

# **World Rugby**

Surveillance Studies

2022 Challenger Series

Men's and Women's Rugby Sevens

Final Report

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#### 1 Introduction

World Rugby is committed to implementing injury surveillance studies at all major World Rugby tournaments and to disseminate the results within the Rugby community.

The aims of these studies are:

- to record and analyse injuries and illnesses sustained by male and female players at individual tournaments,
- to identify changing patterns of injury, and
- to bring injury-related areas of concern to the attention of World Rugby's Chief Medical Officer.

World Rugby injury surveillance studies have previously included the men's and women's Sevens Series, Rugby World Cup Sevens, Olympic Games Rugby Sevens and Commonwealth Games Rugby Sevens. Reports of these injury surveillance studies are available on World Rugby's Player Welfare web pages. The injury surveillance study reported here expands the range of international competitions covered by World Rugby by reporting injuries sustained during the men's and women's 2022 Challenger Series Rugby Sevens. The winners of the men's and women's Challenger Series gain promotion to World Rugby's 2022/23 Sevens Series.

#### 2 Methods

Both the men's and women's injury surveillance studies were conducted in accordance with the definitions and protocols described in the World Rugby approved consensus statement on definitions and procedures for injury surveillance studies in Rugby (Fuller et al., 2007).

The definition of injury was: 'Any injury sustained during a scheduled 2022 Challenger Series match that prevents a player from taking a full part in all normal training activities and/or match play for more than one day following the day of injury'. A recurrent injury was defined as: 'An injury (as defined above) of the same type and at the same site as an index injury and which occurs after a player's return to full participation from the index injury'.

Specific injuries were classified using the Orchard coding system (Orchard, 2010). Injury location, type and cause together with the events leading to the injuries were also recorded.

Injuries that were not related directly to a Challenger Series Rugby Sevens match were not included.

Injury severity was determined by the number of days a player was injured: a player was deemed to be 'injured' until he/she could undertake full, normal training and be available for match selection, whether or not he/she was actually selected. Medical staff were required to make an informed clinical judgement about a player's fitness to train/play on those days when players were not scheduled to train or play. Injured players were followed up after the tournaments to obtain their actual return to play date: the return to play dates for players with injuries that remained unresolved 3 months after the final game in the 2022 Challenger Series were



estimated on the basis of a clinical judgement and prognosis provided by the injured player's medical staff.

The complete lists of categories and sub-categories used for categorising injury locations and injury types are provided in the rugby injury consensus publication (Fuller et al., 2007).

Where appropriate, differences in players' anthropometric data were assessed using unpaired t-tests; differences in the incidences, mean severity and proportions of injuries were assessed using z-tests and differences in median severity using a Mann-Whitney U test. Differences in injury numbers were assessed using the chi-squared test. Where applicable, statistical significance was accepted at the p $\leq 0.05$  level, although it is recognised that this could identify some differences that occurred by chance, due to the number of statistical comparisons being made in the study. For some parameters, potential differences between competitions were assessed by comparing the 95% confidence intervals associated with the parameters for each sample population.

#### 3 Data collection

The men's and women's 2022 Challenger Series Rugby-7s tournaments took place in Santiago, Chile over the period 12 to 14 August 2022.

Each team's medical staff was asked to explain the purpose of the injury surveillance studies to their squad of players. Players' baseline anthropometric information (playing position [back, forward]; date of birth; body mass [Kg]; stature [cm]) was recorded before the start of the tournaments. Medical staff were asked to record injuries sustained during the tournament on the World Rugby online Injury Surveillance Web App, with a member of the team's medical staff recording detailed information about each injury (date of injury, date of return to play, location and type of injury, cause of injury, event leading to injury). All information entered on the ISS Web App was checked and followed up with team medical staff, if required.

#### 4 Results

Results are presented separately for the men's and women's Challenger Series tournaments.

