Original Sample Summary Report

NATIONAL HIGH SCHOOL SPORTS-RELATED INJURY SURVEILLANCE STUDY

2020-21 School Year

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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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REPORTING INFORMATION ONLINE

CONTENTS

REPORTING INFORMATION ONLINE

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 an over 7.9 million in 2018-19. 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 national 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. This surveillance has been conducted 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), the National High School Sports-Related Injury Surveillance Study was able to be continued during the 2020-21 school year. Previous study years were funded by the Centers for Disease Control and Prevention (CDC), 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.

Participation in high school sports varied across the country during the 2020-21 school year due to COVID-19. Multiple factors may have affected injuries and injury rates including characteristics of schools playing sports, athletes who were able to/chose to compete during the pandemic, an Athletic Trainer's ability to participate in High School RIO given other responsibilities, changes in practice-related activities, and the national sample in terms of sport cancellation/modified seasons. Furthermore, in March 2020, nearly all high school sports were suspended due to COVID-19. As a result, data reporting for winter and spring sports in the 2019-20 school year was incomplete, which may have affected trends over time.

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 2020-21 school years.

1.4 Project Design

The National High School Sports-Related Injury Surveillance Study defines 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 and
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

All eligible schools (i.e., all US high schools with a certified athletic trainer (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. Due to lower participation this year, strata were first filled with schools reporting for all 9 sports followed by schools reporting for 5 or more sports. Strata were then filled with schools reporting for any one of the 9 original sports in an attempt to have 100 schools reporting for each of the 9 original sports to ensure equal distribution of schools between the 8 strata. Participating ATs were offered a $300-$350 honorarium depending on the number of sports reported along with individualized injury reports following the study's conclusion.

1.6 Data Collection

Each AT that enrolled their school in 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 surveillance system. Each participating AT was asked to complete 48 weekly exposure reports: one for each week from July 27, 2020 through June 21, 2021. Exposure reports collected exposure information (number of athlete-competitions and athlete-practices) and the number of reportable injuries sustained by student athletes of each sport that was 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.). This 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 (CI). 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 confidence intervals calculated using SAS to account for the sampling weights and the complex sampling design. Following is an example of the IPR calculation comparing the proportion of male soccer concussions to the proportion of female 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. CI 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, 2020-21 School Year *†

	Event Type	# Injuries	# Exposures	Injury Rate (per 1,000 AEs)	Nationally Estimated # Injuries
Overall	***Total***	***2,088***	***1,040,804***	***2.01***	***1,237,273***
	Competition	1,042	271,383	3.84	619,712
	Practice	1,046	769,421	1.36	617,561
Boys' Football	***Total***	***850***	***250,432***	***3.39***	***485,416***
	Competition	448	36,988	12.11	248,398
	Practice	402	213,444	1.88	237,018
Boys' Soccer	***Total***	***207***	***114,781***	***1.80***	***143,124***
	Competition	102	30,929	3.30	71,425
	Practice	105	83,852	1.25	71,699
Girls' Soccer	***Total***	***212***	***103,035***	***2.06***	***133,171***
	Competition	126	28,800	4.38	77,138
	Practice	86	74,235	1.16	56,033
Girls' Volleyball	***Total***	***106***	***103,670***	***1.02***	***61,279***
	Competition	44	31,443	1.40	27,437
	Practice	62	72,227	0.86	33,842
Boys' Basketball	***Total***	***220***	***117,695***	***1.87***	***129,429***
	Competition	97	32,914	2.95	64,833
	Practice	123	84,781	1.45	64,596
Girls' Basketball	***Total***	***156***	***83,589***	***1.87***	***79,278***
	Competition	73	23,216	3.14	37,603
	Practice	83	60,373	1.37	41,675
Boys' Wrestling	***Total***	***111***	***65,429***	***1.70***	***81,045***
	Competition	39	14,193	2.75	29,360
	Practice	72	51,236	1.41	51,685

Boys' Baseball	***Total***	***133***	***126,942***	***1.05***	***70,377***
	Competition	67	46,390	1.44	36,233
	Practice	66	80,552	0.82	34,144
Girls' Softball	***Total***	***93***	***75,231***	***1.24***	***54,154***
	Competition	46	26,510	1.74	27,285
	Practice	47	48,721	0.96	26,869

* Only includes injuries resulting in ≥1 day time loss.
† **COVID-19 may have affected these results.**

Table 2.2 Proportion of Injuries Resulting in Time Loss, High School Sports-Related Injury Surveillance Study, US, 2020-21 School Year *†

	< 1 Day Time Loss	≥ 1 Day Time Loss	Time Loss Data Missing	Total
	%	%	%	%
Overall	***0.6%***	***95.4%***	***4.0%***	***100.0%***
Boys' Football	0.9%	95.6%	3.5%	100.0%
Boys' Soccer	0.5%	95.4%	4.1%	100.0%
Girls' Soccer	0.5%	95.9%	3.6%	100.0%
Girls' Volleyball	0.0%	97.2%	2.8%	100.0%
Boys' Basketball	0.4%	93.6%	6.0%	100.0%
Girls' Basketball	0.0%	100.0%	0.0%	100.0%
Boys' Wrestling	0.9%	94.9%	4.3%	100.0%
Boys' Baseball	0.0%	92.4%	7.6%	100.0%
Girls' Softball	1.0%	92.1%	6.9%	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.

† **COVID-19 may have affected these results.**

Table 2.3 Demographic Characteristics of Injured Athletes by Sex, High School Sports-Related Injury Surveillance Study, US, 2020-21 School Year *†

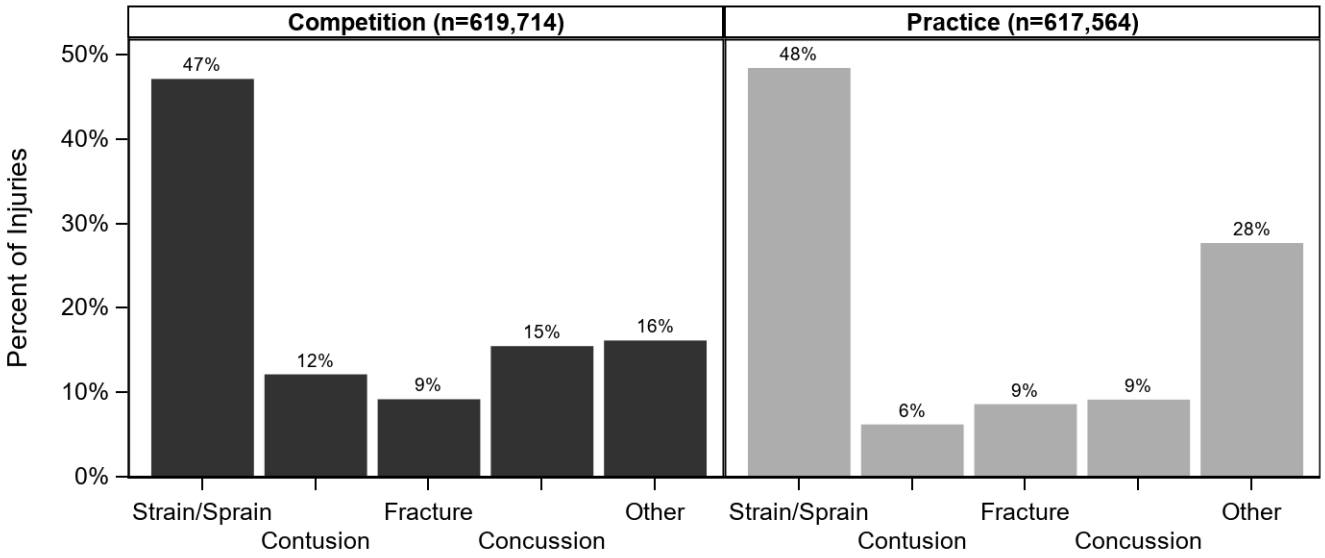
	Male		Female	
Year in School	**n**	**%**	**n**	**%**
Freshman	168,943	21.5%	82,253	27.6%
Sophomore	183,475	23.3%	73,659	24.7%
Junior	196,874	25.0%	72,439	24.3%
Senior	237,969	30.2%	69,568	23.4%
Total ***	***787,261***	***100.0%***	***297,919***	***100.0%***

Age (years)		
Minimum	12	12
Maximum	19	18
Mean (SD)	16.0 (1.3)	15.8 (1.2)
n	621,924	230,326

BMI		
Minimum	16.4	14.2
Maximum	50.4	39.3
Mean (SD)	24.7 (4.5)	22.5 (3.3)
n	444,536	175,704

* 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.
† **COVID-19 may have affected these results.**

Figure 2.1 Injury Diagnosis by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2020-21 School Year†



† COVID-19 may have affected these results.

Table 2.4 Body Site of Injury by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2020-21 School Year *

	Competition		Practice		Overall	
Body Site	**n**	**%**	**n**	**%**	**n**	**%**
Ankle	115,675	18.7%	119,303	19.5%	234,977	19.1%
Head/Face	117,820	19.1%	73,818	12.0%	191,638	15.6%
Knee	107,908	17.5%	82,667	13.5%	190,575	15.5%
Hip/Thigh/Upper Leg	64,099	10.4%	80,660	13.2%	144,759	11.8%
Hand/Wrist	50,211	8.1%	46,896	7.6%	97,106	7.9%
Shoulder	51,354	8.3%	41,208	6.7%	92,562	7.5%
Lower Leg	28,285	4.6%	36,036	5.9%	64,322	5.2%
Trunk	24,985	4.0%	32,849	5.4%	57,833	4.7%
Arm/Elbow	23,662	3.8%	26,031	4.2%	49,692	4.0%
Systemic	3,760	0.6%	43,807	7.1%	47,567	3.9%
Foot	13,075	2.1%	18,079	2.9%	31,154	2.5%
Other	8,046	1.3%	8,523	1.4%	16,569	1.3%
Neck	8,259	1.3%	3,404	0.6%	11,663	0.9%
Total	***617,138***	***100.0%***	***613,279***	***100.0%***	***1,230,418***	***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.
† COVID-19 may have affected these results.

Table 2.5 Most Commonly Injured Ankle Structures, High School Sports-Related Injury Surveillance Study, US, 2020-21 School Year *†

	Male (n=141,119)		Female (n=74,389)		Overall (n=215,508)	
Ankle Ligament Injuries	**n**	**%**	**n**	**%**	**n**	**%**
Anterior Talofibular Ligament	97,159	68.8%	52,643	70.8%	149,802	69.5%
Calcaneofibular Ligament	42,734	30.3%	24,136	32.4%	66,870	31.0%
Anterior Tibiofibular Ligament	29,875	21.2%	13,765	18.5%	43,640	20.2%
Posterior Talofibular Ligament	9,655	6.8%	4,674	6.3%	14,329	6.6%
Deltoid Ligament	9,772	6.9%	3,971	5.3%	13,743	6.4%
Posterior Tibiofibular Ligament	4,206	3.0%	3,844	5.2%	8,050	3.7%

* 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.
† **COVID-19 may have affected these results.**

Table 2.6 Most Commonly Injured Knee Structures, High School Sports-Related Injury Surveillance Study, US, 2020-21 School Year *†

	Male (n=118,372)		Female (n=51,675)		Overall (n=170,047)	
Knee Ligament Injuries	**n**	**%**	**n**	**%**	**n**	**%**
Anterior Cruciate Ligament	30,994	26.2%	21,417	41.4%	52,411	30.8%
Patella and/or Patellar Tendon	31,067	26.2%	14,208	27.5%	45,275	26.6%
Torn Cartilage (Meniscus)	24,324	20.5%	9,432	18.3%	33,756	19.9%
Medial Collateral Ligament	19,692	16.6%	10,939	21.2%	30,631	18.0%
Lateral Collateral Ligament	7,007	5.9%	852	1.6%	7,859	4.6%
Posterior Cruciate Ligament	2,353	2.0%	1,287	2.5%	3,640	2.1%

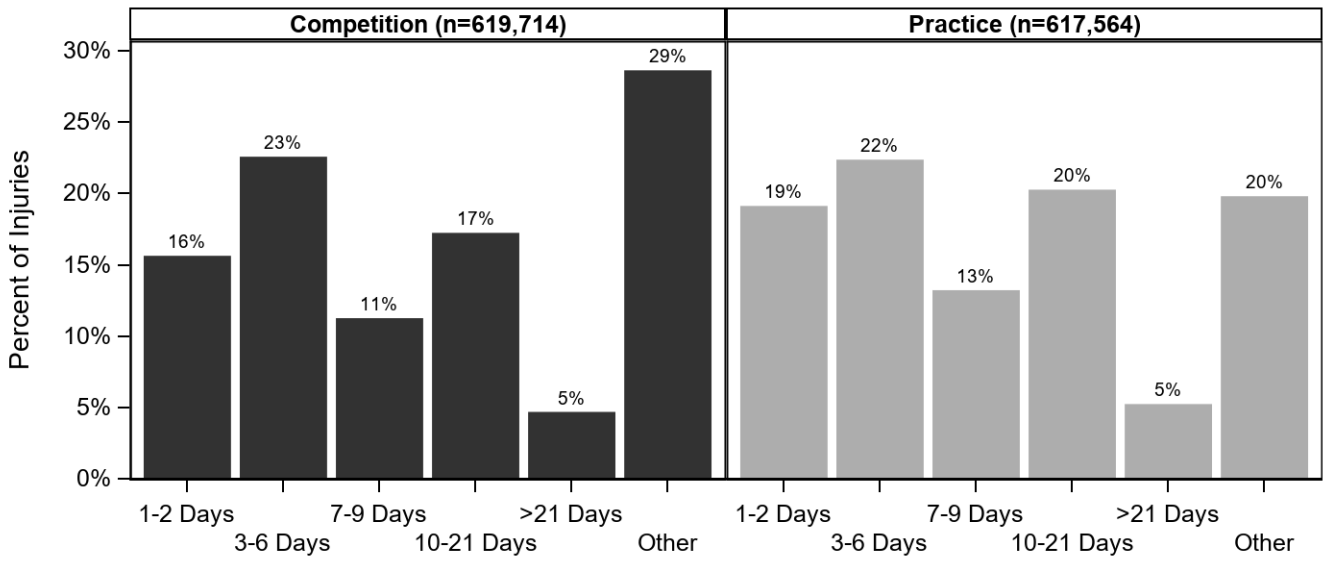
* Multiple ligament responses allowed per injury report. Totals and n's are not always equal due to slight rounding of the weighted number of injuries and missing responses. Due to a low level of non-response, these totals are always similar but are not always equal to the total number of injuries.
† **COVID-19 may have affected these results.**

Table 2.7 Ten Most Common Injury Diagnoses by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2020-21 School Year *†

	Competition (n=617,137)		Practice (n=613,282)		Overall (n=1,230,420)	
Diagnosis	**n**	**%**	**n**	**%**	**n**	**%**
Ankle Strain/Sprain	111,018	18.0%	110,048	17.9%	221,066	18.0%
Head/Face Concussion	95,833	15.5%	56,391	9.2%	152,223	12.4%
Hip/Thigh/Upper Leg Strain/Sprain	40,524	6.6%	72,783	11.9%	113,308	9.2%
Knee Strain/Sprain	58,508	9.5%	32,709	5.3%	91,217	7.4%
Knee Other	33,145	5.4%	40,839	6.7%	73,984	6.0%
Shoulder Other	26,194	4.2%	21,799	3.6%	47,993	3.9%
Systemic Other	3,760	0.6%	43,807	7.1%	47,567	3.9%
Hand/Wrist Fracture	23,283	3.8%	22,644	3.7%	45,927	3.7%
Shoulder Strain/Sprain	19,475	3.2%	16,430	2.7%	35,905	2.9%
Trunk Strain/Sprain	9,653	1.6%	24,145	3.9%	33,798	2.7%

* 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.
† **COVID-19 may have affected these results.**

Figure 2.2 Time Loss by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2020-21 School Year *†



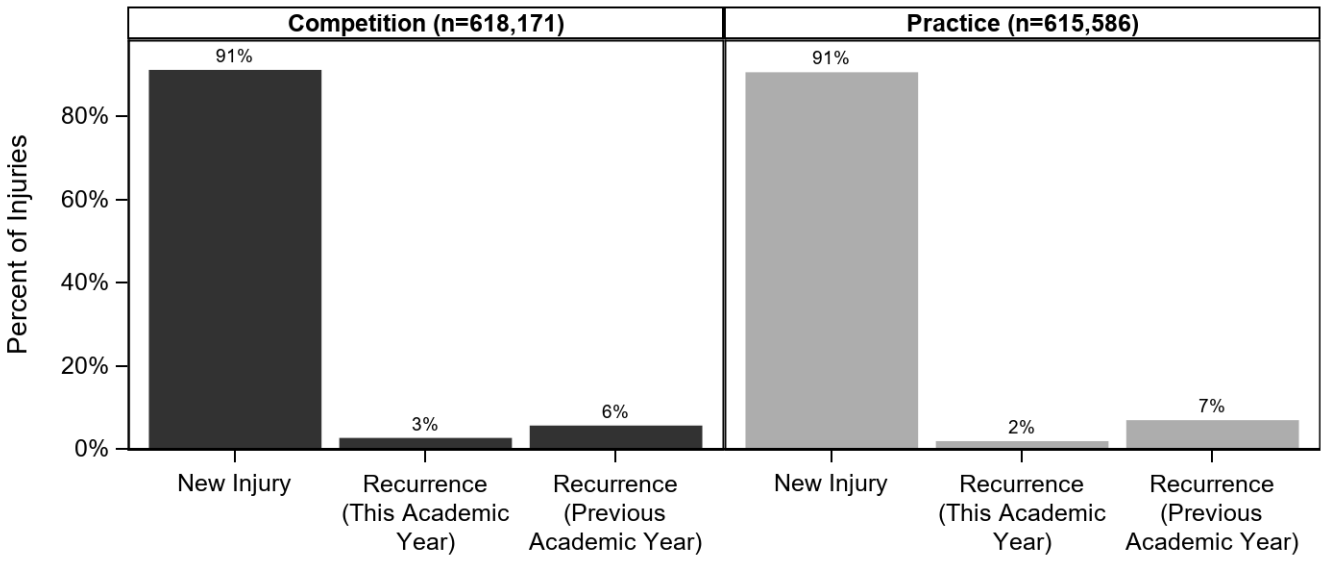
* Other category is made up of medical disqualification for season, medical disqualification for career, athlete chooses not to continue, and season ended before athlete returned to play
† **COVID-19 may have affected these results.**

Table 2.8 Injuries Requiring Surgery by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2020-21 School Year *†

	Competition		Practice		Overall	
Need for Surgery	**n**	**%**	**n**	**%**	**n**	**%**
Required Surgery	68,796	11.3%	32,481	5.3%	101,277	8.3%
Did Not Require Surgery	542,682	88.7%	577,456	94.7%	1,120,138	91.7%
Total	***611,477***	***100.0%***	***609,937***	***100.0%***	***1,221,414***	***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.
† COVID-19 may have affected these results.

Figure 2.3 New and Recurring Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2020-21 School Year†



† COVID-19 may have affected these results.

Table 2.9 Time during Season of Injury, High School Sports-Related Injury Surveillance Study, US, 2020-21 School Year *†

Time in Season	n	%
Preseason	292,490	23.7%
Regular Season	864,578	70.1%
Post Season	47,146	3.8%
Unknown/Other	29,226	2.4%
Total	***1,233,440***	***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.
† **COVID-19 may have affected these results.**

Table 2.10 Practice-Related Variables, High School Sports-Related Injury Surveillance Study, US, 2020-21 School Year *†

Time in Practice	n	%
First 1/2 Hour	49,872	8.3%
Second 1/2 Hour	81,327	13.5%
1-2 Hours into Practice	280,442	46.5%
>2 Hours into Practice	30,202	5.0%
Unknown	161,249	26.7%
Total	***603,091***	***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.
† **COVID-19 may have affected these results.**

Table 2.11 Methods for Injury Evaluation and Assessment, High School Sports-Related Injury Surveillance Study, US, 2020-21 School Year *†

Injuries Evaluated By:	n=1,237,277	%
Certified Athletic Trainer	1,135,447	91.8%
Orthopedic Physician	189,655	15.3%
Physician/Pediatrician	171,500	13.9%
Other	19,692	1.6%
Physician's Assistant	12,570	1.0%
Nurse Practitioner	8,778	0.7%
Chiropractor	7,597	0.6%
Neurologist/Neuropsychologist	3,400	0.3%
Dentist/Oral Surgeon	2,572	0.2%

Assessment Method:	n=1,237,277	%
Evaluation	1,181,286	95.5%
X-Ray	418,757	33.8%
MRI	158,474	12.8%
Blood Work/Lab Test	45,127	3.6%
CT-Scan	19,733	1.6%
Other	11,169	0.9%

* Multiple responses allowed per injury report.
† **COVID-19 may have affected these results.**

III. Boys' Football Injury Epidemiology

Table 3.1 Football Injury Rates by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2020-21 School Year *†

	# Injuries	# Exposures	Injury Rate (per 1,000 AEs)	Nationally Estimated # Injuries
Total	***850***	***250,432***	***3.39***	***485,416***
Competition	448	36,988	12.11	248,398
Practice	402	213,444	1.88	237,018

* All remaining analyses in this chapter present data weighted to provide national injury estimates.
† **COVID-19 may have affected these results.**

Table 3.2 Demographic Characteristics of Injured Football Athletes, High School Sports-Related Injury Surveillance Study, US, 2020-21 School Year *

Year in School	n	%
Freshman	84,713	20.1%
Sophomore	102,935	24.4%
Junior	103,619	24.6%
Senior	130,042	30.9%
Total	***421,308***	***100.0%***

Age (years)	
Minimum	12
Maximum	19
Mean (SD)	16.0 (1.3)
n	337,370

BMI	
Minimum	16.4
Maximum	50.4
Mean (SD)	25.9 (4.9)
n	233,847

* 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, 2020-21 School Year

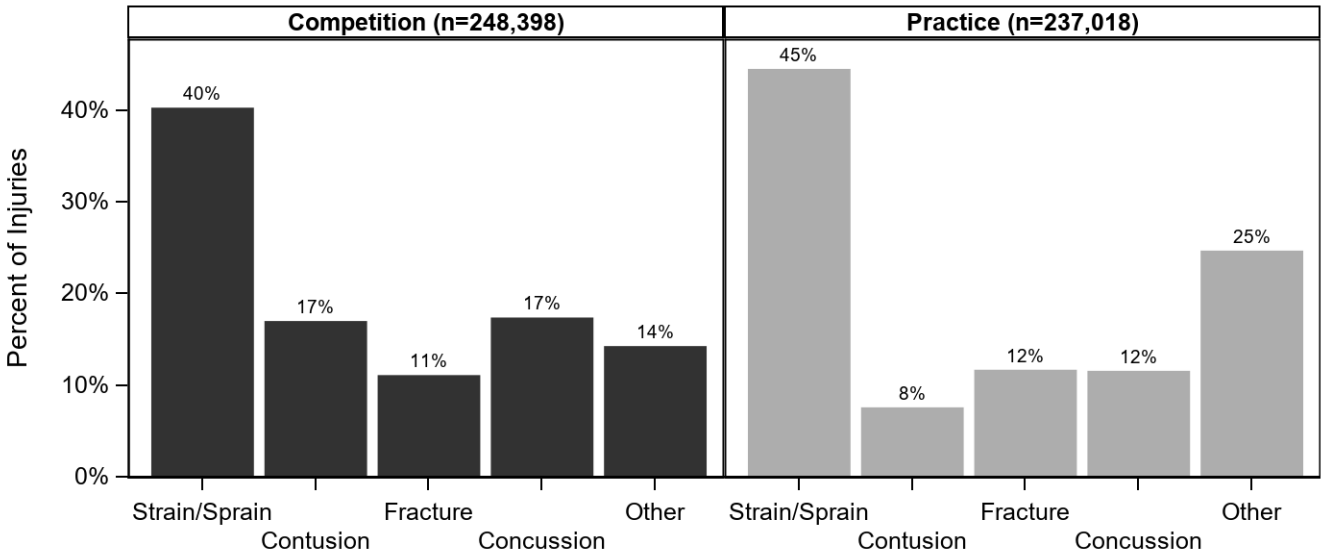


Table 3.3 Body Site of Football Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2020-21 School Year *

	Competition		Practice		Overall	
Body Site	**n**	**%**	**n**	**%**	**n**	**%**
Knee	43,566	17.7%	44,132	18.6%	87,698	18.1%
Head/Face	46,509	18.9%	31,954	13.5%	78,463	16.2%
Ankle	30,001	12.2%	34,193	14.4%	64,193	13.3%
Hip/Thigh/Upper Leg	23,061	9.4%	28,385	12.0%	51,447	10.6%
Hand/Wrist	21,859	8.9%	28,003	11.8%	49,861	10.3%
Shoulder	26,955	10.9%	20,951	8.8%	47,906	9.9%
Trunk	13,254	5.4%	11,954	5.0%	25,208	5.2%
Lower Leg	12,352	5.0%	6,236	2.6%	18,587	3.8%
Arm/Elbow	9,896	4.0%	7,994	3.4%	17,890	3.7%
Foot	7,509	3.0%	7,298	3.1%	14,808	3.1%
Other	5,294	2.2%	6,463	2.7%	11,757	2.4%
Systemic	1,176	0.5%	7,552	3.2%	8,728	1.8%
Neck	4,798	1.9%	1,903	0.8%	6,701	1.4%
Total	***246,230***	***100.0%***	***237,018***	***100.0%***	***483,248***	***100.0%***

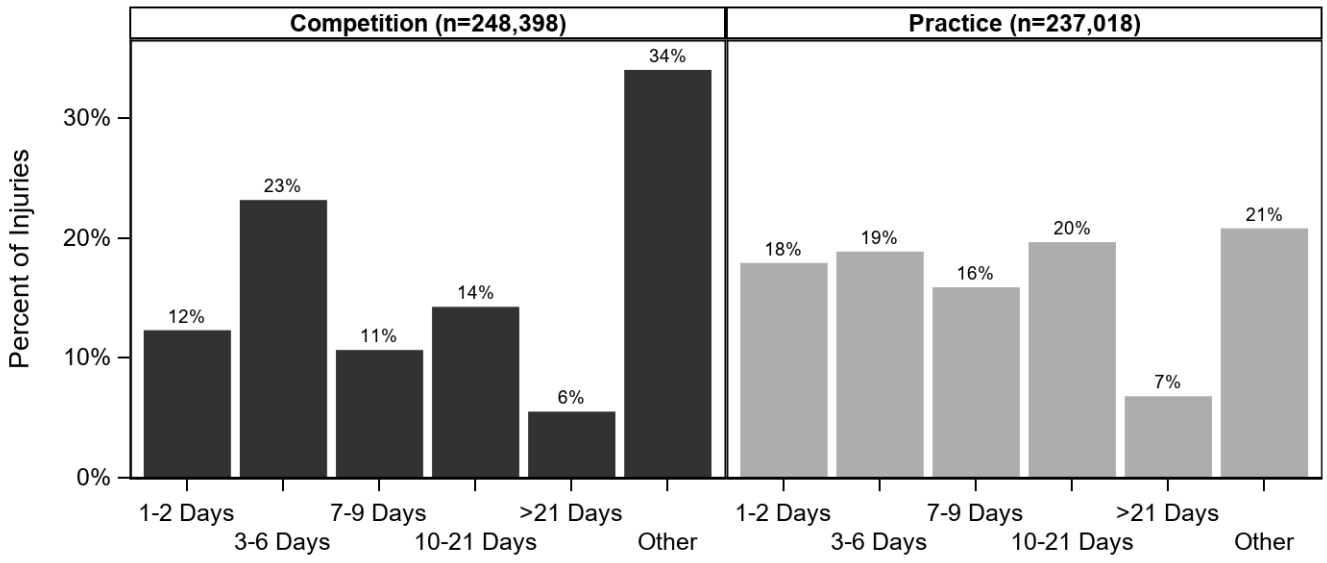
* Totals and n's represent the total weighted number of injury reports containing a valid response for the particular question. Due to a low level of non-response, these totals are always similar but are not always equal to the total number of injuries.

