Youth Rugby Injury Surveillance and Prevention Project

Season Report 2019-2020

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RFU INJURY SURVEILLANCE PROJECTS

Professional Rugby Injury Surveillance Project (PRISP)
Gallagher Premiership and England Senior Men

Women's Rugby Injury Surveillance Project (WRISP)
Allianz Premier 15s and Red Roses

Championship Rugby Injury Surveillance Project
Greene King Championship

BUCS Super Rugby Injury Surveillance Project
Elite men's University Rugby

Community Rugby Injury Surveillance and Prevention (CRISP) Project
Levels 3-9 of adult men's community rugby

Youth Rugby Injury Surveillance Project (YRISP)
Schoolboy rugby in under-13, under-15 and under-18 age groups

KEY FINDINGS

PROJECT OVERVIEW

Schools Participating:
21 Schools, 36 teams

Age Groups:
Under 13, 15, 18

Match Exposure:
420 games, 6911 hours

Injury Definition:
24-hour time-loss

Injuries Reported:
192 injuries

OVERALL MATCH INJURIES

Injury Incidence Rate:
27.8 per 1000 player match hours

Mean Severity (days absent):
28 days

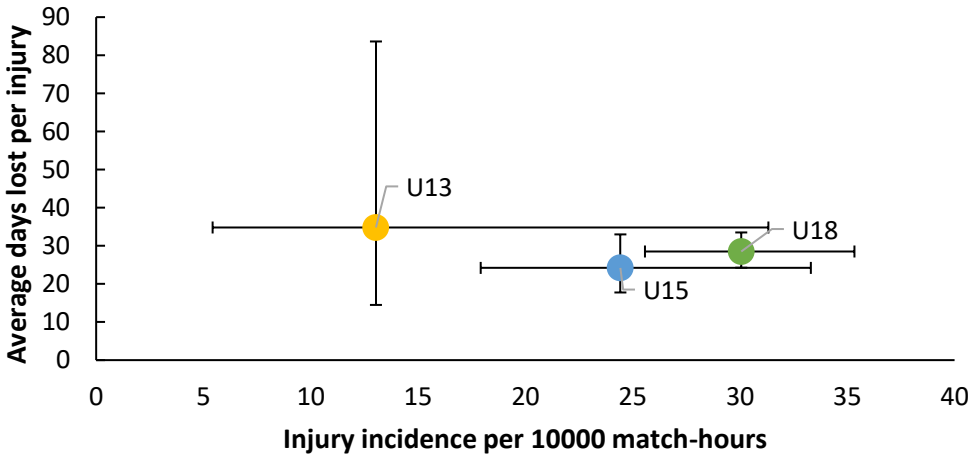
Injury Burden:
775 days absence per 1000 hours

Injury Event:
30% tackling; 26% being tackled

OVERVIEW PER AGE GROUP

1 injury per team every: **U13 – 7.0 matches, U15 – 2.8 matches, U18 – 1.9 matches**
Injury Incidence Rate (per 1000 player match-hours): **U13 – 13.0, U15 – 24.4, U18 – 30.1**
Mean days absent from rugby: **U13 – 35 days, U15 – 24 days, U18 – 29 days**

Each of the data points below represents an age group. How common an injury is (incidence) increases from left to right, with the days absent (severity) due to injury increasing from the bottom to the top. The lines extending from each data point reflect the possible variation based on the data collected.



EXECUTIVE SUMMARY

The Youth Rugby Injury Surveillance Project (YRISP) is responsible for the collection and analysis of injury data within schoolboy rugby union; specifically focussing on the under-13, under-15 and under-18 age groups. This report is the third of its kind and seeks to describe injury risk within this population for the 2019/20 playing season. Below is an overview of the findings:

- 21 schools participated in the project over the course of the 2019-20 season, providing data for 36 individual teams (U13 - 4, U15 - 10, U18 - 22).

- A total of 420 matches (U13 - 35, U15 - 111, U18 - 274) (6911 player hours) were recorded, with 192 match injuries (U13 - 5, U15 - 40, U18 - 147).

- The overall rate of match injuries causing a player to miss more than 24 hours of rugby during the 2019-20 season was 27.8 injuries per 1000 player match hours. In the 2018-19 season this was 34.8 injuries per 1000 player match hours.

- Match injury incidence increased with playing-age: U13 – 13.0 per 1000 player match hours (/1000h), U15 – 24.4/1000h, U18 – 30.1/1000h.

- On average, an U13 team can expect an injury every 7.0 games, an U15 team every 2.8 games and an U18 team every 1.9 games.

- Burden, calculated by multiplying the severity (days lost) of injuries by the incidence, was 775 days per 1000 player match hours.

- The tackle was associated with 56% of all injuries.

- The incidence of reported concussion during 2019-20 was 8.7 injuries per 1000 player match hours.

- 60% of all concussions occurred in the tackle. Concussion incidence when tackling was 3.5/1000h and was 1.7/1000h when carrying the ball into a tackle.

- Most of the matches within schoolboy rugby are played before Christmas. Some data from games which were scheduled after Christmas may have been missed due to the Covid-19 pandemic.

CONTENTS

INTRODUCTION

The Youth Rugby Injury Surveillance Project (YRISP) collects match exposure and match injuries from schools across England at the under-13, under-15 and under-18 age groups. The aim of the project is to better understand the risk, types and mechanisms of injuries in schoolboy rugby across different age groups. This informs strategies to reduce injuries and enhance the safety of the game.

This is the third YRISP season report, and it sits alongside the reports for the professional men's (PRISP), elite women's (WRISP), community men's (CRISP) and university (BUCS Super Rugby) game. Injury research in youth and school rugby in England has been carried out intermittently since 2006. A 2-season study from 2006-2008 investigated injuries in U17-18 schools and academy rugby, finding a higher injury rate in academy matches (35 and 47 injuries per 1000 player match hours, respectively). In the 2014-15 season, a study in Irish school first XV rugby reported an incidence rate of 29 per 1000 player match hours. In a 2015-16 study of U15-18 school age groups, injury incidence was found to be 26-30 per 1000 player match hours. For reference, the incidence rates in the 2019-20 season for PRISP was 88 per 1000 match-hours and for BUCS Super Rugby was 85 per 1000 match-hours. All of the previously mentioned studies used the same 24-hour time loss definition adopted in this report. The CRISP report uses a 7-day time loss injury, reporting an incidence rate of 26 per 1000 match-hours for the 2019-20 season.