Results obtained at the men's and women's 2022 Challenger Series Rugby-7s tournaments are compared with the results previously reported for the men's and women's 2020 Tokyo Olympic Games (which took place in 2021), as the Olympic Games tournament provides a similar standard of play and was implemented in a similar format to those of the 2022 Challenger Series.

When assessing the results presented in this report, it is essential to take into account that the overall match exposure levels and the numbers of injuries sustained during the tournaments were relatively small and, therefore, the confidence intervals reported for the results are wide. For this reason, the data have not been "over-analysed" by using too many sub-categories and, for some results, information for backs and forwards have been combined in order to provide more meaningful information.



# 4.1 Men's 2022 Challenger Series

The 12 countries taking part in the men's 2022 Challenger Series were: Chile, Georgia, Germany, Hong Kong, Jamaica, Lithuania, Papua New Guinea, South Korea, Tonga, Uganda, Uruguay and Zimbabwe. All teams provided players' anthropometric information and nine teams provided injury data.

# 4.1.1 Players' anthropometric data

Table 1 summarises the numbers and anthropometric data for players categorised as backs, forwards and all players at the 2022 Challenger Series and 2020 Tokyo Olympics.

Table 1: Men's anthropometric data: 2022 Challenger Series and 2020 Tokyo Olympics

Tournament/	Mean (Standard deviation, number of players)		
measure	Backs	Forwards	ALL players
2022 Challenger	Series		
Stature, cm Body mass, Kg Age, years	177.7 (7.7, 79) 82.1 (7.3, 79) 25.6 (3.7, 79)	183.4 (5.9, 65) 90.4 (9.4, 65) 24.9 (3.3, 65)	180.3 (7.5, 144) 85.8 (9.2, 144) 25.3 (3.5, 144)
2020 Tokyo Olympics			
Stature, cm Body mass, Kg Age, years	179.9 (6.3, 89) 84.9 (7.2, 89) 27.2 (3.7, 89)	186.6 (5.3, 67) 95.8 (6.6, 67) 27.2 (4.1, 67)	182.8 (6.8, 156) 89.5 (8.8, 156) 27.2 (3.8, 156)

At the 2022 Challenger Series, forwards were significantly taller (p<0.001) and heavier (<0.001) than the backs but there was no significant difference in their ages (p=0.234).

Backs were significantly younger (p<0.001), shorter (p=0.041) and lighter (p<0.012) at the 2022 Challenger Series than at the 2020 Tokyo Olympics. Forwards were also significantly younger (<0.001), shorter (p<0.001) and lighter (p<0.001) at the 2022 Challenger Series compared to the 2020 Tokyo Olympics.

#### 4.1.2 Injuries

The 9 men's teams reporting injuries sustained 10 match injuries (backs: 3; forwards: 7) as a result of 53 team-games (backs: 49.5 player-match-hours; forwards: 37.1 player-match-hours; all players: 86.6 player-match-hours).



#### 4.1.2a Incidence of match injuries

Table 2 summarises the number of match injuries, exposures and incidences of injuries sustained at the 2022 Challenger Series and 2020 Tokyo Olympics.

Table 2: Numbers, exposures (player-match-hours) and incidences (injuries/1000 player-match-hours, 95% confidence interval) of match injuries sustained at the 2022 Challenger Series and 2020 Tokyo Olympics.

Tournament	Backs	Forwards	ALL players		
2022 Challeng	2022 Challenger Series				
Injuries	3	7	10		
Exposure	49.5	37.1	86.6		
Incidence	61 (20 - 188)	189 (90 - 396)	116 (62 – 215)		
2020 Tokyo O	2020 Tokyo Olympics				
Injuries	7	5	12		
Exposure	52.3	39.2	91.5		
Incidence	134 (64 – 281)	128 (53 – 307)	131 (75 – 231)		

Despite the incidence of injury for forwards being three times higher than that for backs at the 2022 Challenger Series, the difference was not statistically significant (p=0.099).

