The Irish Rugby Injury Surveillance Project

All-Ireland League Amateur Club Rugby

2018-2019 Season Report

University of Limerick
Ollscoil Luimnigh

IRFU

Authored by the Irish Rugby Injury Surveillance (IRIS) Project Steering Group

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The authors would like to acknowledge with considerable gratitude, the work of the doctors, physiotherapists and club staff involved with the IRIS clubs who have recorded injury information throughout the project.

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Irish Rugby Football Union Foreword

The IRFU welcomes the second Irish Rugby Injury Surveillance report which has been compiled by the University of Limerick. This report provides data from a significantly greater number of teams. The report compares 2018/19 season results with those from the 2017/18 season enabling us to begin to see trends. The data are vital to enable the IRFU to assess trends and to guide in the prevention and management of injuries.

I wish to thank all the clubs, data collectors and researchers for all the work that has been necessary to produce this second report. The IRFU is committed to ongoing longitudinal research to further enhance our understanding of the incidence, nature and severity of injuries in the adult game.

Dr. Rod McLoughlin

Irish Rugby Injury Surveillance Foreword

The Irish Rugby Injury Surveillance (IRIS) project involves research stemming from ongoing sports performance, injury prevention and psychological preparation work by University of Limerick academics across a range of sports, as well as our specific expertise in Rugby Union. It has effectively brought together academics with expert practitioner experience from the fields of biomechanics, medicine, mathematics and statistics, physiotherapy, physiology, sport psychology, and strength & conditioning as well as three doctoral researchers. This holistic approach to injury surveillance and prevention is central to the project.

Comprehensive injury surveillance systems in amateur Rugby Union are rare and this innovative project to date has involved the research, design and implementation of an online injury recording platform. Collection has now been completed of a second season's data and this 2018/19 season report documents our collaborative work with the IRFU, and with 32 male and female All-Ireland League Clubs. It represents 644 matches, over 1150 players, and support from dedicated data injury recorders, coaches, doctors, physiotherapists, managers and ancillary staff within clubs: thank you. The IRIS project included the addition of schools surveillance for Senior Cup (reported separately), and in the future IRIS will also report on the incidence, nature and severity of injuries in School Junior Cup, and underage amateur Rugby.

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1.0 Executive Summary

1.1 Match Injuries

Starting in September 2018, the Irish Rugby Injury Surveillance (IRIS) project collected one full season of injury data across 644 matches from 32 men's and women's amateur Rugby clubs.

Men's AIL

- There were 25 men's clubs involved in the IRIS Project (10 Division One, 15 Division Two clubs).
- There was a total of 959 male players registered in the IRIS Project (410 Division One, 549 Division Two players).
- **The overall match time-loss injury incidence rate for males was 47.2/1,000 player hours.**
    - This is slightly lower than the overall match time-loss injury incidence rate for males during the 2017-2018 season (49.7/1,000 player hours).
    - The match time-loss injury incidence rate for Division One males was 42.8/1,000 player hours.
    - The match time-loss injury incidence rate for Division Two males was 50.3/1,000 player hours.
- A single male player would have to play 15 matches to sustain one injury.

Women's AIL

- There were 7 women's clubs involved in the IRIS project (5 Women's AIL, 2 Women's league).
- There was a total of 195 female players registered in the IRIS Project.
- **The overall match time-loss injury incidence rate for females was 27.7/1,000 player hours.**
    - This is lower than the overall match time-loss injury incidence rate for females during the 2017 - 2018 season (46.2/1,000 player hours).
- A single female player would have to play 27 matches to sustain one injury.

1.2 Training Injuries

There was a total of 121 training injuries reported in the men's clubs.

- This is higher than the total number of training injuries reported in the 2017-2018 season (85 training injuries).
- There was a total of 51 training injuries in Division One men's clubs.
- There was a total of 70 training injuries in Division Two men's clubs.

There was a total of 11 training injuries reported in the women's clubs.

- This is lower than the total number of training injuries reported in the 2017-2018 season (16 training injuries).

1.3 Injury Occurrence

The most commonly reported match injuries for the men's clubs were concussion (11%), followed by ankle ligament sprains (9%). Concussion injuries resulted in an average of 26 days absence from Rugby match or training activities, while ankle ligament sprains resulted in an average of 47 days absence.

The most commonly reported match injuries for the women's clubs were concussion (19%) and ankle ligament sprains (12%). Concussion injuries resulted in an average of 30 days absence from Rugby match or training activities, while ankle ligament sprains resulted in an average of 43 days absence.

1.4 Injury Event

The tackle event accounted for the majority of match and training injuries, with 59% of all injuries happening during the tackle. The tackler was at a slightly increased risk of injury with 52% of the tackle-related injuries due to tackling as opposed to being tackled (48%).
However, during the 2017-2018 season, the ball carrier (being tackled) was at a slightly increased risk with 54% of the tackle-related injuries.

1.5 Playing Position

Of all match injuries recorded in the men's clubs, 61% were to the forwards (position no. 1-8), while 39% were to the backs (position no. 9-15). The hookers (no. 2) had the highest proportion of injuries with 11% of all injuries. In comparison, the openside flankers (no.7) had the highest proportion of match injuries during the 2017-2018 season (11%).

Of all match injuries recorded in the women's clubs, 60% were to the forwards (position no. 1-8), while 40% were to the backs (position no. 9-15). The second rows (no. 4) had the highest proportion of match injuries with 16% of all injuries. In comparison, the inside centres (no.12) had the highest proportion of match injuries during the 2017-2018 season (18%).

1.6 Injury Burden (number x time lost per injury)

The burden of an injury assesses the frequency of an injury in relation to the severity of the injury (measured as the number of days absent).

Ankle ligament sprains carried the highest injury burden and accounted for 9% of all match injuries in the men's clubs. Ankle ligament sprains resulted in an average of 47 days absence from Rugby match or training activities.

Concussions carried the highest injury burden and accounted for 19% of all match in the women's clubs. Concussions resulted in an average of 30 days absence from Rugby match or training activities.

2.0 Introduction

2.1 The IRIS Project

The Irish Rugby Injury Surveillance (IRIS) project has developed and implemented the first long-term Rugby Union specific injury surveillance system within amateur Rugby Union in Ireland. This system monitors the incidence, type, nature and severity of both match and training injuries occurring across the amateur game in Ireland. By monitoring this information, injury trends may emerge which will aid in the development and implementation of future evidence-based injury prevention strategies in order to minimise injury risk and enhance player welfare.

IRIS Aims:

- To develop and implement an injury surveillance system for amateur Rugby Union in Ireland.
- To monitor the incidence and type of injuries occurring and identify any possible injury risk factors.
- To enhance the health and welfare of Rugby Union players by using this information to assist the IRFU policy regarding injury prevention strategies.

2.2 Injury Definitions

The IRIS project follows the guidelines from the World Rugby 'Consensus statement on injury definitions and data collection procedures for studies of injuries in Rugby Union'.[1]

An injury is defined as "Any physical complaint, which was caused by a transfer of energy that exceeded the body's ability to maintain its structural and/or functional integrity that was sustained by a player during a Rugby match or Rugby training, irrespective of the need for medical attention or time-loss from Rugby activities."

A recurrent injury is one of the same site and same type as the original injury and occurs after the player has made a full return to match play following the original injury.

Both time-loss and medical attention injuries have been monitored and analysed separately. Medical attention injuries are any injury that resulted in 0-1 days absent from Rugby match or training activities (i.e. slight injuries). Any injury that results in greater than 1 day absence from match or training activities is classed as a time-loss injury and categorised according to injury severity. Only these injuries were included in injury incidence calculations. [1]

Injury severity is calculated as the number of days that elapsed from the date of injury to the date of the player's return to full participation in training and availability for match selection.

Injury severity is classified as;
slight (*0-1 days*), minimal (*2-3 days*), mild (*4-7 days*), moderate (*8-28 days*) and severe (*>28 days*).

Match injury data are presented as the number of injuries per 1,000 player hours of match exposure. In order to calculate match injury incidence rates, the following calculation was used:

Team match injury incidence rate (IR):

$$IR = \frac{\text{number of injuries}}{\text{number of matches x number of players (15) x match duration (1.33)}} \times 1000$$

[1] Fuller, C. W., Molloy, M. G., Bagate, C., Bahr, R., Brooks, J. H., Donson, H., Kemp, S. P., McCrory, P., McIntosh, A. S., Meeuwisse, W. H., Quarrie, K. L., Raftery, M. & Wiley, P. 2007. Consensus statement on injury definitions and data collection procedures for studies of injuries in Rugby Union. Br J Sports Med, 41, 328-31.

2.3 Recruitment

At the beginning of the 2018-2019 season, the IRIS team recruited 17 additional clubs from the men's and women's AIL and women's league. These clubs joined the 19 clubs involved in the IRIS Project during the 2017-2018 season. The men's AIL is split into two divisions; Division One (Men's AIL 1) and Division Two (Men's AIL 2).

The IRIS project had an 89% compliance rate for the 2018-2019 season, similar to the 90% compliance rate during the 2017-2018 season.

The participating clubs are shown in Table 1.

Table 1: : The IRIS clubs 2018-2019

	Men's AIL	Women's Rugby
Number of clubs	25 (*Division One = 10; Division Two = 15*)	7 (*AIL = 5; League = 2*)
Number of players	959 (*Division One =410; Division Two = 549*)	195 (*AIL = 160; League = 35*)

Each club nominated an 'injury recorder', who was trained on the use of the IRIS online system during the pre-season training of the 2018-2019 season. In the majority of clubs, the physiotherapist or doctor to the Senior 1XV acted as the injury recorder. Each injury recorder was given a secure and confidential login to their own clubs home-page on the IRIS system. Each club registered all players involved with the Senior 1XV on the IRIS system. Beginning with the start of the Rugby season in September 2018, the injury recorder documented all injuries occurring to the Senior 1XV male or female team. The injury recorders also reported when a player returned to play so that injury severity data could be calculated.

3.0 Match Injuries

3.1 Overall Time-loss Match Injuries

For the 2018-2019 season, data from 32 clubs across 664 matches were collected.