Table 3.4 Ten Most Common Football Injury Diagnoses by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2020-21 School Year *

	Competition (n=246,230)		Practice (n=237,018)		Overall (n=483,250)	
Diagnosis	**n**	**%**	**n**	**%**	**n**	**%**
Head/Face Concussion	43,161	17.5%	27,398	11.6%	70,559	14.6%
Ankle Strain/Sprain	28,188	11.4%	31,524	13.3%	59,712	12.4%
Knee Strain/Sprain	23,719	9.6%	19,605	8.3%	43,324	9.0%
Hip/Thigh/Upper Leg Strain/Sprain	11,428	4.6%	23,841	10.1%	35,269	7.3%
Knee Other	10,813	4.4%	20,640	8.7%	31,453	6.5%
Hand/Wrist Fracture	10,534	4.3%	14,021	5.9%	24,555	5.1%
Shoulder Other	9,580	3.9%	10,862	4.6%	20,442	4.2%
Shoulder Strain/Sprain	12,429	5.0%	7,109	3.0%	19,538	4.0%
Hand/Wrist Strain/Sprain	7,124	2.9%	8,546	3.6%	15,669	3.2%
Knee Contusion	8,663	3.5%	3,887	1.6%	12,550	2.6%

* 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, 2020-21 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, 2020-21 School Year *

	Competition		Practice		Overall	
Need for Surgery	**n**	**%**	**n**	**%**	**n**	**%**
Required Surgery	24,937	10.2%	18,517	7.9%	43,453	9.1%
Did Not Require Surgery	218,409	89.8%	216,981	92.1%	435,390	90.9%
Total	***243,345***	***100.0%***	***235,498***	***100.0%***	***478,844***	***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, 2020-21 School Year

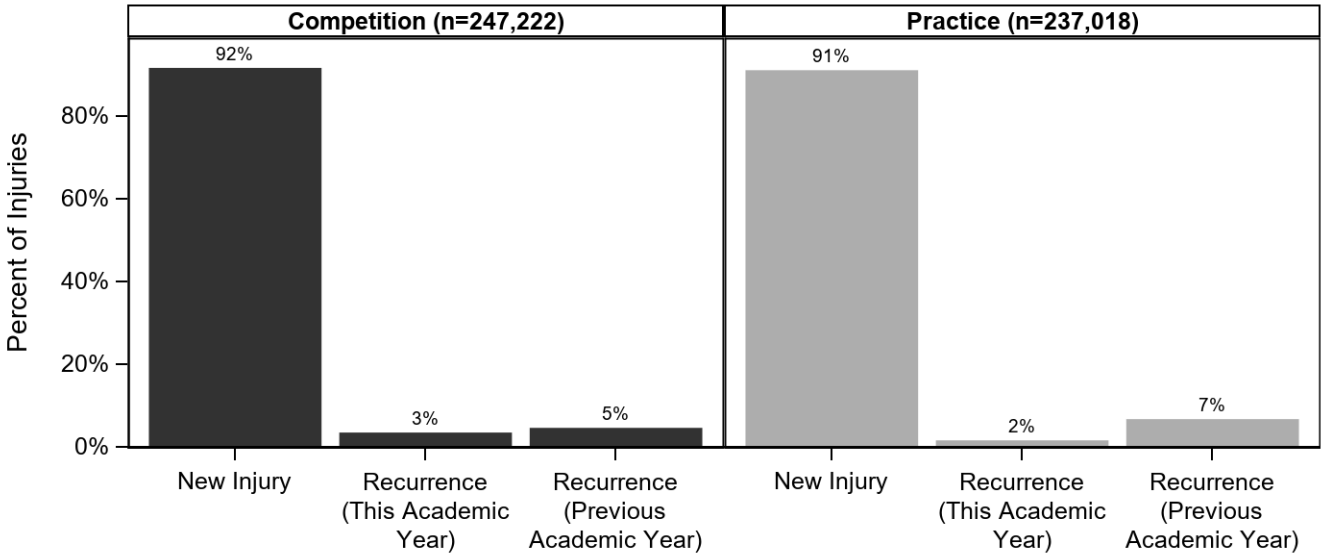


Table 3.6 Time during Season of Football Injuries, High School Sports-Related Injury Surveillance Study, US, 2020-21 School Year *

Time in Season	n	%
Preseason	109,271	22.5%
Regular Season	333,611	68.8%
Post Season	19,528	4.0%
Unknown/Other	22,264	4.6%
Total	***484,673***	***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, 2020-21 School Year *

Time in Competition	n	%
Pre-competition/Warm-Ups	2,034	0.9%
First Quarter	32,155	14.2%
Second Quarter	76,032	33.6%
Third Quarter	65,273	28.8%
Fourth Quarter	49,933	22.0%
Overtime	1,176	0.5%
Total	***226,603***	***100.0%***

Field Location		
End Zone	5,181	2.3%
Red Zone (20 Yard Line to Goal Line)	39,531	17.4%
Between the 20 Yard Lines	119,386	52.4%
Off the Field	2,034	0.9%
Unknown	61,493	27.0%
Total	***227,624***	***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, 2020-21 School Year *

Time in Practice	n	%
First 1/2 Hour	19,973	8.5%
Second 1/2 Hour	30,782	13.2%
1-2 Hours into Practice	117,278	50.2%
>2 Hours into Practice	21,575	9.2%
Unknown	44,140	18.9%
Total	***233,749***	***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, 2020-21 School Year

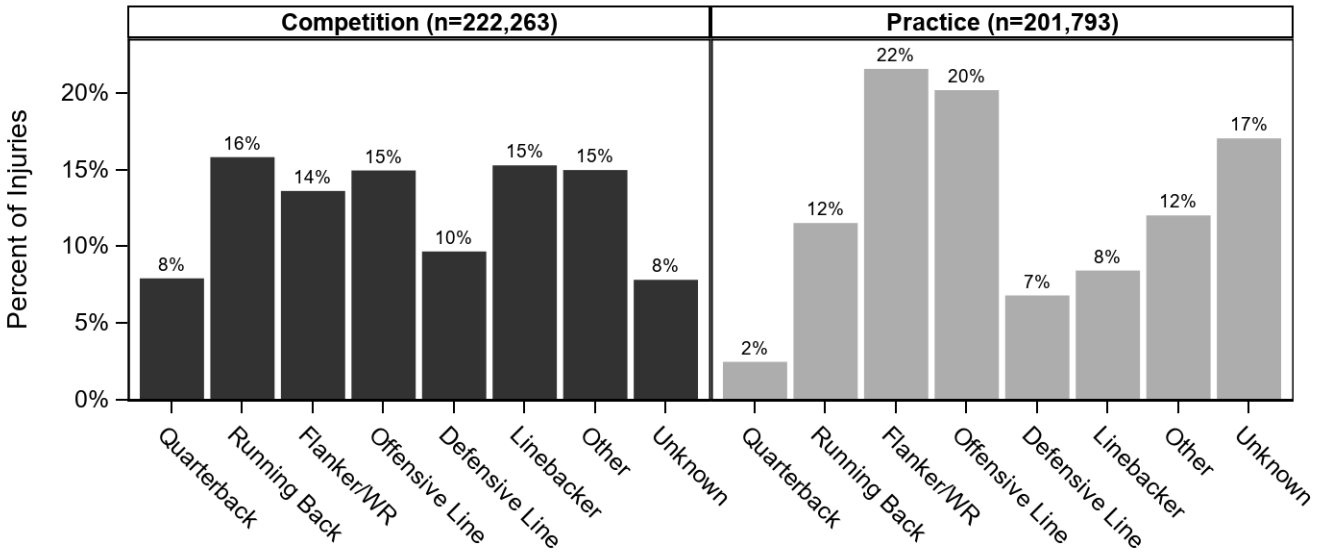


Table 3.9 Activities Leading to Football Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2020-21 School Year *

	Competition		Practice		Overall	
Activity	**n**	**%**	**n**	**%**	**n**	**%**
Being Tackled	79,028	34.6%	31,360	15.2%	110,389	25.4%
Tackling	49,839	21.8%	21,542	10.5%	71,381	16.4%
Blocking	29,202	12.8%	31,855	15.5%	61,058	14.1%
Unknown	19,746	8.6%	29,110	14.2%	48,857	11.3%
Other	10,826	4.7%	26,875	13.1%	37,700	8.7%
Rotation Around a Planted Foot/Inversion	8,218	3.6%	18,338	8.9%	26,556	6.1%
Stepped On, Fell On or Kicked	11,723	5.1%	10,853	5.3%	22,575	5.2%
N/A **	4,557	2.0%	17,685	8.6%	22,241	5.1%
Being Blocked	13,802	6.0%	7,748	3.8%	21,550	5.0%
Uneven Playing Surface	1,084	0.5%	4,235	2.1%	5,320	1.2%
Contact with Blocking Sled/Dummy	0	0.0%	4,213	2.0%	4,213	1.0%
Contact with Ball	372	0.2%	792	0.4%	1,164	0.3%
Contact with Seats, Bleacher or Table	0	0.0%	1,038	0.5%	1,038	0.2%
Total	***228,397***	***100.0%***	***205,644***	***100.0%***	***434,041***	***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, 2020-21 School Year *

	Diagnosis									
	Strain/Sprain		Contusion		Fracture		Concussion		Other	
Activity	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**
Being Blocked	6,545	3.6%	4,689	8.3%	3,281	6.3%	5,190	8.7%	1,845	2.2%
Being Tackled	37,517	20.7%	18,737	33.1%	12,437	24.0%	26,358	44.1%	15,340	18.1%
Blocking	21,817	12.0%	5,440	9.6%	12,692	24.5%	6,976	11.7%	14,133	16.7%
Contact with Ball	282	0.2%	0	0.0%	372	0.7%	0	0.0%	510	0.6%
Contact with Blocking Sled/Dummy	1,875	1.0%	510	0.9%	0	0.0%	0	0.0%	1,828	2.2%
Contact with Seats, Bleacher or Table	0	0.0%	0	0.0%	0	0.0%	666	1.1%	372	0.4%
N/A **	9,246	5.1%	0	0.0%	0	0.0%	0	0.0%	12,996	15.4%
Other	19,590	10.8%	2,137	3.8%	5,862	11.3%	1,255	2.1%	8,856	10.5%
Rotation Around a Planted Foot/Inversion	23,051	12.7%	513	0.9%	0	0.0%	0	0.0%	2,993	3.5%
Stepped On, Fell On or Kicked	11,400	6.3%	9,139	16.2%	810	1.6%	0	0.0%	1,226	1.4%
Tackling	19,910	11.0%	12,007	21.2%	11,871	22.9%	12,213	20.5%	15,380	18.2%
Uneven Playing Surface	5,320	2.9%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Unknown	24,838	13.7%	3,394	6.0%	4,478	8.6%	7,059	11.8%	9,087	10.7%
Total	***181,390***	***100.0%***	***56,566***	***100.0%***	***51,802***	***100.0%***	***59,716***	***100.0%***	***84,567***	***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, 2020-21 School Year *†

	# Injuries	# Exposures	Injury Rate (per 1,000 AEs)	Nationally Estimated # Injuries
Total	***207***	***114,781***	***1.80***	***143,124***
Competition	102	30,929	3.30	71,425
Practice	105	83,852	1.25	71,699

* All remaining analyses in this chapter present data weighted to provide national injury estimates.
† **COVID-19 may have affected these results.**

Table 4.2 Demographic Characteristics of Injured Boys' Soccer Athletes, High School Sports-Related Injury Surveillance Study, US, 2020-21 School Year *

Year in School	n	%
Freshman	28,525	20.9%
Sophomore	25,935	19.0%
Junior	40,179	29.4%
Senior	41,812	30.6%
Total	***136,452***	***100.0%***

Age (years)	
Minimum	14
Maximum	19
Mean (SD)	16.1 (1.3)
n	113,954

BMI	
Minimum	17.8
Maximum	35.6
Mean (SD)	22.7 (2.6)
n	81,136

* 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, 2020-21 School Year

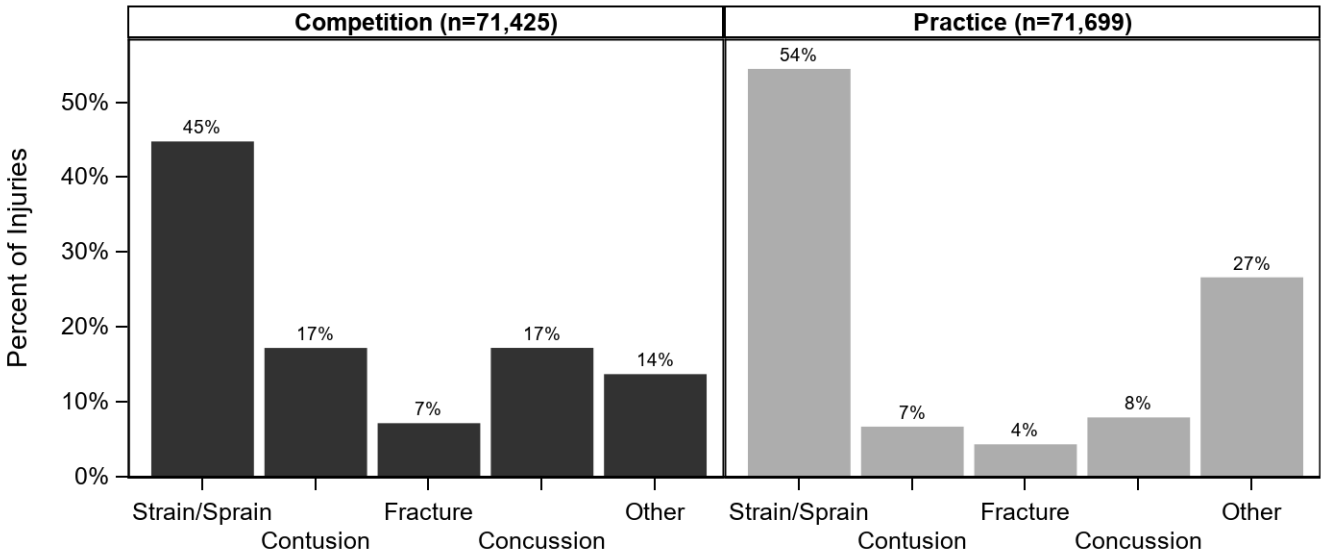


Table 4.3 Body Site of Boys' Soccer Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2020-21 School Year *

	Competition		Practice		Overall	
Body Site	**n**	**%**	**n**	**%**	**n**	**%**
Hip/Thigh/Upper Leg	15,248	21.3%	19,600	27.3%	34,849	24.3%
Ankle	11,351	15.9%	16,542	23.1%	27,893	19.5%
Head/Face	14,918	20.9%	6,366	8.9%	21,285	14.9%
Knee	9,957	13.9%	6,862	9.6%	16,818	11.8%
Lower Leg	5,145	7.2%	10,321	14.4%	15,466	10.8%
Hand/Wrist	5,359	7.5%	2,596	3.6%	7,955	5.6%
Foot	2,290	3.2%	3,838	5.4%	6,128	4.3%
Trunk	2,511	3.5%	2,786	3.9%	5,296	3.7%
Systemic	1,407	2.0%	1,485	2.1%	2,893	2.0%
Other	1,832	2.6%	0	0.0%	1,832	1.3%
Shoulder	1,407	2.0%	222	0.3%	1,630	1.1%
Arm/Elbow	0	0.0%	729	1.0%	729	0.5%
Neck	0	0.0%	352	0.5%	352	0.2%
Total	***71,425***	***100.0%***	***71,699***	***100.0%***	***143,125***	***100.0%***

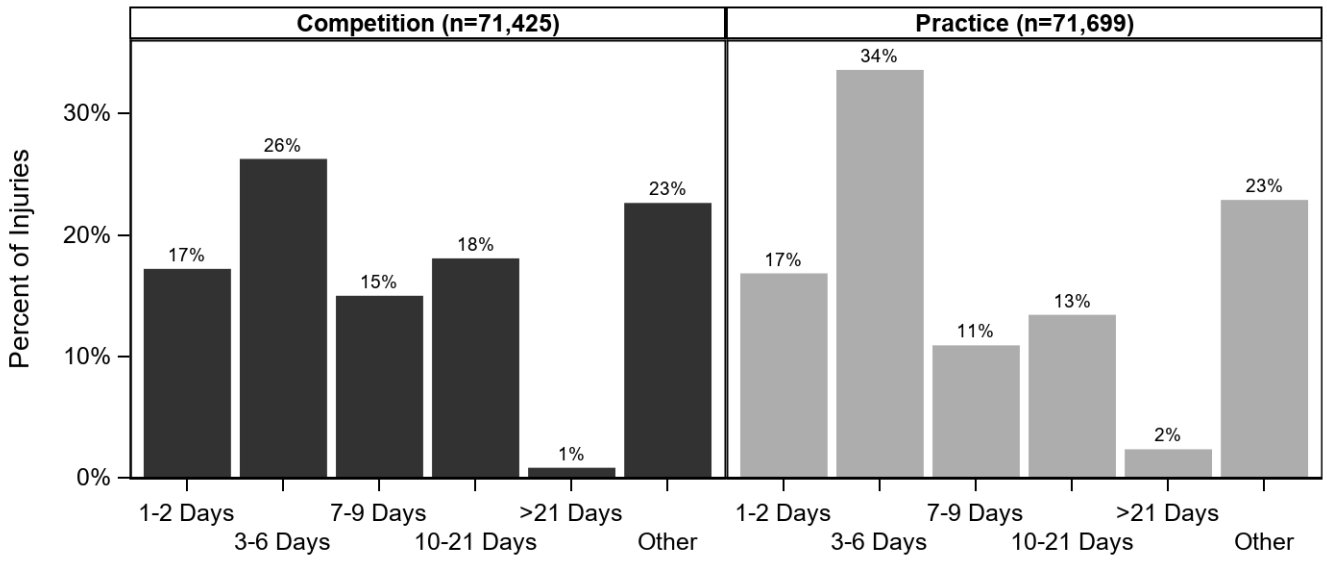
* Totals and n's represent the total weighted number of injury reports containing a valid response for the particular question. Due to a low level of non-response, these totals are always similar but are not always equal to the total number of injuries.

