Original Sample Summary Report

NATIONAL HIGH SCHOOL SPORTS-RELATED INJURY SURVEILLANCE STUDY

2022-23 School Year

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High School RIO™

High School Sports-Related Injury Surveillance Study

ACKNOWLEDGEMENTS

We thank the certified athletic trainers (ATs) for their hard work and dedication in providing us with complete and accurate data. Without their efforts, this study would not have been possible. We would like to thank the National Federation of State High School Associations (NFHS) for their support of this project. The content of this report was funded in part by the Centers for Disease Control and Prevention (CDC) grants #R49/CE000674-01 and #R49/CE001172-01. The content of this report is solely the responsibility of the authors and does not necessarily represent the official views of the CDC. We would also like to acknowledge the generous research funding contributions of the National Federation of State High School Associations (NFHS), National Operating Committee on Standards for Athletic Equipment (NOCSAE), and DonJoy Orthotics.

NOTE

The analyses presented here provide only a brief summary of collected data, with the feasibility of a more detailed presentation limited by the extensive breadth and detail contained in the dataset. The principal investigator, Christy Collins, PhD, is happy to provide further information or to discuss research partnership opportunities upon request.

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I. Introduction & Methodology

1.1 PROJECT OVERVIEW

To combat the epidemic of obesity among youth in the United States (US), adolescents must be encouraged to get up off the couch and participate in physically active sports, recreation, and leisure activities. Participation in high school sports, one of the most popular physical activities among adolescents, has grown rapidly from an estimated 4.0 million participants in 1971-72 to over 7.8 million in 2022-23. While the health benefits of a physically active lifestyle including participating in sports are undeniable, high school athletes are at risk of sports-related injury because a certain endemic level of injury can be expected among participants of any physical activity. The challenge to injury epidemiologists is to reduce injury rates among high school athletes to the lowest possible level without discouraging adolescents from engaging in this important form of physical activity. This goal can best be accomplished by investigating the etiology of preventable injuries; by developing, implementing, and evaluating protective interventions using such science-based evidence; and by responsibly reporting epidemiologic findings while promoting a physically active lifestyle among adolescents.

1.2 BACKGROUND AND SIGNIFICANCE

High school sports play an important role in the adoption and maintenance of a physically active lifestyle among millions of US adolescents. Too often injury prevention in this population is overlooked as sports-related injuries are thought to be unavoidable. In reality, sports-related injuries are largely preventable through the application of preventive interventions based on evidence-based science. The morbidity, mortality, and disability caused by high school sports-related injuries can be reduced through the development of effective prevention strategies and through programmatic decisions based on injury prevention. However, such efforts rely upon accurate estimates of injury incidence, injury rate calculations, and risk and protective factor data. Previously, no injury surveillance system capable of providing researchers with the needed quality of injury and exposure data for high school sports-related injuries existed.

Since the 2005-06 school year, the National High School Sports-Related Injury Surveillance Study has monitored injuries among US high school athletes participating in boys' football, boys' and girls' soccer, girls' volleyball, boys' and girls' basketball, boys' wrestling, boys' baseball, and girls' softball. Other sports were added in subsequent years including girls' field hockey, girls' gymnastics, boys' volleyball, boys' ice hockey, boys' and girls' lacrosse, boys' and girls' swimming & diving, boys' and girls' track & field, boys' and girls' tennis, boys' and girls' cross country, and cheerleading (boys' volleyball, girls' gymnastics, and boys' and girls' tennis are no longer under surveillance). The study data have been collected using the time- and cost-efficient RIO (Reporting Information Online) surveillance system. Through the generous contributions of the National Federation of State High School Associations (NFHS) and the NFHS Foundation, the National High School Sports-Related Injury Surveillance Study was able to be continued during the 2022-23 school year. Previous years of this study were funded by the Centers for Disease Control and Prevention (CDC), National Federation of State High School Associations (NFHS), the National Operating Committee on Standards for Athletic Equipment (NOCSAE), the Research Institute at Nationwide Children's Hospital, DonJoy Orthotics, EyeBlack, and The Ohio State University.

During the 2019-20 school year, the National High School Sports-Related Injury Surveillance Study transitioned from Dr. Dawn Comstock at the University of Colorado to Dr. Christy Collins at the Datalys Center for Sports Injury Research and Prevention, Inc. Dr. Collins worked with Dr. Comstock on the National High School Sports-Related Injury Surveillance Study during the 2005-06 through 2013-14 school years and is carrying on the important work of this surveillance system.

1.3 Specific Aims

The continuing objectives of this study are to maintain the National High School Sports- Related Injury Surveillance Study among a nationally representative sample of US high schools. The specific aims of this study are:

A. To determine the incidence (number) of injuries among US high school boys' football, boys' and girls' soccer, girls' volleyball, boys' and girls' basketball, boys' wrestling, boys' baseball, and girls' softball athletes.
B. To calculate the rate of injuries per 1,000 athlete-competitions, per 1,000 athlete-practices, and per 1,000 athlete-exposures for US high school athletes in the 9 sports of interest.
C. To provide detailed information about the injuries sustained by US high school athletes including the type, site, severity, initial and subsequent treatment/care, outcome, etc.
D. To provide detailed information about the injury events including athlete demographics, position played, phase of play/activity, etc.
E. To identify potential risk or protective factors.
F. To compare injury rates and patterns from the 2005-06 through the 2022-23 school years.

1.4 Project Design

The National High School Sports-Related Injury Surveillance Study defined an injury as:

A. An injury that occurred as a result of participation in an organized high school competition or practice and
B. Required medical attention by a team physician, certified athletic trainer, personal physician, or emergency department/urgent care facility and
C. Resulted in restriction of the high school athlete's participation for one or more days beyond the day of injury OR
D. Any fracture, concussion, dental injury, or exertional heat event regardless of whether or not it resulted in restriction of the student-athlete's participation.

An athlete exposure was defined as one athlete participating in one practice or competition where he or she is exposed to the possibility of athletic injury. Exposure was expressed in two parts:

A. Number of athlete-practices = the sum of the number of athletes at each practice during the past week. For example, if 20 athletes practiced on Monday through Thursday and 18 practiced on Friday, the number of athlete-practices would equal 98.
B. Number of athlete-competitions = the sum of the number of athletes at each competition during the past week. For example, if 9 athletes played in a Freshman game, 12 in a JV game, and 14 in a Varsity game, the number of athlete-competitions would equal 35.

1.5 Sample Recruitment

Certified athletic trainers (AT) who provide care to high school athletes were eligible to participate. Eligible ATs received an email introducing the study and inviting them to participate. All high schools with an AT willing to serve as a reporter were categorized into 8 sampling strata by geographic location (northeast, midwest, south, and west) and high school size (enrollment <= 1,000 or > 1,000 students). Participant schools were then randomly selected from each substrata to obtain 100 study schools. To maintain a nationally representative sample, if a school dropped out of the study, another school from the same stratum was randomly selected for replacement. Participating ATs were offered a $300-$350 honorarium depending on the number of sports reported along with an individualized school injury report and 10 Category B CEUs following the study's conclusion.

1.6 Data Collection

ATs enrolled in the National High School Sports-Related Injury Surveillance Study received an email every Monday throughout the study period reminding them to enter their school's data into the RIO surveillance system. Each participating AT was asked to complete 48 weekly exposure reports: one for each week from July 25, 2022 through June 25, 2023. Exposure reports collected exposure information (number of athlete-competitions, athlete-practices, and athlete-performances for cheerleading) and the number of reportable injuries sustained by student athletes for each sport currently in session at their school. For each reportable injury, the AT was asked to complete an injury report. The injury report collected detailed information about the injured player (e.g., age, year in school, etc.), the injury (e.g., site, type, severity, etc.) and the injury event (e.g., position played, phase of play, etc.). The internet-based surveillance tool provided ATs with the ability to view all their submitted data throughout the study and update reports as needed (e.g., need for surgery, days till resuming play, etc.).

1.7 Data Management

In an effort to decrease loss-to follow up, a log of reporters' utilization of the internet-based injury surveillance system was maintained throughout the study period. Reporters who repeatedly failed to log on to complete the weekly exposure and injury reports or who had errors with their reporting were contacted by the study staff and either reminded to report, asked to correct errors, or assessed for their willingness to continue participating in the study.

1.8 Data Analysis

Data were analyzed using SAS software, version 9.4. Although fractures, concussions, dental injuries, and exertional heat events resulting in <1 day time loss were collected, unless otherwise noted, analyses in this report excluded these injuries. With the exception of injury rates, data were weighted for all analyses to produce national estimates. For each sport in each stratum, weights account for the total number of US schools offering the sport and the average number of participating study schools reporting each week for that sport. For example, following is the algorithm used to calculate football weights for the small (enrollment <= 1,000) west stratum:

$$\text{weight} = \frac{\text{national total \# of small west US high schools}}{\text{average \# of small west participating schools reporting football each week}}$$

Injury rates were calculated as the ratio of unweighted case counts per 1,000 athlete-exposures, and they were compared using rate ratios (RR) with 95% confidence intervals (CIs). The following is an example of the RR calculation comparing the rate of injury in boys' soccer to the rate of injury in girls' soccer:

$$\text{RR} = \frac{\text{\# boys' soccer injuries / total \# boys' soccer athlete-exposures}}{\text{\# girls' soccer injuries / total \# girls' soccer athlete-exposures}}$$

Injury proportions were compared using injury proportion ratios (IPR) and corresponding 95% CIs adjusted to account for the sampling weights and the complex sampling design. The following is an example of the IPR calculation comparing the proportion of boys' soccer concussions to the proportion of girls' soccer concussions:

$$\text{IPR} = \frac{\text{\# boys' soccer concussions / total \# boys' soccer injuries}}{\text{\# girls' soccer concussions / total \# girls' soccer injuries}}$$

An RR or IPR >1.00 suggests a risk association while an RR or IPR <1.00 suggests a protective association. CIs not including 1.00 were considered statistically significant. Injury rates over time were compared by running a linear regression and testing for trend.

II. Overall Injury Epidemiology

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Table 2.1 Injury Rates by Sport and Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2022-23 School Year *

	Event Type	# Injuries	# Exposures	Injury Rate (per 1,000 AEs)	Nationally Estimated # Injuries
Overall	***Total***	***3,836***	***1,590,164***	***2.41***	***1,534,842***
	Competition	2,155	436,699	4.93	894,718
	Practice	1,681	1,153,465	1.46	640,124
Boys' Football	***Total***	***1,533***	***403,405***	***3.80***	***552,396***
	Competition	891	69,406	12.84	336,471
	Practice	642	333,999	1.92	215,925
Boys' Soccer	***Total***	***301***	***167,203***	***1.80***	***198,877***
	Competition	195	50,996	3.82	120,281
	Practice	106	116,207	0.91	78,596
Girls' Soccer	***Total***	***331***	***135,101***	***2.45***	***192,685***
	Competition	226	40,748	5.55	132,485
	Practice	105	94,353	1.11	60,200
Girls' Volleyball	***Total***	***180***	***140,131***	***1.28***	***73,903***
	Competition	80	48,471	1.65	31,391
	Practice	100	91,660	1.09	42,512
Boys' Basketball	***Total***	***383***	***200,133***	***1.91***	***124,110***
	Competition	195	58,487	3.33	64,575
	Practice	188	141,646	1.33	59,535
Girls' Basketball	***Total***	***289***	***135,164***	***2.14***	***86,437***
	Competition	193	40,289	4.79	58,076
	Practice	96	94,875	1.01	28,361
Boys' Wrestling	***Total***	***451***	***145,604***	***3.10***	***149,885***
	Competition	190	36,047	5.27	73,599
	Practice	261	109,557	2.38	76,286

Boys' Baseball	***Total***	***214***	***160,770***	***1.33***	***70,685***
	Competition	109	56,788	1.92	36,455
	Practice	105	103,982	1.01	34,230
Girls' Softball	***Total***	***154***	***102,653***	***1.50***	***85,864***
	Competition	76	35,467	2.14	41,385
	Practice	78	67,186	1.16	44,479

* Only includes injuries resulting in ≥1 day time loss.

Table 2.2 Proportion of Injuries Resulting in Time Loss, High School Sports-Related Injury Surveillance Study, US, 2022-23 School Year *

	< 1 Day Time Loss	≥ 1 Day Time Loss	Time Loss Data Missing	Total
	%	%	%	%
Overall	***1.7%***	***94.3%***	***4.0%***	***100.0%***
Boys' Football	1.0%	94.3%	4.7%	100.0%
Boys' Soccer	0.6%	95.3%	4.1%	100.0%
Girls' Soccer	2.3%	93.2%	4.5%	100.0%
Girls' Volleyball	2.7%	95.7%	1.6%	100.0%
Boys' Basketball	3.0%	94.3%	2.7%	100.0%
Girls' Basketball	3.2%	91.7%	5.1%	100.0%
Boys' Wrestling	1.9%	94.0%	4.2%	100.0%
Boys' Baseball	2.3%	97.3%	0.5%	100.0%
Girls' Softball	2.4%	93.9%	3.7%	100.0%

* By study definition, non-time loss injuries were fractures, concussions, dental injuries, and exertional heat events that resulted in < 1 day time loss. Because they accounted for a small proportion of all injuries overall, they are not included in any other analyses.

Table 2.3 Demographic Characteristics of Injured Athletes by Sex, High School Sports-Related Injury Surveillance Study, US, 2022-23 School Year *

	Male		Female	
Year in School	**n**	**%**	**n**	**%**
Freshman	231,336	22.7%	108,049	26.3%
Sophomore	259,048	25.5%	137,926	33.6%
Junior	257,934	25.4%	96,809	23.6%
Senior	268,567	26.4%	67,378	16.4%
Total **	***1,016,885***	***100.0%***	***410,162***	***100.0%***

Age (years)		
Minimum	12	13
Maximum	19	18
Mean (SD)	15.8 (1.2)	15.6 (1.2)
n	846,616	325,569

BMI		
Minimum	15.6	15.7
Maximum	50.2	42.4
Mean (SD)	24.9 (4.9)	22.5 (3.3)
n	678,256	251,714

* All remaining analyses in this chapter present data weighted to provide national injury estimates.
** Throughout this chapter, totals and n's represent the total weighted number of injury reports containing a valid response for the particular question. Due to a low level of non-response, these totals are always similar but are not always equal to the total number of injuries.

Figure 2.1 Injury Diagnosis by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2022-23 School Year

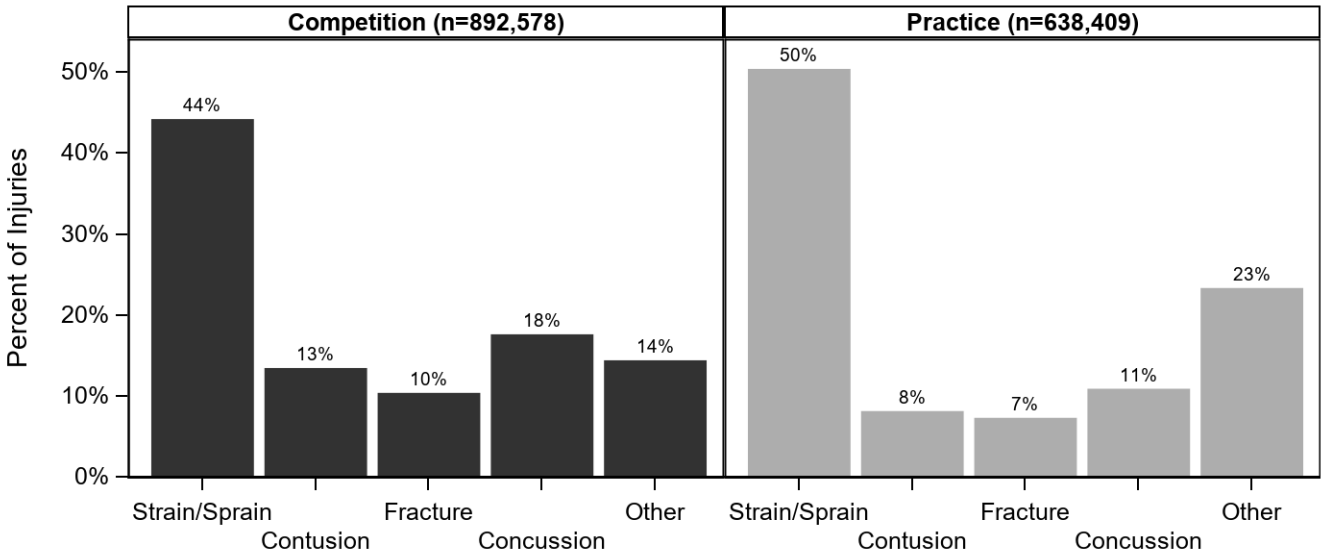

Table 2.4 Body Site of Injury by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2022-23 School Year *

	Competition		Practice		Overall	
Body Site	**n**	**%**	**n**	**%**	**n**	**%**
Ankle	143,671	16.1%	132,036	20.6%	275,707	18.0%
Head/Face	179,764	20.1%	88,565	13.8%	268,330	17.5%
Knee	147,232	16.5%	86,465	13.5%	233,697	15.2%
Hip/Thigh/Upper Leg	86,264	9.6%	68,662	10.7%	154,925	10.1%
Hand/Wrist	82,163	9.2%	61,164	9.6%	143,327	9.3%
Shoulder	60,270	6.7%	55,535	8.7%	115,805	7.5%
Lower Leg	52,666	5.9%	35,779	5.6%	88,445	5.8%
Trunk	44,393	5.0%	35,250	5.5%	79,643	5.2%
Arm/Elbow	35,863	4.0%	19,372	3.0%	55,235	3.6%
Foot	26,586	3.0%	28,296	4.4%	54,882	3.6%
Neck	12,003	1.3%	13,112	2.0%	25,115	1.6%
Other	16,799	1.9%	7,301	1.1%	24,099	1.6%
Systemic	6,649	0.7%	8,588	1.3%	15,237	1.0%
Total	***894,322***	***100.0%***	***640,124***	***100.0%***	***1,534,446***	***100.0%***

* Totals and n's represent the total weighted number of injury reports containing a valid response for the particular question. Due to a low level of non-response, these totals are always similar but are not always equal to the total number of injuries.

Table 2.5 Most Commonly Injured Ankle Structures, High School Sports-Related Injury Surveillance Study, US, 2022-23 School Year *

	Male (n=164,242)		Female (n=95,395)		Overall (n=259,637)	
Ankle Ligament Injuries	**n**	**%**	**n**	**%**	**n**	**%**
Anterior Talofibular Ligament	115,503	70.3%	81,236	85.2%	196,739	75.8%
Calcaneofibular Ligament	54,740	33.3%	31,348	32.9%	86,088	33.2%
Anterior Tibiofibular Ligament	25,538	15.5%	8,941	9.4%	34,479	13.3%
Posterior Talofibular Ligament	7,420	4.5%	7,649	8.0%	15,069	5.8%
Deltoid Ligament	8,035	4.9%	2,196	2.3%	10,231	3.9%
Posterior Tibiofibular Ligament	3,883	2.4%	655	0.7%	4,538	1.7%

* Multiple ligament responses allowed per injury report. Totals and n's are not always equal due to slight rounding of the weighted number of injuries and missing responses. Due to a low level of non-response, these totals are always similar but are not always equal to the total number of injuries.

Table 2.6 Most Commonly Injured Knee Structures, High School Sports-Related Injury Surveillance Study, US, 2022-23 School Year *

	Male (n=147,995)		Female (n=72,373)		Overall (n=220,368)	
Knee Ligament Injuries	**n**	**%**	**n**	**%**	**n**	**%**
Patella and/or Patellar Tendon	41,255	27.9%	21,110	29.2%	62,365	28.3%
Anterior Cruciate Ligament	33,575	22.7%	25,838	35.7%	59,413	27.0%
Medial Collateral Ligament	34,757	23.5%	14,835	20.5%	49,592	22.5%
Torn Cartilage (Meniscus)	32,231	21.8%	14,367	19.9%	46,598	21.1%
Lateral Collateral Ligament	5,689	3.8%	2,804	3.9%	8,493	3.9%
Posterior Cruciate Ligament	4,703	3.2%	616	0.9%	5,319	2.4%

* Multiple ligament responses allowed per injury report. Totals and n's are not always equal due to slight rounding of the weighted number of injuries and missing responses. Due to a low level of non-response, these totals are always similar but are not always equal to the total number of injuries.

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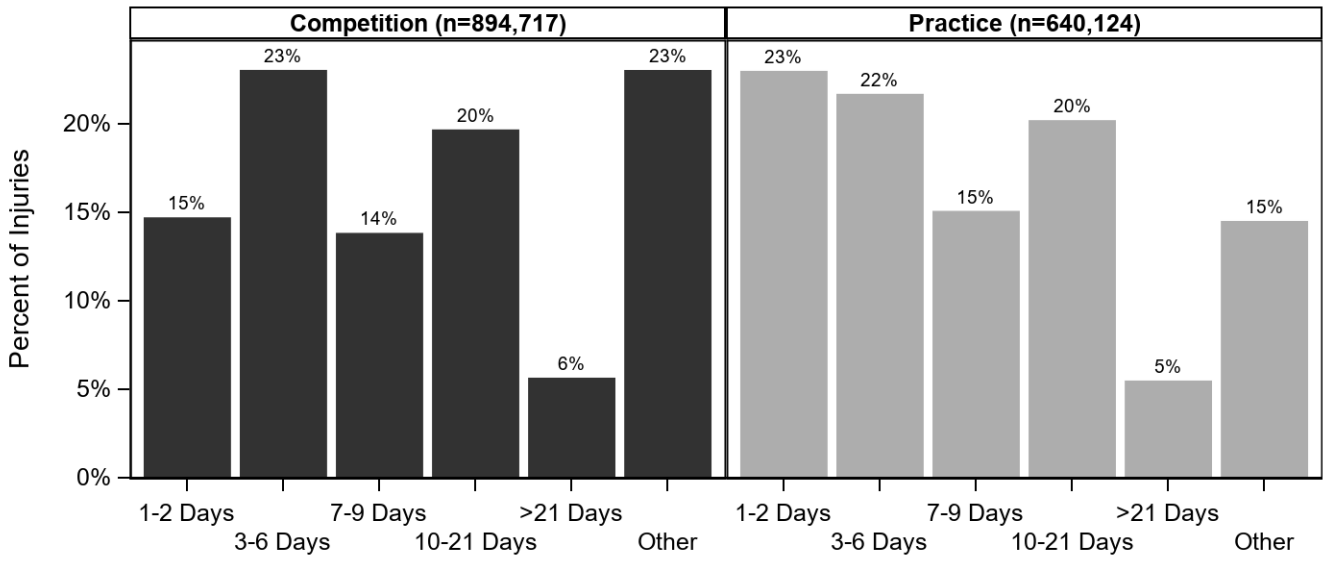
Table 2.7 Ten Most Common Injury Diagnoses by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2022-23 School Year *

	Competition (n=892,456)		Practice (n=638,407)		Overall (n=1,530,863)	
Diagnosis	**n**	**%**	**n**	**%**	**n**	**%**
Ankle Strain/Sprain	135,124	15.1%	125,848	19.7%	260,972	17.0%
Head/Face Concussion	157,062	17.6%	68,964	10.8%	226,027	14.8%
Knee Strain/Sprain	81,754	9.2%	40,005	6.3%	121,759	8.0%
Hip/Thigh/Upper Leg Strain/Sprain	54,545	6.1%	53,692	8.4%	108,238	7.1%
Knee Other	41,972	4.7%	35,367	5.5%	77,339	5.1%
Shoulder Other	32,954	3.7%	31,503	4.9%	64,457	4.2%
Hand/Wrist Fracture	33,716	3.8%	22,278	3.5%	55,994	3.7%
Hand/Wrist Strain/Sprain	30,187	3.4%	24,136	3.8%	54,322	3.5%
Shoulder Strain/Sprain	24,861	2.8%	22,476	3.5%	47,337	3.1%
Trunk Strain/Sprain	22,646	2.5%	19,594	3.1%	42,240	2.8%

* Totals and n's represent the total weighted number of injury reports containing a valid response for the particular question. Due to a low level of non-response, these totals are always similar but are not always equal to the total number of injuries.

Figure 2.2 Time Loss by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2022-23 School Year *



* Other category is made up of medical disqualification for season, medical disqualification for career, athlete chooses not to continue, and season ended before athlete returned to play

Table 2.8 Injuries Requiring Surgery by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2022-23 School Year *

	Competition		Practice		Overall	
Need for Surgery	**n**	**%**	**n**	**%**	**n**	**%**
Required Surgery	85,076	9.6%	25,577	4.0%	110,653	7.3%
Did Not Require Surgery	802,033	90.4%	611,510	96.0%	1,413,543	92.7%
Total	***887,110***	***100.0%***	***637,086***	***100.0%***	***1,524,196***	***100.0%***

* Totals and n's represent the total weighted number of injury reports containing a valid response for the particular question. Due to a low level of non-response, these totals are always similar but are not always equal to the total number of injuries.

Figure 2.3 New and Recurring Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2022-23 School Year

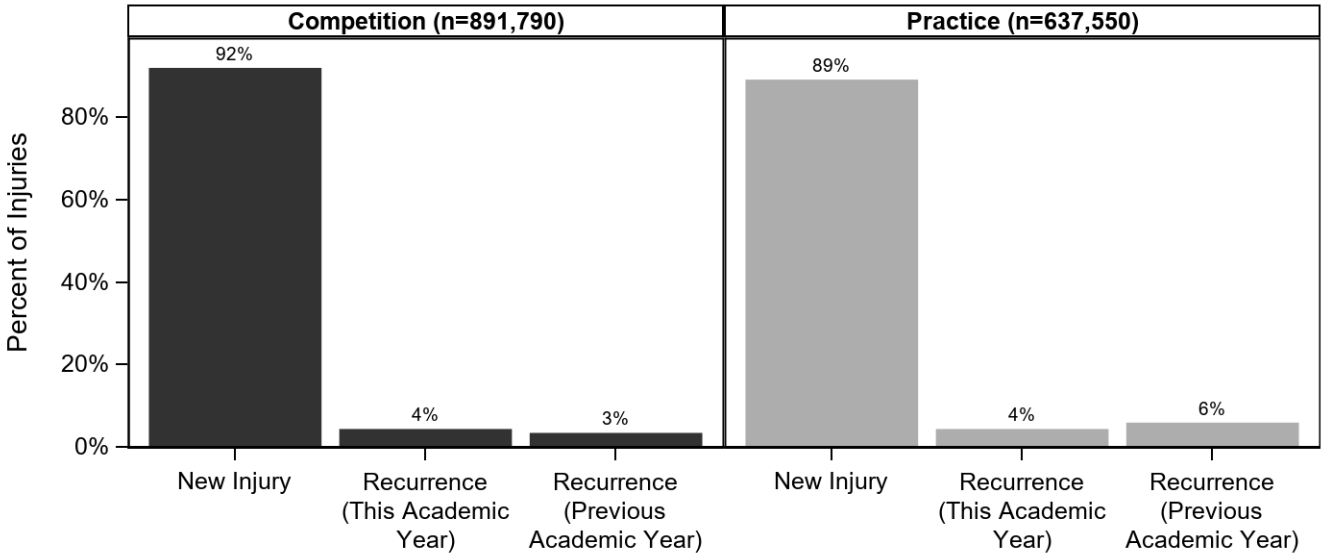


Table 2.9 Time during Season of Injury, High School Sports-Related Injury Surveillance Study, US, 2022-23 School Year *

Time in Season	n	%
Preseason	285,450	18.6%
Regular Season	1,155,802	75.5%
Post Season	80,621	5.3%
Unknown/Other	9,620	0.6%
Total	***1,531,494***	***100.0%***

* Totals and n's represent the total weighted number of injury reports containing a valid response for the particular question. Due to a low level of non-response, these totals are always similar but are not always equal to the total number of injuries.

Table 2.10 Practice-Related Variables, High School Sports-Related Injury Surveillance Study, US, 2022-23 School Year *

Time in Practice	n	%
First 1/2 Hour	39,675	6.3%
Second 1/2 Hour	77,107	12.3%
1-2 Hours into Practice	338,960	54.0%
>2 Hours into Practice	21,609	3.4%
Unknown	149,989	23.9%
Total	***627,341***	***100.0%***

* Totals and n's represent the total weighted number of injury reports containing a valid response for the particular question. Due to a low level of non-response, these totals are always similar but are not always equal to the total number of injuries.

Table 2.11 Methods for Injury Evaluation and Assessment, High School Sports-Related Injury Surveillance Study, US, 2022-23 School Year *

Injuries Evaluated By:	n=1,534,841	%
Certified Athletic Trainer	1,404,418	91.5%
Orthopedic Physician	239,588	15.6%
Physician/Pediatrician	226,529	14.8%
Physician's Assistant	24,229	1.6%
Other	19,067	1.2%
Nurse Practitioner	15,487	1.0%
Neurologist/Neuropsychologist	7,556	0.5%
Chiropractor	2,949	0.2%
School Nurse	2,621	0.2%

Assessment Method:	n=1,534,841	%
Evaluation	1,513,206	98.6%
X-Ray	504,889	32.9%
MRI	159,734	10.4%
CT-Scan	25,600	1.7%
Blood Work/Lab Test	12,530	0.8%
Other	11,734	0.8%

* Multiple responses allowed per injury report.

III. Boys' Football Injury Epidemiology

Table 3.1 Football Injury Rates by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2022-23 School Year *

	# Injuries	# Exposures	Injury Rate (per 1,000 AEs)	Nationally Estimated # Injuries
Total	***1,533***	***403,405***	***3.80***	***552,396***
Competition	891	69,406	12.84	336,471
Practice	642	333,999	1.92	215,925

* All remaining analyses in this chapter present data weighted to provide national injury estimates.

Table 3.2 Demographic Characteristics of Injured Football Athletes, High School Sports-Related Injury Surveillance Study, US, 2022-23 School Year *

Year in School	n	%
Freshman	124,604	23.6%
Sophomore	121,051	23.0%
Junior	129,875	24.6%
Senior	151,546	28.8%
Total	***527,076***	***100.0%***

Age (years)	
Minimum	13
Maximum	19
Mean (SD)	15.8 (1.2)
n	424,892

BMI	
Minimum	15.6
Maximum	50.2
Mean (SD)	26.2 (5.4)
n	336,530

* Throughout this chapter, totals and n's represent the total weighted number of injury reports containing a valid response for the particular question. Due to a low level of non-response, these totals are always similar but are not always equal to the total number of injuries.