Previous season reports for Youth Rugby Injury Surveillance Project and associated injury surveillance project can be found on the England rugby player welfare/RugbySafe website:

https://www.englandrugby.com/participation/playing/player-welfare-rugby-safe/rugbysafe-research

The information generated by the YRISP report can be used to inform injury prevention strategies and also provide a comparison of injury risk compared with other levels of the game. The data will also inform the risk assessment used to determine the level of first aid/immediate care provision required as set out in RFU Regulation 9 (Player Safety) and accompanying guidelines. With data over multiple seasons, it will be possible to detect changes in injury patterns over time, either in response to law changes, education programmes or the evolving progression of the game. Information also informs educational resources within the RFU's RugbySafe player welfare and wellbeing programme. For example, previous research has demonstrated that a rugby specific warm-up programme, Activate, can reduce injuries; this is accessible at:

https://www.englandrugby.com/participation/coaching/activate

DEFINITIONS

All methods and definitions used in this study comply with those outlined in the consensus statement for injury definitions and data collection procedures for studies of injuries in rugby union (Fuller et al 2007).

Time-loss injury

A time-loss injury was defined as 'any injury that prevents a player from taking a full part in all training activities typically planned for that day and/or match play for more than 24 hours from midnight at the end of the day the injury was sustained'. For example, if a player was injured during a match on Saturday and he was able to take a full part in training on Monday, the incident would not be classed as an injury. If the player's training was restricted on Monday due to the injury received on Saturday, the incident would be classed as a time-loss injury and reported.

Days absent from rugby (Injury severity)

Injury severity was measured as time (days) lost from competition and practice and defined as the number of days from the date of the injury to the date that the player was deemed to have regained full fitness not including the day of injury or the day of return. A player was deemed to have regained full fitness when he was 'able to take a part in training activities (typically planned for that day) and was available for match selection.' Severity is subdivided into the following categories: 2-7 days, 8-28 days, 29-84 days and greater than 84 days.

Injury incidence

The likelihood of sustaining an injury during match play or training is reported as the injury incidence. Time-loss injury data is presented as the number of injuries per 1000 player-hours of match exposure. This is a standardised method of presenting injury information so that data can be compared between different groups with a different number of matches. It is calculated by:

$$\text{Injury incidence} = \text{number of Injuries} \,/\, \left[(\text{number of matches} \times \text{number of players (15)} \times \text{match duration (1.33 hours)})/1000\right]$$

Confidence interval (CI)

The confidence interval shows, with 95% certainty, the likely range of the true value for a given statistic.

Burden

The burden of injury is a measure which takes into account both the frequency and severity of injuries. Burden is measured as the number of days absence per 1,000 player-hours of exposure.

Statistical significance

A result is considered to be statistically significant if the probability that it has arisen by chance is less than 5%, or 1 in 20. In this report, statistical analysis has been performed for the match injury incidence, severity and burden.

Overall injury incidence, severity and burden

For the 2019-20 season, 192 match injuries were reported over 420 matches (6911 hour of match exposure) for all teams combined. This resulted in an overall match time-loss injury incidence of 27.8 injuries per 1000 player match hours.

Table 1. Overview of match injury incidence, mean severity and burden for 2019-20 season.

Overview	Exposure (player-hours)	Injuries (n)	Incidence (/1000h)	Mean Days Absence	Burden (/1000h)	Matches per Injury
U13	384	5	13.0	35	454	7.0
U15	1638	40	24.4	24	592	2.8
U18	4890	147	30.1	29	856	1.9
Overall	**6911**	**192**	**27.8**	**28**	**775**	**2.2**

Figure 1 shows injury incidence over the past three seasons across age groups and from season-to-season. There were no differences between seasons in the U13 or U15 injury incidence. However, the U18 injury incidence in 2019/20 was significantly lower than in 2018/19. When data for all three seasons are combined, the U18 age group had a significantly higher injury incidence than the two younger age groups, but the U13 and U15 age groups were not different.

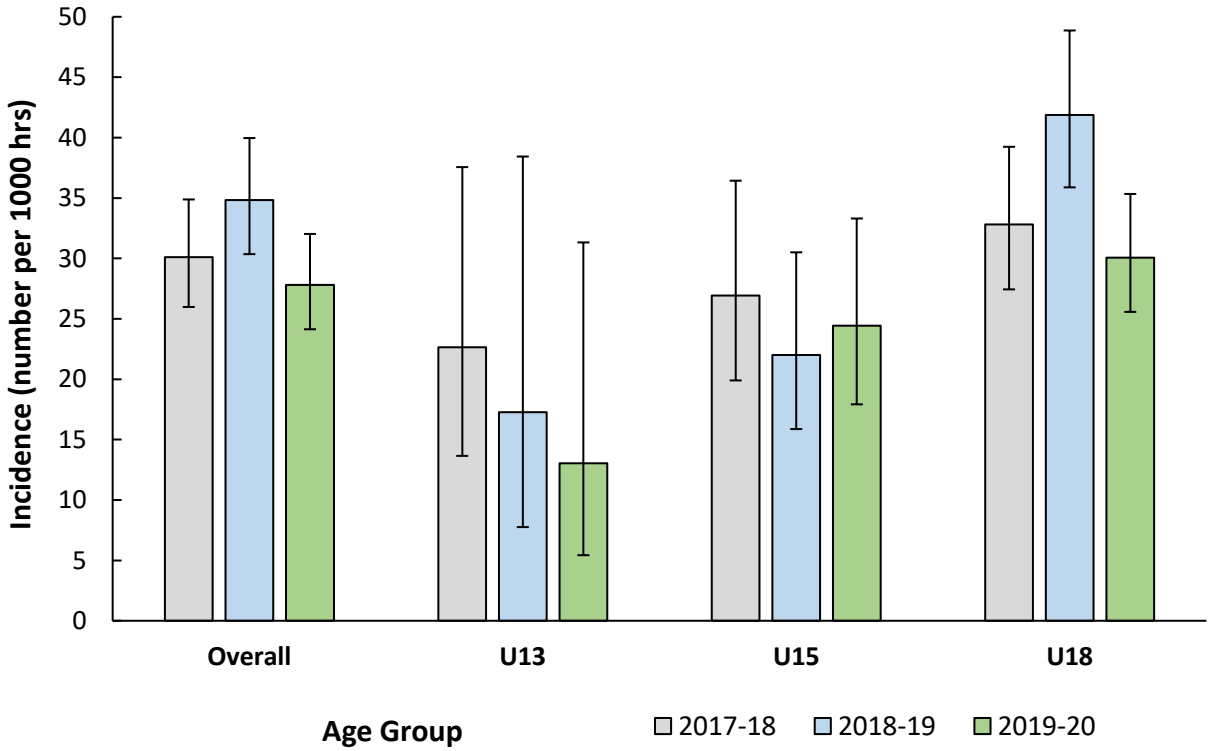


Figure 1. Injury incidence for over 3 seasons (2017-18, 2018-19 and 2019-20).

