



Brief Summary Report: 2019/20 High School Sports-Related Injury Surveillance Study
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Introduction

2019/20 marked the 15th year of the High School Sports-Related Injury Surveillance Study (High School RIO).

- The original surveillance study of athletes participating in 9 sports (boys' football, soccer, basketball, wrestling, and baseball and girls' soccer, volleyball, basketball and softball) from 100 nationally representative randomly selected US high schools was continued.
 - o The data compiled over this 15 year study represents the longest running continuous surveillance study and the largest dataset of all time-loss sports injuries compiled from a national sample of US high school athletes.
- The expanded surveillance study continued the 12th year of surveillance of athletes participating in 8 additional sports (boys' lacrosse, ice hockey, swimming & diving, and track & field and girls' field hockey, lacrosse, swimming & diving, and track & field) and, for the 11th year, cheerleading. For the 8th year, data were also collected for athletes participating in boys' and girls' cross country. The expanded study captures data from a convenience sample of US high schools.
 - o While they were previously included in High School RIO, boys' volleyball and girls' gymnastics data were no longer collected starting in the 2012/13 academic year due to the low number of schools with athletic trainers who provided services for these sports. Similarly, while they were previously included in High School RIO, boys' and girls' tennis data were no longer collected starting in the 2018/19 academic year due to the very low number of injuries sustained by athletes participating in tennis.
- To date, from 2005/06 through 2019/20, participating schools have reported 108,574 injuries during 55,146,724 athletic exposures (AE) for an injury rate of 1.97 injuries per 1,000 AE all 24 sports studied.
 - o 57,020 competition injuries during 13,852,890 competition exposures for an injury rate of 4.12 injuries per 1,000 AE
 - o 51,300 practice injuries during 40,812,159 practice exposures for an injury rate of 1.26 injuries per 1,000 AE
 - o 254 performance injuries during 481,675 performance exposures for an injury rate of 0.53 injuries per 1,000 AE (cheerleading only)
- This surveillance study was funded through the generous support of the NFHS.

2019/20 Data Snapshot

Prior to the suspension of high school sports in March 2020 due to COVID-19, the surveillance system captured a large amount of high quality, detailed data on incidence of injury, number of athletic exposures, and injury event information.

- When combined, the schools reporting for both the original random sample and the convenience sample reported 5,422 injuries (56% competition related) during 2,497,216 AE for an injury rate of 2.17 injuries per 1,000 AE in the 20 sports studied.
- While injury rates varied by sport, competition injury rates were higher than practice injury rates for all but 2 of the 20 sports (Figure 1).
- Patterns of injury also varied by sport (Table 1)
 - o the head/face was the commonly injured body site in 7 sports, ankle in 4 sports, lower leg in 3 sports, shoulder in 2 sports, knee in 1 sport, and thigh/upper leg in 1 sport (two sports had ties – shoulder and elbow in baseball and knee and lower leg in boys' cross country).
 - o strains/sprains were the most common injury diagnosis in all but boys' ice hockey and cheerleading, in which concussions were the most common.
 - o across sports 0.0% to 10.6% of the injuries kept the student athlete out of play for >3 weeks.
 - o across sports 0.0% to 8.7% of the injuries resulted in surgical repair.
- In general, patterns were similar to 2018/19. However, patterns for individual sports may have been impacted by COVID-19.
- Although abbreviated, the 2019/20 data will play an important role in understanding how COVID-19 affects injury rates as high school athletes return to play after an extended break from sports.

Trends Over Time

The suspension of high school sports in March 2020 due to COVID-19 affected trends over time. While this is particularly true for winter and spring sports, COVID-19 may have also impacted data collection for fall sports. One benefit of the RIO system is the ability to report data retrospectively. However, many of the ATs who enter fall sport data into the RIO system at the end of the academic year were unable to access their records to complete data entry. Injury rates and patterns at these schools may be systematically different than for schools who enter data prospectively.

Impact

Data from this surveillance study has been used over the past year in multiple forums

- NFHS SMAC review at NFHS SMAC committee meetings.
- NFHS SMAC data requests to address topics of interest throughout the year.
- NFHS Rules Committee reviews.
- Continued evaluation of the effectiveness of several NFHS rule changes.
- Weekly surveillance for infectious disease outbreaks (skin infections) and communication with affected schools or geographic areas to contain the spread of the illness.
- Weekly surveillance for exertional heat illness and communication with NFHS if increases are noted in specific geographic areas.

