021 Drake Rugby Biomarker Study identified structural abnormalities in the brain amongst active elite Rugby Union and League players. This was the case even in the absence of a recently diagnosed concussion. Out of the 44 players studied (41 male and 3 female), white matter damage was present in

4 Rafferty J, Ranson C, Oatley G, Mostafa M, Mathema P, Crick T, Moore IS. On average, a professional rugby union player is more likely than not to sustain a concussion after 25 matches. Br J Sports Med. 2019 Aug;53(15):969-973. doi: 10.1136/bjsports-2017-098417.

5 Van Pelt, K.L., Puetz, T., Swallow, J. *et al.* Data-Driven Risk Classification of Concussion Rates: A Systematic Review and Meta-Analysis. *Sports Med* 51, 1227–1244 (2021). https://doi.org/10.1007/s40279-021-01428-7

6 Mayo Clinic, Concussion, 18 June 2026

23% of players, while unexpected reductions in white matter volume were seen in half of the 18 rugby players studied in the longitudinal subgroup. These structural changes to the physical brain were not found in the control subjects. Taken together, the researchers concluded that their findings suggest an association of participation in elite adult rugby with changes in brain structure, however further large-scale studies are needed to clarify whether the abnormalities observed are related to an increased risk of neurodegenerative disease and impaired neurocognitive function following elite rugby participation.[7]

Similarly, a later study published in 2025, using donated brains from the UNITE brain bank, found that exposure to repetitive head impacts across all types of contact sports may be associated with a range of brain abnormalities beyond CTE pathology, including white matter degeneration and hippocampal sclerosis (loss of neurons). These changes have been linked to dementia, although the prevalence, causal mechanisms, and clinical significance in the wider sporting population remain uncertain.[8]

Two studies published in 2025 led by Imperial College London, UCL, the Institute of Sport, Exercise and Health, and the UK Dementia Research Institute also found evidence linking elite rugby and long-term changes to the brain. In an assessment of 200 former elite male and female players aged between 30 and 61, researchers detected notable biological markers using sensitive brain imaging and blood tests: approximately one in four players had elevated blood markers associated with Alzheimer's-type changes, and longer playing careers were correlated with reduced brain volume in regions vital for memory and reasoning. Crucially, these former players performed normally on standard cognitive tests and none met the criteria for early-onset dementia. While these findings relate to the recruited cohort and should not be interpreted as a prevalence estimate for former rugby players generally, the presence of measurable physical differences in outwardly healthy, middle-aged athletes led researchers to conclude that sustained, long-term health surveillance is necessary across the sport.[9]

A collaborative study between the University of Glasgow, Boston University and the University of Sydney, published in 2023, found CTE present in more than two thirds (68%) of the brains examined from 31 former amateur and elite rugby union players. Because brain-donation studies carry high selection bias, this figure cannot be interpreted as the true prevalence of the disease across the wider rugby-playing population. Nonetheless, within this donor cohort, career length emerged as the primary predictor of pathology, with each additional year of play associated with a 14% increase in the risk of CTE, regardless of playing position or level of competition.[10]

The impact of rugby is not just limited to identifiable structural changes to the brain. A study of 412 former male Scottish international rugby players, who largely played during the amateur era at an elite level, found that the risk of a neurodegenerative disease diagnosis was significantly higher than in matched population controls. Looking at specific brain diseases, they found that the risk of dementia was around 2.17 times higher, the risk of Parkinson's disease around 3 times higher and the risk of motor

7 Karl A Zimmerman, Etienne Laverse, Ravjeet Samra, Maria Yanez Lopez, Amy E Jolly, Niall J Bourke, Neil S N Graham, Maneesh C Patel, John Hardy, Simon Kemp, Huw R Morris, David J Sharp, White matter abnormalities in active elite adult rugby players, Brain Communications, Volume 3, Issue 3, 2021, fcab133, https://doi.org/10.1093/braincomms/fcab133

8 Emrani, S., Koutures, A., Tripodis, Y. et al. Characterizing white matter and vascular pathologies in brain donors exposed to repetitive head impacts. Acta Neuropathol 149, 24 (2025). https://doi.org/10.1007/s00401-025-02860-z

9 Parker TD, Hain JA, Rooney EJ, Zimmerman KA, Lee Y, Del Giovane M, Graham NSN, Patel M, Hampshire A, Wilson MG, Friedland D, Sharp DJ, Sylvester RJ. Brain health concerns in former rugby players: clinical and cognitive phenotypes. Brain. 2025 Aug 1;148(8):2698-2713. doi: 10.1093/brain/awae416; Graham NSN, Zimmerman KA, Hain J, Rooney E, Lee Y, Del Giovane M, Parker T, Wilson MG, Malhotra P, David MCB, Kolanko M, Patel M, Veleva E, Swann O, Heslegrave A, Zetterberg H, Friedland D, Sylvester R, Sharp DJ. Biomarker evidence of neurodegeneration in mid-life former rugby players. Brain. 2025 Aug 1;148(8):2684-2697. doi: 10.1093/brain/awaf152.

10 Stewart W, Buckland ME, Abdolmohammadi B, Affleck AJ, Alvarez VE, Gilchrist S, Huber BR, Lee EB, Lyall DM, Nowinski CJ, Russell ER, Stein TD, Suter CM, McKee AC. Risk of chronic traumatic encephalopathy in rugby union is associated with length of playing career. Acta Neuropathol. 2023 Dec;146(6):829-832. doi: 10.1007/s00401-023-02644-3

neurone disease around 15 times higher. Like with many other research studies, there remains significant uncertainty due to limitations around the size of the cohort (especially regarding the risk surrounding specific brain diseases), so while these findings should not be interpreted as precise increased risk levels, they do show a potentially important association.[11]

Finally, a 2025 study into neurodegenerative diseases in male former first-class New Zealand rugby players found that a higher percentage of rugby players than males in the general population developed neurodegenerative diseases, at 6.5% compared to 5.2%. They also found increased risks for any neurodegenerative disease (1.22 times higher), Alzheimer's disease (1.61 times higher) and other dementias (1.23 times higher). Significant differences were not observed for Parkinson's disease and motor neurone disease.[12]

Further research presented also explores the effects of concussion and sub-concussive impacts on long-term brain function.

Concussion

Concussions and their long-term effects are an area of increasing public awareness and academic interest, and the sport is receiving greater scrutiny of player welfare.

Overall, concussions are more easily identified than in the past. In England, the Professional Rugby Injury Surveillance Project (PRISP) and Women's Professional Rugby Injury Surveillance Project (WRISP), undertaken by the England Professional Rugby Injury Surveillance Project, found that concussion was the most common match injury in the 2024-25 season for both male and female players, making up 26% and 25% of all match injuries respectively. During training, the proportion of injuries that were concussions dropped to 10% (19% of all concussions) for men but remained at 25% for women, indicating they remain a significant risk for players throughout the week and season.[13]

Although the concussion rate in elite rugby remains high, part of this is likely to be due to greater awareness and diagnosis of concussions, especially in the men's game, meaning that appropriate treatment and recovery can follow.

In the men's game, the overall trend since 2002 can be marked as having three distinct phases. There was stability between 2002 and the early 2010s which was followed by a period of significant increase in diagnoses up until around 2016. This increase in concussion rate coincided with the introduction of the head injury assessment and standardised mandatory education. Since then, the concussion rate has stabilised, with the 2024-25 season having a match concussion incidence rate of 15.1 per 1,000 hours, the second lowest rate since 2015-16.

For the women's game, the incidence of match concussion was 13.4 concussions per 1,000 hours, which was within the expected range for the last 3 seasons of WRISP data.

11 Russell ER, Mackay DF, Lyall D, Stewart K, MacLean JA, Robson J, Pell JP, Stewart W. Neurodegenerative disease risk among former international rugby union players. J Neurol Neurosurg Psychiatry. 2022 Dec;93(12):1262-1268. doi: 10.1136/jnnp-2022-329675

12 Anns F, Quarrie KL, Milne BJ, Li C, Gardner AJ, Murphy IR, Verhagen E, Wright C, Morton SMB, Lumley T, Tippett L, D'Souza S. Neurodegenerative Diseases in Male Former First-Class New Zealand Rugby Players. Sports Med. 2026 Feb;56(2):543-558. doi: 10.1007/s40279-025-02299-y

13 England Professional Rugby Injury Surveillance Project, Professional Rugby Injury Surveillance Project (PRISP), Season Report 2024-25; England Professional Rugby Injury Surveillance Project, Women's Professional Rugby Injury Surveillance Project (WRISP), Season Report 2024-25

The introduction of measures such as Graduated Return to Play in 2022 also appears to have impacted concussion management. In 2024-25, just 4% of male players returned to playing within 7 days of a concussion, compared to 37% of players between 2016 and 2022, prior to World Rugby introducing the changes. This suggests that players are therefore getting more recovery and are more likely to be symptom-free before returning to play.

The research emerging from academic institutions is revealing the impact that concussions can have on players many years and even decades after they were experienced. For example, a study from the Advanced BRAIN Health Clinic (ABHC) Research Programme found that former elite rugby players in mid-life have a heavy burden of symptoms, such as depression, anxiety, post-concussion symptoms, and executive dysfunction, which increased with the number of self-reported concussions during their career. The study found that former players had abnormally high levels of depressive and anxiety symptoms at 28.5% and 35.2% respectively, both of which are higher than population estimates from general population datasets. However, this rose further to almost 38.9% for depressive symptoms and 42.2% for anxiety symptoms in those with high numbers of concussions.[14]

In a similar vein, a study from Durham University found that retired elite rugby players report worse mental health than amateurs and non-contact athletes, and the more concussions they report, the worse the picture. Former professionals had significantly higher rates of depression, anxiety and irritability, and had sleep disruption at 1.8 to 2.9 times the rate of the comparison groups. Like with the previous study, players reporting more concussions, in this case measured by five or more concussions, were nearly twice as likely to report depression and anxiety symptoms as those with fewer concussions. Half of players with three or more concussions showed signs of poor mental health, compared with one in three of those with fewer than three.[15]

More innovative research is also underway to advance our understanding of the impact of rugby and concussion on the brain. For example, the Podium Institute at Oxford University partnered with Gloucester Rugby to take MRI neuroimaging scans of players after every match in the 2025-26 season if a suspected or diagnosed concussion has taken place, supported by data from instrumented mouthguards and video footage of the game. This was also accompanied by other assessment techniques such as electroencephalography (EEG), pupillometry, eye-tracking, neck strength, a portable balance system, and point-of-care blood and saliva tests to assess physiological responses to the trauma. The data was collected during the most recent 2025-26 rugby season, and so while the findings have not yet been published, this should not be seen as a reason to not yet act.[16]

Sub-Concussive Impacts

Concussion is just one consideration for professional rugby players when considering their long-term brain health. Although concussions receive the most public and media scrutiny, as well as being easier to define and measure for research studies, the overall effect of all HAEs, including cumulative impacts that do not result in a concussion, can be just as significant over the course of a player's career.