Figure 3.1 Diagnosis of Football Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2022-23 School Year

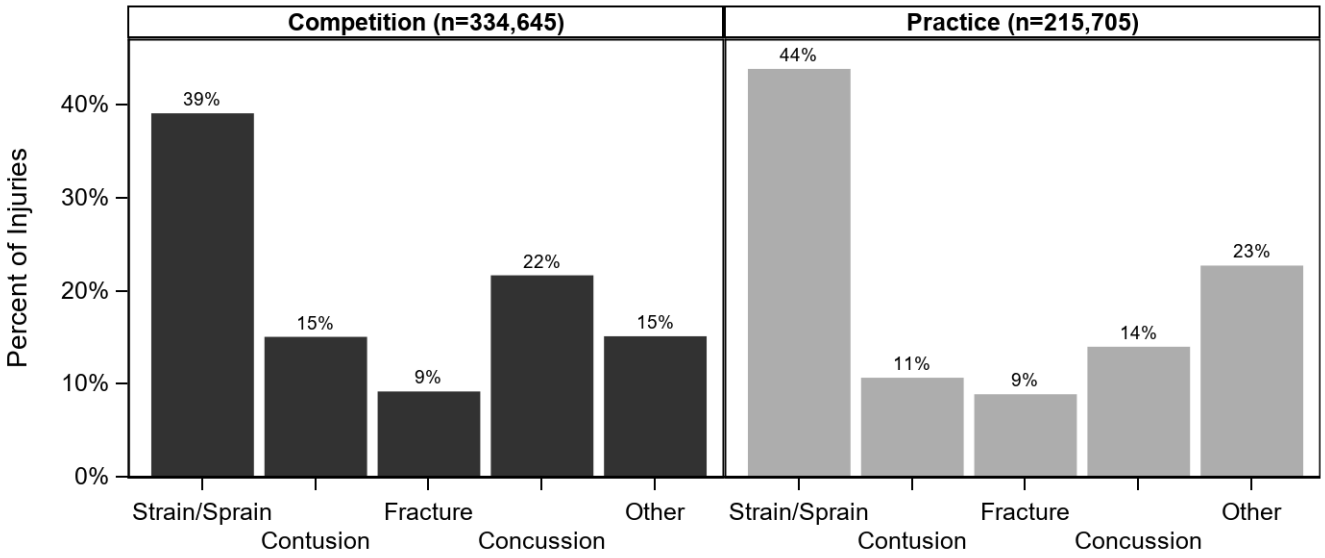


Table 3.3 Body Site of Football Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2022-23 School Year *

	Competition		Practice		Overall	
Body Site	**n**	**%**	**n**	**%**	**n**	**%**
Head/Face	73,246	21.8%	32,300	15.0%	105,546	19.1%
Knee	50,420	15.0%	26,029	12.1%	76,448	13.8%
Ankle	36,009	10.7%	32,027	14.8%	68,036	12.3%
Hand/Wrist	34,980	10.4%	29,268	13.6%	64,248	11.6%
Shoulder	32,421	9.6%	23,586	10.9%	56,007	10.1%
Hip/Thigh/Upper Leg	27,845	8.3%	20,369	9.4%	48,213	8.7%
Trunk	20,659	6.1%	12,444	5.8%	33,104	6.0%
Lower Leg	21,618	6.4%	10,485	4.9%	32,103	5.8%
Arm/Elbow	14,115	4.2%	6,458	3.0%	20,574	3.7%
Foot	8,401	2.5%	9,155	4.2%	17,556	3.2%
Neck	6,977	2.1%	4,959	2.3%	11,936	2.2%
Other	7,251	2.2%	3,497	1.6%	10,749	1.9%
Systemic	2,193	0.7%	5,348	2.5%	7,540	1.4%
Total	***336,135***	***100.0%***	***215,925***	***100.0%***	***552,060***	***100.0%***

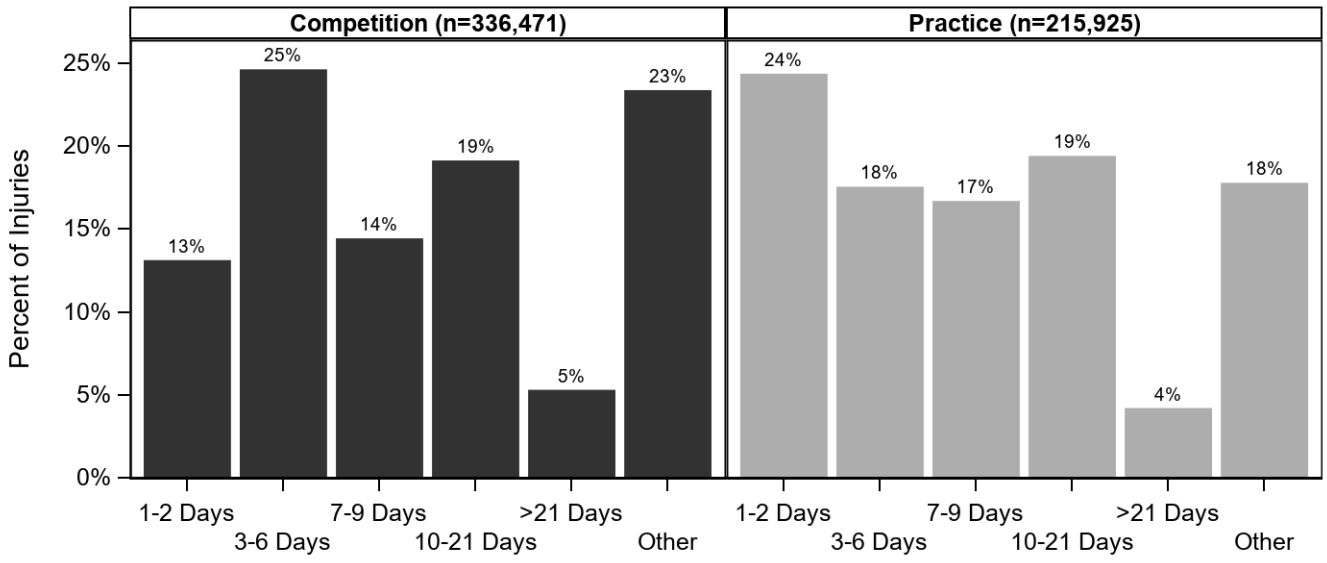
* Totals and n's represent the total weighted number of injury reports containing a valid response for the particular question. Due to a low level of non-response, these totals are always similar but are not always equal to the total number of injuries.

Table 3.4 Ten Most Common Football Injury Diagnoses by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2022-23 School Year *

	Competition (n=334,581)		Practice (n=215,706)		Overall (n=550,286)	
Diagnosis	**n**	**%**	**n**	**%**	**n**	**%**
Head/Face Concussion	72,439	21.7%	30,136	14.0%	102,575	18.6%
Ankle Strain/Sprain	34,428	10.3%	30,391	14.1%	64,819	11.8%
Knee Strain/Sprain	29,641	8.9%	12,192	5.7%	41,834	7.6%
Shoulder Other	18,892	5.6%	13,163	6.1%	32,056	5.8%
Hip/Thigh/Upper Leg Strain/Sprain	14,922	4.5%	14,724	6.8%	29,646	5.4%
Knee Other	13,819	4.1%	9,166	4.2%	22,986	4.2%
Hand/Wrist Strain/Sprain	12,564	3.8%	10,390	4.8%	22,954	4.2%
Hand/Wrist Fracture	12,635	3.8%	9,592	4.4%	22,227	4.0%
Shoulder Strain/Sprain	12,466	3.7%	8,980	4.2%	21,446	3.9%
Trunk Strain/Sprain	9,341	2.8%	5,984	2.8%	15,325	2.8%

* Totals and n's represent the total weighted number of injury reports containing a valid response for the particular question. Due to a low level of non-response, these totals are always similar but are not always equal to the total number of injuries.

Figure 3.2 Time Loss of Football Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2022-23 School Year *



* Other category is made up of medical disqualification for season, medical disqualification for career, athlete chooses not to continue, and season ended before athlete returned to play.

Table 3.5 Football Injuries Requiring Surgery by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2022-23 School Year *

	Competition		Practice		Overall	
Need for Surgery	**n**	**%**	**n**	**%**	**n**	**%**
Required Surgery	26,666	8.0%	9,584	4.5%	36,251	6.6%
Did Not Require Surgery	305,772	92.0%	205,070	95.5%	510,843	93.4%
Total	***332,439***	***100.0%***	***214,655***	***100.0%***	***547,093***	***100.0%***

* Totals and n's represent the total weighted number of injury reports containing a valid response for the particular question. Due to a low level of non-response, these totals are always similar but are not always equal to the total number of injuries.

Figure 3.3 History of Football Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2022-23 School Year

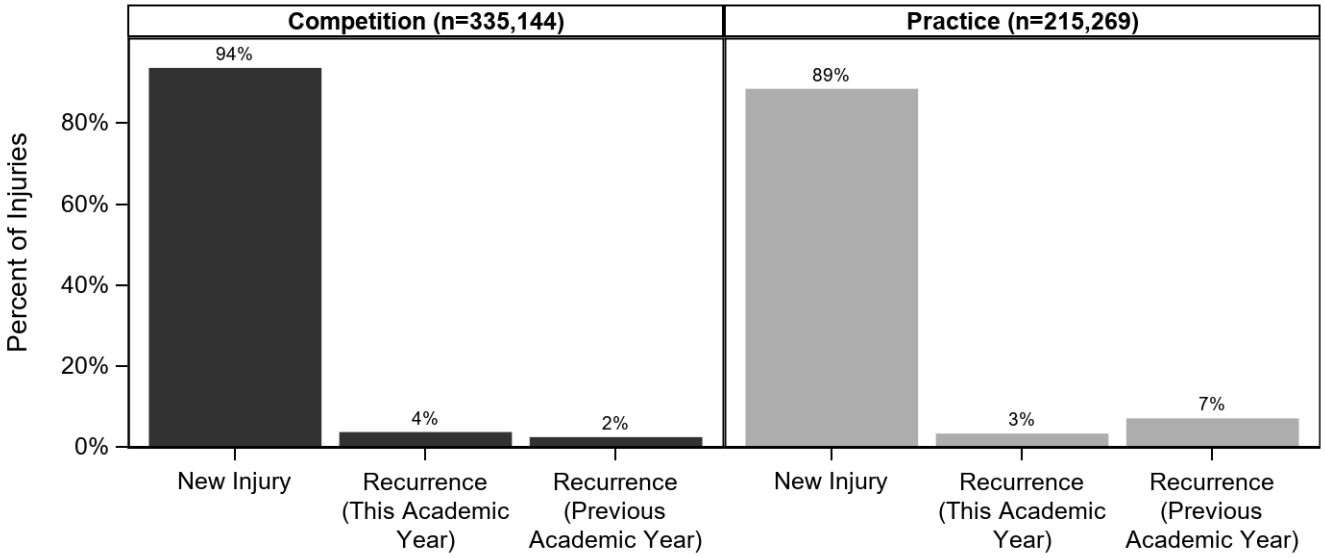


Table 3.6 Time during Season of Football Injuries, High School Sports-Related Injury Surveillance Study, US, 2022-23 School Year *

Time in Season	n	%
Preseason	101,670	18.4%
Regular Season	419,781	76.1%
Post Season	24,632	4.5%
Unknown/Other	5,589	1.0%
Total	***551,672***	***100.0%***

* Totals and n's represent the total weighted number of injury reports containing a valid response for the particular question. Due to a low level of non-response, these totals are always similar but are not always equal to the total number of injuries.

Table 3.7 Competition-Related Variables for Football Injuries, High School Sports-Related Injury Surveillance Study, US, 2022-23 School Year *

Time in Competition	n	%
Pre-competition/Warm-Ups	4,625	1.5%
First Quarter	37,549	12.2%
Second Quarter	86,891	28.2%
Third Quarter	98,401	31.9%
Fourth Quarter	80,570	26.1%
Overtime	325	0.1%
Total	***308,361***	***100.0%***

Field Location		
End Zone	2,957	0.9%
Red Zone (20 Yard Line to Goal Line)	37,716	12.1%
Between the 20 Yard Lines	185,077	59.4%
Off the Field	1,450	0.5%
Unknown	84,182	27.0%
Total	***311,382***	***100.0%***

* Totals and n's represent the total weighted number of injury reports containing a valid response for the particular question. Due to a low level of non-response, these totals are always similar but are not always equal to the total number of injuries.

Table 3.8 Practice-Related Variables for Football Injuries, High School Sports-Related Injury Surveillance Study, US, 2022-23 School Year *

Time in Practice	n	%
First 1/2 Hour	12,673	6.0%
Second 1/2 Hour	28,040	13.2%
1-2 Hours into Practice	124,345	58.6%
>2 Hours into Practice	9,064	4.3%
Unknown	38,129	18.0%
Total	***212,250***	***100.0%***

* Totals and n's represent the total weighted number of injury reports containing a valid response for the particular question. Due to a low level of non-response, these totals are always similar but are not always equal to the total number of injuries.

Figure 3.4 Player Position of Football Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2022-23 School Year

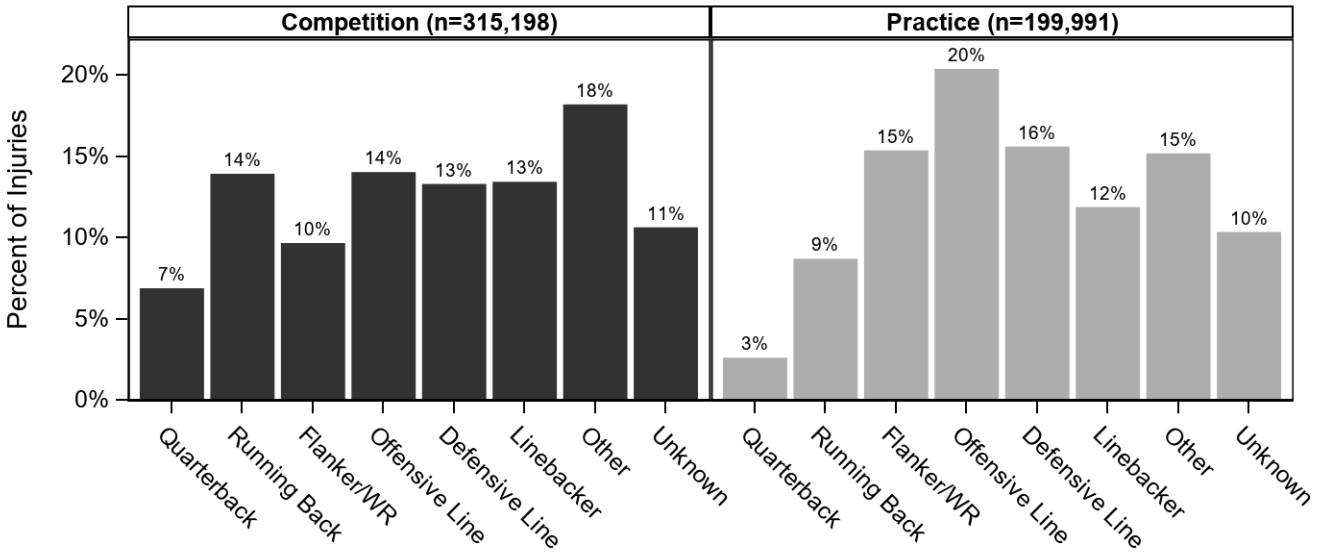


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Table 3.9 Activities Leading to Football Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2022-23 School Year *

	Competition		Practice		Overall	
Activity	**n**	**%**	**n**	**%**	**n**	**%**
Tackling	82,198	26.1%	32,420	16.2%	114,618	22.2%
Being Tackled	84,980	27.0%	24,739	12.3%	109,719	21.3%
Blocking	45,711	14.5%	35,225	17.6%	80,936	15.7%
Unknown	27,294	8.7%	17,790	8.9%	45,084	8.7%
Being Blocked	23,595	7.5%	11,809	5.9%	35,403	6.9%
Stepped On, Fell On or Kicked	20,778	6.6%	12,387	6.2%	33,165	6.4%
N/A **	5,544	1.8%	23,443	11.7%	28,987	5.6%
Other	9,826	3.1%	15,081	7.5%	24,907	4.8%
Rotation Around a Planted Foot/Inversion	10,429	3.3%	13,015	6.5%	23,445	4.5%
Contact with Ball	2,486	0.8%	7,712	3.8%	10,198	2.0%
Contact with Blocking Sled/Dummy	0	0.0%	5,279	2.6%	5,279	1.0%
Uneven Playing Surface	1,561	0.5%	1,799	0.9%	3,359	0.7%
Contact with Seats, Bleacher or Table	633	0.2%	0	0.0%	633	0.1%
Total	***315,034***	***100.0%***	***200,698***	***100.0%***	***515,732***	***100.0%***

* Totals and n's represent the total weighted number of injury reports containing a valid response for the particular question. Due to a low level of non-response, these totals are always similar but are not always equal to the total number of injuries.
** Includes overuse, heat illness, conditioning, etc.

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Table 3.10 Activity Resulting in Football Injuries by Injury Diagnosis, High School Sports-Related Injury Surveillance Study, US, 2022-23 School Year *

	Diagnosis									
	Strain/Sprain		Contusion		Fracture		Concussion		Other	
Activity	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**
Being Blocked	10,819	5.2%	8,057	11.8%	1,637	3.5%	7,574	7.9%	7,316	7.7%
Being Tackled	39,972	19.2%	19,505	28.6%	10,751	22.7%	27,902	29.1%	11,479	12.2%
Blocking	32,751	15.7%	7,851	11.5%	7,825	16.6%	17,272	18.0%	15,237	16.1%
Contact with Ball	3,856	1.8%	633	0.9%	3,164	6.7%	110	0.1%	2,434	2.6%
Contact with Blocking Sled/Dummy	3,460	1.7%	0	0.0%	990	2.1%	613	0.6%	215	0.2%
Contact with Seats, Bleacher or Table	633	0.3%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
N/A **	10,244	4.9%	110	0.2%	0	0.0%	0	0.0%	18,632	19.7%
Other	13,709	6.6%	1,774	2.6%	2,565	5.4%	336	0.4%	6,308	6.7%
Rotation Around a Planted Foot/Inversion	17,603	8.4%	789	1.2%	488	1.0%	0	0.0%	4,564	4.8%
Stepped On, Fell On or Kicked	15,347	7.4%	12,253	18.0%	3,628	7.7%	63	0.1%	1,874	2.0%
Tackling	37,310	17.9%	15,045	22.0%	12,306	26.0%	28,498	29.7%	20,341	21.5%
Uneven Playing Surface	2,067	1.0%	0	0.0%	0	0.0%	464	0.5%	828	0.9%
Unknown	20,666	9.9%	2,221	3.3%	3,906	8.3%	13,071	13.6%	5,221	5.5%
Total	***208,438***	***100.0%***	***68,238***	***100.0%***	***47,260***	***100.0%***	***95,902***	***100.0%***	***94,451***	***100.0%***

* Totals and n's represent the total weighted number of injury reports containing a valid response for the particular question. Due to a low level of non-response, these totals are always similar but are not always equal to the total number of injuries.
** Includes overuse, heat illness, conditioning, etc.

IV. Boys' Soccer Injury Epidemiology

Table 4.1 Boys' Soccer Injury Rates by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2022-23 School Year *

	# Injuries	# Exposures	Injury Rate (per 1,000 AEs)	Nationally Estimated # Injuries
Total	***301***	***167,203***	***1.80***	***198,877***
Competition	195	50,996	3.82	120,281
Practice	106	116,207	0.91	78,596

* All remaining analyses in this chapter present data weighted to provide national injury estimates.

Table 4.2 Demographic Characteristics of Injured Boys' Soccer Athletes, High School Sports-Related Injury Surveillance Study, US, 2022-23 School Year *

Year in School	n	%
Freshman	31,998	16.9%
Sophomore	53,559	28.3%
Junior	44,564	23.5%
Senior	59,279	31.3%
Total	***189,401***	***100.0%***

Age (years)	
Minimum	14
Maximum	19
Mean (SD)	16.1 (1.2)
n	155,312

BMI	
Minimum	16.2
Maximum	33.4
Mean (SD)	22.4 (2.8)
n	130,812

* Throughout this chapter, totals and n's represent the total weighted number of injury reports containing a valid response for the particular question. Due to a low level of non-response, these totals are always similar but are not always equal to the total number of injuries.

Figure 4.1 Diagnosis of Boys' Soccer Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2022-23 School Year

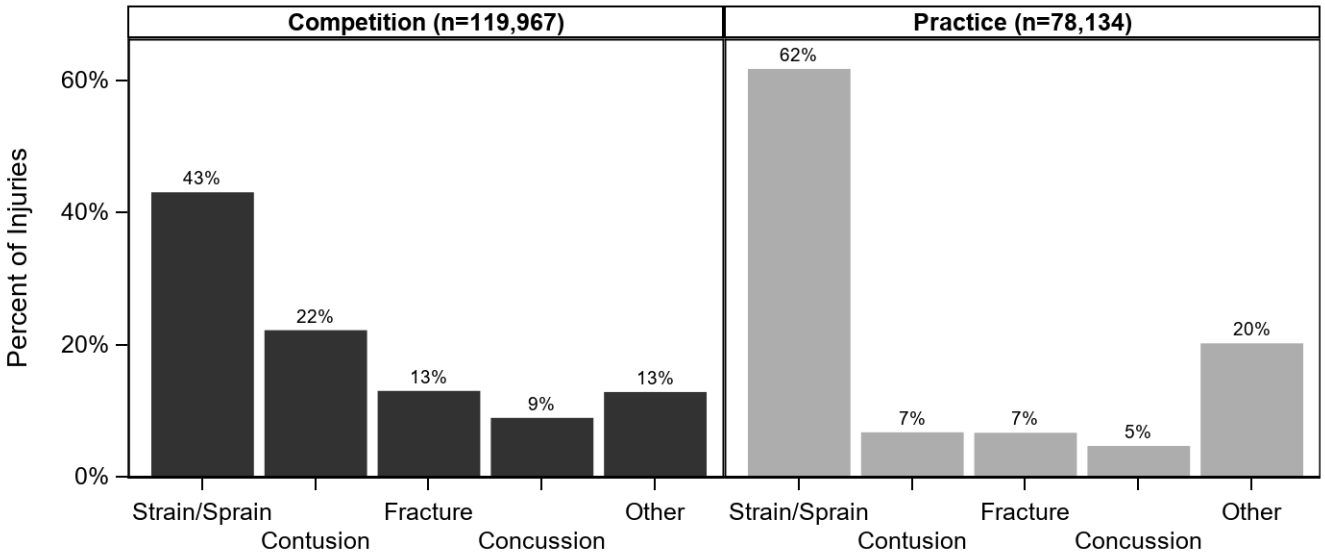


Table 4.3 Body Site of Boys' Soccer Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2022-23 School Year *

	Competition		Practice		Overall	
Body Site	**n**	**%**	**n**	**%**	**n**	**%**
Hip/Thigh/Upper Leg	27,565	22.9%	14,865	18.9%	42,430	21.3%
Ankle	21,281	17.7%	18,294	23.3%	39,575	19.9%
Knee	25,341	21.1%	11,670	14.8%	37,010	18.6%
Head/Face	15,178	12.6%	4,104	5.2%	19,282	9.7%
Lower Leg	8,273	6.9%	8,086	10.3%	16,359	8.2%
Foot	5,815	4.8%	6,961	8.9%	12,777	6.4%
Hand/Wrist	7,488	6.2%	4,551	5.8%	12,039	6.1%
Trunk	4,376	3.6%	6,297	8.0%	10,673	5.4%
Arm/Elbow	2,749	2.3%	1,535	2.0%	4,284	2.2%
Other	849	0.7%	886	1.1%	1,735	0.9%
Shoulder	313	0.3%	886	1.1%	1,199	0.6%
Neck	313	0.3%	461	0.6%	775	0.4%
Systemic	738	0.6%	0	0.0%	738	0.4%
Total	***120,281***	***100.0%***	***78,596***	***100.0%***	***198,876***	***100.0%***

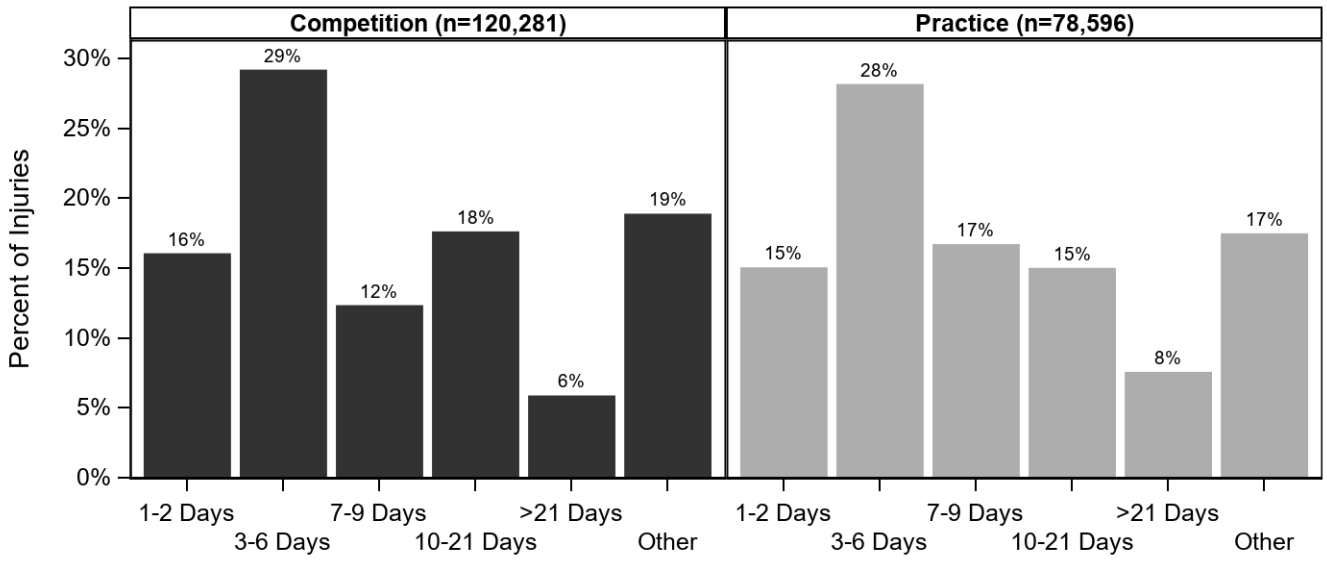
* Totals and n's represent the total weighted number of injury reports containing a valid response for the particular question. Due to a low level of non-response, these totals are always similar but are not always equal to the total number of injuries.

Table 4.4 Ten Most Common Boys' Soccer Injury Diagnoses by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2022-23 School Year *

	Competition (n=119,965)		Practice (n=78,134)		Overall (n=198,101)	
Diagnosis	**n**	**%**	**n**	**%**	**n**	**%**
Ankle Strain/Sprain	18,504	15.4%	17,519	22.4%	36,024	18.2%
Hip/Thigh/Upper Leg Strain/Sprain	16,423	13.7%	13,330	17.1%	29,753	15.0%
Knee Strain/Sprain	9,945	8.3%	8,113	10.4%	18,059	9.1%
Head/Face Concussion	10,691	8.9%	3,182	4.1%	13,873	7.0%
Knee Other	9,833	8.2%	2,882	3.7%	12,715	6.4%
Hip/Thigh/Upper Leg Contusion	7,688	6.4%	1,535	2.0%	9,223	4.7%
Hand/Wrist Fracture	5,929	4.9%	1,535	2.0%	7,464	3.8%
Lower Leg Contusion	3,915	3.3%	2,273	2.9%	6,188	3.1%
Lower Leg Other	738	0.6%	4,546	5.8%	5,284	2.7%
Lower Leg Strain/Sprain	3,338	2.8%	1,268	1.6%	4,606	2.3%

* Totals and n's represent the total weighted number of injury reports containing a valid response for the particular question. Due to a low level of non-response, these totals are always similar but are not always equal to the total number of injuries.

Figure 4.2 Time Loss of Boys' Soccer Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2022-23 School Year *



* Other category is made up of medical disqualification for season, medical disqualification for career, athlete chooses not to continue, and season ended before athlete returned to play.

Table 4.5 Boys' Soccer Injuries Requiring Surgery by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2022-23 School Year *

	Competition		Practice		Overall	
Need for Surgery	**n**	**%**	**n**	**%**	**n**	**%**
Required Surgery	12,704	10.6%	2,882	3.7%	15,586	7.8%
Did Not Require Surgery	107,263	89.4%	75,714	96.3%	182,977	92.2%
Total	***119,967***	***100.0%***	***78,596***	***100.0%***	***198,563***	***100.0%***

* Totals and n's represent the total weighted number of injury reports containing a valid response for the particular question. Due to a low level of non-response, these totals are always similar but are not always equal to the total number of injuries.

Figure 4.3 History of Boys' Soccer Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2022-23 School Year

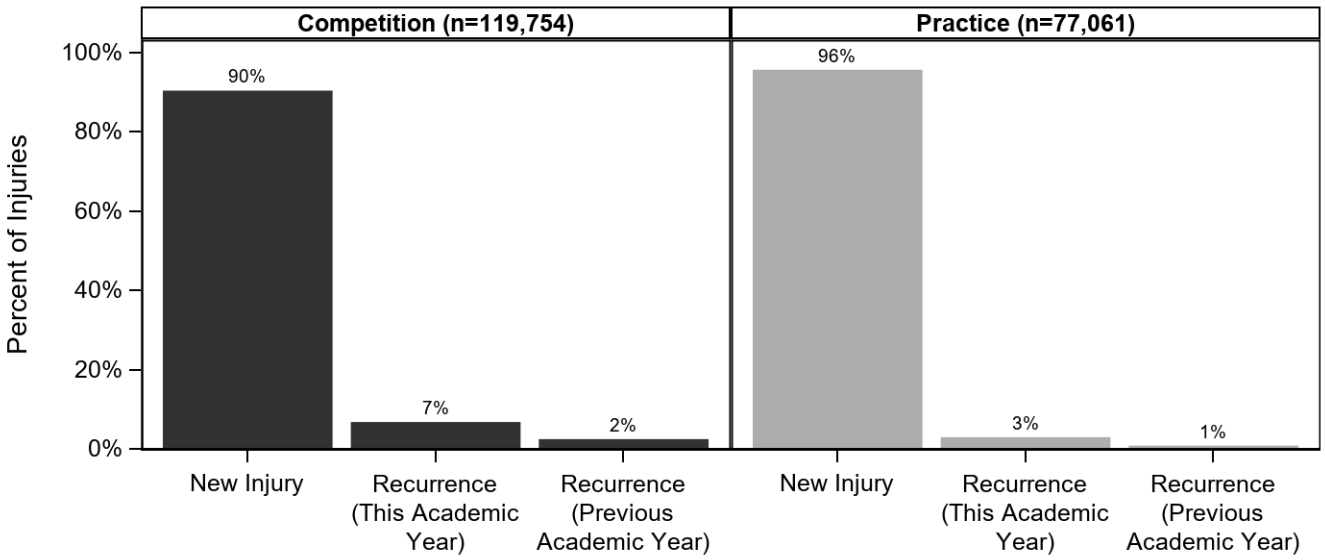


Table 4.6 Time during Season of Boys' Soccer Injuries, High School Sports-Related Injury Surveillance Study, US, 2022-23 School Year *

Time in Season	n	%
Preseason	36,114	18.2%
Regular Season	147,809	74.3%
Post Season	14,953	7.5%
Total	***198,876***	***100.0%***

* Totals and n's represent the total weighted number of injury reports containing a valid response for the particular question. Due to a low level of non-response, these totals are always similar but are not always equal to the total number of injuries.

Table 4.7 Competition-Related Variables for Boys' Soccer Injuries, High School Sports-Related Injury Surveillance Study, US, 2022-23 School Year *

Time in Competition	n	%
Pre-competition/Warm-Ups	2,219	2.0%
First Half	23,451	20.9%
Second Half	73,812	65.8%
Unknown	12,625	11.3%
Total	***112,106***	***100.0%***

Field Location		
Goal Box (Defense)	13,685	12.3%
Goal Box (Offense)	7,895	7.1%
Side of Goal Box (Defense)	3,684	3.3%
Side of Goal Box (Offense)	988	0.9%
Top of Goal Box Extended to Center Line (Offense)	32,688	29.3%
Top of Goal Box Extended to Center Line (Defense)	18,738	16.8%
Off the Field	1,959	1.8%
Unknown	31,795	28.5%
Total	***111,432***	***100.0%***

* Totals and n's represent the total weighted number of injury reports containing a valid response for the particular question. Due to a low level of non-response, these totals are always similar but are not always equal to the total number of injuries.

Table 4.8 Practice-Related Variables for Boys' Soccer Injuries, High School Sports-Related Injury Surveillance Study, US, 2022-23 School Year *

Time in Practice	n	%
First 1/2 Hour	3,722	4.8%
Second 1/2 Hour	5,158	6.7%
1-2 Hours into Practice	47,682	61.7%
>2 Hours into Practice	1,162	1.5%
Unknown	19,506	25.3%
Total	***77,231***	***100.0%***

* Totals and n's represent the total weighted number of injury reports containing a valid response for the particular question. Due to a low level of non-response, these totals are always similar but are not always equal to the total number of injuries.