The mean severity (days absent) was 35, 24 and 29 days for the U13, U15 and U18 age groups, respectively (Table 1). Injuries lasting 8-28 days were the most common, responsible for 38% of injuries in 2019-20. Injuries resulting in 29-84 days absent from rugby accounted for 23% of injuries.

Table 2. Match injury incidence for each injury severity classification over three seasons (2017-18, 2018-19 and 2019-20).

Injury Severity Classification	2017-18		2018-19		2019-20	
	Count n (%)	Incidence (/1000h)	Count n (%)	Incidence (/1000h)	Count n (%)	Incidence (/1000h)
2-7 days	43 (24%)	7.3	34 (17%)	5.8	24 (13%)	3.5
8-28 days	57 (32%)	9.7	73 (36%)	12.5	73 (38%)	10.6
29-84 days	42 (24%)	7.1	50 (24%)	8.6	45 (23%)	6.5
>84 days	9 (5%)	1.5	8 (4%)	1.4	10 (5%)	1.4
Unknown	26 (15%)	4.4	38 (19%)	6.5	40 (21%)	5.8

Injury burden was not significantly different in the 2019/20 season from the 2018/19 season for the U13 and U15 age groups. Injury burden for the U18 age group was significantly lower in the 2019/20 season compared to the 2018/19 season. Combining the three seasons, the U18 age group has significantly higher burden than the two younger age groups. There were no significant differences between U13 and U15 age groups.

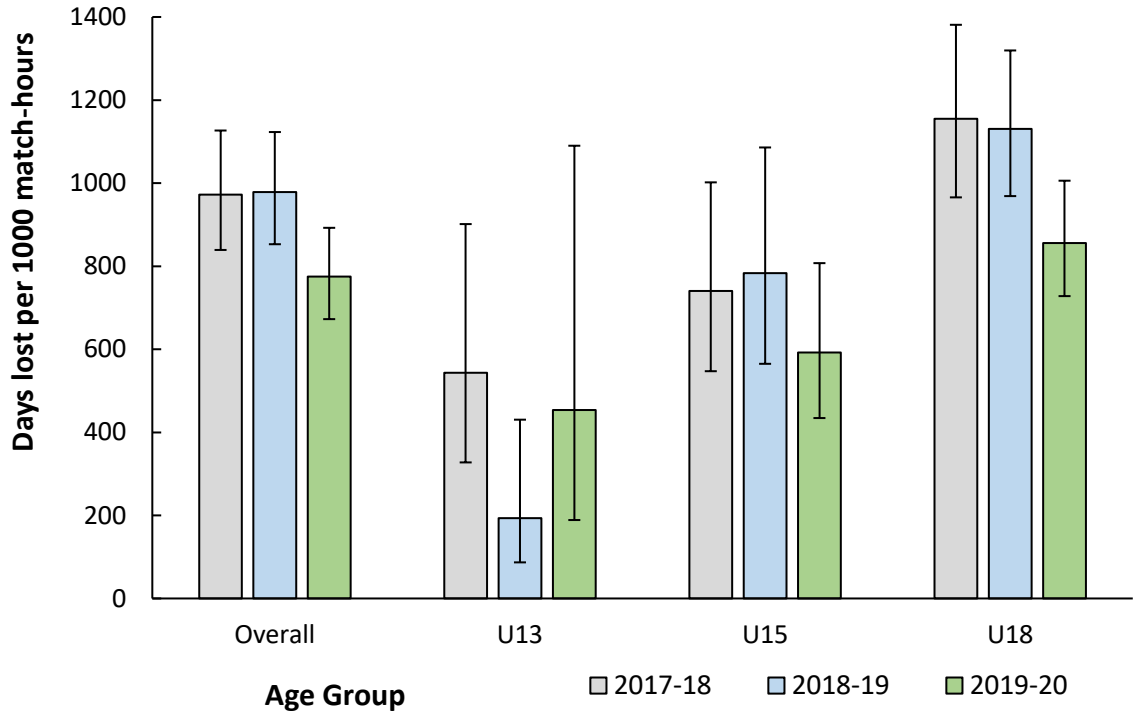


Figure 2. Injury burden over three seasons (2017-18, 2018-19 and 2019-20).

Figure 3 shows a comparison of injury incidence in 2019-20 at different levels of the game. Injury incidence is highest for Premiership rugby players, at 88 injuries per 1000 player match-hours. International men and international women (125 and 129 per 1000 player match-hours, respectively) are similar, followed by BUCS Super and Championship rugby (85 and 59 per 1000 player match-hours, respectively). These are higher than that seen at all levels of the school game, with Premiership women the closest comparative rate (39 per 1000 player-match hours). The same pattern can be seen for 7-day time-loss injuries (Figure 4). For 7-day time-loss injuries, all schoolboy rugby was lower than all levels of men's community rugby.