14 Thomas D Parker, Jessica A Hain, Erin J Rooney, Karl A Zimmerman, Ying Lee, Martina Del Giovane, Neil S N Graham, Maneesh Patel, Adam Hampshire, Mathew G Wilson, Daniel Friedland, David J Sharp, Richard J Sylvester, Brain health concerns in former rugby players: clinical and cognitive phenotypes, Brain, Volume 148, Issue 8, August 2025, Pages 2698–2713, https://doi.org/10.1093/brain/awae416

15 Hind K, Konerth N, Entwistle I, Hume P, Theadom A, Lewis G, King D, Goodbourn T, Bottiglieri M, Ferraces-Riegas P, Ellison A, Chazot P. Mental Health and Wellbeing of Retired Elite and Amateur Rugby Players and Non-contact Athletes and Associations with Sports-Related Concussion: The UK Rugby Health Project. Sports Med. 2022 Jun;52(6):1419-1431. doi: 10.1007/s40279-021-01594-8

16 The Podium Institute, Gloucester Rugby and The Podium Institute to Partner on Head Injury Study, 2 October 2025



In 2024, an editorial study noted that although described as 'sub-concussive', many impacts that do not result in a diagnosed concussion are in fact more forceful than those that result in a concussive diagnosis. While the name suggests that they are minor, or less significant, than impacts that cause a diagnosed concussion, this is wrong. The study observed that impacts without a concussion diagnosis are linked to biomarker changes, white matter damage, cortical thinning and loss of brain volume, but it was the duration of exposure to repeated head impacts, for example the length of a player's career, that predicted CTE status and severity better than the number of diagnosed concussions. The paper outlines that 'the absence of symptoms following an HAE [head acceleration event] does not indicate that no injury occurred, but rather that no injury occurred to a salient network.'[17]

Although this research focused on male American football players, the overall principle applies to rugby. Symptoms do not reliably follow impact size, meaning protocols built around spotting concussion, such as the Head Injury Assessment, cannot on their own control cumulative harm.

This argument is supported by other studies too. The Drake Foundation's imaging study emphasised that many head impacts do not result in a clinical concussion but contribute to changes in brain structure, including blood vessel damage and reduced brain volume.

The FIELD study found that in professional football, former players' risk of death from Alzheimer's disease was five times higher than controls, motor neurone disease almost four times and Parkinson's disease twice. Yet football has a lower rate of concussion than other contact sports like rugby, indicating that repetitive sub-concussive impacts from actions such as heading the ball are having a significant effect on players. This further suggests the need for measures specifically addressing this cumulative impact.[18]

As with concussion, the risk of exposure to HAEs is higher in matches than in training. A 2024 study, supported by World Rugby, found that rugby players spent between 1.75 and 2.5 times longer in training than in matches, yet experienced 2.8 to 11.7 times more HAEs in matches. While the researchers noted a number of limitations with the instrumented mouthguard data, the findings highlight the importance of a holistic and balanced approach to safeguard players, that reflects where the greatest risks are while making reasonable adjustments that can protect the game by keeping its fundamental qualities unchanged.[19]

Changes to Date

Rugby's governing bodies including World Rugby and the RFU have introduced numerous changes around concussion management and their involvement with research projects is welcome, including the RFU's recently announced partnership with BRAIN-SAFE (Brain Research for Adaptive Traumatic Injury: Simulation, Assessment, Forecasting & Education), a national research hub led by Imperial College London.[20]

17 Nowinski, Rhim, McKee, Zafonte, Dodick, Cantu and Daneshvar, 'Subconcussive' is a dangerous misnomer: hits of greater magnitude than concussive impacts may not cause symptoms, British Journal of Sports Medicine 58(14): 754, 2024, https://doi.org/10.1136/bjsports-2023-107413

18 Mackay, D.F., E.R. Russell, K. Stewart, J.A. MacLean, J.P. Pell, and W. Stewart. 2019. Neurodegenerative disease mortality among former professional soccer players. The New England Journal of Medicine 381 (19): 1801–08. doi:10.1056/NEJMoa1908483

19 Roe, G., Sawczuk, T., Tooby, J., Hudson, S., White, R., Mackay, L., Owen, C., Starling, L., Cross, M., Falvey, É., Hendricks, S., Kemp, S., Rasmussen, K., Readhead, C., Salmon, D., Stokes, K., Tucker, R. and Jones, B. (2024), Training and Match-Related Head Acceleration Events in Top Level Domestic Senior Women's and Men's Rugby Union: A Multi-League Instrumented Mouthguard Study. Scand J Med Sci Sports, 34: e14744. https://doi.org/10.1111/sms.14744

20 RFU, BRAIN-SAFE | Advancing our understanding of brain injury, 12 November 2026

From the introduction of the Head Injury Assessment (HIA) and mandatory stand-down periods to increased education and awareness of concussion and its symptoms, the game has shown it is taking the medical risk of concussion seriously at all levels of the sport.

The HIA was introduced in 2015. Following any head collision, if a player sustains a head impact with the potential for a concussion, they must be removed from play for an HIA. Trained medical personnel then use this assessment to decide if the player can return or if for player safety, they must sit out the rest of the game. The assessment has been subsequently modified, such as extending the time off the pitch for assessment from 10 minutes to 12 minutes at the end of 2019. Since July 2022, stand-down periods dictate that elite players who display symptoms of a concussion should not play within 12 days.[21]

> **Current players are the "best looked after in history"**
> **Current Prem player**

Rugby has also introduced enhanced use of technology to monitor head acceleration event exposure, and how much force players experience at any point. In January 2024, World Rugby introduced in-game alerts from smart mouthguard technology to show if a player has experienced a high-level HAE which could lead to an injury. The smart mouthguards work in real time to send alerts of high forces to the independent matchday doctor, enabling players who have experienced a high HAE, but not necessarily shown symptoms or been seen by medics or cameras, to be taken off and assessed. Elite rugby players are required to wear smart mouthguards to be able to access the HIA process. In the English elite game, instrumented mouthguards are also required in training as well as matches, enabling coaches to better tailor drills, tackle skills and training load for each individual player, and best support their performance and welfare.[22]

Measures have been taken by both World Rugby and the RFU to manage player loads both in totality and with regards to contact training, aiming to reduce injury risk and support player welfare. While not solely targeted at head and brain injuries, it is likely to have limited some exposure to potentially harmful HAEs, particularly the sub-concussive impacts, and provided more recovery periods for the brain.

In September 2021, World Rugby and International Rugby Players Association (IRPA) published new contact training load guidance in the men's and women's Rugby World Cup player welfare standards. The recommended limits for the professional game are a maximum of 15 minutes per week of full contact training across a maximum of two days per week with Mondays and Fridays comprising zero full contact training to allow for recovery and preparation; controlled contact training for a maximum of 40 minutes per week; and a maximum of 30 minutes set piece training per week.[23] However, this is only guidance.

In 2026, Prem clubs agreed to further significantly regulate contact training. From the 2026/27 season, the Men's Professional Rugby Board (MPRB) regulations introduced a Graduated Return to Contact process, where all Prem players returning from their five-week off-season break have a phased reintroduction to contact training, including no contact at all in the first week, and no full contact until the fourth week of their return.[24]

21 World Rugby, HIA Protocol; World Rugby, New World Rugby Graduated Return to Play protocols set "gold standard", 21 June 2022

22 RFU, Men's Professional Rugby Board ("PRB") Regulations, effective from 1 September 2026

23 World Rugby, Players, unions and competitions support new guidelines for rugby contact training load, 22 September 2021

24 RFU, Men's Professional Rugby Board ("PRB") Regulations, effective from 1 September 2026

The updated regulations also provide for increased data and monitoring. In addition to players being required to wear instrumented mouthguards during contact training sessions in the week and during matches, contact sessions are videoed, analysed and uploaded to a central English rugby database, and all concussions suffered in training must be logged centrally and analysed.

These measures will also provide an enhanced research programme focused on the training environment and individual player exposure. Players have also been given the 'right to disconnect', including no monitoring via GPS units, during their mandatory 5 weeks' rest period. Prior to this, 35% of players said they have their fitness monitored by their clubs when on holiday, raising concerns about whether players had been able to actually rest, physically and psychologically, during their off-season.[25]

However, it is worth noting that these changes introduced for the 2026/27 season have only applied in full to the Prem game through changes to the MPRB regulations, whilst the Graduated Return to Contact process has not been applied to the Professional Women's Rugby competition.

In addition to increasing regulations for contact training, measures have been put into place to better regulate total player loads.

In October 2025, World Rugby agreed to new player load guidelines for the elite men's and women's game. Agreement with the new guidelines was a condition of approval for the new Nations Championship, which began in the summer of 2026. The new guidelines state that players should: Play a maximum of 30 games in a single season and no more than six consecutive match weeks; have a dedicated 5-week off-season break; be entitled to minimum rest periods of at least one week, should they be selected for international fixtures; and have 12 weeks of non-contact time across the year.[26]

In the men's elite game in England, many of these measures were adopted as formal regulations, as opposed to guidance. Prem players may only play in a maximum of 30 games per season, and clubs or the RFU need to apply for an exemption for a player to go over this number.

Players must also have a dedicated 5-week off-season break consisting of 2 weeks' absolute rest, immediately followed by 3 weeks' active rest. In the Prem, this right exists in both the regulations and the standard player contract. This right also exists in the PWR standard player contract for female players.

According to the MPRB regulations, players selected in the matchday 23 for all matches for their country during the Six Nations Championship and Autumn International fixtures will have a one-week rest period within the three weeks following the end of any such period of international duty.

Finally, every player is entitled to a minimum non-competition window of ten weeks, starting at the end of their last scheduled club or international duty, whichever is later for that player in each season.