Table 4.4 Ten Most Common Boys' Soccer Injury Diagnoses by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2020-21 School Year *

	Competition (n=71,422)		Practice (n=71,698)		Overall (n=143,124)	
Diagnosis	**n**	**%**	**n**	**%**	**n**	**%**
Hip/Thigh/Upper Leg Strain/Sprain	10,858	15.2%	17,547	24.5%	28,406	19.8%
Ankle Strain/Sprain	10,297	14.4%	15,853	22.1%	26,150	18.3%
Head/Face Concussion	12,286	17.2%	5,677	7.9%	17,963	12.6%
Knee Other	3,981	5.6%	4,360	6.1%	8,341	5.8%
Lower Leg Other	1,407	2.0%	6,817	9.5%	8,225	5.7%
Knee Strain/Sprain	5,283	7.4%	623	0.9%	5,906	4.1%
Hand/Wrist Fracture	2,544	3.6%	2,373	3.3%	4,918	3.4%
Hip/Thigh/Upper Leg Contusion	4,025	5.6%	0	0.0%	4,025	2.8%
Lower Leg Strain/Sprain	1,666	2.3%	2,097	2.9%	3,762	2.6%
Lower Leg Contusion	2,072	2.9%	1,407	2.0%	3,479	2.4%

* 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, 2020-21 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, 2020-21 School Year *

	Competition		Practice		Overall	
Need for Surgery	**n**	**%**	**n**	**%**	**n**	**%**
Required Surgery	4,831	6.9%	1,312	1.8%	6,143	4.3%
Did Not Require Surgery	65,137	93.1%	70,387	98.2%	135,524	95.7%
Total	***69,969***	***100.0%***	***71,699***	***100.0%***	***141,668***	***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, 2020-21 School Year

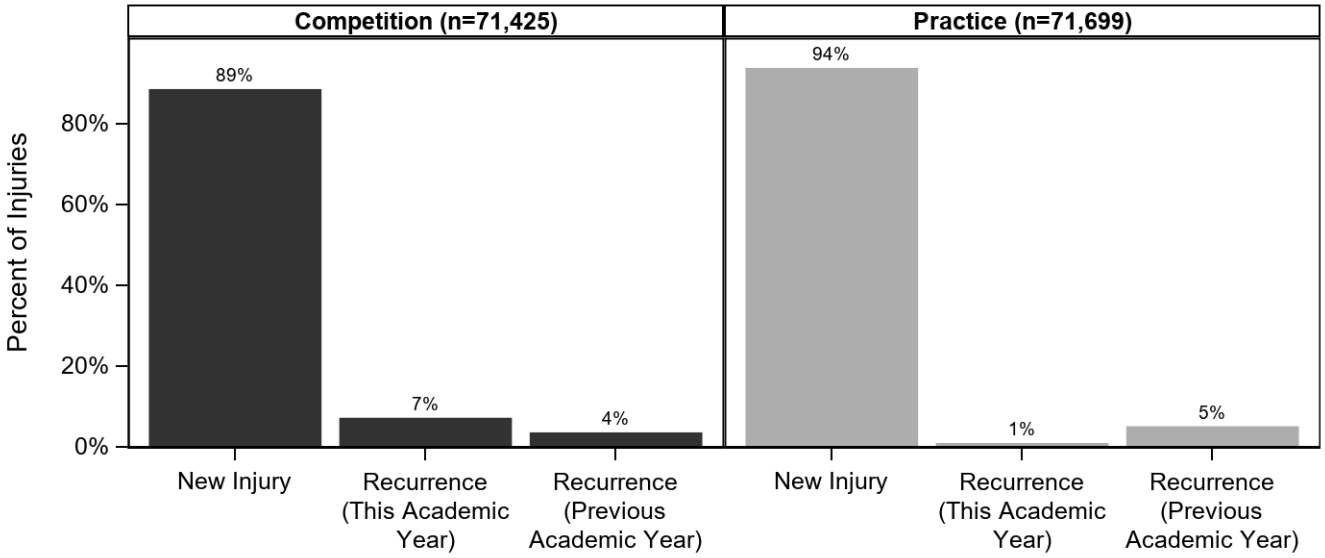


Table 4.6 Time during Season of Boys' Soccer Injuries, High School Sports-Related Injury Surveillance Study, US, 2020-21 School Year *

Time in Season	n	%
Preseason	46,365	32.6%
Regular Season	87,353	61.3%
Post Season	8,028	5.6%
Unknown/Other	689	0.5%
Total	***142,435***	***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, 2020-21 School Year *

Time in Competition	n	%
Pre-competition/Warm-Ups	1,747	2.7%
First Half	22,581	34.4%
Second Half	29,397	44.8%
Overtime	689	1.1%
Unknown	11,203	17.1%
Total	***65,617***	***100.0%***

Field Location		
Goal Box (Defense)	6,307	9.4%
Goal Box (Offense)	8,510	12.7%
Side of Goal Box (Defense)	4,058	6.1%
Side of Goal Box (Offense)	2,993	4.5%
Top of Goal Box Extended to Center Line (Offense)	13,988	20.9%
Top of Goal Box Extended to Center Line (Defense)	8,942	13.4%
Off the Field	1,878	2.8%
Unknown	20,175	30.2%
Total	***66,852***	***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, 2020-21 School Year *

Time in Practice	n	%
First 1/2 Hour	5,735	8.1%
Second 1/2 Hour	7,057	9.9%
1-2 Hours into Practice	35,427	49.9%
>2 Hours into Practice	2,815	4.0%
Unknown	20,019	28.2%
Total	***71,053***	***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, 2020-21 School Year

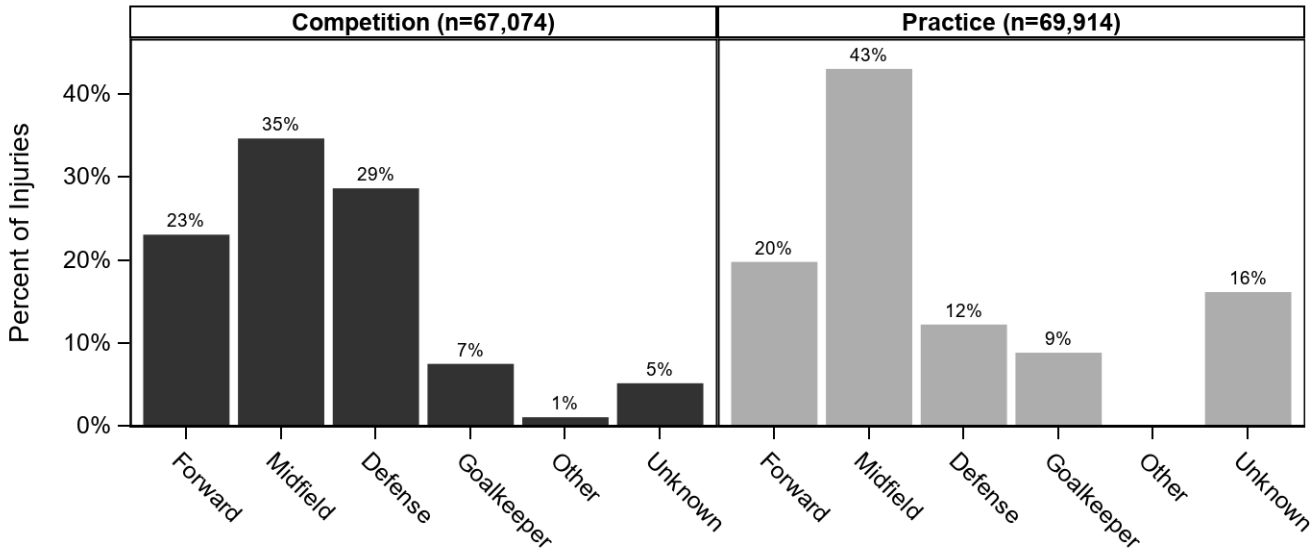


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Table 4.9 Activities Leading to Boys' Soccer Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2020-21 School Year *

	Competition		Practice		Overall	
Activity	**n**	**%**	**n**	**%**	**n**	**%**
General Play	13,441	20.0%	25,444	36.4%	38,885	28.4%
Unknown	6,077	9.1%	9,202	13.2%	15,279	11.2%
Defending	7,281	10.9%	6,454	9.2%	13,735	10.0%
Chasing Loose Ball	10,015	14.9%	3,017	4.3%	13,032	9.5%
Shooting	5,668	8.4%	6,835	9.8%	12,503	9.1%
Ball Handling/Dribbling	6,842	10.2%	2,697	3.9%	9,539	7.0%
Heading Ball	6,086	9.1%	3,267	4.7%	9,352	6.8%
Goaltending	3,399	5.1%	4,210	6.0%	7,609	5.6%
Receiving Pass	2,469	3.7%	1,878	2.7%	4,348	3.2%
Blocking Shot	1,878	2.8%	2,461	3.5%	4,339	3.2%
Passing	2,539	3.8%	912	1.3%	3,450	2.5%
Receiving a Slide Tackle	689	1.0%	1,407	2.0%	2,097	1.5%
Other	0	0.0%	1,508	2.2%	1,508	1.1%
Attempting a Slide Tackle	689	1.0%	0	0.0%	689	0.5%
Conditioning	0	0.0%	623	0.9%	623	0.5%
Total	***67,074***	***100.0%***	***69,914***	***100.0%***	***136,988***	***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, 2020-21 School Year *

	Diagnosis									
	Strain/Sprain		Contusion		Fracture		Concussion		Other	
Activity	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**
Attempting a Slide Tackle	689	1.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Ball Handling/Dribbling	6,186	9.3%	1,850	10.8%	1,503	18.3%	0	0.0%	0	0.0%
Blocking Shot	689	1.0%	0	0.0%	836	10.2%	2,815	15.7%	0	0.0%
Chasing Loose Ball	5,033	7.5%	2,979	17.4%	2,278	27.8%	1,379	7.7%	1,364	5.0%
Conditioning	494	0.7%	0	0.0%	0	0.0%	0	0.0%	129	0.5%
Defending	5,472	8.2%	1,713	10.0%	1,586	19.3%	3,830	21.3%	1,134	4.2%
General Play	22,730	34.1%	4,294	25.1%	222	2.7%	364	2.0%	11,274	41.6%
Goaltending	3,063	4.6%	587	3.4%	729	8.9%	1,407	7.8%	1,823	6.7%
Heading Ball	352	0.5%	1,379	8.1%	364	4.4%	6,124	34.1%	1,134	4.2%
Other	129	0.2%	0	0.0%	0	0.0%	0	0.0%	1,379	5.1%
Passing	2,068	3.1%	689	4.0%	0	0.0%	222	1.2%	471	1.7%
Receiving Pass	1,878	2.8%	0	0.0%	0	0.0%	1,235	6.9%	1,235	4.6%
Receiving a Slide Tackle	689	1.0%	1,407	8.2%	0	0.0%	0	0.0%	0	0.0%
Shooting	11,268	16.9%	0	0.0%	0	0.0%	0	0.0%	1,235	4.6%
Unknown	5,929	8.9%	2,177	12.7%	689	8.4%	587	3.3%	5,897	21.8%
Total	***66,670***	***100.0%***	***17,074***	***100.0%***	***8,208***	***100.0%***	***17,963***	***100.0%***	***27,074***	***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, 2020-21 School Year *†

	# Injuries	# Exposures	Injury Rate (per 1,000 AEs)	Nationally Estimated # Injuries
Total	***212***	***103,035***	***2.06***	***133,171***
Competition	126	28,800	4.38	77,138
Practice	86	74,235	1.16	56,033

* All remaining analyses in this chapter present data weighted to provide national injury estimates.
† **COVID-19 may have affected these results.**

Table 5.2 Demographic Characteristics of Injured Girls' Soccer Athletes, High School Sports-Related Injury Surveillance Study, US, 2020-21 School Year *

Year in School	n	%
Freshman	32,329	25.3%
Sophomore	25,439	19.9%
Junior	34,328	26.8%
Senior	35,926	28.1%
Total	***128,022***	***100.0%***

Age (years)	
Minimum	13
Maximum	18
Mean (SD)	15.8 (1.2)
n	90,650

BMI	
Minimum	15.3
Maximum	31.3
Mean (SD)	21.8 (2.7)
n	66,907

* 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, 2020-21 School Year

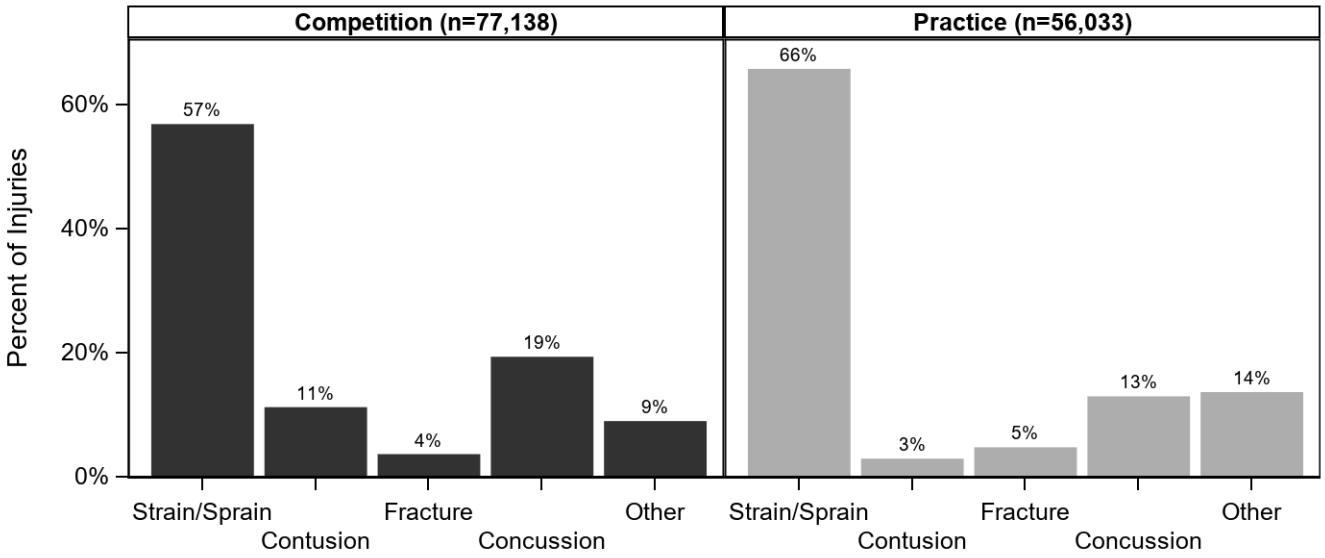


Table 5.3 Body Site of Girls' Soccer Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2020-21 School Year *

	Competition		Practice		Overall	
Body Site	**n**	**%**	**n**	**%**	**n**	**%**
Ankle	16,923	21.9%	12,993	23.2%	29,916	22.5%
Hip/Thigh/Upper Leg	11,653	15.1%	18,016	32.2%	29,669	22.3%
Knee	18,995	24.6%	5,466	9.8%	24,461	18.4%
Head/Face	15,536	20.1%	7,637	13.6%	23,173	17.4%
Lower Leg	3,998	5.2%	6,232	11.1%	10,230	7.7%
Hand/Wrist	3,199	4.1%	3,065	5.5%	6,264	4.7%
Shoulder	2,805	3.6%	0	0.0%	2,805	2.1%
Trunk	654	0.8%	1,798	3.2%	2,452	1.8%
Foot	1,376	1.8%	363	0.6%	1,739	1.3%
Neck	1,378	1.8%	0	0.0%	1,378	1.0%
Arm/Elbow	490	0.6%	464	0.8%	954	0.7%
Other	131	0.2%	0	0.0%	131	0.1%
Total	***77,138***	***100.0%***	***56,033***	***100.0%***	***133,172***	***100.0%***

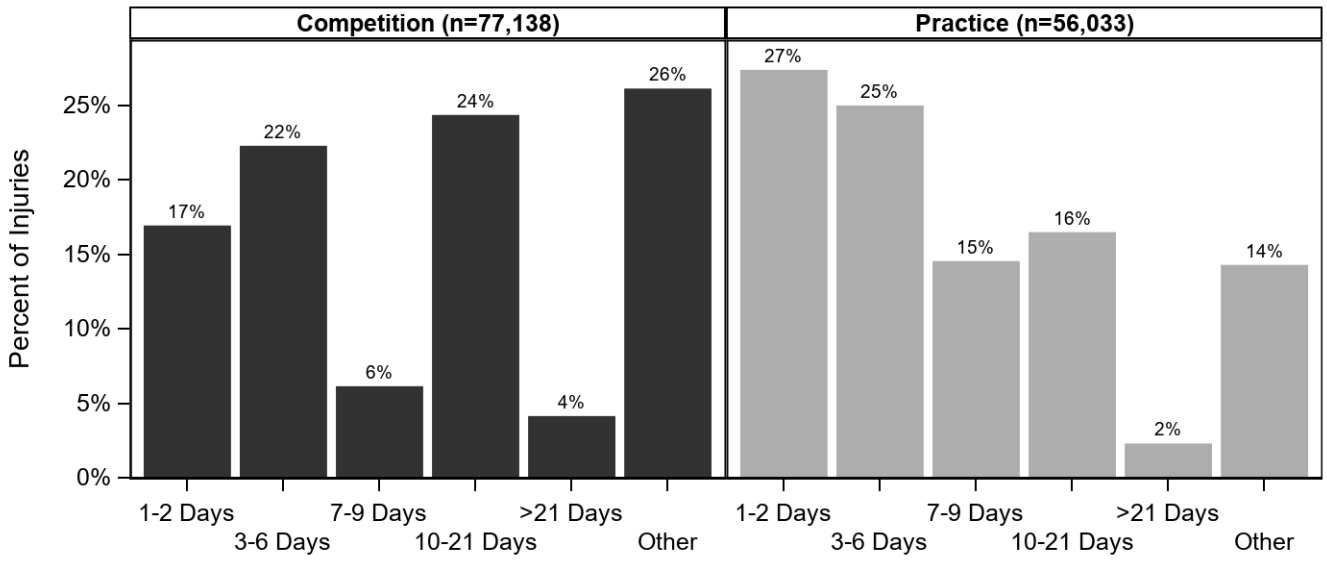
* Totals and n's represent the total weighted number of injury reports containing a valid response for the particular question. Due to a low level of non-response, these totals are always similar but are not always equal to the total number of injuries.

Table 5.4 Ten Most Common Girls' Soccer Injury Diagnoses by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2020-21 School Year *

	Competition (n=77,138)		Practice (n=56,034)		Overall (n=133,172)	
Diagnosis	**n**	**%**	**n**	**%**	**n**	**%**
Ankle Strain/Sprain	16,923	21.9%	12,862	23.0%	29,785	22.4%
Hip/Thigh/Upper Leg Strain/Sprain	9,157	11.9%	17,784	31.7%	26,941	20.2%
Head/Face Concussion	14,916	19.3%	7,262	13.0%	22,178	16.7%
Knee Strain/Sprain	12,936	16.8%	1,405	2.5%	14,341	10.8%
Knee Other	3,790	4.9%	2,917	5.2%	6,707	5.0%
Lower Leg Other	0	0.0%	4,133	7.4%	4,133	3.1%
Hand/Wrist Fracture	1,290	1.7%	1,921	3.4%	3,211	2.4%
Knee Contusion	1,894	2.5%	1,144	2.0%	3,038	2.3%
Lower Leg Contusion	2,854	3.7%	0	0.0%	2,854	2.1%
Lower Leg Strain/Sprain	490	0.6%	2,099	3.7%	2,589	1.9%

* 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, 2020-21 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, 2020-21 School Year *

	Competition		Practice		Overall	
Need for Surgery	**n**	**%**	**n**	**%**	**n**	**%**
Required Surgery	8,147	10.6%	1,126	2.0%	9,273	7.0%
Did Not Require Surgery	68,759	89.4%	54,418	98.0%	123,177	93.0%
Total	***76,906***	***100.0%***	***55,544***	***100.0%***	***132,450***	***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, 2020-21 School Year

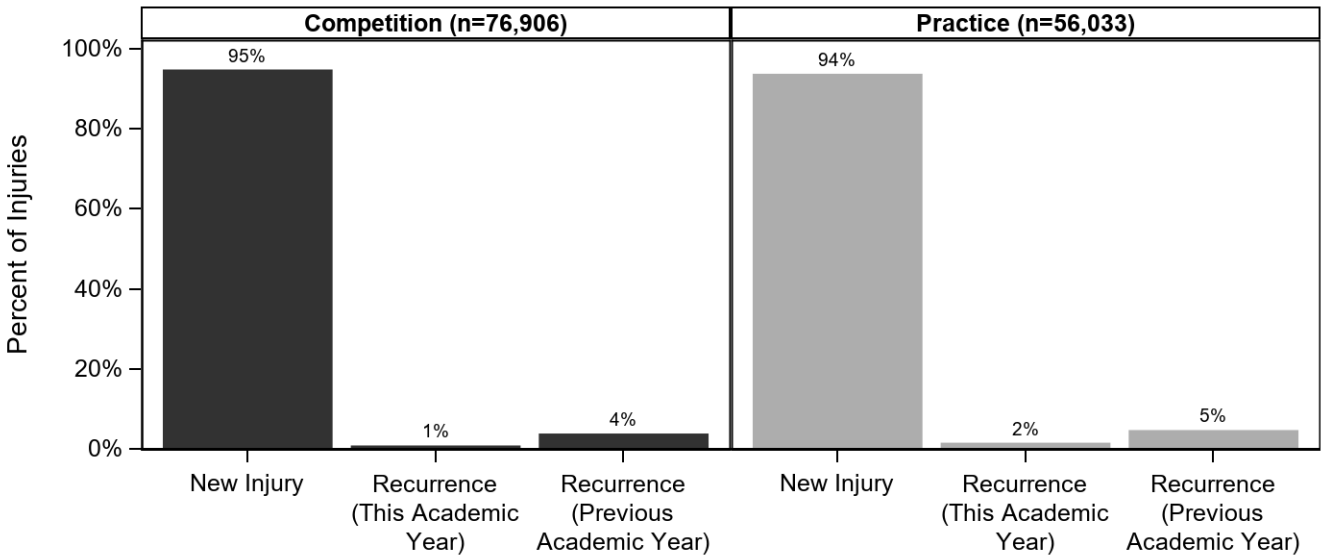


Table 5.6 Time during Season of Girls' Soccer Injuries, High School Sports-Related Injury Surveillance Study, US, 2020-21 School Year *

Time in Season	n	%
Preseason	26,617	20.0%
Regular Season	101,647	76.3%
Post Season	4,908	3.7%
Total	***133,172***	***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, 2020-21 School Year *

Time in Competition	n	%
Pre-competition/Warm-Ups	886	1.2%
First Half	17,033	23.0%
Second Half	36,345	49.0%
Overtime	1,661	2.2%
Unknown	18,288	24.6%
Total	***74,215***	***100.0%***

Field Location		
Goal Box (Defense)	7,268	9.9%
Goal Box (Offense)	3,061	4.2%
Side of Goal Box (Defense)	7,001	9.5%
Side of Goal Box (Offense)	6,674	9.1%
Top of Goal Box Extended to Center Line (Offense)	12,833	17.4%
Top of Goal Box Extended to Center Line (Defense)	8,684	11.8%
Unknown	28,039	38.1%
Total	***73,560***	***100.0%***

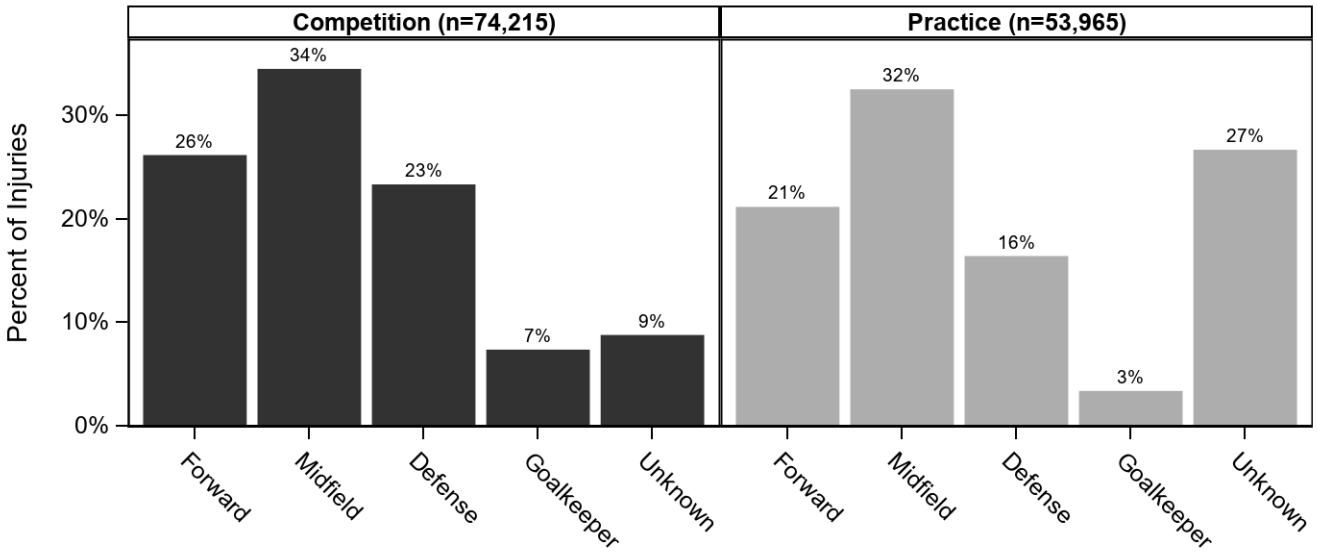
* Totals and n's represent the total weighted number of injury reports containing a valid response for the particular question. Due to a low level of non-response, these totals are always similar but are not always equal to the total number of injuries.