- State Associations and State Association SMACs data requests to address topics of interest
- Publications in the scientific literature and presentations at national scientific conferences.
- Data requests from other government or professional organizations including the CDC, NOCSAE, NATA and SFIA.
- Data requests from industry partners (e.g., requests from companies working to improve protective equipment)

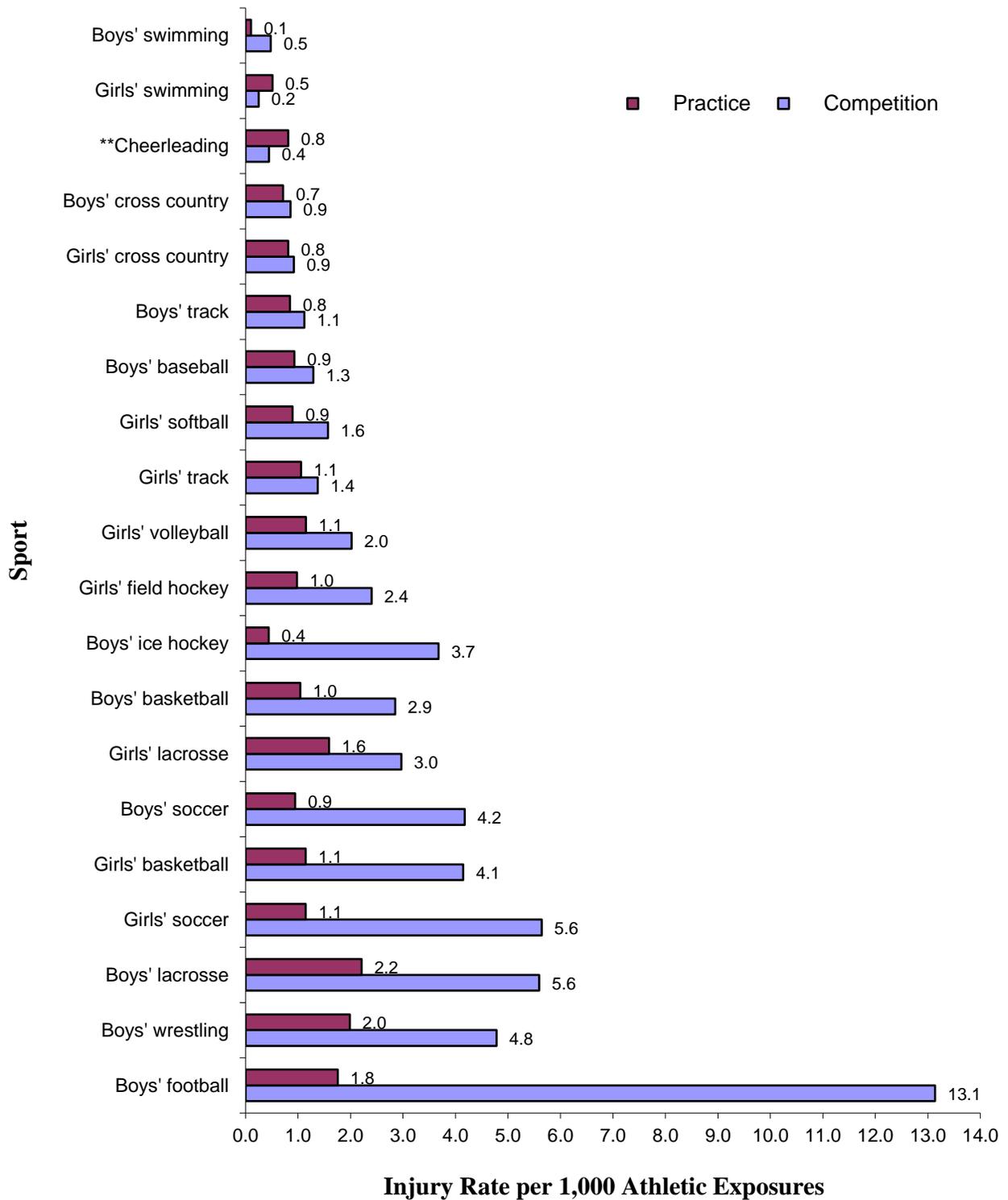
Future

During the 2020/21 academic year, High School RIO will be fully led by Dr. Christy Collins, President of the Datalys Center for Sports Injury Research and Prevention, Inc., a non-profit organization located in Indianapolis, Indiana.

