

**Supplementary Table A: Summary of articles: data extraction of the demographics**

Author(s), Year	Participants (n, sex)	Age of participants (years) (mean $\pm$ SD)*	Study design **	Sport / Sporting Event	Level of participation	Length of surveillance (days)
Alonso et al (2012)	n=512 (sex not recorded)	26.9 $\pm$ 4.7	Prospective	2011 IAAF World Championships	Recreational / amateur / military	9
Bjørneboe et al (2016)	n=5070 player-seasons (all male)	Not recorded	Prospective cohort	Football	Elite / professional / international / national	1 460 (1 261 367 player-days)
Chesson et al (2020)	n=17 (all male)	17.7 $\pm$ 0.7	Observational prospective cohort	Rugby (league players)	Recreational / amateur / military	175
Cox et al (2010)	n=20 (M=16, F=4)	35.2 $\pm$ 8.4	RCT	Half-marathon 21.1 km	Recreational / amateur / military	35
Cox et al (2010) <sup>a</sup>	n=20 (all male)	27.3 $\pm$ 6.4	RCT	Running	Recreational / amateur / military	98
Cox et al (2008) <sup>‡</sup>	n=70 (M=51; F=19)	19.3 $\pm$ 2.6	Prospective study	Mixed	Elite / professional / international / national	420
Cox et al (2004)	n=20 (all males)	24.6 $\pm$ 3.0	RCT	Distance Runners	Elite / professional / international / national	120
Cunniffe et al (2011)	n=31 (all male)	26.5	Prospective	Rugby	Elite / professional / international / national	336
Da Boit et al (2015)	n=17 (M=9, F=6)	28.3 $\pm$ 6.4	RCT	General	Recreational / amateur / military	112
Davison et al (2020)	n=61 (sex unknown)	39.3 $\pm$ 11.5	RCT	Endurance athletes	Recreational / amateur / military	90
Derman et al (2019)	n=567 (M=433, F=134)	32.1 $\pm$ 10.3	Prospective	Winter Paralympics	Elite / professional / international / national	12
Derman et al (2014)	n=3329 (sex not recorded)	Not recorded	Prospective	Paralympics	Elite / professional / international / national	14
Dressendorfer et al (2002)	n=9 (all males)	24.7 $\pm$ 2.1	Prospective	Mountain bike cyclists	Recreational / amateur / military	98
Edouard et al (2015)	n=528 (sex not recorded)	25.3 $\pm$ 4.2	Prospective	2013 European Athletics Indoors	Elite / professional / international / national	4

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Edouard et al (2014)	n=1244 (sex not recorded)	Not recorded	Prospective	2012 European Athletics championships	Elite / professional / international / national	5
Edouard et al (2013)	n=440 (sex not recorded)	25.2 ± 4.0	Prospective	2011 European Athletics Indoors	Elite / professional / international / national	3
Fahlman and Engels (2005)	n=75 (all male)	20.5 ± 1.5	Prospective with athlete and control groups	American Football	Recreational / amateur / military	365
Fricker et al (2005)	n=20 (all males)	24.2 ± 3.1	Prospective	Middle-distance runners	Elite / professional / international / national	120
Furusawa et al (2007)	Racers n=21 (all male)	42.0 ± 1.74 (Mean ± SE)	Prospective cohort	Wheelchair marathon racers	Recreational / amateur	44
Gleeson et al (2012) <sup>a</sup>	n=80 (M=46, F=34)	22.5 ± 4.0	Prospective	Endurance-based physical activity	Recreational / amateur / military	120
Gleeson et al (2011)	n=26	25 ± 9	RCT	Endurance athletes	Recreational / amateur / military	120
Hall et al (2007)	n=14 (sex not recorded)	24.9 ± 5.8	RCT	Active adults	Recreational / amateur / military	28
Hanstad et al (2011)	n=99 (M=74, F=25)	Not recorded	Prospective	2010 Winter Olympics - Norwegian team	Elite / professional / international / national	19
Haywood et al (2014)	n=38 (all male)	24.7 ± 3.6	RCT	Rugby	Elite / professional / international / national	28
He et al (2014)	n=210 (M=147, F=63)	20.4 ± 1.9 (male) 20.5 ± 3.1 (female)	Prospective cohort	Endurance	Recreational / amateur / military	112
He et al (2013) <sup>a</sup>	n=31 (sex not recorded)	21 ± 2	Prospective cohort	Endurance	Recreational / amateur / military	112
He et al (2013) <sup>b</sup>	n=225 (sex not recorded)	21 ± 3	Prospective cohort	Endurance	Recreational / amateur / military	112
Henson et al (2008)	n=21 (M=18, F=3)	46.0 ± 2.3	RCT	Ultra marathon runner	Recreational / amateur / military	14
Ihalainen et al (2015)	n=25 (all male)	34.6 ± 1.3	Prospective cohort	Endurance	Recreational / amateur / military	84