There were no significant differences in the incidences of injury recorded at the Challenger Series, compared to the 2020 Tokyo Olympics, for backs (p=0.250), forwards (p=0.509) or all players (p=0.779).

#### 4.1.2b Severity of injury

Table 3 summarises the mean and median severities of injuries sustained during the 2022 Challenger Series and 2020 Tokyo Olympics.

Table 3: Mean and median severities of match injuries sustained at the 2022 Challenger Series and 2020 Tokyo Olympics.

	Severity (95% Confidence interval), days		
Tournament/ severity	Backs	Forwards	ALL players
2022 Challeng Mean Median	<b>er Series</b> 29 (21 - 37) 25 (25 - 37)	34 (11 - 57) 16 (11 - 91)	33 (17 - 49) 25 (11 - 57)
<b>2020 Tokyo Ol</b> Mean Median	<b>ympics</b> 30 (19 - 41) 36 (5 - 47)	108 (41 - 175) 122 (19 - 213)	63 (27 - 98) 41 (19 - 122)



The severity values shown in Table 3, for both the 2022 Challenger Series and 2020 Tokyo tournaments, should be interpreted with caution, as the total numbers of injuries sustained in both competitions were small; this is reflected in the wide 95% CIs shown for backs and forwards.

There are no statistically significant differences between backs and forwards at the 2022 Challenger Series for either mean (p=0.682) or median (p=0.728) severities.

Based on the 95% CIs, there are also no significant differences in the severity of injuries sustained at the 2022 Challenger Series and 2020 Tokyo Olympics.

# 4.1.2c Location and type of injury

The number of injuries sustained in a single Challenger Series tournament is small, which means that the confidence intervals for some sub-location and sub-type injuries are very wide. While providing some useful information, it is important to treat the values presented below with caution.

Table 4 summarises the main and sub-locations of injuries sustained by ALL players at the 2022 Challenger Series and the main injury locations for the 2020 Tokyo Olympics.

Table 4: Locations of match injuries sustained by ALL players at the 2022 Challenger Series and 2020 Tokyo Olympics.

	Proportion, % (95% Confidence interval)		
Location of injury	2022 Challenger Series	2020 Tokyo Olympics	
Head/neck Head/face	40.0 (9.6 - 70.4) 40.0 (9.6 - 70.4)	41.7 (13.8 - 69.6)	
Upper limbs Shoulder/clavicle Wrist/hand	20.0 (0 - 44.8) 10.0 (0 - 28.6) 10.0 (0 - 28.6)	8.3 (0 - 24.0)	
Trunk	0.0 ( - )	8.3 (0 - 24.0)	
Lower limbs	40.0 (9.6 - 70.4)	41.7 (13.8 - 69.6)	
Knee	10.0 (0 - 28.6)		
Ankle	30.0 (1.6 - 58.4)		

Based on the 95% CIs, there are no statistically significant differences in the main locations of injuries sustained at the 2022 Challenger Series and 2020 Tokyo Olympics.



Table 5 summarises the main and sub-types of injuries sustained by ALL players at the 2022 Challenger Series and the main types sustained at the 2020 Tokyo Olympics.

Table 5: Main and sub-types of match injuries sustained by ALL players at the 2022 Challenger Series and the main types at the 2020 Tokyo Olympics.

	Proportion, % (95% Confidence interval		
Type of injury	2022 Challenger Series	2020 Tokyo Olympics	
Bone	10.0 (0 - 28.6)	0.0 ( - )	
Fracture C/PNS	10.0 (0 - 28.6) 30.0 (1.6 -58.4)	41.7 (13.8 - 69.6)	
Brain injury	30.0 (1.6 -58.4)		
Joint/non-bone/ligament	60.0 (29.6 - 90.4)	41.7 (13.8 - 69.6)	
Lesion meniscus/cartilage	10.0 (0 - 28.6)		
Sprain/ligament	50.0 (19.0 - 81.0)		
Muscle/tendon	0.0 ( - )	8.3 (0 - 24.0)	
Other	0.0 ( - )	8.3 (0 - 24.0)	

C/PNS: Central and peripheral nervous systems

Based on the 95% CIs, there are no statistically significant differences in the main types of injuries sustained at the 2022 Challenger Series and 2020 Tokyo Olympics.