Table 5.8 Practice-Related Variables for Girls' Soccer Injuries, High School Sports-Related Injury Surveillance Study, US, 2020-21 School Year *

Time in Practice	n	%
First 1/2 Hour	4,084	7.4%
Second 1/2 Hour	9,426	17.2%
1-2 Hours into Practice	20,684	37.7%
>2 Hours into Practice	1,287	2.3%
Unknown	19,376	35.3%
Total	***54,857***	***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, 2020-21 School Year



REPORTING INFORMATION ONLINE

Table 5.9 Activities Leading to Girls' Soccer Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2020-21 School Year *

	Competition		Practice		Overall	
Activity	**n**	**%**	**n**	**%**	**n**	**%**
Unknown	9,271	12.5%	15,739	29.2%	25,010	19.5%
General Play	12,908	17.4%	10,507	19.5%	23,415	18.3%
Defending	9,971	13.4%	3,719	6.9%	13,690	10.7%
Heading Ball	9,728	13.1%	3,037	5.6%	12,765	10.0%
Chasing Loose Ball	8,484	11.4%	3,454	6.4%	11,938	9.3%
Ball Handling/Dribbling	8,762	11.8%	2,895	5.4%	11,657	9.1%
Shooting	3,409	4.6%	4,122	7.6%	7,531	5.9%
Passing	2,032	2.7%	2,452	4.5%	4,484	3.5%
Receiving Pass	2,036	2.7%	2,398	4.4%	4,434	3.5%
Goaltending	2,362	3.2%	1,683	3.1%	4,046	3.2%
Blocking Shot	3,877	5.2%	131	0.2%	4,007	3.1%
Conditioning	0	0.0%	3,828	7.1%	3,828	3.0%
Receiving a Slide Tackle	1,144	1.5%	0	0.0%	1,144	0.9%
Attempting a Slide Tackle	232	0.3%	0	0.0%	232	0.2%
Total	***74,215***	***100.0%***	***53,965***	***100.0%***	***128,180***	***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, 2020-21 School Year *

	Diagnosis									
	Strain/Sprain		Contusion		Fracture		Concussion		Other	
Activity	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**
Attempting a Slide Tackle	232	0.3%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Ball Handling/Dribbling	9,028	11.4%	954	9.3%	0	0.0%	232	1.1%	1,443	10.1%
Blocking Shot	1,807	2.3%	0	0.0%	0	0.0%	2,200	10.7%	0	0.0%
Chasing Loose Ball	6,378	8.1%	1,309	12.7%	0	0.0%	1,029	5.0%	3,222	22.5%
Conditioning	3,453	4.4%	0	0.0%	375	9.6%	0	0.0%	0	0.0%
Defending	7,788	9.9%	2,173	21.1%	0	0.0%	3,109	15.1%	620	4.3%
General Play	16,924	21.4%	865	8.4%	1,665	42.5%	2,207	10.7%	1,754	12.3%
Goaltending	1,439	1.8%	261	2.5%	785	20.0%	1,097	5.3%	464	3.2%
Heading Ball	2,923	3.7%	0	0.0%	0	0.0%	8,555	41.5%	1,287	9.0%
Passing	3,830	4.8%	654	6.4%	0	0.0%	0	0.0%	0	0.0%
Receiving Pass	2,656	3.4%	1,546	15.0%	0	0.0%	232	1.1%	0	0.0%
Receiving a Slide Tackle	490	0.6%	654	6.4%	0	0.0%	0	0.0%	0	0.0%
Shooting	7,299	9.2%	0	0.0%	0	0.0%	232	1.1%	0	0.0%
Unknown	14,797	18.7%	1,867	18.2%	1,097	28.0%	1,740	8.4%	5,509	38.5%
Total	***79,044***	***100.0%***	***10,283***	***100.0%***	***3,921***	***100.0%***	***20,632***	***100.0%***	***14,300***	***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, 2020-21 School Year *†

	# Injuries	# Exposures	Injury Rate (per 1,000 AEs)	Nationally Estimated # Injuries
Total	***106***	***103,670***	***1.02***	***61,279***
Competition	44	31,443	1.40	27,437
Practice	62	72,227	0.86	33,842

* All remaining analyses in this chapter present data weighted to provide national injury estimates.
† **COVID-19 may have affected these results.**

Table 6.2 Demographic Characteristics of Injured Girls' Volleyball Athletes, High School Sports-Related Injury Surveillance Study, US, 2020-21 School Year *

Year in School	n	%
Freshman	15,182	24.8%
Sophomore	16,917	27.7%
Junior	13,261	21.7%
Senior	15,786	25.8%
Total	***61,146***	***100.0%***

Age (years)	
Minimum	14
Maximum	18
Mean (SD)	15.8 (1.3)
n	53,036

BMI	
Minimum	16.6
Maximum	39.3
Mean (SD)	22.2 (3.1)
n	42,089

* 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, 2020-21 School Year

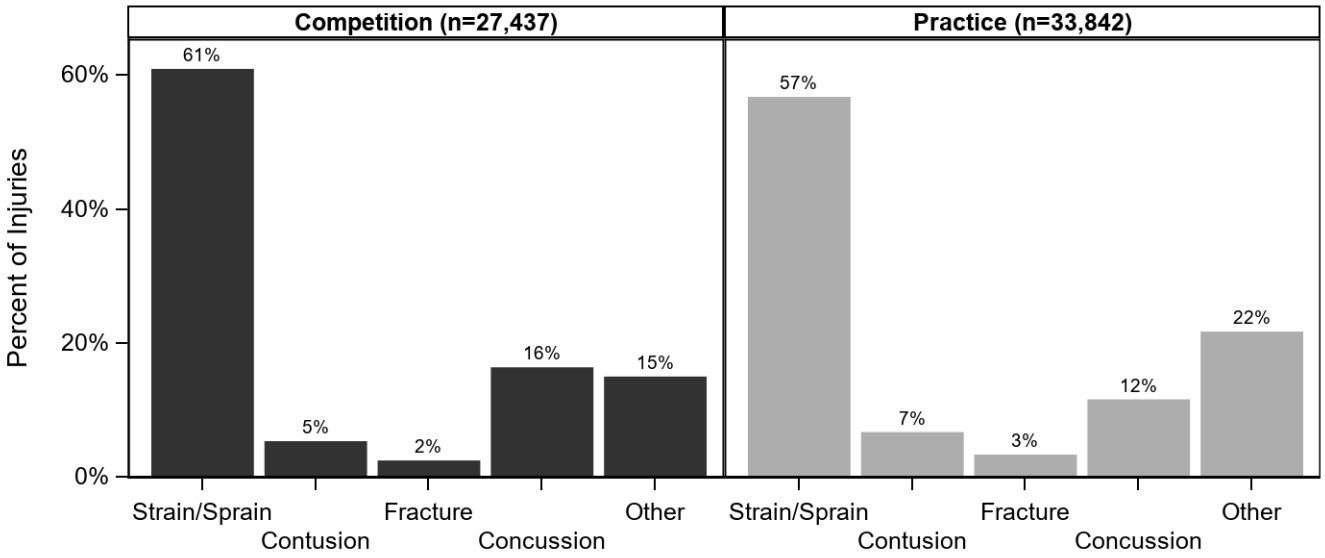


Table 6.3 Body Site of Girls' Volleyball Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2020-21 School Year *

	Competition		Practice		Overall	
Body Site	**n**	**%**	**n**	**%**	**n**	**%**
Ankle	9,643	35.1%	10,245	30.7%	19,888	32.7%
Knee	6,863	25.0%	5,573	16.7%	12,436	20.5%
Head/Face	5,131	18.7%	3,912	11.7%	9,043	14.9%
Shoulder	800	2.9%	3,754	11.3%	4,555	7.5%
Arm/Elbow	640	2.3%	2,903	8.7%	3,543	5.8%
Hand/Wrist	1,310	4.8%	2,008	6.0%	3,318	5.5%
Hip/Thigh/Upper Leg	2,410	8.8%	666	2.0%	3,076	5.1%
Lower Leg	0	0.0%	1,799	5.4%	1,799	3.0%
Trunk	493	1.8%	1,133	3.4%	1,627	2.7%
Systemic	147	0.5%	1,355	4.1%	1,502	2.5%
Total	***27,437***	***100.0%***	***33,349***	***100.0%***	***60,787***	***100.0%***

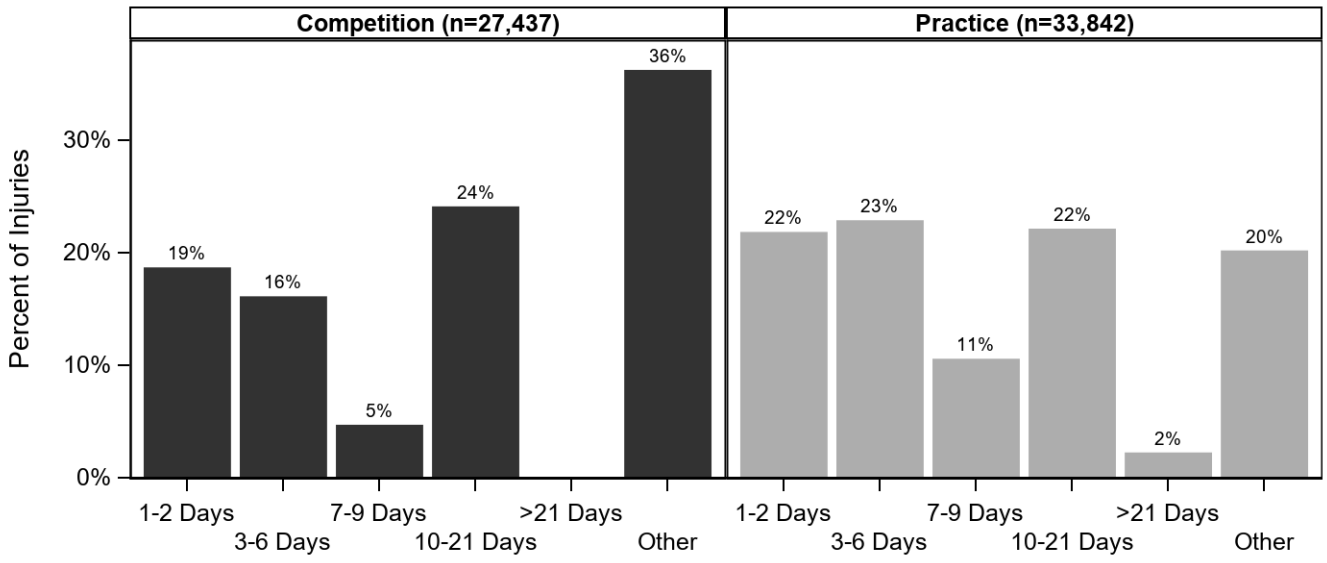
* Totals and n's represent the total weighted number of injury reports containing a valid response for the particular question. Due to a low level of non-response, these totals are always similar but are not always equal to the total number of injuries.

Table 6.4 Ten Most Common Girls' Volleyball Injury Diagnoses by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2020-21 School Year *

	Competition (n=27,435)		Practice (n=33,348)		Overall (n=60,785)	
Diagnosis	**n**	**%**	**n**	**%**	**n**	**%**
Ankle Strain/Sprain	9,643	35.1%	8,787	26.3%	18,429	30.3%
Head/Face Concussion	4,486	16.4%	3,912	11.7%	8,399	13.8%
Knee Strain/Sprain	4,474	16.3%	2,371	7.1%	6,846	11.3%
Knee Other	1,744	6.4%	3,202	9.6%	4,945	8.1%
Shoulder Strain/Sprain	800	2.9%	2,941	8.8%	3,741	6.2%
Arm/Elbow Strain/Sprain	0	0.0%	2,237	6.7%	2,237	3.7%
Hip/Thigh/Upper Leg Other	1,078	3.9%	666	2.0%	1,744	2.9%
Hand/Wrist Strain/Sprain	644	2.3%	1,073	3.2%	1,718	2.8%
Trunk Strain/Sprain	493	1.8%	1,133	3.4%	1,627	2.7%
Systemic Other	147	0.5%	1,355	4.1%	1,502	2.5%

* 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 6.2 Time Loss of Girls' Volleyball Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2020-21 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, 2020-21 School Year *

	Competition		Practice		Overall	
Need for Surgery	**n**	**%**	**n**	**%**	**n**	**%**
Required Surgery	6,218	22.8%	2,543	7.8%	8,761	14.6%
Did Not Require Surgery	21,085	77.2%	30,140	92.2%	51,225	85.4%
Total	***27,303***	***100.0%***	***32,683***	***100.0%***	***59,986***	***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, 2020-21 School Year

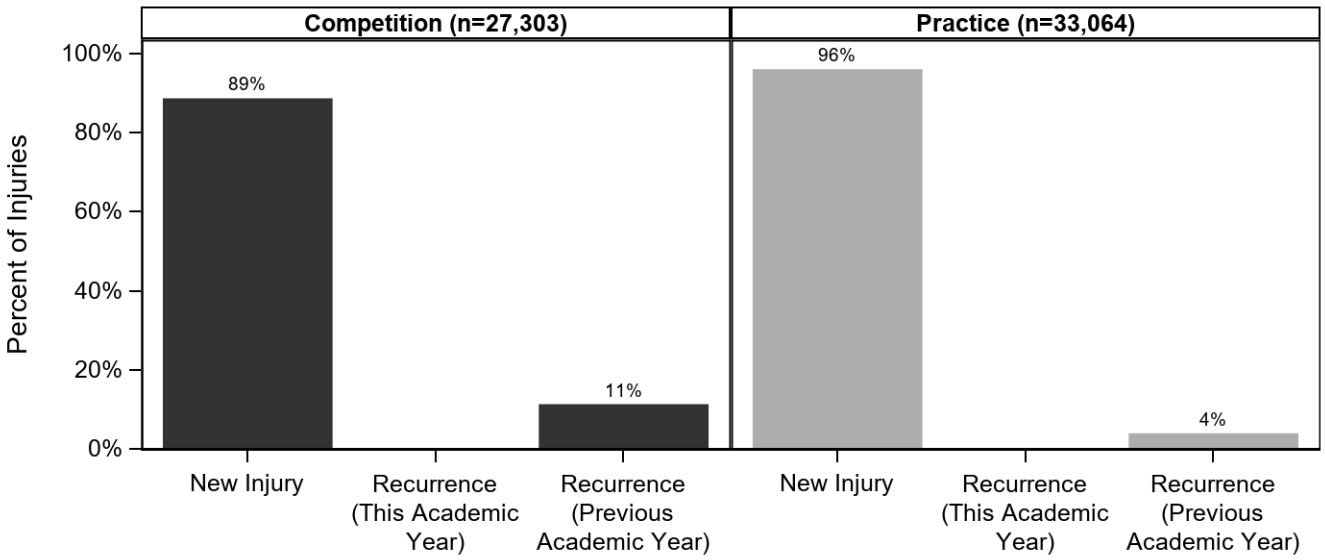


Table 6.6 Time during Season of Girls' Volleyball Injuries, High School Sports-Related Injury Surveillance Study, US, 2020-21 School Year *

Time in Season	n	%
Preseason	11,423	18.7%
Regular Season	49,216	80.5%
Post Season	493	0.8%
Total	***61,132***	***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, 2020-21 School Year *

Time in Competition	n	%
Pre-competition/Warm-Ups	3,164	11.7%
First Game	3,869	14.3%
Second Game	5,683	21.0%
Third Game	4,602	17.0%
Fifth Game	1,459	5.4%
Unknown	8,233	30.5%
Total	***27,009***	***100.0%***

Court Location		
Right Back (Server)	2,491	9.2%
Right Forward	6,126	22.7%
Outside Court (Your Side)	666	2.5%
Middle Forward	3,016	11.2%
Left Forward	3,696	13.7%
Left Back	134	0.5%
Outside the Playable Area	134	0.5%
At the Net	3,284	12.2%
Unknown	7,462	27.6%
Total	***27,009***	***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, 2020-21 School Year *

Time in Practice	n	%
First 1/2 Hour	3,670	11.1%
Second 1/2 Hour	5,461	16.5%
1-2 Hours into Practice	16,194	49.0%
Unknown	7,730	23.4%
Total	***33,055***	***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.

Figure 6.4 Player Position of Girls' Volleyball Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2020-21 School Year

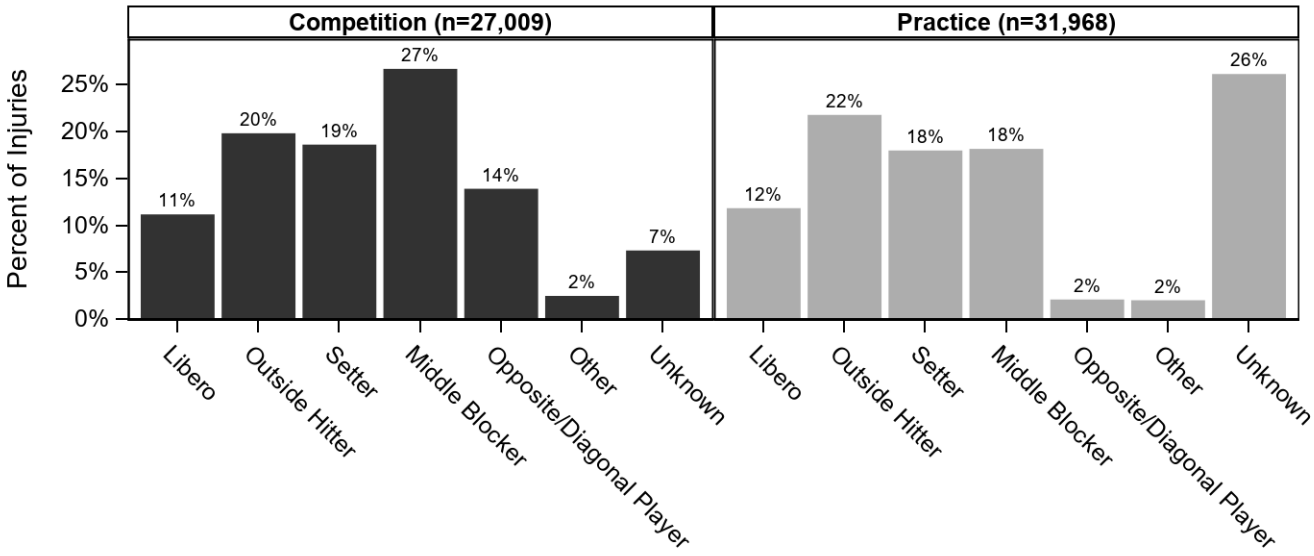


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Table 6.9 Activities Leading to Girls' Volleyball Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2020-21 School Year *

	Competition		Practice		Overall	
Activity	**n**	**%**	**n**	**%**	**n**	**%**
Blocking	7,856	28.9%	6,581	20.7%	14,437	24.5%
General Play	4,788	17.6%	7,971	25.0%	12,758	21.6%
Digging	5,646	20.8%	5,461	17.2%	11,108	18.8%
Unknown	800	2.9%	6,215	19.5%	7,015	11.9%
Spiking	5,028	18.5%	1,782	5.6%	6,810	11.5%
Setting	1,459	5.4%	1,592	5.0%	3,051	5.2%
Passing	1,445	5.3%	281	0.9%	1,726	2.9%
Serving	0	0.0%	1,310	4.1%	1,310	2.2%
Other	134	0.5%	493	1.5%	627	1.1%
Conditioning	0	0.0%	134	0.4%	134	0.2%
Total	***27,156***	***100.0%***	***31,821***	***100.0%***	***58,977***	***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, 2020-21 School Year *

	Diagnosis									
	Strain/Sprain		Contusion		Fracture		Concussion		Other	
Activity	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**
Blocking	11,654	32.8%	0	0.0%	493	27.6%	134	1.6%	2,156	22.5%
Conditioning	134	0.4%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Digging	4,362	12.3%	2,272	61.1%	800	44.8%	1,952	23.2%	1,722	18.0%
General Play	5,736	16.2%	644	17.3%	0	0.0%	4,600	54.8%	1,778	18.6%
Other	493	1.4%	0	0.0%	0	0.0%	134	1.6%	0	0.0%
Passing	792	2.2%	800	21.5%	0	0.0%	134	1.6%	0	0.0%
Serving	1,310	3.7%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Setting	3,051	8.6%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Spiking	6,144	17.3%	0	0.0%	0	0.0%	0	0.0%	666	7.0%
Unknown	1,825	5.1%	0	0.0%	493	27.6%	1,445	17.2%	3,252	34.0%
Total	***35,501***	***100.0%***	***3,717***	***100.0%***	***1,786***	***100.0%***	***8,399***	***100.0%***	***9,575***	***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, 2020-21 School Year *†

	# Injuries	# Exposures	Injury Rate (per 1,000 AEs)	Nationally Estimated # Injuries
Total	***220***	***117,695***	***1.87***	***129,429***
Competition	97	32,914	2.95	64,833
Practice	123	84,781	1.45	64,596

* All remaining analyses in this chapter present data weighted to provide national injury estimates.
† **COVID-19 may have affected these results.**

Table 7.2 Demographic Characteristics of Injured Boys' Basketball Athletes, High School Sports-Related Injury Surveillance Study, US, 2020-21 School Year *

Year in School	n	%
Freshman	24,502	21.4%
Sophomore	26,210	22.9%
Junior	28,912	25.3%
Senior	34,758	30.4%
Total	***114,384***	***100.0%***

Age (years)	
Minimum	12
Maximum	18
Mean (SD)	16.1 (1.3)
n	89,047

BMI	
Minimum	17.3
Maximum	34.3
Mean (SD)	22.8 (2.4)
n	63,796

* 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, 2020-21 School Year

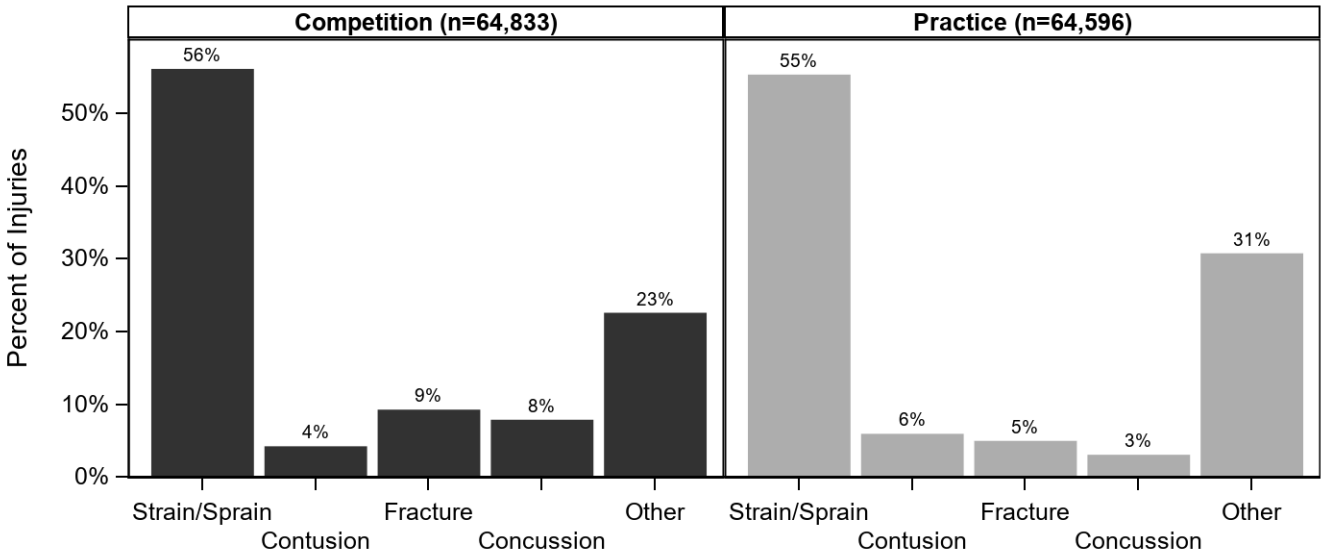


Table 7.3 Body Site of Boys' Basketball Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2020-21 School Year *

	Competition		Practice		Overall	
Body Site	**n**	**%**	**n**	**%**	**n**	**%**
Ankle	25,898	39.9%	24,050	37.2%	49,948	38.6%
Head/Face	12,819	19.8%	6,128	9.5%	18,946	14.6%
Knee	7,938	12.2%	6,208	9.6%	14,146	10.9%
Hand/Wrist	7,871	12.1%	1,752	2.7%	9,623	7.4%
Lower Leg	2,733	4.2%	5,406	8.4%	8,138	6.3%
Systemic	0	0.0%	7,781	12.0%	7,781	6.0%
Trunk	1,448	2.2%	5,365	8.3%	6,813	5.3%
Hip/Thigh/Upper Leg	2,666	4.1%	3,655	5.7%	6,321	4.9%
Foot	0	0.0%	3,643	5.6%	3,643	2.8%
Shoulder	2,819	4.3%	608	0.9%	3,428	2.6%
Arm/Elbow	642	1.0%	0	0.0%	642	0.5%
Total	***64,833***	***100.0%***	***64,596***	***100.0%***	***129,429***	***100.0%***

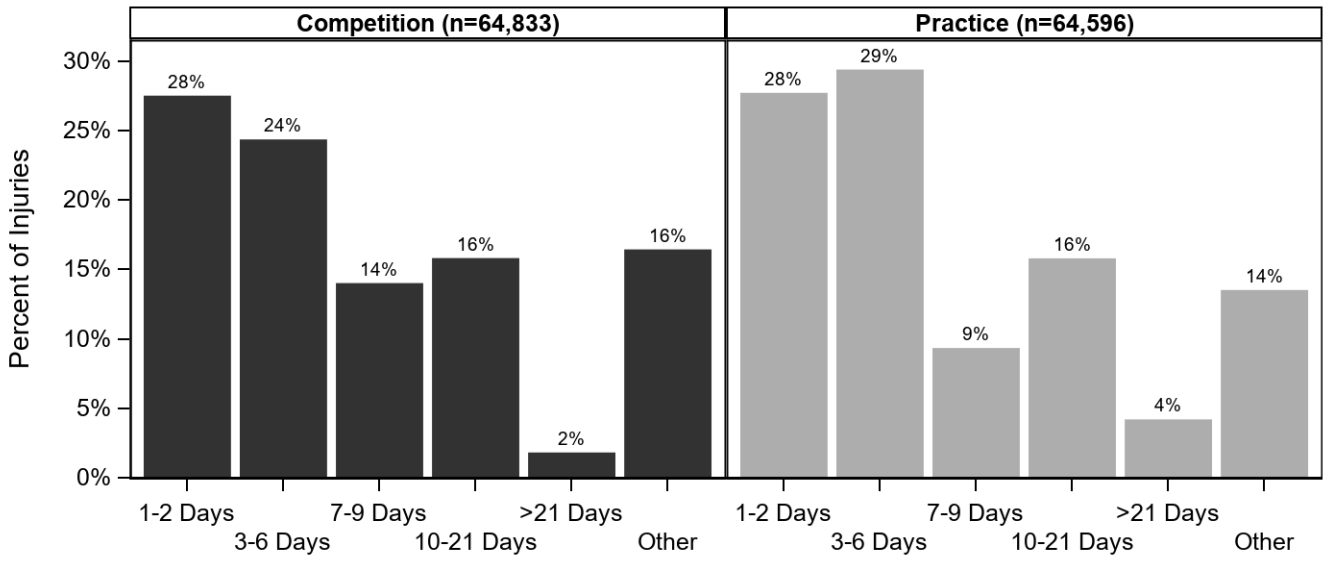
* Totals and n's represent the total weighted number of injury reports containing a valid response for the particular question. Due to a low level of non-response, these totals are always similar but are not always equal to the total number of injuries.