Figure 4.4 Player Position of Boys' Soccer Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2022-23 School Year

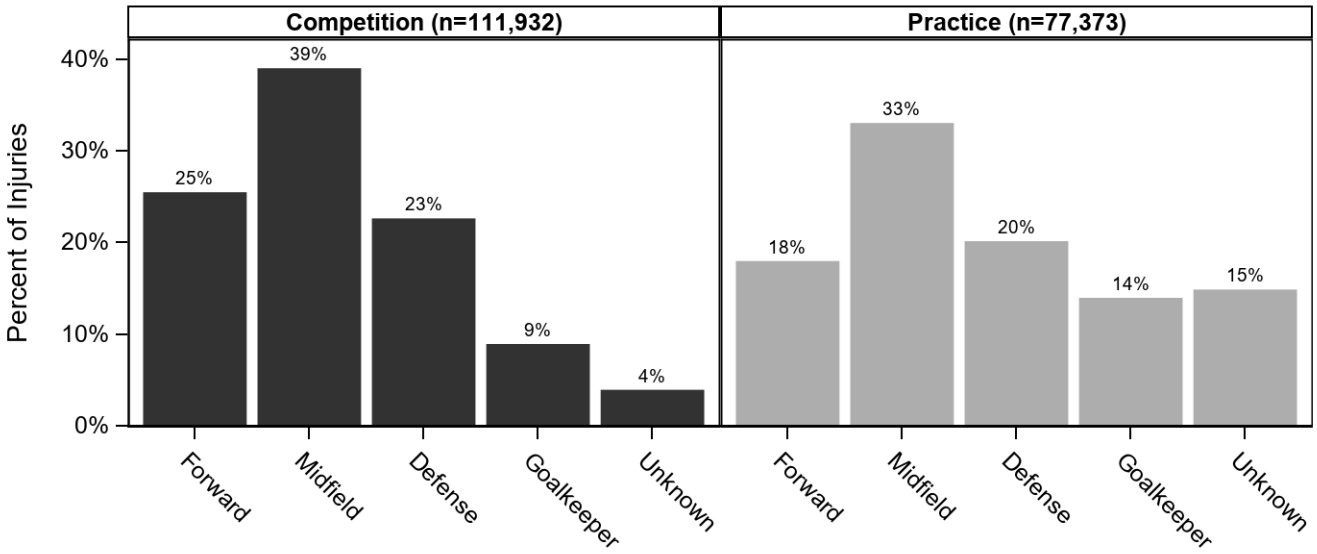


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Table 4.9 Activities Leading to Boys' Soccer Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2022-23 School Year *

	Competition		Practice		Overall	
Activity	**n**	**%**	**n**	**%**	**n**	**%**
General Play	30,573	27.2%	32,308	41.6%	62,882	33.1%
Defending	14,184	12.6%	6,604	8.5%	20,787	10.9%
Ball Handling/Dribbling	16,021	14.2%	3,583	4.6%	19,604	10.3%
Chasing Loose Ball	13,084	11.6%	3,822	4.9%	16,906	8.9%
Goaltending	7,881	7.0%	7,384	9.5%	15,266	8.0%
Unknown	8,930	7.9%	4,717	6.1%	13,647	7.2%
Heading Ball	5,008	4.5%	4,730	6.1%	9,738	5.1%
Shooting	2,682	2.4%	5,339	6.9%	8,021	4.2%
Receiving Pass	3,227	2.9%	3,351	4.3%	6,579	3.5%
Receiving a Slide Tackle	4,841	4.3%	0	0.0%	4,841	2.5%
Passing	2,677	2.4%	1,535	2.0%	4,212	2.2%
Blocking Shot	1,245	1.1%	1,458	1.9%	2,703	1.4%
Conditioning	0	0.0%	2,541	3.3%	2,541	1.3%
Attempting a Slide Tackle	1,864	1.7%	0	0.0%	1,864	1.0%
Other	313	0.3%	313	0.4%	627	0.3%
Total	***112,531***	***100.0%***	***77,687***	***100.0%***	***190,218***	***100.0%***

* Totals and n's represent the total weighted number of injury reports containing a valid response for the particular question. Due to a low level of non-response, these totals are always similar but are not always equal to the total number of injuries.

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Table 4.10 Activity Resulting in Boys' Soccer Injuries by Injury Diagnosis, High School Sports-Related Injury Surveillance Study, US, 2022-23 School Year *

	Diagnosis									
	Strain/Sprain		Contusion		Fracture		Concussion		Other	
Activity	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**
Attempting a Slide Tackle	1,864	1.9%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Ball Handling/Dribbling	11,554	11.9%	5,454	17.5%	2,384	12.6%	0	0.0%	213	0.7%
Blocking Shot	1,458	1.5%	0	0.0%	0	0.0%	1,245	9.2%	0	0.0%
Chasing Loose Ball	7,387	7.6%	5,431	17.4%	2,325	12.3%	627	4.6%	674	2.3%
Conditioning	1,692	1.7%	0	0.0%	0	0.0%	0	0.0%	849	2.9%
Defending	6,993	7.2%	2,655	8.5%	4,422	23.4%	1,336	9.9%	5,382	18.7%
General Play	34,588	35.5%	7,861	25.2%	1,959	10.4%	2,570	19.0%	15,904	55.3%
Goaltending	3,666	3.8%	3,482	11.2%	3,467	18.3%	2,489	18.4%	2,162	7.5%
Heading Ball	6,075	6.2%	313	1.0%	0	0.0%	2,113	15.7%	1,236	4.3%
Other	627	0.6%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Passing	3,372	3.5%	840	2.7%	0	0.0%	0	0.0%	0	0.0%
Receiving Pass	5,490	5.6%	213	0.7%	424	2.2%	137	1.0%	313	1.1%
Receiving a Slide Tackle	1,848	1.9%	2,993	9.6%	0	0.0%	0	0.0%	0	0.0%
Shooting	4,299	4.4%	1,412	4.5%	1,535	8.1%	0	0.0%	775	2.7%
Unknown	6,459	6.6%	527	1.7%	2,412	12.7%	2,976	22.1%	1,273	4.4%
Total	***97,373***	***100.0%***	***31,181***	***100.0%***	***18,929***	***100.0%***	***13,494***	***100.0%***	***28,781***	***100.0%***

* Totals and n's represent the total weighted number of injury reports containing a valid response for the particular question. Due to a low level of non-response, these totals are always similar but are not always equal to the total number of injuries.

V. Girls' Soccer Injury Epidemiology

Table 5.1 Girls' Soccer Injury Rates by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2022-23 School Year *

	# Injuries	# Exposures	Injury Rate (per 1,000 AEs)	Nationally Estimated # Injuries
Total	***331***	***135,101***	***2.45***	***192,685***
Competition	226	40,748	5.55	132,485
Practice	105	94,353	1.11	60,200

* All remaining analyses in this chapter present data weighted to provide national injury estimates.

Table 5.2 Demographic Characteristics of Injured Girls' Soccer Athletes, High School Sports-Related Injury Surveillance Study, US, 2022-23 School Year *

Year in School	n	%
Freshman	47,440	26.0%
Sophomore	61,814	33.9%
Junior	40,872	22.4%
Senior	32,252	17.7%
Total	***182,378***	***100.0%***

Age (years)	
Minimum	13
Maximum	18
Mean (SD)	15.7 (1.2)
n	141,178

BMI	
Minimum	15.7
Maximum	33.7
Mean (SD)	21.9 (2.6)
n	117,561

* Throughout this chapter, totals and n's represent the total weighted number of injury reports containing a valid response for the particular question. Due to a low level of non-response, these totals are always similar but are not always equal to the total number of injuries.

Figure 5.1 Diagnosis of Girls' Soccer Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2022-23 School Year

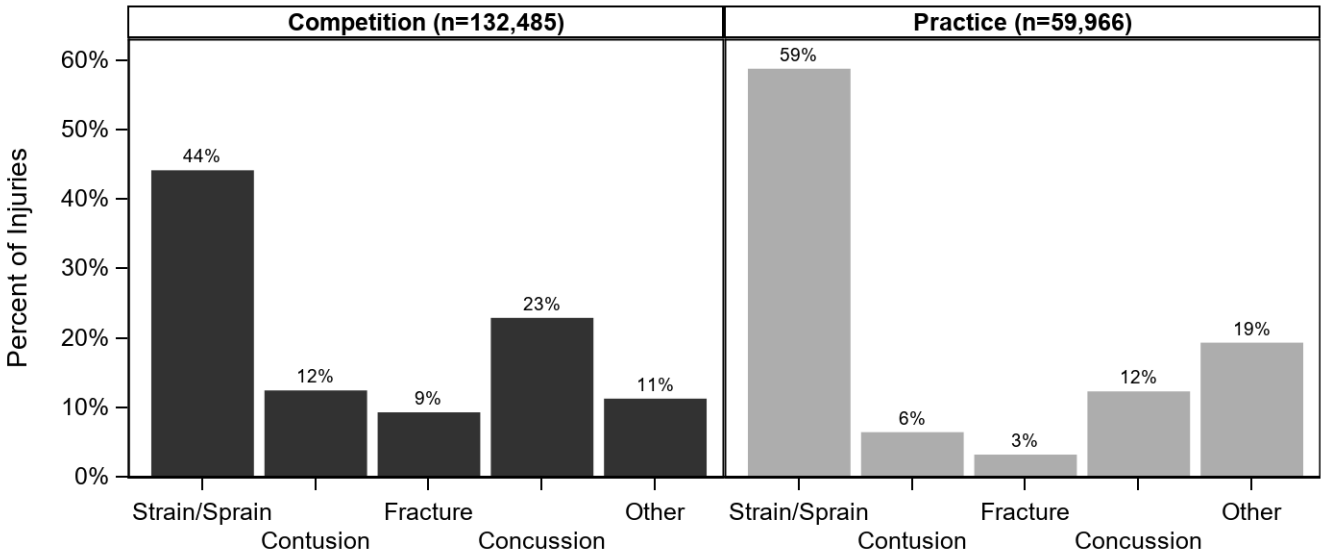

Table 5.3 Body Site of Girls' Soccer Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2022-23 School Year *

	Competition		Practice		Overall	
Body Site	**n**	**%**	**n**	**%**	**n**	**%**
Head/Face	31,291	23.6%	7,860	13.1%	39,151	20.3%
Ankle	21,824	16.5%	15,477	25.7%	37,301	19.4%
Knee	27,191	20.5%	7,808	13.0%	34,999	18.2%
Hip/Thigh/Upper Leg	15,128	11.4%	14,050	23.3%	29,178	15.1%
Lower Leg	9,239	7.0%	7,808	13.0%	17,047	8.8%
Foot	9,041	6.8%	1,957	3.3%	10,998	5.7%
Trunk	5,444	4.1%	0	0.0%	5,444	2.8%
Hand/Wrist	2,915	2.2%	1,957	3.3%	4,872	2.5%
Arm/Elbow	3,011	2.3%	1,164	1.9%	4,174	2.2%
Other	3,462	2.6%	0	0.0%	3,462	1.8%
Systemic	2,471	1.9%	884	1.5%	3,354	1.7%
Neck	234	0.2%	1,235	2.1%	1,470	0.8%
Shoulder	1,235	0.9%	0	0.0%	1,235	0.6%
Total	***132,485***	***100.0%***	***60,200***	***100.0%***	***192,686***	***100.0%***

* Totals and n's represent the total weighted number of injury reports containing a valid response for the particular question. Due to a low level of non-response, these totals are always similar but are not always equal to the total number of injuries.

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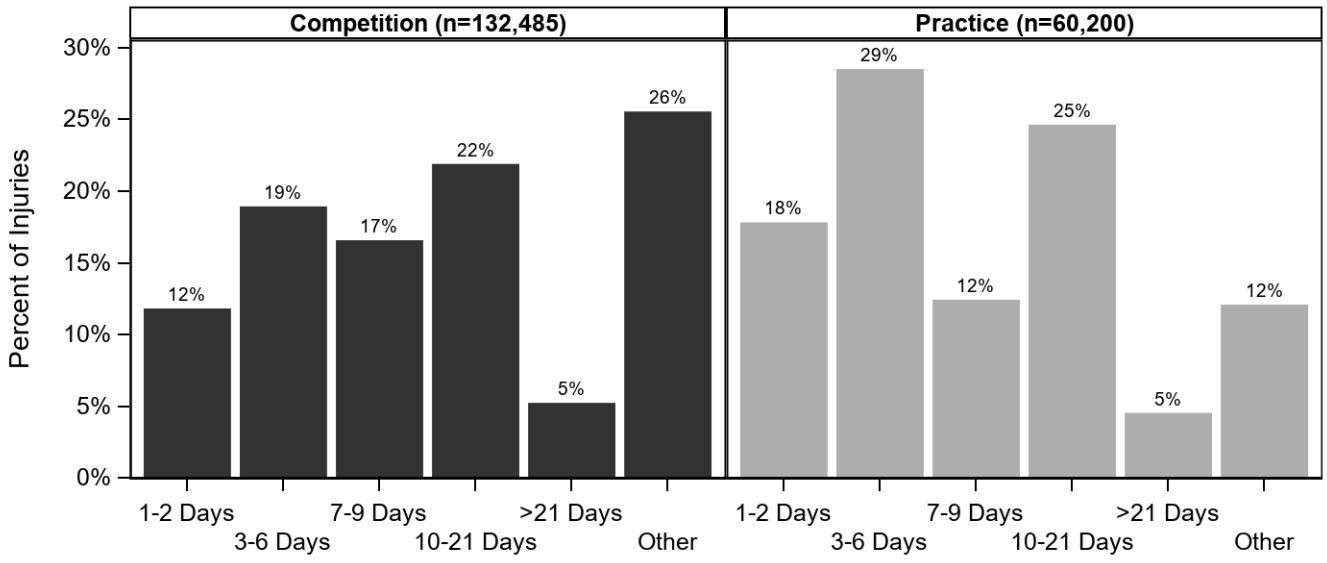
Table 5.4 Ten Most Common Girls' Soccer Injury Diagnoses by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2022-23 School Year *

	Competition (n=132,488)		Practice (n=59,968)		Overall (n=192,451)	
Diagnosis	**n**	**%**	**n**	**%**	**n**	**%**
Head/Face Concussion	30,323	22.9%	7,373	12.3%	37,696	19.6%
Ankle Strain/Sprain	19,117	14.4%	14,801	24.7%	33,918	17.6%
Hip/Thigh/Upper Leg Strain/Sprain	12,816	9.7%	10,712	17.9%	23,528	12.2%
Knee Strain/Sprain	17,000	12.8%	3,098	5.2%	20,098	10.4%
Knee Other	6,197	4.7%	3,546	5.9%	9,743	5.1%
Lower Leg Other	2,427	1.8%	3,374	5.6%	5,800	3.0%
Knee Contusion	3,995	3.0%	1,164	1.9%	5,159	2.7%
Lower Leg Strain/Sprain	2,471	1.9%	2,471	4.1%	4,941	2.6%
Foot Strain/Sprain	2,146	1.6%	1,957	3.3%	4,103	2.1%
Lower Leg Contusion	1,933	1.5%	1,964	3.3%	3,897	2.0%

* Totals and n's represent the total weighted number of injury reports containing a valid response for the particular question. Due to a low level of non-response, these totals are always similar but are not always equal to the total number of injuries.

Figure 5.2 Time Loss of Girls' Soccer Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2022-23 School Year *



* Other category is made up of medical disqualification for season, medical disqualification for career, athlete chooses not to continue, and season ended before athlete returned to play.

Table 5.5 Girls' Soccer Injuries Requiring Surgery by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2022-23 School Year *

	Competition		Practice		Overall	
Need for Surgery	**n**	**%**	**n**	**%**	**n**	**%**
Required Surgery	12,729	9.6%	3,025	5.0%	15,754	8.2%
Did Not Require Surgery	119,522	90.4%	57,176	95.0%	176,698	91.8%
Total	***132,251***	***100.0%***	***60,200***	***100.0%***	***192,451***	***100.0%***

* Totals and n's represent the total weighted number of injury reports containing a valid response for the particular question. Due to a low level of non-response, these totals are always similar but are not always equal to the total number of injuries.

Figure 5.3 History of Girls' Soccer Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2022-23 School Year

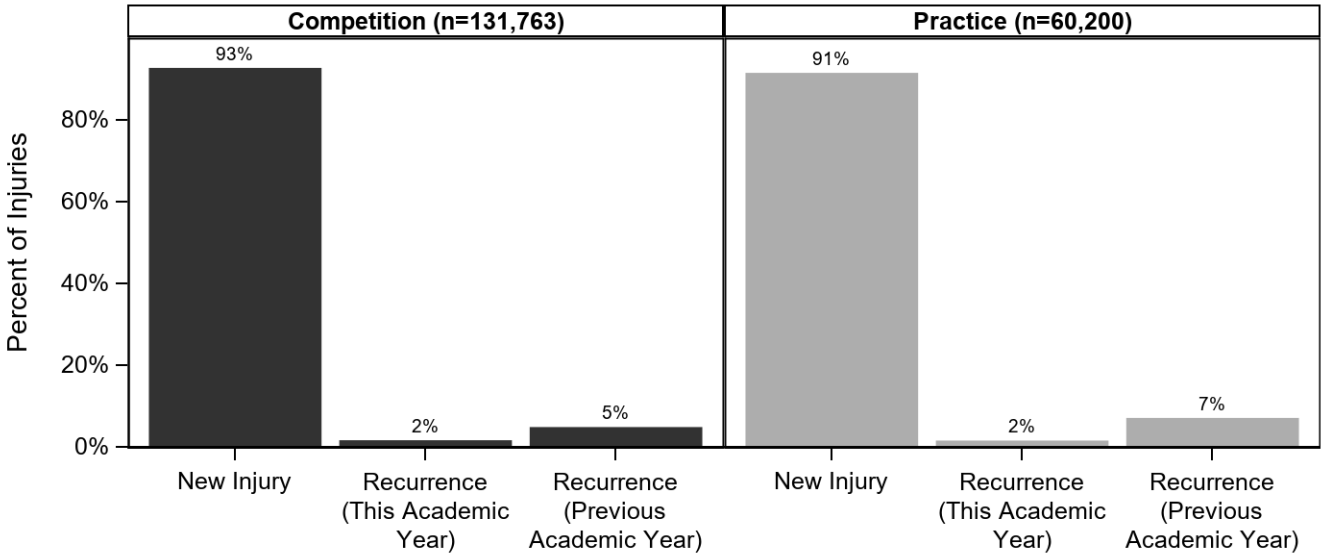


Table 5.6 Time during Season of Girls' Soccer Injuries, High School Sports-Related Injury Surveillance Study, US, 2022-23 School Year *

Time in Season	n	%
Preseason	33,429	17.4%
Regular Season	139,722	72.7%
Post Season	18,651	9.7%
Unknown/Other	442	0.2%
Total	***192,244***	***100.0%***

* Totals and n's represent the total weighted number of injury reports containing a valid response for the particular question. Due to a low level of non-response, these totals are always similar but are not always equal to the total number of injuries.

Table 5.7 Competition-Related Variables for Girls' Soccer Injuries, High School Sports-Related Injury Surveillance Study, US, 2022-23 School Year *

Time in Competition	n	%
Pre-competition/Warm-Ups	7,949	6.4%
First Half	35,476	28.4%
Second Half	60,449	48.4%
Overtime	234	0.2%
Unknown	20,849	16.7%
Total	***124,957***	***100.0%***

Field Location		
Goal Box (Defense)	11,149	9.0%
Goal Box (Offense)	7,596	6.1%
Side of Goal Box (Defense)	5,084	4.1%
Side of Goal Box (Offense)	5,572	4.5%
Top of Goal Box Extended to Center Line (Offense)	24,602	19.8%
Top of Goal Box Extended to Center Line (Defense)	25,399	20.5%
Off the Field	3,543	2.9%
Unknown	41,164	33.2%
Total	***124,109***	***100.0%***

* Totals and n's represent the total weighted number of injury reports containing a valid response for the particular question. Due to a low level of non-response, these totals are always similar but are not always equal to the total number of injuries.

Table 5.8 Practice-Related Variables for Girls' Soccer Injuries, High School Sports-Related Injury Surveillance Study, US, 2022-23 School Year *

Time in Practice	n	%
First 1/2 Hour	2,480	4.2%
Second 1/2 Hour	5,503	9.3%
1-2 Hours into Practice	31,004	52.3%
>2 Hours into Practice	2,790	4.7%
Unknown	17,475	29.5%
Total	***59,252***	***100.0%***

* Totals and n's represent the total weighted number of injury reports containing a valid response for the particular question. Due to a low level of non-response, these totals are always similar but are not always equal to the total number of injuries.

Figure 5.4 Player Position of Girls' Soccer Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2022-23 School Year

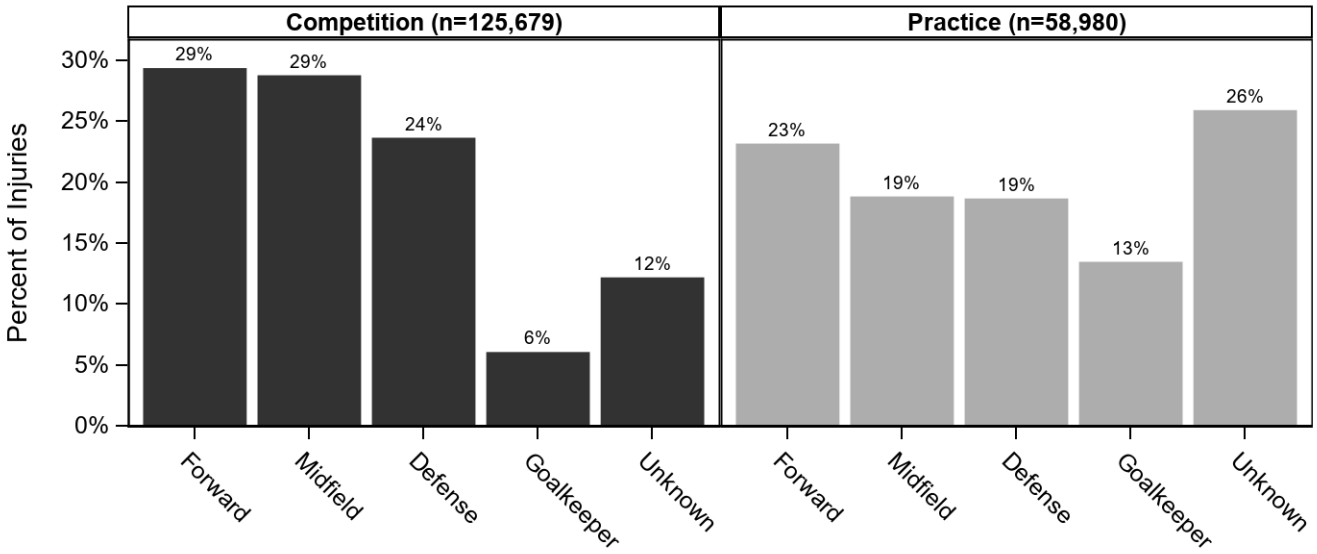


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Table 5.9 Activities Leading to Girls' Soccer Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2022-23 School Year *

	Competition		Practice		Overall	
Activity	**n**	**%**	**n**	**%**	**n**	**%**
General Play	32,153	25.6%	24,057	40.7%	56,210	30.5%
Defending	25,405	20.3%	3,991	6.8%	29,396	15.9%
Unknown	14,977	11.9%	12,804	21.7%	27,781	15.1%
Chasing Loose Ball	13,261	10.6%	4,265	7.2%	17,526	9.5%
Goaltending	6,271	5.0%	5,854	9.9%	12,125	6.6%
Ball Handling/Dribbling	8,084	6.4%	2,210	3.7%	10,295	5.6%
Heading Ball	8,633	6.9%	0	0.0%	8,633	4.7%
Shooting	6,016	4.8%	263	0.4%	6,278	3.4%
Passing	3,760	3.0%	722	1.2%	4,482	2.4%
Receiving Pass	2,750	2.2%	1,073	1.8%	3,823	2.1%
Other	2,475	2.0%	929	1.6%	3,404	1.8%
Conditioning	0	0.0%	2,389	4.0%	2,389	1.3%
Receiving a Slide Tackle	884	0.7%	0	0.0%	884	0.5%
Blocking Shot	263	0.2%	488	0.8%	750	0.4%
Attempting a Slide Tackle	488	0.4%	0	0.0%	488	0.3%
Total	***125,416***	***100.0%***	***59,046***	***100.0%***	***184,462***	***100.0%***

* Totals and n's represent the total weighted number of injury reports containing a valid response for the particular question. Due to a low level of non-response, these totals are always similar but are not always equal to the total number of injuries.

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Table 5.10 Activity Resulting in Girls' Soccer Injuries by Injury Diagnosis, High School Sports-Related Injury Surveillance Study, US, 2022-23 School Year *

	Diagnosis									
	Strain/Sprain		Contusion		Fracture		Concussion		Other	
Activity	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**
Attempting a Slide Tackle	488	0.5%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Ball Handling/Dribbling	6,284	6.9%	1,342	7.0%	1,730	13.9%	234	0.7%	705	2.7%
Blocking Shot	750	0.8%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Chasing Loose Ball	8,609	9.5%	1,463	7.6%	1,336	10.8%	4,148	11.6%	1,971	7.6%
Conditioning	1,947	2.1%	0	0.0%	0	0.0%	0	0.0%	442	1.7%
Defending	13,407	14.8%	2,841	14.8%	1,957	15.8%	7,791	21.8%	3,400	13.1%
General Play	30,198	33.2%	7,721	40.1%	3,555	28.6%	4,180	11.7%	10,556	40.6%
Goaltending	6,996	7.7%	300	1.6%	2,471	19.9%	1,861	5.2%	497	1.9%
Heading Ball	0	0.0%	488	2.5%	0	0.0%	8,145	22.8%	0	0.0%
Other	3,141	3.5%	0	0.0%	0	0.0%	263	0.7%	0	0.0%
Passing	3,110	3.4%	884	4.6%	0	0.0%	0	0.0%	488	1.9%
Receiving Pass	965	1.1%	1,785	9.3%	0	0.0%	1,073	3.0%	0	0.0%
Receiving a Slide Tackle	0	0.0%	442	2.3%	442	3.6%	0	0.0%	0	0.0%
Shooting	3,005	3.3%	0	0.0%	0	0.0%	1,235	3.5%	2,038	7.8%
Unknown	11,952	13.2%	1,983	10.3%	929	7.5%	6,756	18.9%	5,925	22.8%
Total	***90,853***	***100.0%***	***19,248***	***100.0%***	***12,419***	***100.0%***	***35,687***	***100.0%***	***26,021***	***100.0%***

* Totals and n's represent the total weighted number of injury reports containing a valid response for the particular question. Due to a low level of non-response, these totals are always similar but are not always equal to the total number of injuries.

VI. Girls' Volleyball Injury Epidemiology

Table 6.1 Girls' Volleyball Injury Rates by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2022-23 School Year *

	# Injuries	# Exposures	Injury Rate (per 1,000 AEs)	Nationally Estimated # Injuries
Total	***180***	***140,131***	***1.28***	***73,903***
Competition	80	48,471	1.65	31,391
Practice	100	91,660	1.09	42,512

* All remaining analyses in this chapter present data weighted to provide national injury estimates.

Table 6.2 Demographic Characteristics of Injured Girls' Volleyball Athletes, High School Sports-Related Injury Surveillance Study, US, 2022-23 School Year *

Year in School	n	%
Freshman	18,952	27.6%
Sophomore	16,908	24.6%
Junior	17,765	25.9%
Senior	15,067	21.9%
Total	***68,693***	***100.0%***

Age (years)	
Minimum	13
Maximum	18
Mean (SD)	15.5 (1.2)
n	55,100

BMI	
Minimum	17.4
Maximum	38.5
Mean (SD)	22.6 (3.5)
n	43,830

* Throughout this chapter, totals and n's represent the total weighted number of injury reports containing a valid response for the particular question. Due to a low level of non-response, these totals are always similar but are not always equal to the total number of injuries.

Figure 6.1 Diagnosis of Girls' Volleyball Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2022-23 School Year

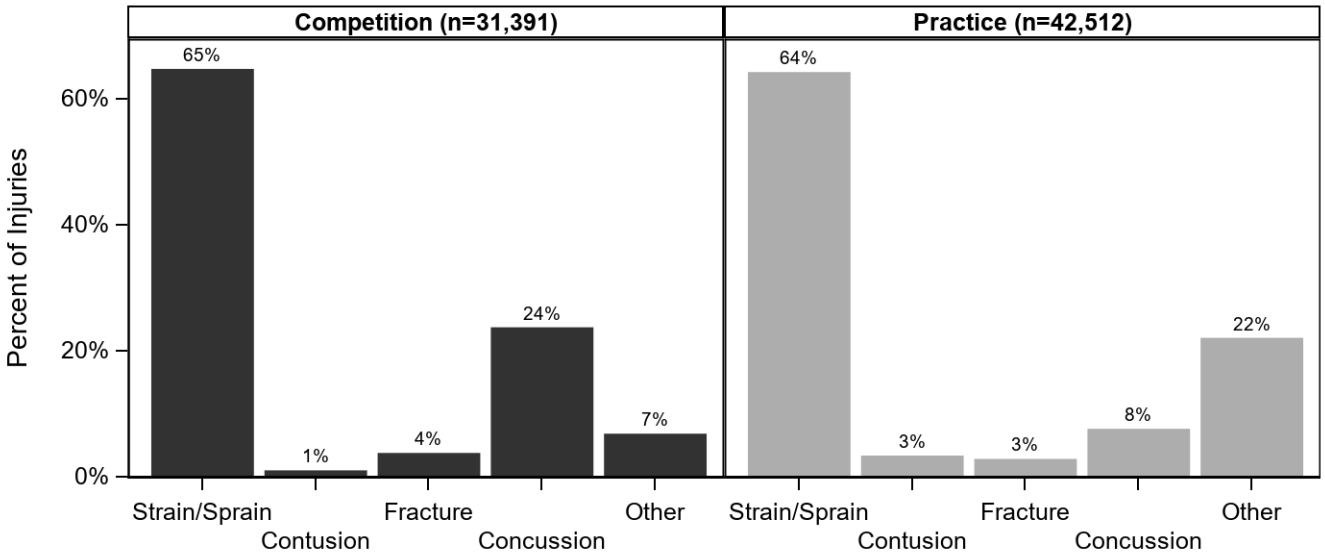


Table 6.3 Body Site of Girls' Volleyball Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2022-23 School Year *

	Competition		Practice		Overall	
Body Site	**n**	**%**	**n**	**%**	**n**	**%**
Ankle	11,946	38.1%	16,372	38.5%	28,318	38.3%
Head/Face	8,123	25.9%	3,844	9.0%	11,967	16.2%
Knee	1,956	6.2%	7,550	17.8%	9,505	12.9%
Shoulder	2,695	8.6%	4,529	10.7%	7,224	9.8%
Hand/Wrist	3,797	12.1%	1,941	4.6%	5,737	7.8%
Hip/Thigh/Upper Leg	973	3.1%	1,686	4.0%	2,659	3.6%
Arm/Elbow	1,585	5.1%	914	2.1%	2,499	3.4%
Lower Leg	211	0.7%	1,632	3.8%	1,843	2.5%
Trunk	0	0.0%	1,635	3.8%	1,635	2.2%
Foot	106	0.3%	1,076	2.5%	1,181	1.6%
Other	0	0.0%	667	1.6%	667	0.9%
Systemic	0	0.0%	667	1.6%	667	0.9%
Total	***31,391***	***100.0%***	***42,512***	***100.0%***	***73,903***	***100.0%***

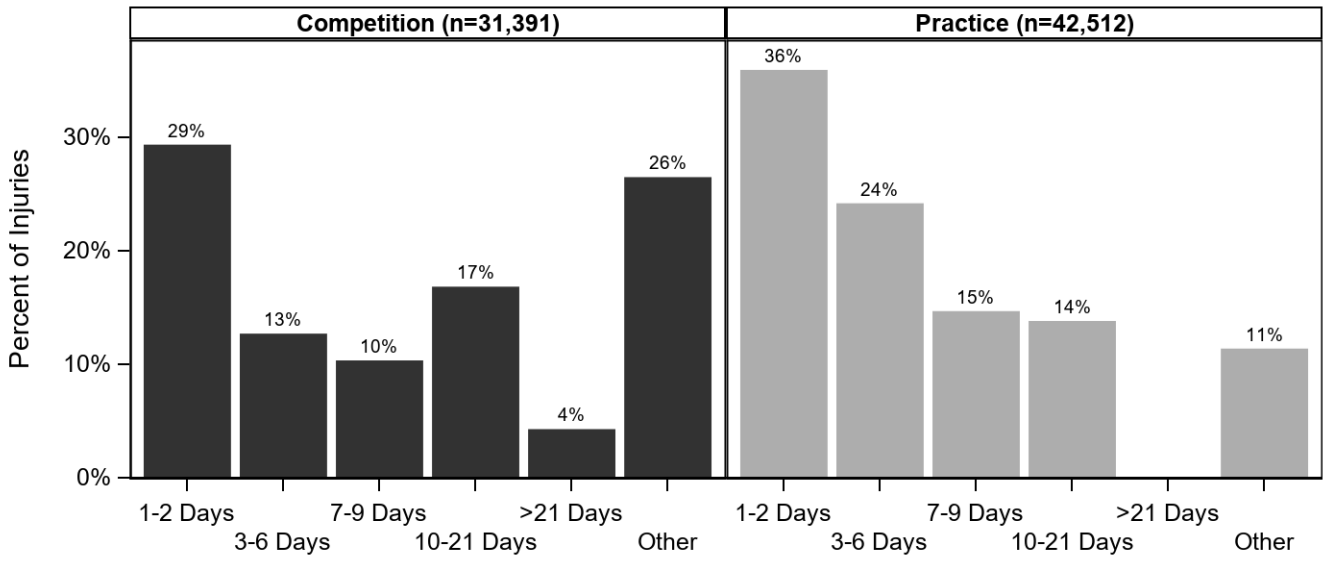
* Totals and n's represent the total weighted number of injury reports containing a valid response for the particular question. Due to a low level of non-response, these totals are always similar but are not always equal to the total number of injuries.