# 4.1.2d Nature and cause of onset of injury

The number of injuries sustained in a single Challenger Series tournament is also too small to provide meaningful tournament-based analyses of the nature and cause of injuries sustained for backs and forwards separately.

Table 6 summarises the nature of onset of injuries sustained by ALL players at the 2022 Challenger Series and 2020 Tokyo Olympics.

Table 6: Nature of onset of injury at the 2022 Challenger Series and 2020 Tokyo Olympics.

Notice of information	Proportion, % (95% Confidence interval)			
Nature of injury	2022 Challenger Series 2020 Tokyo Olympics			
Acute	90.0 (71.4 - 100)	100 ( - )		
Gradual onset	10.0 (0 - 28.6)	0.0 ( - )		

Ninety per cent of all injuries sustained at the 2022 Challenger Series are acute in nature. Based on the 95% CIs, there are no statistically significant differences between the two tournaments.



Table 7 summarises the cause of onset of injuries sustained by ALL players at the 2022 Challenger Series and 2020 Tokyo Olympics.

Table 7: Cause of onset of injury at the 2022 Challenger Series and 2020 Tokyo Olympics.

Cause of injury	Proportion, % (95% Confidence interval) 2022 Challenger Series 2020 Tokyo Olympics		
Contact	100.0 ( - )	83.3 (62.2 - 100)	
Non-contact	0.0 ( - )	16.7 (0 - 37.8)	

All injuries sustained at the 2022 Challenger Series were due to contact events. Based on the 95% CIs there are no statistically significant differences between the two tournaments.

#### 4.1.2e Match period of injury

Table 8 provides a summary of the time periods during matches when injuries were sustained at the 2022 Challenger Series and 2020 Tokyo Olympics.

Table 8: Period of match when injuries were sustained at the 2022 Challenger Series and 2020 Tokyo Olympics.

Period of match	Proportion, % (95% Confidence interval) 2022 Challenger Series 2020 Tokyo Olympics		
First half	50.0 (19.0 - 81.0)	33.3 (6.7 - 60.0)	
Second half	50.0 (19.0 - 81.0)	66.7 (40.0 - 93.3)	

Based on the 95% CIs, there are no significant differences between the 2022 Challenger Series and 2020 Tokyo.



# 4.2 Women's 2022 Challenger Series

The 12 countries taking part in the women's 2022 Challenger Series were: Argentina, Belgium, Chile, China, Colombia, Japan, Kazakhstan, Kenya, Mexico, Papua New Guinea, Poland and South Africa. All teams provided players' anthropometric data and ten teams provided injury data.

# 4.2.1 Players' anthropometric data

Table 9 summarises the number of match injuries, exposures and incidences of injuries sustained at the 2022 Challenger Series and 2020 Tokyo Olympics.

Table 9: Women's anthropometric data: 2022 Challenger Series and 2020 Tokyo Olympics.

Tournament/	Mean (Standard deviation, number of players)		
measure	Backs	Forwards	ALL players
2022 Challenger	Series		
Stature, cm Body mass, Kg Age, years	165.7 (7.0, 83) 62.0 (6.6, 83) 24.9 (4.4, 83)	167.8 (5.7, 60) 66.6 (5.8, 60) 25.7 (4.2, 60)	166.6 (6.6, 143) 63.9 (6.7, 143) 25.2 (4.1, 143)
2020 Tokyo Olympics			
Stature, cm	166.6 (5.3, 89)	170.7 (6.5, 67)	168.3 (6.2, 156)
Body mass, Kg	64.7 (5.2, 89)	71.0 (6.7, 67)	67.4 (6.7, 156)
Age, years	25.1 (3.4, 89)	26.5 (3.7, 67)	25.7 (3.6, 156)

Forwards were taller (p-0.056) and significantly heavier (p<0.001) than backs at the 2022 Challenger Series but there was no statistically significant difference between the players' ages (p=0.276).