Table 7.4 Ten Most Common Boys' Basketball Injury Diagnoses by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2020-21 School Year *

	Competition (n=64,833)		Practice (n=64,594)		Overall (n=129,430)	
Diagnosis	**n**	**%**	**n**	**%**	**n**	**%**
Ankle Strain/Sprain	24,864	38.4%	23,359	36.2%	48,222	37.3%
Knee Other	4,579	7.1%	4,925	7.6%	9,504	7.3%
Systemic Other	0	0.0%	7,781	12.0%	7,781	6.0%
Head/Face Concussion	5,087	7.8%	1,953	3.0%	7,040	5.4%
Hand/Wrist Strain/Sprain	5,314	8.2%	1,443	2.2%	6,757	5.2%
Head/Face Other	4,910	7.6%	1,034	1.6%	5,944	4.6%
Hip/Thigh/Upper Leg Strain/Sprain	1,770	2.7%	3,655	5.7%	5,425	4.2%
Head/Face Fracture	2,822	4.4%	1,963	3.0%	4,784	3.7%
Lower Leg Strain/Sprain	642	1.0%	3,776	5.8%	4,419	3.4%
Trunk Strain/Sprain	1,320	2.0%	2,891	4.5%	4,212	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, 2020-21 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, 2020-21 School Year *

	Competition		Practice		Overall	
Need for Surgery	**n**	**%**	**n**	**%**	**n**	**%**
Required Surgery	4,480	7.0%	154	0.2%	4,635	3.6%
Did Not Require Surgery	59,279	93.0%	64,287	99.8%	123,567	96.4%
Total	***63,759***	***100.0%***	***64,442***	***100.0%***	***128,201***	***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, 2020-21 School Year

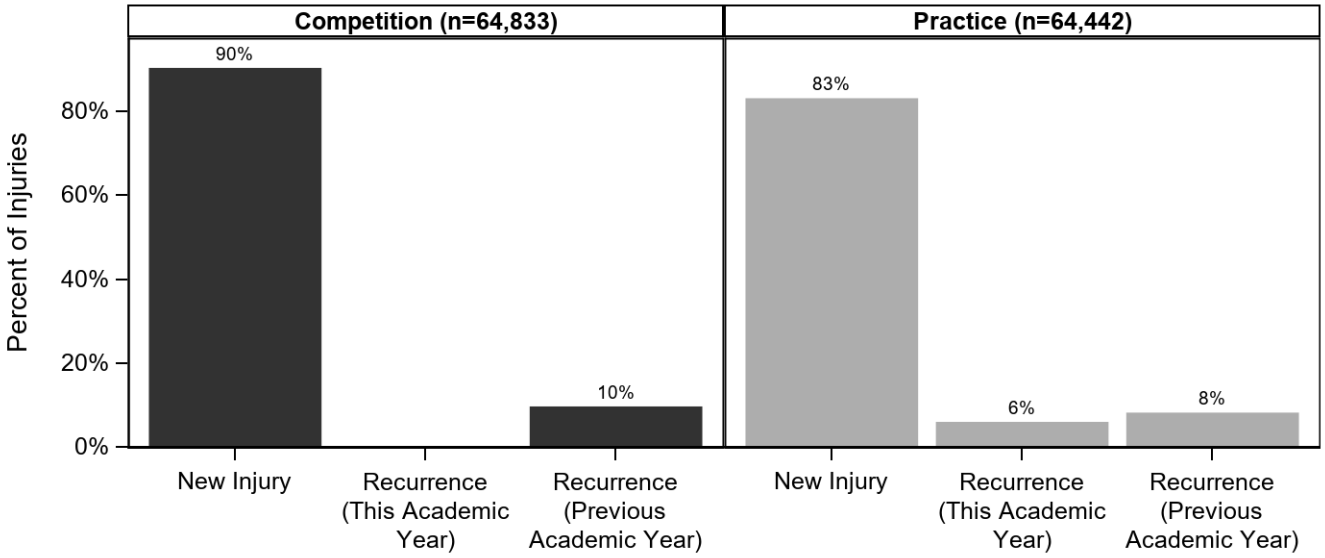


Table 7.6 Time during Season of Boys' Basketball Injuries, High School Sports-Related Injury Surveillance Study, US, 2020-21 School Year *

Time in Season	n	%
Preseason	25,406	19.8%
Regular Season	96,670	75.2%
Post Season	1,307	1.0%
Unknown/Other	5,249	4.1%
Total	***128,633***	***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.

Table 7.7 Competition-Related Variables for Boys' Basketball Injuries, High School Sports-Related Injury Surveillance Study, US, 2020-21 School Year *

Time in Competition	n	%
Pre-competition/Warm-Ups	608	1.1%
First Quarter	2,323	4.0%
Second Quarter	16,700	28.8%
Third Quarter	16,043	27.7%
Fourth Quarter	11,658	20.1%
Unknown	10,569	18.3%
Total	***57,902***	***100.0%***

Court Location		
Inside Lane (Offense)	14,425	24.9%
Inside Lane (Defense)	17,713	30.6%
Between 3 Point Arc and Lane (Offense)	3,683	6.4%
Between 3 Point Arc and Lane (Defense)	2,678	4.6%
Outside 3 Point Arc (Offense)	2,083	3.6%
Outside 3 Point Arc (Defense)	3,467	6.0%
Off the Court	1,320	2.3%
Backcourt	154	0.3%
Unknown	12,379	21.4%
Total	***57,902***	***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, 2020-21 School Year *

Time in Practice	n	%
First 1/2 Hour	8,628	13.6%
Second 1/2 Hour	8,708	13.7%
1-2 Hours into Practice	35,945	56.5%
>2 Hours into Practice	1,486	2.3%
Unknown	8,802	13.8%
Total	***63,569***	***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, 2020-21 School Year

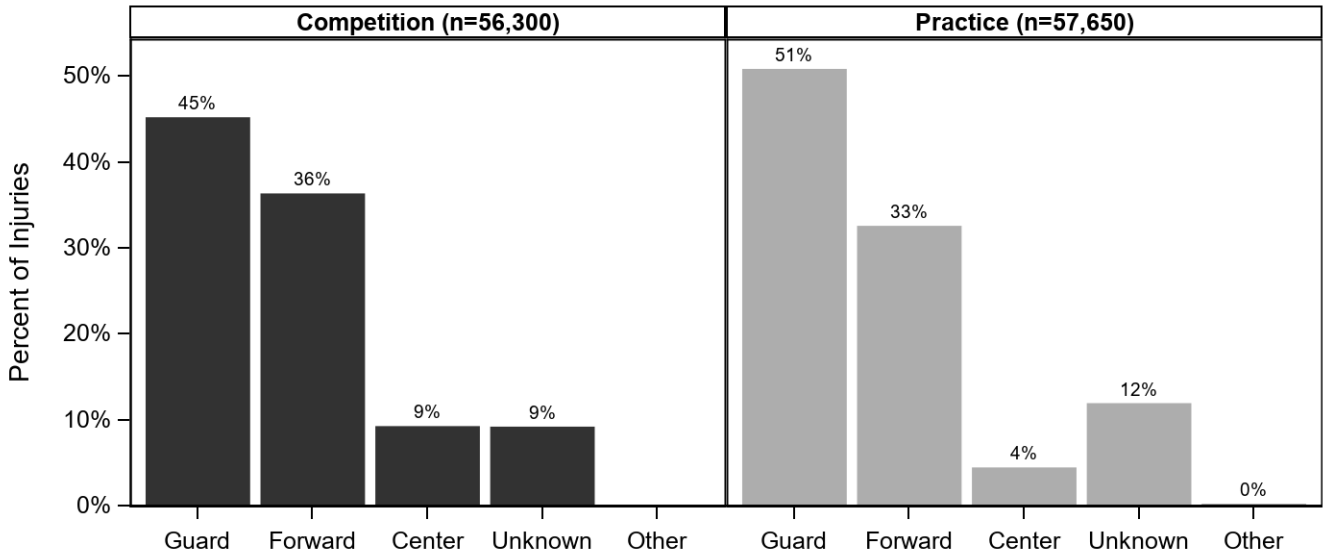


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Table 7.9 Activities Leading to Boys' Basketball Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2020-21 School Year *

	Competition		Practice		Overall	
Activity	**n**	**%**	**n**	**%**	**n**	**%**
Rebounding	23,504	40.6%	13,182	22.9%	36,686	31.7%
General Play	4,053	7.0%	25,464	44.2%	29,517	25.5%
Defending	11,343	19.6%	4,955	8.6%	16,298	14.1%
Unknown	5,553	9.6%	4,638	8.0%	10,191	8.8%
Chasing Loose Ball	7,183	12.4%	1,334	2.3%	8,517	7.4%
Shooting	2,682	4.6%	2,347	4.1%	5,028	4.4%
Ball Handling/Dribbling	2,334	4.0%	1,251	2.2%	3,585	3.1%
Receiving Pass	1,251	2.2%	1,826	3.2%	3,077	2.7%
Conditioning	0	0.0%	2,527	4.4%	2,527	2.2%
Other	0	0.0%	128	0.2%	128	0.1%
Total	***57,902***	***100.0%***	***57,650***	***100.0%***	***115,552***	***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, 2020-21 School Year *

	Diagnosis									
	Strain/Sprain		Contusion		Fracture		Concussion		Other	
Activity	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**
Ball Handling/Dribbling	2,405	3.5%	642	9.8%	537	6.0%	0	0.0%	0	0.0%
Chasing Loose Ball	4,411	6.5%	154	2.4%	642	7.1%	691	18.3%	2,618	9.4%
Conditioning	2,527	3.7%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Defending	7,754	11.4%	128	2.0%	2,021	22.4%	2,195	58.0%	4,200	15.0%
General Play	14,425	21.1%	1,433	21.9%	2,238	24.8%	128	3.4%	11,294	40.3%
Other	0	0.0%	0	0.0%	0	0.0%	0	0.0%	128	0.5%
Rebounding	29,338	43.0%	1,178	18.0%	1,405	15.6%	0	0.0%	4,765	17.0%
Receiving Pass	1,931	2.8%	537	8.2%	608	6.7%	0	0.0%	0	0.0%
Shooting	2,650	3.9%	1,178	18.0%	537	6.0%	128	3.4%	537	1.9%
Unknown	2,773	4.1%	1,285	19.7%	1,034	11.5%	642	17.0%	4,457	15.9%
Total	***68,214***	***100.0%***	***6,534***	***100.0%***	***9,022***	***100.0%***	***3,784***	***100.0%***	***27,998***	***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, 2020-21 School Year *†

	# Injuries	# Exposures	Injury Rate (per 1,000 AEs)	Nationally Estimated # Injuries
Total	***156***	***83,589***	***1.87***	***79,278***
Competition	73	23,216	3.14	37,603
Practice	83	60,373	1.37	41,675

* All remaining analyses in this chapter present data weighted to provide national injury estimates.
† **COVID-19 may have affected these results.**

Table 8.2 Demographic Characteristics of Injured Girls' Basketball Athletes, High School Sports-Related Injury Surveillance Study, US, 2020-21 School Year *

Year in School	n	%
Freshman	22,613	32.3%
Sophomore	13,714	19.6%
Junior	16,784	24.0%
Senior	16,897	24.1%
Total	***70,008***	***100.0%***

Age (years)	
Minimum	14
Maximum	18
Mean (SD)	15.8 (1.2)
n	59,520

BMI	
Minimum	14.2
Maximum	34.9
Mean (SD)	22.2 (3.4)
n	43,793

* 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, 2020-21 School Year

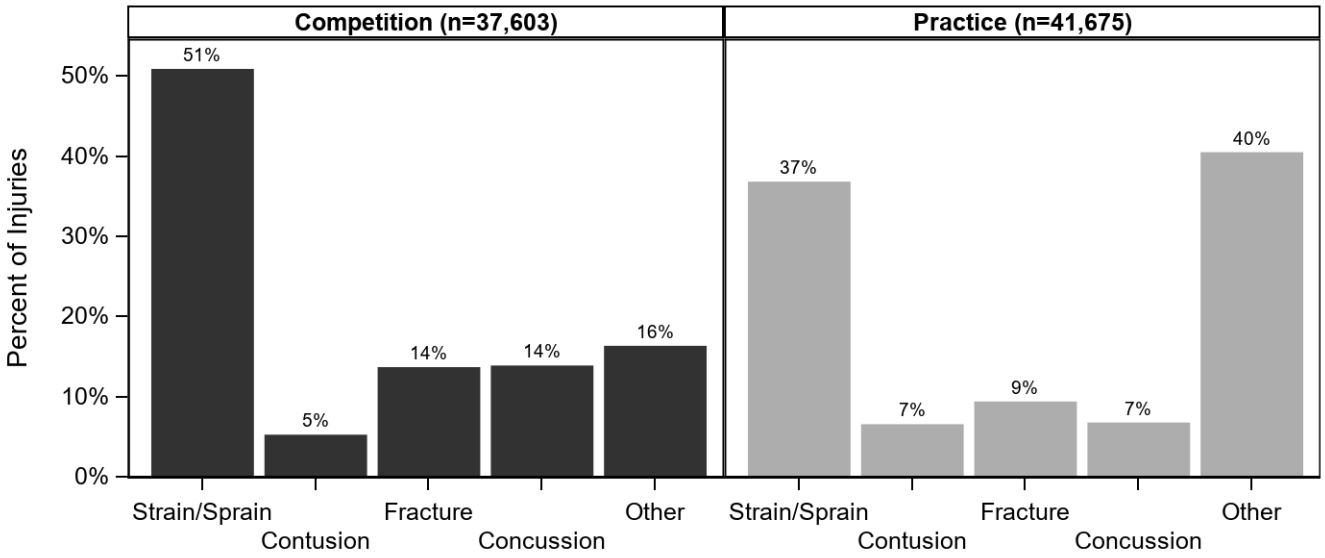


Table 8.3 Body Site of Girls' Basketball Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2020-21 School Year *

	Competition		Practice		Overall	
Body Site	**n**	**%**	**n**	**%**	**n**	**%**
Knee	12,148	32.3%	5,190	13.7%	17,338	23.0%
Ankle	8,925	23.7%	7,282	19.2%	16,207	21.5%
Head/Face	6,678	17.8%	4,948	13.1%	11,626	15.4%
Hand/Wrist	4,449	11.8%	4,915	13.0%	9,364	12.4%
Systemic	948	2.5%	5,993	15.8%	6,940	9.2%
Hip/Thigh/Upper Leg	1,144	3.0%	3,284	8.7%	4,428	5.9%
Foot	1,811	4.8%	1,402	3.7%	3,213	4.3%
Lower Leg	513	1.4%	2,517	6.6%	3,029	4.0%
Trunk	0	0.0%	1,238	3.3%	1,238	1.6%
Shoulder	128	0.3%	988	2.6%	1,115	1.5%
Other	701	1.9%	0	0.0%	701	0.9%
Arm/Elbow	159	0.4%	0	0.0%	159	0.2%
Neck	0	0.0%	128	0.3%	128	0.2%
Total	***37,603***	***100.0%***	***37,884***	***100.0%***	***75,487***	***100.0%***

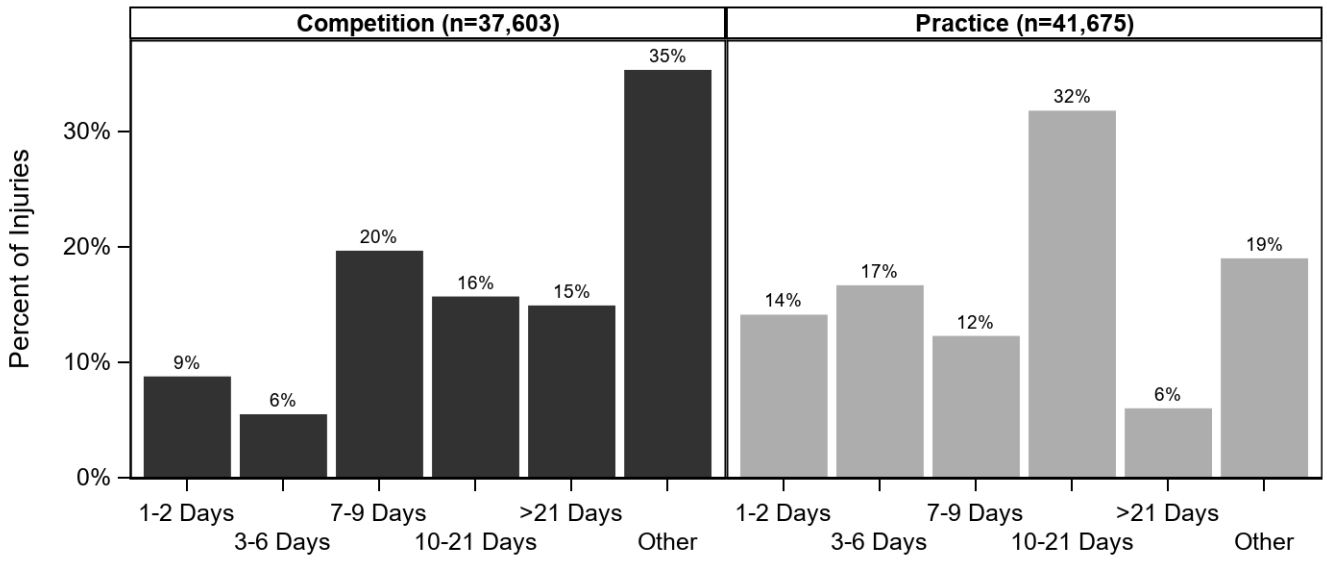
* Totals and n's represent the total weighted number of injury reports containing a valid response for the particular question. Due to a low level of non-response, these totals are always similar but are not always equal to the total number of injuries.

Table 8.4 Ten Most Common Girls' Basketball Injury Diagnoses by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2020-21 School Year *

	Competition (n=37,604)		Practice (n=37,887)		Overall (n=75,489)	
Diagnosis	**n**	**%**	**n**	**%**	**n**	**%**
Ankle Strain/Sprain	8,607	22.9%	6,048	16.0%	14,655	19.4%
Head/Face Concussion	5,217	13.9%	2,818	7.4%	8,036	10.6%
Knee Other	4,747	12.6%	3,211	8.5%	7,958	10.5%
Knee Strain/Sprain	6,101	16.2%	1,467	3.9%	7,567	10.0%
Systemic Other	948	2.5%	5,993	15.8%	6,940	9.2%
Hand/Wrist Fracture	3,493	9.3%	2,261	6.0%	5,754	7.6%
Hip/Thigh/Upper Leg Strain/Sprain	1,144	3.0%	3,284	8.7%	4,428	5.9%
Lower Leg Strain/Sprain	513	1.4%	2,071	5.5%	2,584	3.4%
Head/Face Contusion	513	1.4%	1,460	3.9%	1,973	2.6%
Hand/Wrist Strain/Sprain	956	2.5%	948	2.5%	1,904	2.5%

* 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 8.2 Time Loss of Girls' Basketball Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2020-21 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, 2020-21 School Year *

	Competition		Practice		Overall	
Need for Surgery	**n**	**%**	**n**	**%**	**n**	**%**
Required Surgery	6,436	17.2%	988	2.4%	7,423	9.5%
Did Not Require Surgery	30,881	82.8%	39,581	97.6%	70,461	90.5%
Total	***37,316***	***100.0%***	***40,568***	***100.0%***	***77,884***	***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, 2020-21 School Year

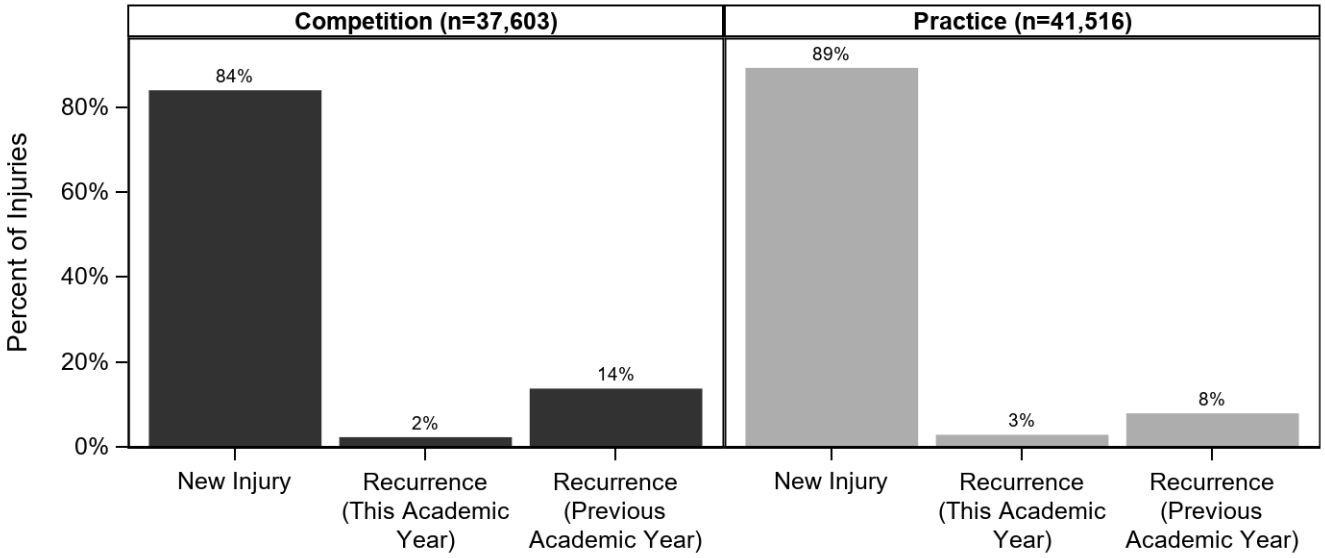


Table 8.6 Time during Season of Girls' Basketball Injuries, High School Sports-Related Injury Surveillance Study, US, 2020-21 School Year *

Time in Season	n	%
Preseason	10,271	13.0%
Regular Season	65,170	82.2%
Post Season	3,324	4.2%
Unknown/Other	513	0.6%
Total	***79,278***	***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, 2020-21 School Year *

Time in Competition	n	%
Pre-competition/Warm-Ups	1,500	4.5%
First Quarter	1,808	5.5%
Second Quarter	6,790	20.5%
Third Quarter	8,169	24.7%
Fourth Quarter	9,776	29.6%
Overtime	159	0.5%
Unknown	4,863	14.7%
Total	***33,064***	***100.0%***

Court Location		
Inside Lane (Offense)	7,371	22.7%
Inside Lane (Defense)	5,872	18.1%
Between 3 Point Arc and Lane (Offense)	1,592	4.9%
Between 3 Point Arc and Lane (Defense)	1,274	3.9%
Outside 3 Point Arc (Offense)	159	0.5%
Outside 3 Point Arc (Defense)	2,508	7.7%
Off the Court	701	2.2%
Backcourt	2,258	7.0%
Unknown	10,690	33.0%
Total	***32,424***	***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, 2020-21 School Year *

Time in Practice	n	%
First 1/2 Hour	2,159	5.5%
Second 1/2 Hour	4,167	10.6%
1-2 Hours into Practice	12,207	31.2%
>2 Hours into Practice	2,136	5.5%
Unknown	18,502	47.2%
Total	***39,171***	***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, 2020-21 School Year

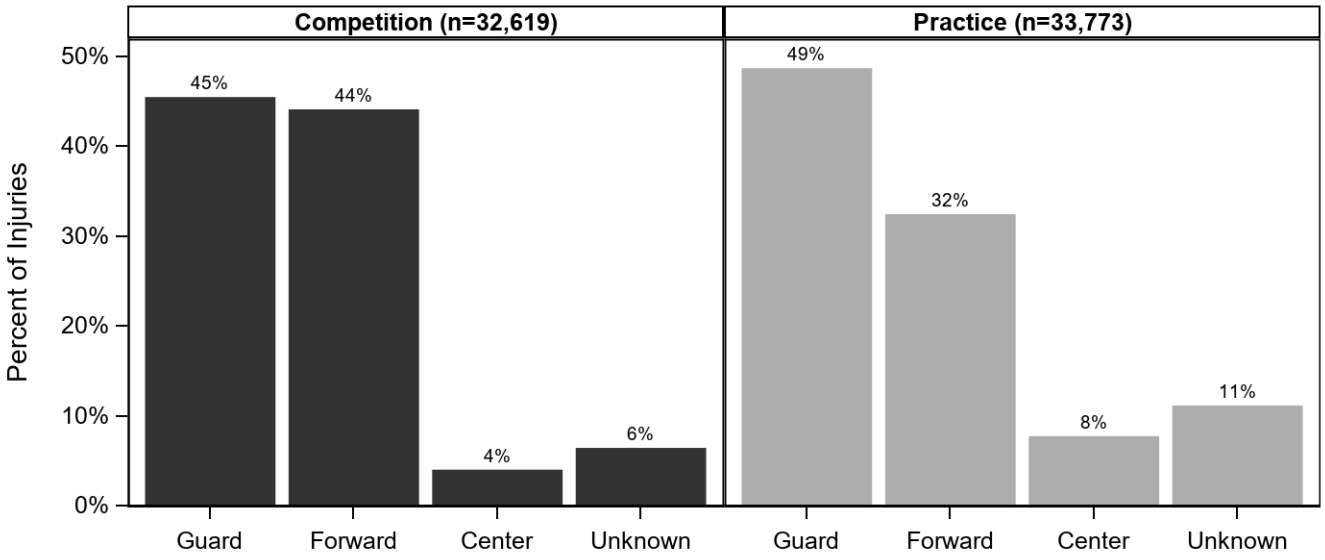


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Table 8.9 Activities Leading to Girls' Basketball Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2020-21 School Year *