Other measures have been trialled at community and age-graded levels. In May 2023, World Rugby Council approved trials of a lower tackle height in community rugby. England, Ireland, Scotland and Wales were among 11 nations running the two-year trial, which saw the legal tackle height drop to below the base of the sternum. In December 2025, World Rugby announced that the community game trials would be extended to the Under-20 World Championship in summer 2026.[27]

25 BBC Sport, Prem clubs agree to limit contact in training, 6 March 2026

26 World Rugby, World Rugby Executive Board agrees new player load guidelines, 1 October 2025

27 BUCS, New tackle height regulations for the 2023-2024 season, 17 July 2023

World Rugby said the community trials showed a shift in player behaviour, with high concussion risk upright tackles falling by roughly 8 to 10 per cent after the sternum tackle-height limit was introduced. Some unions reported a reduction in concussion rates, although World Rugby noted the concussion data is still limited and needs more evidence over time.[28]

Elite players acknowledge that positive steps have been made in regards to player welfare, with one international player telling the Working Group that 'I do think we're incredibly well looked after in terms of the data, the gum shields, how contact sessions are being recorded. I think if you look back… gum shields were optional… So there's been an incredible progression as time's gone on'.

However, another player reflected that these measures, alongside better data collection, mean that they have 'a constant reminder about what you're actually having to go through on a Saturday and then sometimes during the week in training', adding that concerns about brain health and long-term consequences are on players' minds 'daily'.

During a 2021 parliamentary inquiry, World Rugby's chief medical officer, Dr Éanna Falvey, acknowledged that there has been frustration at the pace of change within the sport, but claimed that 'good science takes some time' and that unintended consequences had to be avoided.[29]

The Working Group understands this sentiment, and welcomes that since these remarks, further changes have been introduced. However, this should not be seen as the end of the road, and there is still further demand from both players and fans alike for additional measures.

Women's Game

This report explores and makes recommendations to understand and reduce the long-term negative impacts of rugby on elite players' brains, for both male and female players. However, the Working Group wanted to highlight the additional challenges that including women in this report entailed.

First, although the body of evidence into understanding the links between rugby and long-term brain health is growing, many of the research studies only consider male players, or participants are disproportionately more male than female. This can skew understanding as to what is 'normal', as it may not be the same for both sexes.

During the evidence session, elite female players told the group that they feel the impact of this in their playing career. One athlete told the group that after a hit to the head, her symptoms overlapped considerably with her menstrual cycle symptoms, making it more difficult to identify and diagnose whether it was a concussion or not. A second female player explained that many of her teammates' symptoms were not the typical symptoms of concussion and head injury that they were taught about, highlighting gaps in understanding around the symptoms of concussions in men and women. Similarly, she reflected that the symptoms were more associated with hormonal responses and could be more easily brushed off as not relating to a concussion, forfeiting the enhanced care and recovery that might have been required.

The female players explained that they felt most research, and many of the World Rugby baselines, are based on men, and often do not reflect women's experiences.

28 Talking Rugby Union, Lower tackle height trial to expand to U20 Championship, 17 December 2025

29 Digital, Culture, Media and Sport Committee, Oral evidence: Concussion in sport, HC 1177, Tuesday 23 March 2021

The group also heard about disparities in resources between men's and women's teams and how this can make treatment more variable. For example, the PWR competition is not fully professional and players highlighted that many female teams lack access to a full-time medical team, making injury monitoring and support far more difficult. These challenges are compounded by the fact that the majority of PWR players maintain dual careers, working or studying alongside their rugby, with 60% of PWR players being volunteers. Consequently, injured players must juggle treatment and recovery programmes around external jobs that often serve as their main source of income. This split focus can place significant personal and logistical stress on injured athletes, compromising their rehabilitation and risking slower recovery times.

Even access to basic resources for the female players appeared to be a challenge. One player told the group about how after a confirmed or suspected concussion, male players would be given a nutrition pack including supplements to help with brain health and recovery. However, the female players at the club were not able to access that same support due to what they believed were resourcing constraints.

Although women are on average smaller than men, and therefore tackles may be relatively less forceful, this must be recognised within the context of women also being less conditioned and having lower muscle mass to protect themselves against injury.

For example, research by Swansea University found that when comparing men and women in rugby, there were no significant differences for peak linear head acceleration or peak rotational head acceleration, despite the mean male body mass being 24% greater than female. However, it was observed that the mean female maximal isometric neck strength was 47% lower than male. While the study did not go as far as in their conclusion, this could be interpreted as the women's ability to protect their head from the forces experienced was lower, putting them at risk.[30]

While evidence about the effect of elite rugby on women is weaker compared to the effect on men, and the women's game lacks resources compared to the men's, the Working Group did not feel it was appropriate to make recommendations only for the men's game.

The recommendations proposed in this report are intended to be a minimum standard for all players. Two of the proposals from the Working Group do not have a direct cost, and it is recommended that an external funder is sought to pilot a brain health assessment before it is rolled out. All of the recommendations aim to be ambitious but feasible within the constraints set.

The measures should be kept under review and updated as more evidence about female players emerges, but there is enough data to conclude that head impacts in rugby increase the long-term risk for players, and therefore further measures are required for male and female players alike. Furthermore, while there were some responses from current and retired female players in the Working Group's polling, it was predominantly completed by male players. Further gathering of the views and experiences of those at the top level of the women's game would complement additional broadening of the scientific evidence base.

30 Williams EMP, Petrie FJ, Pennington TN, Powell DRL, Arora H, Mackintosh KA, Greybe DG. European Journal of Sport Science. 2022;22(11):1649–1658. DOI: 10.1080/17461391.2021.1973573.

FAN AND PLAYER VIEWS

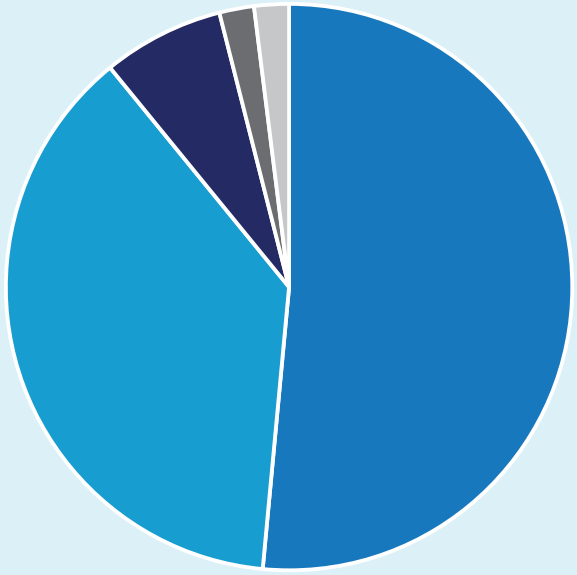
Any changes to the laws or regulations of rugby should only be introduced with the support of both fans and players. The purpose of the Working Group is not to harm the sport or turn it into a game that is not recognised as rugby, but to make proportionate and measured recommendations that protect the game as well as its players.

For this reason, the Working Group commissioned rigorous independent polling of both rugby watchers and the elite playing community.[31] Recognising the ongoing imperative to broaden the game's appeal, the Group also extended this exercise to the wider public, to examine their perceptions of the game and how this impacts on interest in watching, as well as encouraging participation.

When it comes to head injuries, rugby watchers, from the most engaged fan to the more casual watcher, believe it is the biggest problem facing the professional game. Polling commissioned by the Working Group found that 90% of rugby fans view head injuries and their consequences as very or fairly problematic, which far outstrips the proportion giving the same answer for other issues, including player welfare in general, financial problems, attracting new audiences, players leaving for overseas, and fixture scheduling.

How much of a problem do you think head injuries and their consequences are for the professional game in the UK?

Very problematic	52%
Fairly problematic	38%
Not very problematic	7%
Not at all problematic	2%
Don't know	2%



31 Two surveys were commissioned. The first was of 5,479 members of the wider British public, including 1,501 rugby watchers. The second was of the elite playing community and received 68 responses, including ten current or recently retired players and 56 who had retired more than five years ago.

This high level of concern holds across levels of engagement as well as fans of both the men's and women's game, club and international rugby. Even 68% of non-fans view head injuries as problematic, which is 20 percentage points higher than any of the other issues tested. Concerns about head injuries have spread beyond just those who engage with the sport.

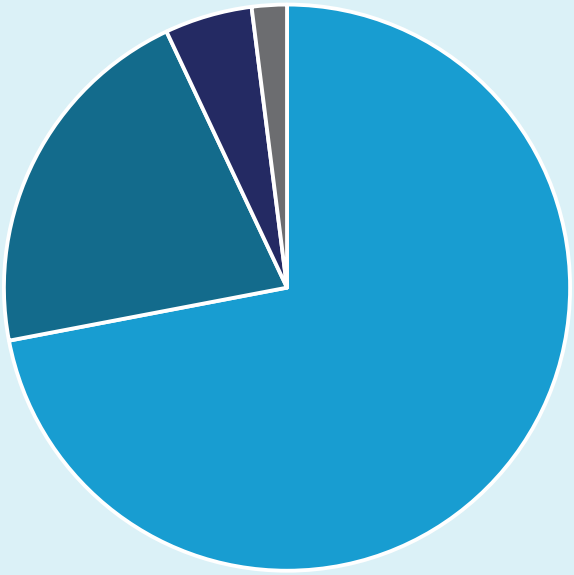
These concerns have been persistent over recent years, and could also have a long-term impact on the game. In 2021, a survey by the Drake Foundation found that 63% of amateur players decided to limit the amount they play, or to give up playing completely, in light of reports that former professionals believe rugby is to blame for permanent brain injuries, while 58% of parents feared rugby could have a detrimental long-term impact on their child's health.[32] Coupled with the findings of the RFU's 2024 semi-independent review of rugby union in schools, *Changing the Game: the Future of Schools Rugby in England*, which highlighted fears over head injuries as one of the reasons behind the decline in participation numbers, this raises questions about the future pipeline of talent into the elite game.[33]

Although rugby watchers recognised that the game has come a long way on how it recognises and tries to address head injuries, they believe more can be done. When considering what the game is doing to protect professional players from head injuries and their consequences, 46% believe a lot more is being done now than five years ago. However, just 20% of fans say the game is doing the most it can, while in a separate question, **a majority say the game has room to improve, with 56% saying that it is doing well but more can be done**.

Among the playing community of current and retired elite athletes, **94% of those surveyed said they are worried about the long-term effects of head impacts sustained during their career**.

How worried or not are you personally about the longer-term effects of head impacts sustained in your career?