Backs at the 2022 Challenger Series were significantly lighter (p<0.001) than backs at the 2020 Tokyo Olympics but there were no significant differences in age (0.734) or stature (p=0.342). Forwards were significantly shorter (p<0.001) and lighter (p<0.001) compared to forwards at the 2020 Tokyo Olympics but there was no significant difference in the players' ages.

#### 4.2.2 Injuries

The 10 women's teams reporting match injuries sustained 9 match injuries (backs: 4; forwards: 4; position unknown: 1), as a result of 53 team-games (backs: 49.5 player-match-hours; forwards: 37.1 player-match-hours; all players: 86.6 player-match-hours). The small number of injuries sustained during the 2022 Challenger Series means that the analysis presented below is limited.



# 4.2.2a Incidence of match injuries

Table 10 summarises the number of match injuries, exposures and incidences of injuries at the 2022 Challenger Series and 2020 Tokyo Olympics for backs, forwards and all players.

Table 10: Numbers, exposures (player-match-hours) and incidences (injuries/1000 player-match-hours, 95% confidence interval) of match injuries sustained at the 2022 Challenger Series and 2020 Tokyo Olympics.

Tournament	Backs	Forwards	ALL players	
2022 Challeng	er Series			
Injuries	4	4	9*	
Exposure	53.2	39.9	93.1	
Incidence	75 (28 – 200)	100 (38 - 267)	97 (50 – 186)	
2020 Tokyo Ol	2020 Tokyo Olympics			
Injuries	8	3	11	
Exposure	57.9	43.4	101.3	
Incidence	138 (69 – 276)	69 (22 - 214)	109 (60 – 196)	

<sup>\*</sup> Playing position of 1 injured player was not identified.

There was no significant difference in the incidences of injury sustained by backs and forwards at the 2022 Challenger Series (p=0.682). There were also no significant differences between the incidences of injuries sustained at the 2022 Challenger Series and the 2020 Tokyo Olympics for either backs (p=0.317), forwards (p=0.624) or all players (p=0.928).

# 4.2.2b Severity of injury

Table 11 summarises the mean and median severities of all injuries sustained during the 2022 Challenger Series and 2020 Tokyo Olympics.

Table 11: Mean and median severities of match injuries sustained at the 2022 Challenger Series and 2020 Tokyo Olympics.

Tournament/	Severity (9	Severity (95% Confidence interval), days			
severity	Backs	Forwards	ALL players		
2022 Challeng	2022 Challenger Series				
Mean Median	88 (0 - 201) 43 (6 - 259)	37 (8 - 66) 28 (15 - 78)	63 (5 - 120) 36 (6 - 259)		
2020 Tokyo Olympics					
Mean Median	141 (60 - 222) 130 (10 - 318)	79 (0 - 158) 48 (29 - 159)	124 (61 - 187) 106 (17 - 268)		



There were no significant differences in either the mean or median severity values of injuries sustained during the 2022 Challenger Series, for both backs and forwards. These severity values, however, should be interpreted with caution, as the numbers of injuries sustained in both competitions were small; this is reflected in the width of the 95% CIs.

# 4.2.2c Location and type of injury

The small number of injuries sustained at the 2022 Challenger Series means that it is not possible to provide meaningful analyses for either the location or type of injuries sustained.

Table 12 summarises the main and sub-locations of injuries sustained by ALL players at the 2022 Challenger Series and the main injury locations sustained at the 2020 Tokyo Olympics.