Table 6.4 Ten Most Common Girls' Volleyball Injury Diagnoses by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2022-23 School Year *

	Competition (n=31,391)		Practice (n=42,512)		Overall (n=73,902)	
Diagnosis	**n**	**%**	**n**	**%**	**n**	**%**
Ankle Strain/Sprain	11,645	37.1%	16,177	38.1%	27,821	37.6%
Head/Face Concussion	7,441	23.7%	3,232	7.6%	10,672	14.4%
Hand/Wrist Strain/Sprain	3,204	10.2%	1,835	4.3%	5,040	6.8%
Knee Strain/Sprain	1,377	4.4%	3,125	7.4%	4,502	6.1%
Knee Other	367	1.2%	4,017	9.4%	4,385	5.9%
Shoulder Other	667	2.1%	3,361	7.9%	4,027	5.4%
Shoulder Strain/Sprain	2,028	6.5%	1,169	2.7%	3,197	4.3%
Hip/Thigh/Upper Leg Strain/Sprain	973	3.1%	1,686	4.0%	2,659	3.6%
Arm/Elbow Strain/Sprain	973	3.1%	612	1.4%	1,585	2.1%
Trunk Strain/Sprain	0	0.0%	1,530	3.6%	1,530	2.1%

* Totals and n's represent the total weighted number of injury reports containing a valid response for the particular question. Due to a low level of non-response, these totals are always similar but are not always equal to the total number of injuries.

Figure 6.2 Time Loss of Girls' Volleyball Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2022-23 School Year *



* Other category is made up of medical disqualification for season, medical disqualification for career, athlete chooses not to continue, and season ended before athlete returned to play.

Table 6.5 Girls' Volleyball Injuries Requiring Surgery by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2022-23 School Year *

	Competition		Practice		Overall	
Need for Surgery	**n**	**%**	**n**	**%**	**n**	**%**
Required Surgery	1,773	5.6%	824	1.9%	2,597	3.5%
Did Not Require Surgery	29,617	94.4%	41,688	98.1%	71,306	96.5%
Total	***31,391***	***100.0%***	***42,512***	***100.0%***	***73,903***	***100.0%***

* Totals and n's represent the total weighted number of injury reports containing a valid response for the particular question. Due to a low level of non-response, these totals are always similar but are not always equal to the total number of injuries.

Figure 6.3 History of Girls' Volleyball Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2022-23 School Year

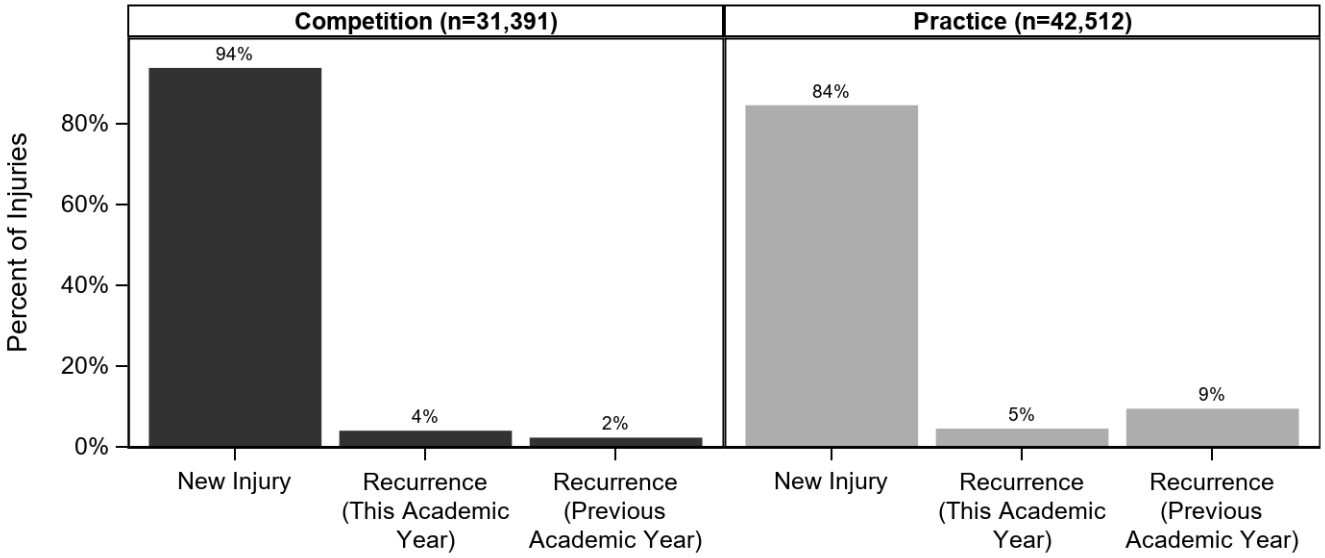


Table 6.6 Time during Season of Girls' Volleyball Injuries, High School Sports-Related Injury Surveillance Study, US, 2022-23 School Year *

Time in Season	n	%
Preseason	17,241	23.6%
Regular Season	52,412	71.7%
Post Season	2,234	3.1%
Unknown/Other	1,169	1.6%
Total	***73,055***	***100.0%***

* Totals and n's represent the total weighted number of injury reports containing a valid response for the particular question. Due to a low level of non-response, these totals are always similar but are not always equal to the total number of injuries.

Table 6.7 Competition-Related Variables for Girls' Volleyball Injuries, High School Sports-Related Injury Surveillance Study, US, 2022-23 School Year *

Time in Competition	n	%
Pre-competition/Warm-Ups	4,076	13.1%
First Game	3,290	10.6%
Second Game	10,807	34.7%
Third Game	4,087	13.1%
Fourth Game	890	2.9%
Fifth Game	1,256	4.0%
Unknown	6,773	21.7%
Total	***31,180***	***100.0%***

Court Location		
Right Back (Server)	1,454	4.8%
Right Forward	4,507	14.9%
Outside Court (Your Side)	301	1.0%
Middle Forward	5,076	16.8%
Left Forward	2,043	6.8%
Left Back	3,575	11.8%
At the Net	944	3.1%
Unknown	12,326	40.8%
Total	***30,226***	***100.0%***

* Totals and n's represent the total weighted number of injury reports containing a valid response for the particular question. Due to a low level of non-response, these totals are always similar but are not always equal to the total number of injuries.

Table 6.8 Practice-Related Variables for Girls' Volleyball Injuries, High School Sports-Related Injury Surveillance Study, US, 2022-23 School Year *

Time in Practice	n	%
First 1/2 Hour	3,227	7.9%
Second 1/2 Hour	8,419	20.7%
1-2 Hours into Practice	15,813	38.9%
>2 Hours into Practice	1,004	2.5%
Unknown	12,154	29.9%
Total	***40,616***	***100.0%***

* Totals and n's represent the total weighted number of injury reports containing a valid response for the particular question. Due to a low level of non-response, these totals are always similar but are not always equal to the total number of injuries.

Figure 6.4 Player Position of Girls' Volleyball Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2022-23 School Year

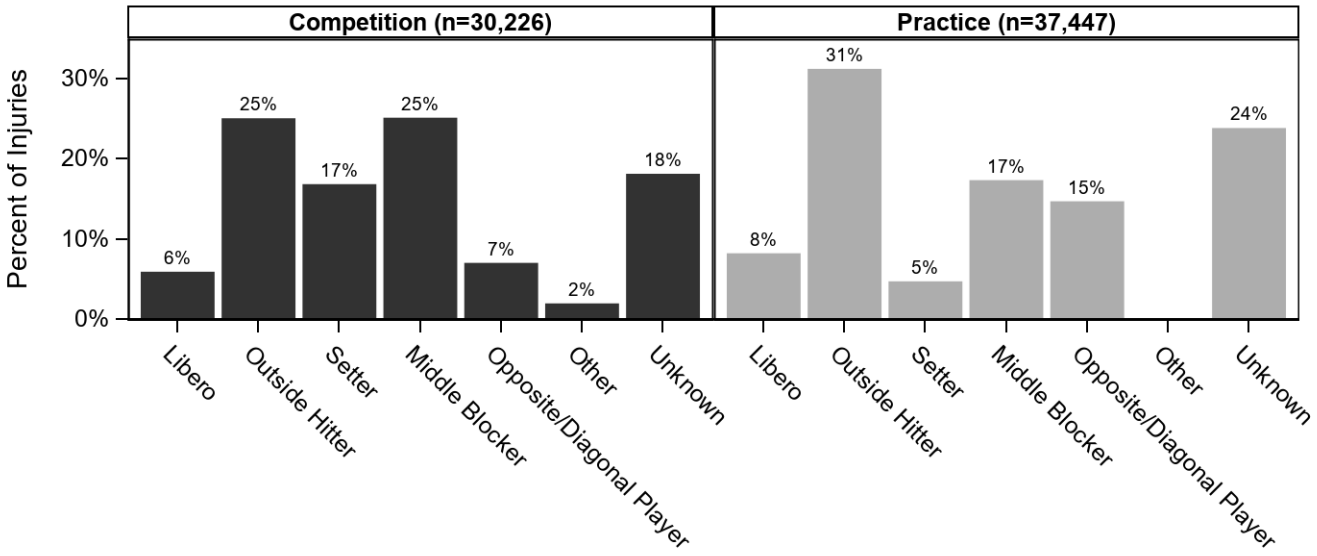


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Table 6.9 Activities Leading to Girls' Volleyball Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2022-23 School Year *

	Competition		Practice		Overall	
Activity	**n**	**%**	**n**	**%**	**n**	**%**
General Play	2,980	9.5%	12,076	32.1%	15,055	21.8%
Blocking	8,117	25.9%	4,671	12.4%	12,788	18.6%
Digging	8,481	27.1%	2,474	6.6%	10,955	15.9%
Spiking	2,821	9.0%	4,244	11.3%	7,065	10.2%
Unknown	1,389	4.4%	4,802	12.8%	6,191	9.0%
Serving	2,895	9.3%	3,237	8.6%	6,132	8.9%
Setting	1,907	6.1%	2,127	5.6%	4,033	5.9%
Other	1,923	6.1%	1,475	3.9%	3,398	4.9%
Passing	772	2.5%	1,871	5.0%	2,643	3.8%
Conditioning	0	0.0%	667	1.8%	667	1.0%
Total	***31,285***	***100.0%***	***37,643***	***100.0%***	***68,928***	***100.0%***

* Totals and n's represent the total weighted number of injury reports containing a valid response for the particular question. Due to a low level of non-response, these totals are always similar but are not always equal to the total number of injuries.

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Table 6.10 Activity Resulting in Girls' Volleyball Injuries by Injury Diagnosis, High School Sports-Related Injury Surveillance Study, US, 2022-23 School Year *

	Diagnosis									
	Strain/Sprain		Contusion		Fracture		Concussion		Other	
Activity	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**
Blocking	10,825	24.8%	211	14.6%	1,099	46.1%	391	3.7%	262	2.4%
Conditioning	667	1.5%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Digging	4,078	9.3%	808	56.1%	486	20.4%	4,002	37.9%	1,580	14.5%
General Play	10,194	23.4%	211	14.6%	106	4.4%	698	6.6%	3,847	35.2%
Other	1,099	2.5%	0	0.0%	0	0.0%	1,437	13.6%	862	7.9%
Passing	2,432	5.6%	106	7.3%	106	4.4%	0	0.0%	0	0.0%
Serving	4,174	9.6%	0	0.0%	0	0.0%	679	6.4%	1,279	11.7%
Setting	3,838	8.8%	0	0.0%	0	0.0%	196	1.9%	0	0.0%
Spiking	4,633	10.6%	0	0.0%	0	0.0%	612	5.8%	1,820	16.7%
Unknown	1,675	3.8%	106	7.3%	589	24.7%	2,552	24.2%	1,269	11.6%
Total	***43,614***	***100.0%***	***1,442***	***100.0%***	***2,386***	***100.0%***	***10,567***	***100.0%***	***10,920***	***100.0%***

* Totals and n's represent the total weighted number of injury reports containing a valid response for the particular question. Due to a low level of non-response, these totals are always similar but are not always equal to the total number of injuries.

VII. Boys' Basketball Injury Epidemiology

Table 7.1 Boys' Basketball Injury Rates by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2022-23 School Year *

	# Injuries	# Exposures	Injury Rate (per 1,000 AEs)	Nationally Estimated # Injuries
Total	***383***	***200,133***	***1.91***	***124,110***
Competition	195	58,487	3.33	64,575
Practice	188	141,646	1.33	59,535

* All remaining analyses in this chapter present data weighted to provide national injury estimates.

Table 7.2 Demographic Characteristics of Injured Boys' Basketball Athletes, High School Sports-Related Injury Surveillance Study, US, 2022-23 School Year *

Year in School	n	%
Freshman	26,824	22.7%
Sophomore	38,898	32.9%
Junior	28,022	23.7%
Senior	24,502	20.7%
Total	***118,246***	***100.0%***

Age (years)	
Minimum	13
Maximum	19
Mean (SD)	15.9 (1.2)
n	100,376

BMI	
Minimum	16.7
Maximum	36.2
Mean (SD)	22.8 (3.2)
n	76,880

* Throughout this chapter, totals and n's represent the total weighted number of injury reports containing a valid response for the particular question. Due to a low level of non-response, these totals are always similar but are not always equal to the total number of injuries.

Figure 7.1 Diagnosis of Boys' Basketball Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2022-23 School Year

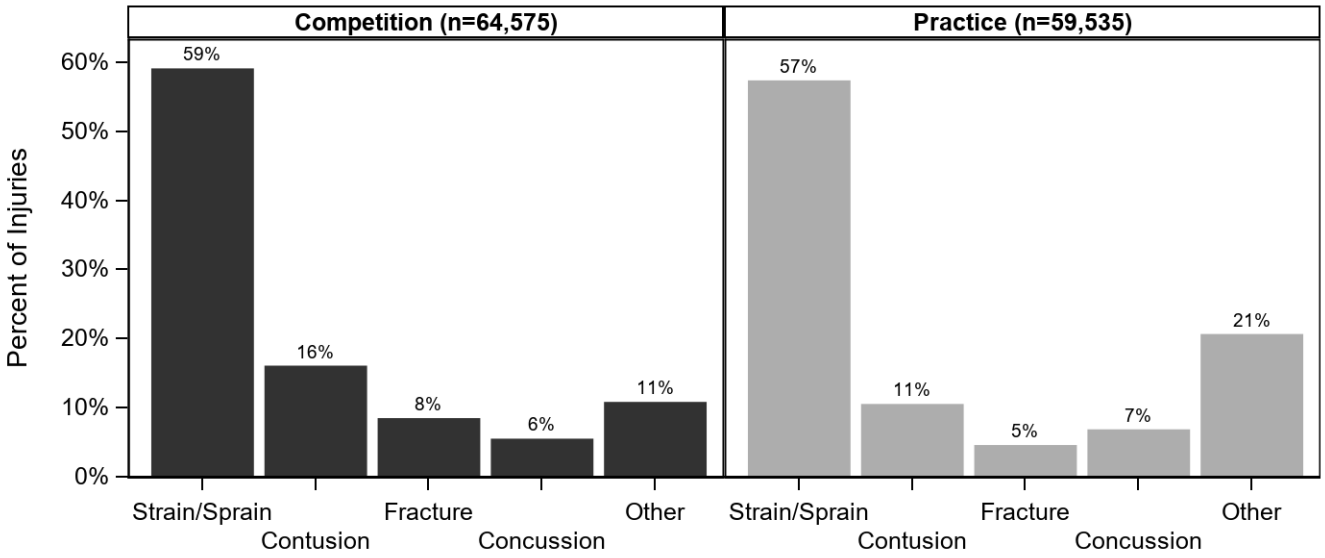


Table 7.3 Body Site of Boys' Basketball Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2022-23 School Year *

	Competition		Practice		Overall	
Body Site	**n**	**%**	**n**	**%**	**n**	**%**
Ankle	23,358	36.2%	21,143	35.5%	44,501	35.9%
Knee	10,119	15.7%	8,750	14.7%	18,868	15.2%
Head/Face	5,529	8.6%	8,722	14.7%	14,251	11.5%
Hip/Thigh/Upper Leg	5,363	8.3%	5,703	9.6%	11,066	8.9%
Hand/Wrist	8,012	12.4%	2,200	3.7%	10,212	8.2%
Lower Leg	3,925	6.1%	2,878	4.8%	6,803	5.5%
Trunk	3,796	5.9%	2,827	4.7%	6,623	5.3%
Foot	1,140	1.8%	3,351	5.6%	4,491	3.6%
Shoulder	1,776	2.7%	1,793	3.0%	3,569	2.9%
Arm/Elbow	740	1.1%	818	1.4%	1,558	1.3%
Neck	250	0.4%	1,101	1.8%	1,351	1.1%
Systemic	284	0.4%	250	0.4%	534	0.4%
Other	284	0.4%	0	0.0%	284	0.2%
Total	***64,575***	***100.0%***	***59,535***	***100.0%***	***124,110***	***100.0%***

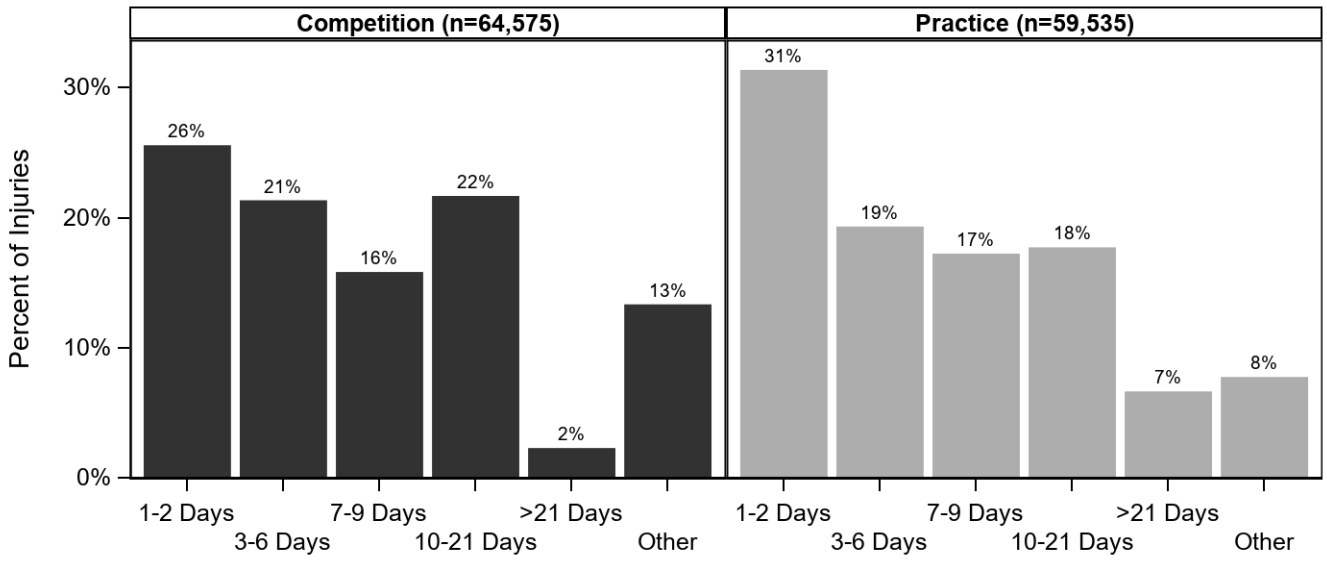
* Totals and n's represent the total weighted number of injury reports containing a valid response for the particular question. Due to a low level of non-response, these totals are always similar but are not always equal to the total number of injuries.

Table 7.4 Ten Most Common Boys' Basketball Injury Diagnoses by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2022-23 School Year *

	Competition (n=64,574)		Practice (n=59,534)		Overall (n=124,108)	
Diagnosis	**n**	**%**	**n**	**%**	**n**	**%**
Ankle Strain/Sprain	22,525	34.9%	20,797	34.9%	43,323	34.9%
Head/Face Concussion	3,557	5.5%	4,084	6.9%	7,641	6.2%
Knee Other	3,172	4.9%	3,932	6.6%	7,103	5.7%
Hip/Thigh/Upper Leg Strain/Sprain	2,418	3.7%	4,127	6.9%	6,545	5.3%
Knee Contusion	4,088	6.3%	1,945	3.3%	6,033	4.9%
Knee Strain/Sprain	2,859	4.4%	2,873	4.8%	5,732	4.6%
Hand/Wrist Strain/Sprain	4,477	6.9%	796	1.3%	5,273	4.2%
Head/Face Other	1,722	2.7%	3,254	5.5%	4,976	4.0%
Hand/Wrist Fracture	3,045	4.7%	1,308	2.2%	4,353	3.5%
Hip/Thigh/Upper Leg Contusion	2,661	4.1%	1,481	2.5%	4,141	3.3%

* Totals and n's represent the total weighted number of injury reports containing a valid response for the particular question. Due to a low level of non-response, these totals are always similar but are not always equal to the total number of injuries.

Figure 7.2 Time Loss of Boys' Basketball Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2022-23 School Year *



* Other category is made up of medical disqualification for season, medical disqualification for career, athlete chooses not to continue, and season ended before athlete returned to play.

Table 7.5 Boys' Basketball Injuries Requiring Surgery by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2022-23 School Year *

	Competition		Practice		Overall	
Need for Surgery	**n**	**%**	**n**	**%**	**n**	**%**
Required Surgery	1,543	2.4%	1,075	1.8%	2,619	2.1%
Did Not Require Surgery	62,728	97.6%	57,969	98.2%	120,697	97.9%
Total	***64,271***	***100.0%***	***59,045***	***100.0%***	***123,316***	***100.0%***

* Totals and n's represent the total weighted number of injury reports containing a valid response for the particular question. Due to a low level of non-response, these totals are always similar but are not always equal to the total number of injuries.

Figure 7.3 History of Boys' Basketball Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2022-23 School Year

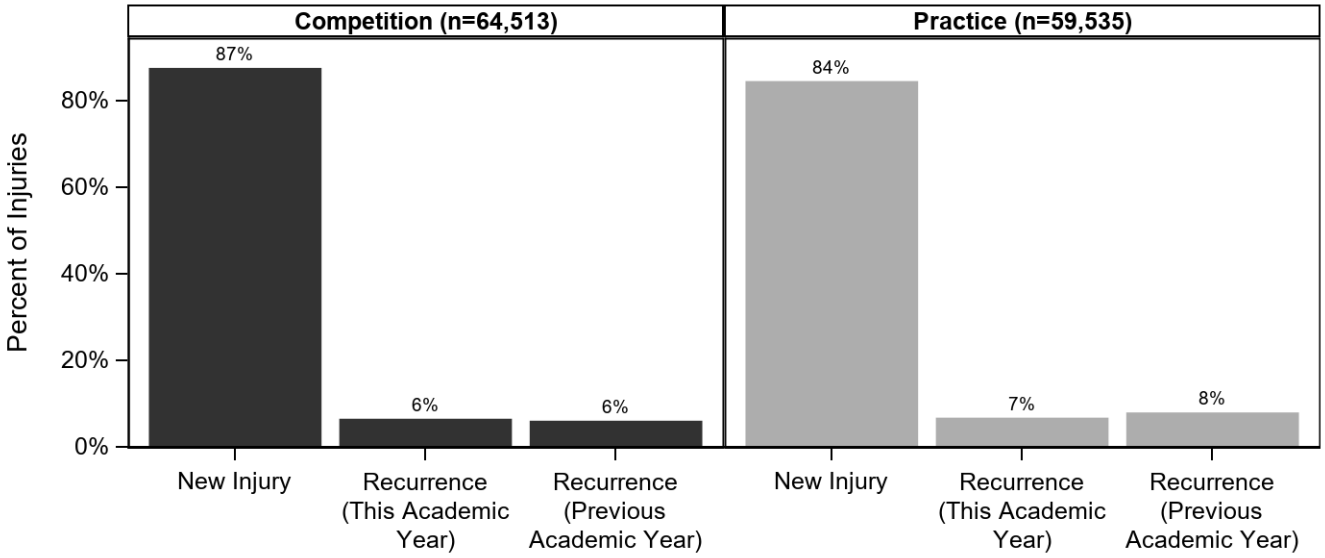


Table 7.6 Time during Season of Boys' Basketball Injuries, High School Sports-Related Injury Surveillance Study, US, 2022-23 School Year *

Time in Season	n	%
Preseason	29,112	23.5%
Regular Season	91,885	74.0%
Post Season	2,010	1.6%
Unknown/Other	1,102	0.9%
Total	***124,110***	***100.0%***

* Totals and n's represent the total weighted number of injury reports containing a valid response for the particular question. Due to a low level of non-response, these totals are always similar but are not always equal to the total number of injuries.

Table 7.7 Competition-Related Variables for Boys' Basketball Injuries, High School Sports-Related Injury Surveillance Study, US, 2022-23 School Year *

Time in Competition	n	%
Pre-competition/Warm-Ups	987	1.6%
First Quarter	6,541	10.8%
Second Quarter	18,282	30.1%
Third Quarter	11,016	18.1%
Fourth Quarter	12,537	20.6%
Overtime	740	1.2%
Unknown	10,647	17.5%
Total	***60,751***	***100.0%***

Court Location		
Inside Lane (Offense)	10,981	18.1%
Inside Lane (Defense)	14,155	23.3%
Between 3 Point Arc and Lane (Offense)	4,940	8.1%
Between 3 Point Arc and Lane (Defense)	5,735	9.5%
Outside 3 Point Arc (Offense)	2,266	3.7%
Outside 3 Point Arc (Defense)	1,764	2.9%
Out of Bounds	1,307	2.2%
Off the Court	852	1.4%
Backcourt	1,474	2.4%
Unknown	17,181	28.3%
Total	***60,656***	***100.0%***

* Totals and n's represent the total weighted number of injury reports containing a valid response for the particular question. Due to a low level of non-response, these totals are always similar but are not always equal to the total number of injuries.

Table 7.8 Practice-Related Variables for Boys' Basketball Injuries, High School Sports-Related Injury Surveillance Study, US, 2022-23 School Year *

Time in Practice	n	%
First 1/2 Hour	5,536	9.4%
Second 1/2 Hour	4,293	7.3%
1-2 Hours into Practice	34,997	59.2%
>2 Hours into Practice	1,985	3.4%
Unknown	12,351	20.9%
Total	***59,162***	***100.0%***

* Totals and n's represent the total weighted number of injury reports containing a valid response for the particular question. Due to a low level of non-response, these totals are always similar but are not always equal to the total number of injuries.

Figure 7.4 Player Position of Boys' Basketball Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2022-23 School Year

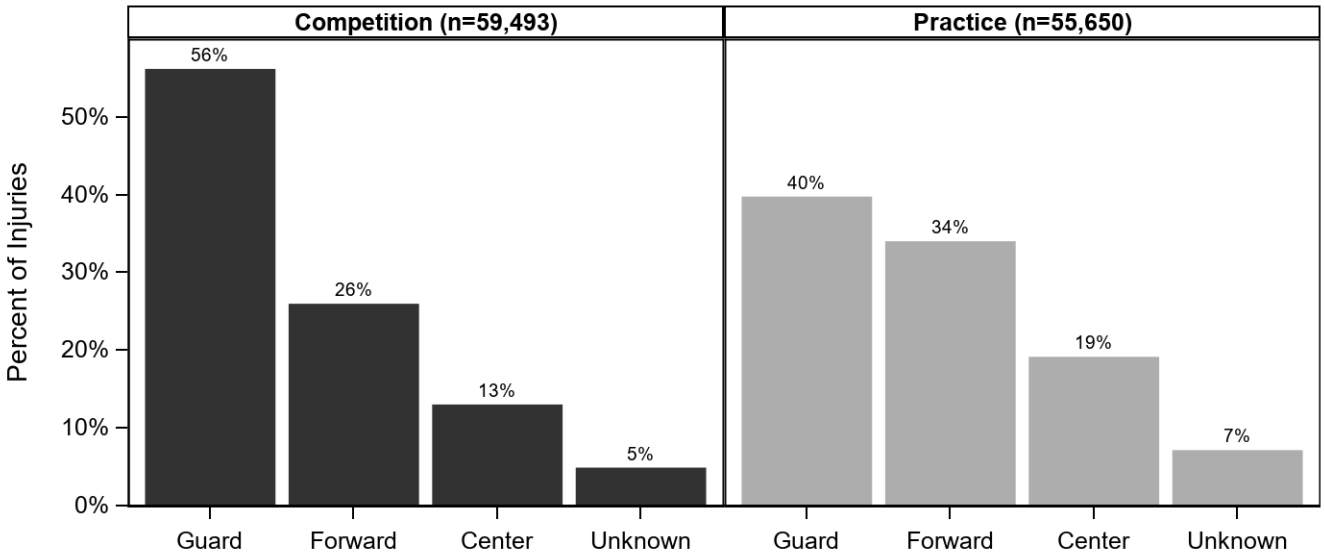


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Table 7.9 Activities Leading to Boys' Basketball Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2022-23 School Year *

	Competition		Practice		Overall	
Activity	**n**	**%**	**n**	**%**	**n**	**%**
Rebounding	17,542	28.7%	13,303	23.9%	30,845	26.4%
General Play	9,920	16.2%	12,379	22.2%	22,299	19.1%
Defending	8,521	13.9%	8,440	15.2%	16,961	14.5%
Chasing Loose Ball	7,281	11.9%	5,328	9.6%	12,609	10.8%
Unknown	5,054	8.3%	7,030	12.6%	12,084	10.3%
Shooting	6,178	10.1%	4,055	7.3%	10,233	8.8%
Ball Handling/Dribbling	3,670	6.0%	2,483	4.5%	6,154	5.3%
Conditioning	0	0.0%	2,536	4.6%	2,536	2.2%
Receiving Pass	1,653	2.7%	95	0.2%	1,748	1.5%
Other	1,347	2.2%	0	0.0%	1,347	1.2%
Total	***61,167***	***100.0%***	***55,650***	***100.0%***	***116,817***	***100.0%***

* Totals and n's represent the total weighted number of injury reports containing a valid response for the particular question. Due to a low level of non-response, these totals are always similar but are not always equal to the total number of injuries.