Very worried	72%
Fairly worried	21%
Not very worried	5%
Not at all worried	2%



32 The Drake Foundation, The Drake Foundation survey reveals health concerns in grass-roots football & rugby: calls for law changes to make the sports safer, 19 February 2021

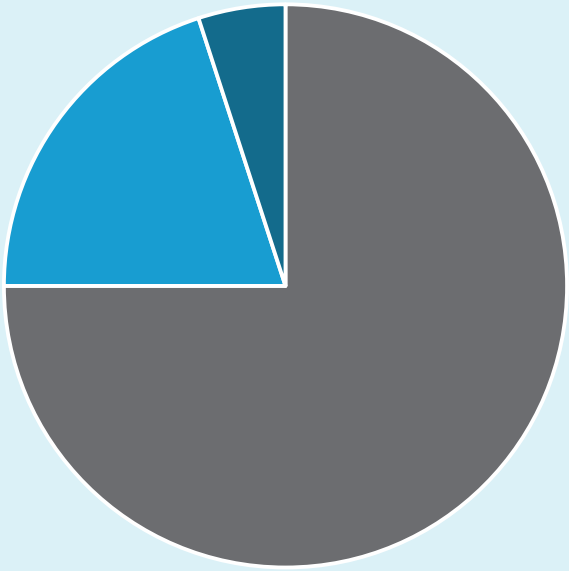
33 RFU, Report of the Review of Rugby in Schools, Changing the Game: The Future of Schools Rugby in England, 2024

While nearly 8 in 10 feel the game is doing more now on head injuries than it was five years ago, just 6% believe those in charge of the game are doing all they can to prevent and reduce the effects of concussions and head impacts for players.

This is broadly based on the view that the current measures taken to date have been impactful, but not fully sufficient on their own, with 75% answering that measures including Graduated Return to Play and instrumented mouthguards have made a difference, but more work is needed.

Would you say those measures, taken together, in addressing head injuries and long-term brain health problems in rugby, have…

Completely solved the issue	0%
Made a difference but more work is needed	75%
Not made a difference at all	20%
Don't know	5%



Current elite players also raised concerns about the long-term impact of rugby on their brain health in the evidence session. One male player described the culture change since the start of their career, explaining how players' mindsets have 'completely changed, completely flipped on its head'. While ten years ago, concussion was seen by players as a badge of honour, they are now thinking about the impact of the sport on their brain health 'daily'.

Another player felt that their short-term care following a head impact was well addressed through the Head Injury Assessment protocol, but didn't feel that their longer-term brain health was considered.

A third player added that: 'Long term is what we're all worried about… Not necessarily concussions, but just repeated head knocks that wouldn't even count as a concussion, just the repetitive nature of it is what people are scared of'.

With both the public and athletes demonstrating significant concerns about the long-term brain health of elite rugby players, there appears to be clear scope for further action to build on the measures already introduced and continue to safeguard players.

RISK OF INSUFFICIENT ACTION

Although the recent changes are positive steps, there remain significant risks associated with failing to build on them and sustain adequate action surrounding head injuries and long-term brain health.

Beyond the direct impact on the players themselves, there is a financial risk to the sport that could threaten its longevity. The risk of both concussion and sub-concussive hits is not limited to rugby but affects other contact sports too, which also therefore carry uncertainty and risk of long-term neurodegenerative conditions. Other sports internationally have found these risks so great that it has impacted insurance coverage, putting players at even greater risk, and by extension, the game itself.

In Australia, players in the Australian Football League (AFL) are no longer covered by insurance for brain injuries after their insurance provider, Zurich Insurance, withdrew coverage. From 1 May 2026, no total and permanent disability (TPD) benefit will be payable for any claim made for traumatic head injury, concussion, Chronic Traumatic Encephalopathy (CTE), post-concussion syndrome or any neurological impairment linked to brain injury. The insurance provider cited 'widespread uncertainty' around the potential magnitude of CTE and the long-term effects of concussion.[34]

Meanwhile, in the US, there were reports in 2019 that the National Football League (NFL) was struggling to find insurance coverage following concussion litigation over the preceding years. ESPN reported that 'The NFL no longer has general liability insurance covering head trauma, according to multiple sources; just one carrier is willing to provide workers' compensation coverage for NFL teams. Before concussion litigation roiled the NFL beginning in 2011, at least a dozen carriers occupied the insurance market for pro football, according to industry experts'.[35]

> **While the Working Group has not seen evidence that English Rugby is currently at risk of losing its insurance coverage, there is international precedent that it could happen. Rugby's governing bodies should be proactive in managing the risk of long-term brain injuries so that a similar situation does not occur.**

34 ABC, AFL players to lose insurance coverage for brain injuries, 27 March 2026

35 ESPN, For the NFL and all of football, a new threat: an evaporating insurance market, 17 January 2019



RECOMMENDATIONS

The Working Group has made three recommendations:

1

Brain Health Checks:

Introduce a regular Brain Health Check including an MRI scan, to empower players with more information about their brain health.

2

Non-Contact Weeks:

Increase the number of non-contact weeks for players across the calendar year to limit cumulative exposure and ensure proper enforcement.

3

Improved Data Sharing:

Enhance data sharing into a central research dataset, to facilitate research into understanding the link between the game and players' brain health.

These recommendations are applicable to players in both the men's Prem competition and the women's PWR. As set out earlier in the report, although there is less information about the risk to women, this is not a reason for inaction when it is clear there are still significant challenges facing female players, and less wraparound support available where injuries and head acceleration events occur.

> **The recommendations are intended to set a minimum standard of care across all clubs. Like the introduction of other measures so far, these should not be seen as the end point, but as another step towards protecting players based on existing understanding of risk and mitigation. The regulations should be kept under review and further updated as more research is published and the evidence base improves.**

Recommendation 1: Introduce a Regular Brain Health Check

Throughout the evidence session with the current professional rugby players, a recurring theme was how keen athletes are for more information about their own health. One female player remarked that 'most female athletes are just hungry for more and more data', the sentiment of which was echoed by the other players.

What was particularly notable was that they didn't just want to see their personal health data, but wanted to proactively use it to inform career decisions. One player told the group that 'if I could actively see that my brain health was deteriorating, I would have a serious think about packing it in, to be honest with you. So I would rather want to know than not'. Another player raised concerns that no baseline data was recorded, meaning that changes could not be measured later in their career to assess whether any damage had occurred.

> **The Working Group therefore proposes the introduction of a Brain Health Check for both male and female players. The assessment should be made available to players upon entering the professional leagues (Prem and PWR) and follow-up checks should be offered at regular intervals.**

All clubs should offer players the opportunity to take part in the assessment, but it would be the player's choice whether they did so. Players would own their own data, and they would be encouraged to contribute it to a secure central research database (see Recommendation Three). Clubs would not be able to use the data to inform playing or career decisions – any decisions on the basis of the assessment must be made by the individual player.

There are two purposes to this assessment. The primary aim is to improve player welfare by providing clinically relevant information about players' current health to support informed decision-making. The Working Group felt it was important that players have access to clinically relevant findings about their neurological health, alongside clear information about the known and uncertain risks associated with continuing to play, while recognising that the final decision should remain with the individual following appropriate medical advice.

A second benefit would be to help reduce the gap in current scientific understanding. Coupled with data already recorded including from the instrumented mouthguards, establishing a prospective longitudinal programme will generate additional evidence that can provide greater context to HAEs. In turn, this may improve understanding of the relationship between elite rugby and long-term neurological conditions, and help to inform future player welfare policies.

The assessment draws on the precedent set by the RFU's cardiac screening programme and World Rugby's Cardiac Screening Guideline, which recommends regular testing in light of the risk of sudden cardiac death (SCD).

The Assessment

The proposed assessment framework draws on the expertise of the clinical and academic members of the group, and consists of four components: a neuroimaging MRI scan, a functional and cognitive test, an in-person medical review, and blood biomarker collection. While each element provides valuable information individually, their combined interpretation offers a more comprehensive assessment of brain health, and so the Group recommends that all components are introduced.

The neuroimaging component of the assessment should comprise advanced neurostructural imaging using MRI, ideally using research-grade sequences where available.

Wherever possible, players should undergo imaging using the same MRI scanner throughout their professional career to maximise the reliability of longitudinal comparisons. This could be achieved by assigning each professional club to a designated regional imaging centre.

Players would also complete a cognitive and functional assessment designed to measure domains such as memory, attention, processing speed and executive function. This could be completed online, provided appropriate safeguards are implemented to verify player identity and maintain test integrity – particularly given how players had previously admitted to cheating on earlier versions of the HIA.[36]

Following the brain scans and cognitive testing, players would attend an in-person medical review conducted by an appropriately trained clinician. The clinician would be able to use the imaging and test results as part of the review, alongside a structured medical assessment covering considerations including concussion history, neurological symptoms, general health and other relevant clinical factors. The medical review should also encompass mental health, sleep, behavioural change and everyday functioning, using appropriately validated assessment measures.[37]

Finally, blood-based biomarkers would be collected. Although current evidence does not support their use in clinical or playing decisions, prospective collection supports long-term longitudinal monitoring as scientific capability improves, in turn supporting the development of new diagnostic approaches and refining future iterations of the assessment programme.

The components would collectively be used to provide both clinical and research data. Based on current understanding and technology, the cognitive and functional assessment and medical review would provide clinically relevant information about a player's current health and wellbeing, identify changes warranting further investigation, and highlight potentially treatable problems.

As selected cognitive, psychological and functional assessments can be administered in person or remotely, this may help improve access to repeated monitoring, particularly where resources are more limited in the women's game.[38] Longitudinal assessment also allows changes to be interpreted against previous performance and relevant reference data, while accounting for measurement variability, practice effects and factors such as fatigue, mood, pain and medication.

The Working Group recognises the substantial value of MRI scans as a tool to measure change over time, and notes the distinction between the established use of conventional MRI for clinically indicated

36 BBC Sport, 'I cheated HIA process to play on in 2017 Lions Test', 2 March 2026

37 Reardon CL, Gouttebarge V, Kroshus-Havril E, et al. Mental health in elite athletes: International Olympic Committee consensus statement (2026). British Journal of Sports Medicine. 2026;60:1083–1130. https://doi.org/10.1136/bjsports-2025-111514

38 Boucher EF, Grey MJ, Hornberger M, Hanson S. Online longitudinal monitoring of brain health in former contact sport athletes: A study of acceptability and ethicality. European Journal of Sport Science. 2024;24:549–556. https://doi.org/10.1002/ejsc.12052

investigations and the proposed use of advanced MRI for longitudinal research in asymptomatic players. Although there are current limitations in interpreting advanced imaging findings, particularly in asymptomatic individuals and in predicting future neurological risk, building a longitudinal imaging archive would provide valuable long-term research and monitoring data. Future scientific advances may improve the clinical utility of baseline and follow-up scans, although this remains to be established.[39] However, if this data is not collected from the outset, including the initial baseline, the opportunity to track individual structural changes over time is permanently lost.