	Competition		Practice		Overall	
Activity	**n**	**%**	**n**	**%**	**n**	**%**
General Play	5,033	15.5%	9,791	28.4%	14,823	22.1%
Unknown	2,931	9.0%	8,283	24.0%	11,214	16.7%
Rebounding	4,472	13.7%	5,212	15.1%	9,684	14.4%
Defending	5,241	16.1%	2,902	8.4%	8,143	12.1%
Ball Handling/Dribbling	6,097	18.7%	1,266	3.7%	7,362	11.0%
Chasing Loose Ball	2,959	9.1%	2,659	7.7%	5,618	8.4%
Shooting	2,199	6.8%	927	2.7%	3,126	4.7%
Receiving Pass	2,279	7.0%	828	2.4%	3,108	4.6%
Passing	828	2.5%	948	2.7%	1,776	2.6%
Conditioning	0	0.0%	1,556	4.5%	1,556	2.3%
Other	513	1.6%	0	0.0%	513	0.8%
Screening	0	0.0%	159	0.5%	159	0.2%
Total	***32,552***	***100.0%***	***34,531***	***100.0%***	***67,082***	***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, 2020-21 School Year *

	Diagnosis									
	Strain/Sprain		Contusion		Fracture		Concussion		Other	
Activity	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**
Ball Handling/Dribbling	3,689	12.4%	2,248	47.8%	0	0.0%	159	2.3%	1,266	7.6%
Chasing Loose Ball	1,706	5.7%	513	10.9%	1,561	17.2%	1,680	24.6%	159	1.0%
Conditioning	446	1.5%	0	0.0%	0	0.0%	0	0.0%	1,110	6.7%
Defending	3,188	10.7%	0	0.0%	2,596	28.7%	2,199	32.2%	159	1.0%
General Play	6,906	23.2%	1,303	27.7%	0	0.0%	0	0.0%	6,615	39.6%
Other	513	1.7%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Passing	701	2.4%	0	0.0%	0	0.0%	128	1.9%	948	5.7%
Rebounding	5,299	17.8%	513	10.9%	1,213	13.4%	318	4.7%	2,341	14.0%
Receiving Pass	0	0.0%	128	2.7%	2,032	22.5%	948	13.9%	0	0.0%
Screening	159	0.5%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Shooting	2,456	8.2%	0	0.0%	0	0.0%	0	0.0%	670	4.0%
Unknown	4,742	15.9%	0	0.0%	1,649	18.2%	1,402	20.5%	3,422	20.5%
Total	***29,805***	***100.0%***	***4,704***	***100.0%***	***9,051***	***100.0%***	***6,833***	***100.0%***	***16,690***	***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, 2020-21 School Year *†

	# Injuries	# Exposures	Injury Rate (per 1,000 AEs)	Nationally Estimated # Injuries
Total	***111***	***65,429***	***1.70***	***81,045***
Competition	39	14,193	2.75	29,360
Practice	72	51,236	1.41	51,685

* All remaining analyses in this chapter present data weighted to provide national injury estimates.
† **COVID-19 may have affected these results.**

Table 9.2 Demographic Characteristics of Injured Boys' Wrestling Athletes, High School Sports-Related Injury Surveillance Study, US, 2020-21 School Year *

Year in School	n	%
Freshman	20,522	27.2%
Sophomore	19,312	25.6%
Junior	13,764	18.3%
Senior	21,739	28.9%
Total	***75,336***	***100.0%***

Age (years)	
Minimum	13
Maximum	19
Mean (SD)	16.0 (1.3)
n	49,579

BMI	
Minimum	16.7
Maximum	43.0
Mean (SD)	25.2 (5.7)
n	33,223

* 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, 2020-21 School Year

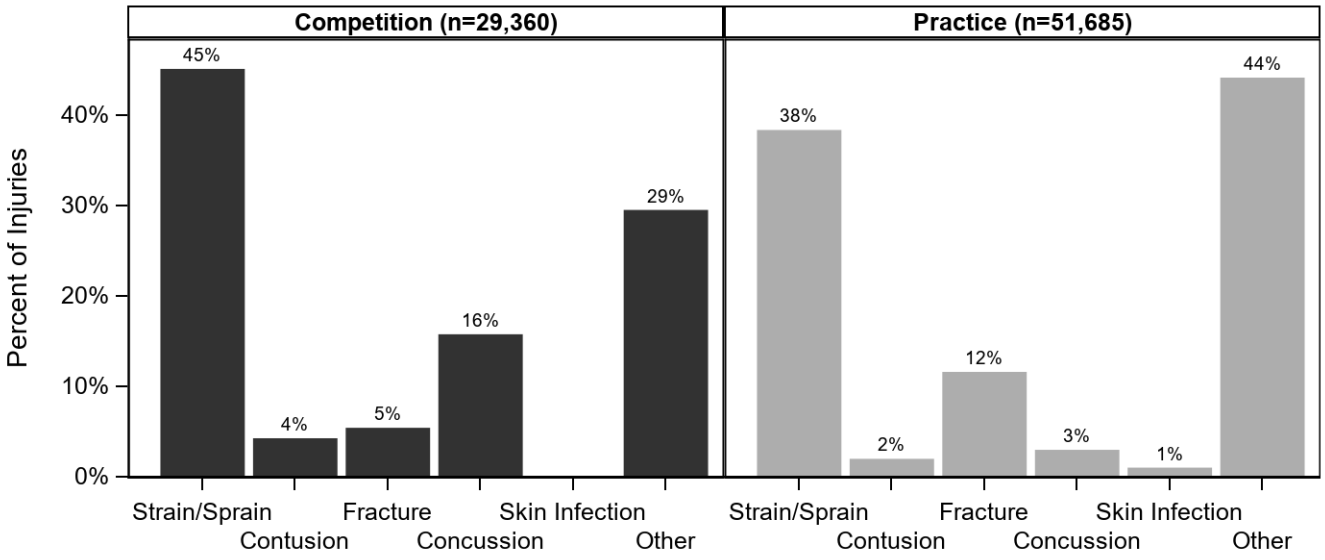


Table 9.3 Body Site of Boys' Wrestling Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2020-21 School Year *

	Competition		Practice		Overall	
Body Site	**n**	**%**	**n**	**%**	**n**	**%**
Systemic	0	0.0%	18,110	35.0%	18,110	22.3%
Shoulder	8,519	29.0%	5,804	11.2%	14,323	17.7%
Knee	4,657	15.9%	6,490	12.6%	11,147	13.8%
Trunk	5,772	19.7%	4,084	7.9%	9,857	12.2%
Head/Face	4,812	16.4%	2,575	5.0%	7,387	9.1%
Ankle	2,202	7.5%	4,176	8.1%	6,379	7.9%
Arm/Elbow	2,389	8.1%	3,857	7.5%	6,246	7.7%
Lower Leg	165	0.6%	2,573	5.0%	2,739	3.4%
Other	0	0.0%	1,971	3.8%	1,971	2.4%
Neck	511	1.7%	1,022	2.0%	1,533	1.9%
Hand/Wrist	165	0.6%	511	1.0%	676	0.8%
Foot	0	0.0%	511	1.0%	511	0.6%
Hip/Thigh/Upper Leg	165	0.6%	0	0.0%	165	0.2%
Total	***29,360***	***100.0%***	***51,685***	***100.0%***	***81,045***	***100.0%***

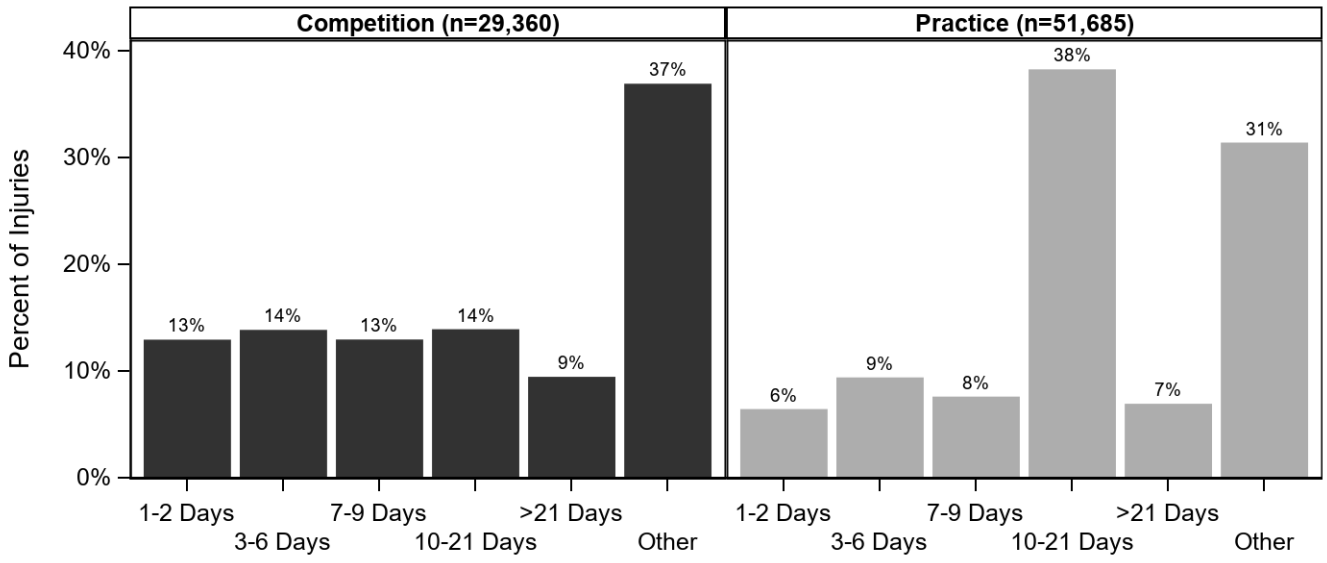
* Totals and n's represent the total weighted number of injury reports containing a valid response for the particular question. Due to a low level of non-response, these totals are always similar but are not always equal to the total number of injuries.

Table 9.4 Ten Most Common Boys' Wrestling Injury Diagnoses by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2020-21 School Year *

	Competition (n=29,358)		Practice (n=51,684)		Overall (n=81,044)	
Diagnosis	**n**	**%**	**n**	**%**	**n**	**%**
Systemic Other	0	0.0%	18,110	35.0%	18,110	22.3%
Shoulder Other	5,793	19.7%	1,882	3.6%	7,676	9.5%
Knee Strain/Sprain	2,486	8.5%	5,075	9.8%	7,561	9.3%
Trunk Strain/Sprain	3,497	11.9%	3,389	6.6%	6,887	8.5%
Ankle Strain/Sprain	2,202	7.5%	4,176	8.1%	6,379	7.9%
Head/Face Concussion	4,624	15.8%	1,537	3.0%	6,160	7.6%
Shoulder Strain/Sprain	1,987	6.8%	3,922	7.6%	5,909	7.3%
Arm/Elbow Strain/Sprain	2,389	8.1%	695	1.3%	3,084	3.8%
Knee Other	2,172	7.4%	904	1.7%	3,075	3.8%
Lower Leg Fracture	165	0.6%	2,573	5.0%	2,739	3.4%

* 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, 2020-21 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, 2020-21 School Year *

	Competition		Practice		Overall	
Need for Surgery	**n**	**%**	**n**	**%**	**n**	**%**
Required Surgery	11,304	38.5%	5,821	11.7%	17,124	21.7%
Did Not Require Surgery	18,056	61.5%	43,893	88.3%	61,950	78.3%
Total	***29,360***	***100.0%***	***49,714***	***100.0%***	***79,074***	***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, 2020-21 School Year

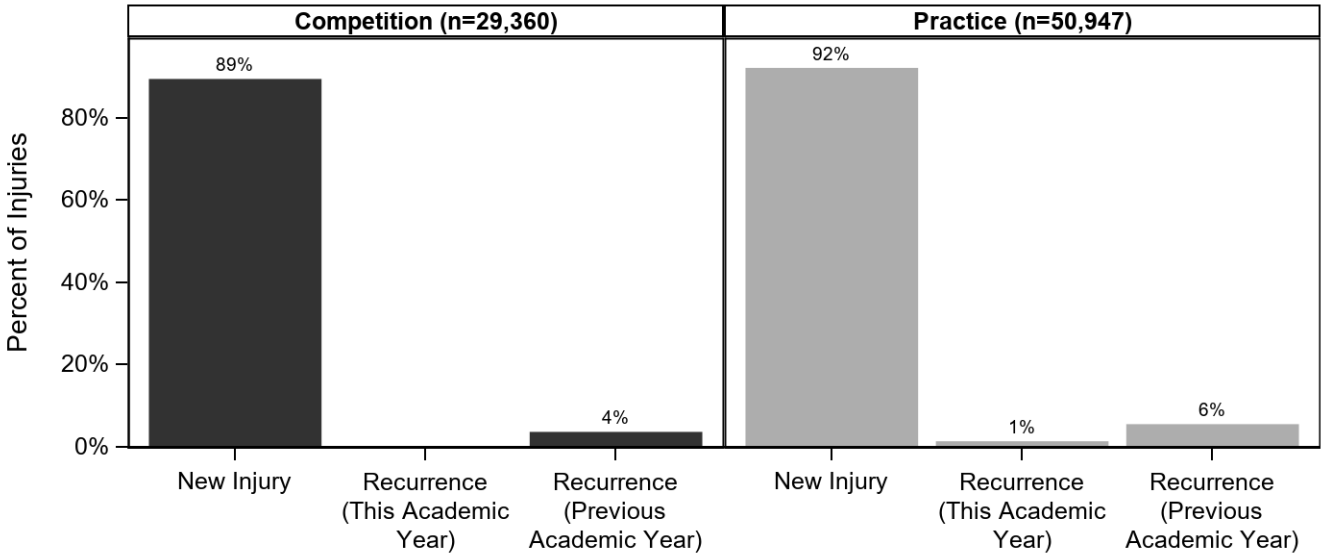


Table 9.6 Time during Season of Boys' Wrestling Injuries, High School Sports-Related Injury Surveillance Study, US, 2020-21 School Year *

Time in Season	n	%
Preseason	25,930	32.6%
Regular Season	47,137	59.2%
Post Season	6,006	7.5%
Unknown/Other	511	0.6%
Total	***79,585***	***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, 2020-21 School Year *

Time in Competition	n	%
First Period	5,375	19.9%
Second Period	6,180	22.9%
Third Period	4,783	17.7%
Unknown	10,632	39.4%
Total	***26,970***	***100.0%***

Mat Location		
Within 28ft Circle	19,339	70.4%
Out of Bounds	2,556	9.3%
Unknown	5,586	20.3%
Total	***27,481***	***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, 2020-21 School Year *

Time in Practice	n	%
First 1/2 Hour	1,560	3.3%
Second 1/2 Hour	7,720	16.2%
1-2 Hours into Practice	18,858	39.7%
Unknown	19,421	40.8%
Total	***47,559***	***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 9.9 Activities Leading to Boys' Wrestling Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2020-21 School Year *

	Competition		Practice		Overall	
Activity	**n**	**%**	**n**	**%**	**n**	**%**
Takedown	7,551	27.5%	11,845	35.1%	19,396	31.7%
Unknown	7,832	28.5%	6,889	20.4%	14,721	24.0%
Sparring	5,865	21.3%	5,955	17.6%	11,819	19.3%
Near Fall	2,775	10.1%	695	2.1%	3,470	5.7%
Escape	2,617	9.5%	0	0.0%	2,617	4.3%
Conditioning	0	0.0%	2,294	6.8%	2,294	3.7%
Other	0	0.0%	1,717	5.1%	1,717	2.8%
N/A **	0	0.0%	1,706	5.1%	1,706	2.8%
Fall	676	2.5%	1,022	3.0%	1,698	2.8%
Reversal	165	0.6%	883	2.6%	1,049	1.7%
Riding	0	0.0%	738	2.2%	738	1.2%
Total	***27,481***	***100.0%***	***33,744***	***100.0%***	***61,226***	***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.
** 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, 2020-21 School Year

	Diagnosis									
	Strain Sprain		Contusion		Fracture		Concussion		Other	
Activity	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**
Conditioning	165	0.5%	0	0.0%	695	9.2%	0	0.0%	1,433	10.2%
Escape	738	2.4%	0	0.0%	0	0.0%	0	0.0%	1,878	13.4%
Fall	0	0.0%	1,533	67.5%	0	0.0%	165	2.7%	0	0.0%
N/A **	0	0.0%	0	0.0%	0	0.0%	0	0.0%	1,706	12.2%
Near Fall	695	2.2%	738	32.5%	0	0.0%	0	0.0%	2,037	14.5%
Other	1,717	5.5%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Reversal	1,049	3.4%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Riding	738	2.4%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Sparring	9,787	31.4%	0	0.0%	165	2.2%	165	2.7%	1,702	12.1%
Takedown	7,729	24.8%	0	0.0%	5,814	76.7%	4,415	71.7%	1,438	10.2%
Unknown	8,554	27.4%	0	0.0%	904	11.9%	1,415	23.0%	3,849	27.4%
Total	***31,173***	***100.0%***	***2,271***	***100.0%***	***7,578***	***100.0%***	***6,160***	***100.0%***	***14,043***	***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, 2020-21 School Year *†

	# Injuries	# Exposures	Injury Rate (per 1,000 AEs)	Nationally Estimated # Injuries
Total	***133***	***126,942***	***1.05***	***70,377***
Competition	67	46,390	1.44	36,233
Practice	66	80,552	0.82	34,144

* All remaining analyses in this chapter present data weighted to provide national injury estimates.
† **COVID-19 may have affected these results.**

Table 10.2 Demographic Characteristics of Injured Boys' Baseball Athletes, High School Sports-Related Injury Surveillance Study, US, 2020-21 School Year *

Year in School	n	%
Freshman	17,644	27.4%
Sophomore	13,584	21.1%
Junior	15,156	23.5%
Senior	18,062	28.0%
Total	***64,446***	***100.0%***

Age (years)	
Minimum	14
Maximum	18
Mean (SD)	16.0 (1.2)
n	52,998

BMI	
Minimum	18.7
Maximum	31.2
Mean (SD)	23.6 (2.6)
n	46,613

* 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, 2020-21 School Year

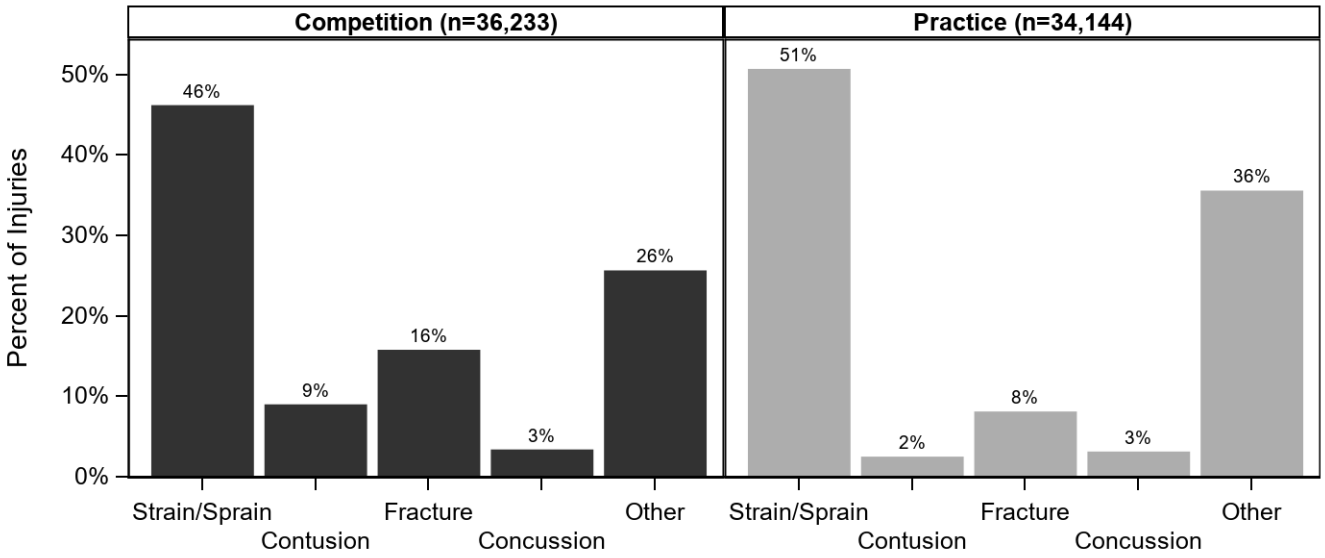


Table 10.3 Body Site of Boys' Baseball Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2020-21 School Year *

	Competition		Practice		Overall	
Body Site	**n**	**%**	**n**	**%**	**n**	**%**
Arm/Elbow	9,253	25.5%	7,715	22.6%	16,968	24.1%
Shoulder	7,289	20.1%	4,655	13.6%	11,945	17.0%
Hip/Thigh/Upper Leg	5,383	14.9%	4,072	11.9%	9,456	13.4%
Hand/Wrist	3,364	9.3%	3,310	9.7%	6,675	9.5%
Ankle	2,680	7.4%	2,773	8.1%	5,452	7.7%
Head/Face	2,532	7.0%	2,727	8.0%	5,259	7.5%
Trunk	853	2.4%	4,326	12.7%	5,179	7.4%
Knee	2,720	7.5%	2,121	6.2%	4,841	6.9%
Lower Leg	1,981	5.5%	952	2.8%	2,934	4.2%
Systemic	0	0.0%	1,257	3.7%	1,257	1.8%
Foot	88	0.2%	147	0.4%	235	0.3%
Other	88	0.2%	88	0.3%	177	0.3%
Total	***36,233***	***100.0%***	***34,144***	***100.0%***	***70,378***	***100.0%***

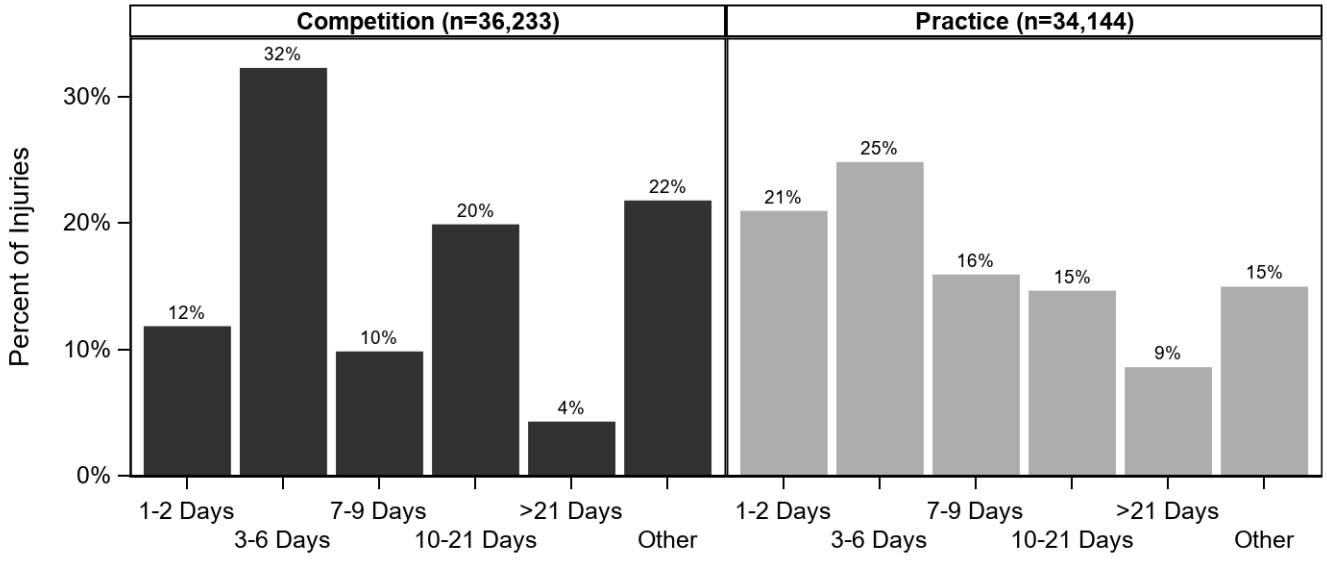
* Totals and n's represent the total weighted number of injury reports containing a valid response for the particular question. Due to a low level of non-response, these totals are always similar but are not always equal to the total number of injuries.