A total of 585 match time-loss injuries (any injury resulting in more than 1 days absence from Rugby match or training activities) were recorded. Any injuries resulting in 0-1 days absence from Rugby match or training activities (slight injuries) were classified as 'medical attention injuries' and were not included in the analysis of time-loss injuries, as per international best practice. [2]

The overall team match time-loss injury incidence rates:

- Men's teams – 47.2/1,000 player hours.
- Women's teams – 27.7/1,000 player hours.
- This is approximately one time-loss injury per match for the men's teams and every second match for the women's teams.
- A single male player would have to play 15 matches to sustain one injury.
- A female player would have to play 27 matches in order to suffer one injury.

Table 2 shows the overall team match time-loss injury incidence rate for the division one men's clubs (Men's AIL 1), the division two men's teams (Men's AIL 2) and the women's clubs (Women's Rugby).

Table 2: Match time-loss injuries (excluding 'slight' injuries).

Division	No. Clubs	No. Players	No. Matches	Exposure hours	No. Injuries	IR*
Men's AIL 1	10	410	228	4560	195	42.8
Men's AIL 2	15	549	331	6620	333	50.3
Overall men's	25	959	559	11180	528	47.2
Women's Rugby	7	195	103	2060	57	27.7
Overall women's	7	195	103	2060	57	27.7

***IR** – Incidence rate per 1,000 player hours.

- 15% of match time-loss injuries required medical investigation and/or imaging.
- 6% of match time-loss injuries resulted in surgical intervention.
- 2% of match time-loss injuries required an ambulance transfer from the pitch.
- 2% of match time-loss injuries required pitch-side suturing.

[2] Fuller, C. W., Molloy, M. G., Bagate, C., Bahr, R., Brooks, J. H., Donson, H., Kemp, S. P., McCrory, P., McIntosh, A. S., Meeuwisse, W. H., Quarrie, K. L., Raftery, M. & Wiley, P. 2007. Consensus statement on injury definitions and data collection procedures for studies of injuries in Rugby Union. Br J Sports Med, 41, 328-31.
Williams, S., Trewartha, G., Kemp, S. & Stokes, K. 2013. A meta-analysis of injuries in senior men's professional Rugby Union. Sports Med, 43, 1043-55.

3.2 Match Injury Classification

The injury diagnosis refers to the specific bodily location alongside the nature of the injury.

The most common injury diagnosis for the men's clubs was concussion, followed by ATFL (anterior talo-fibular ligament) ankle sprains, accounting for 11% and 9% of all time-loss match injuries respectively.

Similarly, the most common time-loss match injury diagnoses for the women's clubs were concussion (19%) and ATFL sprains (12%).

Tables 3 and 4 shows the top three most common specific match time-loss injury diagnosis for all the men's and women's clubs for the current season (2018-2019) and season one (2017-2018).

Table 3:[3] Overall most common injury diagnoses for all men's clubs; 2018-19 VS 2017-18 (IR/1,000 player hours, %of injuries)

Men's AIL	
2018-2019	**2017-2018**
Concussion 5.3 (11%)	Concussion 6.1 (12%)
ATFL Sprains 4.1 (9%)	ATFL Sprains 5.7 (11%)
Hamstring Strains 3.9 (8%)	Hamstring Strains 4.1 (8%)

Table 4:[3] Overall most common injury diagnoses for all women's clubs; 2018-19 VS 2017-18 (IR/1,000 player hours, %of injuries)

Women's Rugby	
2018-2019	**2017-2018**
Concussion 5.3 (19%)	ATFL Sprains 5.1 (11%)
ATFL Sprains 3.4 (12%)	Concussion 5.1 (11%)
Knee MCL Sprains 2.9 (11%)	Rotator Cuff Strains 3.2 (7%)

[3] An 'ATFL sprain' (anterior talo-fibular ligament sprain) refers to a tear of the ligament located on the outside of the ankle joint. It is also called an inversion sprain or lateral ligament sprain.
A 'hamstring strain', refers to a tear of the muscle group located on the back (posterior aspect) of the thigh.
A 'knee MCL sprain' (medial collateral ligament) refers to a tear of the ligament on the inner part (medial aspect) of the knee joint.
A 'rotator cuff strain', refers to a tear of any of the four tendons that surround the shoulder joint.

Table 5 shows the top three most common specific match time-loss injury diagnosis for each of the men's divisions (Division One and Division Two) during the 2018-2019 season.

Table 5:[4] Most common injury diagnoses for the men's Division One and Division Two 2018-2019 (IR/1,000 player hours, %of injuries)

Men's AIL 1	Men's AIL 2
Concussion 5.7 (13%)	Concussion 4.9 (10%)
Hamstring Strains 3.9 (9%)	ATFL Sprains 4.8 (10%)
ACJ Sprains 3.5 (8%)	Hamstring Strains 3.6 (7%)

[4] A 'hamstring strain', refers to a tear of the muscle group located on the back (posterior aspect) of the thigh.
An 'ACJ sprain' (acromio-clavicular joint sprain) refers to a tear of the ligaments that connect the collar bone (clavicle) to the shoulder (glenohumeral joint).
An 'ATFL sprain' (anterior talo-fibular ligament sprain) refers to a tear of the ligament located on the outside of the ankle joint. It is also called an inversion sprain or lateral ligament sprain.

The shoulder was the most commonly injured bodily location in the men's clubs, accounting for 14% of all injuries, while the knee was the most commonly injured bodily location in the women's clubs, accounting for 23% of all injuries.

Tables 6 and 7 show the most common diagnoses for each commonly injured bodily locations.

Table 6:[5] Men's AIL: Most common injury diagnoses with regards body location (IR/1,000 player hours, % of injuries)

Location	Diagnosis
Shoulder 6.6/1,000 player hours (14%)	ACJ Sprain 2.9 Rotator Cuff Strains 1.9 GHJ Dislocations 0.9
Knee 6.0/1,000 player hours (13%)	MCL Sprains 1.4 Contusions 0.9 ACL Ruptures 0.8
Head 5.9/1,000 player hours (12%)	Concussion 5.3 Laceration 0.3 Contusions 0.3

Table 7:[5] Women's clubs: Most common injury diagnoses with regards body location (IR/1,000 player hours, % of injuries)

Location	Diagnosis
Knee 6.3 (23%)	MCL Sprains 2.9 ACL Ruptures 1.5 Contusions 1.0
Head 5.8 (21%)	Concussion 5.3 Perforated Eardrum 0.5
Ankle 3.9 (14%)	ATFL Sprains 3.4 Peroneal Tendon Strain 0.5

[5] An 'ACJ sprain' (acromio-clavicular joint sprain) refers to a tear of the ligaments that connect the collar bone (clavicle) to the shoulder (glenohumeral joint).
A 'rotator cuff strain', refers to a tear of any of the four tendons that surround the shoulder joint.
A 'GHJ dislocation' (gleno-humeral joint dislocation) refers to the separation of the upper arm bone (humerus) from the shoulder socket (glenoid fossa).
An 'MCL sprain' (medial collateral ligament sprain) refers to a tear of the ligament on the inner part (medial aspect) of the knee joint.
A 'haematoma/contusion' refers to a bruise located anywhere on the body.
An 'ACL rupture' (anterior cruciate ligament rupture) refers to a complete tear of the ligament inside the knee joint.
A 'laceration' refers to a cut located anywhere on the body.
A 'perforated eardrum' is a hole or small tear in the eardrum.
An 'ATFL sprain' (anterior talo-fibular ligament sprain) refers to a tear of the ligament located on the outside of the ankle joint. It is also called an inversion sprain or lateral ligament sprain.
A peroneal tendon strain refers to a tear of the muscle tendon on the outer part of the ankle joint.

3.3 Timing of Match Injury

The 4th quarter had the highest number of injuries for both the men's and women's teams.

A small proportion of injuries occurred during match play where the exact timing of injury was unknown (1.3/1,000 player hours in the Men's AIL and 0.5/1,000 player hours in the Women's Rugby).

During the 2018-2019 season the men's clubs saw an increase in injuries towards the 4th quarter of the match. This differs from the peak in injury incidence during the 3rd quarter last season (2017-2018). Figure 1(a) shows the timing of match injury for the men's clubs comparing this season (2018-2019) to season one (2017-2018).

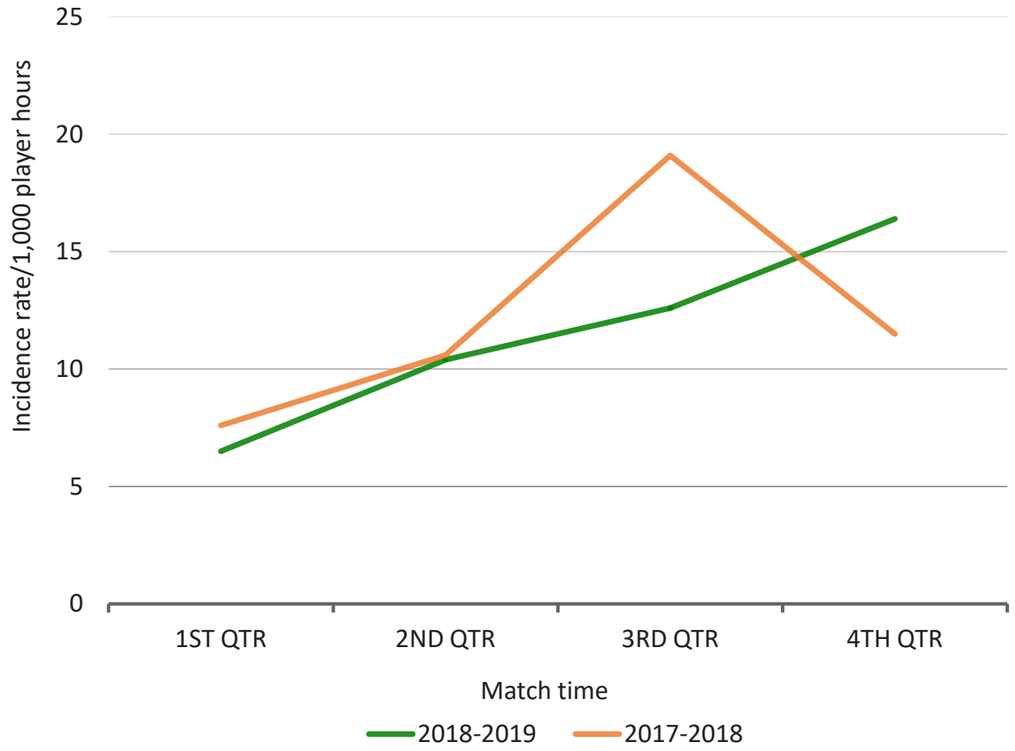

Figure 1(a): Timing of injury during match play for men's clubs (IR/1,000 player hours)

During the 2018-2019 season the women's clubs saw an increase in injuries in the 2nd quarter of the match, which was similar during the 2017-2018 season. During both seasons, the women's injury incidence plateaued after the 2nd quarter, however there was a slight increase towards the 4th quarter observed during the current season (2018-2019). Figure 1(b) shows the timing of match injury for the women's clubs comparing this season (2018-2019) to season one (2017-2018).