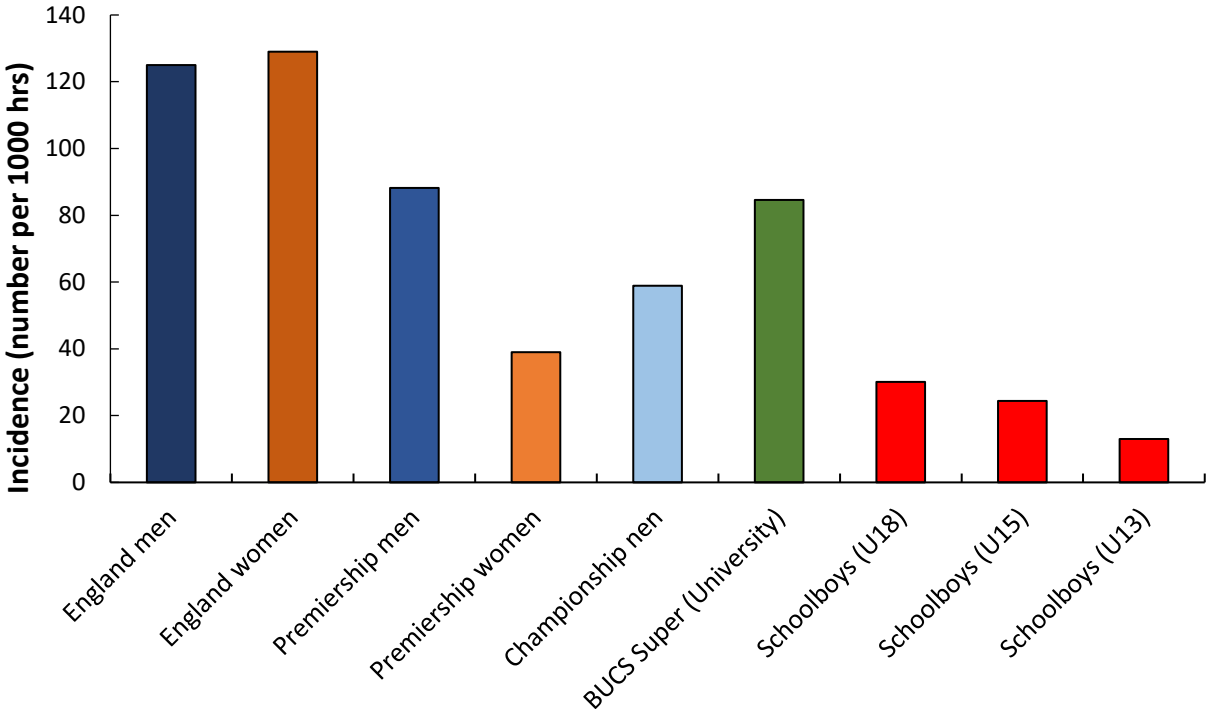


Figure 3. A comparison of greater than 24-hour time-loss injury rates for different levels of school rugby with elite level and university rugby.

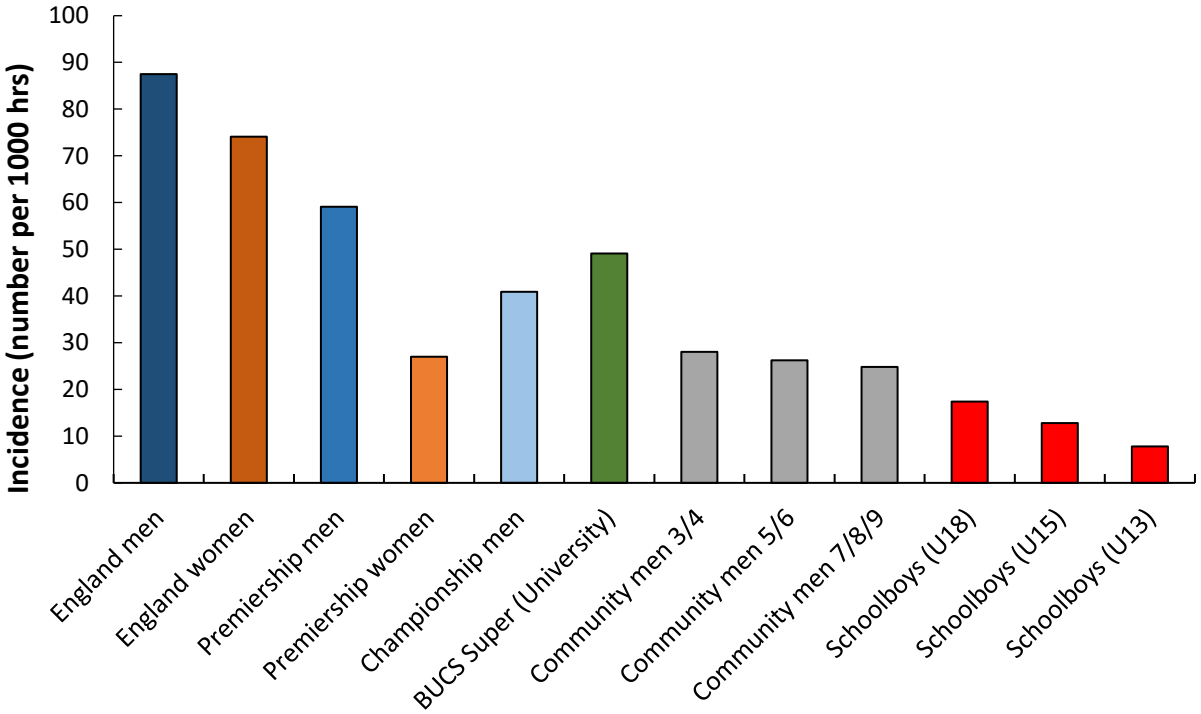


Figure 4. A comparison of greater than 7-day time-loss injury rates for different levels of community rugby with professional, university level and schools rugby.

Data sources: YRISP schoolboy data is taken from the 2019-20 findings of this current report. Data from all other playing levels are derived from respective season reports for the 2019-20 season.

Injury event

The tackle was the most common event associated with injury, collectively accounting for 56% of match injuries. This finding is common across other injury surveillance studies, which have shown the tackle to be responsible for between 40% and 64% of all youth rugby injuries.

