



UNIVERSITY OF
BATH



**PREMIERSHIP
RUGBY**



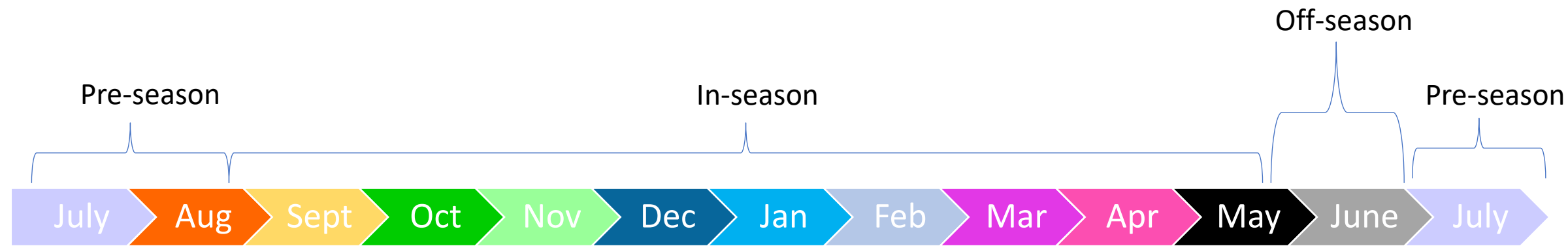
Prolonged restricted training, fixture congestion and player rotation: What the COVID-19 pandemic taught us about injury risk in professional collision sport. *(Under Review)*