Table 10.4 Ten Most Common Boys' Baseball Injury Diagnoses by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2020-21 School Year *

	Competition (n=36,233)		Practice (n=34,144)		Overall (n=70,374)	
Diagnosis	**n**	**%**	**n**	**%**	**n**	**%**
Arm/Elbow Strain/Sprain	4,985	13.8%	4,142	12.1%	9,127	13.0%
Shoulder Other	4,599	12.7%	3,674	10.8%	8,273	11.8%
Hip/Thigh/Upper Leg Strain/Sprain	4,458	12.3%	3,690	10.8%	8,148	11.6%
Arm/Elbow Other	2,669	7.4%	3,573	10.5%	6,241	8.9%
Ankle Strain/Sprain	2,680	7.4%	2,321	6.8%	5,000	7.1%
Trunk Strain/Sprain	618	1.7%	4,180	12.2%	4,798	6.8%
Hand/Wrist Fracture	2,803	7.7%	1,080	3.2%	3,883	5.5%
Shoulder Strain/Sprain	2,690	7.4%	981	2.9%	3,672	5.2%
Head/Face Fracture	1,305	3.6%	1,511	4.4%	2,816	4.0%
Head/Face Concussion	1,228	3.4%	1,069	3.1%	2,297	3.3%
Knee Strain/Sprain	776	2.1%	1,522	4.5%	2,297	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 10.2 Time Loss of Boys' Baseball Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2020-21 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, 2020-21 School Year *

	Competition		Practice		Overall	
Need for Surgery	**n**	**%**	**n**	**%**	**n**	**%**
Required Surgery	1,923	5.3%	529	1.6%	2,452	3.5%
Did Not Require Surgery	34,311	94.7%	33,615	98.4%	67,925	96.5%
Total	***36,233***	***100.0%***	***34,144***	***100.0%***	***70,378***	***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.

Figure 10.3 History of Boys' Baseball Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2020-21 School Year

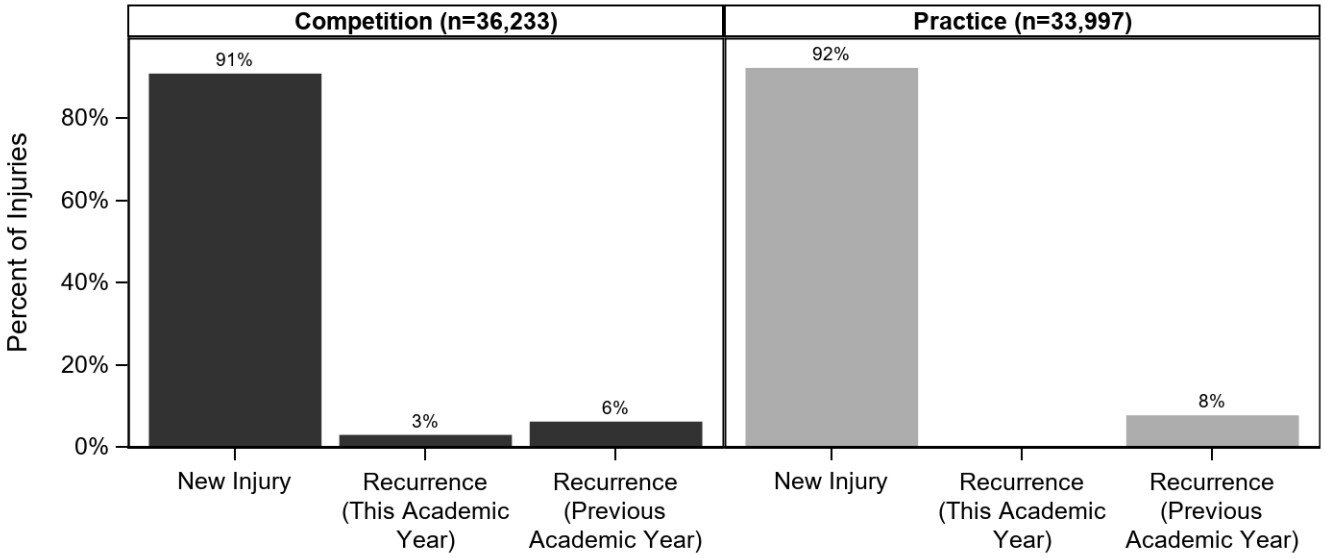


Table 10.6 Time during Season of Boys' Baseball Injuries, High School Sports-Related Injury Surveillance Study, US, 2020-21 School Year *

Time in Season	n	%
Preseason	24,767	35.2%
Regular Season	42,546	60.5%
Post Season	3,064	4.4%
Total	***70,378***	***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 10.7 Competition-Related Variables for Boys' Baseball Injuries, High School Sports-Related Injury Surveillance Study, US, 2020-21 School Year *

Time in Competition	n	%
Pre-competition/Warm-Ups	2,768	7.9%
First Inning	3,388	9.6%
Second Inning	1,588	4.5%
Third Inning	1,257	3.6%
Fourth Inning	2,474	7.0%
Fifth Inning	3,209	9.1%
Sixth Inning	1,565	4.5%
Seventh Inning	4,241	12.1%
Extra Inning	529	1.5%
Unknown	14,133	40.2%
Total	***35,153***	***100.0%***

Field Location		
Pitchers Mound	8,905	25.3%
Home Plate	7,900	22.5%
First Base	4,575	13.0%
Second Base	3,827	10.9%
Third Base	2,709	7.7%
Outfield	1,610	4.6%
Foul Territory	529	1.5%
Other	2,779	7.9%
Unknown	2,319	6.6%
Total	***35,153***	***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, 2020-21 School Year *

Time in Practice	n	%
First 1/2 Hour	1,316	4.0%
Second 1/2 Hour	3,645	10.9%
1-2 Hours into Practice	12,466	37.4%
>2 Hours into Practice	904	2.7%
Unknown	14,960	44.9%
Total	***33,291***	***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, 2020-21 School Year

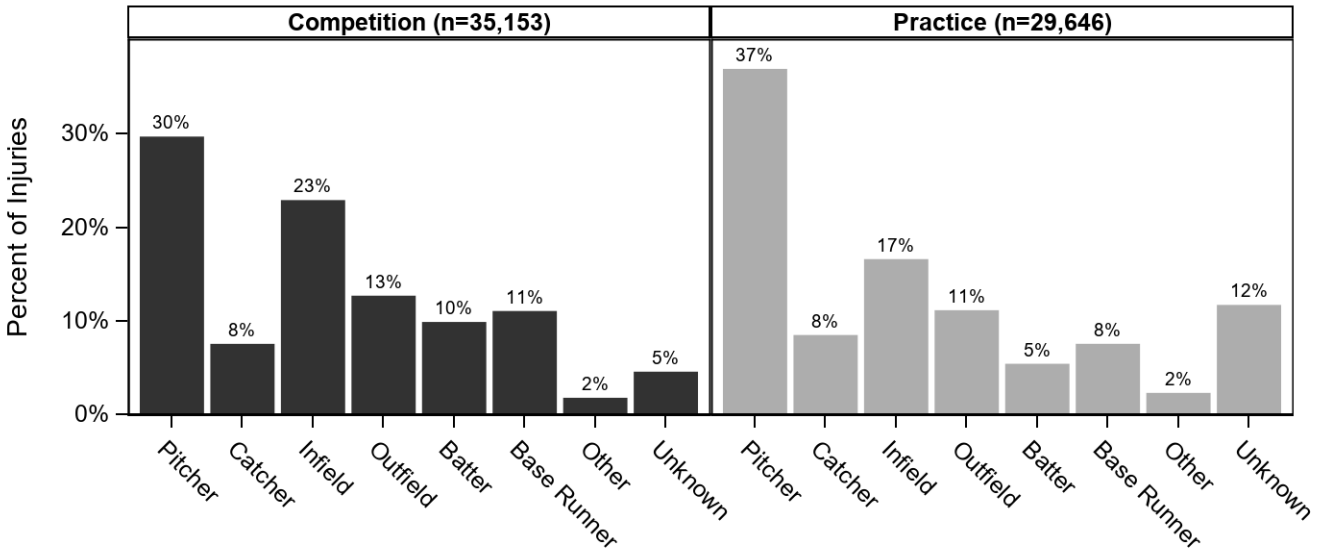


Table 10.9 Activities Leading to Boys' Baseball Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2020-21 School Year *

	Competition		Practice		Overall	
Activity	**n**	**%**	**n**	**%**	**n**	**%**
Pitching	9,985	28.4%	9,742	32.8%	19,727	30.4%
Running Bases	6,589	18.7%	3,155	10.6%	9,744	15.0%
Batting	5,311	15.1%	2,206	7.4%	7,517	11.6%
Throwing	3,650	10.4%	2,265	7.6%	5,915	9.1%
Conditioning	0	0.0%	4,612	15.5%	4,612	7.1%
General Play	1,532	4.4%	2,356	7.9%	3,888	6.0%
Fielding a Batted Ball	2,396	6.8%	1,088	3.7%	3,485	5.4%
Sliding	1,426	4.1%	1,227	4.1%	2,653	4.1%
Unknown	776	2.2%	1,169	3.9%	1,944	3.0%
Other	618	1.8%	1,206	4.1%	1,824	2.8%
Catching	1,565	4.5%	235	0.8%	1,800	2.8%
Fielding a Thrown Ball	1,305	3.7%	473	1.6%	1,778	2.7%
Total	***35,153***	***100.0%***	***29,734***	***100.0%***	***64,887***	***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.

REPORTING INFORMATION ONLINE

Table 10.10 Activity Resulting in Boys' Baseball Injuries by Injury Diagnosis, High School Sports-Related Injury Surveillance Study, US, 2020-21 School Year *

	Diagnosis									
	Strain/Sprain		Contusion		Fracture		Concussion		Other	
Activity	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**
Batting	2,206	7.4%	2,161	52.5%	3,003	35.4%	0	0.0%	147	0.7%
Catching	618	2.1%	88	2.2%	947	11.2%	0	0.0%	147	0.7%
Conditioning	3,268	11.0%	0	0.0%	0	0.0%	0	0.0%	1,344	6.6%
Fielding a Batted Ball	177	0.6%	765	18.6%	1,944	22.9%	599	26.1%	0	0.0%
Fielding a Thrown Ball	1,778	6.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
General Play	1,532	5.2%	0	0.0%	0	0.0%	0	0.0%	2,356	11.6%
Other	1,059	3.6%	88	2.2%	529	6.2%	147	6.4%	0	0.0%
Pitching	7,755	26.1%	88	2.2%	452	5.3%	776	33.8%	10,656	52.6%
Running Bases	6,974	23.5%	147	3.6%	0	0.0%	776	33.8%	1,848	9.1%
Sliding	235	0.8%	776	18.9%	1,080	12.7%	0	0.0%	562	2.8%
Throwing	3,345	11.3%	0	0.0%	529	6.2%	0	0.0%	2,040	10.1%
Unknown	776	2.6%	0	0.0%	0	0.0%	0	0.0%	1,169	5.8%
Total	***29,723***	***100.0%***	***4,113***	***100.0%***	***8,486***	***100.0%***	***2,297***	***100.0%***	***20,268***	***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, 2020-21 School Year *†

	# Injuries	# Exposures	Injury Rate (per 1,000 AEs)	Nationally Estimated # Injuries
Total	***93***	***75,231***	***1.24***	***54,154***
Competition	46	26,510	1.74	27,285
Practice	47	48,721	0.96	26,869

* All remaining analyses in this chapter present data weighted to provide national injury estimates.
† **COVID-19 may have affected these results.**

Table 11.2 Demographic Characteristics of Injured Girls' Softball Athletes, High School Sports-Related Injury Surveillance Study, US, 2020-21 School Year *

Year in School	n	%
Freshman	16,142	29.8%
Sophomore	17,765	32.8%
Junior	11,942	22.1%
Senior	8,306	15.3%
Total	***54,155***	***100.0%***

Age (years)	
Minimum	12
Maximum	18
Mean (SD)	15.8 (1.2)
n	40,329

BMI	
Minimum	17.5
Maximum	34.9
Mean (SD)	24.5 (3.9)
n	33,139

* 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, 2020-21 School Year

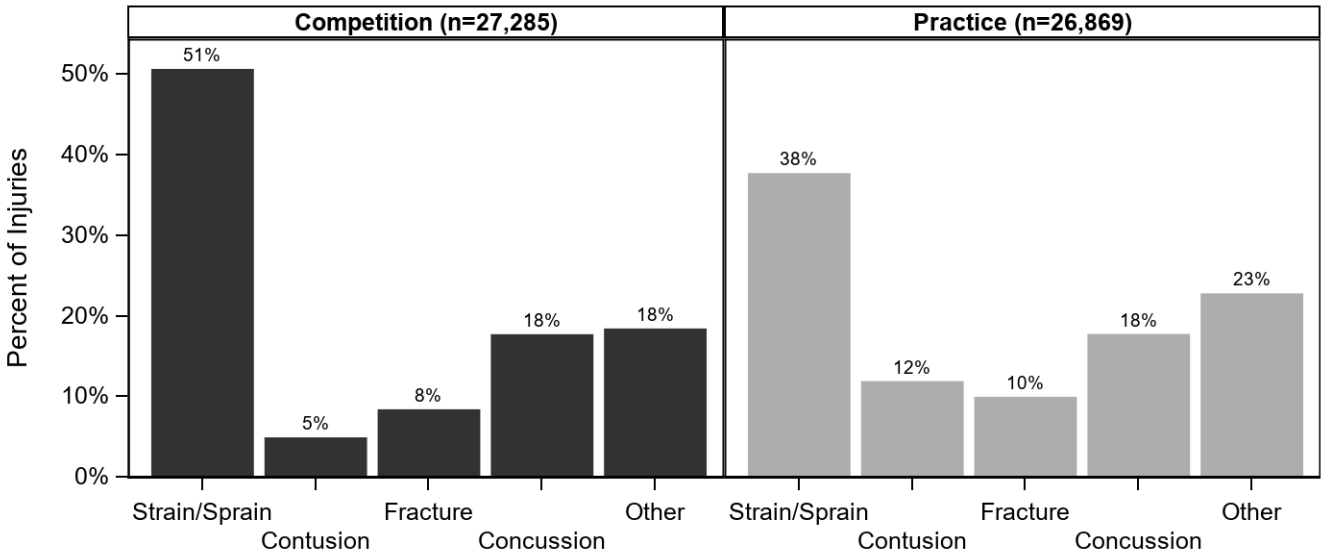


Table 11.3 Body Site of Girls' Softball Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2020-21 School Year *

	Competition		Practice		Overall	
Body Site	**n**	**%**	**n**	**%**	**n**	**%**
Head/Face	8,885	33.1%	7,571	28.2%	16,455	30.6%
Ankle	8,052	30.0%	7,049	26.2%	15,101	28.1%
Hip/Thigh/Upper Leg	2,368	8.8%	2,981	11.1%	5,349	10.0%
Shoulder	631	2.3%	4,225	15.7%	4,856	9.0%
Hand/Wrist	2,634	9.8%	736	2.7%	3,370	6.3%
Arm/Elbow	192	0.7%	2,368	8.8%	2,560	4.8%
Knee	1,064	4.0%	625	2.3%	1,689	3.1%
Neck	1,572	5.8%	0	0.0%	1,572	2.9%
Lower Leg	1,399	5.2%	0	0.0%	1,399	2.6%
Foot	0	0.0%	877	3.3%	877	1.6%
Systemic	81	0.3%	274	1.0%	355	0.7%
Trunk	0	0.0%	163	0.6%	163	0.3%
Total	***26,879***	***100.0%***	***26,869***	***100.0%***	***53,748***	***100.0%***

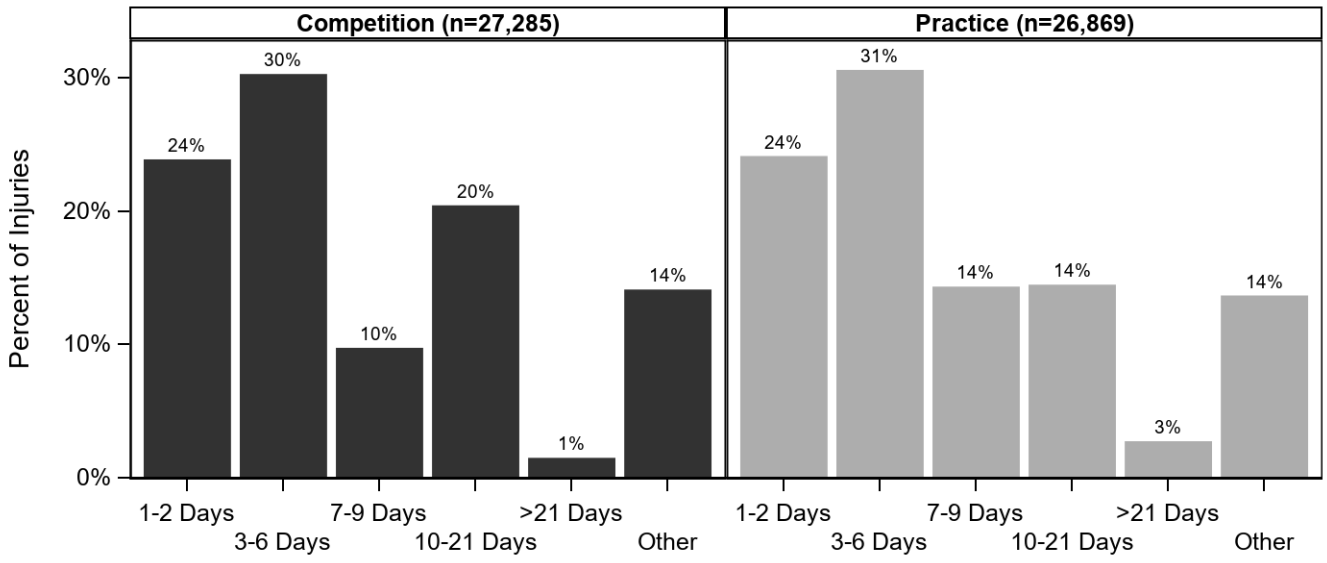
* Totals and n's represent the total weighted number of injury reports containing a valid response for the particular question. Due to a low level of non-response, these totals are always similar but are not always equal to the total number of injuries.

Table 11.4 Ten Most Common Girls' Softball Injury Diagnoses by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2020-21 School Year *

	Competition (n=26,879)		Practice (n=26,871)		Overall (n=53,747)	
Diagnosis	**n**	**%**	**n**	**%**	**n**	**%**
Ankle Strain/Sprain	7,614	28.3%	5,120	19.1%	12,733	23.7%
Head/Face Concussion	4,828	18.0%	4,764	17.7%	9,591	17.8%
Hip/Thigh/Upper Leg Strain/Sprain	877	3.3%	2,981	11.1%	3,858	7.2%
Shoulder Other	631	2.3%	2,908	10.8%	3,539	6.6%
Head/Face Contusion	814	3.0%	2,208	8.2%	3,021	5.6%
Head/Face Fracture	2,285	8.5%	192	0.7%	2,477	4.6%
Ankle Fracture	0	0.0%	1,930	7.2%	1,930	3.6%
Arm/Elbow Other	0	0.0%	1,930	7.2%	1,930	3.6%
Neck Strain/Sprain	1,572	5.8%	0	0.0%	1,572	2.9%
Hand/Wrist Strain/Sprain	1,317	4.9%	192	0.7%	1,509	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 11.2 Time Loss of Girls' Softball Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2020-21 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, 2020-21 School Year *

	Competition		Practice		Overall	
Need for Surgery	**n**	**%**	**n**	**%**	**n**	**%**
Required Surgery	520	1.9%	1,491	5.8%	2,011	3.8%
Did Not Require Surgery	26,765	98.1%	24,153	94.2%	50,919	96.2%
Total	***27,285***	***100.0%***	***25,644***	***100.0%***	***52,930***	***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, 2020-21 School Year

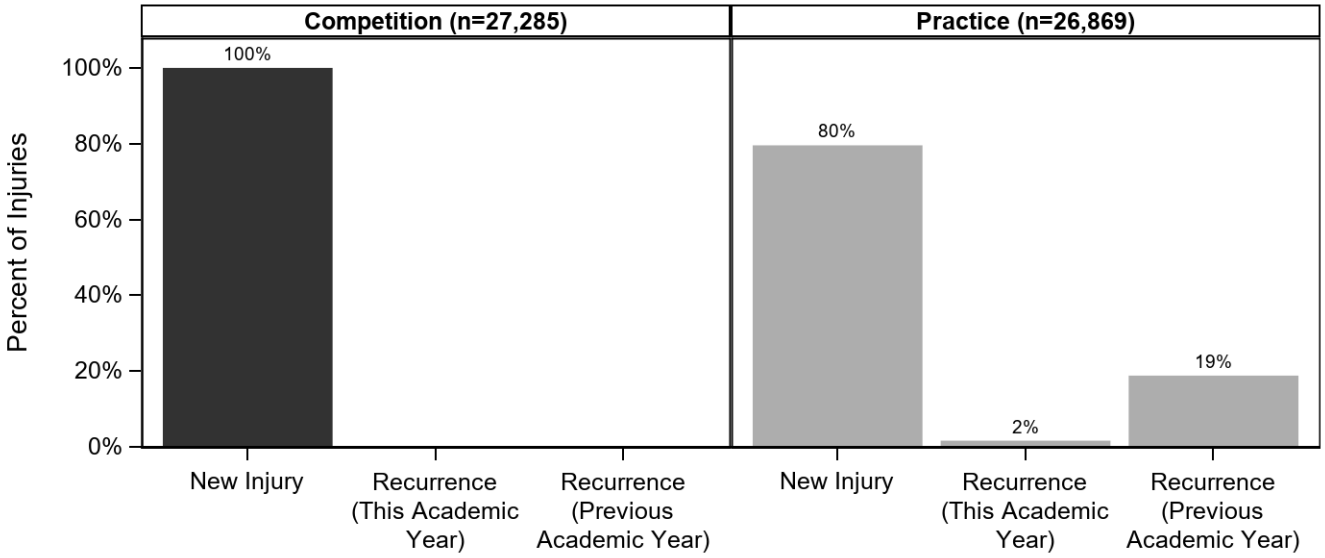


Table 11.6 Time during Season of Girls' Softball Injuries, High School Sports-Related Injury Surveillance Study, US, 2020-21 School Year *

Time in Season	n	%
Preseason	12,439	23.0%
Regular Season	41,228	76.1%
Post Season	488	0.9%
Total	***54,155***	***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 11.7 Competition-Related Variables for Girls' Softball Injuries, High School Sports-Related Injury Surveillance Study, US, 2020-21 School Year *

Time in Competition	n	%
Pre-competition/Warm-Ups	1,558	5.7%
First Inning	2,194	8.0%
Second Inning	1,672	6.1%
Third Inning	3,263	12.0%
Fourth Inning	5,144	18.9%
Fifth Inning	3,337	12.2%
Sixth Inning	2,208	8.1%
Seventh Inning	814	3.0%
Unknown	7,096	26.0%
Total	***27,285***	***100.0%***

Field Location		
Unknown	791	2.9%
Other	439	1.6%
Foul Territory	81	0.3%
Outfield	3,510	12.9%
Infield	439	1.6%
Third Base	3,041	11.1%
Second Base	5,413	19.8%
First Base	1,965	7.2%
Home Plate	7,035	25.8%
Pitchers Mound	4,573	16.8%
Total	***27,285***	***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, 2020-21 School Year *

Time in Practice	n	%
First 1/2 Hour	2,747	10.3%
Second 1/2 Hour	4,360	16.3%
1-2 Hours into Practice	11,383	42.5%
Unknown	8,298	31.0%
Total	***26,788***	***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, 2020-21 School Year