Advanced MRI is already being used as a research tool to monitor changes in the brain after head impacts in collision sports. Examples include the Drake Rugby Biomarker Study cited earlier in this report, and a small exploratory study at Cardiff University in 2025 involving six university footballers and six controls which used advanced MRI to quantify the change in microscopic brain structure immediately, and then months after, acute football heading. While the latter study's small sample and incomplete follow-up limit the interpretation of its findings, these studies indicate a role for the methodology in research.[40]

In a policy and clinical context, baseline MRI scans at the beginning of an elite career offer two distinct benefits: they can identify structural abnormalities, and they establish an objective personal baseline against which future post-injury or late-career scans can be compared. As scientific understanding evolves, baseline imaging will provide a useful reference for future longitudinal comparisons. It may also help establish the clinical significance and prognostic value of changes detected in asymptomatic players.

The assessment should remain subject to regular scientific and clinical review by expert panels and regulatory bodies, with independent clinical oversight of interpretation, referral and follow-up arrangements. As evidence evolves, validated new technologies should be incorporated into the programme while outdated or less informative measures are retired, ensuring that the assessment remains best practice in the field of sports medicine.

Timings and Interpretation

The first brain health assessment should be offered when a player enters the professional game, establishing an individual baseline against which future assessments can be compared. Subsequent assessments should be offered at regular intervals in line with the existing men's cardiac screening programme. While it would be a requirement for clubs to make the assessment available to players, it should be optional for athletes whether they agree to complete it.

Where possible, assessments should be scheduled during the off-season to reduce the influence of recent match exposure. However, recognising the practical constraints of delivering a national programme, assessments should aim to take place at the same point in the annual calendar to maximise comparability over time.

Players must be fully informed of the purpose of the assessment and any potential unintended consequences that could result from the assessment, including the diagnosis of conditions that could

39 Patricios JS, Schneider KJ, Dvorak J, et al. Consensus statement on concussion in sport: the 6th International Conference on Concussion in Sport, Amsterdam, October 2022. British Journal of Sports Medicine. 2023;57:695–711. https://doi.org/10.1136/bjsports-2023-106898

40 McCloskey H, McNabb CB, Laguna PL, Keenan B, Evans J, Jones DK, Palombo M, Barnes-Wood M, Adams R, Connelly S, Theobald P. Quantified Head-Ball Impacts in Soccer: A Preliminary, Prospective Study. Neurotrauma Rep. 2025 Sep 25;6(1):928-943. doi: 10.1177/2689288X251380145

affect their ability to continue playing. Those considered to be in a higher risk profile, for example due to their medical history, should be particularly encouraged to take part. The limitations of the assessment should also be made clear, including what is clinical evidence and what is about risk.

The findings of each component of the test should be interpreted by an appropriately trained clinician, with guidance set to provide consistency between clubs while preserving appropriate professional judgement, including within the context of the player's wider medical history and overall clinical picture. This should distinguish clinically established neurological injury from findings whose clinical significance and implications for future neurological risk remain uncertain.

Where assessments identify findings that represent an immediate and/or significant risk to a player's health, these should be managed through established clinical pathways, including referral to appropriate specialist services where indicated.

> **"We're always hungry for more data"**
> **Current Prem player**

For findings that are less acute, results must be communicated transparently and with appropriate nuance while supporting player confidence and wellbeing. Players may have questions or concerns about what testing could mean for their playing career, performance, or long-term health, and so a holistic approach is essential: clinicians should frame results constructively, and clearly explain the limits of predictive data, especially in asymptomatic athletes, so findings are not misunderstood or overstated. Players should also have access to confidential support, ensuring they feel informed, supported, and in control of their health throughout the process.

Player and Public Support

When asked, rugby watchers were overwhelmingly supportive of annual brain checks. After being shown a description of the proposed brain health checks, 92% of fans expressed support for them, including two-thirds (68%) who strongly support the measure. Only 1% of fans opposed these checks. High levels of support are consistent across fans of all engagement levels, men's and women's rugby, and club and international fans.

The players the Working Group spoke to were also supportive of such a measure too. One player said that she would love to have a scan and thought it should be offered to all players, while another explained that some players at his club had already been asking about whether they could have an MRI scan, reiterating how keen players are for more information about their health.

> **"Personally, I'd love to have a scan, and I think it should be offered to players should they want it"**
> **Current PWR player**

However, the players suggested that there might be some cultural challenges, particularly amongst players who were later on in their career and would be less interested in finding out about their health as they felt the damage had already been done and wanted to continue to play. That said, they thought that younger players were more conscious of the risks and would be keen to undergo such assessments, but this should be on a voluntary basis, rather than a mandatory requirement for all players.

Polling of the playing community also showed overwhelming support for a Brain Health Check. **Every member of the rugby community surveyed strongly supported the principle of players having better access and regular medical support to assess their brain health**. Every current player surveyed said they would want access to these checks if they were voluntary, while 44 of the 46 former players said they would want these checks if they were still playing.

Implementation

Legitimate concerns were raised both internally by Working Group members, and externally about the practicality of introducing a comprehensive programme such as this, particularly in the women's game which has access to fewer resources.

The framework has been designed to be comprehensive while retaining as much flexibility around timings as possible. The assessment should take less than a day in its entirety and each component does not need to be completed at the same time. Given that the medical review will have access to the MRI and functional testing results, the time demand will be spread over the course of several days or weeks.

The Working Group is also mindful of the cost of the programme. While exact costs would be subject to contract negotiations, it is estimated that the assessment could cost approximately £800 to £1,500 per player.

This is based on private MRI scans of the brain and head typically costing between £350 and £750[41], although there may be higher costs if more advanced sequencing techniques are required. In-person private consultations with a Sports and Exercise medical consultant typically range between £200 and £400[42] while neurocognitive testing is around £100[43]. Private blood biomarker collections typically range between £150 and £200 for a broad health panel, but this would be dependent on the number of biomarkers tested.[44]

There was discussion within the Group around the likelihood of costs falling over time, which could help the assessment become more accessible, and it was observed that not every player will want to have the assessment. However, the Working Group fully appreciates the cost remains a significant hurdle to be overcome.

In recognition of logistical challenges around cost and capacity, the Working Group considered that there may be ways to phase the introduction of the Brain Health Check during its rollout. Options that were discussed include starting with new players entering the Prem and PWR to establish their personal clinical baseline which future assessments can be compared against, or undertaking a pilot programme. There could also be commercial opportunities with sponsorships, and collaborations with universities.

The Group believes that securing external philanthropic funding would be useful in accelerating the rollout of the programme across both the Prem and PWR, but that this alone is unlikely to be the permanent answer in addressing the challenge of cost.

41 Unirad, April 2026

42 PureSports Medicine, Concussion Clinic; The Royal Buckinghamshire Hospital, Neurology Services

43 Akeso, Fees & Services

44 Swift Blood Tests, 14 October 2026; Superdrug, Blood Test Price List

Case Study
Cardiac Screening Programme

There is precedent for health screening in professional rugby players through the established cardiac screening protocols aiming to identify underlying cardiovascular risks and prevent sudden cardiac death.

Under current World Rugby guidelines, all players participating in sanctioned international tournaments and competitions are required to complete a comprehensive cardiac screening before playing. This includes a standardised cardiac questionnaire, a physical examination, and a recommended or mandated ECG, depending on the specific terms of participation for the competition.[45]

Before undergoing evaluation, players sign a consent form detailing the scope of the assessment, potential outcomes, and information should an abnormality be detected, supported by a recommended cooling-off period after signing. If screening uncovers a potential risk, the team physician is responsible for initiating secondary investigations, ideally in consultation with a specialist sports cardiologist. The final determination regarding a player's fitness to compete rests with the team physician and Union. Athletes identified as belonging to higher-risk cohorts are also considered for more frequent and detailed monitoring.

Outside of central World Rugby tournaments, it is recommended that players in domestic competitions and professional clubs undergo a tiered frequency assessment. Cardiac screening is recommended for all players under the age of 20, with repeat evaluations every two years. For players over 20, screening is recommended if they have not previously completed one, if previous assessments highlighted potential concerns, or if an athlete develops new clinical symptoms suggestive of cardiac disease.

In England, the charity Cardiac Risk in the Young (CRY) supports screening for England Rugby Football Union and all Prem Clubs in the men's game.[46]

Case Study
Richmond Rugby

Community programmes already established demonstrate that players and clubs actively welcome structured health monitoring when accessible. At Richmond Rugby, a club-wide cardiac screening initiative was set up in 2019, offering comprehensive heart health checks, including a clinical questionnaire, physical examination, and ECG, at a heavily subsidised rate of £60, compared to a typical commercial cost of £300.

The uptake showed a strong desire within the rugby community for objective health data. In its first year alone, the programme completed over 300 screenings for players and coaching staff. Despite the programme being paused during Covid, by January 2025, 1,000 screenings had been completed for club members. For the senior men's and women's teams, screenings usually take place on a training evening, with the medical team managing priority lists and communicating dates directly to the squads. The sustained success of the Richmond model suggests that there is demand amongst athletes to understand their personal health risks, even where it is not mandatory.[47]

45 World Rugby, Cardiac Screening Guideline

46 Cardiac Risk in the Young, Cardiac Screening in Sport

47 Richmond Heavies Foundation, Screening for senior men and women players: England Rugby, Richmond Rugby supporting heart health with 1000th screening, 23 January 2025

Case Study
Cardiff University Women's Rugby Football Club

While instrumented mouthguards are now mandatory during matches and contact training sessions in the elite men's and women's rugby games, their high uptake in other non-mandatory environments reiterates the keenness of athletes to have access to more data.

The Cardiff University Women's Rugby Football Club 1st XV have used instrumented mouthguards since the 2025/26 season in the national Super BUCS league.

Like in elite rugby, the governing mantra remains 'If in doubt, sit them out': should the matchday physiotherapist suspect a head injury, then a player is permanently withdrawn. Mouthguard data is also assessed during the match (in locations where a strong data connection can be established) and afterwards, to identify any players that have sustained an impact that breaches current World Rugby thresholds. The player and physio are informed and, at the earliest opportunity, consulted to decide on the most appropriate treatment modality.