RSN 2021
Lindsay Starling

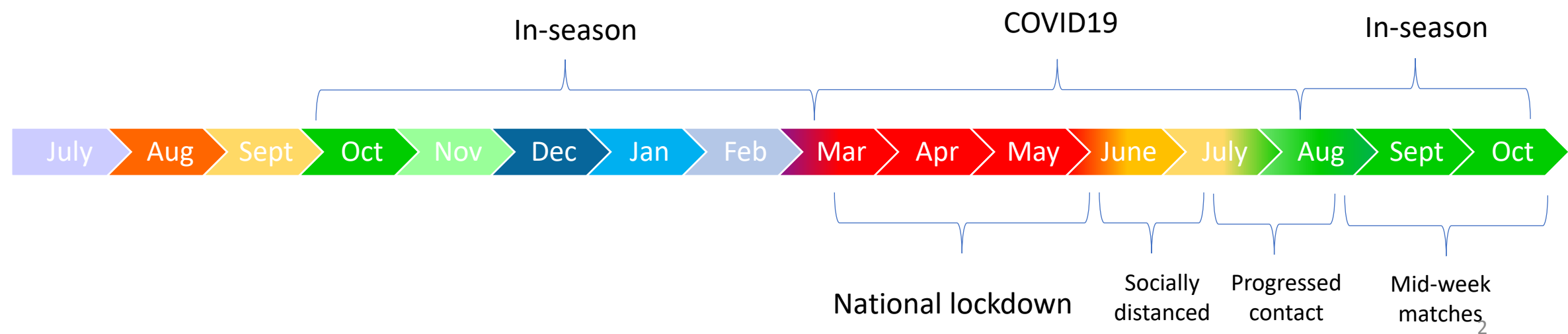
**RUGBY
SCIENCE
NETWORK**



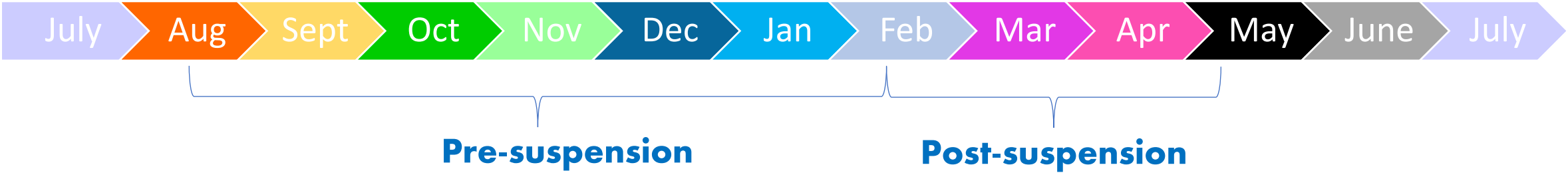
Typical season



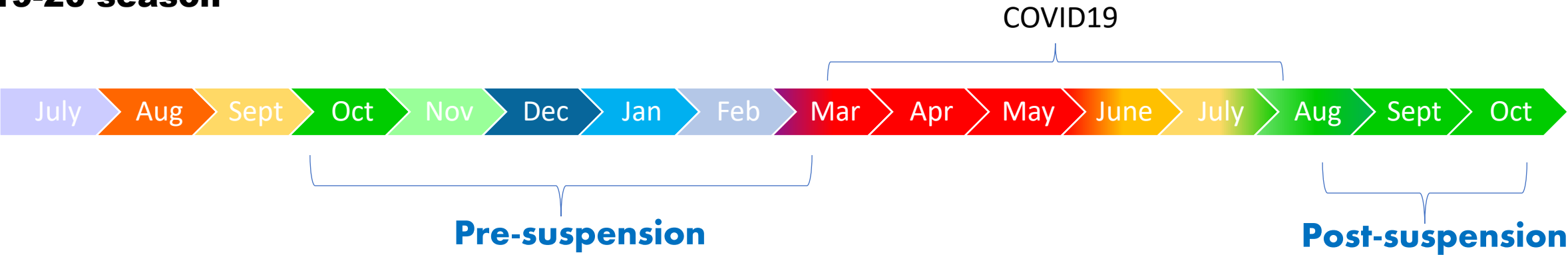
2019-20 season



2016/17 – 2018/19 seasons

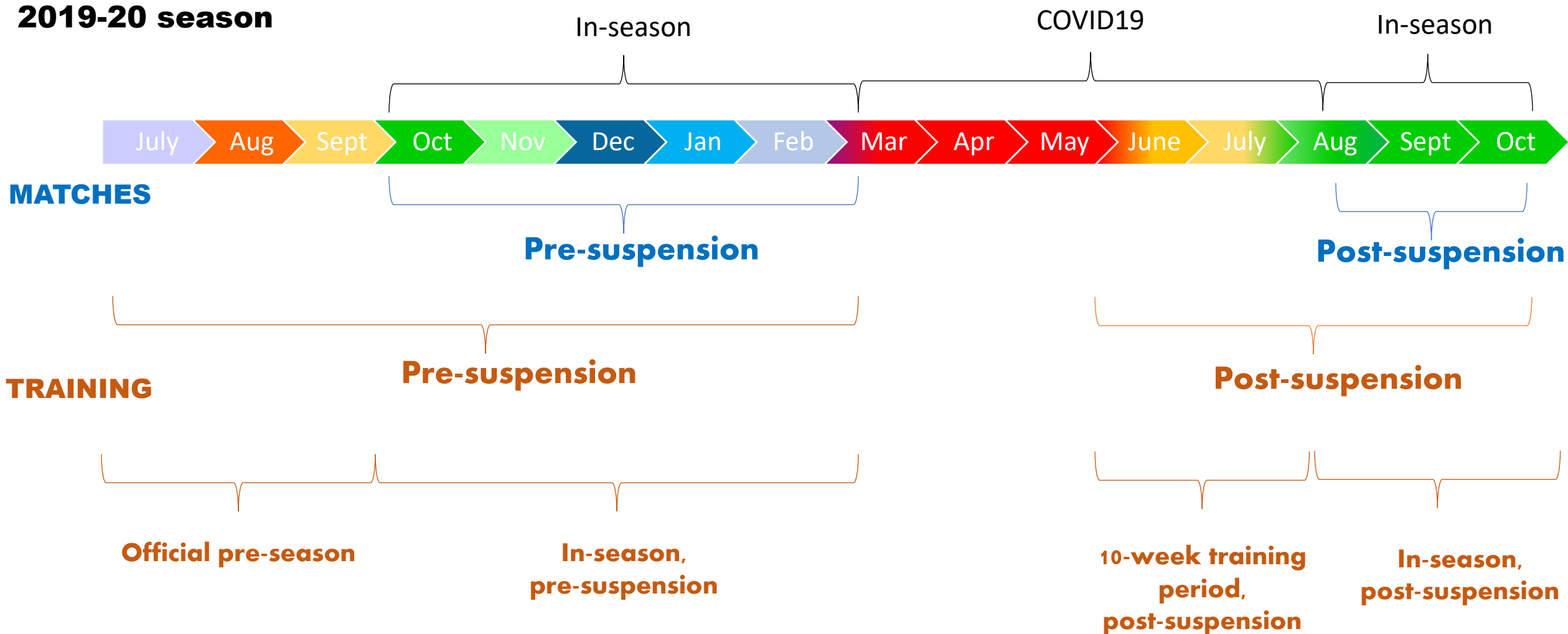


2019-20 season



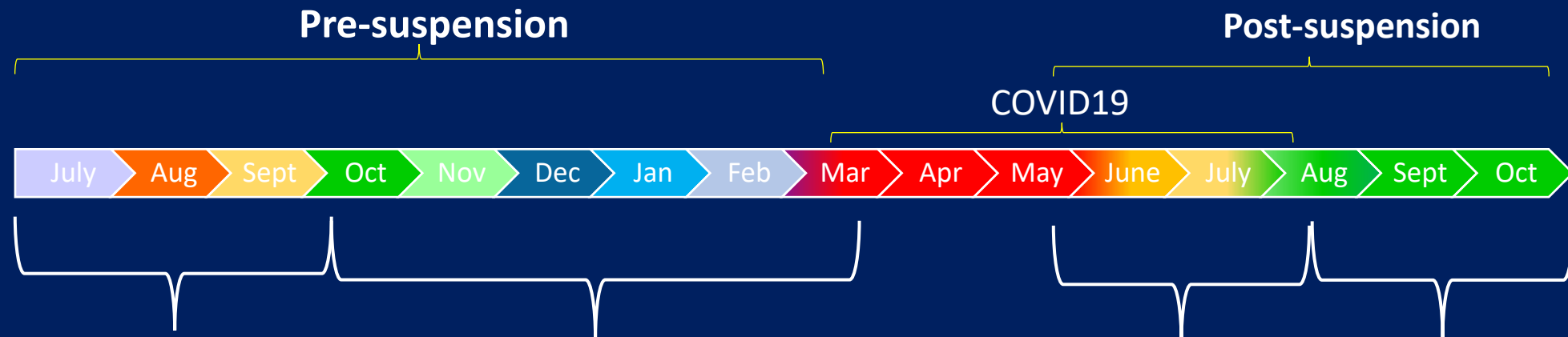
Data analysis

2019-20 season



	Number of injuries	Incidence (95%CI)	IRR (95%CI) p value	Mean severity (95%CI)	Median severity (IQR)	Mean burden (95%CI)
Overall 2019-20	534	3.1 (2.8 - 3.3)		34 (31 - 37)	18 (8 - 45)	104 (34 - 318)
Pre-suspension	337	2.7 (2.5 - 3.1)	1.4 (1.1 - 1.7)	36 (33 - 41)	18 (7 - 46)	100 (31 - 327)
Post-suspension	197	3.8 (3.3 - 4.4)	p=0.005*	30 (26 - 34)	20 (9 - 44)	112 (41 - 307)
Rugby skills contact	290	9.1 (8.1 - 10.2)		33 (30 - 37)	15 (7 - 41)	303 (158 - 580)
Pre-suspension	188	8.4 (7.3 - 9.7)	1.3 (1.0 - 1.6)	37 (32 - 42)	16 (7 - 41)	309 (157 - 608)