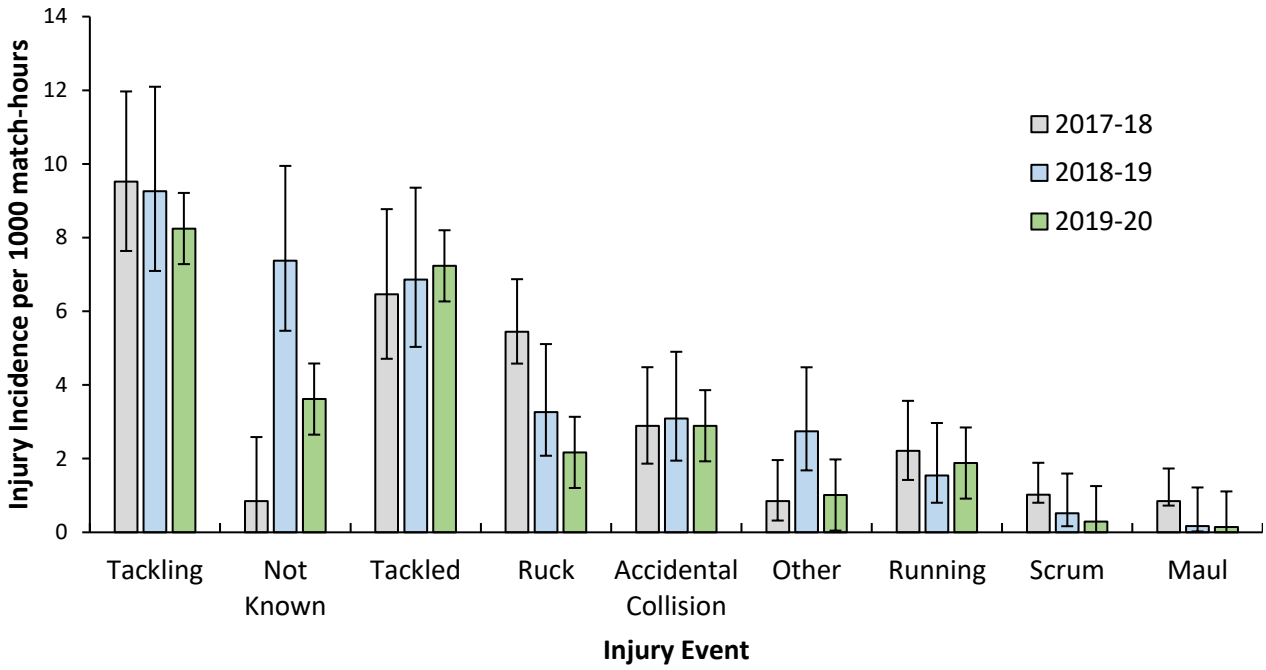


Figure 5. The incidence of injuries for specific match events for all playing levels combined across three seasons (2017-18, 2018-19 and 2019-20). In 2018-19, one team did not record injury event for any injuries, which explains the high incidence of "Not Known" events for that season.

Figure 6 combines incidence and average severity (days absence) for each injury event. Tackling was the event associated with the highest number of injuries, with the highest severity coming from the lineout (38 days lost, n=1). Being tackled was the next most severe event (38 days lost, n=50).

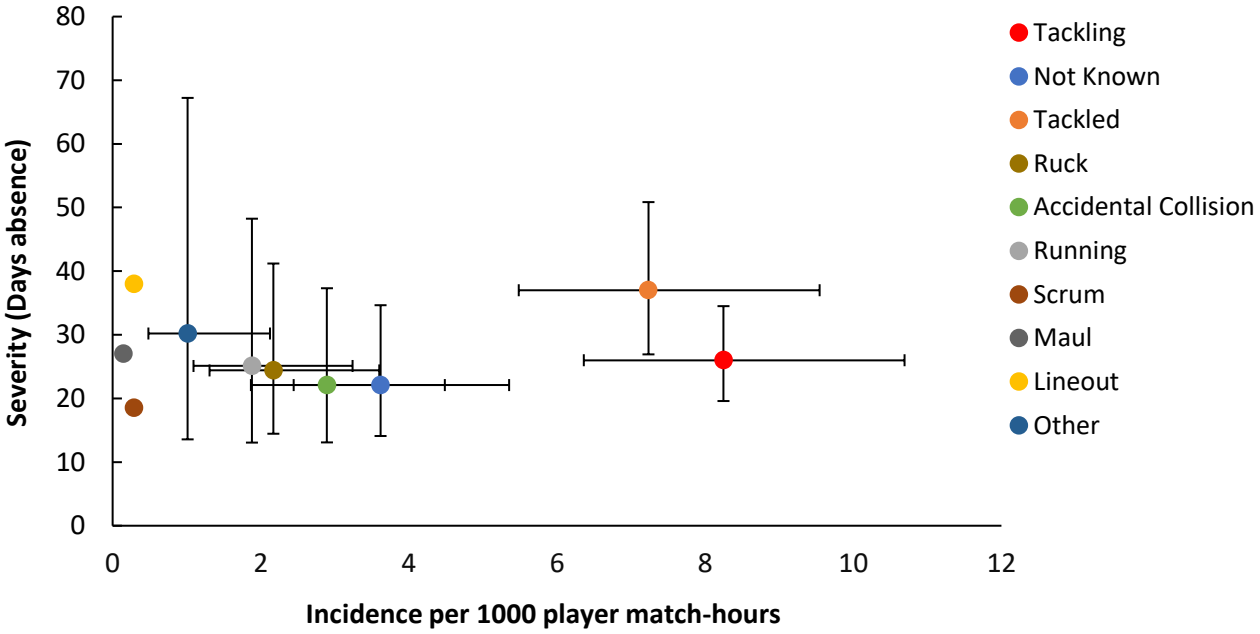


Figure 6. Injury event by incidence and days absence for 2019-20 season. *Note: Confidence intervals have been removed from events where n<5.*

Injury location

This section provides information on the most common injury sites. Figure 7 shows the head and neck was the most commonly injured locations at all age groups (joint most common at U13). Overall, the most common injury location was the head and neck, accounting for 38% of all injuries.

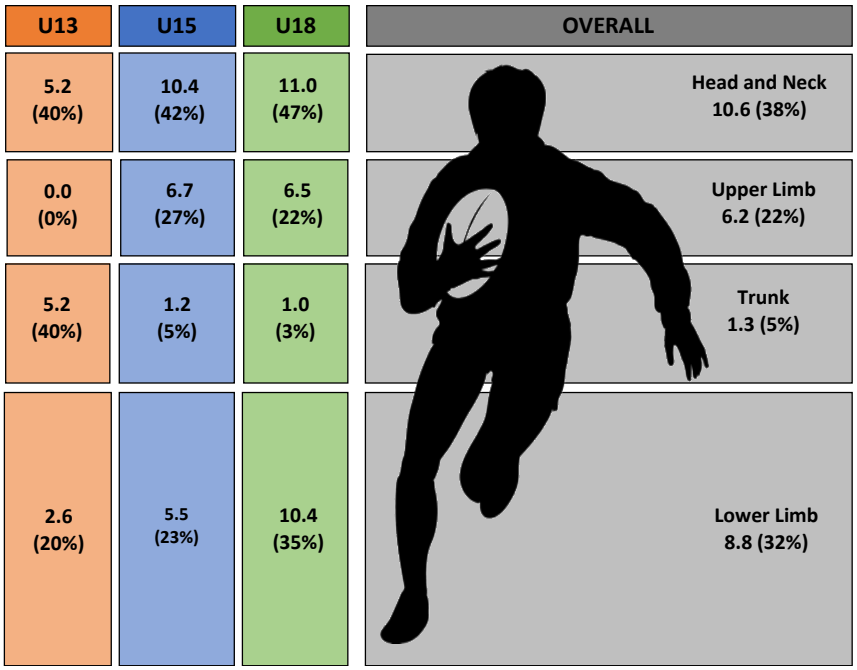


Figure 7. The distribution of match injuries by body region for 2019-20 season. Percentages (%) may not equal 100% due to unknown locations.