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Kekkonen et al (2007)	n=71 (M=63, F=8)	40 Range (23-69)	RCT	Marathon	Recreational / amateur / military	146
Laaksi et al (2007)	n=756 (all male) Control subjects (normal Vit D) n=628 (time loss recorded in this group)	Not recorded	Prospective cohort	Military	Recreational / amateur / military	184
McFarlin et al (2013)	n=35 (M=20, F=15)	35 ± 11	RCT	Marathon runners	Recreational / amateur / military	28
Michalickova et al (2016)	n=19 (M=14, F=5)	22.8 ± 2.5	RCT	Mixed	Elite / professional / international / national	98
Nehlsen-Cannarella et al (2000)	n=20 (all female)	22.6 + 0.5 (Mean ± SEM)	Prospective cohort	Rowers	Elite / professional / international / national	60
Nieman et al 2008	n=17 (all male)	25.0 ± 2.2 (Mean ± SE)	RCT	Cyclists	Recreational / amateur / military	35
Nordstrøm et al (2020)	n=225 (all male)	Mean 24 Range (17-41)	Prospective cohort study	Ice hockey	Elite / professional / international / national	210
Orhant et al (2010) <sup>§</sup>	n=81 (all male)	Range (17-34)	Prospective cohort	Soccer	Elite / professional / international / national	1095
Orysiak et al (2017)	n=27 (all male)	16.5 ± 0.5	Prospective cohort	Ice hockey	Recreational / amateur / military	168
Pacque et al (2007)	n=17 (M=13, F=4)	41.5 ± 8.2	Prospective cohort	Ultra endurance running	Recreational / amateur / military	28
Peters et al (2004)	n=19 (all males); fast well trained runners (n=9), slow less trained runners (n=10)	35.4 ± 1.84 (fast well trained runners) 41.4 ± 2.77 (slow well trained runners) (Mean ± SEM)	Prospective cohort	Marathon runners	Recreational / amateur / military	14
Pyne et al (2001)	n=41 (M=21, F=20)	Range (15-27)	Prospective	Swimming	Elite / professional / international / national	42

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Rama et al (2013)	n=19 (M=13, F=6)	17.2 ± 1.3 (male) 15.8 ± 0.8 (female)	Prospective cohort	Swimming	Elite / professional / international / national	203
Sawczuk et al (2020)	n=22 (M=16; F=6)	16.8 ± 0.5	Prospective longitudinal study	Mixed	Recreational / amateur / military	266
Schwellnus et al (2012) <sup>¥</sup>	n=259 (all male)	Not recorded	Prospective cohort	Rugby	Elite / professional / international / national	112
Soligard et al (2017)	n=11274 (M=6185, F= 5089)	Not recorded	Prospective cohort	Summer Olympics	Elite / professional / international / national	17
Somerville et al (2019)	n=12 (M=4, F=8)	16.5 ± 0.5	RCT	Hockey, football, netball	Recreational / amateur / military	63
Somerville et al (2019) <sup>a</sup>	Cohort 2 (school rugby) n=15; cohort 3 (school rugby) n=24, amateur n=18, total n=57 (all male)	Not recorded	Longitudinal cohort	Rugby	Recreational / amateur / military	273
Somerville et al (2019) <sup>b</sup>	Professional n=24 (all male)	Not recorded	Longitudinal cohort	Rugby	Elite / professional / international / national	273
Spence et al (2007) <sup>¥</sup>	n=63 (M=35, F=28)	22.5 ± 3.8 (elite) 25.2 ± 3.6 (recreational)	Prospective	Triathlon Cycling	Elite / professional / international / national	150
Steffen et al (2019)	n=3 984 (M=2002, F=1982)	Range (15-18)	Prospective cohort	Youth Summer Olympics	Elite / professional / international / national	13
Stephenson et al (2019)	n=7 (M=6 male, F=1)	30 ± 10	Prospective cohort	Para triathletes (mixed impairment)	Elite / professional / international / national	238
Svendsen et al (2016)	n=37 (M=22, F=17)	>18	Retrospective cohort	Cross country ski	Elite / professional / international / national	2889
Tiollier et al (2005) <sup>¥</sup>	n=21 (all male)	21 ± 2	Prospective cohort	Military	Recreational / amateur / military	33

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Valtonen et al (2019) <sup>‡</sup>	n=44 (M=31, F=13)	27 ± 6	Prospective observational study	Winter Olympics	Elite / professional / international / national	21
West et al (2011)	n=50 (M=33; F=17)	36.4 ± 8.9 (male) 35.6 ± 10.2 (female)	RCT	Cyclists and triathletes	Recreational / amateur / military	105

M: Males

F: Females

RCT: Randomised control trial

\* All values are reported as mean + SD unless otherwise stated as range, mean ± SEM, mean ± SE or other as indicated

\*\* In randomised control trials, only the placebo group was used for analysis

‡ Data extracted for subgroups in results table (Online Supplementary Table B)