Post-suspension	102	10.8 (8.9 - 13.1)	p=0.32	27 (22 - 33)	13 (7 - 37)	288 (158 - 524)
Rugby skills non-contact	95	1.9 (1.5 - 2.3)		28 (23 - 34)	17 (8 - 37)	52 (13 - 219)
Pre-suspension	58	1.6 (1.3 - 2.1)	1.5 (0.9 - 2.3)	28 (21 - 36)	17 (6 - 27)	46 (10 - 210)
Post-suspension	37	2.4 (1.8 - 3.3)	p=0.52	28 (20 - 39)	17 (9 - 42)	68 (19 - 239)
Conditioning weights	15	0.2 (0.1 - 0.3)		18 (11 - 30)	15 (9 - 25)	4 (0 - 274)
Pre-suspension	9	0.2 (0.1 - 0.3)	1.5 (0.4 - 4.8)	15 (8 - 30)	10 (6 - 15)	3 (0 - 279)
Post-suspension	6	0.3 (0.1 - 0.6)	p=1.0	22 (10 - 49)	24 (16 - 25)	6 (0 - 255)
Conditioning non-weights	134	6.4 (5.4 - 7.6)		41 (35 - 49)	28 (10 - 53)	264 (121 - 573)
Pre-suspension	82	5.2 (4.2 - 6.5)	1.9 (1.3 - 2.7)	44 (36 - 55)	28 (10 - 55)	231 (98 - 544)
Post-suspension	52	9.7 (7.4 - 12.8)	p=0.007*	37 (28 - 48)	32 (11 - 49)	360 (192 - 674)

