Injuries in rugby union

Presented by Keith Stokes
Professor of Applied Physiology, University of Bath
Medical Research Lead, Rugby Football Union

World Rugby Transgender Meeting
25 February 2020

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What I will cover

Background to injury surveillance methods

Injuries in elite rugby union

Size, strength, speed and scrum forces differences between elite men and elite women

Any evidence that size and strength is an injury risk factor?

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What is an injury?

"To many people, discussion about the definition of an injury is an over-complex, theoretical debate about what is essentially a simple issue"

Colin Fuller

Consensus statement

International Olympic Committee consensus statement: methods for recording and reporting of epidemiological data on injury and illness in sport 2020 (including STROBE Extension for Sport Injury and Illness Surveillance (STROBE-SIIS))

Roald Bahr [1,2] Ben Clarsen [1,3] Wayne Derman,[4] Jiri Dvorak,[5] Carolyn A Emery [6,7] Caroline F Finch [8] Martin Hägglund [9] Astrid Junge,[10,11] Simon Kemp,[12,13] Karim M Khan [14,15] Stephen W Marshall,[16] Willem Meeuwisse,[17,18] Margo Mountjoy [19,20] John W Orchard [21] Babette Pluim,[22,23] Kenneth L Quarrie [24,25] Bruce Reider,[26] Martin Schwellnus,[27] Torbjørn Soligard [28,29] Keith A Stokes [30,31] Toomas Timpka [32,33] Evert Verhagen [34] Abhinav Bindra,[35] Richard Budgett,[28] Lars Engebretsen,[1,28] Uğur Erdener,[28] Karim Chamari[36]

Injury is tissue damage or other derangement of normal physical function due to participation in sports, **resulting from rapid or repetitive transfer of kinetic energy**.

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Consensus statements for various sports

ORIGINAL ARTICLE

Methods for injury surveillance in international cricket

J W Orchard, D Newman, R Stretch, W Frost, A Mansingh, A Leipus

Br J Sports Med 2005;**39**:e22 (http://www.bjsportmed.com/cgi/content/full/39/4/e22). doi: 10.1136/bjsm.2004.012732

REVIEW

Consen
collecti

C W Fuller,
W H Meeuv

Journal of Science and Medicine in Sport (2009) 12, 12–19

ELSEVIER

Journal of Science and Medicine in Sport

www.elsevier.com/locate/jsams

OPINION PIECE

Epidemiological studies of injuries in rugby
league: Suggestions for definitions, data collection

European consensus on epidemiological studies of injuries in the thoroughbred horse racing industry

on,[4]
adot[4]

ury

ier,[11]

statement

SHORT REPORT

Consensus statement on injury definitions and data collection procedures for studies of injuries in rugby union

Colin W Fuller, Michael G Molloy, Christian Bagate, Roald Bahr, John H M Brooks, Hilton Donson, Simon P T Kemp, Paul McCrory, Andrew S McIntosh, Willem H Meeuwisse, Kenneth L Quarrie, Martin Raftery, Preston Wiley

Br J Sports Med 2007;**41**:328–331. doi: 10.1136/bjsm.2006.033282

Review

Consensus statement on epidemiological studies of medical conditions in tennis, April 2009

B M Pluim,[1] C W Fuller,[2] M E Batt,[3] L Chase,[4] B Hainline,[5] S Miller,[6] B Montalvan,[7] P Renström,[8] K A Stroia,[4] K Weber,[9] T O Wood[10]

Consensus statement

International consensus statement on injury surveillance in cricket: a 2016 update

John W Orchard,[1,2] Craig Ranson,[3] Benita Olivier,[4] Mandeep Dhillon,[5] Janine Gray,[6,7] Ben Langley,[8] Akshai Mansingh,[9] Isabel S Moore,[3] Ian Murphy,[10] Jon Patricios,[11,12] Thiagarajan Alwar,[13] Christopher J Clark,[14] Brett Harrop,[15] Hussain I Khan,[16] Alex Kountouris,[2] Mairi Macphail,[17] Stephen Mount,[18] Anesu Mupotaringa,[19] David Newman,[8] Kieran O'Reilly,[20] Nicholas Peirce,[8,21] Sohail Saleem,[16] Dayle Shackel,[10] Richard Stretch,[22] Caroline F Finch[23]

International Olympic Committee consensus statement: methods for recording and reporting of epidemiological data on injury and illness in sport 2020 (including STROBE Extension for Sport Injury and Illness Surveillance (STROBE-SIIS))

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Rugby Injury Surveillance

AIM | to describe the incidence and severity of injuries in rugby

METHOD | capture information about all **injuries** during rugby and information about all **exposure** to playing rugby

TIME LOSS INJURY | any injury resulting in an absence from full participation in match play or training

INCIDENCE | number of injuries per 1000 player hours of exposure

SEVERITY | number of missed due to injury

BURDEN | number of days lost per 1000 player hours of exposure

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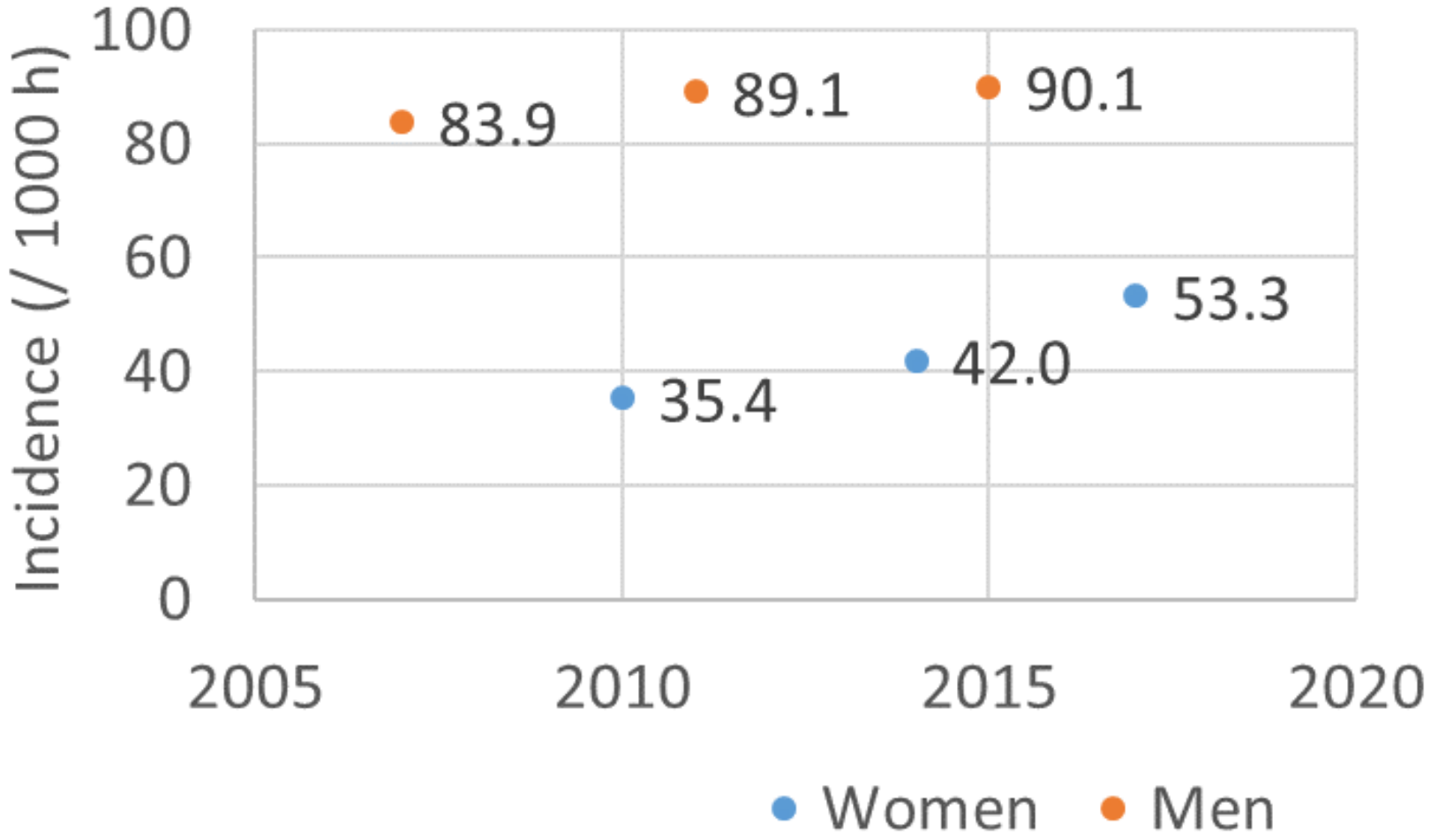
Injury incidence in Rugby World Cups



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Rugby Injury Surveillance in England

