Injury Surveillance Studies

2025 Men's Pacific Nations Cup

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1 Introduction

World Rugby is committed to implementing injury surveillance studies at all major World Rugby competitions 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 competitions,
- identify changing patterns of injury during competitions, and
- bring injury-related areas of concern to the attention of World Rugby's Chief Medical Officer.

The data collected in injury surveillance studies (ISS) are also used to address player welfare issues in a broader context.

This report provides injury surveillance data from the 2025 Pacific Nations Cup (PNC).

2 Methods

The study, which was conducted in accordance with the definitions and protocols described in the World Rugby approved consensus statement on definitions and procedures for ISS in rugby union (Fuller et al., 2007), follows the same methodology as that used for all World Rugby ISS.

The definition of injury was: '*Any injury sustained during a Pacific Nations Cup 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'*. Incidents where a player's absence from match play and/or training was caused by training activities, illness or other medical conditions not related to a Pacific Nations Cup match were not included. 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'.* Injuries were classified using the appropriate OSICS Code (Orchard et al., 2010). Injury location, type and cause together with the event leading to the injury were also recorded.

Injury severity was determined by the number of days a player was injured. A player was deemed 'injured' until able to undertake full normal training and be available for match selection, whether or not actually selected. Medical staff were required to make an informed clinical judgement about players' fitness to train/play on those days when players were not scheduled to train or play. Injured players were followed up after the competition to obtain their return-to-play date. The return-to-play dates for players with injuries that remained unresolved 90 days after the final match were estimated on the basis of the player's medical staff's clinical judgement and prognosis.

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

Differences in players' anthropometric data were assessed using unpaired t-tests; differences in the incidence, mean severity and proportions of injuries were assessed using z-tests and differences in median severity using a Mann-Whitney U test. Statistical significance was accepted at the $p \leq 0.050$ level, although it is recognised that this could identify some differences that occurred by chance due to the number of statistical comparisons made in the study.

3 Data collection

The 2025 PNC involved senior male national players from Canada, Fiji, Japan, Samoa, Tonga and USA. The competition took place from 22 August to 20 September 2025. The competition format consisted of two pools of 3 teams (Pool A: Fiji, Samoa, Tonga; Pool B: Canada, Japan, USA) with Pool matches taking place in the participating countries but with the final round of games taking place in USA.

Prior to the competition taking place, the purpose of the epidemiological study was outlined to the medical teams supporting each participating country. Each player's baseline anthropometric information was recorded (playing position [back, forward]; date of birth; body mass [Kg]; stature [cm]). Players joining a country's squad at a later date were added to the country's list of players and their anthropometric data recorded at the time the player joined the squad.

Medical staff were requested to record each match injury sustained during the competition. Detailed information (date of injury, date of return to play/training, location and type of injury, cause of injury, event leading to injury) was recorded for each injury sustained. The final piece of information recorded is normally an injured player's return-to-play/training date.

4 Results

The 2025 PNC matches took place over the period 22 August to 20 September 2025. Medical staff from all six countries taking part in the competition provided information for the players' anthropometric data and injuries sustained during the competition matches.

4.1 Players' anthropometric data

Table 1 summarises the player numbers and anthropometric data for players taking part in the 2025 PNC.

Table 1: Players' anthropometric data.

Year / Measure	**Mean** (*Standard deviation, number of players*)		
	Backs	***Forwards***	***ALL players***
2025 PNC competition			
Stature, cm	181.0 (6.5, 85)	186.3 (11.0, 108)	184.0 (9.6, 193)
Body mass, Kg	91.6 (8.5, 85)	114.6 (9.2, 107)	104.4 (14.5, 192)
Age, years	27.4 (4.0, 86)	27.9 (3.5, 107)	27.7 (3.7, 193)

Forwards were significantly heavier ($p<0.001$) and taller ($p<0.001$) than backs but there was no significant difference between their ages ($p=0.352$).

4.2 Match injuries

The PNC is a relatively small competition, which is reflected in the competition's total match exposure and the number of injuries reported. The 95% confidence intervals reported for some parameter values are, therefore, wide; despite this, the ISS data reported provide a valid perspective of the magnitude and nature of the injury risk associated with the PNC competition.