Table 12: Locations of match injuries sustained by ALL players at the 2022 Challenger Series and 2020 Tokyo Olympics.

Location of injury	Proportion, % (95% Confidence interval)		
	2022 Challenger Series	2020 Tokyo Olympics	
Head/neck Head/face	25.0 (0 - 55.0) 25.0 (0 - 55.0)	9.1 (0 - 26.1)	
Upper limbs Wrist/hand	25.0 (0 - 55.0) 25.0 (0 - 55.0)	45.5 (16.0 – 74.9)	
Trunk	0.0 ( - )	0.0 ( - )	
Lower limbs Knee Lower leg Ankle	50.0 (15.4 - 84.6) 12.5 (0 - 35.4) 25.0 (0 - 55.0) 12.5 (0 - 35.4)	45.5 (16.0 – 74.9)	

Based on the 95% CIs, there are no statistically significant differences in the main locations of injuries sustained at the 2022 Challenger Series and 2020 Tokyo Olympics.

Table 13 summarises the main and sub-types of injuries sustained by ALL players at the 2022 Challenger Series and the main types of injuries sustained at the 2020 Tokyo Olympics.



Table 13: Main and sub-types of match injuries sustained by ALL players at the 2022 Challenger Series and the main types at the 2020 Tokyo Olympics

Type of injury	Proportion, % (95% Confidence interval)		
	2022 Challenger Series	2020 Tokyo Olympics	
Bone	37.5 (4.0 - 71.0)	18.2 (0 - 41.0)	
Fracture	37.5 (4.0 - 71.0)		
C/PNS	0.0 ( - )	9.1 (0 - 26.1)	
Joint/non-bone/ligament	37.5 (4.0 - 71.0)	54.5 (25.1 - 84.0)	
Ligament sprain	37.5 (4.0 - 71.0)		
Muscle/tendon	12.5 (0 - 35.4)	18.2 (0 - 41.0)	
Muscle strain	12.5 (0 - 35.4)		
Skin laceration	12.5 (0 - 35.4)	0.0 ( - )	

C/PNS: Central and peripheral nervous systems

No concussion injuries were sustained during the women's Challenger Series.

Based on the 95% CIs, there are no statistically significant differences in the main types of injuries sustained at the 2022 Challenger Series and 2020 Tokyo Olympics.

# 4.2.2d Nature and cause of onset of injury

All injuries sustained by backs and forwards were acute in nature. Three of the injuries sustained by backs resulted from contact activities (tackling: 3) and one from a non-contact activity (running: 1). For forwards, two injuries were the result of contact activities (collision: 1; tackled: 1), one from a non-contact activity (running: 1) and one was not identified.

# 4.2.2e Match period of injury

Five of the injuries were sustained in the first half and three in the second half; the timing of one injury could not be identified.



#### 5 Conclusion

The low match exposures and the corresponding small number of match injuries sustained during both the men's and women's Challenger Series limited the depth of analysis possible. However, the incidence of injuries sustained in both the men's and women's competitions were similar to those reported previously for the men's and women's 2020 Tokyo Olympics, which represents a similar competition structure and includes teams of a similar standard.

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China		Wen Songli
Colombia		Ivar Duran Valencia
Georgia	Davit Kobakhidze	
Germany	Bjorn Burgler	
Hong Kong	James Rees	
Jamaica	Zach Baggott	
Japan		Makoto Tanaka, Kanae Yasunaga
Kazakhstan		Sergey Granko
Kenya		Ben Mahinda
Lithuania	Tautvydas Melys	
Mexico		Nabile Marcela Aldrete Flores
Papua New Guinea	John Tekwie	Gabby Mailau
Poland		Robert Cajzer
South Africa		Reagan Cele Khumbuza
South Korea	Woojin Byun	
Tonga	Aurora Paris	
Uganda	Asiimwe Rwakijuma Samuel	
Uruguay	Santiago Ramirez	
Zimbabwe	Margaret Gibson	