Professional Men's Rugby

2002-present

>100,000 h match exposure

>8,000 injuries

Elite / Professional Women's Rugby

2011-2014

2017-present

~7,500 h match exposure

~300 injuries

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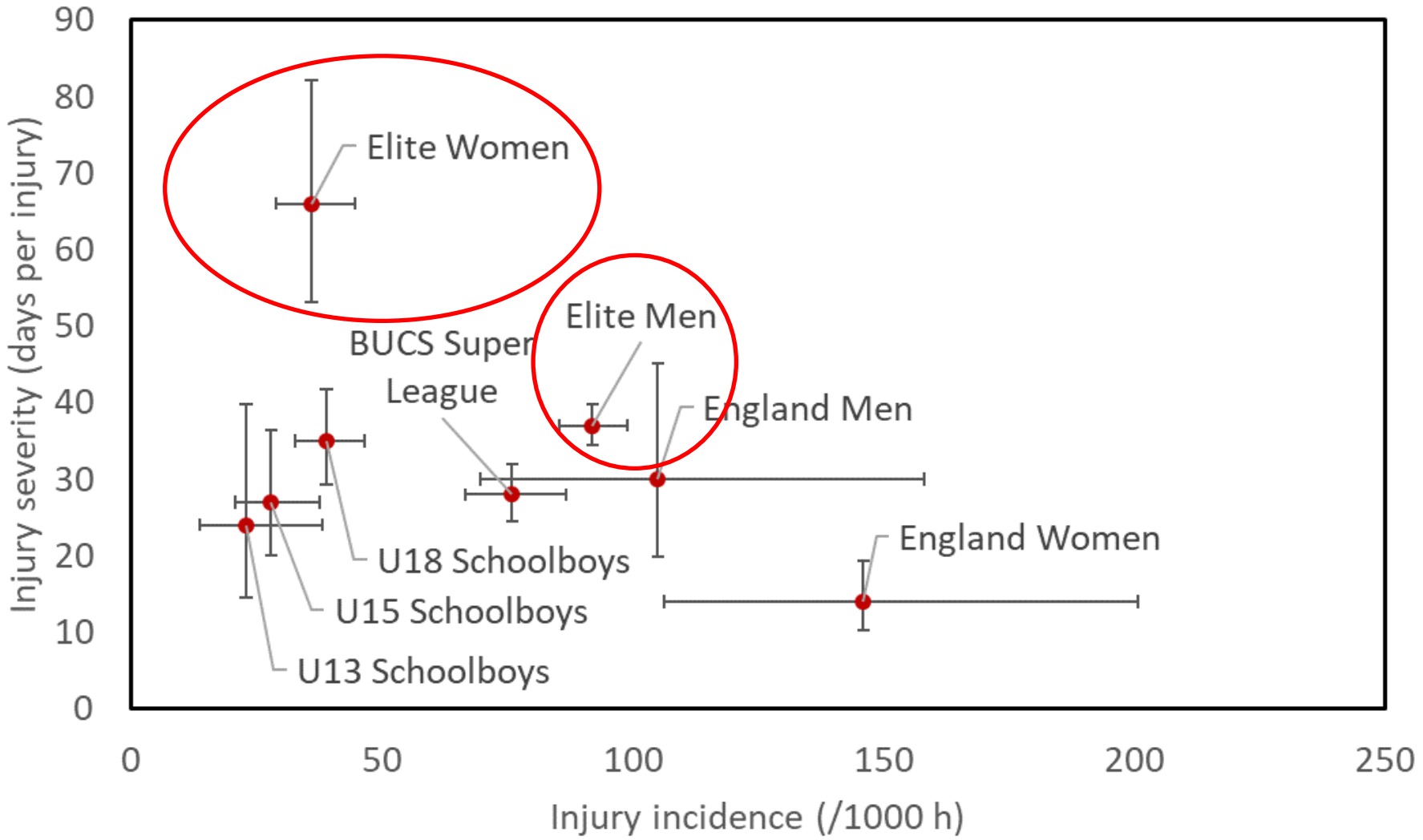
Consistent methods allow us to compare levels (2017-18)



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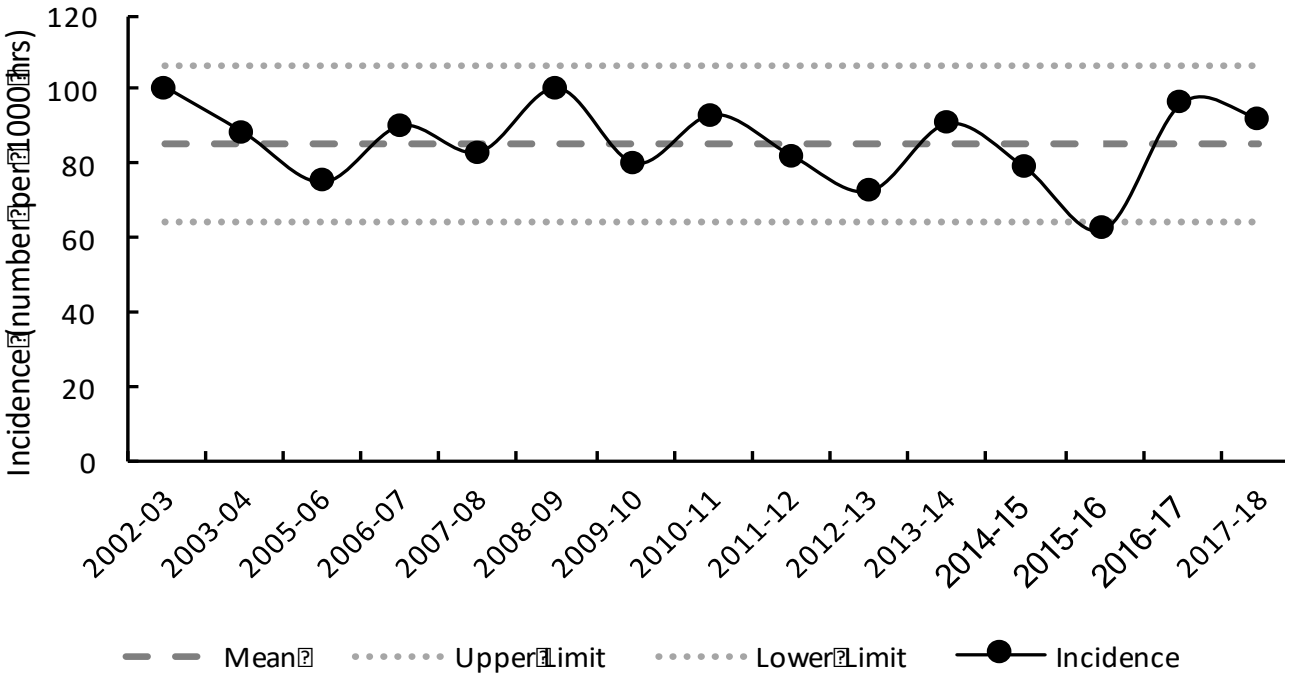
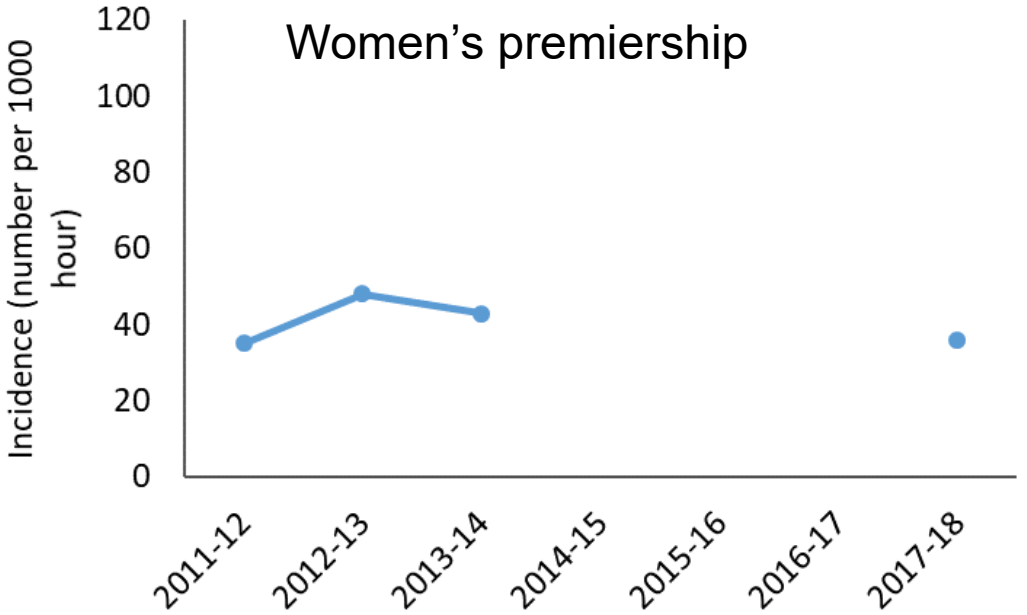
Match injury incidence in the men's game is stable





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RFU PREMIERSHIP RUGBY RPA THE RUGBY PLAYERS ASSOCIATION

Most common match injuries

2012-13	2013-14	2014-15	2015-16	2016-17	2017-18
Concussion 6.7	Concussion 10.5	Concussion 13.4	Concussion 15.8	Concussion 20.9	Concussion 17.9
Hamstring muscle 4.9	Thigh haematoma 4.2	Hamstring muscle 4.4	AC joint 3.1	Hamstring muscle 6.8	Hamstring Muscle 6.4
Ankle syndesmosis 3.8	MCL 3.7	Thigh haematoma 3.4	Hamstring muscle 3.1	MCL 4.2	MCL 4.1
MCL 3.6	Ankle lat. lig. 2.9	MCL 3.3	Calf muscle 2.1	AC joint 3.7	Thigh Haematoma 4.0
Thigh haematoma 3.3	Hamstring muscle 2.5	AC joint 2.9	Ankle lat. lig. 2.0	Thigh haematoma 3.0	AC Joint 3.8

Women 2017-18
Concussion
Ankle ligament
Knee ligament
Shoulder
Knee (other)