4.2a Incidence, severity and burden of injury

The number of match injuries, exposures and incidences of injury experienced by backs and forwards over the twenty-two team-games (11 matches) played during the 2025 PNC are shown in Table 2.

Table 2: Number, exposure (player-hours) and incidence (injuries/1000 player-match-hours, 95% confidence interval) of match injuries.

Year / Measure	*Backs*	*Forwards*	*ALL players*
2025 PNC competition			
Injuries	20	24	44
Exposure	205.3	234.7	440.0
Incidence	97.4 (62.8 – 151.0)	102.3 (68.5 – 152.6)	100.0 (74.4 – 134.4)

Two of the injuries sustained (backs: 1; forwards: 1) were reported as recurrences, which represent 4.5% of all injuries included in the study.

The difference in the injury incidences of backs and forwards is not statistically significant ($p=0.873$).

The mean and median severities of the injuries sustained during the 2025 PNC competition are shown in Table 3.

Table 3: Mean and median severities of match injuries.

Year / Measure	*days, (95% Confidence interval)*		
	Backs	*Forwards*	*ALL players*
2025 PNC competition			
Mean	22.5 (4.7 – 40.2)	16.9 (9.8 – 24.0)	19.4 (10.6 – 28.3)
Median	10.0 (6.0 – 21.0)	9.5 (6.0 – 13.0)	9.5 (6.0 – 13.0)

The total time lost as a consequence of the injuries sustained during the 2025 PNC competition amounted to 855 days (backs: 449; forwards:406).

The differences between the injury severity values for backs and forwards are not statistically significant (mean: p=0.574; median p=0.868).

Although the incidences of injury for backs and forwards were higher during the 2025 PNC than previously for the 2024 PNC (backs: 63.3 injuries/1000 player-hours; forwards: 51.1), the severity of the 2025 injuries was lower than that of the injuries sustained during the 2024 PNC (mean severity - backs: 46.5 days, forwards: 26.5, all players: 36.9; median severity – backs: 28.0 days, forwards: 13.5, all players: 20.0). Consequently, injury burden values during the 2025 PNC competition (backs 2187 days-absence/1000 player-hours, forwards: 1730, all players: 1943) were not significantly different from those reported previously for the 2024 PNC (backs: 2942 days-absence/1000 player-hours, forwards: 1355, all players: 2095).

4.2b Location and type of injury

The locations and types of injuries sustained during the 2025 PNC are shown in Tables 4 and 5, respectively.

Table 4: Locations of match injuries.

Location of injury	*% (95% Confidence interval)*		
	Backs	***Forwards***	***ALL players***
2025 PNC competition			
Head/neck	**25.0 (6.0 – 44.0)**	**45.8 (25.9 – 65.8)**	**36.4 (22.1 – 50.6)**
Head/face	25.0 (6.0 – 44.0)	41.7 (21.9 – 61.4)	34.1 (20.1 – 48.1)
Neck/cervical spine	0.0 (-)	4.2 (0 – 12.2)	2.3 (0 – 6.7)
Upper limbs	**20.0 (2.5 – 37.5)**	**16.7 (1.8 – 31.6)**	**18.2 (6.8 – 29.6)**
Shoulder/clavicle	15.0 (0 – 30.6)	8.3 (0 – 19.4)	11.4 (2.0 – 20.7)
Elbow	0.0 (-)	0.0 (-)	0.0 (-)
Forearm	0.0 (-)	0.0 (-)	0.0 (-)
Wrist/hand	5.0 (0 – 14.6)	8.3 (0 – 19.4)	6.8 (0 – 14.3)
Trunk	**15.0 (0 – 30.6)**	**0.0 (-)**	**6.8 (0 – 14.3)**
Ribs/upper back	15.0 (0 – 30.6)	0.0 (-)	6.8 (0 – 14.3)
Abdomen	0.0 (-)	0.0 (-)	0.0 (-)
Lower back	0.0 (-)	0.0 (-)	0.0 (-)
Lower limbs	**40.0 (18.5 – 61.5)**	**37.5 (18.1 – 56.9)**	**38.6 (24.2 – 53.0)**
Hips/groin	5.0 (0 – 14.6)	12.5 (0 – 25.7)	9.1 (0.6 – 17.6)
Thigh, anterior	10.0 (0 – 23.1)	0.0 (-)	4.5 (0 – 10.7)
Thigh, posterior	0.0 (-)	4.2 (0 – 12.2)	2.3 (0 – 6.7)
Knee	10.0 (0 – 23.1)	4.2 (0 – 12.2)	6.8 (0 – 14.3)
Lower leg	5.0 (0 – 14.6)	12.5 (0 – 25.7)	9.1 (0.6 – 17.6)
Ankle	5.0 (0 – 14.6)	0.0 (-)	2.3 (0 – 6.7)
Foot/toe	5.0 (0 – 14.6)	4.2 (0 – 12.2)	4.5 (0 – 10.7)