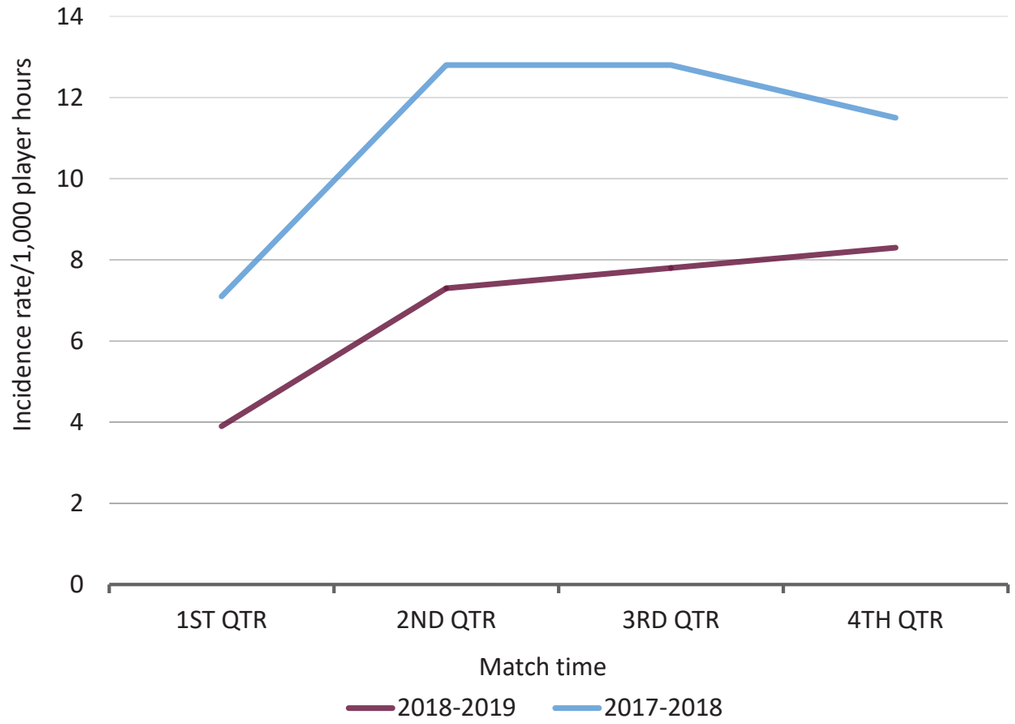

Figure 1(b): Timing of injury during match play for the women's clubs (IR/1,000 player hours)

3.4 Match Injury Event

Figure 2 shows the event surrounding the occurrence of an injury.

The tackle event was the most common injury event across both the men's and women's clubs. As per the 2017-2018 Season One Report, the women's clubs had a higher rate of injuries when being tackled than when tackling. However, in contrast to the 2017-2018 Season One Report, the men's clubs reported a higher rate of injuries to the tackler compared to the ball carrier in this season's report.

Similar to the 2017-2018 Season One Report, the men's clubs had a higher incidence of non-contact injuries (i.e. running in open play) than the women's clubs. The women's clubs had a higher incidence of injuries occurring in the ruck than either of the men's divisions.

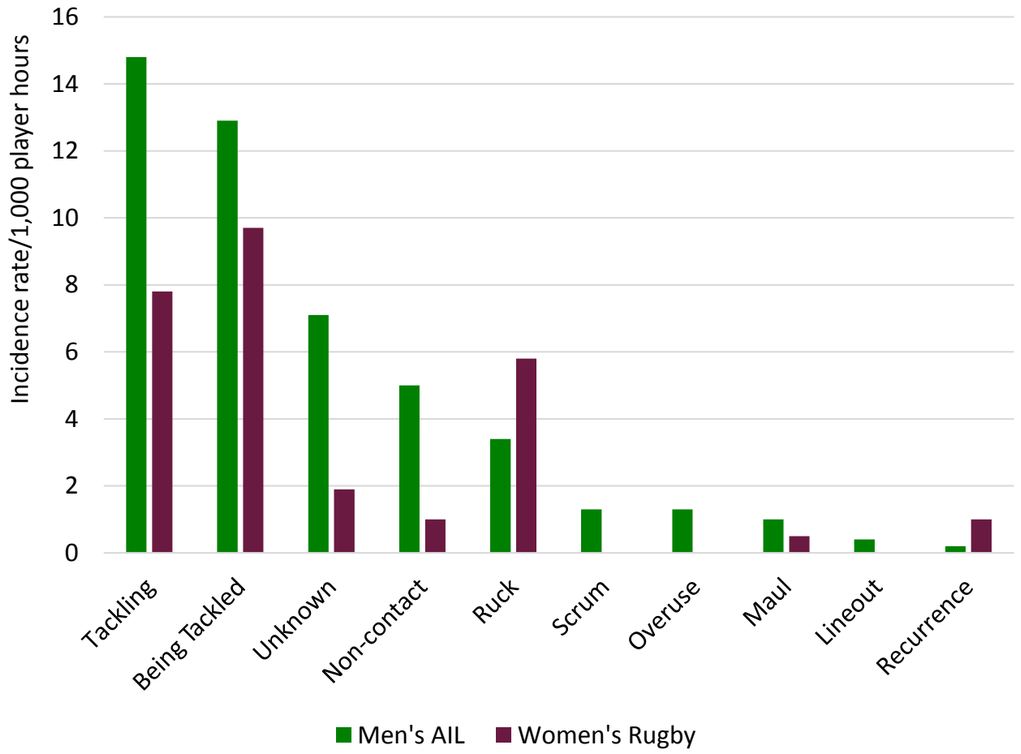

Figure 2: Injury event (IR/1,000 player hours)

3.5 Nature of Match Injury

The nature of injury refers to the type of injury occurring.

Strains (referring to muscle or tendon tears) were the most common injury type for the men's clubs, followed by sprains (referring to ligament tears), which was also the case during the 2017-2018 season. Sprains were the most common injury type for the women's clubs, with significantly less strains reported than the men's clubs during the current season (Figure 3).

During both the current season (2018-2019) and last season (2017-2018), sprains were the most common injury type for women, with a higher rate of sprains recorded compared to the men's clubs. However, in comparison to the 2017-2018 season, the males had a higher incidence of fractures compared to the females

The column labelled 'Other' refers to bursal injuries (men's 0.2/1,000 player hours; women's 0.5/1,000 player hours), labral injuries (men's 0.4/1,000 player hours), hyperextension injuries (men's 0.3/1,000 player hours) and meniscal injuries (men's 0.2/1,000 player hours).

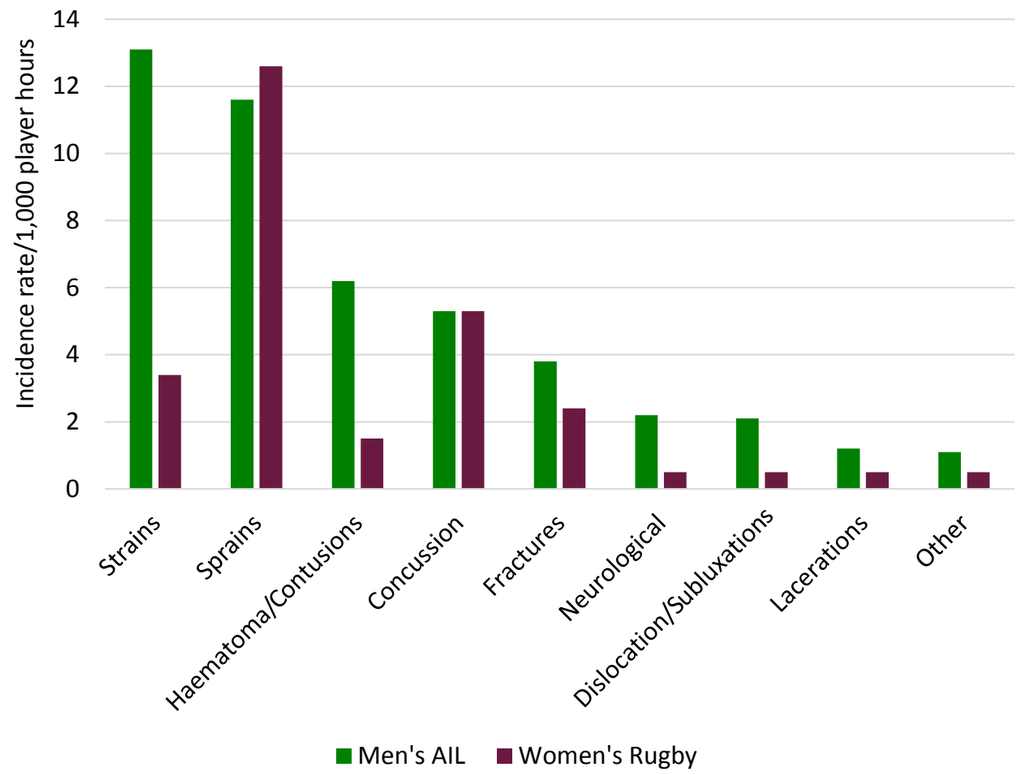

Figure 3: Nature of injury (IR/1,000 player hours)

3.6 Body Location of Match Injury

Similar to the 2017-2018 season, the shoulder was the most commonly injured area in the men's clubs. This was followed by the knee and head during the 2018-2019 season. Ankle injuries were the fourth most common location for an injury, unlike last season where they were the second highest injury location (IR: 6.3/1,000 player hours in 2017-2018).