Dr. Collins, along with the Datalys Center staff, will continue the important work of High School RIO while also adjusting to the significant challenges associated with the COVID-19 pandemic. These specific challenges include the abrupt cessation of sport activity during the 19/20 winter and spring seasons in high school athletics, the individualized return to school and sport at the local and state level, and the possibility for schools to face abrupt closures in the coming months. We aim to capture COVID-19 related information such as the prevalence of illness, protective measures implemented by schools, and the impact of shutdowns and change in policies and procedures on injury and illness prevalence. The Datalys Center will work closely with reporting schools, the NFHS, NFHS SMAC, and NFHS Rules Committees throughout the year to continue to produce the data needed to help drive evidence-based decisions to keep athletes healthy.

- Detailed reports will be provided to the NFHS SMAC at their twice-yearly meetings as well as throughout the year upon request.
- Sentinel incidence reports on specific topics of interest (i.e., exertional heat injuries, skin infections, COVID-19 infections) will again be provided to the NFHS SMAC weekly throughout the year.
- Additional detailed reports will be provided upon request to individual NFHS rules committees.
- Continued cooperation with State Associations and other partner organizations upon request.

Figure 1: Convenience Sample Injury Rates per 1,000 Athletic Exposures by Sport and Type of Athletic Exposure, High School Sports-Related Injury Surveillance Study, US, 2019/20*†



*Includes time loss injuries only

**Cheerleading competition rate represents the rate of injury per 1,000 AEs in competition and performance.

†High school sports were suspended in March 2020 due to COVID-19

Table 1: Convenience Sample Patterns of Injury by Sport, High School Sports-Related Injury Surveillance Study, US, 2019/20[†]