Table 5: Types of match injuries.

Type of injury	% (95% Confidence interval)		
	Backs	*Forwards*	*ALL players*
2025 PNC competition			
Bone	**10.0 (0 – 23.1)**	**4.2 (0 – 12.2)**	**6.8 (0 – 14.3)**
Fracture	10.0 (0 – 23.1)	4.2 (0 – 12.2)	6.8 (0 – 14.3)
C/PNS	10.0 (0 – 23.1)	**33.3 (14.5 – 52.2)**	**22.7 (10.3 – 35.1)**
Concussion	10.0 (0 – 23.1)	29.2 (11.0 – 47.4)	20.5 (8.5 – 32.4)
Nerve	0.0 (-)	4.2 (0 – 12.2)	2.3 (0 – 6.7)
Joint (non-bone)/lig[t]	**25.0 (6.0 – 44.0)**	**20.8 (4.6 – 37.1)**	**22.7 (10.3 – 35.1)**
Dislocation/sublux[n]	10.0 (0 – 23.1)	4.2 (0 – 12.2)	6.8 (0 – 14.3)
Lesion meniscus	0.0 (-)	0.0 (-)	0.0 (-)
Sprain/ligament	15.0 (0 – 30.6)	16.7 (1.8 – 31.6)	15.9 (5.1 – 26.7)
Muscle/tendon	**30.0 (9.9 – 50.1)**	**37.5 (18.1 – 56.9)**	**34.1 (20.1 – 48.1)**
Haematoma	5.0 (0 – 14.6)	12.5 (0 – 25.7)	9.1 (0.6 – 17.6)
Muscle rupture/etc	25.0 (6.0 – 44.0)	20.8 (4.6 – 37.1)	22.7 (10.3 – 35.1)
Tendon injury	0.0 (-)	4.2 (0 – 12.2)	2.3 (0 – 6.7)
Skin	**15.0 (0 – 30.6)**	**4.2 (0 – 12.2)**	**9.1 (0.6 – 17.6)**
Laceration	15.0 (0 – 30.6)	4.2 (0 – 12.2)	9.1 (0.6 – 17.6)
Other	**10.0 (0 – 23.1)**	**0.0 (-)**	**4.5 (0 – 10.7)**

C/PNS: Central and peripheral nervous systems

Based on the 95% confidence intervals, there are no significant differences between the results for backs and forwards for either injury location or injury type. The head/face was the most common location of injuries for both backs (25.0%) and forwards (41.7%). The most common injury type was muscle ruptures for backs (25.0%) and concussions for forwards (29.2%).

The most common specific injuries sustained across all players were concussion (20.5%), face laceration (9.1%) and shoulder muscle (6.8%) injuries.

The specific injuries responsible for the greatest time-loss across all players were hip muscle (21.4%), concussion (12.0%) and lower leg muscle (13.6%) injuries.

4.2c Onset and cause of injury

Table 6 summarises the nature of injury onset, as a function of playing position.

Table 6: Nature of onset of match injuries.

Nature of onset	% (95% Confidence interval)		
	Backs	*Forwards*	*ALL players*
2025 PNC competition			
Acute	95.0 (85.4 – 100)	91.7 (80.6 – 100)	93.2 (85.7 – 100)
Gradual-onset	5.0 (0 – 14.6)	8.3 (0 – 19.4)	6.8 (0 – 14.3)

There is no statistically significant difference (p=0.660) between backs and forwards for the proportions of acute and gradual-onset injuries sustained.