Figure 4(a) shows the incidences of injury according to bodily location for the Men's AIL

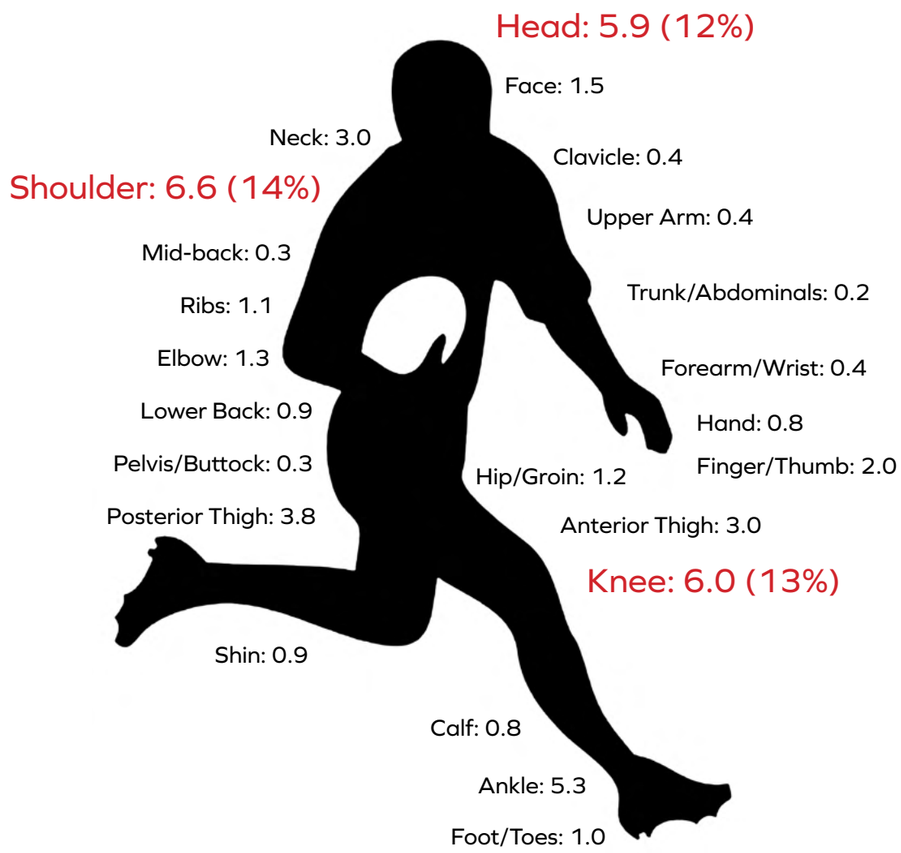

Figure 4(a): Location of injury for the Men's AIL (IR/1,000 player hours)

The knee was the most commonly injured area in the women's clubs, an increase from the 2017-2018 season where it was the fifth most common location of injury (IR: 4.5/1,000 player hours in 2017-2018). The head and ankle were the second and third most commonly injured locations.

Figure 4(b) shows the incidences of injury according to bodily location for the Women's Rugby

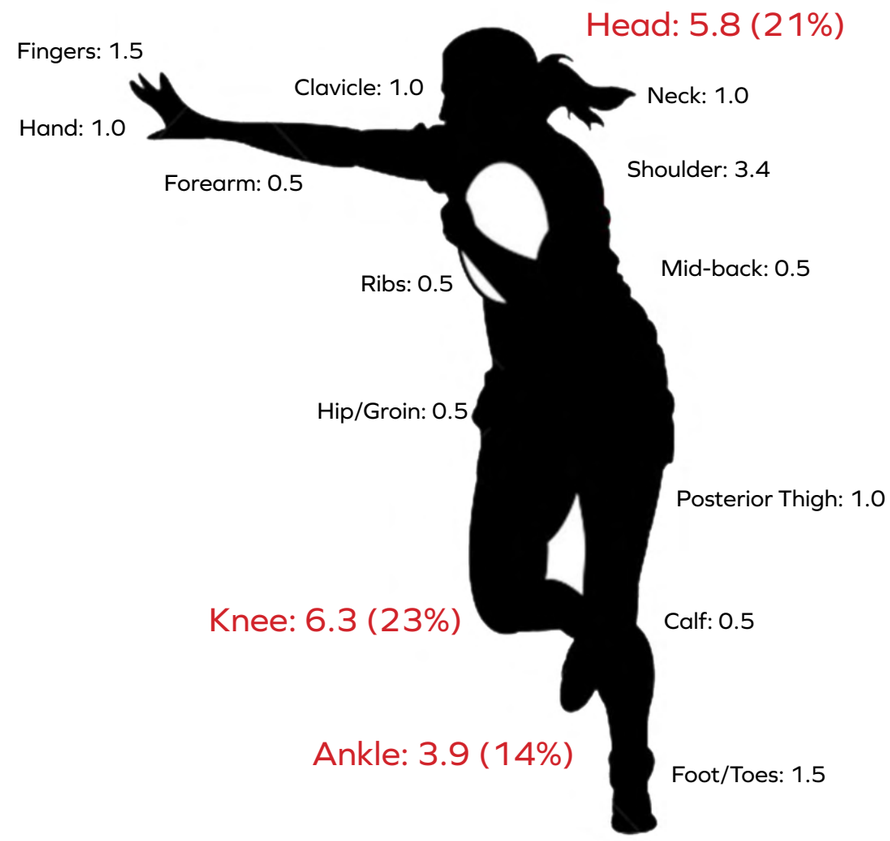

Figure 4 (b): Location of injury for the Women's clubs (IR/1,000 player hours)

3.7 Playing Position of Match Injury

Rugby player positions are split into 'forwards' (position no. 1-8) and 'backs' (position no. 9-15).

The hooker (no. 2) suffered the most injuries in the men's clubs (11%). During the 2017-2018 season, the openside flanker had the majority of injuries with 11% of all injuries, however was the second most commonly injured position during the 2018-2019 season with 9%.

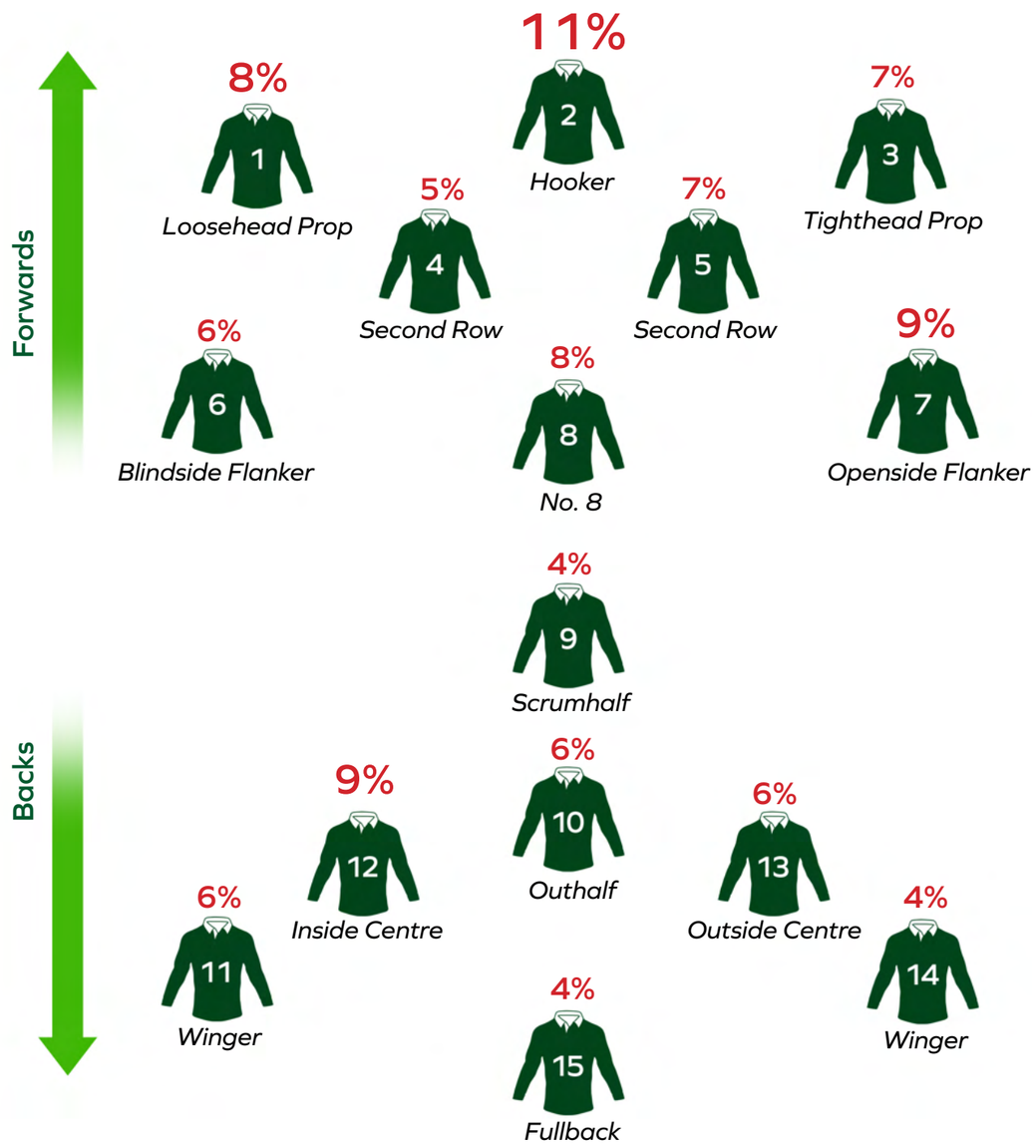

Figure 5(a): Percentage of injuries occurring per playing position in the Men's AIL

The second row (no. 4) suffered the majority of injuries in the Women's clubs with 16% of all injuries (Fig. 5b). This was followed by the inside centre (no.12) and tighthead prop (no. 3), both with 11% of all injuries. During the 2017-2018 season, the inside centre (no. 12) suffered the majority of injuries with 18% of all the injuries recorded last season.