Training injuries



	2019-20	Official 19/20 pre-season	In-season, pre-suspension	10-week training period post-suspension	In-season, post-suspension
Incidence/1000 hours (95%CI)					
Overall	3.1 (2.8 - 3.3)	3.7 (3.1 - 4.3)	2.3 (2.0 - 2.7)	4.7 (4.0 - 5.6)	2.6 (2.0 - 3.3)
Rugby skills contact	9.1 (8.1 - 10.2)	20.1 (15.5 - 26.1)	6.7 (5.7 - 8.0)	15.8 (12.5 - 20.0)	6.3 (4.5 - 9.0)
Rugby skills non-contact	1.9 (1.5 - 2.3)	2.9 (2.0 - 4.4)	1.2 (0.9 - 1.7)	2.9 (1.9 - 4.4)	1.9 (1.1 - 3.2)
Conditioning weights	0.2 (0.1 - 0.3)	0.2 (0.1 - 0.6)	0.2 (0.1 - 0.4)	0.4 (0.2 - 1.0)	0.1 (0.0 - 0.8)
Conditioning non-weights	6.4 (5.4 - 7.6)	5.2 (4.0 - 6.8)	5.3 (3.7 - 7.6)	9.2 (6.8 - 12.5)	12.7 (6.8 - 23.6)

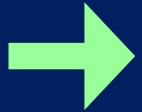
	Number	Incidence (95%CI)	IRR (95%CI) p value	Mean severity (95% CI)	Median (IQR)	Mean burden (95%CI)
2016-19 overall	2318	96 (92 - 100)		34 (33 - 35)	12 (6 - 38)	3248 (2658 - 3968)
2016-19 Pre-suspension	1582	95 (91 - 100)	1.0 (0.9 - 1.1) p=0.70	33 (31 - 34)	12 (5 - 36)	3110 (2544 - 3802)
2016-19 Post-suspension	736	97 (90 - 104)		36 (34 - 39)	14 (6 - 41)	3496 (2865 - 4267)
2019-20 overall	709	88 (82 - 95)		38 (35 - 41)	11 (5 - 38)	3334 (2706 - 4108)
2019-20 Pre-suspension	521	93 (85 - 101)	0.8 (0.7 - 1.0) p=0.18	40 (37 - 44)	11 (5 - 34)	3728 (3043 - 4568)
2019-20 Post-suspension	188	77 (67 - 89)		32 (27 - 36)*	13 (6 - 46)	2430 (1944 - 3038)

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risk at immediate return to training



risk at resumption of competition

1. 10-week preparatory training = “2nd pre-season”
2. Positive effects of extended period of non-contact training
3. No relegation



Midweek match fixtures – match injuries

Shorter (<6days turnaround) vs *Normal* (≥6 days turnaround)

	Number	Incidence (95%CI)	IRR (95%CI) p value	Mean severity (95%CI)	Median severity (IQR)	Mean burden (95%CI)
Overall	188	77 (67 - 89)		32 (27 - 36)	13 (6 - 46)	2431 (1945 - 3039)
Normal	81	71 (57 - 88)	1.2 (0.9 - 1.6)	27 (22 - 34)	11 (5 - 39)	1930 (1529 - 2435)
Shorter	107	82 (68 - 99)	p=1.0	35 (29 - 42)	15 (6 - 56)	2871 (2313 - 3563)
Contact	136	56 (47 - 66)		29 (24 - 34)	11 (6 - 39)	1613 (1240 - 2097)
Contact normal	60	53 (41 - 68)	1.1 (0.8 - 1.6)	26 (20 - 33)	11 (5 - 36)	1352 (1032 - 1771)
Contact shorter	76	58 (47 - 73)	p=1.0	32 (25 - 39)	11 (7 - 48)	1842 (1425 - 2380)
Non-contact	52	21 (16 - 28)		38 (29 - 50)	20 (6 - 60)	818 (535 - 1251)
Non-contact normal	21	18 (12 - 28)	1.3 (0.7 - 2.4)	31 (20 - 48)	20 (5 - 60)	578 (366 - 913)
Non-contact shorter	31	24 (17 - 34)	p=1.0	43 (30 - 61)	21 (6 - 64)	1029 (689 - 1538)
Soft tissue	118	48 (40 - 58)		38 (32 - 46)	16 (5 - 61)	1851 (1396 - 2453)
Soft tissue normal	45	39 (29 - 53)	1.4 (1.0 - 2.1)	31 (23 - 42)	14 (5 - 35)	1239 (907 - 1692)
Soft tissue shorter	73	56 (45 - 71)	p=0.4	43 (34 - 53)	18 (5 - 65)	2388 (1838 - 3101)*
Concussion	45	18 (14 - 25)		13 (9 - 17)	8 (6 - 15)	233 (147 - 367)
Concussion normal	19	17 (11 - 26)	1.2 (0.6 - 2.3)	12 (8 - 18)	7 (5 - 11)	196 (122 - 318)
Concussion shorter	26	20 (14 - 29)	p=1.0	13 (9 - 19)	9 (7 - 18)	265 (171 - 410)