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Table 7.10 Activity Resulting in Boys' Basketball Injuries by Injury Diagnosis, High School Sports-Related Injury Surveillance Study, US, 2022-23 School Year *

	Diagnosis									
	Strain/Sprain		Contusion		Fracture		Concussion		Other	
Activity	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**
Ball Handling/Dribbling	3,809	5.6%	1,470	8.9%	0	0.0%	529	7.2%	346	2.1%
Chasing Loose Ball	5,172	7.6%	1,614	9.7%	1,800	22.2%	1,462	20.0%	2,562	15.6%
Conditioning	1,095	1.6%	0	0.0%	0	0.0%	0	0.0%	1,441	8.8%
Defending	6,573	9.6%	5,685	34.3%	794	9.8%	1,982	27.1%	1,928	11.7%
General Play	12,347	18.0%	3,828	23.1%	958	11.8%	590	8.1%	4,575	27.9%
Other	779	1.1%	0	0.0%	0	0.0%	0	0.0%	568	3.5%
Rebounding	22,442	32.8%	1,740	10.5%	3,554	43.8%	1,181	16.2%	1,927	11.7%
Receiving Pass	1,653	2.4%	0	0.0%	0	0.0%	0	0.0%	95	0.6%
Shooting	6,513	9.5%	2,158	13.0%	475	5.9%	630	8.6%	458	2.8%
Unknown	8,025	11.7%	62	0.4%	534	6.6%	936	12.8%	2,528	15.4%
Total	***68,408***	***100.0%***	***16,557***	***100.0%***	***8,115***	***100.0%***	***7,309***	***100.0%***	***16,428***	***100.0%***

* Totals and n's represent the total weighted number of injury reports containing a valid response for the particular question. Due to a low level of non-response, these totals are always similar but are not always equal to the total number of injuries.

VIII. Girls' Basketball Injury Epidemiology

Table 8.1 Girls' Basketball Injury Rates by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2022-23 School Year *

	# Injuries	# Exposures	Injury Rate (per 1,000 AEs)	Nationally Estimated # Injuries
Total	***289***	***135,164***	***2.14***	***86,437***
Competition	193	40,289	4.79	58,076
Practice	96	94,875	1.01	28,361

* All remaining analyses in this chapter present data weighted to provide national injury estimates.

Table 8.2 Demographic Characteristics of Injured Girls' Basketball Athletes, High School Sports-Related Injury Surveillance Study, US, 2022-23 School Year *

Year in School	n	%
Freshman	21,850	26.4%
Sophomore	26,592	32.1%
Junior	17,427	21.0%
Senior	16,956	20.5%
Total	***82,826***	***100.0%***

Age (years)	
Minimum	13
Maximum	18
Mean (SD)	15.6 (1.2)
n	68,449

BMI	
Minimum	17.4
Maximum	42.4
Mean (SD)	22.7 (3.7)
n	46,341

* Throughout this chapter, totals and n's represent the total weighted number of injury reports containing a valid response for the particular question. Due to a low level of non-response, these totals are always similar but are not always equal to the total number of injuries.

Figure 8.1 Diagnosis of Girls' Basketball Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2022-23 School Year

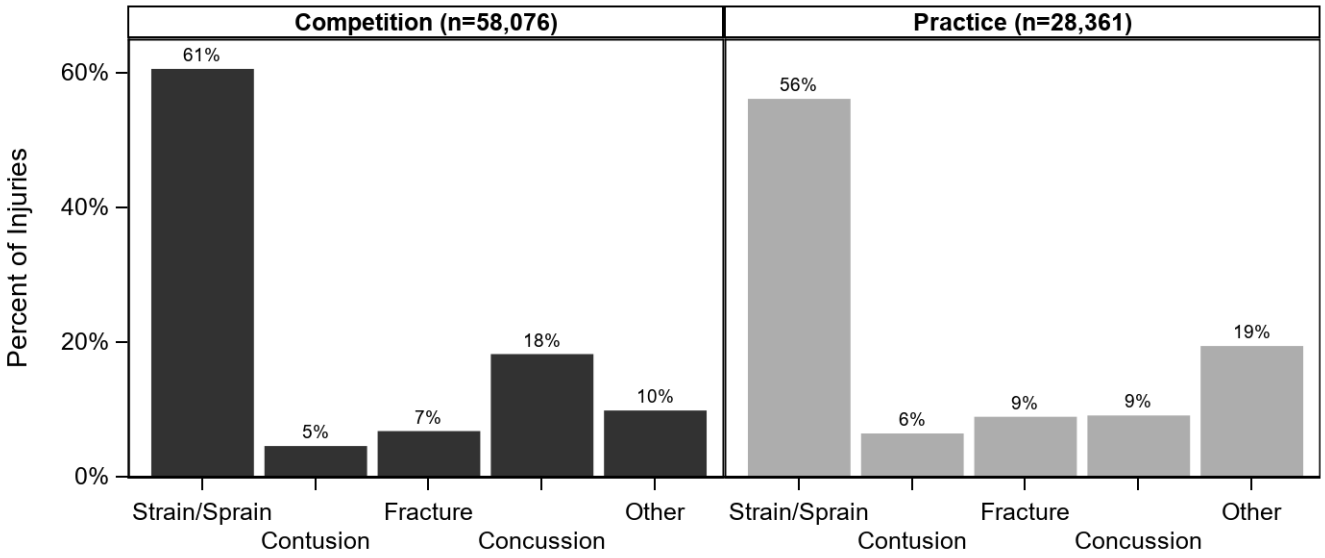


Table 8.3 Body Site of Girls' Basketball Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2022-23 School Year *

	Competition		Practice		Overall	
Body Site	**n**	**%**	**n**	**%**	**n**	**%**
Ankle	19,399	33.4%	11,977	42.2%	31,376	36.3%
Knee	14,001	24.1%	3,896	13.7%	17,897	20.7%
Head/Face	13,435	23.2%	3,137	11.1%	16,572	19.2%
Hand/Wrist	5,148	8.9%	1,384	4.9%	6,533	7.6%
Hip/Thigh/Upper Leg	1,374	2.4%	2,323	8.2%	3,697	4.3%
Lower Leg	1,768	3.0%	1,616	5.7%	3,384	3.9%
Foot	0	0.0%	2,193	7.7%	2,193	2.5%
Arm/Elbow	675	1.2%	917	3.2%	1,592	1.8%
Trunk	290	0.5%	917	3.2%	1,207	1.4%
Neck	855	1.5%	0	0.0%	855	1.0%
Shoulder	536	0.9%	0	0.0%	536	0.6%
Systemic	536	0.9%	0	0.0%	536	0.6%
Total	***58,017***	***100.0%***	***28,361***	***100.0%***	***86,378***	***100.0%***

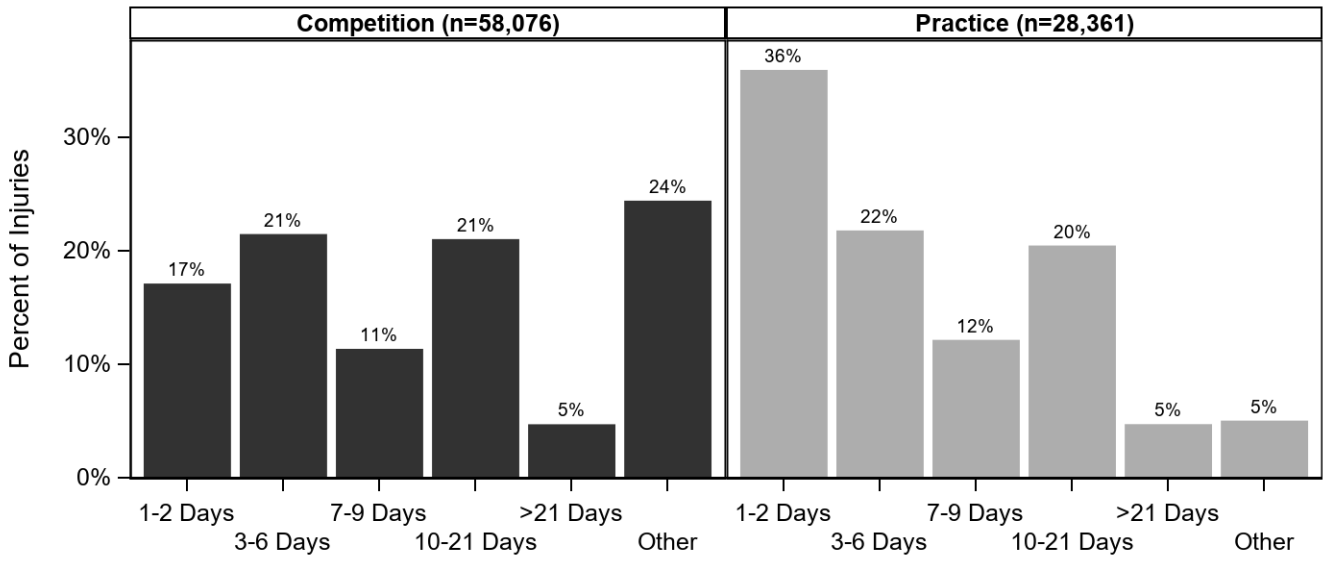
* Totals and n's represent the total weighted number of injury reports containing a valid response for the particular question. Due to a low level of non-response, these totals are always similar but are not always equal to the total number of injuries.

Table 8.4 Ten Most Common Girls' Basketball Injury Diagnoses by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2022-23 School Year *

	Competition (n=58,017)		Practice (n=28,359)		Overall (n=86,376)	
Diagnosis	**n**	**%**	**n**	**%**	**n**	**%**
Ankle Strain/Sprain	19,050	32.8%	11,977	42.2%	31,027	35.9%
Head/Face Concussion	10,523	18.1%	2,581	9.1%	13,104	15.2%
Knee Strain/Sprain	10,145	17.5%	702	2.5%	10,847	12.6%
Knee Other	2,318	4.0%	2,287	8.1%	4,606	5.3%
Hand/Wrist Fracture	2,357	4.1%	861	3.0%	3,218	3.7%
Hip/Thigh/Upper Leg Strain/Sprain	1,259	2.2%	1,223	4.3%	2,483	2.9%
Knee Contusion	1,538	2.7%	906	3.2%	2,443	2.8%
Hand/Wrist Strain/Sprain	1,826	3.1%	523	1.8%	2,349	2.7%
Lower Leg Strain/Sprain	1,768	3.0%	290	1.0%	2,058	2.4%
Head/Face Other	1,708	2.9%	0	0.0%	1,708	2.0%

* Totals and n's represent the total weighted number of injury reports containing a valid response for the particular question. Due to a low level of non-response, these totals are always similar but are not always equal to the total number of injuries.

Figure 8.2 Time Loss of Girls' Basketball Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2022-23 School Year *



* Other category is made up of medical disqualification for season, medical disqualification for career, athlete chooses not to continue, and season ended before athlete returned to play.

Table 8.5 Girls' Basketball Injuries Requiring Surgery by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2022-23 School Year *

	Competition		Practice		Overall	
Need for Surgery	**n**	**%**	**n**	**%**	**n**	**%**
Required Surgery	10,218	17.8%	115	0.4%	10,333	12.0%
Did Not Require Surgery	47,302	82.2%	28,246	99.6%	75,548	88.0%
Total	***57,520***	***100.0%***	***28,361***	***100.0%***	***85,881***	***100.0%***

* Totals and n's represent the total weighted number of injury reports containing a valid response for the particular question. Due to a low level of non-response, these totals are always similar but are not always equal to the total number of injuries.

Figure 8.3 History of Girls' Basketball Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2022-23 School Year

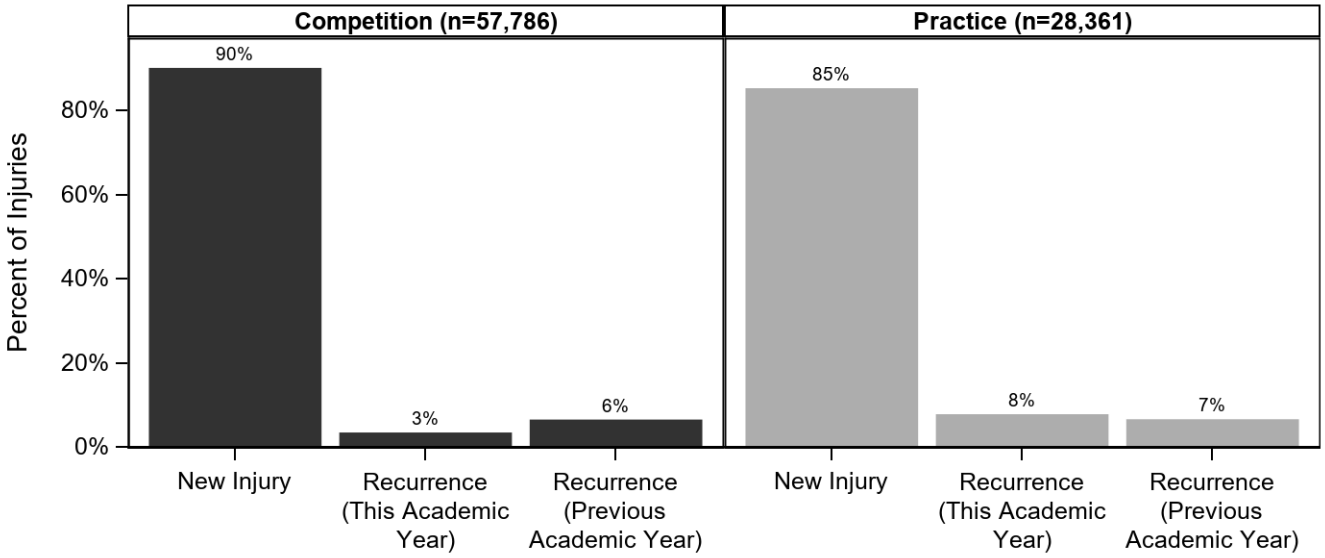


Table 8.6 Time during Season of Girls' Basketball Injuries, High School Sports-Related Injury Surveillance Study, US, 2022-23 School Year *

Time in Season	n	%
Preseason	9,846	11.4%
Regular Season	74,709	86.5%
Post Season	1,768	2.0%
Total	***86,322***	***100.0%***

* Totals and n's represent the total weighted number of injury reports containing a valid response for the particular question. Due to a low level of non-response, these totals are always similar but are not always equal to the total number of injuries.

Table 8.7 Competition-Related Variables for Girls' Basketball Injuries, High School Sports-Related Injury Surveillance Study, US, 2022-23 School Year *

Time in Competition	n	%
Pre-competition/Warm-Ups	1,939	3.5%
First Quarter	6,283	11.2%
Second Quarter	10,206	18.2%
Third Quarter	15,984	28.5%
Fourth Quarter	11,230	20.0%
Unknown	10,383	18.5%
Total	***56,025***	***100.0%***

Court Location		
Inside Lane (Offense)	8,949	16.0%
Inside Lane (Defense)	9,160	16.4%
Between 3 Point Arc and Lane (Offense)	3,081	5.5%
Between 3 Point Arc and Lane (Defense)	6,076	10.9%
Outside 3 Point Arc (Offense)	2,468	4.4%
Outside 3 Point Arc (Defense)	4,471	8.0%
Out of Bounds	1,963	3.5%
Off the Court	290	0.5%
Backcourt	731	1.3%
Unknown	18,781	33.6%
Total	***55,970***	***100.0%***

* Totals and n's represent the total weighted number of injury reports containing a valid response for the particular question. Due to a low level of non-response, these totals are always similar but are not always equal to the total number of injuries.

Table 8.8 Practice-Related Variables for Girls' Basketball Injuries, High School Sports-Related Injury Surveillance Study, US, 2022-23 School Year *

Time in Practice	n	%
First 1/2 Hour	2,025	7.2%
Second 1/2 Hour	6,366	22.5%
1-2 Hours into Practice	11,120	39.4%
>2 Hours into Practice	600	2.1%
Unknown	8,135	28.8%
Total	***28,246***	***100.0%***

* Totals and n's represent the total weighted number of injury reports containing a valid response for the particular question. Due to a low level of non-response, these totals are always similar but are not always equal to the total number of injuries.

Figure 8.4 Player Position of Girls' Basketball Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2022-23 School Year

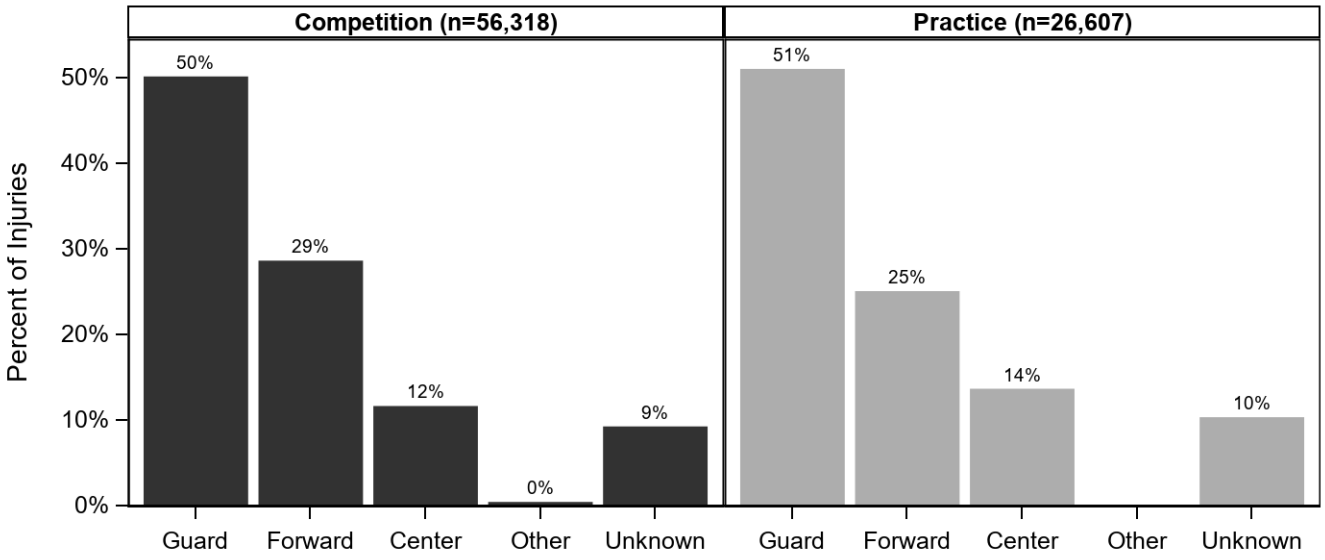


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Table 8.9 Activities Leading to Girls' Basketball Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2022-23 School Year *

	Competition		Practice		Overall	
Activity	**n**	**%**	**n**	**%**	**n**	**%**
General Play	7,495	13.3%	8,586	32.6%	16,081	19.4%
Defending	12,497	22.2%	1,786	6.8%	14,283	17.3%
Rebounding	10,245	18.2%	3,438	13.0%	13,683	16.5%
Unknown	7,500	13.3%	4,840	18.4%	12,339	14.9%
Chasing Loose Ball	8,741	15.5%	1,457	5.5%	10,199	12.3%
Shooting	4,921	8.7%	239	0.9%	5,160	6.2%
Ball Handling/Dribbling	3,329	5.9%	1,576	6.0%	4,905	5.9%
Conditioning	0	0.0%	2,932	11.1%	2,932	3.5%
Other	556	1.0%	855	3.2%	1,411	1.7%
Receiving Pass	479	0.9%	659	2.5%	1,138	1.4%
Passing	556	1.0%	0	0.0%	556	0.7%
Total	***56,318***	***100.0%***	***26,368***	***100.0%***	***82,687***	***100.0%***

* Totals and n's represent the total weighted number of injury reports containing a valid response for the particular question. Due to a low level of non-response, these totals are always similar but are not always equal to the total number of injuries.

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Table 8.10 Activity Resulting in Girls' Basketball Injuries by Injury Diagnosis, High School Sports-Related Injury Surveillance Study, US, 2022-23 School Year *

	Diagnosis									
	Strain/Sprain		Contusion		Fracture		Concussion		Other	
Activity	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**
Ball Handling/Dribbling	3,610	7.3%	0	0.0%	0	0.0%	1,295	10.9%	0	0.0%
Chasing Loose Ball	4,706	9.5%	1,152	25.8%	0	0.0%	2,553	21.6%	1,788	16.3%
Conditioning	1,092	2.2%	0	0.0%	1,109	18.8%	0	0.0%	731	6.7%
Defending	7,470	15.1%	616	13.8%	349	5.9%	3,814	32.2%	2,033	18.5%
General Play	9,320	18.8%	1,024	22.9%	849	14.4%	666	5.6%	4,221	38.4%
Other	616	1.2%	0	0.0%	0	0.0%	239	2.0%	556	5.1%
Passing	556	1.1%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Rebounding	9,564	19.3%	115	2.6%	1,530	25.9%	1,612	13.6%	862	7.8%
Receiving Pass	118	0.2%	174	3.9%	492	8.3%	353	3.0%	0	0.0%
Shooting	5,041	10.2%	0	0.0%	118	2.0%	0	0.0%	0	0.0%
Unknown	7,377	14.9%	1,390	31.1%	1,461	24.7%	1,309	11.1%	802	7.3%
Total	***49,473***	***100.0%***	***4,471***	***100.0%***	***5,908***	***100.0%***	***11,841***	***100.0%***	***10,994***	***100.0%***

* Totals and n's represent the total weighted number of injury reports containing a valid response for the particular question. Due to a low level of non-response, these totals are always similar but are not always equal to the total number of injuries.

IX. Boys' Wrestling Injury Epidemiology

Table 9.1 Boys' Wrestling Injury Rates by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2022-23 School Year *

	# Injuries	# Exposures	Injury Rate (per 1,000 AEs)	Nationally Estimated # Injuries
Total	***451***	***145,604***	***3.10***	***149,885***
Competition	190	36,047	5.27	73,599
Practice	261	109,557	2.38	76,286

* All remaining analyses in this chapter present data weighted to provide national injury estimates.

Table 9.2 Demographic Characteristics of Injured Boys' Wrestling Athletes, High School Sports-Related Injury Surveillance Study, US, 2022-23 School Year *

Year in School	n	%
Freshman	38,965	26.4%
Sophomore	31,350	21.2%
Junior	47,381	32.1%
Senior	30,092	20.4%
Total	***147,788***	***100.0%***

Age (years)	
Minimum	12
Maximum	18
Mean (SD)	15.7 (1.2)
n	130,382

BMI	
Minimum	17.3
Maximum	42.7
Mean (SD)	23.9 (4.4)
n	103,608

* Throughout this chapter, totals and n's represent the total weighted number of injury reports containing a valid response for the particular question. Due to a low level of non-response, these totals are always similar but are not always equal to the total number of injuries.

Figure 9.1 Diagnosis of Boys' Wrestling Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2022-23 School Year

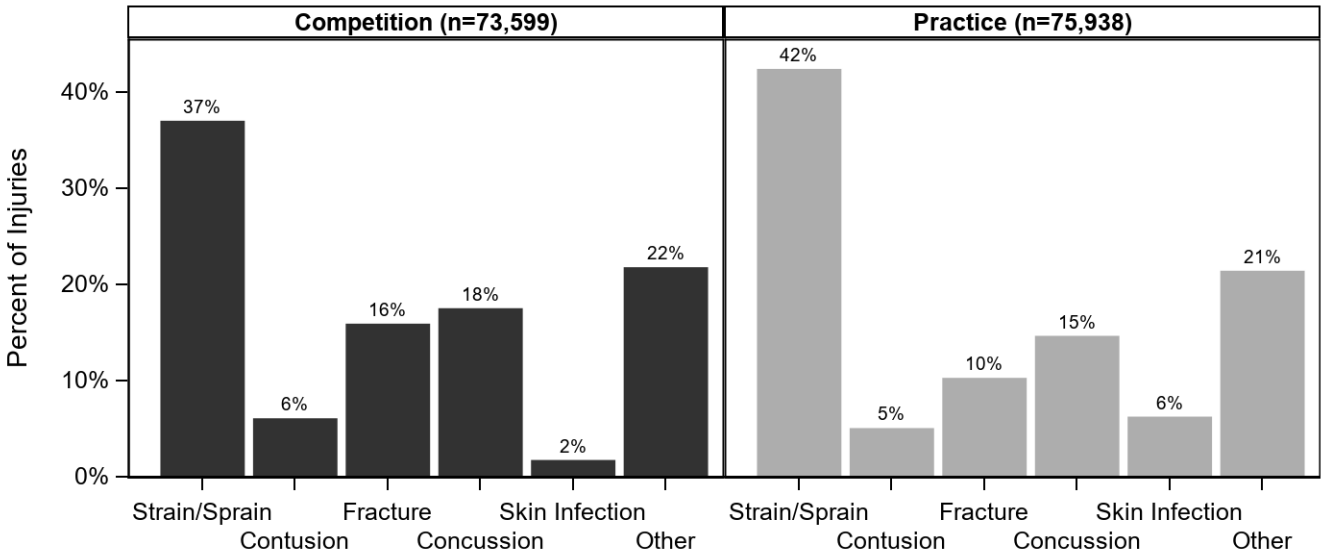


Table 9.3 Body Site of Boys' Wrestling Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2022-23 School Year *

	Competition		Practice		Overall	
Body Site	**n**	**%**	**n**	**%**	**n**	**%**
Head/Face	15,750	21.4%	16,121	21.1%	31,871	21.3%
Knee	9,803	13.3%	13,679	17.9%	23,482	15.7%
Shoulder	11,300	15.4%	5,063	6.6%	16,364	10.9%
Ankle	3,391	4.6%	9,827	12.9%	13,218	8.8%
Hand/Wrist	4,117	5.6%	8,536	11.2%	12,653	8.4%
Trunk	4,738	6.4%	6,698	8.8%	11,436	7.6%
Arm/Elbow	6,077	8.3%	3,538	4.6%	9,615	6.4%
Neck	3,373	4.6%	5,355	7.0%	8,729	5.8%
Lower Leg	5,662	7.7%	1,520	2.0%	7,182	4.8%
Other	4,953	6.7%	1,641	2.2%	6,593	4.4%
Hip/Thigh/Upper Leg	2,801	3.8%	3,100	4.1%	5,901	3.9%
Foot	1,207	1.6%	723	0.9%	1,931	1.3%
Systemic	428	0.6%	483	0.6%	911	0.6%
Total	***73,599***	***100.0%***	***76,286***	***100.0%***	***149,886***	***100.0%***

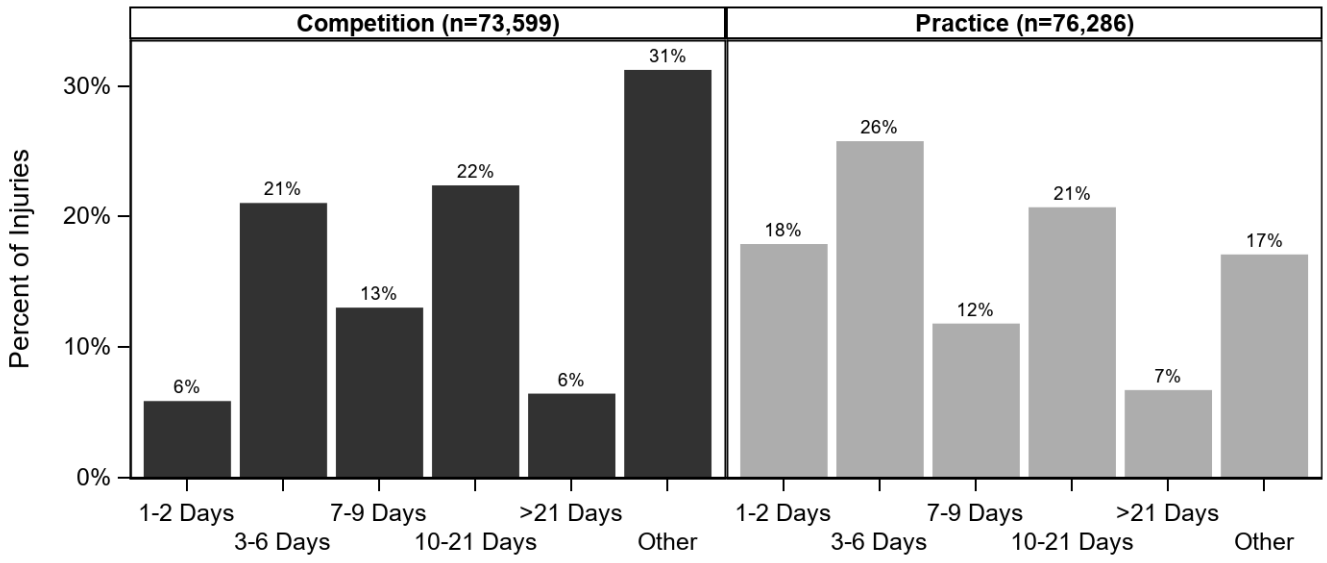
* Totals and n's represent the total weighted number of injury reports containing a valid response for the particular question. Due to a low level of non-response, these totals are always similar but are not always equal to the total number of injuries.

Table 9.4 Ten Most Common Boys' Wrestling Injury Diagnoses by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2022-23 School Year *

	Competition (n=73,600)		Practice (n=75,942)		Overall (n=149,536)	
Diagnosis	**n**	**%**	**n**	**%**	**n**	**%**
Head/Face Concussion	12,889	17.5%	11,118	14.6%	24,006	16.1%
Knee Strain/Sprain	5,516	7.5%	7,037	9.3%	12,553	8.4%
Ankle Strain/Sprain	3,391	4.6%	8,289	10.9%	11,679	7.8%
Knee Other	3,727	5.1%	6,189	8.1%	9,915	6.6%
Shoulder Other	6,476	8.8%	2,232	2.9%	8,709	5.8%
Shoulder Strain/Sprain	4,177	5.7%	2,775	3.7%	6,952	4.6%
Lower Leg Fracture	5,448	7.4%	212	0.3%	5,660	3.8%
Head/Face Other	1,715	2.3%	3,786	5.0%	5,501	3.7%
Neck Strain/Sprain	2,590	3.5%	2,795	3.7%	5,385	3.6%
Hand/Wrist Strain/Sprain	1,963	2.7%	3,266	4.3%	5,228	3.5%

* Totals and n's represent the total weighted number of injury reports containing a valid response for the particular question. Due to a low level of non-response, these totals are always similar but are not always equal to the total number of injuries.

Figure 9.2 Time Loss of Boys' Wrestling Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2022-23 School Year *



* Other category is made up of medical disqualification for season, medical disqualification for career, athlete chooses not to continue, and season ended before athlete returned to play.

Table 9.5 Boys' Wrestling Injuries Requiring Surgery by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2022-23 School Year *

	Competition		Practice		Overall	
Need for Surgery	**n**	**%**	**n**	**%**	**n**	**%**
Required Surgery	10,108	13.8%	3,321	4.4%	13,429	9.0%
Did Not Require Surgery	63,088	86.2%	72,506	95.6%	135,594	91.0%
Total	***73,196***	***100.0%***	***75,827***	***100.0%***	***149,023***	***100.0%***

* Totals and n's represent the total weighted number of injury reports containing a valid response for the particular question. Due to a low level of non-response, these totals are always similar but are not always equal to the total number of injuries.

Figure 9.3 History of Boys' Wrestling Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2022-23 School Year

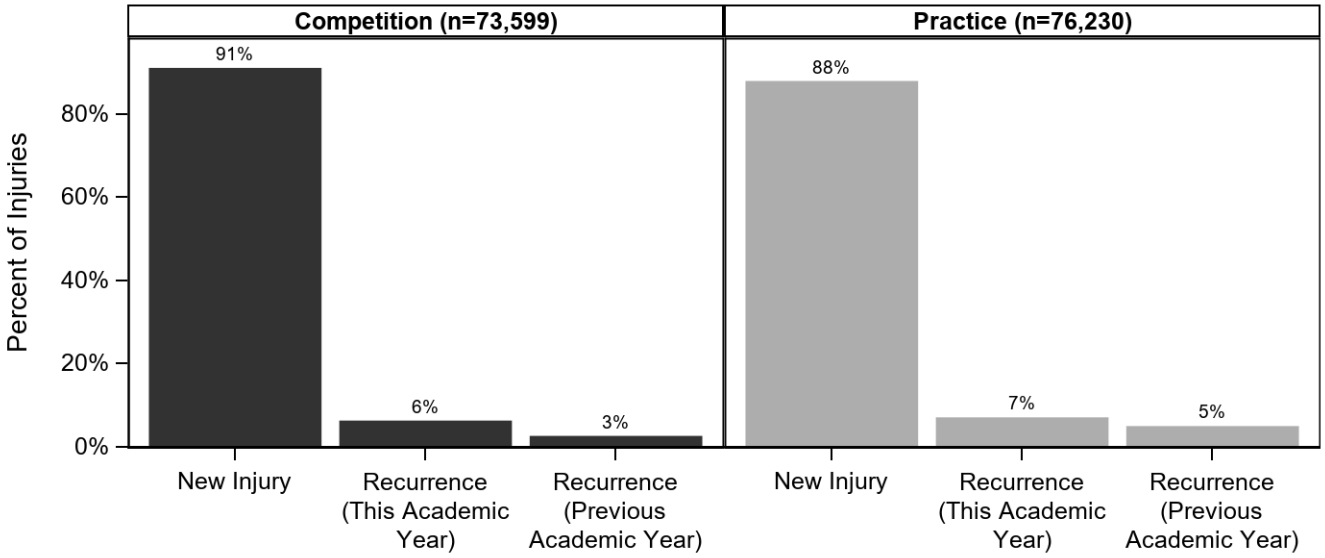


Table 9.6 Time during Season of Boys' Wrestling Injuries, High School Sports-Related Injury Surveillance Study, US, 2022-23 School Year *

Time in Season	n	%
Preseason	20,617	13.8%
Regular Season	114,141	76.2%
Post Season	13,809	9.2%
Unknown/Other	1,318	0.9%
Total	***149,886***	***100.0%***

* Totals and n's represent the total weighted number of injury reports containing a valid response for the particular question. Due to a low level of non-response, these totals are always similar but are not always equal to the total number of injuries.