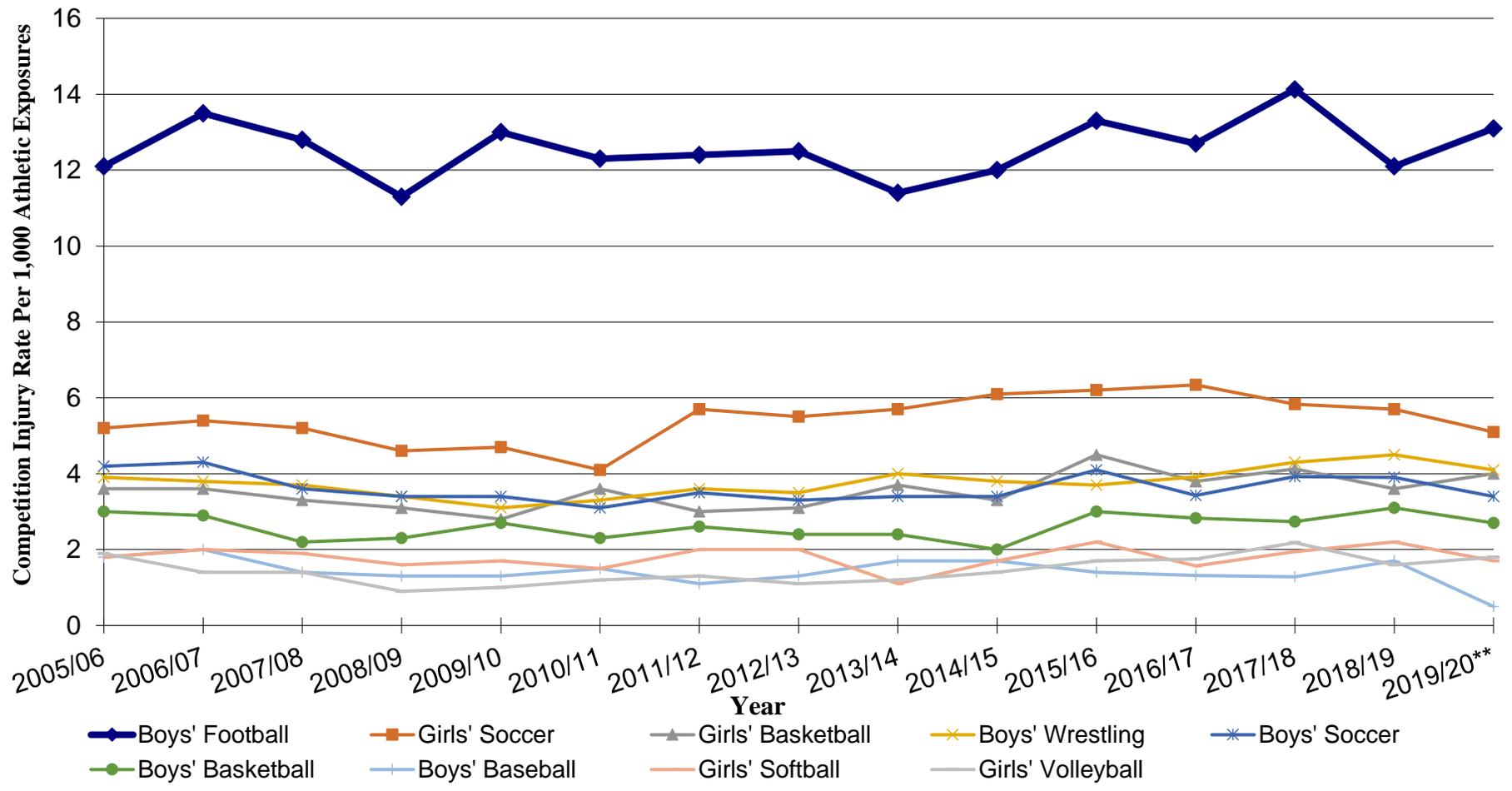
Sport	Most Commonly Injured Body Site	Most Common Diagnosis of Injury	Proportion of Injuries with >3 Weeks Time Loss*	Proportion of Injuries that Resulted in Surgery**
Boys' Sports				
Football	Head/Face	Strain/Sprain	5.6%	8.7%
Soccer	Head/Face	Strain/Sprain	4.4%	2.9%
Basketball	Ankle	Strain/Sprain	9.2%	4.4%
Wrestling	Head/Face	Strain/Sprain	7.6%	6.8%
Baseball	Shoulder and Elbow	Strain/Sprain	3.6%	1.8%
Ice Hockey	Head/Face	Concussion	3.9%	5.2%
Lacrosse	Knee	Strain/Sprain	5.6%	4.2%
Swimming & Diving	Shoulder	Strain/Sprain	0.0%	0.0%
Track & Field	Lower Leg	Strain/Sprain	6.4%	0.0%
Cross Country	Knee and Lower Leg	Strain/Sprain	3.9%	1.3%
Girls' Sports				
Soccer	Head/Face	Strain/Sprain	4.7%	6.1%
Volleyball	Ankle	Strain/Sprain	5.8%	5.8%
Basketball	Ankle	Strain/Sprain	5.8%	7.5%
Softball	Ankle	Strain/Sprain	6.4%	6.4%
Field Hockey	Head/Face	Strain/Sprain	0.9%	2.8%
Lacrosse	Lower Leg	Strain/Sprain	5.6%	2.8%
Swimming & Diving	Shoulder	Strain/Sprain	9.1%	0.0%
Track & Field	Thigh/Upper Leg	Strain/Sprain	10.6%	0.0%
Cross Country	Lower Leg	Strain/Sprain	5.5%	2.7%
Coed' Sports				
Cheerleading	Head/Face	Concussion	12.8%	2.8%

*Injury outcomes included in this category consists of ≥ 22 days before athlete returns to play only. It does not include other categories (e.g., season ending, career ending, etc.).

** Includes injuries that were surgically repaired prior to return to play during the sport season and injuries that were repaired after the end of the season.

[†]High school sports were suspended in March 2020 due to COVID-19

Figure 2: Original Sample Trends over Time in Rates of Competition Related Injury by Sport, High School Sports-Related Injury Surveillance Study, US, 2005/06-2019/20*



*Includes time loss injuries only

**High school sports were suspended in March 2020 due to COVID-19

Table 2. Original Sample Concussion National Estimates and Rates by Sport and Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2005/06 – 2019/20 School Years