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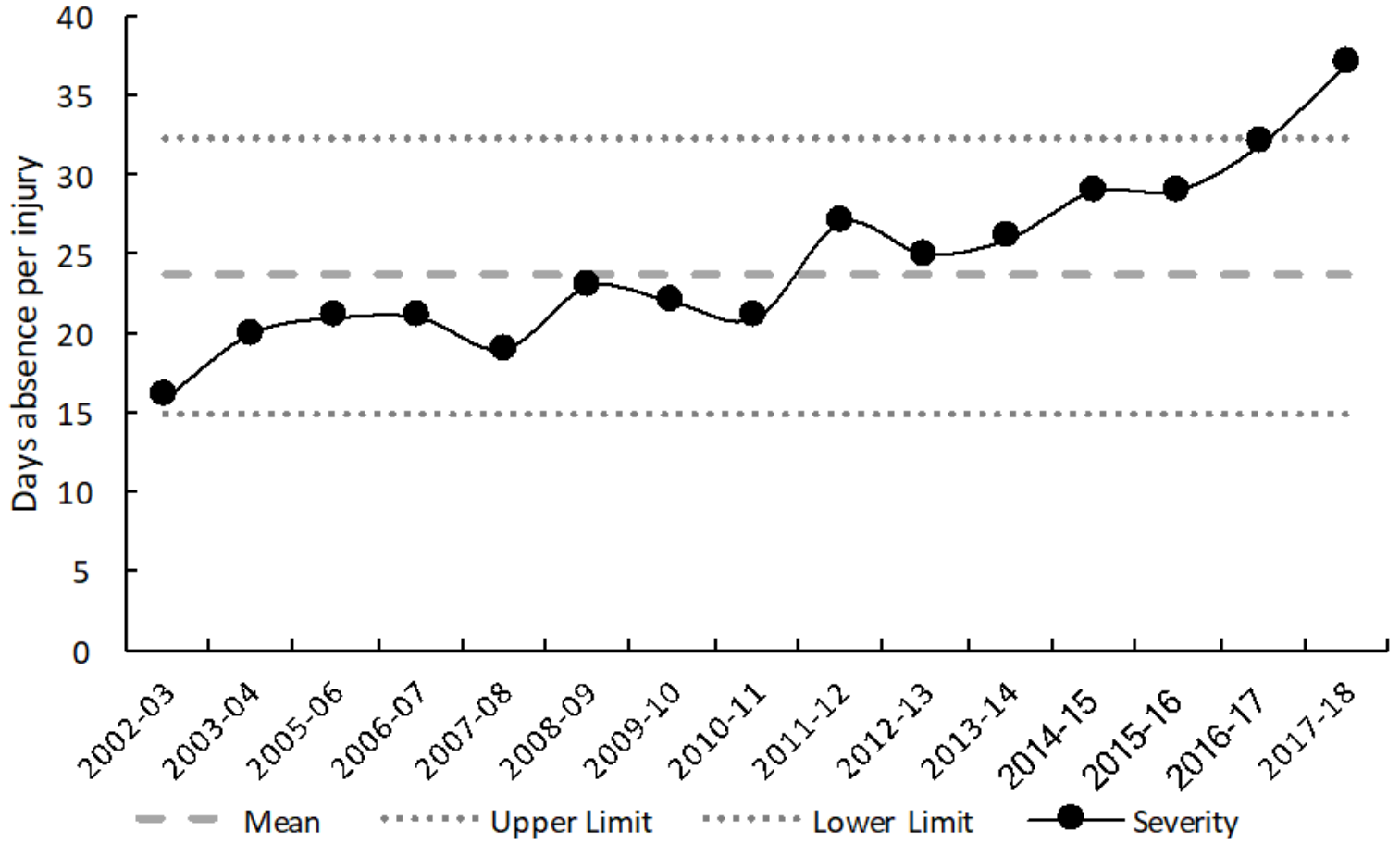
Match injury severity in the men's game has increased



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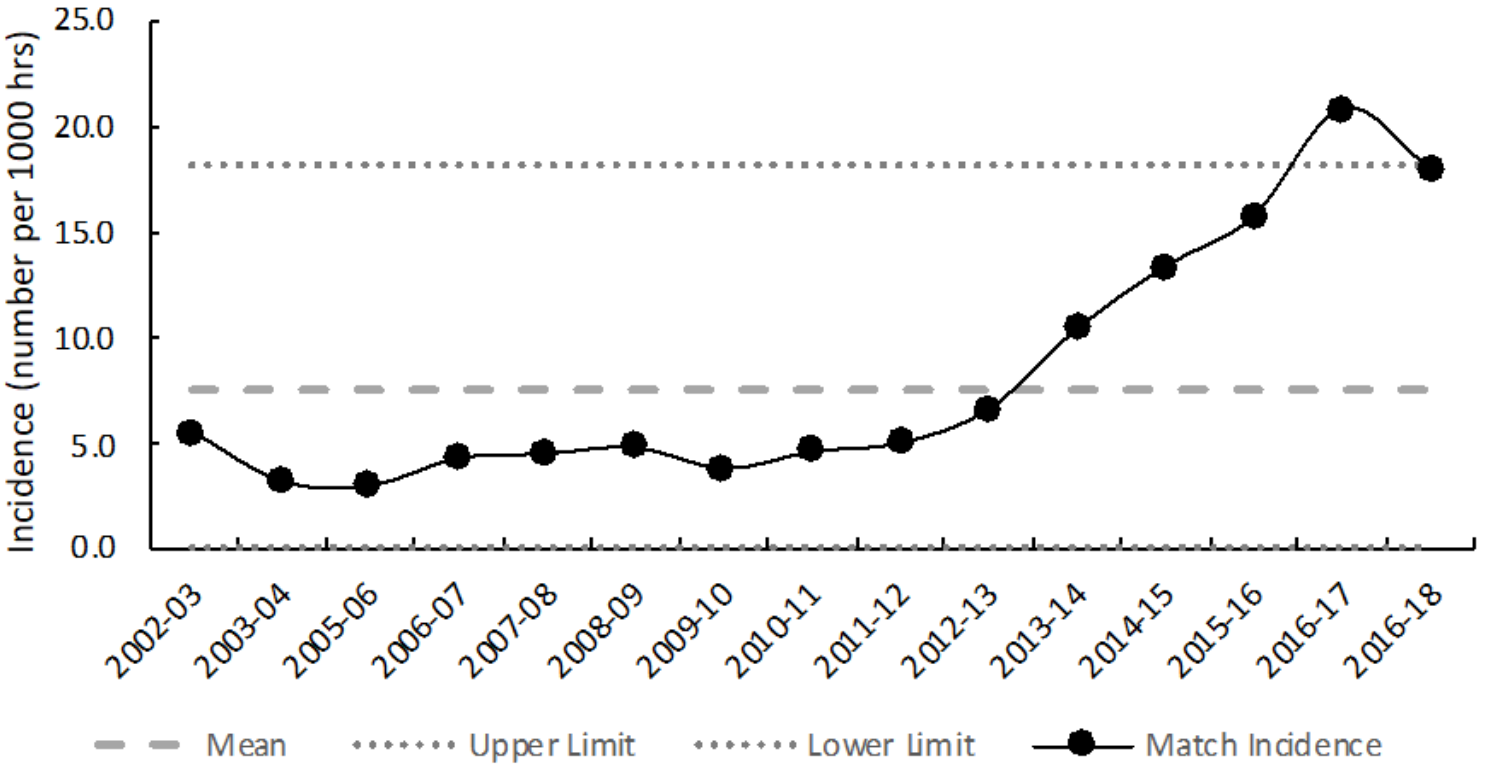
Match concussion incidence in the men's game has increased



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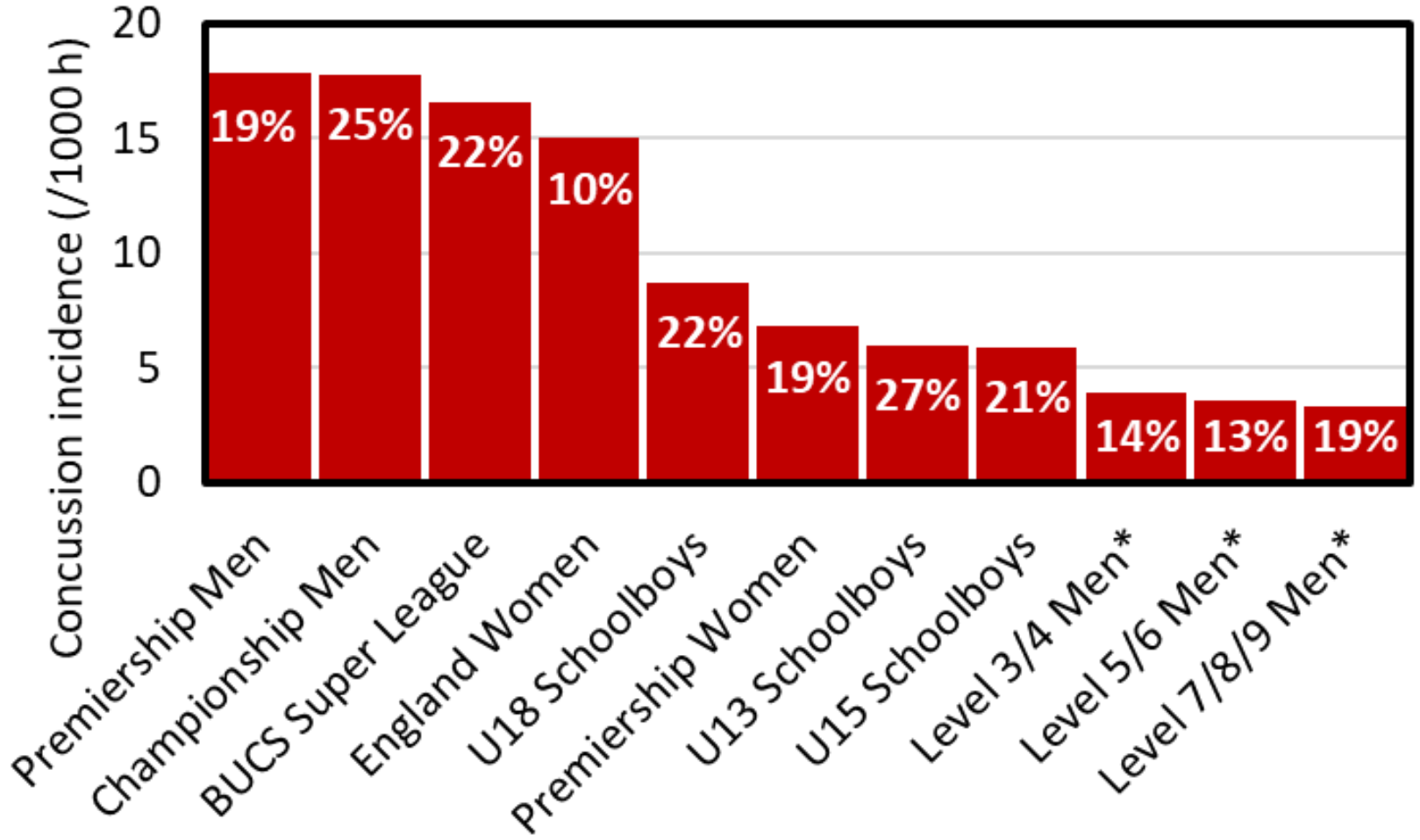
Concussion at different levels in England (2017-19)