Table 9.7 Competition-Related Variables for Boys' Wrestling Injuries, High School Sports-Related Injury Surveillance Study, US, 2022-23 School Year *

Time in Competition	n	%
Pre-competition/Warm-Ups	1,324	2.0%
First Period	8,430	12.5%
Second Period	16,360	24.2%
Third Period	12,332	18.3%
Overtime	647	1.0%
Unknown	28,477	42.1%
Total	***67,571***	***100.0%***

Mat Location		
Within 28ft Circle	60,082	87.0%
Out of Bounds	106	0.2%
Off Mat	1,557	2.3%
Unknown	7,332	10.6%
Total	***69,077***	***100.0%***

* Totals and n's represent the total weighted number of injury reports containing a valid response for the particular question. Due to a low level of non-response, these totals are always similar but are not always equal to the total number of injuries.

Table 9.8 Practice-Related Variables for Boys' Wrestling Injuries, High School Sports-Related Injury Surveillance Study, US, 2022-23 School Year *

Time in Practice	n	%
First 1/2 Hour	3,713	5.1%
Second 1/2 Hour	11,404	15.7%
1-2 Hours into Practice	35,157	48.4%
>2 Hours into Practice	3,931	5.4%
Unknown	18,483	25.4%
Total	***72,689***	***100.0%***

* Totals and n's represent the total weighted number of injury reports containing a valid response for the particular question. Due to a low level of non-response, these totals are always similar but are not always equal to the total number of injuries.

Table 9.9 Activities Leading to Boys' Wrestling Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2022-23 School Year *

	Competition		Practice		Overall	
Activity	**n**	**%**	**n**	**%**	**n**	**%**
Takedown	38,620	55.9%	18,158	25.4%	56,778	40.4%
Unknown	6,619	9.6%	19,212	26.9%	25,832	18.4%
Sparring	7,703	11.1%	14,007	19.6%	21,710	15.4%
Escape	4,610	6.7%	3,060	4.3%	7,670	5.5%
N/A **	2,243	3.2%	4,164	5.8%	6,407	4.6%
Near Fall	3,958	5.7%	967	1.4%	4,926	3.5%
Other	1,157	1.7%	3,015	4.2%	4,173	3.0%
Conditioning	106	0.2%	4,006	5.6%	4,112	2.9%
Riding	1,826	2.6%	2,156	3.0%	3,983	2.8%
Fall	1,381	2.0%	1,553	2.2%	2,934	2.1%
Reversal	861	1.2%	1,158	1.6%	2,020	1.4%
Total	***69,085***	***100.0%***	***71,458***	***100.0%***	***140,543***	***100.0%***

* Totals and n's represent the total weighted number of injury reports containing a valid response for the particular question. Due to a low level of non-response, these totals are always similar but are not always equal to the total number of injuries.
** Includes overuse, heat illness, conditioning, etc.

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Table 9.10 Activity Resulting in Boys' Wrestling Injuries by Injury Diagnosis, High School Sports-Related Injury Surveillance Study, US, 2022-23 School Year

	Diagnosis									
	Strain Sprain		Contusion		Fracture		Concussion		Other	
Activity	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**
Conditioning	2,000	3.5%	320	3.9%	56	0.3%	1,217	5.4%	519	1.5%
Escape	3,129	5.5%	106	1.3%	1,509	8.4%	1,139	5.1%	1,786	5.2%
Fall	1,608	2.8%	0	0.0%	270	1.5%	597	2.7%	112	0.3%
N/A **	0	0.0%	0	0.0%	0	0.0%	0	0.0%	6,407	18.6%
Near Fall	1,852	3.2%	106	1.3%	1,295	7.2%	0	0.0%	1,672	4.9%
Other	106	0.2%	56	0.7%	214	1.2%	645	2.9%	3,151	9.2%
Reversal	597	1.0%	861	10.5%	0	0.0%	0	0.0%	561	1.6%
Riding	2,907	5.1%	647	7.9%	0	0.0%	0	0.0%	428	1.2%
Sparring	11,795	20.6%	249	3.0%	1,615	9.0%	3,870	17.2%	4,181	12.2%
Takedown	19,300	33.7%	3,373	41.1%	10,767	60.0%	13,478	60.0%	9,861	28.7%
Unknown	13,918	24.3%	2,482	30.3%	2,218	12.4%	1,528	6.8%	5,685	16.5%
Total	***57,213***	***100.0%***	***8,201***	***100.0%***	***17,943***	***100.0%***	***22,474***	***100.0%***	***34,363***	***100.0%***

* Totals and n's represent the total weighted number of injury reports containing a valid response for the particular question. Due to a low level of non-response, these totals are always similar but are not always equal to the total number of injuries.
** Includes overuse, heat illness, conditioning, etc.

X. Boys' Baseball Injury Epidemiology

Table 10.1 Boys' Baseball Injury Rates by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2022-23 School Year *

	# Injuries	# Exposures	Injury Rate (per 1,000 AEs)	Nationally Estimated # Injuries
Total	***214***	***160,770***	***1.33***	***70,685***
Competition	109	56,788	1.92	36,455
Practice	105	103,982	1.01	34,230

* All remaining analyses in this chapter present data weighted to provide national injury estimates.

Table 10.2 Demographic Characteristics of Injured Boys' Baseball Athletes, High School Sports-Related Injury Surveillance Study, US, 2022-23 School Year *

Year in School	n	%
Freshman	16,860	24.3%
Sophomore	19,897	28.7%
Junior	18,449	26.6%
Senior	14,086	20.3%
Total	***69,293***	***100.0%***

Age (years)	
Minimum	14
Maximum	19
Mean (SD)	16.1 (1.3)
n	57,934

BMI	
Minimum	16.5
Maximum	36.6
Mean (SD)	24.1 (3.7)
n	47,809

* Throughout this chapter, totals and n's represent the total weighted number of injury reports containing a valid response for the particular question. Due to a low level of non-response, these totals are always similar but are not always equal to the total number of injuries.

Figure 10.1 Diagnosis of Boys' Baseball Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2022-23 School Year

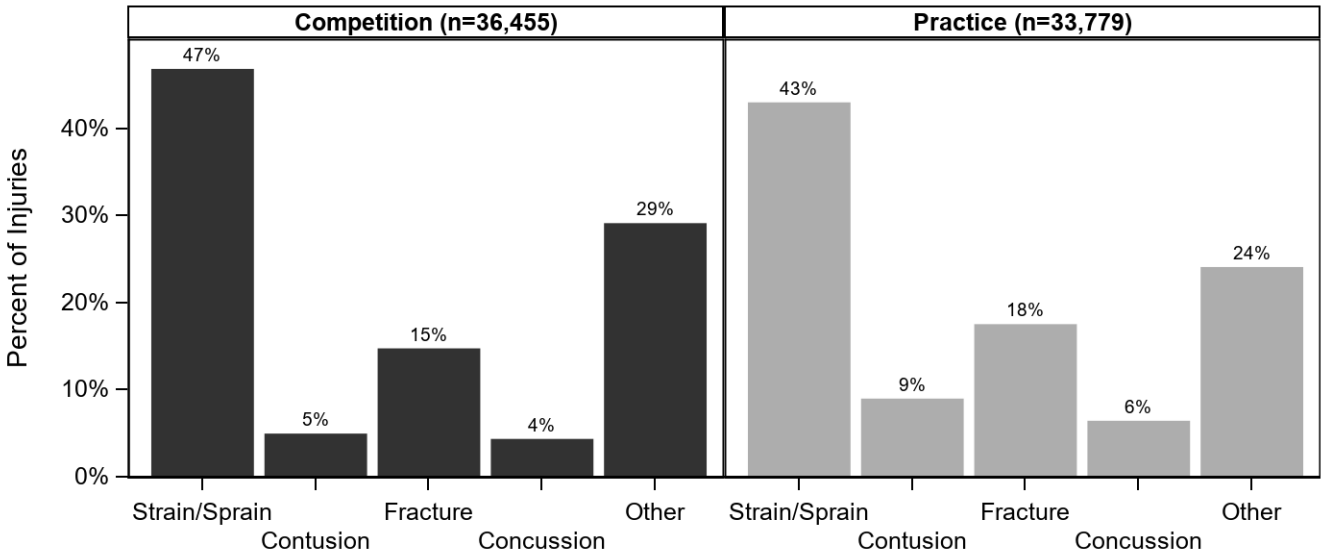


Table 10.3 Body Site of Boys' Baseball Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2022-23 School Year *

	Competition		Practice		Overall	
Body Site	**n**	**%**	**n**	**%**	**n**	**%**
Shoulder	8,376	23.0%	6,665	19.5%	15,040	21.3%
Hand/Wrist	5,083	13.9%	7,213	21.1%	12,296	17.4%
Arm/Elbow	5,976	16.4%	3,597	10.5%	9,573	13.5%
Head/Face	6,027	16.5%	2,575	7.5%	8,601	12.2%
Ankle	2,709	7.4%	4,422	12.9%	7,132	10.1%
Hip/Thigh/Upper Leg	2,816	7.7%	3,231	9.4%	6,047	8.6%
Knee	2,549	7.0%	2,916	8.5%	5,465	7.7%
Trunk	2,411	6.6%	2,055	6.0%	4,466	6.3%
Lower Leg	451	1.2%	305	0.9%	756	1.1%
Other	0	0.0%	610	1.8%	610	0.9%
Systemic	0	0.0%	353	1.0%	353	0.5%
Foot	58	0.2%	288	0.8%	346	0.5%
Total	***36,455***	***100.0%***	***34,230***	***100.0%***	***70,685***	***100.0%***

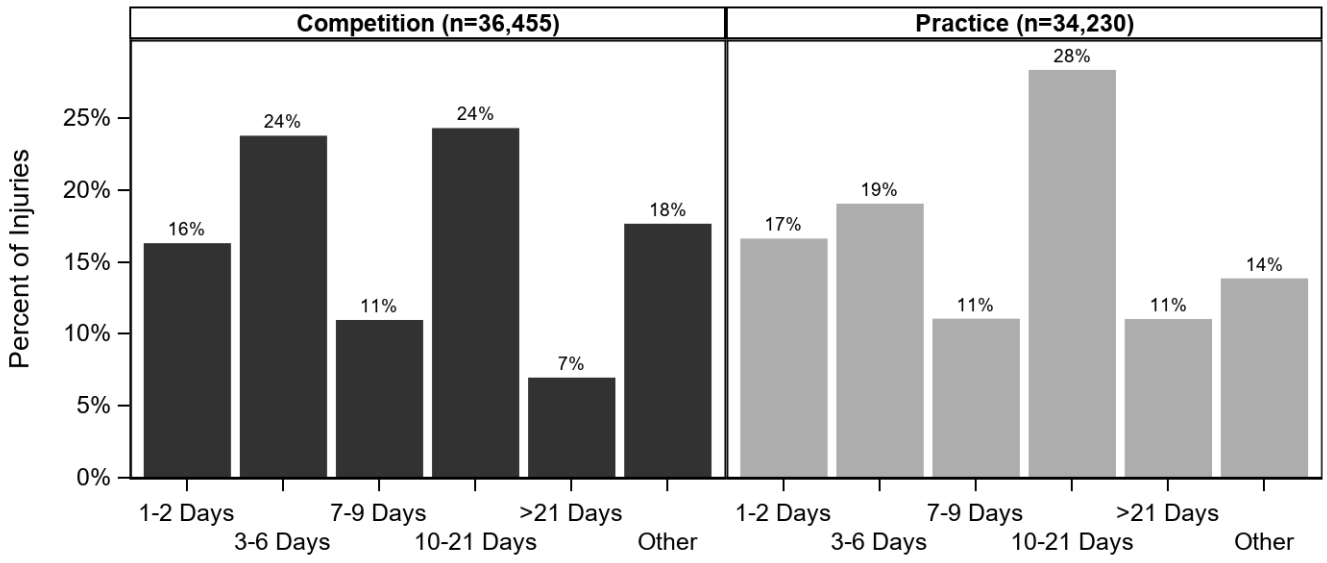
* Totals and n's represent the total weighted number of injury reports containing a valid response for the particular question. Due to a low level of non-response, these totals are always similar but are not always equal to the total number of injuries.

Table 10.4 Ten Most Common Boys' Baseball Injury Diagnoses by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2022-23 School Year *

	Competition (n=36,457)		Practice (n=33,782)		Overall (n=70,233)	
Diagnosis	**n**	**%**	**n**	**%**	**n**	**%**
Shoulder Other	3,720	10.2%	3,706	11.0%	7,426	10.6%
Shoulder Strain/Sprain	4,475	12.3%	2,901	8.6%	7,375	10.5%
Ankle Strain/Sprain	2,709	7.4%	3,459	10.2%	6,168	8.8%
Hand/Wrist Fracture	2,370	6.5%	3,712	11.0%	6,082	8.7%
Arm/Elbow Strain/Sprain	2,638	7.2%	1,793	5.3%	4,430	6.3%
Trunk Strain/Sprain	2,353	6.5%	2,055	6.1%	4,408	6.3%
Hip/Thigh/Upper Leg Strain/Sprain	2,032	5.6%	2,370	7.0%	4,402	6.3%
Arm/Elbow Other	3,223	8.8%	753	2.2%	3,975	5.7%
Head/Face Concussion	1,583	4.3%	2,171	6.4%	3,754	5.3%
Head/Face Fracture	2,495	6.8%	346	1.0%	2,841	4.0%

* Totals and n's represent the total weighted number of injury reports containing a valid response for the particular question. Due to a low level of non-response, these totals are always similar but are not always equal to the total number of injuries.

Figure 10.2 Time Loss of Boys' Baseball Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2022-23 School Year *



* Other category is made up of medical disqualification for season, medical disqualification for career, athlete chooses not to continue, and season ended before athlete returned to play.

Table 10.5 Boys' Baseball Injuries Requiring Surgery by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2022-23 School Year *

	Competition		Practice		Overall	
Need for Surgery	**n**	**%**	**n**	**%**	**n**	**%**
Required Surgery	2,761	7.8%	1,727	5.0%	4,488	6.5%
Did Not Require Surgery	32,475	92.2%	32,504	95.0%	64,978	93.5%
Total	***35,236***	***100.0%***	***34,230***	***100.0%***	***69,466***	***100.0%***

* Totals and n's represent the total weighted number of injury reports containing a valid response for the particular question. Due to a low level of non-response, these totals are always similar but are not always equal to the total number of injuries.

Figure 10.3 History of Boys' Baseball Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2022-23 School Year

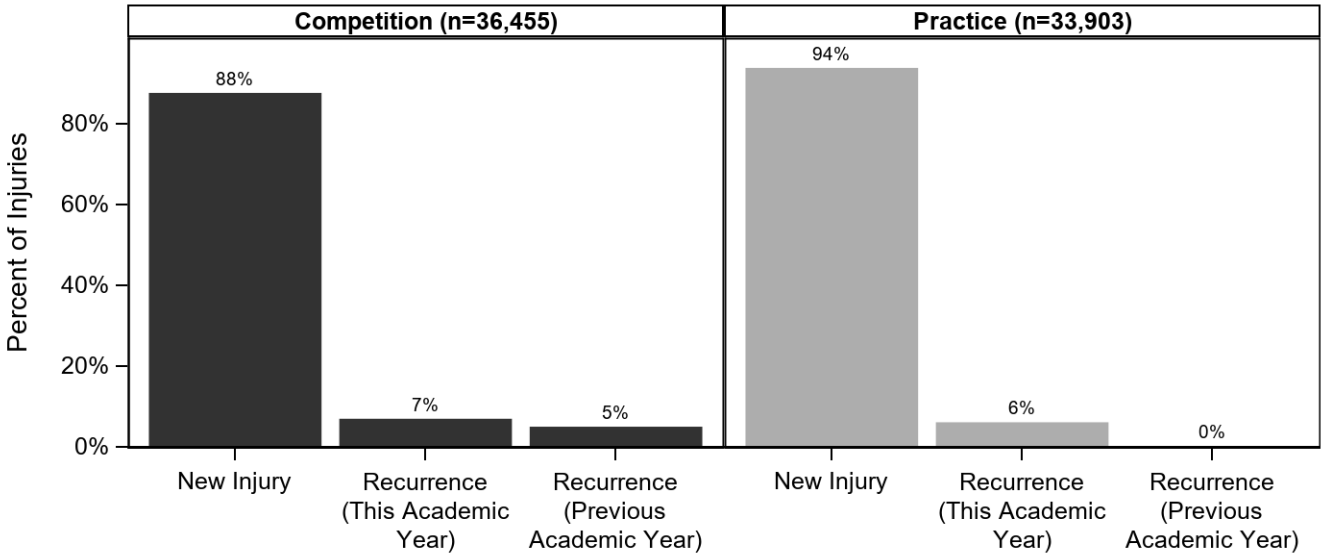


Table 10.6 Time during Season of Boys' Baseball Injuries, High School Sports-Related Injury Surveillance Study, US, 2022-23 School Year *

Time in Season	n	%
Preseason	16,184	23.3%
Regular Season	51,089	73.5%
Post Season	2,192	3.2%
Total	***69,466***	***100.0%***

* Totals and n's represent the total weighted number of injury reports containing a valid response for the particular question. Due to a low level of non-response, these totals are always similar but are not always equal to the total number of injuries.

Table 10.7 Competition-Related Variables for Boys' Baseball Injuries, High School Sports-Related Injury Surveillance Study, US, 2022-23 School Year *

Time in Competition	n	%
Pre-competition/Warm-Ups	1,622	4.6%
First Inning	2,455	6.9%
Second Inning	3,648	10.3%
Third Inning	4,191	11.8%
Fourth Inning	5,184	14.6%
Fifth Inning	3,308	9.3%
Sixth Inning	1,465	4.1%
Seventh Inning	2,535	7.1%
Unknown	11,146	31.3%
Total	***35,555***	***100.0%***

Field Location		
Pitchers Mound	8,265	22.9%
Home Plate	8,408	23.3%
First Base	3,334	9.3%
Second Base	5,078	14.1%
Third Base	3,352	9.3%
Infield	811	2.2%
Outfield	3,473	9.6%
Foul Territory	124	0.3%
Other	182	0.5%
Unknown	3,015	8.4%
Total	***36,042***	***100.0%***

* Totals and n's represent the total weighted number of injury reports containing a valid response for the particular question. Due to a low level of non-response, these totals are always similar but are not always equal to the total number of injuries.

Table 10.8 Practice-Related Variables for Boys' Baseball Injuries, High School Sports-Related Injury Surveillance Study, US, 2022-23 School Year *

Time in Practice	n	%
First 1/2 Hour	2,842	8.3%
Second 1/2 Hour	2,068	6.1%
1-2 Hours into Practice	19,569	57.4%
>2 Hours into Practice	526	1.5%
Unknown	9,109	26.7%
Total	***34,114***	***100.0%***

* Totals and n's represent the total weighted number of injury reports containing a valid response for the particular question. Due to a low level of non-response, these totals are always similar but are not always equal to the total number of injuries.

Figure 10.4 Player Position of Boys' Baseball Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2022-23 School Year

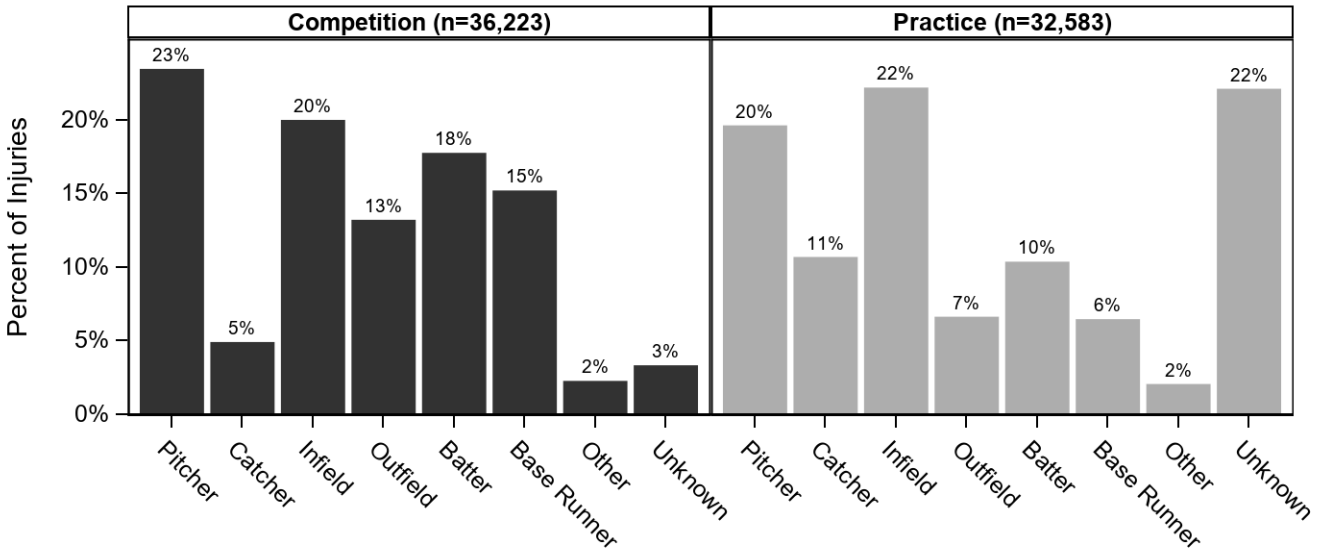


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Table 10.9 Activities Leading to Boys' Baseball Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2022-23 School Year *

	Competition		Practice		Overall	
Activity	**n**	**%**	**n**	**%**	**n**	**%**
Pitching	8,265	22.8%	4,943	14.6%	13,208	18.9%
Running Bases	6,474	17.9%	4,319	12.8%	10,794	15.4%
Batting	5,146	14.2%	3,917	11.6%	9,064	12.9%
Fielding a Batted Ball	3,618	10.0%	3,240	9.6%	6,858	9.8%
Sliding	4,367	12.1%	1,829	5.4%	6,196	8.8%
Catching	2,797	7.7%	2,724	8.1%	5,522	7.9%
Throwing	2,168	6.0%	2,912	8.6%	5,079	7.3%
Other	1,421	3.9%	2,389	7.1%	3,810	5.4%
Unknown	821	2.3%	2,734	8.1%	3,555	5.1%
General Play	58	0.2%	2,630	7.8%	2,688	3.8%
Fielding a Thrown Ball	963	2.7%	796	2.4%	1,759	2.5%
Conditioning	124	0.3%	1,368	4.0%	1,492	2.1%
Total	***36,223***	***100.0%***	***33,801***	***100.0%***	***70,025***	***100.0%***

* Totals and n's represent the total weighted number of injury reports containing a valid response for the particular question. Due to a low level of non-response, these totals are always similar but are not always equal to the total number of injuries.

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Table 10.10 Activity Resulting in Boys' Baseball Injuries by Injury Diagnosis, High School Sports-Related Injury Surveillance Study, US, 2022-23 School Year *

	Diagnosis									
	Strain/Sprain		Contusion		Fracture		Concussion		Other	
Activity	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**
Batting	1,305	4.1%	1,759	36.8%	3,021	26.7%	764	20.7%	2,214	12.0%
Catching	3,092	9.8%	0	0.0%	753	6.7%	1,022	27.7%	655	3.5%
Conditioning	1,041	3.3%	0	0.0%	0	0.0%	0	0.0%	451	2.4%
Fielding a Batted Ball	1,375	4.4%	1,239	25.9%	1,699	15.0%	476	12.9%	1,741	9.4%
Fielding a Thrown Ball	411	1.3%	680	14.2%	668	5.9%	0	0.0%	0	0.0%
General Play	1,899	6.0%	0	0.0%	58	0.5%	0	0.0%	731	4.0%
Other	2,384	7.6%	116	2.4%	288	2.6%	327	8.9%	695	3.8%
Pitching	7,952	25.3%	327	6.8%	412	3.6%	695	18.8%	3,823	20.7%
Running Bases	6,726	21.4%	600	12.6%	2,494	22.1%	0	0.0%	973	5.3%
Sliding	2,728	8.7%	0	0.0%	1,548	13.7%	0	0.0%	1,920	10.4%
Throwing	2,160	6.9%	0	0.0%	0	0.0%	58	1.6%	2,862	15.5%
Unknown	411	1.3%	58	1.2%	353	3.1%	353	9.5%	2,381	12.9%
Total	***31,482***	***100.0%***	***4,779***	***100.0%***	***11,293***	***100.0%***	***3,696***	***100.0%***	***18,447***	***100.0%***

* Totals and n's represent the total weighted number of injury reports containing a valid response for the particular question. Due to a low level of non-response, these totals are always similar but are not always equal to the total number of injuries.

XI. Girls' Softball Injury Epidemiology

Table 11.1 Girls' Softball Injury Rates by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2022-23 School Year *

	# Injuries	# Exposures	Injury Rate (per 1,000 AEs)	Nationally Estimated # Injuries
Total	***154***	***102,653***	***1.50***	***85,864***
Competition	76	35,467	2.14	41,385
Practice	78	67,186	1.16	44,479

* All remaining analyses in this chapter present data weighted to provide national injury estimates.

Table 11.2 Demographic Characteristics of Injured Girls' Softball Athletes, High School Sports-Related Injury Surveillance Study, US, 2022-23 School Year *

Year in School	n	%
Freshman	19,377	23.4%
Sophomore	35,027	42.3%
Junior	22,447	27.1%
Senior	5,963	7.2%
Total	***82,813***	***100.0%***

Age (years)	
Minimum	13
Maximum	18
Mean (SD)	15.6 (1.1)
n	62,584

BMI	
Minimum	16.6
Maximum	36.2
Mean (SD)	23.1 (3.5)
n	46,699

* Throughout this chapter, totals and n's represent the total weighted number of injury reports containing a valid response for the particular question. Due to a low level of non-response, these totals are always similar but are not always equal to the total number of injuries.

Figure 11.1 Diagnosis of Girls' Softball Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2022-23 School Year

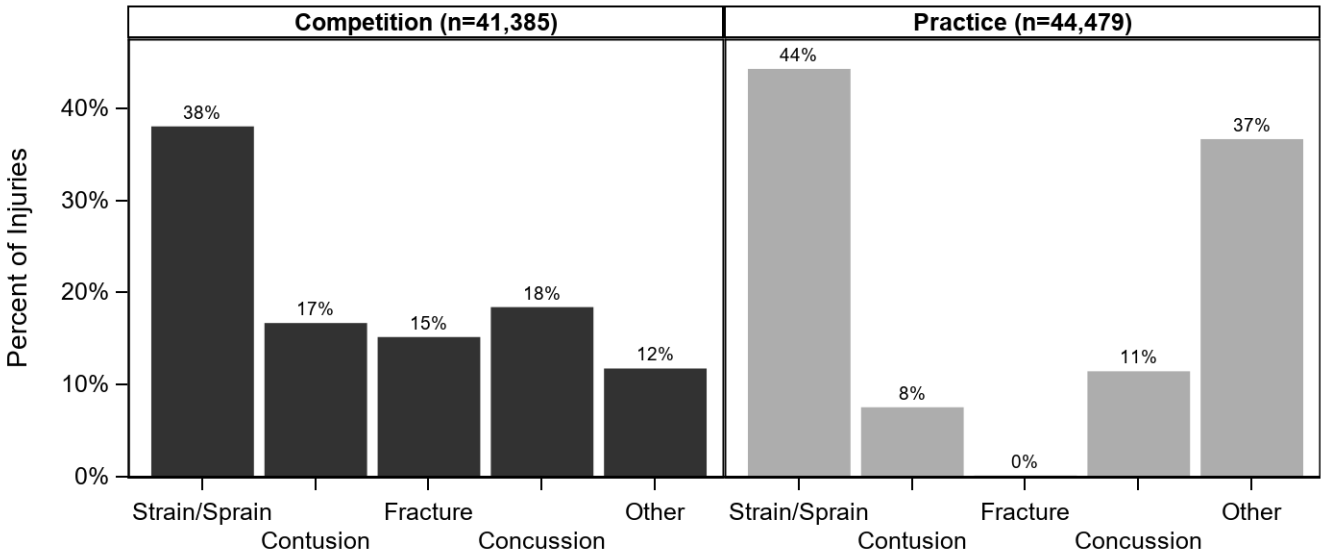


Table 11.3 Body Site of Girls' Softball Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2022-23 School Year *

	Competition		Practice		Overall	
Body Site	**n**	**%**	**n**	**%**	**n**	**%**
Head/Face	11,187	27.0%	9,902	22.3%	21,089	24.6%
Hand/Wrist	10,624	25.7%	4,113	9.2%	14,737	17.2%
Shoulder	1,618	3.9%	13,013	29.3%	14,631	17.0%
Knee	5,853	14.1%	4,168	9.4%	10,021	11.7%
Ankle	3,754	9.1%	2,496	5.6%	6,250	7.3%
Hip/Thigh/Upper Leg	2,399	5.8%	3,334	7.5%	5,734	6.7%
Trunk	2,679	6.5%	2,377	5.3%	5,056	5.9%
Foot	817	2.0%	2,592	5.8%	3,409	4.0%
Lower Leg	1,519	3.7%	1,448	3.3%	2,967	3.5%
Arm/Elbow	934	2.3%	431	1.0%	1,365	1.6%
Systemic	0	0.0%	604	1.4%	604	0.7%
Total	***41,385***	***100.0%***	***44,479***	***100.0%***	***85,863***	***100.0%***

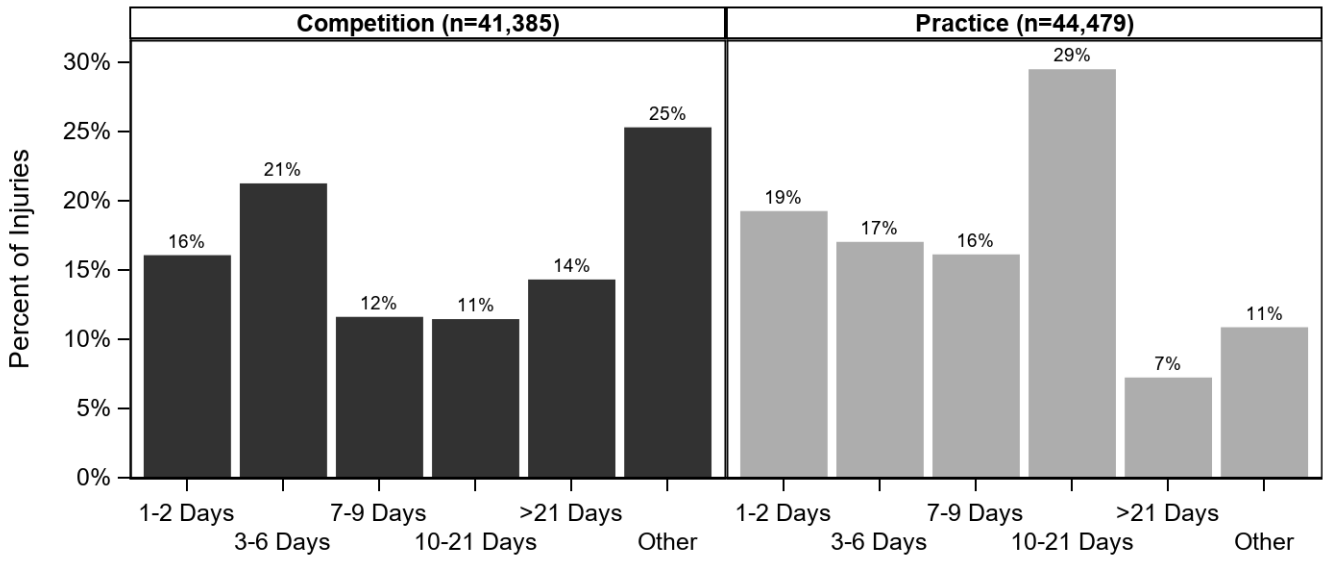
* Totals and n's represent the total weighted number of injury reports containing a valid response for the particular question. Due to a low level of non-response, these totals are always similar but are not always equal to the total number of injuries.