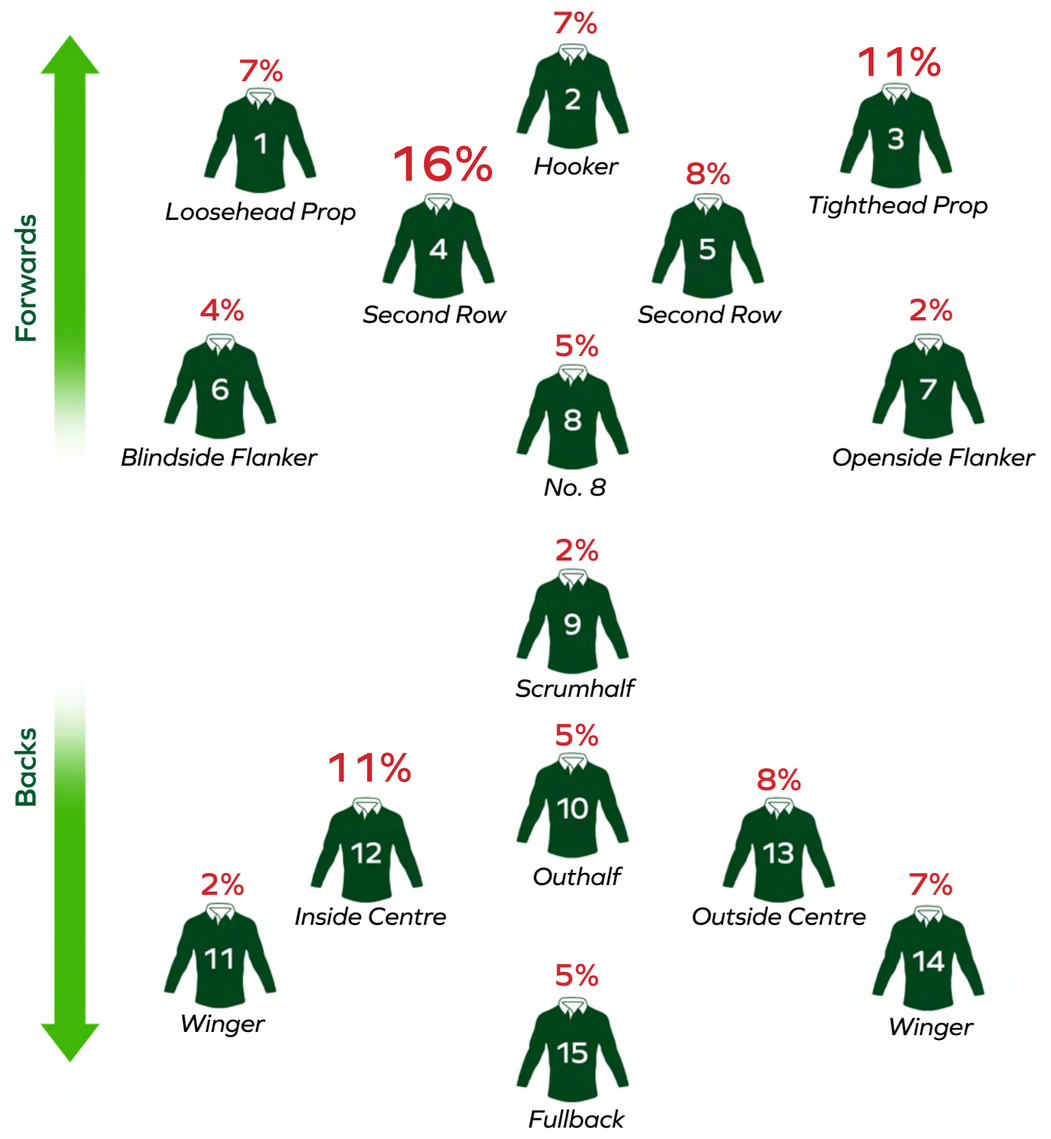

Figure 5(b): Percentage of injuries occurring per playing position in the Women's clubs

3.8 Match Injury Severity

Injury severity was calculated as total number of days absent from Rugby match or training and classified according to the World Rugby Consensus guidelines. The majority of injuries were moderate or severe (resulting in greater than eight days absence), as shown in Figure 6.

Slight injuries (0-1 days absence) were considered as 'medical attention injuries' and were not included in analysis of time-loss injuries.[6] Slight injuries are discussed in more detail in sub-section 3.10.

In comparison to the 2017-2018 season, the women's clubs had significantly less moderate injuries (8-28 days absence), while the men's clubs had similar severity rates during both seasons.

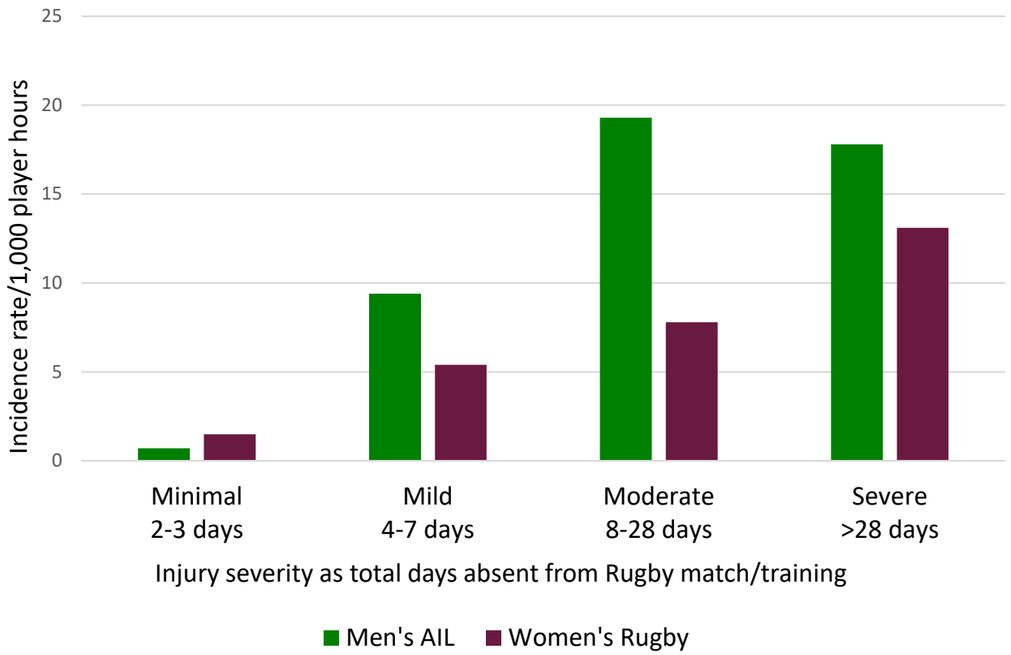

Figure 6: Injury severity of time-loss injuries (IR/1,000 player hours)

[6] Fuller, C. W., Molloy, M. G., Bagate, C., Bahr, R., Brooks, J. H., Donson, H., Kemp, S. P., McCrory, P., McIntosh, A. S., Meeuwisse, W. H., Quarrie, K. L., Raftery, M. & Wiley, P. 2007. Consensus statement on injury definitions and data collection procedures for studies of injuries in Rugby Union. Br J Sports Med, 41, 328-31.
Williams, S., Trewartha, G., Kemp, S. & Stokes, K. 2013. A meta-analysis of injuries in senior men's professional Rugby Union. Sports Med, 43, 1043-55.

3.9 Match Injury Burden (number of injuries x time lost per injury)

The burden of an injury assesses the frequency of an injury in relation to the severity of the injury (measured as the number of days absence).

Ankle ligament sprains (ATFL sprains) carried the highest burden in the men's clubs and accounted for 9% of all match injuries, resulting in an average of 47 days absence from Rugby match or training activities. During the 2017-2018 season, hamstring injuries carried the highest burden accounting for 8% of all match injuries and resulting in an average of 54 days absence.

In the men's clubs, the knee and the shoulder joints were commonly injured sites, which resulted in severe injuries (in terms of total number of days absent from Rugby match or training). Nine anterior cruciate ligament (ACL) ruptures in the knee (2% of all match injuries) occurred during matches, resulting in an average of 247 days absence, while ten glenohumeral joint (GHJ) dislocations in the shoulder (2% of all match injuries) also occurred, resulting in an average of 103 days absence.

Concussions carried the highest burden in the women's clubs and accounted for 19% of all match injuries, resulting in an average of 30 days absence from Rugby match or training activities. During the 2017-2018 season, ankle ligament sprains carried the highest injury burden accounting for 14% of all injuries and resulting in an average of 103 days absence.

In the women's clubs three ACL ruptures occurred (5% of all match injuries), resulting in an average of 245 days absence. One GHJ dislocation was also reported (2% of all match injuries), resulting in 315 days absence.

Table 8[7]: Injury Burden (%of match injuries) and average TDO (total days off)

	Injury Burden	Average Total Days Off
Men's AIL	ATFL Sprains 4.1 (9%) Concussion 5.3 (11%) Hamstring Strains 3.9 (8%)	47 26 36
Women's Rugby	Concussion 5.3 (19%) ACL Ruptures 1.5 (5%) ATFL Sprains 3.4 (12%)	30 245 43

[7] An 'ATFL sprain' (anterior talo-fibular ligament sprain) is a tear of the ligament located on the outside of the ankle joint. It is also called an inversion sprain or lateral ligament sprain.
A 'hamstring strain' refers to a tear of one or more of the muscles located on the back (posterior aspect) of the thigh.
An 'ACL rupture' (anterior cruciate ligament) refers to the complete tear of the main stabilising ligaments of the knee joint.

3.10 Medical Attention Match Injuries (slight injuries)

Any injuries resulting in 0-1 days absence from Rugby match or training are considered as slight, or 'medical attention', injuries and therefore were excluded from the analysis of time-loss injuries, as per international best practice.[8]

During the 2018-2019 season, 36 medical attention injuries were recorded in the men's clubs, while no medical attention injuries occurred in the women's clubs.

The overall team match medical attention injury incidence rates:

- Men's AIL clubs – 3.2/1,000 player hours

Table 9: Match medical attention injuries (slight injuries) per division

Division	No. Clubs	No. Players	No. Matches	Exposure hours	No. Injuries	IR*
Men's AIL 1	10	410	228	4560	7	1.5
Men's AIL 2	15	549	331	6620	29	4.4
Overall men's	25	959	559	11180	36	3.2
Women's Rugby	7	195	103	2060	0	0
Overall women's	7	195	103	2060	0	0

*Incidence rate per 1,000 player hours

- Medical attention injuries most commonly occurred in the 3rd quarter of the match.
- Lacerations were the most common medical attention injuries with an incidence rate of 1.3/1,000 player hours.
- 85% of these lacerations required pitch-side suturing.
- The head and face were the most common locations of injury, with an incidence rate of 1.1/1,000 player hours for head and face lacerations.
- The tackle event accounted for the majority of medical attention injuries, with being tackled resulting in more injuries than tackling across the two men's divisions.