This system has proven extremely popular, with unusually high compliance. Players report that the mouthguard data has been valuable in validating a diagnosis when they experience concussive symptoms, following a significant collision. This has been especially effective in disassociating any menstrual symptoms, which can cause confusion when attempting to diagnose a concussion. Players report feeling safer and adopt a more proactive approach to head health and general athlete welfare, despite the lack of requirement to use the technology.

Recommendation 2: Increase and Enforce the Number of Non-Contact Weeks Across the Calendar Year

It is generally recognised that a certain level of contact training is required to help players prepare for games and to reduce injury risk. However, throughout an athlete's career, repeated exposure to lower-level HAEs during routine training sessions, that are a more controllable environment compared with matches, contributes significantly to the neurological risk they face.

World Rugby themselves have acknowledged 'the importance of minimizing exposure to head impacts during training and match play' adding that 'this has become increasingly important as understanding in this area has evolved, with recent research suggesting the potential for long-term health consequences from such impacts in a dose-dependent manner…'[48]

> **Protecting long-term brain health requires proactive measures to reduce cumulative exposure in training environments alongside match-day interventions.**

Since October 2025, World Rugby has advised that players should have 12 weeks of non-contact time accumulated across the calendar year. This includes off-season, pre-season, injury breaks, bye-weeks and travel periods. During these weeks, players should not have matches or training drills involving live tackling, cleanout, live set-piece or opposed set-piece. Instrumented mouthguard data should not register any head acceleration events of more than 15g.[49]

However, guidance is not mandatory for clubs, and the Working Group heard evidence that non-binding guidelines are rarely effective in elite sport. Without formal regulation, clubs can potentially face intense pressure to maintain high-contact training loads, fearing that reducing contact will advantage their rivals.

The fact that there are guidelines, issued alongside a rationale, reflects that the governing body recognises the value and potential benefit it could offer players to limit exposure to HAEs. It also suggests that World Rugby believes the measure to be realistic and achievable, although they acknowledge it would require cooperation between clubs and Unions for international players.

While individual load management plans are valuable, they must operate beneath an overarching standard of care. There already exists a minimum amount of non-contact training time throughout the year, including five weeks of off-season leave and, in the Prem, the first week of pre-season return.

Other options could be to reduce the number of contact sessions per week or reduce the total time of contact training per week. From a regulatory perspective, and building on World Rugby's guidelines, regulating non-contact weeks appears the more achievable goal, at present. It is therefore recommended

48 World Rugby, World Rugby's Head Impact Monitoring Programme, 2023

49 World Rugby, Player Load Guidelines

that the minimum number of enforced non-contact weeks across the calendar year be increased for both the men's and women's game. Non-contact weeks are defined in line with World Rugby's definition in their Player Load Guidelines.[50]

Ideally this would mirror World Rugby's 12-week guidance, but it was recognised by the Working Group that there may be logistical and scheduling challenges, particularly for international players. However, increasing the number of weeks from what players are already entitled to, supported by updates to the game's regulations and/or player contracts, would ensure that all clubs adhere to changes and put them all on a level playing field, instead of fearing that unilateral action would put other teams at a competitive advantage.

This proposal builds on existing measures to better monitor and regulate training, including video recordings of contact training sessions and instrumented mouthguard data collection. Although there are many variables that cannot be controlled on matchday, where it is possible to make improvements in controlled environments such as training sessions, that should be enacted.

The recommendation is intended to set the scope and enforcement mechanisms of such a policy, but it would remain the responsibility of clubs, coaches and medical staff to determine the day-to-day operations, such as specific drills, contact intensity, and individualised player plans. By establishing a transparent, audit-backed enforcement model, rugby can ensure that training load limits deliver genuine protection for professional players across their entire careers.

Implementation and Enforcement

The key to delivering real risk reduction is through enforcement, and that may mean moving past clubs self-regulating to establish independent mechanisms for monitoring and compliance.

Enforcement should draw inspiration from international best practice, such as the video auditing system used in the NFL. In the Prem and PWR, contact training sessions must already be uploaded to a central database within 24 hours, meaning that independent player welfare auditors should be able to cross-reference this with player data from instrumented mouthguards to ensure the correct processes are being followed. Discrepancies between logged contact time and recorded head acceleration events would then trigger a follow-up review.

Effective enforcement mechanisms are required to maintain compliance by clubs, which would be in keeping with the agreement and regulations surrounding the training changes introduced in the 2026/27 season. Specific details around what those would look like and when they would be applied would need to be agreed by the governing bodies.

Player and Public Support

Current professional players raised concerns that players may not feel able to ask their coaches for a pause from the most intense training to protect their health during the early stages of their career. This would be dependent on the individual's relationship with their club, but players noted that for younger players wanting to make selection and prove themselves, it would be a very difficult conversation to have.

However, it was also the case that players are willing to adapt their training, with one player saying there is 'appetite…for sure'. In 2023, a survey from the Rugby Players Association found that 89% of players said

50 World Rugby, Player Load Guidelines

they wanted regulation of contact in training, reiterating that there is support for measures that better protect player welfare.[51]

> **"Reducing the accumulation of head impacts from both training and matches over the course of a rugby career needs to be at the forefront of every rugby governing body's thinking"**
> **Retired male Prem player**

This very high level of support for introducing rules around non-contact training amongst the playing community was mirrored in the Working Group's polling. 86% of the playing community said they support making the 12 weeks of training without full contact mandatory, with two in three expressing strong support. Only one respondent expressed any sort of opposition. When given the opportunity to write down further views, several retired players indicated that they felt moving from recommended to mandatory was the only way to drive implementation by clubs.

Upgrading the guidance to an enforceable regulation also received significant support from fans, with polling showing that 76% supported the idea of players having 12 weeks of non-contact training across a year, with only 4% opposed. Majorities of all sub-groups of fans were supportive of this proposal, underlining the broad base of positive feeling towards this proposed change.

Overall, it was clear there was a strong majority amongst both fans and the playing community to support this change.

51 BBC Sport, Prem clubs agree to limit contact in training, 6 March 2026

Recommendation 3: Enhance Data Sharing for Research Purposes

Thanks to measures introduced in recent years, more information is now being recorded, including from instrumented mouthguard data from training and matches, video recordings, and concussion history. World Rugby, the leagues and their academic partners have used this information to create one of the largest and most mature datasets in elite sport, which is welcome.

There are good examples of this data being used effectively. For example, one player described how his training was adjusted by his club's medical professionals as his mouthguard data showed he had experienced several weeks of particularly significant forces during head acceleration events in training, and so needed to ease up slightly to allow sufficient recovery. Likewise, beginning in the 2026/27 season, World Rugby uses centralised mouthguard data to identify outliers with high HAE exposure above a certain threshold over a three-week period of matches, and notifies clubs of such outliers for player management purposes. Players are, in turn, informed by their clubs.[52]

More generally, there were some inconsistencies about how much information players were able to see about their data which was recorded. Some clubs appeared much more forthcoming with sharing information with players, but most players that the Working Group spoke with had not seen anything, although they would have been interested if it had been offered.

> **However, the Working Group found there were gaps in how the data is being used, and believes that increased data sharing could enable more research, particularly using long-term data to identify wider patterns and trends. This could help players better understand their performance and potential risks, while improving wider understanding of the sport.**

When asked, players were not aware of any long-term analysis comparing their data from the current season to, for example, the previous season, or predictions based on wider analysis of what they might expect in the upcoming weeks and months. One player described how they had received some data which initially raised concerns, so their club tried to get in touch with others to get data for the same position, to see how it compared. Eventually they succeeded but this process took months, despite the data already being readily collected. However, timely interventions are required, and therefore data is needed quickly, in order for training changes to be most effective and to minimise potential stress and anxiety in the player, as is being seen with the introduction of World Rugby's HAE outlier process.

However, the players recognised the value of this data, and how it could be used effectively to improve understanding of both the wider sport, as well as their own experiences. One player said that where that data exists, it is 'so important' to look at it across their career. As the report considered earlier, players are also keen to have more of their data collected to improve their own understanding of their body and health.

52 World Rugby, Newsletter - Player Matters: The HAE Outlier Project, October 2026

Players also indicated a strong willingness to share their data externally to support research into the sport. One player said that she thought all the players at her club would be 'really happy to engage in that data sharing' specifically to help improve understanding of concussions and head injuries, which was echoed by other players in order to improve practices.

These views were also reflected in the survey of the playing community, where all of the current players surveyed reported being very comfortable sharing the data collected in these checks to help with scientific research. Amongst former players, 87% said they would be comfortable when asked hypothetically.

> **"Everyone at [my club] would also be keen to share data and improve the practices"**
> **Current PWR player**

This was particularly the case when it came to women's health and the impact of rugby on female bodies, where, as was discussed earlier in the report, academic research is less established relative to men. The female players the Working Group spoke to were especially keen to share their data to improve research in this space.

It is therefore recommended that in addition to the information that is already collected by World Rugby and the clubs, players are invited to contribute their anonymised, or pseudonymised, data into a secure central research dataset. The information from the Brain Health Check should also be included once rolled out.

Access to the data can then be made available to academic researchers and clinicians with appropriate authorisation. This would be subject to independent research governance, with decisions about research access, analysis and publication taken separately to clubs and governing bodies.

Existing academic partnerships and collaborations are welcome, including the recently announced BRAIN-SAFE (Brain Research for Adaptive Traumatic Injury: Simulation, Assessment, Forecasting & Education), a new national research hub led by Imperial College London.[53]

However, the Working Group noted from their own experiences that access to the player data currently collected by the RFU and World Rugby can be difficult to obtain for researchers at other institutions, potentially limiting how the data can be utilised to improve understanding and injury management.

The intention would be to support research into the relationship between rugby participation, cumulative head-impact exposure and long-term brain health, while preserving the confidentiality of individual clinical information. It could also help reduce fragmentation between individual assessments and research programmes, and support analysis across seasons and, where appropriate, across clubs and competitions.

This would be particularly beneficial for better understanding the impact of repetitive sub-concussive head acceleration events, where unlike concussions which are recorded, it is more difficult to measure and monitor long-term exposure. While concussion records are an essential part of player welfare monitoring, they cannot provide a complete account of head impact exposure and so better longitudinal data could help researchers examine these issues more systematically, including into retirement.

This approach should mirror the successful model adopted by the England and Wales Cricket Board (ECB).