Table 11.4 Ten Most Common Girls' Softball Injury Diagnoses by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2022-23 School Year *

	Competition (n=41,382)		Practice (n=44,477)		Overall (n=85,863)	
Diagnosis	**n**	**%**	**n**	**%**	**n**	**%**
Head/Face Concussion	7,617	18.4%	5,089	11.4%	12,706	14.8%
Shoulder Other	431	1.0%	7,561	17.0%	7,992	9.3%
Shoulder Strain/Sprain	1,187	2.9%	5,452	12.3%	6,639	7.7%
Hand/Wrist Strain/Sprain	2,789	6.7%	3,469	7.8%	6,258	7.3%
Ankle Strain/Sprain	3,754	9.1%	2,437	5.5%	6,192	7.2%
Knee Strain/Sprain	3,765	9.1%	1,558	3.5%	5,323	6.2%
Hip/Thigh/Upper Leg Strain/Sprain	2,145	5.2%	2,690	6.0%	4,835	5.6%
Trunk Strain/Sprain	2,034	4.9%	2,377	5.3%	4,412	5.1%
Knee Other	2,030	4.9%	2,064	4.6%	4,094	4.8%
Hand/Wrist Fracture	3,642	8.8%	0	0.0%	3,642	4.2%

* Totals and n's represent the total weighted number of injury reports containing a valid response for the particular question. Due to a low level of non-response, these totals are always similar but are not always equal to the total number of injuries.

Figure 11.2 Time Loss of Girls' Softball Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2022-23 School Year *



* Other category is made up of medical disqualification for season, medical disqualification for career, athlete chooses not to continue, and season ended before athlete returned to play.

Table 11.5 Girls' Softball Injuries Requiring Surgery by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2022-23 School Year *

	Competition		Practice		Overall	
Need for Surgery	**n**	**%**	**n**	**%**	**n**	**%**
Required Surgery	6,572	16.1%	3,025	6.9%	9,597	11.4%
Did Not Require Surgery	34,266	83.9%	40,636	93.1%	74,903	88.6%
Total	***40,839***	***100.0%***	***43,661***	***100.0%***	***84,500***	***100.0%***

* Totals and n's represent the total weighted number of injury reports containing a valid response for the particular question. Due to a low level of non-response, these totals are always similar but are not always equal to the total number of injuries.

Figure 11.3 History of Girls' Softball Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2022-23 School Year

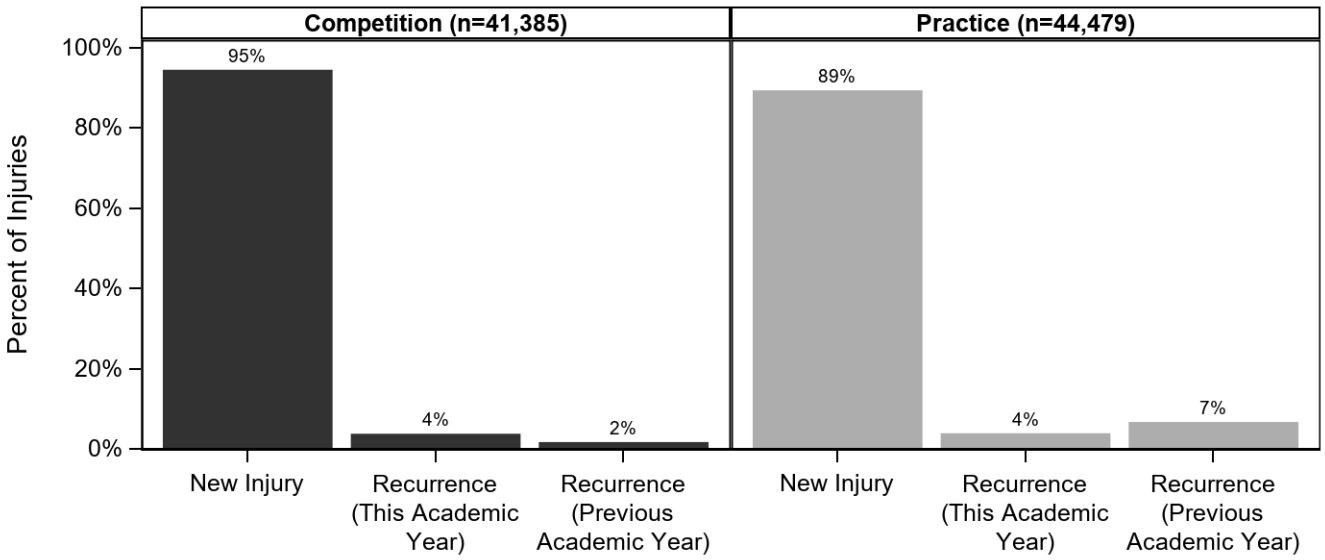


Table 11.6 Time during Season of Girls' Softball Injuries, High School Sports-Related Injury Surveillance Study, US, 2022-23 School Year *

Time in Season	n	%
Preseason	21,238	24.7%
Regular Season	64,255	74.8%
Post Season	371	0.4%
Total	***85,863***	***100.0%***

* Totals and n's represent the total weighted number of injury reports containing a valid response for the particular question. Due to a low level of non-response, these totals are always similar but are not always equal to the total number of injuries.

Table 11.7 Competition-Related Variables for Girls' Softball Injuries, High School Sports-Related Injury Surveillance Study, US, 2022-23 School Year *

Time in Competition	n	%
Pre-competition/Warm-Ups	7,154	18.0%
First Inning	58	0.1%
Second Inning	899	2.3%
Third Inning	3,625	9.1%
Fourth Inning	8,085	20.3%
Fifth Inning	5,126	12.9%
Sixth Inning	2,030	5.1%
Seventh Inning	312	0.8%
Unknown	12,504	31.4%
Total	***39,793***	***100.0%***

Field Location		
Unknown	4,582	11.5%
Other	1,519	3.8%
Foul Territory	1,072	2.7%
Outfield	2,939	7.4%
Infield	1,972	5.0%
Third Base	2,649	6.7%
Second Base	3,849	9.7%
First Base	2,791	7.0%
Home Plate	13,779	34.6%
Pitchers Mound	4,642	11.7%
Total	***39,793***	***100.0%***

* Totals and n's represent the total weighted number of injury reports containing a valid response for the particular question. Due to a low level of non-response, these totals are always similar but are not always equal to the total number of injuries.

Table 11.8 Practice-Related Variables for Girls' Softball Injuries, High School Sports-Related Injury Surveillance Study, US, 2022-23 School Year *

Time in Practice	n	%
First 1/2 Hour	3,456	7.9%
Second 1/2 Hour	5,856	13.4%
1-2 Hours into Practice	19,274	44.0%
>2 Hours into Practice	548	1.3%
Unknown	14,647	33.5%
Total	***43,781***	***100.0%***

* Totals and n's represent the total weighted number of injury reports containing a valid response for the particular question. Due to a low level of non-response, these totals are always similar but are not always equal to the total number of injuries.

Figure 11.4 Player Position of Girls' Softball Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2022-23 School Year

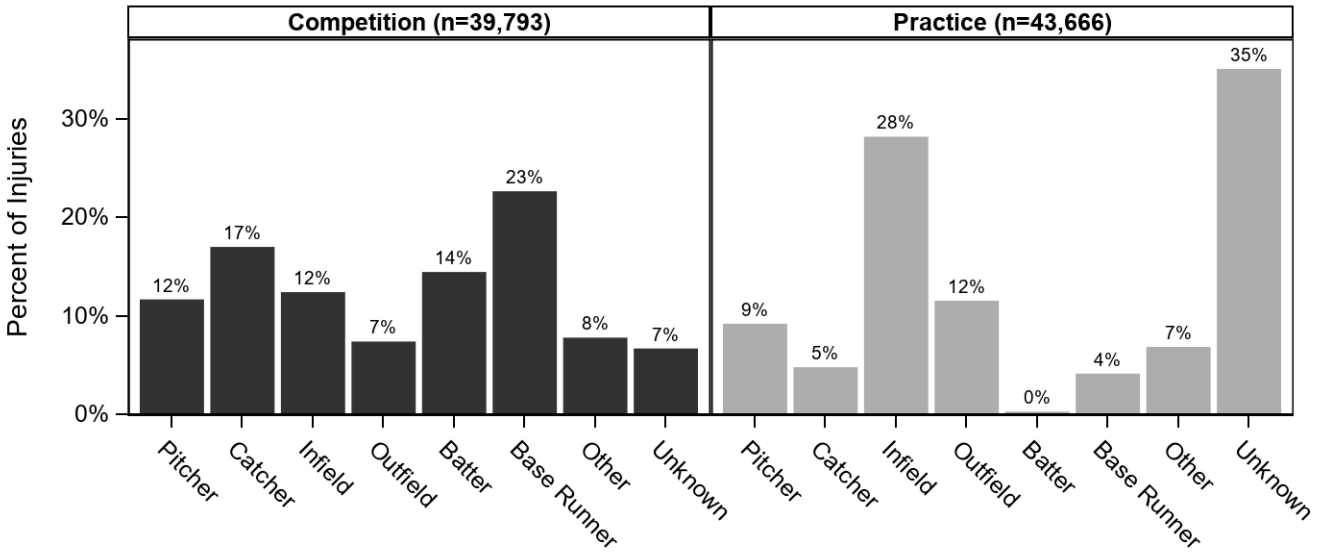


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Table 11.9 Activities Leading to Girls' Softball Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2022-23 School Year *

	Competition		Practice		Overall	
Activity	**n**	**%**	**n**	**%**	**n**	**%**
Running Bases	7,100	17.8%	4,001	9.2%	11,101	13.3%
Catching	7,463	18.8%	3,154	7.2%	10,617	12.7%
Fielding a Thrown Ball	3,512	8.8%	6,258	14.3%	9,770	11.7%
Fielding a Batted Ball	2,619	6.6%	7,062	16.2%	9,680	11.6%
Throwing	1,812	4.6%	6,819	15.6%	8,631	10.3%
Sliding	6,064	15.2%	1,950	4.5%	8,014	9.6%
Pitching	3,998	10.0%	3,642	8.3%	7,639	9.2%
Other	2,547	6.4%	4,854	11.1%	7,401	8.9%
Batting	4,052	10.2%	1,245	2.9%	5,297	6.3%
Unknown	373	0.9%	2,207	5.1%	2,580	3.1%
General Play	254	0.6%	1,927	4.4%	2,181	2.6%
Conditioning	0	0.0%	548	1.3%	548	0.7%
Total	***39,793***	***100.0%***	***43,666***	***100.0%***	***83,459***	***100.0%***

* Totals and n's represent the total weighted number of injury reports containing a valid response for the particular question. Due to a low level of non-response, these totals are always similar but are not always equal to the total number of injuries.

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Table 11.10 Activity Resulting in Girls' Softball Injuries by Injury Diagnosis, High School Sports-Related Injury Surveillance Study, US, 2022-23 School Year *

	Diagnosis									
	Strain/Sprain		Contusion		Fracture		Concussion		Other	
Activity	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**
Batting	173	0.5%	3,062	29.9%	173	3.4%	58	0.5%	1,831	8.9%
Catching	5,766	16.5%	117	1.1%	644	12.5%	4,090	32.8%	0	0.0%
Conditioning	548	1.6%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Fielding a Batted Ball	3,785	10.8%	2,479	24.2%	703	13.7%	703	5.6%	2,010	9.7%
Fielding a Thrown Ball	3,159	9.0%	2,004	19.5%	373	7.2%	1,581	12.7%	2,654	12.9%
General Play	58	0.2%	254	2.5%	0	0.0%	58	0.5%	1,810	8.8%
Other	4,305	12.3%	0	0.0%	1,187	23.1%	644	5.2%	1,264	6.1%
Pitching	2,377	6.8%	1,909	18.6%	173	3.4%	0	0.0%	3,180	15.4%
Running Bases	4,876	13.9%	373	3.6%	373	7.2%	4,094	32.8%	1,385	6.7%
Sliding	4,937	14.1%	58	0.6%	254	4.9%	1,187	9.5%	1,577	7.6%
Throwing	3,951	11.3%	0	0.0%	1,264	24.6%	58	0.5%	3,357	16.3%
Unknown	1,017	2.9%	0	0.0%	0	0.0%	0	0.0%	1,563	7.6%
Total	***34,952***	***100.0%***	***10,255***	***100.0%***	***5,144***	***100.0%***	***12,474***	***100.0%***	***20,633***	***100.0%***

* Totals and n's represent the total weighted number of injury reports containing a valid response for the particular question. Due to a low level of non-response, these totals are always similar but are not always equal to the total number of injuries.

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XII. Gender Differences within Sports

12.1 Boys' and Girls' Soccer

Table 12.1 Comparison of Boys' and Girls' Soccer Injury Rates, High School Sports-Related Injury Surveillance Study, US, 2022-23 School Year

	Boys' Soccer	Girls' Soccer *	RR (95% CI) **
Total	1.80	**2.45**	**1.36 (1.16-1.59)**
Competition	3.82	**5.55**	**1.45 (1.20-1.76)**
Practice	0.91	**1.11**	1.22 (0.93-1.60)

* Throughout this chapter, rate ratios (RR) and injury proportion ratios (IPR) compare the gender with a higher injury rate/proportion (bolded) to the gender with a lower injury rate/proportion.
** Throughout this chapter, statistically significant RR and IPR are bolded.

Table 12.2 Comparison of Body Sites of Boys' and Girls' Soccer Injuries, High School Sports-Related Injury Surveillance Study, US, 2022-23 School Year *

Body Site	Boys' Soccer	Girls' Soccer	IPR (95% CI)
Head/Face	9.7%	**20.3%**	**2.09 (1.27-3.43)**
Neck	0.4%	**0.8%**	1.95 (0.22-17.42)
Shoulder	0.6%	**0.6%**	1.06 (0.11-10.22)
Trunk	**5.4%**	2.8%	1.90 (0.67-5.40)
Arm/Elbow	2.2%	**2.2%**	1.00 (0.23-4.36)
Hand/Wrist	**6.1%**	2.5%	2.40 (0.87-6.65)
Hip/Thigh/Upper Leg	**21.3%**	15.1%	1.41 (0.92-2.18)
Knee	**18.6%**	18.2%	1.03 (0.67-1.57)
Lower Leg	8.2%	**8.8%**	1.07 (0.56-2.05)
Ankle	**19.9%**	19.4%	1.02 (0.68-1.52)
Foot	**6.4%**	5.7%	1.13 (0.51-2.51)
Other	0.9%	**1.8%**	2.05 (0.49-8.63)
Systemic	0.4%	**1.7%**	4.68 (0.80-27.38)
Total	***100.0%***	***100.0%***	**--**

* Totals are not always equal to 100% due to slight rounding or missing responses.

Table 12.3 Comparison of Diagnoses of Boys' and Girls' Soccer Injuries, High School Sports-Related Injury Surveillance Study, US, 2022-23 School Year *

Diagnosis	Boys' Soccer	Girls' Soccer	IPR (95% CI)
Strain/Sprain	**50.4%**	48.7%	1.04 (0.85-1.26)
Contusion	**16.1%**	10.6%	1.52 (0.92-2.52)
Fracture	**10.5%**	7.4%	1.42 (0.72-2.81)
Concussion	7.2%	**19.6%**	**2.71 (1.58-4.63)**
Other	**15.7%**	13.8%	1.14 (0.71-1.85)
Total	***100.0%***	***100.0%***	**--**

* Totals are not always equal to 100% due to slight rounding or missing responses.

Table 12.4 Most Common Boys' and Girls' Soccer Injury Diagnoses, High School Sports-Related Injury Surveillance Study, US, 2022-23 School Year *

Diagnosis	Boys' Soccer	Girls' Soccer	IPR (95% CI)
Ankle Strain/Sprain	**18.2%**	17.6%	1.03 (0.67-1.58)
Head/Face Concussion	7.0%	**19.6%**	**2.80 (1.62-4.83)**
Hip/Thigh/Upper Leg Strain/Sprain	**15.0%**	12.2%	1.23 (0.74-2.05)
Knee Other	**6.4%**	5.1%	1.27 (0.56-2.87)
Knee Strain/Sprain	9.1%	**10.4%**	1.15 (0.63-2.09)

* Only includes diagnoses accounting for >5% of boys' or girls' soccer injuries.

Table 12.5 Comparison of Time Loss of Boys' and Girls' Soccer Injuries, High School Sports-Related Injury Surveillance Study, US, 2022-23 School Year *

Time Loss	Boys' Soccer	Girls' Soccer	IPR (95% CI)
1-2 Days	**15.7%**	13.7%	1.15 (0.72-1.84)
3-6 Days	**28.8%**	21.9%	1.32 (0.94-1.87)
7-9 Days	14.1%	**15.3%**	1.09 (0.68-1.77)
10-21 Days	16.6%	**22.8%**	1.39 (0.92-2.09)
>21 Days	**6.6%**	5.0%	1.31 (0.55-3.15)
Other	18.3%	**21.3%**	1.16 (0.78-1.74)
Total	***100.0%***	***100.0%***	**--**

* Totals are not always equal to 100% due to slight rounding or missing responses.

Table 12.6 Comparison of Mechanisms of Boys' and Girls' Soccer Injuries, High School Sports-Related Injury Surveillance Study, US, 2022-23 School Year *

Soccer Mechanism	Boys' Soccer	Girls' Soccer	IPR (95% CI)
Contact with Another Player	**30.4%**	17.2%	**1.76 (1.24-2.50)**
Contact with Ball	15.7%	**16.4%**	1.04 (0.64-1.70)
Contact with Goal	**0.7%**	0.0%	**18.21 (1.14-290.77)**
N/A **	12.6%	**13.6%**	1.07 (0.65-1.79)
Other	11.7%	**15.8%**	1.36 (0.79-2.34)
Rotation Around a Planted Foot/Inversion	6.4%	**14.7%**	**2.28 (1.31-3.97)**
Slide Tackle	**6.4%**	3.4%	1.90 (0.77-4.69)
Stepped On/Fell On/Kicked	8.9%	**11.3%**	1.26 (0.69-2.31)
Uneven Playing Surface	0.8%	**1.8%**	2.14 (0.50-9.23)
Unknown	**6.3%**	5.8%	1.08 (0.49-2.36)
Total	***100.0%***	***100.0%***	**--**

* Totals are not always equal to 100% due to slight rounding or missing responses.
** Includes overuse, heat illness, conditioning, etc.

Table 12.7 Comparison of Activities of Boys' and Girls' Soccer Injuries, High School Sports-Related Injury Surveillance Study, US, 2022-23 School Year *

Soccer Activity	Boys' Soccer	Girls' Soccer	IPR (95% CI)
Attempting a Slide Tackle	**1.0%**	0.3%	3.71 (0.23-58.95)
Ball Handling/Dribbling	**10.3%**	5.6%	1.85 (0.94-3.64)
Blocking Shot	**1.4%**	0.4%	3.49 (0.51-23.79)
Chasing Loose Ball	8.9%	**9.5%**	1.07 (0.58-1.97)
Conditioning	**1.3%**	1.3%	1.03 (0.28-3.82)
Defending	10.9%	**15.9%**	1.46 (0.85-2.49)
General Play	**33.1%**	30.5%	1.08 (0.80-1.48)
Goaltending	**8.0%**	6.6%	1.22 (0.56-2.65)
Heading Ball	**5.1%**	4.7%	1.09 (0.47-2.57)
Other	0.3%	**1.8%**	**5.60 (1.04-30.21)**
Passing	2.2%	**2.4%**	1.10 (0.35-3.40)
Receiving Pass	**3.5%**	2.1%	1.67 (0.49-5.65)
Receiving a Slide Tackle	**2.5%**	0.5%	5.31 (0.96-29.41)
Shooting	**4.2%**	3.4%	1.24 (0.45-3.39)
Unknown	7.2%	**15.1%**	**2.10 (1.19-3.71)**
Total	***100.0%***	***100.0%***	**--**

* Totals are not always equal to 100% due to slight rounding or missing responses.

12.2 Boys' and Girls' Basketball

Table 12.8 Comparison of Boys' and Girls' Basketball Injury Rates, High School Sports-Related Injury Surveillance Study, US, 2022-23 School Year

	Boys' Basketball	Girls' Basketball *	RR (95% CI) **
Total	1.91	**2.14**	1.12 (0.96-1.30)
Competition	3.33	**4.79**	**1.44 (1.18-1.75)**
Practice	**1.33**	1.01	**1.31 (1.03-1.68)**

* Throughout this chapter, rate ratios (RR) and injury proportion ratios (IPR) compare the gender with a higher injury rate/proportion (bolded) to the gender with a lower injury rate/proportion.
** Throughout this chapter, statistically significant RR and IPR are bolded.

Table 12.9 Comparison of Body Sites of Boys' and Girls' Basketball Injuries, High School Sports-Related Injury Surveillance Study, US, 2022-23 School Year *

Body Site	Boys' Basketball	Girls' Basketball	IPR (95% CI)
Head/Face	11.5%	**19.2%**	**1.67 (1.09-2.55)**
Neck	**1.1%**	1.0%	1.10 (0.12-10.17)
Shoulder	**2.9%**	0.6%	**4.63 (1.00-21.40)**
Trunk	**5.3%**	1.4%	**3.82 (1.11-13.14)**
Arm/Elbow	1.3%	**1.8%**	1.47 (0.36-5.99)
Hand/Wrist	**8.2%**	7.6%	1.09 (0.58-2.05)
Hip/Thigh/Upper Leg	**8.9%**	4.3%	2.08 (0.92-4.70)
Knee	15.2%	**20.7%**	1.36 (0.90-2.07)
Lower Leg	**5.5%**	3.9%	1.40 (0.61-3.23)
Ankle	35.9%	**36.3%**	1.01 (0.79-1.30)
Foot	**3.6%**	2.5%	1.43 (0.51-3.97)
Other	**0.2%**	0.0%	--
Systemic	0.4%	**0.6%**	1.44 (0.20-10.41)
Total	***100.0%***	***100.0%***	**--**

* Totals are not always equal to 100% due to slight rounding or missing responses.

Table 12.10 Comparison of Diagnoses of Boys' and Girls' Basketball Injuries, High School Sports-Related Injury Surveillance Study, US, 2022-23 School Year *

Diagnosis	Boys' Basketball	Girls' Basketball	IPR (95% CI)
Strain/Sprain	58.3%	**59.1%**	1.02 (0.87-1.19)
Contusion	**13.4%**	5.2%	**2.59 (1.32-5.09)**
Fracture	6.6%	**7.5%**	1.13 (0.57-2.23)
Concussion	6.2%	**15.2%**	**2.46 (1.47-4.13)**
Other	**15.5%**	13.0%	1.20 (0.74-1.93)
Total	***100.0%***	***100.0%***	**--**

* Totals are not always equal to 100% due to slight rounding or missing responses.

Table 12.11 Most Common Boys' and Girls' Basketball Injury Diagnoses, High School Sports-Related Injury Surveillance Study, US, 2022-23 School Year *

Diagnosis	Boys' Basketball	Girls' Basketball	IPR (95% CI)
Ankle Strain/Sprain	34.9%	**35.9%**	1.03 (0.80-1.33)
Head/Face Concussion	6.2%	**15.2%**	**2.46 (1.47-4.13)**
Hip/Thigh/Upper Leg Strain/Sprain	**5.3%**	2.9%	1.83 (0.71-4.77)
Knee Other	**5.7%**	5.3%	1.07 (0.47-2.43)
Knee Strain/Sprain	4.6%	**12.6%**	**2.72 (1.42-5.19)**

* Only includes diagnoses accounting for >5% of boys' or girls' basketball injuries.

Table 12.12 Comparison of Time Loss of Boys' and Girls' Basketball Injuries, High School Sports-Related Injury Surveillance Study, US, 2022-23 School Year *

Time Loss	Boys' Basketball	Girls' Basketball	IPR (95% CI)
1-2 Days	**28.3%**	23.3%	1.22 (0.88-1.68)
3-6 Days	20.4%	**21.6%**	1.06 (0.74-1.51)
7-9 Days	**16.5%**	11.6%	1.42 (0.87-2.31)
10-21 Days	19.8%	**20.8%**	1.05 (0.73-1.53)
>21 Days	4.4%	**4.7%**	1.06 (0.46-2.48)
Other	10.7%	**18.0%**	**1.69 (1.08-2.67)**
Total	***100.0%***	***100.0%***	**--**

* Totals are not always equal to 100% due to slight rounding or missing responses.

Table 12.13 Comparison of Mechanisms of Boys' and Girls' Basketball Injuries, High School Sports-Related Injury Surveillance Study, US, 2022-23 School Year *

Basketball Mechanism	Boys' Basketball	Girls' Basketball	IPR (95% CI)
Collision with Another Player	**26.8%**	21.8%	1.22 (0.86-1.74)
Contact with Ball	2.7%	**4.8%**	1.76 (0.64-4.90)
Jumping/Landing	**28.7%**	24.7%	1.16 (0.85-1.59)
N/A **	7.4%	**8.4%**	1.13 (0.60-2.12)
Other	**10.4%**	8.5%	1.22 (0.69-2.17)
Rotation Around a Planted Foot/Inversion	11.3%	**18.3%**	**1.62 (1.07-2.46)**
Stepped On/Fell On/Kicked	**8.6%**	7.3%	1.18 (0.61-2.26)
Unknown	4.1%	**6.2%**	1.50 (0.66-3.42)
Total	***100.0%***	***100.0%***	**--**

* Totals are not always equal to 100% due to slight rounding or missing responses.
** Includes overuse, heat illness, conditioning, etc.

Table 12.14 Comparison of Activities of Boys' and Girls' Basketball Injuries, High School Sports-Related Injury Surveillance Study, US, 2022-23 School Year *

Basketball Activity	Boys' Basketball	Girls' Basketball	IPR (95% CI)
Ball Handling/Dribbling	5.3%	**5.9%**	1.13 (0.53-2.39)
Chasing Loose Ball	10.8%	**12.3%**	1.14 (0.69-1.89)
Conditioning	2.2%	**3.5%**	1.63 (0.65-4.12)
Defending	14.5%	**17.3%**	1.19 (0.77-1.83)
General Play	19.1%	**19.4%**	1.02 (0.68-1.53)
Other	1.2%	**1.7%**	1.48 (0.31-7.17)
Passing	0.0%	**0.7%**	--
Rebounding	**26.4%**	16.5%	**1.60 (1.10-2.31)**
Receiving Pass	**1.5%**	1.4%	1.09 (0.23-5.23)
Shooting	**8.8%**	6.2%	1.40 (0.68-2.89)
Unknown	10.3%	**14.9%**	1.44 (0.88-2.36)
Total	***100.0%***	***100.0%***	**--**

* Totals are not always equal to 100% due to slight rounding or missing responses.

12.3 Boys' Baseball and Girls' Softball

Table 12.15 Comparison of Baseball and Softball Injury Rates, High School Sports-Related Injury Surveillance Study, US, 2022-23 School Year

	Boys' Baseball	Girls' Softball *	RR (95% CI) **
Total	1.33	**1.50**	1.13 (0.92-1.39)
Competition	1.92	**2.14**	1.12 (0.83-1.50)
Practice	1.01	**1.16**	1.15 (0.86-1.54)

* Throughout this chapter, rate ratios (RR) and injury proportion ratios (IPR) compare the gender with a higher injury rate/proportion (bolded) to the gender with a lower injury rate/proportion.
** Throughout this chapter, statistically significant RR and IPR are bolded.

Table 12.16 Comparison of Body Sites of Baseball and Softball Injuries, High School Sports-Related Injury Surveillance Study, US, 2022-23 School Year *

Body Site	Boys' Baseball	Girls' Softball	IPR (95% CI)
Head/Face	12.2%	**24.6%**	**2.01 (1.15-3.48)**
Shoulder	**21.3%**	17.0%	1.26 (0.71-2.23)
Trunk	**6.3%**	5.9%	1.08 (0.41-2.85)
Arm/Elbow	**13.5%**	1.6%	**8.57 (2.60-28.28)**
Hand/Wrist	**17.4%**	17.2%	1.02 (0.57-1.83)
Hip/Thigh/Upper Leg	**8.6%**	6.7%	1.29 (0.55-3.03)
Knee	7.7%	**11.7%**	1.60 (0.71-3.61)
Lower Leg	1.1%	**3.5%**	3.84 (0.82-17.87)
Ankle	**10.1%**	7.3%	1.39 (0.58-3.36)
Foot	0.5%	**4.0%**	**8.06 (1.09-59.76)**
Other	**0.9%**	0.0%	--
Systemic	0.5%	**0.7%**	1.40 (0.13-15.55)
Total	***100.0%***	***100.0%***	**--**

* Totals are not always equal to 100% due to slight rounding or missing responses.

Table 12.17 Comparison of Diagnoses of Baseball and Softball Injuries, High School Sports-Related Injury Surveillance Study, US, 2022-23 School Year *

Diagnosis	Boys' Baseball	Girls' Softball	IPR (95% CI)
Strain/Sprain	**45.0%**	41.2%	1.09 (0.80-1.48)
Contusion	6.9%	**11.9%**	1.73 (0.85-3.52)
Fracture	**16.1%**	7.4%	2.18 (0.97-4.89)
Concussion	5.3%	**14.8%**	**2.77 (1.23-6.25)**
Other	**26.7%**	24.6%	1.08 (0.69-1.71)
Total	***100.0%***	***100.0%***	**--**

* Totals are not always equal to 100% due to slight rounding or missing responses.

Table 12.18 Most Common Baseball and Softball Injury Diagnoses, High School Sports-Related Injury Surveillance Study, US, 2022-23 School Year *

Diagnosis	Boys' Baseball	Girls' Softball	IPR (95% CI)
Ankle Strain/Sprain	**8.8%**	7.2%	1.22 (0.49-3.03)
Arm/Elbow Other	**5.7%**	0.7%	**8.05 (1.68-38.62)**
Arm/Elbow Strain/Sprain	**6.3%**	0.1%	**92.87 (11.74-734.84)**
Hand/Wrist Fracture	**8.7%**	4.2%	2.04 (0.65-6.37)
Hand/Wrist Strain/Sprain	2.4%	**7.3%**	2.98 (0.76-11.65)
Head/Face Concussion	5.3%	**14.8%**	**2.77 (1.23-6.25)**
Hip/Thigh/Upper Leg Strain/Sprain	**6.3%**	5.6%	1.11 (0.42-2.96)
Knee Strain/Sprain	4.0%	**6.2%**	1.55 (0.46-5.18)
Shoulder Other	**10.6%**	9.3%	1.14 (0.51-2.54)
Shoulder Strain/Sprain	**10.5%**	7.7%	1.36 (0.53-3.48)
Trunk Strain/Sprain	**6.3%**	5.1%	1.22 (0.44-3.39)

* Only includes diagnoses accounting for >5% of boys' baseball or girls' softball injuries.

Table 12.19 Comparison of Time Loss of Baseball and Softball Injuries, High School Sports-Related Injury Surveillance Study, US, 2022-23 School Year *

Time Loss	Boys' Baseball	Girls' Softball	IPR (95% CI)
1-2 Days	16.5%	**17.7%**	1.07 (0.62-1.85)
3-6 Days	**21.5%**	19.1%	1.13 (0.66-1.94)
7-9 Days	11.0%	**14.0%**	1.34 (0.67-2.65)
10-21 Days	**26.3%**	20.8%	1.27 (0.78-2.07)
>21 Days	8.9%	**10.6%**	1.18 (0.52-2.69)
Other	15.8%	**17.8%**	1.12 (0.63-2.00)
Total	***100.0%***	***100.0%***	**--**

* Totals are not always equal to 100% due to slight rounding or missing responses.