[8] Fuller, C. W., Molloy, M. G., Bagate, C., Bahr, R., Brooks, J. H., Donson, H., Kemp, S. P., McCrory, P., McIntosh, A. S., Meeuwisse, W. H., Quarrie, K. L., Raftery, M. & Wiley, P. 2007. Consensus statement on injury definitions and data collection procedures for studies of injuries in Rugby Union. Br J Sports Med, 41, 328-31.
Williams, S., Trewartha, G., Kemp, S. & Stokes, K. 2013. A meta-analysis of injuries in senior men's professional Rugby Union. Sports Med, 43, 1043-55.

3.11 Other Match-related Injuries

A small proportion of injuries occurred during the warm-up and these were not included in the analysis of the time-loss match injury incidence, as only injuries occurring during the match play counted as match injuries.

- In the Men's AIL 13 warm-up injuries occurred, while no warm-up injuries occurred in the Women's Rugby.
- The posterior thigh was the most common location of injury, followed by the ankle.
- Hamstring strains accounted for 38% of all warm-up injuries, followed by ATFL sprains at 31%.[9]
- Non-contact injuries accounted for 54% of warm-up injuries.

[9] A 'hamstring strain' refers to a tear of the muscles located on the back (posterior aspect) of the thigh.
An 'ATFL sprain' (anterior talo-fibular ligament sprain) is a tear of the ligament located on the outside of the ankle joint. It is also called an inversion sprain or lateral ligament sprain.

4.0 Training Injuries

4.1 Overall Time-loss Training Injuries

For the 2018-2019 season, training injury data from 32 clubs (25 men's and 7 women's) were also collected. For operational reasons, as the frequency and duration of training sessions were not recorded for this season, training injury incidence rates are not available. Therefore, the total number of training injuries that occurred are reported.

Any injuries resulting in 0-1 days absent from Rugby match or training activities were considered to be medical attention injuries and are not included in the analysis of time-loss injuries, as per international best practice.[10]

The overall number of training injuries for the Men's AIL clubs was 121, an increase from last season (2017-2018) where 85 training injuries were recorded in the men's clubs.

The overall number of training injuries for the Women's clubs was 11, a decrease from last season (2017-2018) where 16 training injuries were recorded in the women's clubs.

Table 10 shows the overall number of training injuries for the division one men's teams (Men's AIL 1), the division two men's teams (Men's AIL 2) and the women's teams (Women's Rugby).

Table 10: Training time-loss injuries (excluding slight injuries).

Division	No. Clubs	No. Players	No. Injuries
Men's AIL 1	10	410	51
Men's AIL 2	15	549	70
Overall men's	25	959	121
Women's Rugby	7	195	11
Overall women's	7	195	11

[10] Fuller, C. W., Molloy, M. G., Bagate, C., Bahr, R., Brooks, J. H., Donson, H., Kemp, S. P., McCrory, P., McIntosh, A. S., Meeuwisse, W. H., Quarrie, K. L., Raftery, M. & Wiley, P. 2007. Consensus statement on injury definitions and data collection procedures for studies of injuries in Rugby Union. Br J Sports Med, 41, 328-31.
Williams, S., Trewartha, G., Kemp, S. & Stokes, K. 2013. A meta-analysis of injuries in senior men's professional Rugby Union. Sports Med, 43, 1043-55.

4.2 Training Injury Classification

The injury diagnosis refers to the specific bodily location and nature of the injury.

The most common injury diagnosis for the men's clubs was hamstring strains, accounting for 13% of all training time-loss injuries. This was followed by ATFL sprains and calf/Achilles strains, with 12% and 10% of all training time-loss injuries respectively.

The most common injury diagnoses for the women's clubs was hamstring strains and concussions, each accounting for 18% of all time-loss training injuries.

Six shoulder dislocations (glenohumeral joint dislocations) occurred during training in the men's clubs, while one ankle fracture-dislocation occurred during training in the women's clubs.

Tables 11 and 12 shows the top most common specific training time-loss injury diagnosis for all the men's and women's clubs for the current season (2018-2019) and season one (2017-2018).

Table 11:[11] Overall most common injury diagnoses for all men's clubs; 2018-19 VS 2017-18 (%of injuries).

Men's AIL	
2018-2019	**2017-2018**
Hamstring Strains (13%)	Hamstring Strains (12%)
ATFL Sprains (12%)	ATFL Sprains (11%)
Calf/Achilles Strains (10%)	Adductor Strains (11%)

Table 11:[11] Overall most common injury diagnoses for all women's clubs; 2018-19 VS 2017-18 (%of injuries)

Women's Rugby	
2018-2019	**2017-2018**
Hamstring Strains (18%)	ATFL Sprains (19%)
Concussions (18%)	Hamstring Strains (13%)
	Lumbar Spine Strains (13%)

[11] A 'hamstring strain', refers to a tear of the muscle group located on the back (posterior aspect) of the thigh.
An 'ATFL sprain' (anterior talo-fibular ligament sprain) refers to a tear of the ligament located on the outside of the ankle joint. It is also called an inversion sprain or lateral ligament sprain.
A 'calf/Achilles strain', refers to a tear of one or more of the muscle groups located on the back of the lower leg.
An 'adductor strain' refers to a tear of one or more of the muscle groups located on the inner thigh.
A 'lumbar spine strain' refers to a tear of one or more of the muscle groups in the lower back.

Table 13 shows the top three most common specific training time-loss injury diagnosis for each of the men's divisions (Division One and Division Two).

Table 13:[12] Most common injury diagnoses for each men's Division One and Division Two (% of injuries)

Men's AIL 1	Men's AIL 2
Hamstring Strains (18%)	ATFL Sprains (14%)
ATFL Sprains (10%)	Calf/Achilles Strains (11%)
Calf/Achilles Strains (8%)	Hamstring Strains (10%)

[12] A 'hamstring strain', refers to a tear of the muscle group located on the back (posterior aspect) of the thigh.
An 'ATFL sprain' (anterior talo-fibular ligament sprain) refers to a tear of the ligament located on the outside of the ankle joint. It is also called an inversion sprain or lateral ligament sprain.
A 'calf/Achilles strain', refers to a tear of one or more of the muscle groups located on the back of the lower leg.

4.3 Body Location of Training Injuries

Overall, the shoulder and ankle were the most common injury sites in the men's clubs, followed by the posterior thigh. During the 2017-2018 season, the posterior thigh was the most commonly injured body location, followed by the hip and groin.

Figure 7(a) shows the incidences of injury according to bodily location for the Men's AIL.

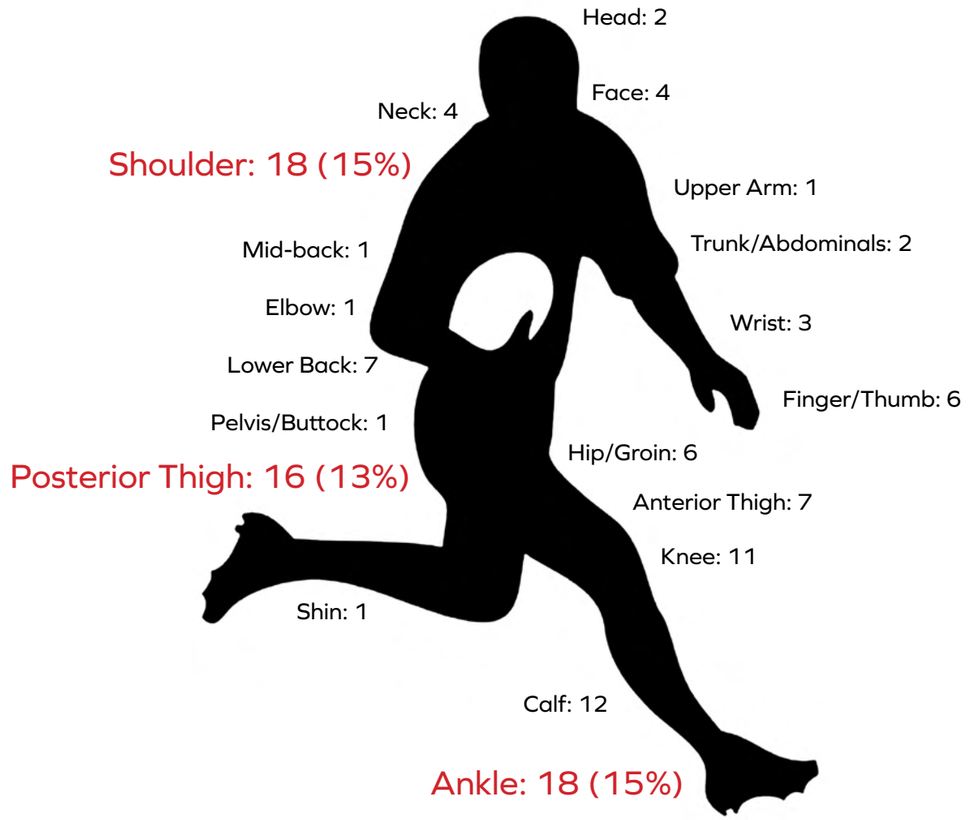

Figure 7 (a): Location of injury for the Men's AIL (number of injuries)

The head, posterior thigh, knee and ankle were the most common locations of injury in the women's clubs. Similarly, during the 2017-2018 season, the ankle, knee and posterior thigh were the most common injury sites in the women's clubs.

Figure 7(b) shows the incidences of injury according to bodily location for the women's clubs.