% values are the proportion of all injuries that are concussion

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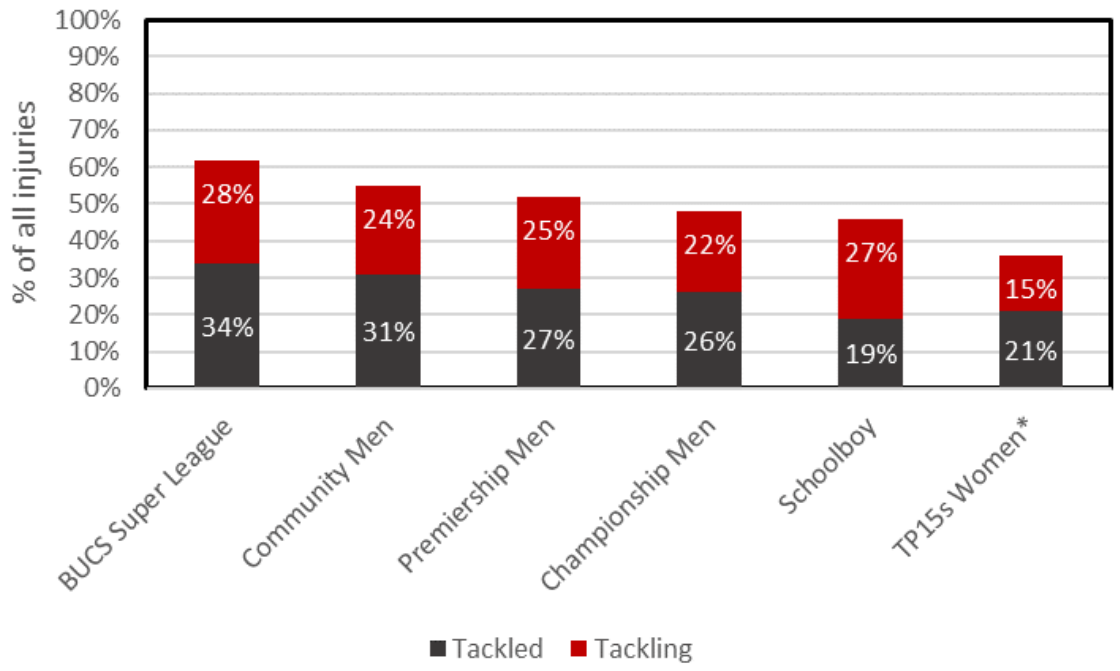
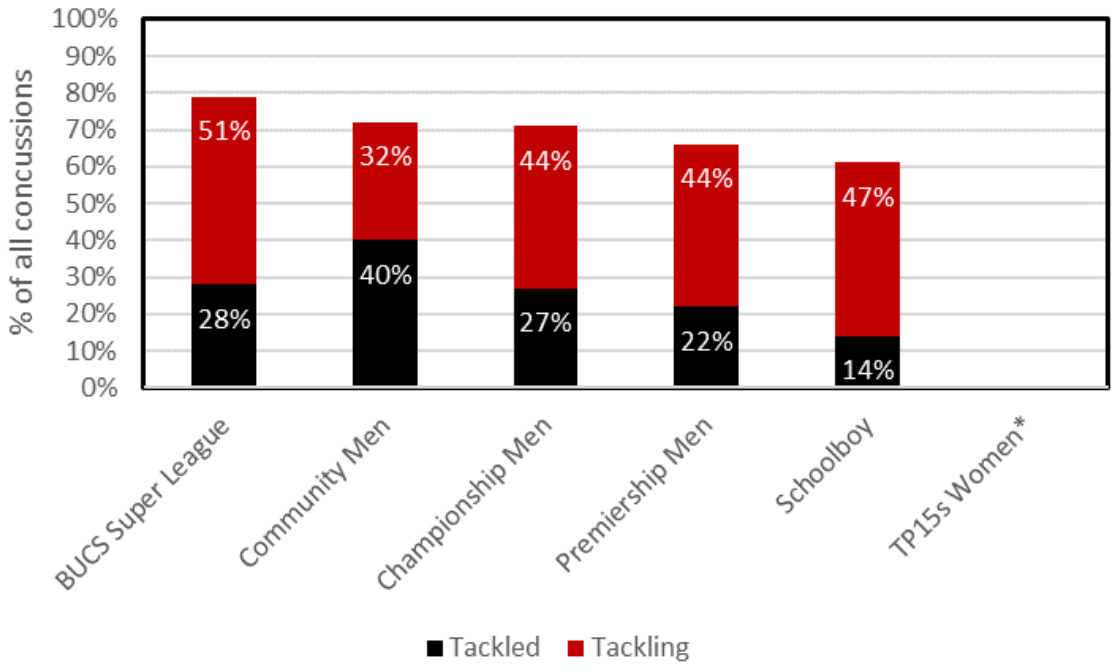
The tackle is associated with a high proportion of injuries

All injuries



Concussions



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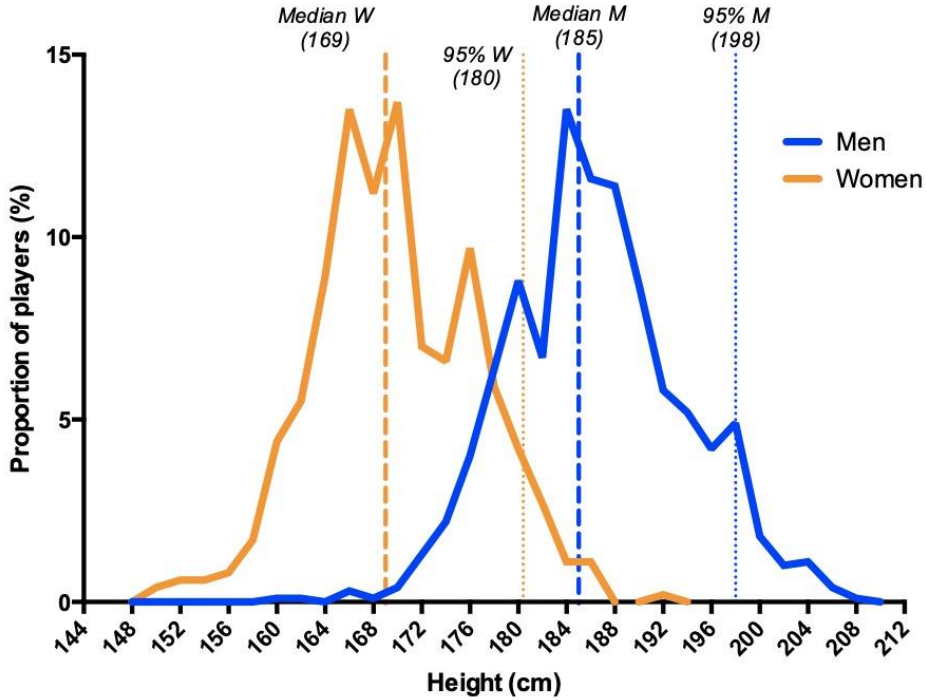
Height in men and women

HEIGHT

	2nd perc.	10th perc.	25th perc.	75th perc.	90th perc.	98th perc.	
	Extremely low	Unusually low	Below average	Broadly normal	Above average	Unusually high	Extremely high
Men (n = 1883)	< 172	172 – 178	178 – 181	181 – 190	190 – 196	196 – 202	> 202

	2nd perc.	10th perc.	25th perc.	75th perc.	90th perc.	98th perc.	
	Extremely low	Unusually low	Below average	Broadly normal	Above average	Unusually high	Extremely high
Women (n = 473)	< 155	155 – 161	161 – 165	165 – 174	174 – 178	178 – 183	> 183



Note: Height shows upper end of a 2cm band (eg: 184 indicates 182-184 cm)

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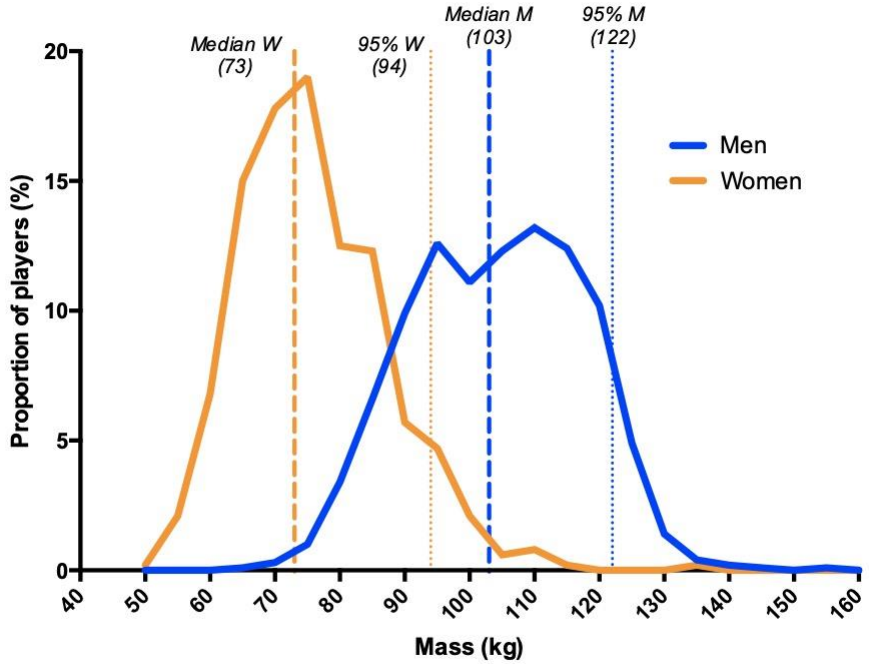
Mass in men and women

MASS

	2nd perc.	10th perc.	25th perc.	75th perc.	90th perc.	98th perc.	
	Extremely low	Unusually low	Below average	Broadly normal	Above average	Unusually high	Extremely high
Men (n = 1883)	< 78	78 – 85	85 – 93	93 – 112	112 – 119	119 – 126	> 126