Table 7 summarises the cause of injury onset, as a function of playing position.

Table 7: Cause of match injuries.

Cause of onset	% (95% Confidence interval)		
	Backs	*Forwards*	*ALL players*
2025 PNC competition			
Contact	80.0 (62.5 – 97.5)	83.3 (68.4 – 98.2)	81.8 (70.4 – 93.2)
Non-contact	20.0 (2.5 – 37.5)	16.7 (1.8 – 31.6)	18.2 (6.8 – 29.6)

There was again no statistically significant difference (p=0.772) between backs and forwards for the proportions of contact and non-contact injuries sustained.

The match activities associated with the injuries sustained by backs and forwards are shown in Table 8.

Table 8. Match activities associated with the injuries sustained

Cause of onset	% (95% Confidence interval)		
	Backs	*Forwards*	*ALL players*
2025 PNC competition			
Collision	45.0 (23.2 – 66.8)	29.2 (11.0 – 47.4)	36.4 (22.1 – 50.6)
Kicking	0.0 (-)	0.0 (-)	0.0 (-)
Lineout	0.0 (-)	0.0 (-)	0.0 (-)
Maul	0.0 (-)	0.0 (-)	0.0 (-)
Ruck	0.0 (-)	12.5 (0 – 25.7)	6.8 (0 – 14.3)
Running	20.0 (2.5 – 37.5)	16.7 (1.8 – 31.6)	18.2 (6.8 – 29.6)
Scrum	0.0 (-)	4.2 (0 – 12.2)	2.3 (0 – 6.7)
Tackled	20.0 (2.5 – 37.5)	16.7 (1.8 – 31.6)	18.2 (6.8 – 29.6)
Tackling	10.0 (0 – 23.1)	16.7 (1.8 – 31.6)	13.6 (3.5 – 23.8)
Other	5.0 (0 – 14.6)	4.2 (0 – 12.2)	4.5 (0 – 10.7)

Collision was the match activity most often associated with injuries for both backs (45.0%) and forwards (29.2%). For concussions, 56% of injuries were associated with collisions, 33% with being-tackled and 11% with tackling.

4.2d Removal of players from game when injured

Table 9 shows the stage in matches when injured players were removed from play.

Table 9: Time when injured players were removed from play.

Cause of onset	% (95% Confidence interval)		
	Backs	*Forwards*	*ALL players*
2025 PNC competition			
Immediately	10.0 (0 – 23.1)	25.0 (7.7 – 42.3)	18.2 (6.8 – 29.6)
Later	25.0 (6.0 – 44.0)	37.5 (18.1 – 56.9)	31.8 (18.1 – 45.6)
Not at all	65.0 (44.1 – 85.9)	37.5 (18.1 – 56.9)	50.0 (35.2 – 64.8)

The majority of injured backs and forwards were either not removed from the game (backs: 65.0%; forwards: 37.5%) or were removed later in the game (backs: 25.0%; forwards: 37.5%). This situation possibly reflects the generally low severity of many of the injuries sustained during the 2025 PNC.

For concussion injuries, however, players were mostly removed immediately (77.8%) or later in the game (11.1%).

4.2e Time in game when players are injured

Table 10 shows the stage in matches when players were injured.

Table 10: Time of game when players were injured.

Cause of onset	% (95% Confidence interval)		
	Backs	*Forwards*	*ALL players*
2025 PNC competition			
0-20 mins	25.0 (6.0 – 44.0)	12.5 (0 – 25.7)	18.2 (6.8 – 29.6)
21-40 mins	0.0 (-)	20.8 (4.6 – 37.1)	11.4 (2.0 – 20.7)
41-60 mins	30.0 (9.9 – 50.1)	29.2 (11.0 – 47.4)	29.5 (16.1 – 43.0)
61-80 mins	45.0 (23.2 – 66.8)	37.5 (18.1 – 56.9)	40.9 (26.4 – 55.4)

Significantly more players (p=0.007) were injured during the second half of matches than were injured during the first half.

5. References

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