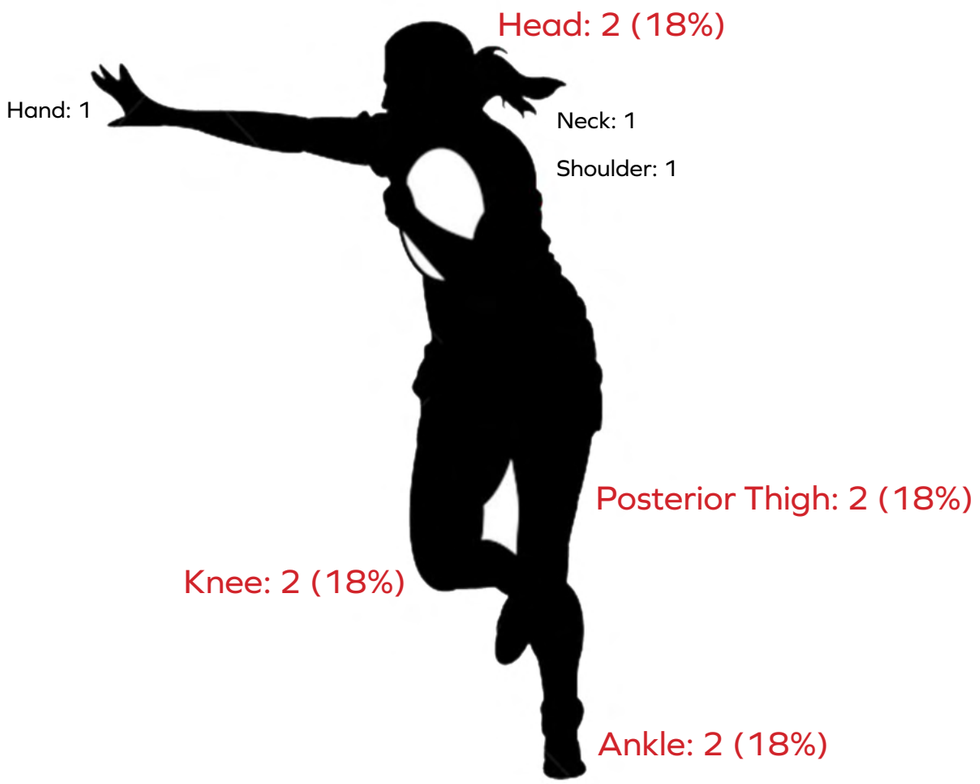

Figure 7 (b): Location of injury for Women's for the Women's clubs (number of injuries).

4.4 Nature of Training Injuries

The nature of injuries refers to the type of injury occurring.

Sprains (referring to ligament injuries) and strains (referring to muscle or tendon injuries) were the most common injury type across both the men's and women's clubs, similar to the 2017-2018 season. The column labelled 'Other' refers to labral tears (n=2, men's clubs) and meniscal tears (n=1, women's clubs), as shown in Figure 8.

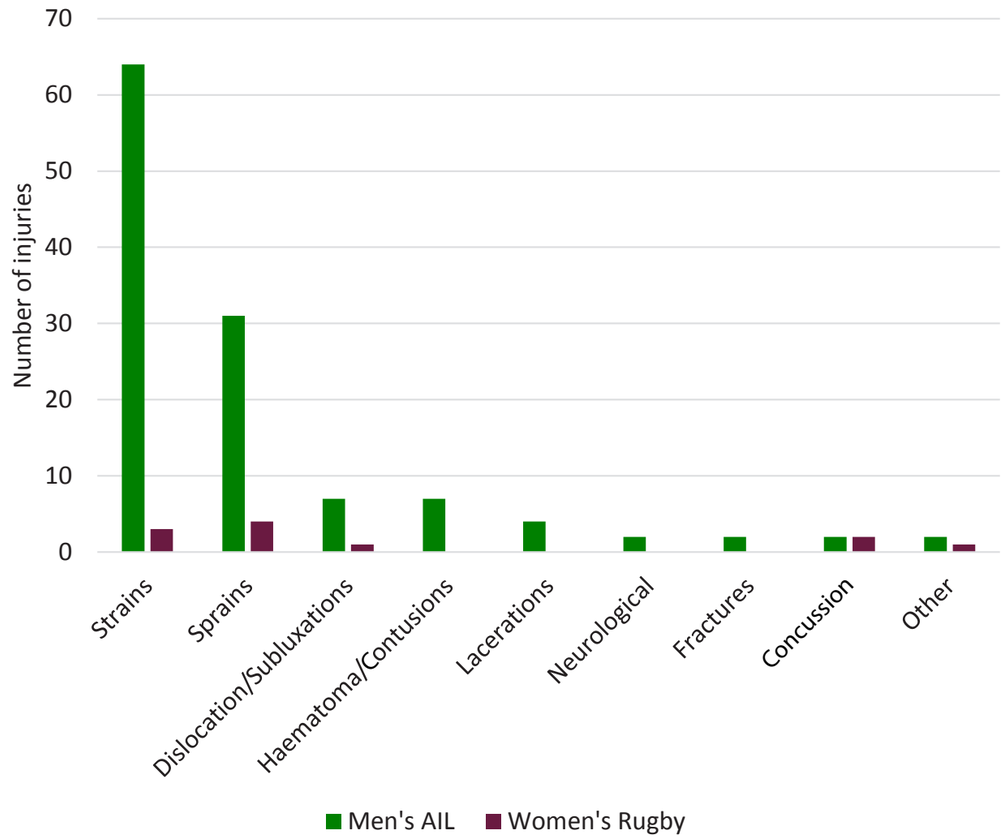

Figure 8: Nature of injury (number of injuries)

4.5 Training Injury Event

Figure 9 shows the events surrounding the occurrence of an injury.

Contact drills accounted for the majority of injuries in the men's clubs, however 39% of injuries occurred in non-contact events including speed drills, agility drills and running in open play (non-contact). During the 2017-2018 season, the majority of training injuries were as a result of tackling in the men's clubs.
In the women's clubs, 36% of injuries occurred in non-contact events including speed drills, agility drills and running in open play (non-contact), which is similar to the events that surrounded training injuries last season (2017-2018).

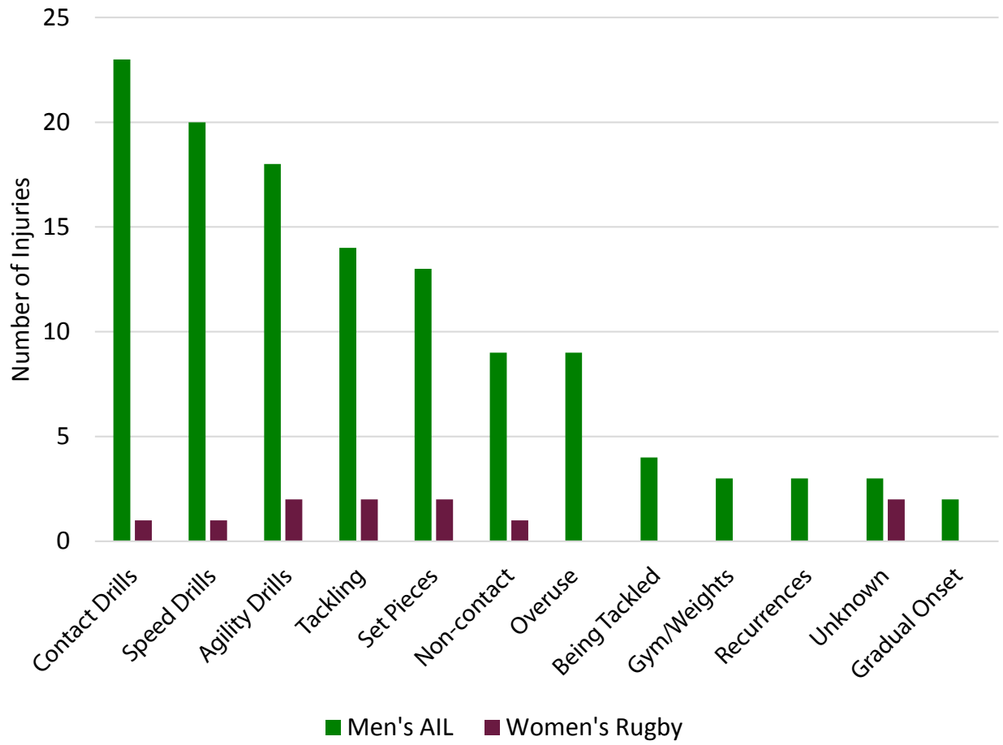

Figure 9: Injury event (number of injuries)

4.6 Training Injury Severity

Injury severity was calculated as total number of days absent from Rugby match or training and classified according to the World Rugby Consensus guidelines. The majority of injuries were moderate or severe (resulting in greater than eight days absent), as shown in Figure 10.

Slight injuries (0-1 days absence) were considered as 'medical attention injuries' and were not included in analysis of time-loss injuries, as per international best practice.[13] Slight injuries are discussed in more detail in sub-section 4.8.

In the men's clubs an increase in severe injuries (>28 days absence) was observed in comparison to the 2017-2018 season, while a decrease in moderate injuries (8-28 days absence) was also seen.

In the women's clubs, a decrease in minimal (2-3 days absence) and mild (4-7 days absence) was observed in comparison to the 2017-2018 season, while the number of moderate (8-28 days absence) and severe (>28 days absence) injuries remained the same.

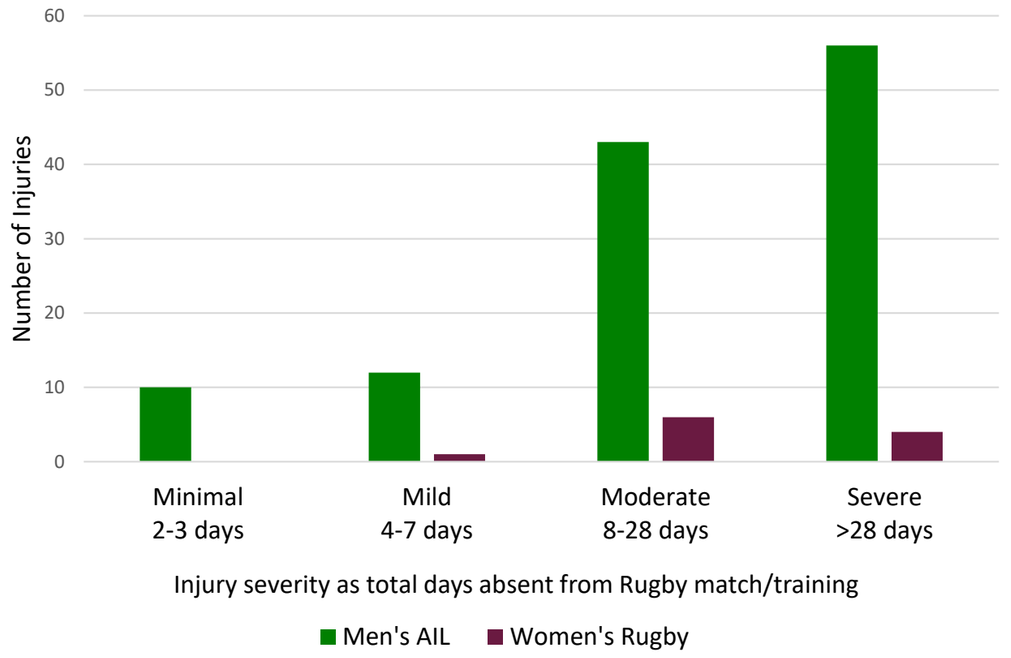

Figure 10: Injury severity (number of injuries)

[13] Fuller, C. W., Molloy, M. G., Bagate, C., Bahr, R., Brooks, J. H., Donson, H., Kemp, S. P., McCrory, P., McIntosh, A. S., Meeuwisse, W. H., Quarrie, K. L., Raftery, M. & Wiley, P. 2007. Consensus statement on injury definitions and data collection procedures for studies of injuries in Rugby Union. Br J Sports Med, 41, 328-31.
Williams, S., Trewartha, G., Kemp, S. & Stokes, K. 2013. A meta-analysis of injuries in senior men's professional Rugby Union. Sports Med, 43, 1043-55.