	2nd perc.	10th perc.	25th perc.	75th perc.	90th perc.	98th perc.	
	Extremely low	Unusually low	Below average	Broadly normal	Above average	Unusually high	Extremely high
Women (n = 473)	< 55	55 – 61	61 – 66	66 – 81	81 – 89	89 – 99.6	> 99.6



Note: Mass shows upper end of a 5kg band (eg: 100kg indicates 95-100kg)

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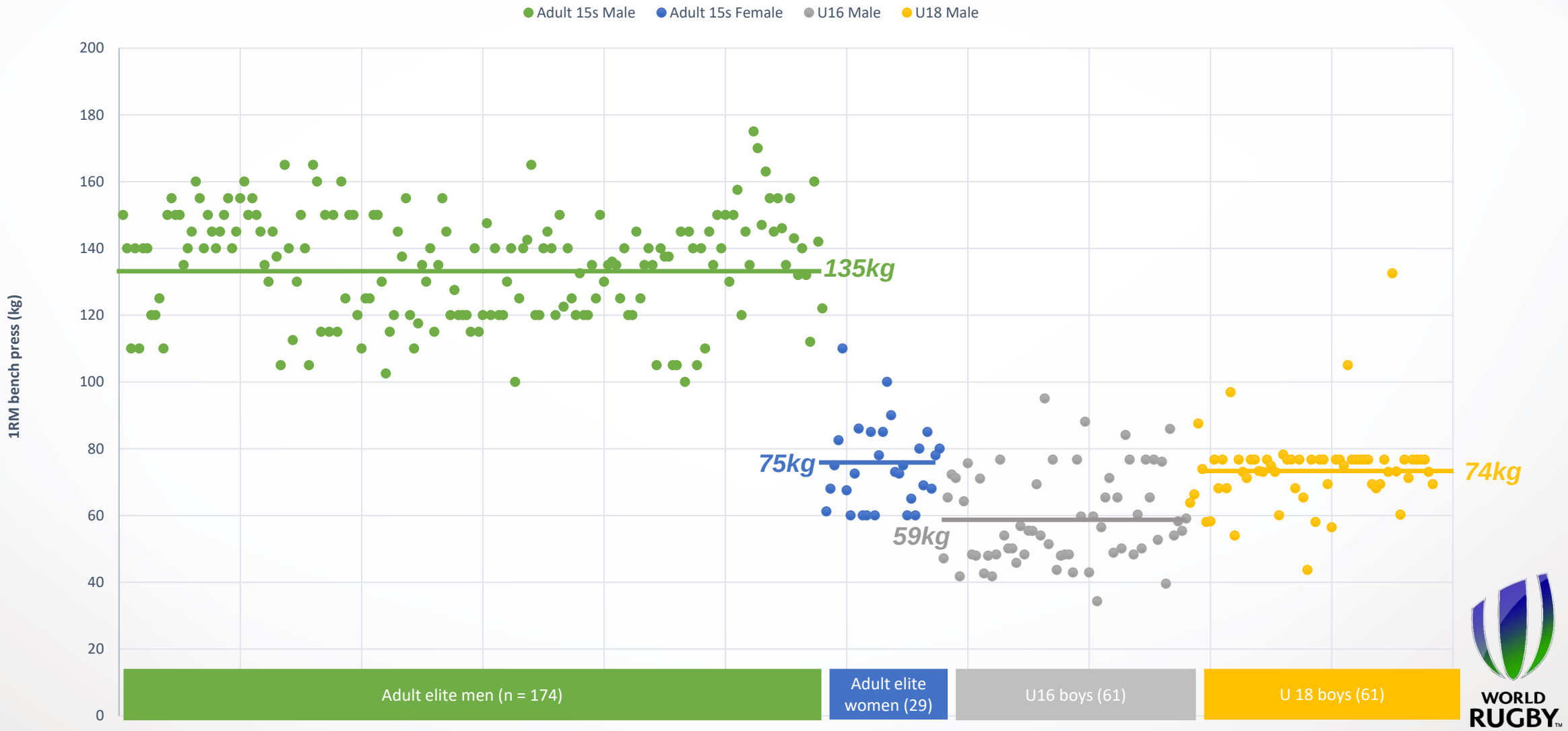
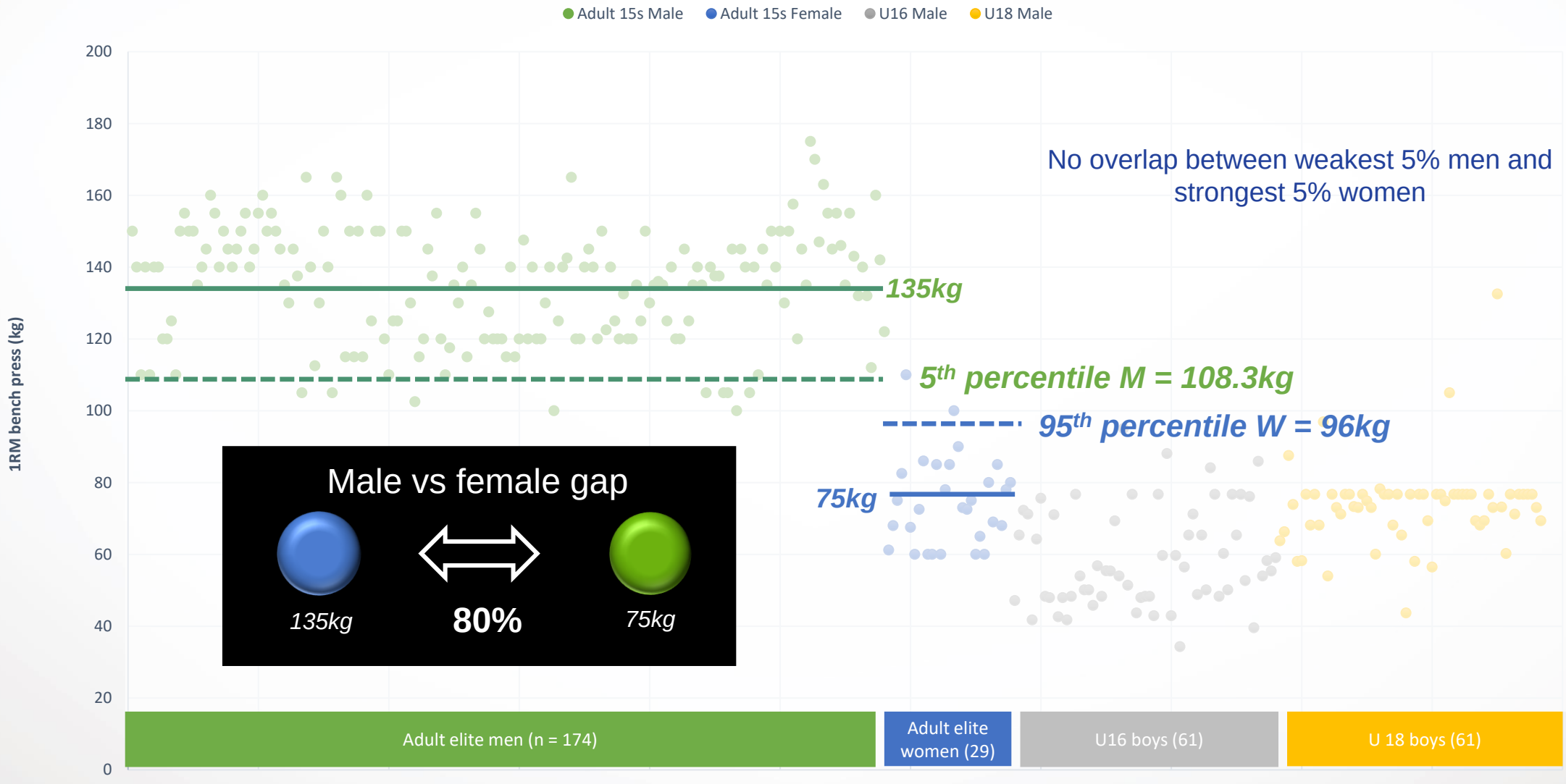
Bench 1-RM Comparison (kg)



WORLD RUGBY

Adult male vs female bench press comparison



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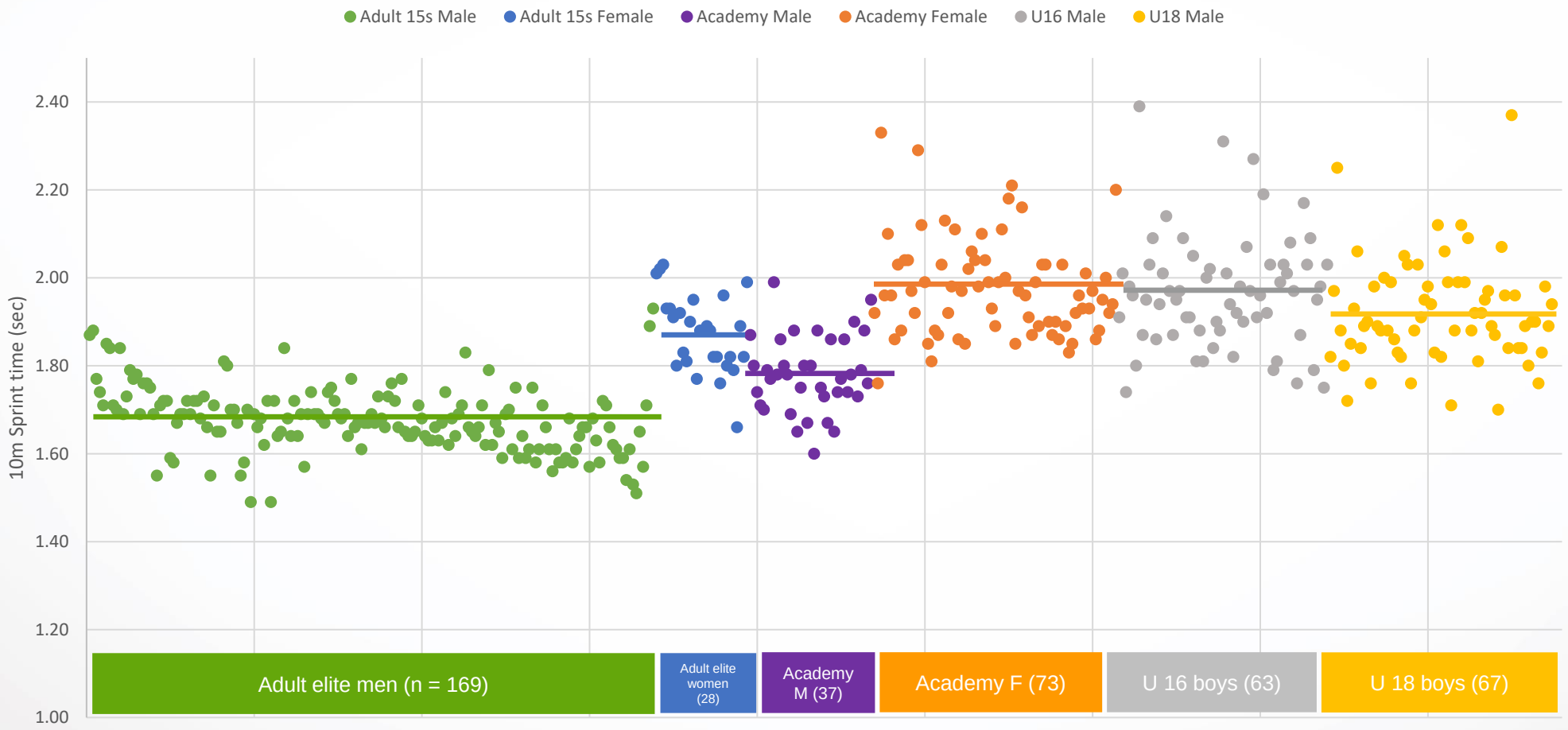
10m Sprint time