	2005-06	2006-07	2007-08**	2008-09**	2009-10**	2010-11**	2011-12**	2012-13**
	# of nationally estimated concussions (rate of concussions per 10,000 athlete-exposures)							
Overall total	134,965 (2.27)	123,864 (2.28)	137,802 (2.41)	149,699 (2.55)	192,051 (3.22)	249,655 (4.09)	333,253 (5.11)	348,565 (5.47)
Competition	92,795 (5.40)	87,749 (5.66)	95,957 (5.99)	109,645 (6.47)	135,983 (7.72)	186,804 (10.16)	210,457 (11.59)	231,621 (12.14)
Practice	42,170 (1.06)	36,114 (1.04)	41,846 (1.09)	40,053 (1.10)	56,067 (1.55)	62,847 (1.79)	122,796 (2.75)	116,944 (2.93)
Boys' football total	55,007 (4.66)	60,136 (4.80)	70,929 (5.29)	70,672 (5.20)	100,928 (7.20)	117,173 (8.20)	140,057 (9.41)	167,604 (11.08)
Competition	33,723 (15.48)	39,265 (18.53)	43,850 (19.82)	46,439 (19.09)	65,227 (27.34)	85,095 (33.73)	69,810 (31.12)	93,029 (35.50)
Practice	21,284 (2.12)	20,870 (2.12)	27,079 (2.41)	24,233 (2.37)	35,701 (3.36)	32,078 (3.11)	70,247 (5.31)	74,575 (6.02)
Boys' soccer total	21,972 (2.22)	15,355 (2.01)	17,447 (1.92)	14,215 (1.67)	20,247 (2.23)	30,716 (2.97)	41,813 (4.14)	46,511 (3.92)
Competition	19,761 (6.09)	12,316 (5.24)	13,847 (5.48)	10,253 (4.71)	18,456 (6.39)	25,858 (8.09)	34,751 (11.14)	38,972 (11.14)
Practice	2,212 (0.38)	3,039 (0.70)	3,600 (0.42)	3,962 (0.39)	1,791 (0.43)	4,858 (0.76)	7,062 (1.30)	7,539 (0.90)
Girls' soccer total	29,204 (3.61)	21,570 (2.26)	23,595 (2.65)	31,739 (3.53)	25,954 (2.96)	37,611 (4.19)	59,215 (7.34)	67,677 (7.87)
Competition	23,080 (9.95)	18,188 (6.50)	21,748 (7.91)	27,684 (10.24)	22,552 (8.23)	35,194 (12.20)	49,180 (21.82)	58,826 (22.99)
Practice	6,124 (0.82)	3,382 (0.52)	1,847 (0.41)	4,055 (0.69)	3,401 (0.67)	2,417 (0.51)	10,035 (1.45)	8,851 (1.46)
Girls' volleyball total	2,568 (0.50)	2,962 (0.68)	4,330 (1.00)	1,837 (0.32)	5,628 (0.88)	4,498 (1.06)	8,667 (1.70)	7,603 (1.72)
Competition	500 (0.46)	2,469 (1.51)	2,625 (1.97)	1,443 (0.62)	2,756 (0.95)	2,335 (1.61)	7,241 (3.94)	4,504 (2.26)