4.7 Training Injury Burden (number of injuries x time lost per injury)

The burden of an injury assesses the frequency of an injury in relation to the severity of the injury (measured as the number of days absence).

Hamstring strains accounted for 13% of all training injuries in the men's clubs and resulted in an average of 47 days absence from Rugby match or training activities, similar to the 2017-2018 season.

In the men's clubs, the knee and the ankle joints were commonly injured sites, which resulted in severe injuries (in terms of total number of days absent from rugby match or training). Four anterior cruciate ligament (ACL) ruptures in the knee (3% of all training injuries) occurred, resulting in an average of 294 days absence. One Achilles tendon rupture occurred resulting in 361 days absence.

Due to the low number of training injuries recorded in the women's clubs, the most severe injuries were also the most burdensome despite the low incidence rate of these injuries. While only one knee meniscal tear, ankle fracture-dislocation and posterior cruciate ligament (PCL) sprain occurred, they resulted in more than half a season absence from Rugby match and/or training activities.

Table 14:[14] Injury Burden (%frequency of training injuries), average TDO (total days off)

	Injury Burden	Average Total Days Off*
Men's AIL	Hamstring Strains 16 (13%) Calf/Achilles Strains 12 (10%) GHJ Dislocations 6 (5%)	47 61 174
Women's Rugby	Knee Meniscus 1 (9%) Ankle Fracture-dislocation 1 (9%) PCL Sprains 1 (9%)	304 205 133

***** In the women's club, the most burdensome injuries were single events, therefore the 'Average Total Days Off' are the actual total number of days absence from Rugby matches and/or training due to the single injury event.

[14] A 'hamstring strain' refers to a tear of the muscles located on the back (posterior aspect) of the
A 'GHJ dislocation' (gleno-humeral joint dislocation) is the separation of the upper arm bone (humerus) from the shoulder socket (glenoid fossa).
A 'calf/Achilles strain', refers to a tear of one or more of the muscle groups located on the back (posterior aspect) of the lower leg.
'Knee meniscus' refers to a tear of the meniscal cartilage inside the knee joint.
A 'PCL sprain' (posterior cruciate ligament sprain) refers to a tear of the stabilising ligament inside the knee joint.

4.8 Medical Attention Training Injuries (slight injuries)

Any injury resulting in 0-1 days absent from Rugby match or training is considered a slight, or 'medical attention' injury and therefore were excluded from the analysis of time-loss injuries, as per best international practice.[15]

During the 2018-2019 season, 4 medical attention injuries occurred during training activities in the men's clubs, while no medical attention or slight injuries occurred in the women's clubs.

Table 15: Training medical attention injuries

Division	No. Clubs	No. Players	No. Injuries
Men's AIL 1	10	410	3
Men's AIL 2	15	549	1
Overall men's	25	959	4
Women's Rugby	7	195	0
Overall women's	7	195	0

- Strains were the most common injury type (75%), followed by sprains (25%).
- Lower limb muscle strains (adductors and hamstrings) were the most common injury site.
- The fingers were the most common upper limb injury site.
- Contact drills accounted for the majority of medical attention injuries (75%).

[15] Fuller, C. W., Molloy, M. G., Bagate, C., Bahr, R., Brooks, J. H., Donson, H., Kemp, S. P., McCrory, P., McIntosh, A. S., Meeuwisse, W. H., Quarrie, K. L., Raftery, M. & Wiley, P. 2007. Consensus statement on injury definitions and data collection procedures for studies of injuries in Rugby Union. Br J Sports Med, 41, 328-31.
Williams, S., Trewartha, G., Kemp, S. & Stokes, K. 2013. A meta-analysis of injuries in senior men's professional Rugby Union. Sports Med, 43, 1043-55.

5.0 Future Directions

Following a successful first season of the IRISweb system, the IRIS project expanded and recruited additional clubs for the 2018-2019 season. Recruitment continued in the Men's AIL across both Division One and Division Two. Recruitment expanded beyond the Women's AIL to the first league division in each province in order to recruit more women's teams. There were 1,154 players involved this season, an increase from the 608 players involved during the 2017-2018 season (479 male, 129 female).

For the 2019-2020 season, the IRIS Project aims to encourage and maintain participation across all the men's clubs (n=25) and to recruit additional women's clubs in an effort to better document the intricacies of the women's game.

IRIS also began conducting injury surveillance in the school's game at Senior Cup level for 2018-2019. For the 2019-2020 season, the IRIS Project will begin collecting injury data from the Junior Cup level to provide crucial age, mass and developing player information.

In the next season (2019-2020), the IRIS Project will be collecting training load data from a select number of men's clubs, in addition to the injury data already being collected.

6.0 Publications and Conferences

6.1 Journal Publications

Leahy T.M., Kenny I.C., Campbell M.J., Warrington G.D., Cahalan R., Harrison A.J., Hayes K., Lyons M., Glynn L.G., & Comyns T.M. (2019). Injury Surveillance in School Rugby: A Systematic Review of Injury Epidemiology & Surveillance Practices. Physical Therapy in Sport. 38, 170-78.

Yeomans, C., Kenny, I.C., Cahalan, R., Warrington, G.D., Harrison, A.J., Hayes, K., Lyons, M., Campbell, M.J., Glynn, L.G. & Comyns, T.M. (2019). The Design, Development, Implementation and Evaluation of IRISweb; A Rugby-specific Injury Surveillance System. Physical Therapy in Sport, 35, 79-88.

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Yeomans, C., Kenny, I.C., Cahalan, R., Warrington, G.D., Harrison, A.J., Hayes, K., Lyons, M., Campbell, M.J & Comyns, T.M. (2018) 'The Incidence of Injury in Amateur Male Rugby Union: a Systematic Review and Meta-analysis'. Sports Medicine, 48(4), 837-848

6.2 Conference Communications

Warrington, G.D., Yeomans, C., Comyns, T.M., Cahalan, R., Glynn, L.G., Harrison, A.J., Hayes, K., Lyons, M., Campbell, M.J. & Kenny, I.C (2019) Developing a Rugby-specific Injury Surveillance System. 66th ACSM American College of Sports Medicine Annual Congress 2019, 28 May-1 June 2019, Orlando, USA.

Comyns, T.M., Yeomans, C., Cahalan, R., Warrington, G.D., Glynn, L.G., Harrison, A.J., Hayes, K., Lyons, M., Campbell, M.J. & Kenny I.C. (2019) Injury Surveillance in Amateur Rugby in Ireland. 66th ACSM American College of Sports Medicine Annual Congress 2019, 28 May-1 June 2019, Orlando, USA.

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Yeomans, C., Kenny, I.C., Cahalan, R., Costello, V., Warrington, G.D., Harrison, A.J., Hayes, K., Lyons, M., Campbell, M.J., Glynn, L.G. & Comyns, TM (2019) Relationship between Physical and Wellness Baseline Screening Measures and Seasonal Amateur Rugby Injury. 66th ACSM American College of Sports Medicine Annual Congress 2019, 28 May-1 June 2019, Orlando, USA.

Griffin, A., Kenny, I.C., Comyns, T.M. & Lyons, M. (2019). A Comparison of the Rolling Average and Exponentially Weighted Moving Average Models for calculating the Acute:Chronic Workload Ratio: a Systematic Review. 2019 All Ireland Postgraduate Conference in Sport Science, Physical Activity and Physical Education, 10 May 2019, Athlone, Ireland.

Leahy T.M., Kenny I.C., Campbell M.J., Warrington G.D., Cahalan R., Harrison A.J., Lyons M., Glynn L.G., & Comyns T.M. (2019). A Systematic Review of Injury Epidemiology and Surveillance Practices in School's Rugby. 2019 All Ireland Postgraduate Conference in Sport Science, Physical Activity and Physical Education, 10 May 2019, Athlone, Ireland.

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Yeomans, C., Kenny, I.C., Cahalan, R., Warrington, G.D., Harrison, A.J., Hayes, K., Lyons, M., Campbell, M.J., Glynn, L.G. & Comyns, TM (2018). The Epidemiology of Match Injury in Irish Amateur Rugby Union. Health Research Institute Research Symposia. 5 December 2018, Limerick, Ireland.

Kenny, I.C. & Comyns T.M. Invited plenary speakers. Kenny, I.C., Yeomans, C., Cahalan, R., Warrington, G.D., Harrison, A.J., Hayes, K., Lyons, M., Campbell, M.J., Glynn, L.G., & Comyns, T.M. (2018) 'Injury Surveillance in Irish Rugby 'The Irish Rugby Injury Surveillance (IRIS) Project'. 6th World Congress of Sports & Exercise Medicine. 3-4 November 2018, Dublin, Ireland.

Yeomans, C., Comyns, T.M., Cahalan, R., Warrington, G.D., Harrison, A.J., Hayes, K., Lyons, M., Campbell, M.J., & Kenny, I.C. 'Injury Monitoring and Player Education: a Survey of Current Practices in Irish Amateur Rugby Union'. 65th ACSM American College of Sports Medicine Annual Congress. 28 May-2 June 2018, Minneapolis U.S.A.

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Yeomans, C., Kenny, I.C., Cahalan, R., Warrington, G.D., Harrison, A.J., Hayes, K., Lyons, M., Campbell, M.J., & Comyns, T.M. 'The Incidence of Injury in Amateur Rugby Union: a Systematic Review and Meta-analysis'. All-Ireland Postgraduate Conference, 21 April 2017. Carlow, Ireland.

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