Players able to cope with intensive, congested match schedule under these conditions

1. Unique conditions of this period
2. Mentally prepare for once-off, 10-week period
3. Greater freedom for player rotation

Shorter (<6days turnaround) vs *Normal* (≥6 days turnaround)

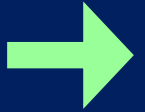
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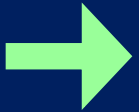
Summary



risk at immediate return to training



risk at resumption of competition

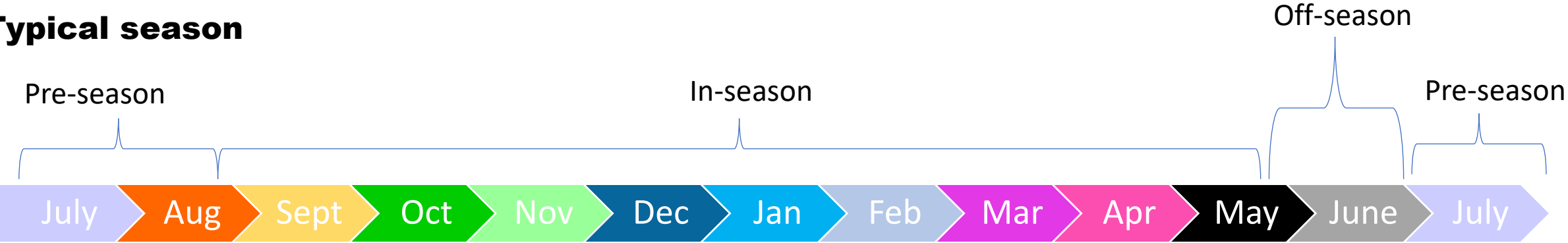


risk between *Shorter* and *Normal* match fixtures

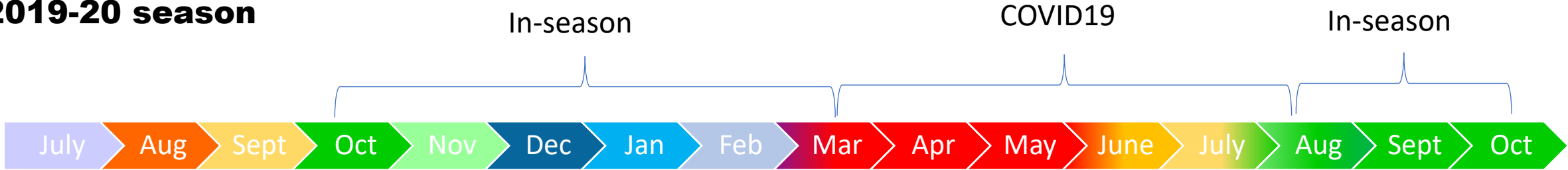


Players starting to show signs of fatigue accumulation towards end of season

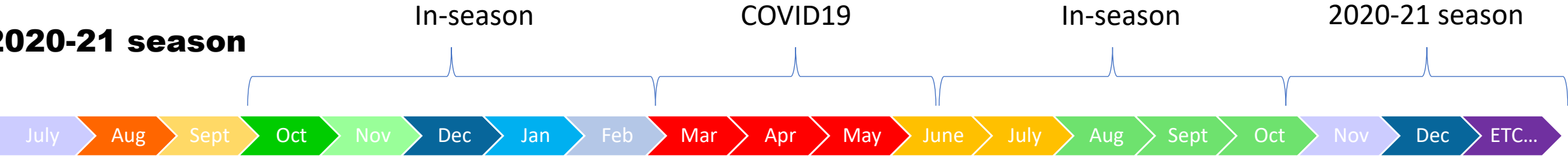
Typical season



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Questions

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