Table 3 shows more information on the incidence and burden for specific body locations. Overall, the most common injury location was the head (n=70), which also had the highest burden, 237 days lost per 1000 player match hours. The most severe injuries occurred to the lumbar spine, with a time loss of 55 days (n=1), followed by the ankle (53 days, n=15).

Table 3. Incidence, severity and burden by body location (ranked within each region for burden) for 2019-20 season. Across incidence, severity and burden, values are colour coded for all sites (red: highest value – green: lowest value).

Body Region	Body Location	Count (n)	Percentage (%)	Incidence (/1000h)	Mean Days Absence	Burden (/1000h)
Head/Neck	Head	70	36.5%	10.1	23	237
	Neck	3	1.6%	0.4	14	6
Upper Limb	Wrist & Hand	18	9.4%	2.6	25	65
	Shoulder	23	12.0%	3.3	40	131
	Elbow	1	0.5%	0.1	34	5
	Forearm	1	0.5%	0.1	Unknown	Unknown
Trunk	Chest	1	0.5%	0.1	30	4
	Lumbar Spine	1	0.5%	0.1	55	8
	Thoracic	3	1.6%	0.4	20	9
	Trunk & Abdomen	4	2.1%	0.6	9	5
Lower Limb	Ankle	15	7.8%	2.2	53	114
	Knee	5	2.6%	0.7	36	26
	Foot	11	5.7%	1.6	30	47
	Thigh	14	7.3%	2.0	19	38
	Hip & Groin	13	6.8%	1.9	8	15
	Lower Leg	3	1.6%	0.4	26	11
Unknown		6	3.1%	0.9	27	24

Injury type

Table 4 shows the incidence, severity and burden of injury by type. For the 2019-20 season, the highest incidence was for central/peripheral nervous system injuries. Bone injuries were the most severe (mean days lost = 49) and Joint / Ligament had the highest burden, a finding consistent across all seasons.

Table 4. Incidence, severity and burden per type of injury over three seasons (2017-18, 2018-19 and 2019-20). *Note: CNS/PNS = Central nervous system/peripheral nervous system and includes the specific diagnosis of concussion.*

Injury Type	2017-18			2018-19			2019-20		
	n	Incidence (/1000h)	Burden (/1000h)	n	Incidence (/1000h)	Burden (/1000h)	n	Incidence (/1000h)	Burden (/1000h)
Joint/ligament	53	9.0	318	63	10.8	363	53	7.7	276
CNS/PNS	42	7.1	211	54	9.3	262	62	9.0	244
Muscle/tendon	45	7.7	155	43	7.4	99	40	5.8	95
Bone/Fracture	21	3.6	303	17	2.9	219	19	2.7	135
Other	9	1.5	25	17	2.9	58	13	1.9	19
Skin/Abrasion	7	1.2	13	9	1.5	20	5	0.7	9

Figure 8 shows the top four most common diagnoses by age group, although due to the low number of injuries at U13 there were only three reported for this age group. The most common type of injury was central/peripheral nervous system injuries for all age groups and overall. Joint/ ligament injuries were joint most common at U18 and second most common at U15 and overall.

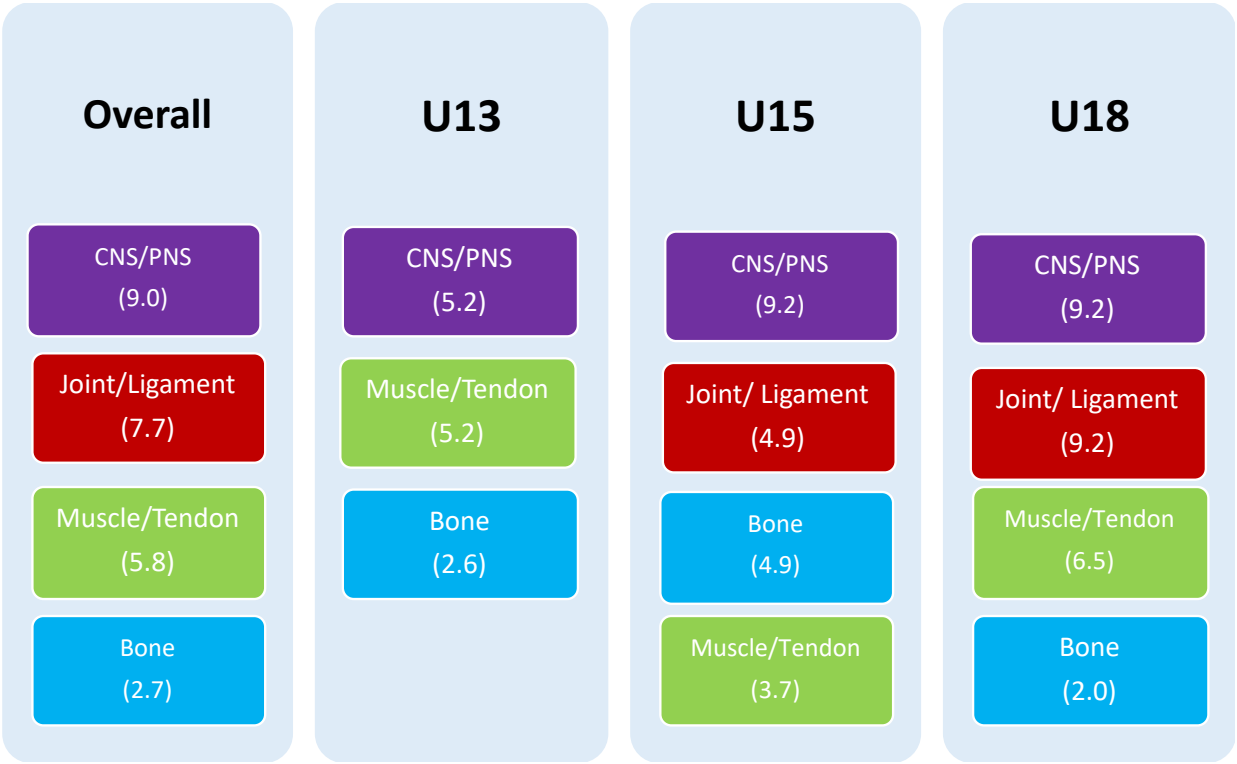


Figure 8. Top four injury types in rank order for **injury incidence** for all age groups in the 2019-20 season. Numbers within brackets denote incidence (injuries per 1000 player match hours).