Averages

1.68s

1.87s

1.78s

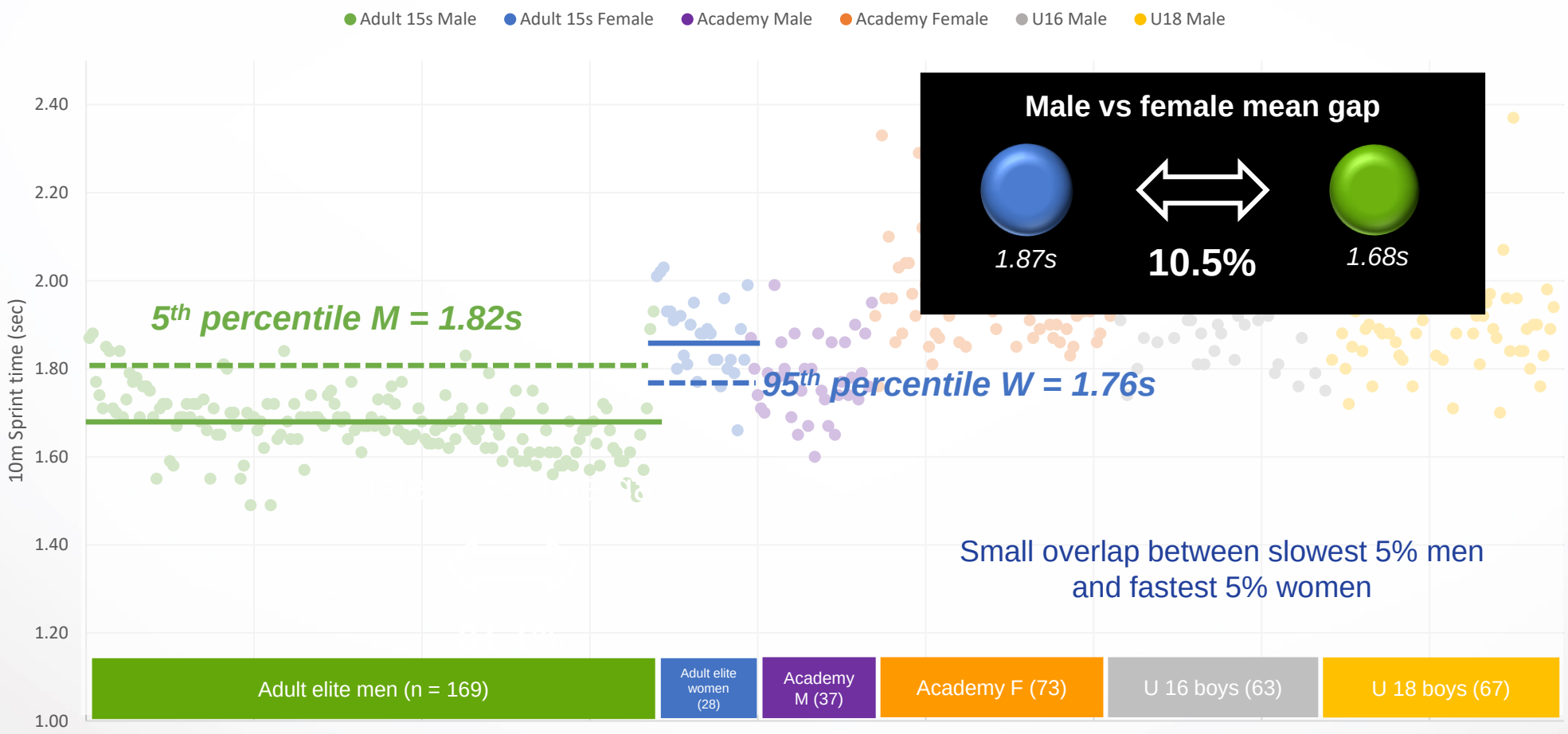
1.98s

1.97s

1.92s

WORLD RUGBY™

Male vs female 10m sprint comparison



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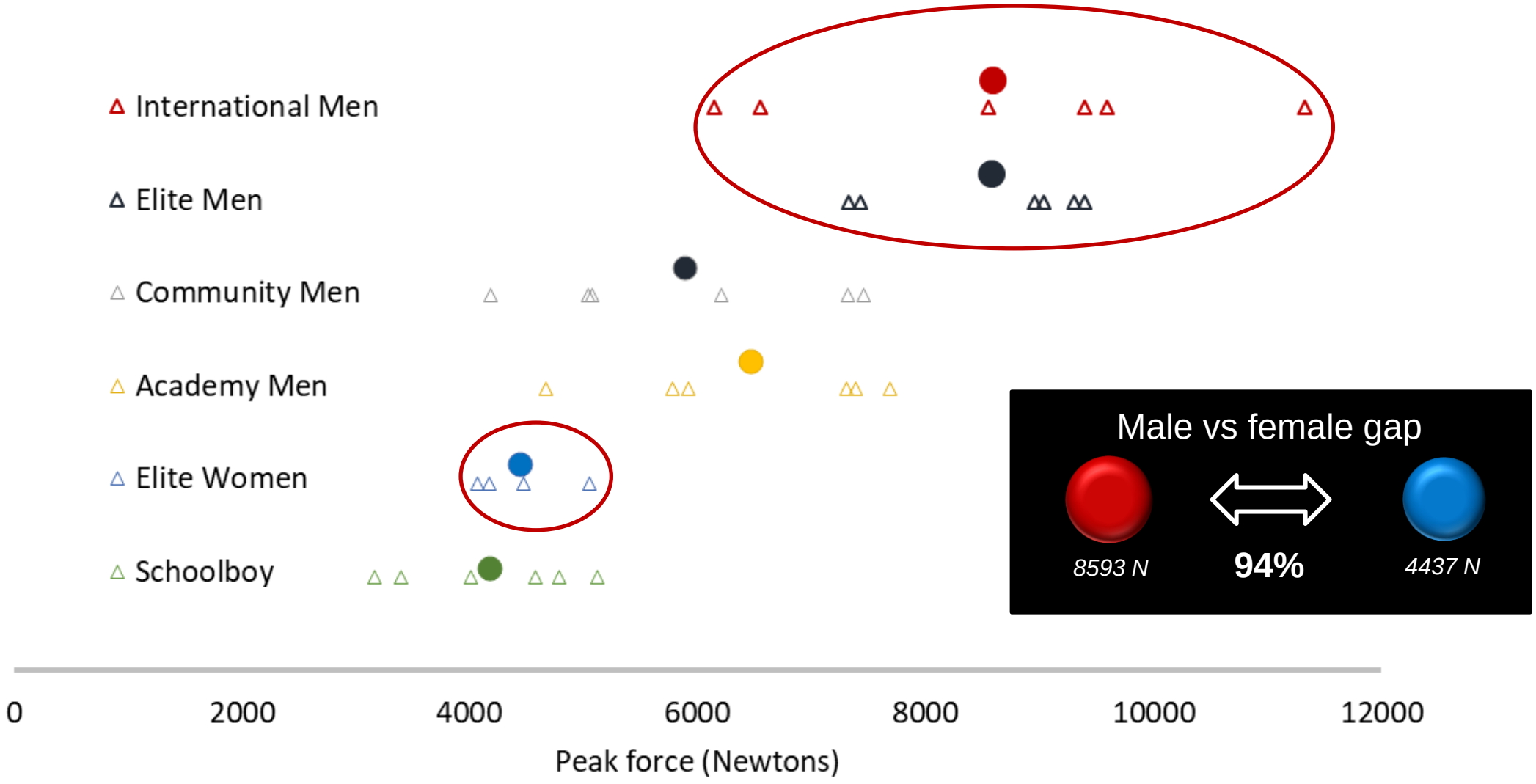
Scrum forces