Table 12.20 Comparison of Mechanisms of Baseball and Softball Injuries, High School Sports-Related Injury Surveillance Study, US, 2022-23 School Year *

Baseball Mechanism	Boys' Baseball	Girls' Softball	IPR (95% CI)
Contact with Another Player	**7.6%**	4.6%	1.65 (0.57-4.81)
Contact with Bases	11.7%	**11.9%**	1.01 (0.49-2.10)
Contact with Thrown Ball (Non-Pitch)	5.3%	**17.3%**	**3.27 (1.41-7.58)**
Hit by Batted Ball	6.4%	**8.9%**	1.38 (0.61-3.10)
Hit by Pitch	**8.4%**	4.5%	1.86 (0.65-5.35)
N/A **	**19.1%**	13.8%	1.39 (0.73-2.64)
Other	16.4%	**16.6%**	1.01 (0.57-1.82)
Rotation Around a Planted Foot/Inversion	**8.7%**	7.3%	1.20 (0.45-3.23)
Throwing (Not Pitching)	3.2%	**6.6%**	2.09 (0.68-6.39)
Throwing (Pitching)	**10.1%**	3.5%	**2.86 (1.05-7.81)**
Unknown	3.0%	**5.0%**	1.64 (0.41-6.49)
Total	***100.0%***	***100.0%***	**--**

* Totals are not always equal to 100% due to slight rounding or missing responses.
** Includes overuse, heat illness, conditioning, etc.

Table 12.21 Comparison of Activities of Baseball and Softball Injuries, High School Sports-Related Injury Surveillance Study, US, 2022-23 School Year *

Baseball Activity	Boys' Baseball	Girls' Softball	IPR (95% CI)
Batting	**12.9%**	6.3%	2.04 (0.84-4.95)
Catching	7.9%	**12.7%**	1.61 (0.72-3.61)
Conditioning	**2.1%**	0.7%	3.25 (0.56-18.96)
Fielding a Batted Ball	9.8%	**11.6%**	1.18 (0.59-2.39)
Fielding a Thrown Ball	2.5%	**11.7%**	**4.66 (1.55-13.99)**
General Play	**3.8%**	2.6%	1.47 (0.31-6.92)
Other	5.4%	**8.9%**	1.63 (0.58-4.55)
Pitching	**18.9%**	9.2%	2.06 (0.99-4.28)
Running Bases	**15.4%**	13.3%	1.16 (0.61-2.21)
Sliding	8.8%	**9.6%**	1.09 (0.46-2.55)
Throwing	7.3%	**10.3%**	1.43 (0.59-3.47)
Unknown	**5.1%**	3.1%	1.64 (0.56-4.79)
Total	***100.0%***	***100.0%***	**--**

* Totals are not always equal to 100% due to slight rounding or missing responses.

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XIII. Trends Over Time

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Table 13.1 Injury Rates by Sport, Type of Exposure, and Year, High School Sports-Related Injury Surveillance Study, US, 2005-06 to 2022-23 School Years *

		2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22	2022-23	P-Value for Trend
Overall	Total	2.46	2.53	2.28	1.96	2.03	1.97	2.17	2.16	2.18	2.13	2.32	2.07	2.45	2.29	2.31	2.01	2.36	2.41	0.7615
	Competition	4.50	4.74	4.36	3.93	4.06	4.12	4.26	4.31	4.22	4.40	4.74	4.25	4.88	4.61	5.16	3.84	4.53	4.93	0.1604
	Practice	1.67	1.71	1.51	1.24	1.28	1.16	1.40	1.34	1.39	1.28	1.39	1.21	1.47	1.38	1.30	1.36	1.47	1.46	0.3335
Boys' Football	Total	4.25	4.33	4.09	3.41	3.64	3.50	3.78	3.87	3.74	3.73	4.08	3.56	4.33	3.85	3.84	3.39	4.12	3.80	0.5657
	Competition	11.72	13.12	12.45	10.94	12.30	12.30	12.41	12.53	11.38	11.97	12.68	11.55	14.13	12.09	13.07	12.11	13.27	12.84	0.1554
	Practice	**2.49**	**2.61**	**2.43**	**1.88**	**1.99**	**1.74**	**2.16**	**2.08**	**2.15**	**2.06**	**2.18**	**1.89**	**2.14**	**2.00**	**1.77**	**1.88**	**2.13**	**1.92**	**0.0200**
Boys' Soccer	Total	2.39	2.19	1.75	1.59	1.73	1.56	1.64	1.52	1.62	1.60	1.87	1.47	1.94	1.83	1.59	1.80	1.76	1.80	0.2653
	Competition	4.14	4.13	3.63	3.35	3.31	3.08	3.47	3.28	3.40	3.43	3.95	3.25	3.92	3.86	3.35	3.30	3.76	3.82	0.8181
	Practice	1.56	1.41	0.95	0.85	1.04	0.90	0.90	0.78	0.82	0.78	0.91	0.67	1.04	0.92	0.82	1.25	0.90	0.91	0.1168
Girls' Soccer	Total	2.32	2.44	2.31	2.00	1.96	1.93	2.42	2.29	2.47	2.64	2.59	2.46	2.82	2.72	2.22	2.06	2.34	2.45	0.2158
	Competition	5.14	5.22	5.06	4.44	4.63	4.13	5.68	5.54	5.72	6.11	5.93	5.91	5.83	5.70	5.12	4.38	5.09	5.55	0.2980
	Practice	1.08	1.29	1.15	0.96	0.81	0.93	1.09	0.92	1.04	1.09	1.09	0.85	1.48	1.34	1.06	1.16	1.07	1.11	0.4014
Girls' Volleyball	Total	1.59	1.34	1.21	0.83	0.97	0.96	1.00	0.89	0.99	1.11	1.19	1.09	1.54	1.34	1.25	1.02	1.25	1.28	0.6416
	Competition	1.88	1.34	1.38	0.82	0.99	1.18	1.27	1.08	1.15	1.39	1.52	1.61	2.18	1.58	1.84	1.40	1.67	1.65	0.0575
	Practice	1.42	1.34	1.13	0.84	0.97	0.85	0.85	0.78	0.91	0.97	1.02	0.83	1.20	1.23	0.95	0.86	1.03	1.09	0.4054
Boys' Basketball	Total	1.82	1.72	1.38	1.33	1.43	1.35	1.40	1.47	1.45	1.08	1.48	1.54	1.54	1.61	1.52	1.87	1.75	1.91	0.1514
	Competition	**2.87**	**2.82**	**2.20**	**2.29**	**2.69**	**2.39**	**2.60**	**2.44**	**2.40**	**1.98**	**2.84**	**2.65**	**2.74**	**3.09**	**2.74**	**2.95**	**3.07**	**3.33**	**0.0227**
	Practice	1.40	1.26	1.04	0.94	0.90	0.91	0.91	1.04	1.02	0.68	0.90	1.04	1.01	0.98	0.99	1.45	1.14	1.33	0.6408
Girls' Basketball	**Total**	**2.02**	**2.03**	**1.57**	**1.47**	**1.56**	**1.73**	**1.57**	**1.83**	**1.88**	**1.65**	**2.14**	**1.87**	**2.15**	**1.95**	**2.06**	**1.87**	**2.43**	**2.14**	**0.0123**
	Competition	**3.56**	**3.52**	**3.19**	**2.95**	**2.84**	**3.59**	**3.03**	**3.13**	**3.66**	**3.27**	**4.17**	**3.63**	**4.12**	**3.63**	**4.01**	**3.14**	**3.96**	**4.79**	**0.0086**
	Practice	1.40	1.39	0.88	0.86	0.99	0.92	0.98	1.24	1.08	0.94	1.24	1.03	1.26	1.21	1.22	1.37	1.73	1.01	0.1953
Boys' Wrestling	Total	2.47	2.45	2.30	2.14	1.92	2.01	2.50	2.33	2.48	2.12	2.23	1.92	2.65	2.52	2.38	1.70	2.96	3.10	0.2213
	Competition	**3.73**	**3.70**	**3.68**	**3.22**	**3.00**	**3.32**	**3.56**	**3.54**	**3.95**	**3.76**	**3.43**	**3.64**	**4.30**	**4.46**	**4.08**	**2.75**	**5.39**	**5.27**	**0.0182**
	Practice	2.07	2.00	1.80	1.75	1.52	1.55	2.10	1.88	1.95	1.61	1.83	1.32	2.04	1.84	1.81	1.41	2.13	2.38	0.7110

Boys' Baseball	Total	1.18	1.25	0.94	0.78	0.82	0.81	0.83	0.88	1.01	0.94	0.84	0.74	0.95	1.03	0.70	1.05	0.96	1.33	0.9128
	Competition	1.71	2.03	1.37	1.32	1.27	1.49	1.14	1.30	1.68	1.67	1.35	1.23	1.28	1.66	0.46	1.44	1.36	1.92	0.4315
	Practice	0.88	0.82	0.71	0.48	0.57	0.46	0.65	0.66	0.63	0.55	0.56	0.44	0.77	0.68	0.74	0.82	0.72	1.01	0.3507
Girls' Softball	Total	1.13	1.11	1.26	1.03	1.11	0.94	1.46	1.15	0.99	1.00	1.30	1.34	1.34	1.43	0.91	1.24	1.55	1.50	0.0526
	Competition	1.76	1.96	1.82	1.60	1.66	1.45	2.04	1.96	1.09	1.67	2.10	1.55	1.94	2.19	1.74	1.74	1.93	2.14	0.2821
	Practice	**0.79**	**0.65**	**0.95**	**0.72**	**0.82**	**0.69**	**1.16**	**0.73**	**0.93**	**0.65**	**0.87**	**1.21**	**1.01**	**1.01**	**0.69**	**0.96**	**1.33**	**1.16**	**0.0190**

* Statistically significant tests for trend are bolded. COVID-19 may have affected these results.

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Table 13.2 Nationally Estimated Number of Injuries by Sport, Type of Exposure, and Year, High School Sports-Related Injury Surveillance Study, US, 2005-06 to 2022-23 School Years *

		2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22	2022-23
Overall	Total	1,422,835	1,443,423	1,401,275	1,214,878	1,330,664	1,195,816	1,392,262	1,361,986	1,427,315	1,196,479	1,393,566	1,160,321	1,367,995	1,307,414	983,683	1,237,273	1,385,717	1,534,842
	Competition	746,284	748,874	748,558	668,031	738,454	711,642	740,493	779,055	790,966	708,150	801,156	699,410	798,725	748,085	551,249	619,712	766,617	894,718
	Practice	676,551	694,549	652,717	546,847	592,210	484,174	651,769	582,931	636,349	488,329	592,410	460,911	569,270	559,329	432,434	617,561	619,100	640,124
Boys' Football	Total	505,908	561,470	605,644	513,455	560,100	483,016	559,064	616,209	624,470	529,483	568,789	444,281	463,626	455,449	392,734	485,416	478,688	552,396
	Competition	274,446	285,252	304,470	279,816	310,130	296,199	287,710	344,097	324,354	286,421	316,308	252,462	281,790	259,317	236,338	248,398	276,694	336,471
	Practice	231,462	276,218	301,174	233,639	249,970	186,817	271,354	272,112	300,116	243,062	252,481	191,819	181,836	196,132	156,396	237,018	201,994	215,925
Boys' Soccer	Total	215,490	168,604	159,009	147,341	152,237	138,974	172,070	149,049	149,278	133,919	174,811	145,215	180,607	184,656	134,036	143,124	174,322	198,877
	Competition	116,987	90,461	99,785	85,837	82,737	81,238	97,540	89,429	90,683	89,091	111,720	98,031	113,655	120,217	77,322	71,425	111,007	120,281
	Practice	98,503	78,143	59,224	61,504	69,500	57,736	74,530	59,620	58,595	44,828	63,091	47,184	66,952	64,439	56,714	71,699	63,315	78,596
Girls' Soccer	Total	182,938	225,560	211,056	185,594	179,509	180,254	222,679	190,382	227,172	217,546	209,027	190,436	242,602	227,951	118,608	133,171	168,680	192,685
	Competition	121,437	145,173	141,924	118,804	129,463	124,674	145,469	141,339	167,975	158,078	142,722	146,696	152,993	140,542	73,390	77,138	118,572	132,485
	Practice	61,501	80,387	69,132	66,790	50,046	55,580	77,210	49,043	59,197	59,468	66,305	43,740	89,609	87,409	45,218	56,033	50,108	60,200
Girls' Volleyball	Total	78,298	79,592	71,791	53,413	67,204	50,711	52,662	44,064	45,144	46,807	58,127	46,601	67,163	59,370	54,665	61,279	68,994	73,903
	Competition	32,177	27,076	25,898	18,204	21,550	21,416	24,439	19,150	16,430	19,373	25,300	23,886	33,075	23,045	25,810	27,437	30,805	31,391
	Practice	46,121	52,516	45,893	35,209	45,654	29,295	28,223	24,914	28,714	27,434	32,827	22,715	34,088	36,325	28,855	33,842	38,189	42,512
Boys' Basketball	Total	96,966	94,482	82,580	77,897	84,102	79,762	75,872	85,819	84,455	55,980	81,240	88,927	93,773	87,521	84,828	129,429	101,263	124,110
	Competition	43,670	45,054	36,560	39,332	46,575	41,252	41,978	44,095	42,504	32,534	45,596	46,251	48,814	48,318	47,736	64,833	53,165	64,575
	Practice	53,296	49,428	46,020	38,565	37,527	38,510	33,894	41,724	41,951	23,446	35,644	42,676	44,959	39,203	37,092	64,596	48,098	59,535
Girls' Basketball	Total	105,355	99,779	71,568	60,673	78,328	83,033	67,280	83,107	89,451	64,491	99,598	70,700	91,059	82,383	76,317	79,278	111,665	86,437
	Competition	53,776	52,140	43,949	34,928	44,026	53,931	37,213	45,645	50,864	38,803	56,786	44,660	54,339	48,080	43,148	37,603	51,976	58,076
	Practice	51,579	47,639	27,619	25,745	34,302	29,102	30,067	37,462	38,587	25,688	42,812	26,040	36,720	34,303	33,169	41,675	59,689	28,361
Boys' Wrestling	Total	107,654	98,836	92,353	87,041	77,857	80,569	107,992	85,485	91,203	60,253	91,642	67,834	103,058	91,176	94,606	81,045	142,959	149,885
	Competition	36,238	37,781	40,260	37,074	36,704	36,536	40,235	35,016	39,378	32,728	38,430	34,405	48,770	44,433	41,914	29,360	64,629	73,599
	Practice	71,416	61,055	52,093	49,967	41,153	44,033	67,757	50,469	51,825	27,525	53,212	33,429	54,288	46,743	52,692	51,685	78,330	76,286

Boys' Baseball	Total	67,064	60,689	46,078	39,869	64,053	46,797	43,590	49,747	62,493	44,208	44,760	36,395	49,716	52,889	13,087	70,377	63,115	70,685
	Competition	33,009	33,746	22,803	25,584	36,502	29,789	20,818	24,807	37,682	27,129	25,581	21,458	26,844	30,158	833	36,233	29,855	36,455
	Practice	34,055	26,943	23,275	14,285	27,551	17,008	22,772	24,940	24,811	17,079	19,179	14,937	22,872	22,731	12,254	34,144	33,260	34,230
Girls' Softball	Total	63,162	54,411	61,196	49,595	67,274	52,700	91,053	58,124	53,649	43,792	65,572	69,932	76,391	66,019	14,802	54,154	76,031	85,864
	Competition	34,544	32,191	32,909	28,452	30,767	26,607	45,091	35,477	21,096	23,993	38,713	31,561	38,445	33,975	4,758	27,285	29,914	41,385
	Practice	28,618	22,220	28,287	21,143	36,507	26,093	45,962	22,647	32,553	19,799	26,859	38,371	37,946	32,044	10,044	26,869	46,117	44,479

* COVID-19 may have affected these results.

Table 13.3 Body Site of Injury by Year, High School Sports-Related Injury Surveillance Study, US, 2005-06 to 2022-23 School Years *

	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22	2022-23
Body Site																		
Ankle	22.6%	19.8%	18.6%	16.3%	17.7%	17.7%	16.1%	15.5%	16.9%	15.1%	16.6%	17.8%	17.8%	18.3%	19.6%	19.1%	17.6%	18.0%
Arm/Elbow	4.1%	3.9%	4.7%	4.2%	4.1%	3.1%	4.0%	3.5%	3.1%	3.7%	3.4%	3.7%	4.6%	3.5%	4.0%	4.0%	4.2%	3.6%
Foot	4.4%	4.3%	4.2%	5.2%	4.2%	4.0%	3.4%	3.2%	2.8%	3.9%	3.6%	2.5%	3.9%	3.9%	3.6%	2.5%	4.7%	3.6%
Hand/Wrist	9.2%	8.1%	10.2%	9.4%	10.2%	8.9%	8.6%	7.4%	7.8%	7.4%	7.8%	7.7%	9.1%	7.9%	8.4%	7.9%	7.0%	9.3%
Head/Face	12.4%	12.6%	12.5%	15.1%	17.2%	23.3%	25.1%	25.7%	25.3%	27.4%	27.3%	27.2%	21.4%	21.4%	21.1%	15.6%	17.8%	17.5%
Hip/Thigh/Upper Leg	10.9%	10.7%	10.3%	10.4%	9.2%	8.3%	9.8%	9.5%	8.7%	9.0%	8.0%	9.0%	10.3%	9.9%	9.9%	11.8%	10.5%	10.1%
Knee	14.3%	16.4%	14.5%	14.7%	15.6%	14.2%	13.4%	14.8%	14.4%	13.7%	14.9%	13.4%	14.1%	13.8%	13.3%	15.5%	14.9%	15.2%
Lower Leg	4.7%	5.4%	5.8%	5.9%	4.7%	5.0%	4.5%	3.9%	4.9%	4.0%	4.3%	4.4%	4.7%	4.2%	4.1%	5.2%	4.3%	5.8%
Neck	2.1%	2.0%	1.8%	1.9%	1.9%	1.8%	1.7%	2.3%	1.2%	1.9%	1.3%	1.4%	0.9%	1.5%	1.5%	0.9%	1.1%	1.6%
Other	1.0%	2.1%	2.1%	2.7%	2.2%	2.1%	2.0%	2.5%	2.4%	2.5%	2.1%	2.3%	2.0%	2.2%	2.3%	1.3%	1.2%	1.6%
Shoulder	7.9%	7.9%	9.1%	8.5%	7.0%	7.0%	6.6%	6.5%	8.5%	7.2%	6.8%	6.4%	6.1%	7.7%	7.0%	7.5%	7.1%	7.5%
Systemic	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	3.9%	4.3%	1.0%
Trunk	6.2%	6.9%	6.4%	5.6%	5.9%	4.7%	5.0%	5.2%	4.1%	4.3%	4.0%	4.3%	5.1%	5.7%	5.2%	4.7%	5.1%	5.2%
Total	***100.0%***	***100.0%***	***100.0%***	***100.0%***	***100.0%***	***100.0%***	***100.0%***	***100.0%***	***100.0%***	***100.0%***	***100.0%***	***100.0%***	***100.0%***	***100.0%***	***100.0%***	***100.0%***	***100.0%***	***100.0%***

* Throughout this chapter, n's represent the total number of injury reports containing a valid response for the particular question. Due to a low level of non-response, these totals are always similar but are not always equal to the total number of injuries. Totals are not always equal to 100% due to slight rounding or missing responses. Systemic was added in the 2020/21 academic year. COVID-19 may have affected these results.

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Table 13.4 Injury Diagnosis by Year, High School Sports-Related Injury Surveillance Study, US, 2005-06 to 2022-23 School Years *

	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22	2022-23
Diagnosis																		
Strain/Sprain	52.2%	48.2%	48.3%	45.8%	44.9%	43.2%	42.2%	42.3%	41.7%	39.8%	40.4%	40.2%	45.1%	44.6%	45.3%	47.8%	44.2%	46.8%
Contusion	12.3%	13.7%	12.7%	11.7%	14.2%	9.6%	10.8%	10.6%	9.4%	9.3%	9.2%	9.6%	10.2%	11.1%	8.1%	9.2%	10.3%	11.2%
Fracture	9.7%	9.0%	10.2%	10.8%	9.6%	10.2%	7.7%	7.8%	7.6%	9.4%	8.6%	8.5%	8.0%	7.9%	7.6%	8.9%	7.7%	9.1%
Concussion	9.3%	8.4%	9.2%	11.5%	14.0%	20.0%	22.2%	23.1%	21.9%	24.6%	24.6%	24.8%	18.8%	18.8%	18.0%	12.3%	15.2%	14.8%
Other	16.5%	20.7%	19.6%	20.1%	17.3%	17.0%	17.1%	16.2%	19.4%	16.9%	17.1%	16.9%	17.9%	17.5%	21.0%	21.9%	22.7%	18.1%
Total	***100.0%***	***100.0%***	***100.0%***	***100.0%***	***100.0%***	***100.0%***	***100.0%***	***100.0%***	***100.0%***	***100.0%***	***100.0%***	***100.0%***	***100.0%***	***100.0%***	***100.0%***	***100.0%***	***100.0%***	***100.0%***

* Totals are not always equal to 100% due to slight rounding or missing responses. COVID-19 may have affected these results.

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Table 13.5 Most Common Injury Diagnoses by Year, High School Sports-Related Injury Surveillance Study, US, 2005-06 to 2022-23 School Years *

	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22	2022-23
Diagnosis																		
Ankle Strain/Sprain	20.6%	17.8%	17.4%	15.0%	16.1%	16.3%	14.7%	14.5%	15.6%	14.2%	15.7%	16.5%	16.4%	16.2%	17.7%	18.0%	15.9%	17.0%
Hand/Wrist Fracture	3.5%	3.6%	4.0%	3.9%	4.2%	4.0%	3.7%	3.2%	3.3%	3.5%	3.6%	3.5%	3.4%	3.5%	3.4%	3.7%	3.1%	3.7%
Hand/Wrist Strain/Sprain	3.6%	2.7%	4.0%	3.0%	2.8%	2.8%	3.0%	2.5%	2.8%	1.9%	2.5%	2.0%	3.5%	2.6%	3.3%	2.7%	2.3%	3.5%
Head/Face Concussion	9.2%	8.4%	9.2%	11.5%	13.9%	20.0%	22.2%	23.1%	21.9%	24.5%	24.6%	24.8%	18.7%	18.8%	18.0%	12.4%	15.2%	14.8%
Hip/Thigh/Upper Leg Strain/Sprain	8.0%	7.7%	7.3%	7.8%	6.5%	6.4%	6.9%	6.7%	6.6%	6.9%	5.7%	6.4%	8.1%	7.2%	7.5%	9.2%	8.2%	7.1%
Knee Other	4.5%	4.8%	4.6%	4.4%	5.1%	4.8%	3.9%	4.1%	4.7%	4.5%	5.2%	4.9%	5.1%	4.9%	4.8%	6.0%	5.2%	5.1%
Knee Strain/Sprain	7.6%	8.7%	7.7%	7.9%	7.9%	7.7%	7.6%	8.2%	7.8%	7.3%	8.1%	6.9%	6.6%	7.2%	6.5%	7.4%	7.0%	8.0%
Shoulder Other	3.1%	3.6%	4.1%	4.0%	3.2%	3.7%	3.1%	3.4%	4.6%	4.0%	3.3%	3.4%	2.9%	3.4%	4.0%	3.9%	3.9%	4.2%
Shoulder Strain/Sprain	3.4%	2.8%	3.5%	3.8%	2.9%	2.2%	2.9%	2.6%	3.3%	2.6%	2.9%	2.7%	2.8%	3.6%	2.6%	2.9%	3.0%	3.1%
Trunk Strain/Sprain	2.9%	2.8%	3.2%	2.7%	2.6%	2.4%	1.9%	2.3%	1.7%	1.9%	1.5%	1.9%	2.6%	3.2%	2.3%	2.7%	2.1%	2.8%

* COVID-19 may have affected these results.

Table 13.6 Time Loss of Injuries by Year, High School Sports-Related Injury Surveillance Study, US, 2005-06 to 2022-23 School Years *

	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22	2022-23
Time Loss																		
1-2 Days	21.8%	26.2%	22.1%	13.6%	14.7%	12.8%	15.9%	12.6%	14.9%	11.0%	16.3%	12.6%	21.2%	19.1%	17.5%	17.4%	16.6%	18.2%
3-6 Days	29.2%	28.1%	28.1%	28.2%	27.3%	25.2%	23.3%	23.6%	21.8%	22.0%	21.9%	22.0%	20.9%	22.5%	22.4%	22.5%	22.7%	22.5%
7-9 Days	14.9%	14.5%	15.4%	17.5%	16.1%	16.7%	16.1%	16.3%	16.7%	15.6%	12.9%	16.1%	12.8%	13.3%	15.3%	12.2%	14.8%	14.4%
10-21 Days	14.7%	13.9%	16.2%	19.5%	16.9%	19.2%	19.6%	21.3%	21.1%	22.1%	21.1%	21.6%	18.8%	21.0%	20.2%	18.7%	20.4%	19.9%
>21 Days	6.6%	6.9%	8.9%	13.6%	7.9%	6.9%	7.0%	7.7%	7.3%	8.9%	7.7%	7.8%	6.5%	5.6%	6.3%	5.0%	7.0%	5.6%
Other	12.9%	10.4%	9.4%	7.5%	17.1%	19.2%	18.0%	18.5%	18.2%	20.5%	20.0%	20.0%	19.8%	18.6%	18.4%	24.2%	18.6%	19.5%
Total	***100.0%***	***100.0%***	***100.0%***	***100.0%***	***100.0%***	***100.0%***	***100.0%***	***100.0%***	***100.0%***	***100.0%***	***100.0%***	***100.0%***	***100.0%***	***100.0%***	***100.0%***	***100.0%***	***100.0%***	***100.0%***

* Totals are not always equal to 100% due to slight rounding or missing responses. COVID-19 may have affected these results.

Table 13.7 Injuries Requiring Surgery by Year, High School Sports-Related Injury Surveillance Study, US, 2005-06 to 2022-23 School Years *

	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22	2022-23
Required Surgery	5.1%	6.4%	6.1%	6.7%	8.1%	8.2%	6.7%	7.3%	7.6%	7.3%	6.1%	7.1%	5.7%	6.4%	6.6%	8.3%	5.5%	7.3%
Did Not Require Surgery	94.9%	93.6%	93.9%	93.3%	91.9%	91.8%	93.3%	92.7%	92.4%	92.7%	93.9%	92.9%	94.3%	93.6%	93.4%	91.7%	94.5%	92.7%
Total	***100.0%***	***100.0%***	***100.0%***	***100.0%***	***100.0%***	***100.0%***	***100.0%***	***100.0%***	***100.0%***	***100.0%***	***100.0%***	***100.0%***	***100.0%***	***100.0%***	***100.0%***	***100.0%***	***100.0%***	***100.0%***

* Totals are not always equal to 100% due to slight rounding or missing responses. COVID-19 may have affected these results.

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XIV. Reporter Demographics & Compliance

During the 2022-23 school year, 144 ATs enrolled to participate in the study. ATs were expected to report for every week in which they were enrolled. For example, an AT who joined the study as a replacement school in week 10 was not expected to report for weeks 1-9. Overall, 130 enrolled ATs reported an average of 39 study weeks. The majority of ATs (88%) reported for more than 20 weeks of the study. Internal validity checks of a 5% randomly selected sample of the 144 schools participating in the convenience sample during the 2022-23 academic year yielded 92.6% sensitivity, 95.8% specificity, a positive predictive value of 73.5%, and a negative predictive value of 99.0%. Internal validity checks are completed every other year. The next internal validity check will occur using data from the 2024-25 academic year.

Prior to the start of the study, participating ATs were asked to complete a short demographics survey. Over three-quarters (84%) of participating high schools were public schools, with the remainder being private. All ATs except for three provided services to their athletes five or more days each week. 72% of ATs participating during the 2022-23 school year had previously participated in the National High School Sports-Related Injury Surveillance Study.

An online “End of Season” survey gave all participating ATs (both in the original study as well as in the expanded study including those ATs who did not report any data) the opportunity to provide feedback on their experiences with the study. This survey was completed by 66 ATs (46%). Average reporting time burdens were 16 minutes for the weekly exposure report and 8 minutes for the injury report form. Using a 5-point Likert scale, RIO was overwhelmingly reported to be either very easy (68%) or somewhat easy (27%) to use (5 and 4 on the Likert scale, respectively), with ATs being either very satisfied (64%) or somewhat satisfied (20%) with the system (5 and 4 on the Likert scale, respectively). Suggestions provided by ATs, such as the addition or clarification of questions or answer choices, will be used to improve the National High School Sports-Related Injury Surveillance Study for the 2023-24 school year.

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XV. SUMMARY

High school sports play an important role in the adoption and maintenance of a physically active lifestyle among millions of US adolescents. Too often, injury prevention in this population is overlooked as sports-related injuries are thought to be unavoidable. In reality, sports-related injuries are largely preventable through the application of evidence-based preventive interventions. Such preventive interventions can include educational campaigns, introduction of new or improved protective equipment, rule changes, other policy changes, etc. The morbidity, mortality, and disability caused by high school sports-related injuries can be reduced through the development and implementation of improved injury diagnosis and treatment modalities as well as through effective prevention strategies. However, surveillance of exposure-based injury rates in a nationally representative sample of high school athletes and subsequent epidemiologic analysis of patterns of injury are needed to drive evidence-based prevention practices.

Prior to the implementation of the National High School Sports-Related Injury Surveillance Study, the study of high school sports-related injuries had largely been limited by an inability to calculate injury rates due to a lack of exposure data (i.e., frequency of participation in athletic activities including practice and competition), an inability to compare findings across groups (i.e., sports/activities, genders, schools, and levels of competition), or an inability to generalize findings from small non-representative samples. The value of national injury surveillance studies that collect injury, exposure, and risk factor data from representative samples has been well demonstrated by the National Collegiate Athletic Association's Injury Surveillance System (NCAA ISS), now known as the Injury Surveillance Program (ISP). Data collected by the NCAA has been used to develop preventive interventions including increased use of protective equipment and rule changes that have had proven success in reducing injuries among collegiate athletes.

For example, NCAA ISP data have been used to develop several interventions intended to reduce the number of preseason heat-related football injuries including the elimination of consecutive days of multiple practices, daily time limitations, and a gradual increase in equipment for conditioning and heat acclimation. Additionally, several committees have considered NCAA ISP data when making recommendations including the NCAA Committee on Competitive Safeguards and Medical Aspects of Sports' recommendation for mandatory eye protection in women's lacrosse, the NCAA Men's Ice Hockey Rules Committee's recommendation for stricter penalties for hitting from behind, checking into the boards, and not wearing a mouthpiece, and the NCAA Men's Basketball Rules Committee's discussions of widening the free-throw lane to prevent injuries related to player contact. Unfortunately, because an equivalent injury surveillance system to collect injury and exposure data from a nationally representative sample of high school athletes had not previously existed, injury prevention efforts targeted to reduce injury rates in this population were based largely upon data collected from collegiate athletes. This is unacceptable because distinct biophysiological differences (e.g., lower muscle mass, immature growth plates, etc.) means high school athletes are not merely miniature versions of their collegiate counterparts.

The successful implementation and maintenance of the National High School Sports-Related Injury Surveillance Study demonstrates the value of a national injury surveillance system at the high school level. Dr. Collins and her research staff are committed to maintaining a permanent national high school sports injury surveillance system.

While the health benefits of a physically active lifestyle including sports participation are undeniable, participants are at risk of injury because a certain endemic level of injury can be expected during any physical activity, especially those with a competitive component. However, injury rates among high school athletes should be reduced to the lowest possible level without discouraging adolescents from engaging in this important form of physical activity. This goal can be best accomplished by monitoring injury rates and patterns of injury among high school athletes over time; investigating the etiology of preventable injuries; and developing, implementing, and evaluating evidence-based preventive interventions. Surveillance systems such as the model used for this study are critical in achieving these goals.