53 RFU, BRAIN-SAFE | Advancing our understanding of brain injury, 12 November 2026

A member of the Working Group noted from their direct experience that the model keeps individual clinical information confidential while contributing anonymised data to a central research dataset, enabling valuable research to be undertaken while maintaining player trust and confidence in the process.[54]

Adopting a similar governance framework in rugby would allow anonymised clinical information, neuroimaging, biomarker and instrumented mouthguard data to be securely combined into a longitudinal dataset examining brain health in contact sport. Maintaining this balance between individual confidentiality and collective scientific benefit will be fundamental to safeguarding the future of both players and the sport.

Maintaining player confidence is essential to the success of the programme, and medical confidentiality remains the top priority. This would require robust independent protocols governing access to the dataset, permitted uses, retention, security and independent oversight. Access should be limited to appropriately authorised purposes, supported by a transparent process for assessing research requests and recording decisions.

Players would own their own data, but it would be the responsibility of the clubs to send it to the central database within an agreed time period. This is in line with existing requirements for male players that clubs must upload the video recordings of contact training sessions to a secure database within 24 hours of the relevant session.[55]

Players should also receive clear information about what data may be shared, how it will be anonymised, who may access it and the purposes for which it may be used. Additionally, there would be an opt-out system for any players who choose not to share this information for research purposes, however it must be explained that their data may still be used for clinical purposes by their club.

Although this enhanced data sharing would only apply to male and female elite players, the benefits are likely to extend beyond elite rugby. The evidence generated will improve wider understanding of how cumulative head acceleration exposure affects neurological health and help establish normative ranges for imaging, cognitive performance and biomechanical metrics. In time, these findings could inform safer coaching practices, improved understanding of how concussions in women differ from those in men, and refinements to return-to-play protocols and participation guidance across the wider rugby pathway, including community and age-graded rugby.

54 England and Wales Cricket Board, Privacy Notice Professional Players, January 2026

55 RFU, Men's Professional Rugby Board ("PRB") Regulations, effective from 1 September 2026


webb ellis

FUTURE OF THE GAME

The proposals put forward in this report are supported by the playing community and the public alike. But beyond having the potential to improve player welfare, they may also benefit the sustainability of the game itself.

If implemented, polling suggests that the changes could both attract new fans and solidify the interest of those already interested in the sport. Across all age groups, the public said the proposals would have a positive impact on their interest in the game, but this was particularly acute amongst young people, with 44% of 18-34-year-olds saying it would have a positive effect compared to just 9% who said it would be negative.

The changes would not only have a clear net positive impact on interest amongst both casual and non-current fans, increasing the audience of the game, but they would also be particularly effective at solidifying the interest of the most engaged fans. This group is ten times more likely to say the changes would have a positive impact on interest than a negative one. Over half of club rugby fans say the changes would have a positive impact on their interest, compared to just 5% who say the impact would be negative.

In addition to current rugby supporters, the recommendations may help to attract and keep the next generation of fans. A substantial majority of parents with children who are interested in rugby or already watch it would be more comfortable with taking them to watch live games if the proposals were implemented. This is especially pronounced where the child already watches rugby: here, 76% of parents say the changes would have a positive impact on their comfort in taking their child to attend. Of those whose children do not currently watch rugby, over half (51%) would be more comfortable taking their child to watch the sport live.

The Working Group's survey also suggests that these changes to the professional game would positively impact youth participation. This comes from increasing the comfort levels of parents of children already playing, or who have an interest in doing so. This suggests a 'signalling' effect, where seeing attention paid to welfare at the highest level shows that the game in general is making efforts on this.

> **These findings show that protecting player health does not come at the expense of rugby, but instead can support its long-term future by reinforcing existing fan support and ensuring a pipeline of future fans and elite talent.**

CONCLUSION

Rugby has made progress in recent years in introducing measures around concussion and long-term brain health. The steps taken to date to manage some of those risks are welcome, but there should be greater focus on the consequences of cumulative head acceleration events on players' brains, and the necessary, associated actions must be taken to reduce them wherever and whenever possible.

The recommendations that have been set out in this report have been designed to be ambitious but achievable. They focus on enhanced medical monitoring, better sharing of data to support research and enhanced contact training regulations. They do not affect the game on match day itself, protecting rugby as the sport that players and fans enjoy, while introducing practical measures that will improve understanding of the long-term consequences of rugby, and safeguard current and future players.

> **Just as the measures introduced by World Rugby and the RFU over the past decade are not the final end point, nor should the recommendations in this report be once implemented. As scientific evidence continues to emerge and our understanding of the relationship between rugby's physical demands and the short- and long-term effects on the brain improves, player welfare measures must continue to be kept under review and updated to ensure best practice is followed at all times.**

Rugby is a well-loved sport across the UK and across the world, but proactive risk management is necessary to protect the game and safeguard player welfare for the years and decades to come.

ANNEX

Meetings

The Working Group met on the following dates:

- 1 June 2026
- 29 June 2026
- 28 July 2026*
- 6 August 2026
- 30 September 2026
- 10 November 2026

* *denotes a workstream meeting, with a sub-group of the Working Group in attendance. In July, two workstream meetings were held: one to develop the brain health assessment recommendation, and the second to develop the player load recommendation.*

Evidence Session

On 30 September 2026, the Working Group held an evidence session with four current professional rugby players – two playing for clubs in the Prem, and two playing for clubs in the PWR. One athlete is also a current international player. It was agreed that the players would not be publicly identified so they could speak more openly.

The purpose of the evidence session was to hear directly from current professional players to ensure that the recommendations reflected their views. The Working Group was clear that any proposals they put forward must have the support of players and have a strong players' voice.

While a full transcript of the evidence session has not been made publicly available in order to protect the anonymity of the players, a summary of the key discussion points follows.

Session:

The session started by asking the players for their views on the current landscape of brain health in rugby, whether recent changes are working, and whether their concerns lie more in the short-term or long-term.

- Female Player A noted a lack of public understanding and significant stigma surrounding concussions. She highlighted that dual-career female players who balance jobs and/or studies alongside rugby face additional stress during recovery from concussions. She also pointed out that female-specific factors, such as overlapping symptoms with the menstrual cycle, complicate diagnosis. She emphasised that while short-term management of concussions is now well

managed through protocols, long-term effects and post-concussion syndrome are of greater concern to players as not being fully addressed or monitored.

- Female Player B echoed the challenges faced by women's players, stating that around 75% of players in the PWR work other jobs, meaning players worry about how a concussion will directly impact their livelihood. She praised smart mouthguards for improving objective monitoring, as players aren't required to self-identify whether a concussion might have occurred, but pointed out that ongoing monitoring is a challenge for female players as resources and medical staff presence vary across clubs. For example, women's teams may not have full-time medical staff, and while the men's team at her club receive specialised care packages following a suspected or diagnosed concussion, the women's team do not receive an equivalent due to budget limits.

- Male Player A stated that current players are the 'best looked after in history' due to data collection and shifting mindsets around head injuries. However, he noted that the increasing physical size and strength of players mean brain health remains a daily concern, with the biggest worry being the long-term, cumulative impact of repeated non-concussive head hits.

- Male Player B agreed that care and tracking have improved drastically, but expressed concern over the lack of measurable data, including a baseline, to monitor changes. He noted that players who suffer multiple concussions currently have no historic benchmark or baseline brain scans to determine if their long-term brain health is deteriorating over time. He added that while there is a good system for collecting data, it doesn't look ahead to the future.

Players were then asked whether they thought the differences in concussion management between the men's and women's programmes were primarily due to a lack of financial and medical resources in the women's game.

- Female Player A confirmed that resource gaps are the primary issue, particularly regarding contact time with medical staff as her team only has a doctor present once a week.

- It was noted that while instrumented mouthguards and session filming are mandatory across both games, the introduction of structured graduated return to contact protocols in preseason is required in the men's game but is not yet standard across the women's league.

Players were next asked what data players receive from their instrumented mouthguards, how clubs utilise it, and whether training load is altered based on high-impact data.

- Male Player A explained that he gets shown the data from the instrumented mouthguards, including the impacts and forces above a certain threshold in matches and training. Physios will then adjust his contact training if he has experienced a particularly heavy week, but that was at the discretion of the staff rather than a league-wide standard.

- Male Player B noted that training load adjustment varies by club culture: at his club, missing the more physical training sessions can negatively impact match selection. Data sharing wasn't common at his club, suggesting that it was down to the individual club what they shared with players.

- Male Player A added that there was a period when he was getting consistently high, alarming data, so the medical staff tried to get in touch with other clubs to ask them to share their data for the same position. While it took a while, there was eventually some collaboration between clubs to share this data.

- Female Player B added that at her club, mouthguard data is monitored to ensure compliance and can dictate selection, ensuring players wear the guard in training rather than keeping it in a sock or sports bra. This has helped to create a culture around wearing the gumshields in training as well as games.

The next question focused on whether players would support greater data-sharing for research to address the historical underrepresentation of women in brain trauma studies.

- Female Player B was very supportive, adding that she thought all the players at her club would be 'really happy' to engage in data sharing to improve care for players with concussion and brain injuries. She also noted that after a concussion, her teammates had often not displayed the typical symptoms or what they had been taught to recognise, with the symptoms more associated with hormonal responses. Medical teams have to be really switched on to be able to identify concussive symptoms, but there are risks the symptoms are dismissed as being tired or over-emotional. She stated more female-specific research is needed to improve recognition and recovery.

- Female Player A agreed that her teammates would also be keen to share data and improve the practices. She described how each of her concussions had displayed different symptoms, but there was often overlap with her menstrual cycle symptoms, making it difficult to identify whether she had been concussed or not. She added that her understanding was that a lot of World Rugby baselines were created using male data and often do not reflect the female experience.

This was followed by asking if players receive guidance on the long-term benefits of mouthguard data, and if clubs track longitudinal data across past seasons or during player transfers.

- Male Player A stated he has not received any long-term analysis of his data, although he would be eager to see it.

- Male Player B said he would like to have more of a look at his own data, but wasn't sure he would proactively initiate those conversations with medical staff as he hasn't identified any issues in his health or performance. If players do feel they have any issues, it should be more common to be able to see their data, especially given it relates to their own brain and health.

- Female Player B recognised the value of looking at data across a player's career, but thought that there would likely be more challenges in the women's game, due to many players being on volunteer contracts and changes across the league. She explained that when she had moved PWR clubs, she had requested her medical and performance data to be transferred to her new club but there wasn't a standardised process for this.

- Female Player A echoed that players in her club aren't shown their mouthguard data, but expressed interest in tracking it over a career. She added that there aren't long-term considerations but feels there should be, especially when players have received multiple concussions.