Practice	2,069 (0.53)	493 (0.28)	1,705 (0.53)	394 (0.16)	2,871 (0.85)	2,163 (0.77)	1,426 (0.55)	3,099 (1.42)
Boys' basketball total	3,513 (0.69)	4,452 (0.73)	4,179 (0.84)	4,247 (0.85)	11,013 (1.98)	11,699 (2.05)	11,011 (2.35)	13,076 (2.26)
Competition	1,639 (1.14)	3,403 (1.98)	2,418 (1.75)	3,439 (2.32)	7,985 (4.73)	8,083 (4.02)	7,648 (5.42)	7,055 (3.99)
Practice	1,874 (0.51)	1,049 (0.21)	1,761 (0.46)	808 (0.24)	3,028 (0.84)	3,616 (1.18)	3,363 (1.08)	6,021 (1.50)
Girls' basketball total	13,136 (2.20)	7,552 (2.04)	7,389 (1.81)	8,700 (1.98)	10,662 (2.02)	19,909 (4.21)	16,902 (3.65)	19,663 (4.53)
Competition	10,826 (6.38)	5,084 (4.48)	6,021 (4.90)	6,643 (5.13)	7,553 (5.02)	14,769 (9.77)	13,186 (8.85)	13,081 (10.14)
Practice	2,310 (0.53)	2,468 (1.00)	1,368 (0.50)	2,057 (0.67)	3,109 (0.69)	5,139 (1.79)	3,715 (1.52)	6,582 (1.98)
Boys' wrestling total	5,417 (1.74)	5,133 (1.54)	5,982 (1.45)	10,096 (2.16)	7,350 (2.15)	13,196 (3.81)	27,041 (5.70)	13,895 (4.89)
Competition	2,268 (3.23)	3,375 (3.43)	2,870 (2.75)	8,206 (5.65)	3,652 (3.49)	6,971 (6.75)	10,976 (8.25)	6,890 (8.28)
Practice	3,149 (1.27)	1,758 (0.87)	3,113 (0.98)	1,891 (0.90)	3,699 (1.65)	6,224 (2.76)	16,065 (4.76)	7,005 (3.63)
Boys' baseball total	1,450 (0.39)	2,747 (0.43)	523 (0.21)	1,858 (0.43)	2,990 (0.37)	6,391 (1.04)	8,594 (1.35)	4,773 (0.99)
Competition	846 (0.63)	1,982 (0.86)	459 (0.45)	1,637 (1.07)	2,735 (0.86)	4,527 (1.80)	6,013 (2.76)	3,245 (1.75)
Practice	605 (0.26)	765 (0.19)	64 (0.08)	221 (0.08)	255 (0.10)	1,863 (0.64)	2,582 (0.57)	1,528 (0.59)
Girls' softball total	2,695 (0.67)	3,957 (0.75)	3,428 (0.69)	6,332 (1.49)	7,279 (1.38)	8,462 (1.39)	19,953 (2.96)	7,763 (1.87)
Competition	152 (0.21)	1,667 (0.94)	2,119 (1.16)	3,901 (2.03)	5,067 (3.12)	3,972 (1.87)	11,652 (5.17)	6,019 (3.91)
Practice	2,543 (0.91)	2,290 (0.65)	1,309 (0.43)	2,432 (1.20)	2,212 (0.49)	4,489 (1.15)	8,301 (1.80)	1,744 (0.83)