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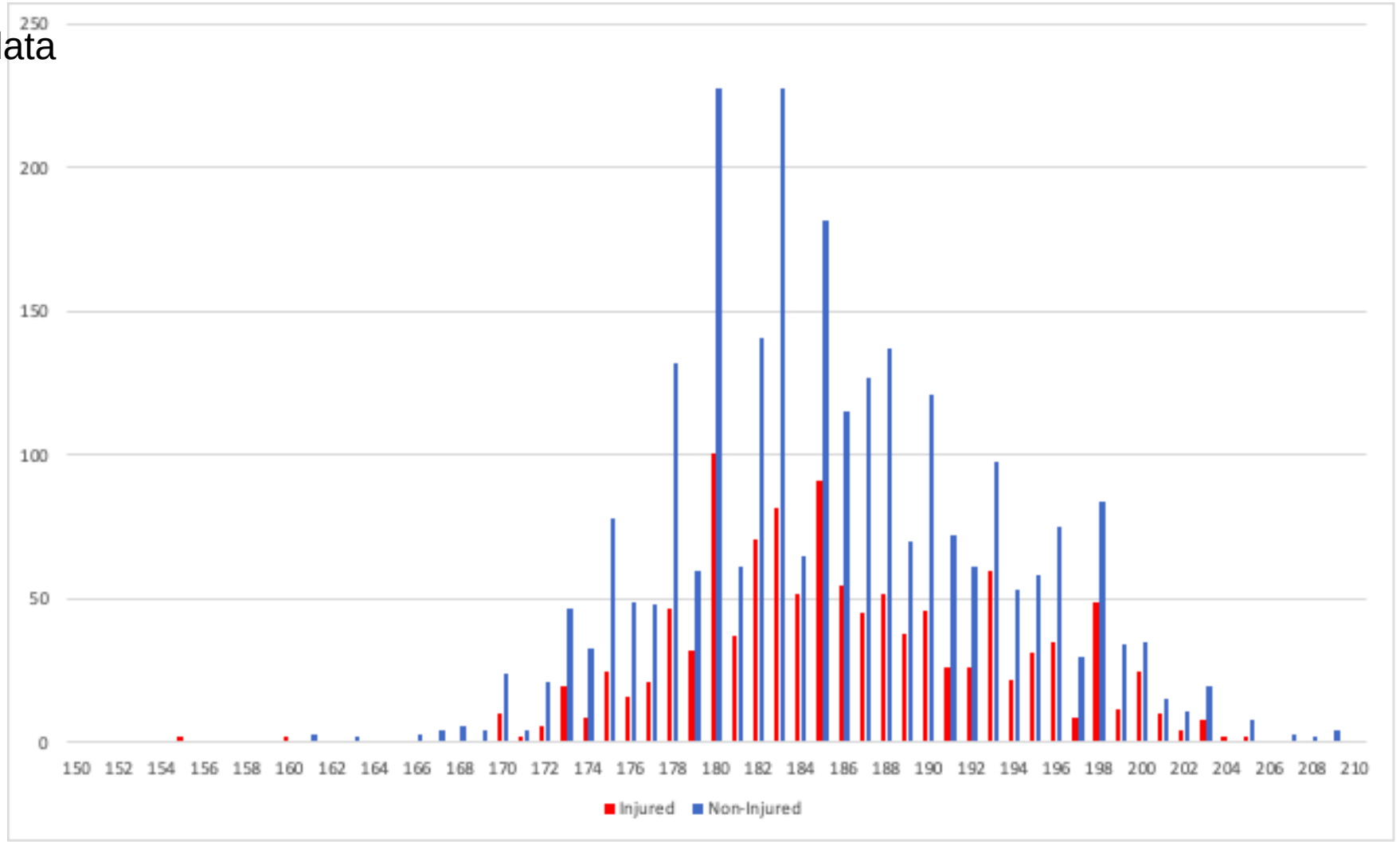
No difference in height between injured and uninjured men

Average height in PRISP data
Injured: 185.9 cm
Not injured: 185.6 cm



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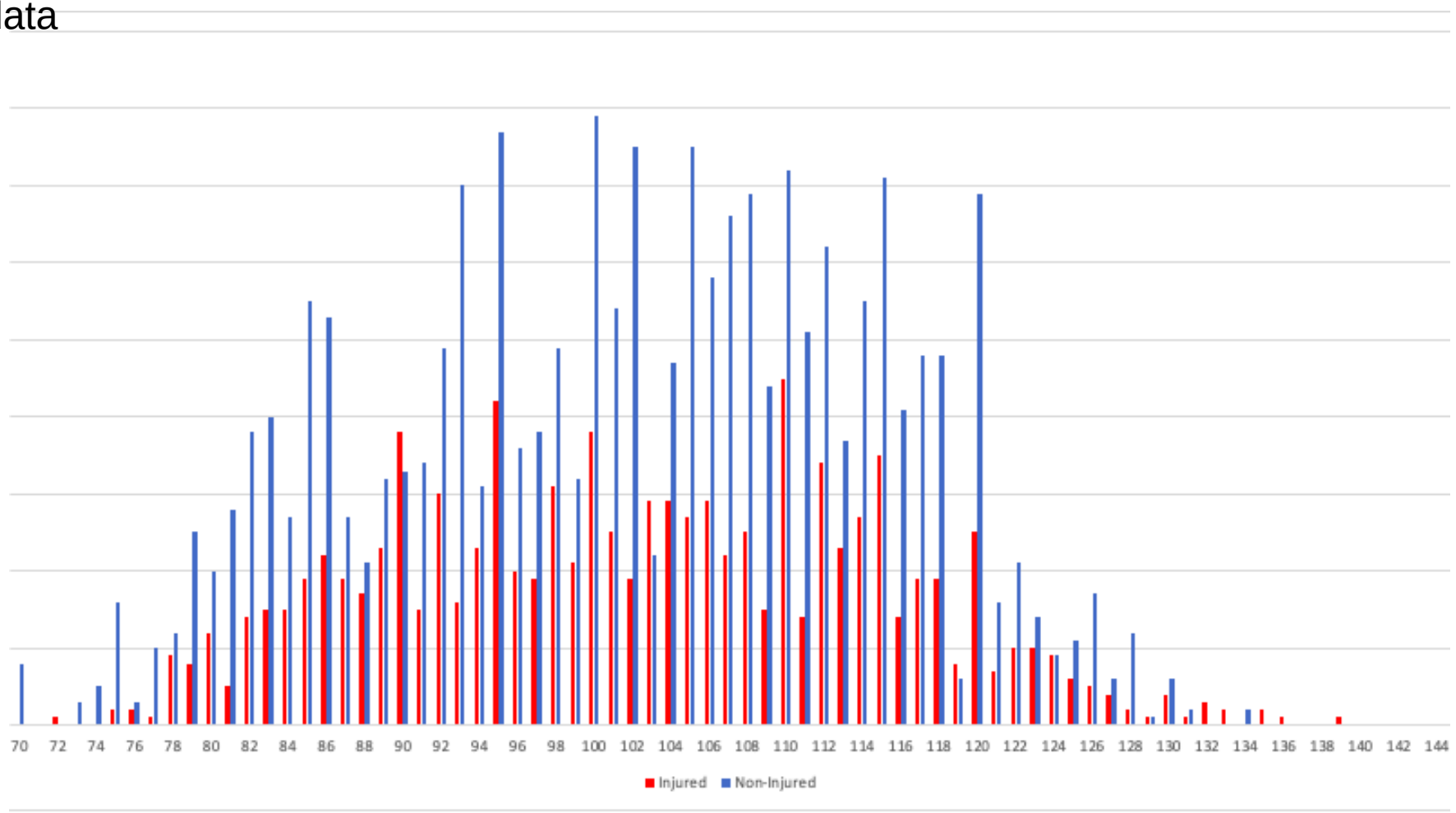
No difference in mass between injured and uninjured men

Average mass in PRISP data
Injured: 102.1 kg
Not injured: 101.5 kg



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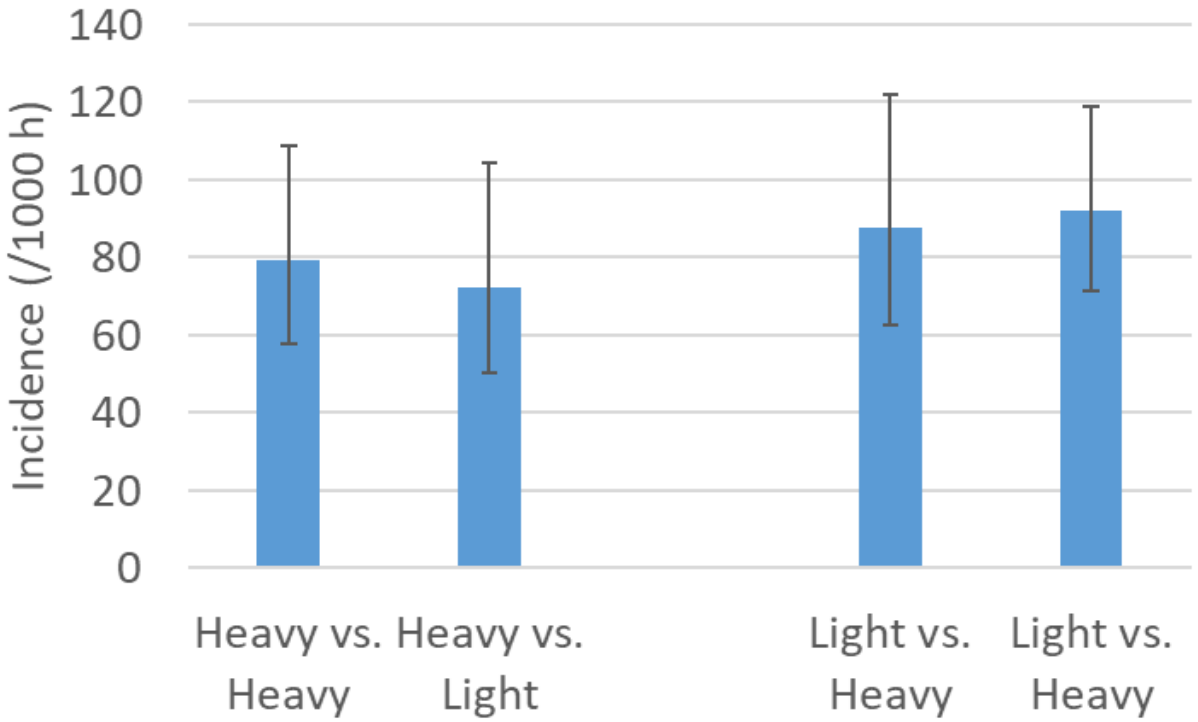
Mass as a risk factors for injury? RWC 2007 data