Players were next asked about what medical support is available to players suffering from persistent, long-term concussion symptoms, whether resources differ between men and women, and what single change players would most like to see.

- Female Player A shared that when dealing with lingering concussion symptoms, she was instructed to seek help independently through the NHS and her GP rather than receiving internal club specialist care, and felt like she had not received much support.

- Female Player B noted that her club is open about the difference in treatment and resources for the women's team compared to the men's, not only for head injuries but more broadly. For example, after suffering a concussion, the men get given daily supplements but the women's nutrition budget does not allow that option. When asked for the single most needed change, she cited education on female-specific symptoms so disoriented players are properly identified.

- Male Player B added that by comparison, when his teammate had persistent symptoms, he received considerable support including meeting with specialists and an individual recovery plan, recognising this was a big difference to the women's game.

- Female Player B said that education on female-specific symptoms for concussion is the biggest change she would like to see, because they are often different to what they have been taught. She added that unless the player was wearing the mouthguard, and the data could help identify whether it was a concussion, it can be very disorienting trying to navigate symptoms and identify the injury.

- Female Player A added that players would benefit from support for taking time off work, including financial assistance or help managing employers, so players do not face unpaid leave while recovering from rugby concussions.

Players were also asked if they would actually want to see their brain health data, or if there is fear that negative results could lead to being pulled off the field or forced into retirement.

- Female Player B stated that female athletes are 'hungry for more and more data.'

- Male Player A stated he would want to know, noting that if he saw clear evidence of brain health deterioration, he would seriously consider retiring.

- Male Player B agreed, but acknowledged a wider cultural barrier in rugby where some players prefer not to know so they can keep playing.

The session turned to asking for the players' perspective on introducing brain health checks (such as baseline MRI scans), specifically regarding their frequency and whether they should be mandatory or optional.

- Male Player B supported the use of MRI scans if that was the best piece of technology to use. He suggested that senior players would not want it to be mandatory and there could be pushback, particularly if they felt the damage had already been done and wanted to play for the final years in their career. But he added that it would be important for young players coming through to have a baseline, which future scans could be compared to. He thought that repeating assessments every two to three years, in line with cardiac screening, would give a good indication of how the brain was being affected.

- Male Player A expressed strong support for MRI brain checks with it being a 'fantastic idea', as players are 'always hungry for more data'. He noted that several players at his club have actively asked physios about accessing them.

- Female Player B emphasised that young female players entering the top tier are particularly vulnerable because they often jump straight from university or amateur setups, where contact is unmonitored, players are relatively less conditioned and neck strength may be lower, directly into elite matches against experienced internationals.

- Female Player A supported offering scans to players who want them, adding she would want one herself, but raised practical concerns of funding in the women's game, noting clubs cannot currently afford basic supplements, let alone MRI scans, without external financial backing.

Players were then asked for feedback on introducing a mandatory 12-week non-contact period to limit head impact exposure during the year.

- Female Player B stated that implementing a fixed 12-week block would be logistically difficult in the women's game due to complex, overlapping international and club calendars that are secondary to the men's schedule.
- Male Player B voiced concern that removing contact completely for 12 weeks could actually increase concussion risk upon return, as players' tackling and contact techniques would degrade without practice. He suggested 12 weeks of reduced contact is beneficial for brain health, but total removal from contact drills for that duration is unworkable in professional rugby.
- It was then clarified that the proposed 12 weeks refers to cumulative, tailored limits on contact volume across a calendar year and includes the preseason and season (including mandatory rest weeks), rather than a single 12-week block.
- Male Player A noted that around 89% of players in a recent RPA survey favoured regulating contact training volume, adding that there is appetite to adapt training.

The female players were asked if breast health and impact protection are discussed or monitored within women's rugby clubs.

- Female Player B explained that breast health is not part of mandatory league-wide protocols, but depends on individual club initiatives. She noted some clubs partner with specialised bra brands to measure, educate, and fit female players with high-impact sports bras as part of their official kit package.

The final question asked if players would feel empowered to tell their club they need more time away from contact training without fearing for their selection or career.

- Both male players stated that they had good relationships with their clubs and were senior enough that they would feel comfortable having that conversation, but conceded that younger players with fewer caps might not have the confidence to speak up.
- Female Player A agreed that young players entering the environment are eager to prove themselves and would find it very difficult to ask for time off due to fear and stigma.
- Female Player B added that part of what the RPA is actively working on is to educate and empower younger players on their rights and how to manage those conversations, as a lot of them are on volunteer contracts, recognising that those conversations can be intimidating.

Polling Methodology

The Working Group commissioned Stack Data Strategy, an independent research consultancy that is a member of the British Polling Council, to field surveys among the professional rugby-playing community, British rugby fans, and the wider public. The surveys were designed to explore player experience, general perceptions on the importance of head injuries in the professional game, awareness of efforts to address these, and reactions to potential changes to reduce the number of head injuries/concussions and their long-term consequences.

The survey of 5,479 members of the wider British public was conducted online from 28 September 2026 to 12 October 2026. Quotas were set to ensure results are representative on age, gender, region, education and past voting behaviour. The overall sample incorporates an additional 'boost' sample of rugby watchers, to bring the total number of rugby watchers surveyed to 1,501. This group was then downweighted to reflect the national incidence observed prior to collecting the boost. Rugby watchers were further qualified by the degree of fandom, from the avid follower (those who watch 'as much as they can' or 'regularly' watch and follow the game) through to the more casual watcher (those who enjoy watching 'but don't follow closely' or who 'occasionally' watch but with low interest).

The playing community survey was programmed online and distributed to contacts in the professional and ex-professional community. The survey was designed to be easily forwarded on to other contacts within this community (a method known as 'snowball sampling'). Across former and current players, there were 68 responses to at least one question. This included ten current or recently retired players and 56 who had retired more than five years ago. As would be expected with a survey carried out during the season, completion is relatively low amongst currently active players. However, the results offer a useful snapshot of opinion within the playing community, as even those who have been retired for a longer period are likely to be well connected with current players.

A further limitation to bear in mind is the low number of completes from within the women's game, as there were only five responses from female current or former players. However, it should be noted that this information was collected at the end of the survey, a point at which some respondents had already exited the survey.

The data tables for the Fans Survey and the Playing Community Survey can be accessed at Stack Data Strategy.

Terms of Reference

The Terms of Reference were agreed to by the Working Group on 29 June 2026.

1. Purpose of the Review

1.1. The Drake Foundation has invested over a decade and more than £2 million to investigate the link between head impacts and long-term brain health in elite rugby. The scientific findings have strengthened the evidence base regarding long-term brain health risks but have not yet translated into the systemic policy changes intended to improve player welfare.

1.2. The Drake-Barclay Working Group has been established by the Drake Foundation as an advisory panel to understand the barriers to policy adoption and to recommend practical, evidence-led policies for the sport.

2. Scope and Remit

The Working Group will operate within a defined scope to ensure targeted delivery.

2.1. In Scope

The Working Group will focus its assessment and recommendations on:

- Elite professional men's and women's rugby union, focusing on England but may extend to the devolved nations, and with reference to World Rugby's international rules where relevant.
- The effect of both concussive and sub-concussive impacts, and their cumulative long-term effects.
- Policies are to be measurable governance interventions that governing bodies can easily monitor and enforce.
- Recommendations will be tested with players and fans, and could include surveys, polling and focus groups.

2.2. Out of Scope

To maintain technical credibility and avoid duplicating existing work, the following are explicitly excluded from the review:

- Recommendations centred on protective equipment, headgear, or tech-based physical interventions (for example, impact-absorbing shields).

- Recommendations unsupported by a credible evidence base or clear implementation rationale.
- New scientific studies will not be commissioned, nor policy recommendations be delayed on the grounds that more research is required, unless the existing evidence base genuinely demands it. This restriction does not preclude stakeholder engagement activity, including polling, focus groups, or consultation exercises intended to test the feasibility and acceptability of proposed recommendations.
- The implementation of any recommendations arising from the report will remain the responsibility of the relevant governing and regulatory bodies.

3. Core Philosophy

3.1. The Working Group proceeds from an explicitly pro-sport position. Its core objective is to protect the players while simultaneously protecting the game.

3.2. The review accepts that rugby union is, and should remain, a contact sport. No recommendation will be made if its primary effect would be to undermine the commercial viability or fundamental character of the game at the elite level.

4. Deliverables

4.1. The final output of the Working Group will be The Drake-Barclay Report. The report will contain a set of actionable policy recommendations, supported by implementation considerations and relevant evidence.

4.2. The report and its subsequent communications strategy will be framed to speak credibly and directly to its key stakeholders:

1. The Rugby Governing Bodies: the RFU and World Rugby.
2. Government: The Department of Health and Social Care (DHSC) and the Department for Culture, Media and Sport (DCMS).
3. The Rugby Community: players, supporters, and families.

4.3. The final report will be reviewed by the Working Group and approved for publication by the Co-Chairs.

5. Timeline

The Working Group will operate over an indicative 16-week period, subject to change, with four phases:

- Stage 1: Framing and Evidence Review – Establishing the baseline evidence and aligning group priorities.
- Stage 2: Policy Options – Drafting possible interventions.
- Stage 3: Polling and Focus Groups – Commissioning supplementary opinion research among players and supporters to test feasibility and stakeholder support.

- Stage 4: Final Recommendations and Launch – Finalising and publishing The Drake-Barclay Report.

6. Governance and Operations

6.1. The Working Group will be co-chaired by James Drake and Steve Barclay MP. Its membership will comprise independent experts across clinical neuroscience, sports governance, public policy, and professional rugby union representation.

6.2. Ways of Working

- Meetings: The Working Group will meet at agreed points, with meetings to be held in person with virtual attendance available for those unable to join. The project is expected to take 16 working weeks from the first meeting on 1 June 2026, but this timeline may be extended due to the summer period and members' existing diary commitments.
- Decision-Making: The Working Group will aim for consensus on all major recommendations. Where consensus cannot be achieved, the final decision will be taken by the Chairs, with dissenting views noted in the report appendix if required.
- Secretariat: Administrative support, minutes, and drafting coordination will be provided by the Drake-Barclay Secretariat.
- Conflicts of Interest: Members will declare any relevant professional, financial, or institutional conflicts of interest to the Chairs and Secretariat.
- Confidentiality: To facilitate open, honest, and rigorous debate, all proceedings and draft options will be conducted under the Chatham House Rule. Members will not speak to the media or publish external comments regarding the internal deliberations of the group prior to the official launch of the final report.



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