* Overall totals represent only the 9 sports from the Original Study which was randomly sampled; **In years 2007/08 through 2019/20, the definition of injury was expanded to include all concussions, regardless of whether or not they resulted in restriction of the student-athlete's participation; †Numbers do not always sum due to rounding; ††*High school sports were suspended in March 2020 due to COVID-19*

Table 2 (Con't). Original Sample Concussion National Estimates and Rates by Sport and Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2005/06 – 2019/20 School Years

	2013-14**	2014-15**	2015-16**	2016-17**	2017-18**	2018-19**	2019-20**††
Overall total*†	342,393 (5.30)	315,540 (5.63)	367,306 (5.81)	305,128 (5.43)	283,956 (5.39)	283,433 (5.24)	200,478 (4.75)
Competition	228,016 (12.01)	208,943 (13.24)	241,515 (13.69)	220,454 (12.87)	212,671 (13.15)	204,249 (12.91)	143,635 (13.42)
Practice	114,377 (2.71)	106,597 (2.78)	125,791 (2.78)	84,674 (2.49)	71,287 (2.26)	79,184 (2.22)	56,843 (1.68)
Boys' football total	161,874 (9.97)	141,715 (10.07)	150,249 (10.39)	132,361 (10.50)	114,876 (11.54)	116,846 (10.35)	82,495 (8.35)
Competition	96,275 (32.98)	83,364 (33.87)	90,689 (35.80)	85,678 (38.37)	81,923 (43.20)	77,672 (37.84)	54,912 (31.87)
Practice	65,599 (5.19)	58,351 (5.24)	59,560 (4.77)	46,683 (4.66)	32,953 (4.46)	39,174 (4.20)	27,583 (3.07)
Boys' soccer total	40,583 (4.38)	29,386 (4.10)	41,380 (4.44)	28,582 (3.34)	32,093 (3.36)	35,287 (3.65)	29,915 (4.02)
Competition	32,110 (12.10)	24,572 (11.10)	28,058 (9.87)	25,881 (9.47)	27,380 (8.82)	31,923 (10.46)	24,037 (11.83)
Practice	8,473 (0.93)	4,814 (0.99)	13,322 (1.95)	2,702 (0.62)	4,713 (0.89)	3,364 (0.60)	5,878 (0.59)
Girls' soccer total	58,946 (6.95)	78,490 (10.39)	76,447 (8.63)	64,707 (7.52)	66,140 (7.44)	56,904 (7.27)	36,781 (6.27)
Competition	50,990 (18.38)	59,226 (27.14)	63,317 (23.97)	58,188 (21.23)	56,364 (20.37)	44,760 (18.61)	28,097 (17.71)
Practice	7,956 (1.93)	19,264 (2.93)	12,830 (1.73)	6,519 (1.11)	9,776 (1.70)	12,144 (2.04)	8,684 (1.67)
Girls' volleyball total	10,874 (2.50)	13,246 (3.17)	16,471 (3.09)	14,734 (3.85)	12,927 (3.00)	10,925 (2.97)	9,975 (2.58)
Competition	4,791 (3.45)	6,713 (4.87)	8,013 (4.93)	8,718 (6.45)	7,646 (5.01)	6,325 (4.76)	6,203 (5.31)
Practice	6,083 (2.00)	6,533 (2.32)	8,458 (2.20)	6,016 (2.54)	5,282 (1.92)	4,600 (2.11)	3,772 (1.22)
Boys' basketball total	12,177 (2.13)	5,627 (1.16)	14,608 (2.57)	14,894 (2.54)	10,038 (1.86)	10,410 (2.07)	12,343 (2.14)
Competition	8,105 (4.25)	2,934 (1.90)	7,613 (5.09)	8,478 (4.66)	6,246 (3.73)	5,410 (4.57)	9,521 (5.35)
Practice	4,072 (1.18)	2,693 (0.84)	6,995 (1.51)	6,416 (1.58)	3,793 (1.03)	5,000 (1.01)	2,822 (0.76)
Girls' basketball total	20,927 (4.58)	17,824 (4.88)	29,111 (6.12)	17,314 (4.27)	16,410 (3.96)	19,555 (4.61)	15,331 (4.03)
Competition	15,713 (12.01)	12,960 (11.53)	19,723 (14.72)	14,218 (10.43)	12,679 (9.95)	14,373 (10.68)	12,471 (10.56)
Practice	5,214 (1.25)	4,864 (1.96)	9,388 (2.32)	3,096 (1.34)	3,731 (1.23)	5,182 (1.96)	2,860 (1.22)
Boys' wrestling total	20,431 (5.97)	14,191 (4.39)	22,448 (5.83)	13,334 (4.22)	13,114 (4.76)	18,543 (5.07)	9,732 (3.16)
Competition	11,205 (12.35)	11,017 (12.22)	11,490 (11.09)	7,624 (8.79)	7,003 (9.84)	13,147 (12.87)	6,802 (7.93)
Practice	9,226 (3.67)	3,174 (1.92)	10,958 (4.04)	5,710 (2.63)	6,111 (2.86)	5,396 (2.37)	2,930 (1.54)
Boys' baseball total	6,523 (1.07)	6,570 (1.49)	5,078 (1.05)	6,074 (1.07)	7,009 (1.17)	5,557 (1.00)	2,091 (0.91)
Competition	4,002 (1.95)	4,232 (2.99)	4,117 (2.50)	3,921 (1.79)	4,714 (2.03)	3,990 (1.81)	460 (2.32)
Practice	2,521 (0.58)	2,338 (0.67)	961 (0.27)	2,153 (0.64)	2,295 (0.68)	1,567 (0.55)	1,631 (0.70)
Girls' softball total	10,058 (1.57)	8,491 (2.51)	11,514 (2.26)	13,128 (2.69)	11,349 (2.56)	9,406 (2.74)	1,815 (1.18)
Competition	4,825 (1.96)	3,925 (4.23)	8,195 (4.03)	7,748 (3.94)	8,716 (4.86)	6,649 (5.06)	1,132 (3.86)
Practice	5,233 (1.37)	4,566 (1.59)	3,319 (1.32)	5,380 (1.97)	2,633 (1.32)	2,757 (1.46)	683 (0.50)

*Overall totals represent only the 9 sports from the Original Study which was randomly sampled; **In years 2007/08 through 2019/20, the definition of injury was expanded to include all concussions, regardless of whether or not they resulted in restriction of the student-athlete's participation; †Numbers do not always sum due to rounding; ††**High school sports were suspended in March 2020 due to COVID-19**