In RWC 2007, injury incidence in games involving 10 heaviest and 10 lightest teams – no difference in incidence when “mismatches” occurred (Fuller, 2010)



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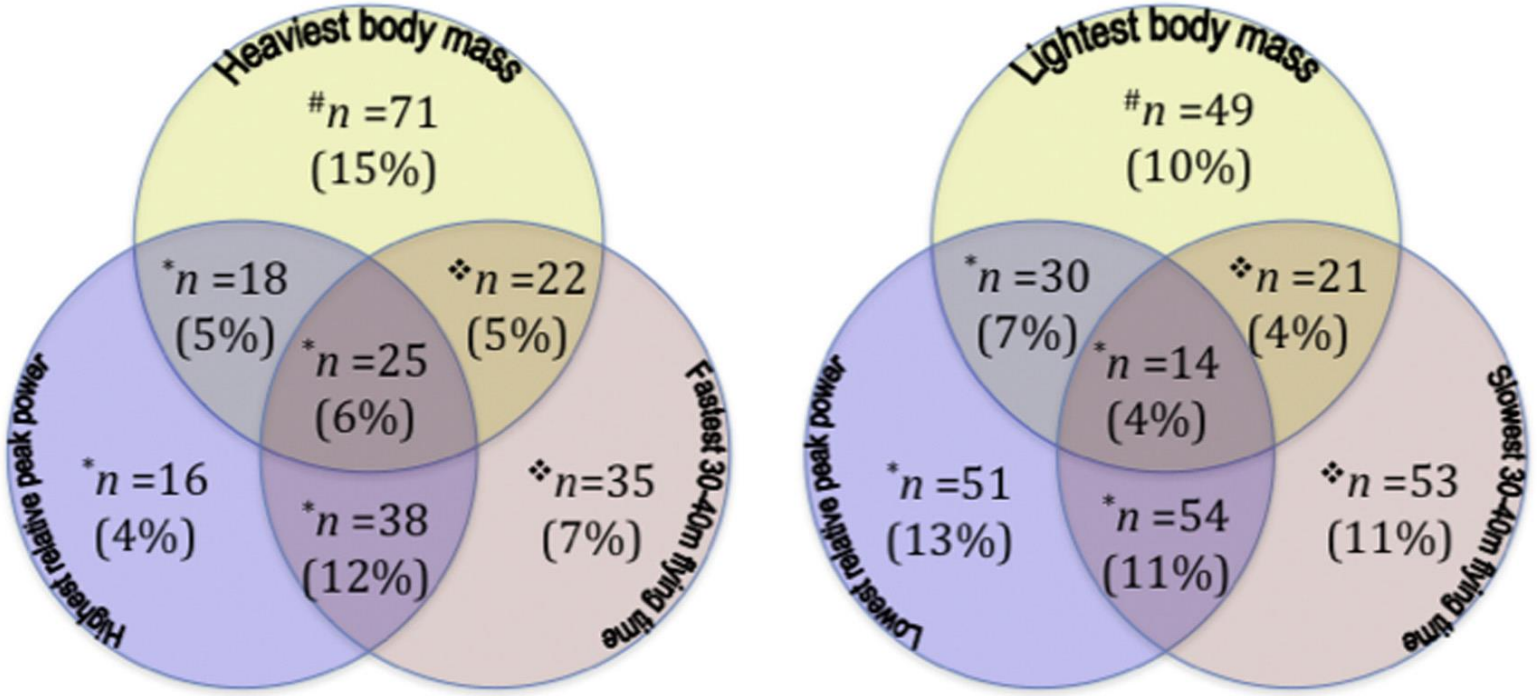
Evidence from age-grade rugby

In youth rugby, it is not necessarily the same players who are biggest, strongest and most powerful (Krause, 2015)



Consistent finding that youth players of greater size (mass or height) are at GREATER risk of injury:
Australian youth (Krause, 2015)
Irish schoolboy (Archbold, 2015)
English schoolboy (unpublished)

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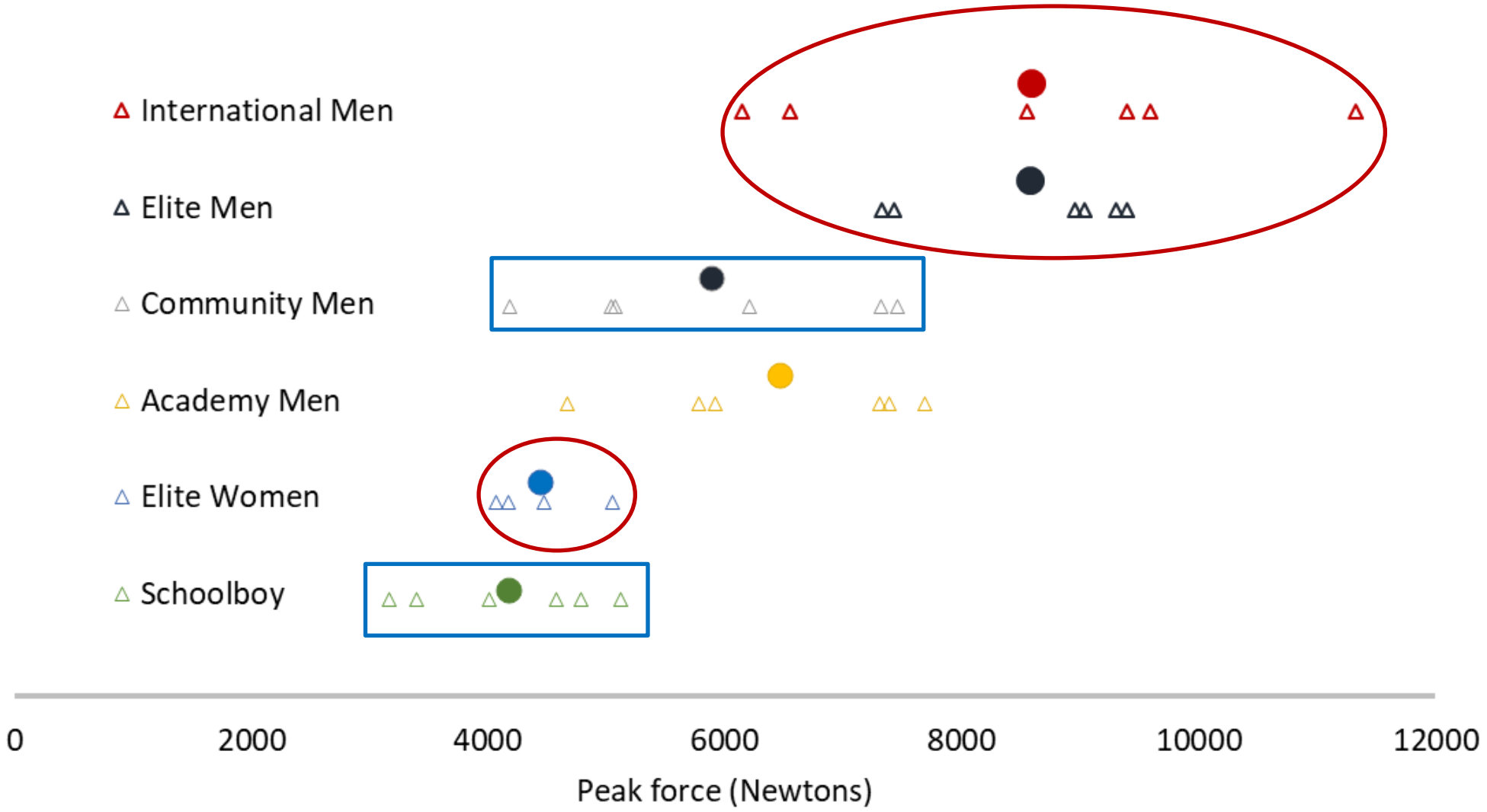
Front row of the scrum as an area of risk?



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Is anything being done about mismatches in rugby?

Open Access Research

BMJ open accessible medical research

Variation in physical development in schoolboy rugby players: can maturity testing reduce mismatch?

Richard W Nutton,[1] David F Hamilton,[2] James D Hutchison,[3] Martin J Mitchell,[1] A Hamish RW Simpson,[1,2] James G B MacLean[4]

New Zealand introduce national club competition for under-85kg players

Weight-restricted rugby is being rolled out on a grander scale this season

By Charlie Morgan, RUGBY REPORTER

20 February 2020 • 11:42am

French front-row safety scheme gets Queensland pilot

By WAYNE SMITH
SENIOR SPORT WRITER
Follow @WayneKeithSmith

12:00AM JANUARY 19, 2019
COMMENTS

Chairman of the Serious Injuries Review Panel James Bell QC

Rugby Australia will conduct a pilot scheme of the French-based "front-rowers passport" system in the Firsts and Seconds of Queensland GPS rugby later this year in response to the report into the four spinal injuries suffered in the same competition in 2018.

Bio-banding in Academy Football: Player's Perceptions of a Maturity Matched Tournament

Ben Bradley, David Johnson, Megan Hill, Darragh McGee, Adam Kana-ah, Callum Sharpin, Peter Sharp, Adam Kelly, Sean Cumming, Robert M Malina

Early maturing players perceived greater physical and technical challenge, and in turn new opportunities.

Late maturing players perceived … greater opportunity to demonstrate technical and tactical abilities

Study: Weight restricted rugby driving youth away from the sport in New Zealand

10 Jul, 2018 2:09pm 4 minutes to read

Junior rugby is divided into weight categories to avoid unsafe mismatches in size. Photo / Warren Buckland

By: Dylan Cleaver
dylan.cleaver@nzherald.co.nz
@dcleaverNZH

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@drkeithstokes

Specific question about neck strength and concussion?

Isometric neck strength been shown to be 50% lower in females

09/09/2019 10:00

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What have I covered?

Injury incidence is higher in the men's than women's game and a large proportion of injuries happen in the tackle

There are stark differences in size, strength, speed and scrum forces between elite men and elite women

There is very limited evidence in sport relating to mismatches as a risk factor for injury (but where challenges arise, they are considered in a range of contexts)

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