Concussion

Concussion incidence and severity

The 2019/20 concussion incidence was 8.7 concussions per 1000 player match hours. This equates to 1 concussion in every 7 team games and accounted for 31% of all time-loss injuries (Table 5).

Table 5. Overview of concussion incidence, severity and burden across three seasons (2017-18, 2018-19 and 2019-20).

	2017-18				2018-19				2019-20			
Age Group	n	Incidence (/1000h)	Severity (days)	Burden (/1000h)	n	Incidence (/1000h)	Severity (days)	Burden (/1000h)	n	Incidence (/1000h)	Severity (days)	Burden (1000h)
U13	4	6.0	22	135	0	-	-	-	2	5.2	34	177
U15	9	5.8	25	144	7	4.3	28	119	15	9.2	24	221
U18	27	7.4	33	246	44	11.4	30	339	43	8.8	28	242
Overall	**40**	**6.8**	**30**	**114**	**51**	**8.7**	**29**	**255**	**60**	**8.7**	**26**	**234**

Match events associated with concussion

In 2019-20, the tackle was the reported injury event for 52% of all concussions with 12% of all concussions to the ball carrier and 40% to the tackling player. Further work is required to understand the specific characteristics of tackles which result in injury.

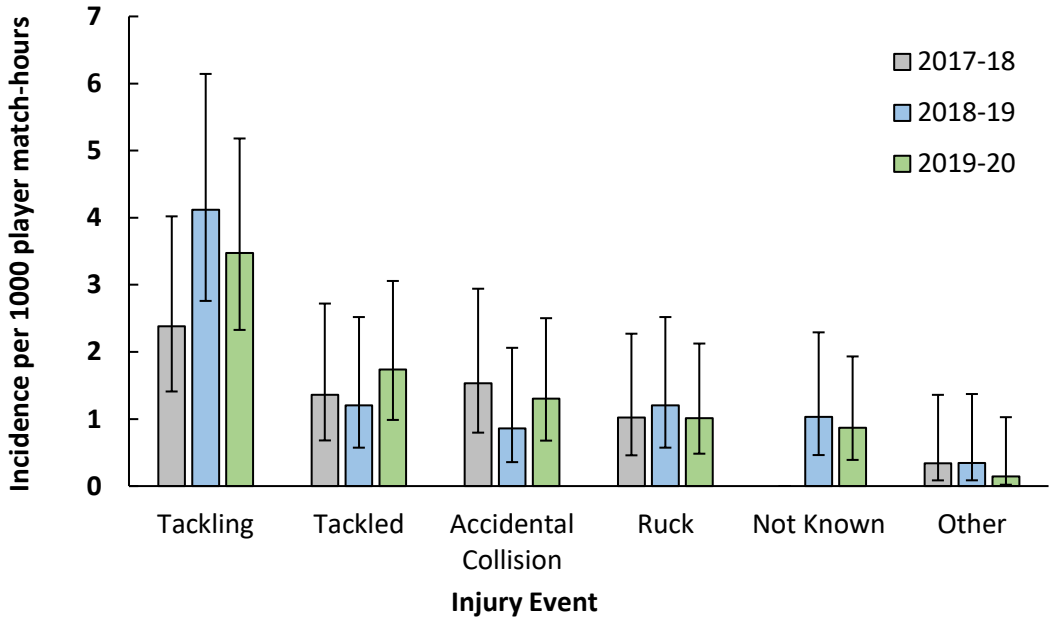


Figure 9. Incidence of reported concussions by match event for 2017-18, 2018-19 and 2019-20 season.

Recognising concussion

In community rugby, all teams should adhere to the principle of recognising the signs and symptoms of concussion and subsequently removing the player from play immediately. The player should not return to the field during that match. More detailed information can be found on:

https://www.englandrugby.com//dxdam/8e/8e2aeb31-9111-4d43-8410-a6ef89aad1c6/Pocket%20Concussion%20Recognition%20Tool_Neutral.pdf

Return to play guidelines

The return to play pathway for player's under-19 and below can be seen in Figure 11. This includes a minimum of two weeks physical rest, prior to commencing a graduated return to play (GRTP) protocol once the athlete is symptom free. All players must be reviewed by a healthcare professional prior to commencing contact. The minimum timeframe in which the protocol can be completed is 23 days. However, not all athletes will recover fully within this timeframe and may need longer. More information on the return to play pathway, GRTP protocol and training resources can be accessed via the RFU's Headcase resource:

https://www.englandrugby.com/participation/playing/headcase

Specific guidelines on the pathways for concussed players returning to play can be accessed via the RFU's Headcase resource:

https://www.englandrugby.com/participation/playing/headcase

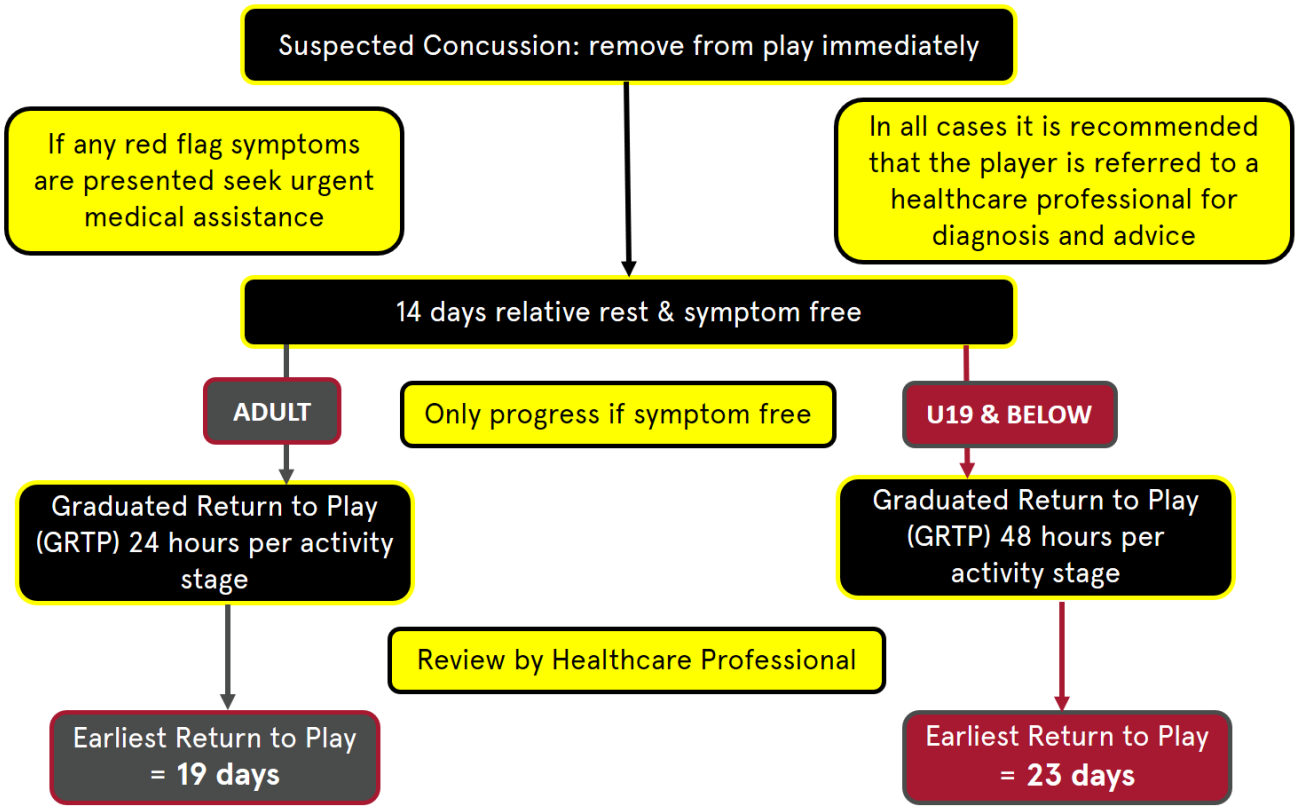


Figure 11. Standard return to play pathway for concussed players.

Playing position

In 2019-20, there were 98 injuries to forwards and 92 injuries to backs, equating to an injury incidence for forwards of 26.6 injuries per 1000 player hours and 28.5 injuries per 1000 player hours for backs (Table 6). The mean number of days missed for an injury to forwards was 27 days, compared with 30 days for backs.

Table 6. Overview of injury incidence, severity and burden by general positional groupings over three seasons (2017-18, 2018-19 and 2019-20).

Pos	2017-18				2018-19				2019/20			
	n	Incidence (p/1000h)	Severity (days)	Burden (/1000h)	n	Incidence (p/1000h)	Severity (days)	Burden (/1000h)	n	Incidence (p/1000h)	Severity (days)	Burden (/1000h)
Fwd	96	30.6	30	912	96	30.9	31	945	98	26.6	27	718
Bks	81	29.5	35	1042	73	26.8	30	792	92	28.5	30	842

When broken down further (Figure 12), injuries were most common for inside and outside backs (30.4/1000h respectively) in the 2019-20 season, although there were no significant differences by position.

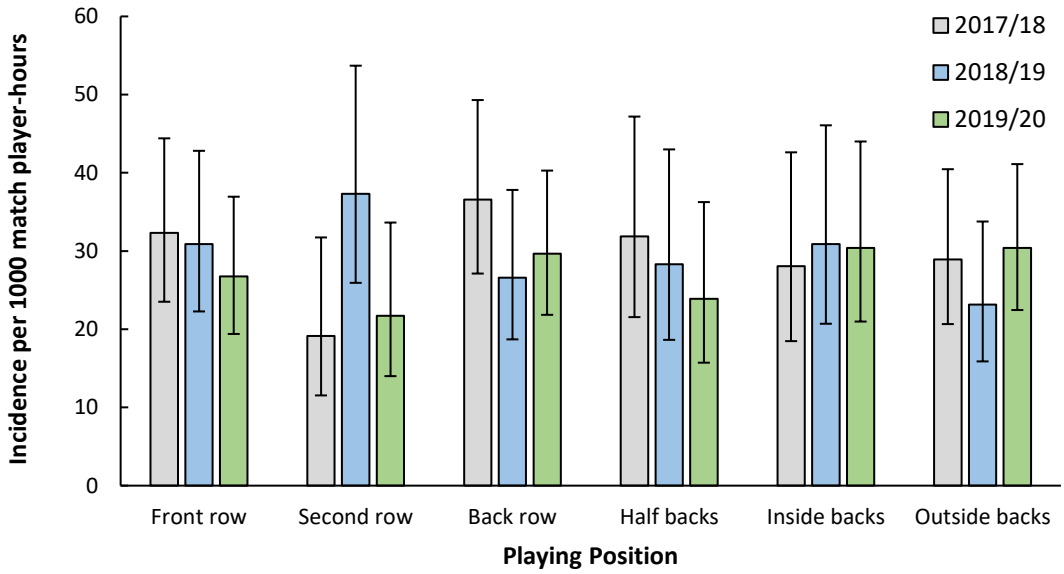


Figure 12. Comparison on injury incidence between positional groups for injury incidence. *Note: Forwards: Front row: loose head and tight head props, hooker, Second row: left and right locks; Back row: open side and blind side flankers, No. 8; Backs: Inside backs: outside half, inside centre, outside centre; outside backs: left and right wings, full back.*

FUTURE DIRECTIONS FOR THE PROJECT

There have been intermittent studies of injury in schoolboy rugby in England since 2006, but this project establishes longitudinal data collection which enables comparisons of trends over consecutive seasons. We are always looking for schools to take part and contribute to this research.

Alongside this research, there is an ongoing study further investigating the *Activate* injury prevention exercise programme. The aim of this research is to evaluate the awareness, use and adherence of *Activate* amongst schoolboy rugby players and coaches, whilst assessing the effectiveness of the programme at various doses.

To give context to these studies, match analysis is also being conducted. Initially, research is looking to understand how the game differs at different age groups by comparing the number of events within matches. As most injuries occur within the tackle, a second study is seeking to identify any differences in the characteristics of the tackle at each age group.

PROJECT METHODS

Recruitment

A database of 278 schools was compiled from previous seasons which was subsequently used for recruitment. Schools were contacted via email and invited to participate in YRISP. Schools who wished to do so participated voluntarily and consent was gained from players and their parents at the beginning of the season. The 21 schools who participated were spread across the country, with the majority located in southern England (Figure 13). There was a greater weighting of independent schools (blue marker) participating compared to state schools (maroon marker).

Figure 13. Map showing locality of participating schools, and their status, for the 2019-20 season.

Data collection

Each participating school assigned a primary contact who was provided with a bespoke worksheet to record exposure and injury reporting. The primary contact was asked to record this data weekly and transfer back to the research team at the University of Bath on a monthly basis. Report forms contained the following information:

Match exposure data (location, surface type, length of game, opponent, outcome)

Injury data (date of injury, return to play date, match quarter, position, mechanism, location, type)

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