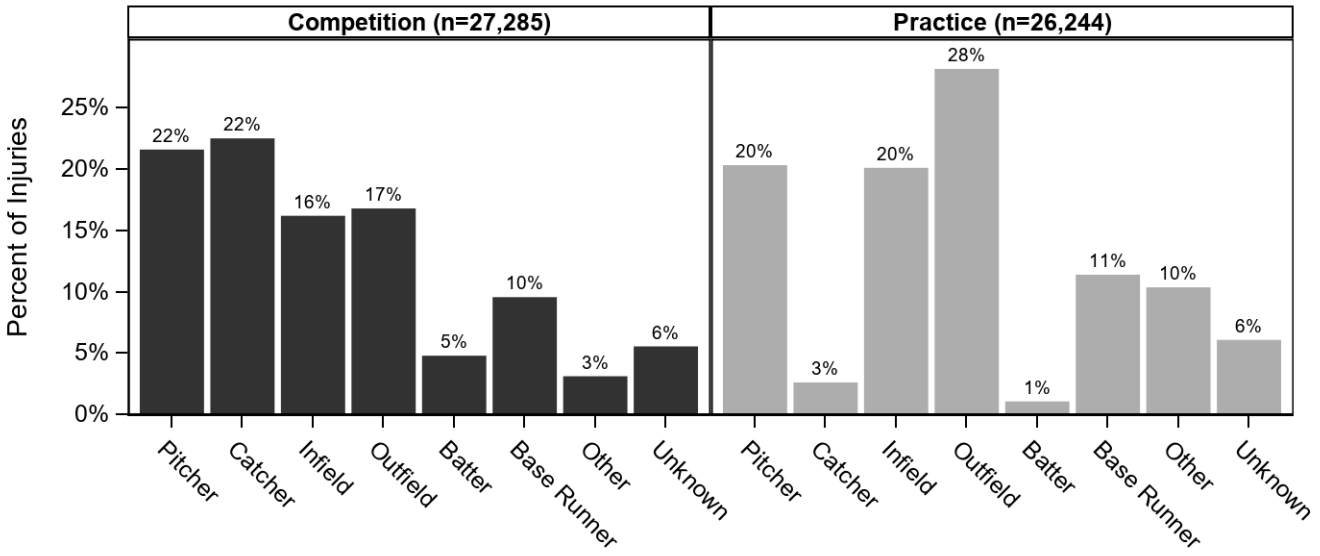

Table 11.9 Activities Leading to Girls' Softball Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2020-21 School Year *

	Competition		Practice		Overall	
Activity	**n**	**%**	**n**	**%**	**n**	**%**
Running Bases	5,651	20.7%	5,023	18.8%	10,674	19.7%
Sliding	4,878	17.9%	3,607	13.5%	8,485	15.7%
Pitching	4,573	16.8%	3,296	12.3%	7,869	14.6%
Fielding a Batted Ball	4,141	15.2%	3,167	11.8%	7,307	13.5%
Catching	3,770	13.8%	2,071	7.7%	5,841	10.8%
Throwing	0	0.0%	5,222	19.5%	5,222	9.7%
Fielding a Thrown Ball	1,756	6.4%	736	2.7%	2,492	4.6%
Batting	927	3.4%	1,509	5.6%	2,436	4.5%
Other	1,399	5.1%	192	0.7%	1,591	2.9%
General Play	0	0.0%	1,334	5.0%	1,334	2.5%
Unknown	192	0.7%	439	1.6%	631	1.2%
Conditioning	0	0.0%	192	0.7%	192	0.4%
Total	***27,285***	***100.0%***	***26,788***	***100.0%***	***54,073***	***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, 2020-21 School Year *

	Diagnosis									
	Strain/Sprain		Contusion		Fracture		Concussion		Other	
Activity	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**
Batting	1,399	5.9%	0	0.0%	0	0.0%	599	6.2%	439	3.9%
Catching	1,756	7.4%	845	18.7%	439	8.9%	2,312	24.1%	488	4.4%
Conditioning	0	0.0%	0	0.0%	0	0.0%	0	0.0%	192	1.7%
Fielding a Batted Ball	439	1.8%	2,103	46.5%	2,309	46.6%	1,938	20.2%	520	4.7%
Fielding a Thrown Ball	1,756	7.4%	544	12.0%	0	0.0%	192	2.0%	0	0.0%
General Play	814	3.4%	0	0.0%	0	0.0%	0	0.0%	520	4.7%
Other	1,509	6.3%	0	0.0%	81	1.6%	0	0.0%	0	0.0%
Pitching	3,000	12.6%	81	1.8%	0	0.0%	407	4.2%	4,380	39.3%
Running Bases	7,886	33.0%	0	0.0%	0	0.0%	2,268	23.6%	520	4.7%
Sliding	4,869	20.4%	951	21.0%	1,491	30.1%	192	2.0%	983	8.8%
Throwing	439	1.8%	0	0.0%	192	3.9%	1,683	17.5%	2,908	26.1%
Unknown	0	0.0%	0	0.0%	439	8.9%	0	0.0%	192	1.7%
Total	***23,865***	***100.0%***	***4,524***	***100.0%***	***4,950***	***100.0%***	***9,591***	***100.0%***	***11,142***	***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.

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, 2020-21 School Year†

	Boys' Soccer	Girls' Soccer *	RR (95% CI) **
Total	1.80	**2.06**	1.14 (0.94-1.38)
Competition	3.30	**4.38**	**1.33 (1.02-1.72)**
Practice	**1.25**	1.16	1.08 (0.81-1.44)

* 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.
† **COVID-19 may have affected these results.**

Table 12.2 Comparison of Body Sites of Boys' and Girls' Soccer Injuries, High School Sports-Related Injury Surveillance Study, US, 2020-21 School Year *

Body Site	Boys' Soccer	Girls' Soccer	IPR (95% CI)
Head/Face	14.9%	**17.4%**	1.17 (0.70-1.97)
Neck	0.2%	**1.0%**	4.21 (0.37-47.83)
Shoulder	1.1%	**2.1%**	1.85 (0.22-15.34)
Trunk	**3.7%**	1.8%	2.01 (0.56-7.26)
Arm/Elbow	0.5%	**0.7%**	1.41 (0.22-8.81)
Hand/Wrist	**5.6%**	4.7%	1.18 (0.42-3.36)
Hip/Thigh/Upper Leg	**24.3%**	22.3%	1.09 (0.72-1.67)
Knee	11.8%	**18.4%**	1.56 (0.92-2.66)
Lower Leg	**10.8%**	7.7%	1.41 (0.64-3.08)
Ankle	19.5%	**22.5%**	1.15 (0.73-1.82)
Foot	**4.3%**	1.3%	**3.28 (1.00-10.71)**
Other	**1.3%**	0.1%	**13.05 (1.21-141.02)**
Systemic	**2.0%**	0.0%	--
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, 2020-21 School Year *

Diagnosis	Boys' Soccer	Girls' Soccer	IPR (95% CI)
Strain/Sprain	49.6%	**60.6%**	1.22 (0.99-1.50)
Contusion	**11.9%**	7.7%	1.54 (0.79-3.04)
Fracture	**5.7%**	4.1%	1.40 (0.55-3.55)
Concussion	12.6%	**16.7%**	1.33 (0.75-2.34)
Other	**20.2%**	10.9%	**1.84 (1.03-3.29)**
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, 2020-21 School Year *

Diagnosis	Boys' Soccer	Girls' Soccer	IPR (95% CI)
Ankle Strain/Sprain	18.3%	**22.4%**	1.22 (0.76-1.96)
Head/Face Concussion	12.6%	**16.7%**	1.33 (0.75-2.34)
Hip/Thigh/Upper Leg Strain/Sprain	19.8%	**20.2%**	1.02 (0.64-1.63)
Knee Other	**5.8%**	5.0%	1.16 (0.46-2.91)
Knee Strain/Sprain	4.1%	**10.8%**	**2.61 (1.16-5.88)**
Lower Leg Other	**5.7%**	3.1%	1.85 (0.52-6.65)

* 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, 2020-21 School Year *

Time Loss	Boys' Soccer	Girls' Soccer	IPR (95% CI)
1-2 Days	17.0%	**21.3%**	1.25 (0.76-2.07)
3-6 Days	**29.9%**	23.4%	1.28 (0.86-1.90)
7-9 Days	**12.9%**	9.7%	1.34 (0.68-2.63)
10-21 Days	15.7%	**21.0%**	1.34 (0.83-2.16)
>21 Days	1.6%	**3.4%**	2.13 (0.46-9.89)
Other	**22.8%**	21.1%	1.08 (0.70-1.65)
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, 2020-21 School Year *

Soccer Mechanism	Boys' Soccer	Girls' Soccer	IPR (95% CI)
Contact with Another Player	**22.9%**	21.4%	1.07 (0.69-1.66)
Contact with Ball	12.7%	**19.1%**	1.51 (0.88-2.57)
Contact with Goal	**0.8%**	0.5%	1.63 (0.10-25.93)
N/A **	**17.6%**	16.2%	1.08 (0.65-1.80)
Other	**11.4%**	4.8%	**2.41 (1.10-5.24)**
Rotation Around a Planted Foot/Inversion	8.7%	**13.3%**	1.53 (0.80-2.93)
Slide Tackle	1.8%	**4.9%**	2.64 (0.63-11.19)
Stepped On/Fell On/Kicked	9.7%	**14.0%**	1.43 (0.74-2.77)
Uneven Playing Surface	**3.5%**	0.1%	**34.47 (4.00-297.34)**
Unknown	**10.8%**	5.7%	1.89 (0.80-4.45)
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, 2020-21 School Year *

Soccer Activity	Boys' Soccer	Girls' Soccer	IPR (95% CI)
Attempting a Slide Tackle	**0.5%**	0.2%	2.78 (0.17-44.91)
Ball Handling/Dribbling	7.0%	**9.1%**	1.31 (0.59-2.89)
Blocking Shot	**3.2%**	3.1%	1.01 (0.23-4.47)
Chasing Loose Ball	**9.5%**	9.3%	1.02 (0.48-2.18)
Conditioning	0.5%	**3.0%**	**6.57 (1.23-34.98)**
Defending	10.0%	**10.7%**	1.07 (0.55-2.08)
General Play	**28.4%**	18.3%	**1.55 (1.02-2.36)**
Goaltending	**5.6%**	3.2%	1.76 (0.69-4.49)
Heading Ball	6.8%	**10.0%**	1.46 (0.66-3.21)
Other	**1.1%**	0.0%	--
Passing	2.5%	**3.5%**	1.39 (0.42-4.59)
Receiving Pass	3.2%	**3.5%**	1.09 (0.26-4.52)
Receiving a Slide Tackle	**1.5%**	0.9%	1.71 (0.23-13.03)
Shooting	**9.1%**	5.9%	1.55 (0.65-3.72)
Unknown	11.2%	**19.5%**	1.75 (0.98-3.11)
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, 2020-21 School Year†

	Boys' Basketball	Girls' Basketball *	RR (95% CI) **
Total	**1.87**	1.87	1.00 (0.82-1.23)
Competition	2.95	**3.14**	1.07 (0.79-1.45)
Practice	**1.45**	1.37	1.06 (0.80-1.39)

* 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.
† **COVID-19 may have affected these results.**

Table 12.9 Comparison of Body Sites of Boys' and Girls' Basketball Injuries, High School Sports-Related Injury Surveillance Study, US, 2020-21 School Year *

Body Site	Boys' Basketball	Girls' Basketball	IPR (95% CI)
Head/Face	14.6%	**15.4%**	1.05 (0.59-1.89)
Neck	0.0%	**0.2%**	--
Shoulder	**2.6%**	1.5%	1.79 (0.36-8.93)
Trunk	**5.3%**	1.6%	3.21 (0.48-21.60)
Arm/Elbow	**0.5%**	0.2%	2.36 (0.15-37.96)
Hand/Wrist	7.4%	**12.4%**	1.67 (0.78-3.56)
Hip/Thigh/Upper Leg	4.9%	**5.9%**	1.20 (0.46-3.11)
Knee	10.9%	**23.0%**	**2.10 (1.19-3.70)**
Lower Leg	**6.3%**	4.0%	1.57 (0.55-4.49)
Ankle	**38.6%**	21.5%	**1.80 (1.20-2.69)**
Foot	2.8%	**4.3%**	1.51 (0.39-5.90)
Other	0.0%	**0.9%**	--
Systemic	6.0%	**9.2%**	1.53 (0.72-3.26)
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, 2020-21 School Year *

Diagnosis	Boys' Basketball	Girls' Basketball	IPR (95% CI)
Strain/Sprain	**55.8%**	43.5%	1.22 (0.95-1.56)
Contusion	5.0%	**5.9%**	1.23 (0.50-3.04)
Fracture	7.1%	**11.4%**	1.69 (0.80-3.58)
Concussion	5.4%	**10.1%**	1.96 (0.83-4.63)
Other	26.7%	**29.0%**	1.05 (0.69-1.58)
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, 2020-21 School Year *

Diagnosis	Boys' Basketball	Girls' Basketball	IPR (95% CI)
Ankle Strain/Sprain	**37.3%**	19.4%	**1.92 (1.26-2.93)**
Hand/Wrist Fracture	1.6%	**7.6%**	**4.71 (1.43-15.50)**
Hand/Wrist Strain/Sprain	**5.2%**	2.5%	2.07 (0.50-8.55)
Head/Face Concussion	5.4%	**10.6%**	1.96 (0.83-4.63)
Hip/Thigh/Upper Leg Strain/Sprain	4.2%	**5.9%**	1.40 (0.51-3.81)
Knee Other	7.3%	**10.5%**	1.44 (0.62-3.30)
Knee Strain/Sprain	2.2%	**10.0%**	**4.55 (1.42-14.55)**
Systemic Other	6.0%	**9.2%**	1.53 (0.72-3.26)

* 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, 2020-21 School Year *

Time Loss	Boys' Basketball	Girls' Basketball	IPR (95% CI)
1-2 Days	**27.6%**	11.6%	**2.27 (1.28-4.01)**
3-6 Days	**26.9%**	11.4%	**2.25 (1.29-3.90)**
7-9 Days	11.7%	**15.8%**	1.42 (0.78-2.58)
10-21 Days	15.8%	**24.2%**	1.29 (0.78-2.13)
>21 Days	3.0%	**10.2%**	**3.58 (1.34-9.58)**
Other	15.0%	**26.8%**	**1.88 (1.18-2.98)**
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, 2020-21 School Year *

Basketball Mechanism	Boys' Basketball	Girls' Basketball	IPR (95% CI)
Collision with Another Player	18.6%	**23.7%**	1.28 (0.77-2.11)
Contact with Ball	2.4%	**6.2%**	2.53 (0.71-8.97)
Jumping/Landing	**30.2%**	17.5%	**1.72 (1.03-2.87)**
N/A **	14.5%	**14.8%**	1.02 (0.57-1.86)
Other	9.8%	**11.0%**	1.12 (0.54-2.30)
Rotation Around a Planted Foot/Inversion	**15.1%**	13.3%	1.14 (0.60-2.15)
Stepped On/Fell On/Kicked	**5.4%**	5.1%	1.07 (0.40-2.86)
Unknown	3.9%	**8.4%**	2.15 (0.73-6.35)
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, 2020-21 School Year *

Basketball Activity	Boys' Basketball	Girls' Basketball	IPR (95% CI)
Ball Handling/Dribbling	3.1%	**11.0%**	**3.54 (1.24-10.11)**
Chasing Loose Ball	7.4%	**8.4%**	1.14 (0.47-2.73)
Conditioning	2.2%	**2.3%**	1.06 (0.16-6.82)
Defending	**14.1%**	12.1%	1.16 (0.60-2.25)
General Play	**25.5%**	22.1%	1.16 (0.73-1.83)
Other	0.1%	**0.8%**	6.93 (0.43-111.53)
Passing	0.0%	**2.6%**	--
Rebounding	**31.7%**	14.4%	**2.20 (1.30-3.72)**
Receiving Pass	2.7%	**4.6%**	1.74 (0.46-6.58)
Screening	0.0%	**0.2%**	--
Shooting	4.4%	**4.7%**	1.07 (0.38-3.03)
Unknown	8.8%	**16.7%**	1.90 (0.98-3.66)
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, 2020-21 School Year†

	Boys' Baseball	Girls' Softball *	RR (95% CI) **
Total	1.05	**1.24**	1.18 (0.91-1.54)
Competition	1.44	**1.74**	1.20 (0.83-1.75)
Practice	0.82	**0.96**	1.18 (0.81-1.71)

* 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.
† **COVID-19 may have affected these results.**

Table 12.16 Comparison of Body Sites of Baseball and Softball Injuries, High School Sports-Related Injury Surveillance Study, US, 2020-21 School Year *

Body Site	Boys' Baseball	Girls' Softball	IPR (95% CI)
Head/Face	7.5%	**30.6%**	**4.10 (2.00-8.38)**
Neck	0.0%	**2.9%**	--
Shoulder	**17.0%**	9.0%	1.88 (0.71-4.98)
Trunk	**7.4%**	0.3%	**24.29 (5.21-113.35)**
Arm/Elbow	**24.1%**	4.8%	**5.06 (1.40-18.32)**
Hand/Wrist	**9.5%**	6.3%	1.51 (0.42-5.40)
Hip/Thigh/Upper Leg	**13.4%**	10.0%	1.35 (0.50-3.67)
Knee	**6.9%**	3.1%	2.19 (0.64-7.45)
Lower Leg	**4.2%**	2.6%	1.60 (0.20-12.73)
Ankle	7.7%	**28.1%**	**3.63 (1.62-8.10)**
Foot	0.3%	**1.6%**	4.88 (0.67-35.81)
Other	**0.3%**	0.0%	--
Systemic	**1.8%**	0.7%	2.70 (0.33-22.30)
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, 2020-21 School Year *

Diagnosis	Boys' Baseball	Girls' Softball	IPR (95% CI)
Strain/Sprain	**48.4%**	44.2%	1.10 (0.76-1.60)
Contusion	5.8%	**8.4%**	1.44 (0.53-3.90)
Fracture	**12.1%**	9.1%	1.31 (0.47-3.67)
Concussion	3.3%	**17.7%**	**5.47 (1.76-17.02)**
Other	**30.5%**	20.6%	1.47 (0.80-2.69)
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, 2020-21 School Year *

Diagnosis	Boys' Baseball	Girls' Softball	IPR (95% CI)
Ankle Strain/Sprain	7.1%	**23.7%**	**3.33 (1.40-7.96)**
Arm/Elbow Other	**8.9%**	3.6%	2.47 (0.45-13.45)
Arm/Elbow Strain/Sprain	**13.0%**	1.2%	**11.05 (2.24-54.43)**
Hand/Wrist Fracture	**5.5%**	1.0%	5.45 (0.61-48.68)
Head/Face Concussion	3.3%	**17.8%**	**5.47 (1.76-17.02)**
Head/Face Contusion	0.2%	**5.6%**	**26.96 (2.98-243.70)**
Hip/Thigh/Upper Leg Strain/Sprain	**11.6%**	7.2%	1.61 (0.52-4.96)
Shoulder Other	**11.8%**	6.6%	1.79 (0.56-5.70)
Shoulder Strain/Sprain	**5.2%**	2.5%	2.13 (0.25-18.32)
Trunk Strain/Sprain	**6.8%**	0.2%	**45.01 (5.49-369.04)**

* 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, 2020-21 School Year *

Time Loss	Boys' Baseball	Girls' Softball	IPR (95% CI)
1-2 Days	16.3%	**24.0%**	1.49 (0.78-2.83)
3-6 Days	28.7%	**30.5%**	1.04 (0.62-1.76)
7-9 Days	**12.8%**	12.0%	1.06 (0.43-2.60)
10-21 Days	17.4%	**17.5%**	1.01 (0.48-2.14)
>21 Days	**6.4%**	2.1%	3.00 (0.67-13.35)
Other	**18.5%**	13.9%	1.32 (0.64-2.72)
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, 2020-21 School Year *

Baseball Mechanism	Boys' Baseball	Girls' Softball	IPR (95% CI)
Contact with Another Player	6.0%	**20.0%**	**3.37 (1.25-9.03)**
Contact with Bases	7.8%	**17.4%**	2.23 (0.83-5.97)
Contact with Thrown Ball (Non-Pitch)	2.2%	**7.5%**	3.36 (0.74-15.35)
Hit by Batted Ball	5.5%	**5.9%**	1.07 (0.33-3.46)
Hit by Pitch	**4.3%**	1.7%	2.58 (0.52-12.77)
N/A **	**20.0%**	6.3%	**3.17 (1.13-8.90)**
Other	17.0%	**21.3%**	1.25 (0.65-2.42)
Rotation Around a Planted Foot/Inversion	3.4%	**3.8%**	1.11 (0.31-3.96)
Throwing (Not Pitching)	**5.3%**	5.0%	1.05 (0.22-4.96)
Throwing (Pitching)	**24.8%**	10.7%	2.31 (0.87-6.14)
Unknown	**3.7%**	0.4%	**10.55 (1.17-94.84)**
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, 2020-21 School Year *

Baseball Activity	Boys' Baseball	Girls' Softball	IPR (95% CI)
Batting	**11.6%**	4.5%	2.57 (0.71-9.34)
Catching	2.8%	**10.8%**	**3.89 (1.22-12.46)**
Conditioning	**7.1%**	0.4%	**20.00 (2.49-160.67)**
Fielding a Batted Ball	5.4%	**13.5%**	2.52 (0.88-7.18)
Fielding a Thrown Ball	2.7%	**4.6%**	1.68 (0.32-8.96)
General Play	**6.0%**	2.5%	2.43 (0.66-8.93)
Other	2.8%	**2.9%**	1.05 (0.15-7.11)
Pitching	**30.4%**	14.6%	2.09 (0.93-4.68)
Running Bases	15.0%	**19.7%**	1.31 (0.63-2.75)
Sliding	4.1%	**15.7%**	**3.84 (1.11-13.29)**
Throwing	9.1%	**9.7%**	1.06 (0.36-3.09)
Unknown	**3.0%**	1.2%	2.57 (0.35-18.82)
Total	***100.0%***	***100.0%***	**--**

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

REPORTING INFORMATION ONLINE

XIII. TRENDS OVER TIME

Table 13.1 Injury Rates by Sport, Type of Exposure, and Year, High School Sports-Related Injury Surveillance Study, US, 2005-06 to 2020-21 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	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	0.6343
	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	0.4020
	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	0.1083
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	0.3279
	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	0.4058
	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**	**0.0154**
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	0.1757
	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	0.3910
	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	0.1290
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	0.2136
	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	0.2662
	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	0.3735
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	0.9500
	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	0.1215
	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	0.2416
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	0.7026
	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	0.2172
	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	0.7392
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	0.1154
	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	0.0983
	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	0.3869
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	0.6099
	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	0.3914
	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	0.2339

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	0.2602
	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	0.1039
	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	0.9067
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	0.4072
	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	0.6696
	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	0.1899

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

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 2020-21 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
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
	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
	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
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
	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
	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
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
	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
	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
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
	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
	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
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
	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
	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
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
	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
	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
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
	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
	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
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
	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
	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

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
	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
	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
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
	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
	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

† **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 2020-21 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
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%	19.9%
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%	4.2%
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%	2.6%
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%	8.2%
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%	16.2%
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%	12.2%
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%	16.1%
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%	5.4%
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%	1.0%
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%	1.4%
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%	7.8%
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%	4.9%
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%***

* 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.
† COVID-19 may have affected these results.

REPORTING INFORMATION ONLINE

Table 13.4 Injury Diagnosis by Year, High School Sports-Related Injury Surveillance Study, US, 2005-06 to 2020-21 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
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%
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%
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%
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%
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%
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%***

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

Table 13.5 Most Common Injury Diagnoses by Year, High School Sports-Related Injury Surveillance Study, US, 2005-06 to 2020-21 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
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%	18.7%
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%	3.9%
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%	2.8%
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%	12.9%
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%	9.6%
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%	6.3%
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%	7.7%
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%	4.1%
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%	3.0%
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%	2.9%

† COVID-19 may have affected these results.

REPORTING INFORMATION ONLINE

Table 13.6 Time Loss of Injuries by Year, High School Sports-Related Injury Surveillance Study, US, 2005-06 to 2020-21 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
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%
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%
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%
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%
>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%
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%
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%***

* 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 2020-21 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
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%
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%
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%***

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

REPORTING INFORMATION ONLINE

XIV. Reporter Demographics & Compliance

During the 2020-21 school year, ATs were invited to participate in the study at the beginning of the school year. 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, 89 ATs enrolled in the original sample reported an average of 41 study weeks. Internal validity checks of a 5% randomly selected sample of the 175 schools participating in the convenience sample during the 2018-19 academic year yielded 76.7% sensitivity, 96.4% specificity, a positive predictive value of 74.2%, and a negative predictive value of 96.9%. Internal validity checks are typically completed every other year but were not conducted in 2020-21 due to the pandemic. The next internal validity check will occur using data from the 2021-22 academic year.

Prior to the start of the 2020-21 High School RIO study, participating ATs were asked to complete a short demographics survey. Over three-quarters (80.4%) of participating high schools (both in the original study as well as in the expanded convenience study) were public schools, with the remainder being private. All ATs except for 3 provided services to athletes of their high school on five or more days each week. Over 90% of ATs participating during the 2020-21 school year had previously participated in the High School RIO study.

An online 'End of Season' survey gave all participating ATs (both in the original study as well as in the expanded convenience study including those ATs who did not report any data) the opportunity to provide feedback on their experiences with High School RIO. This survey was completed by 38 ATs (34.5%). Average reporting time burdens were 17 minutes for the weekly exposure report and 7 minutes for the injury report form. Using a 5 point Likert scale, RIO was overwhelmingly reported to be either very easy (65.8%) or somewhat easy (31.6%) to use (5 and 4 on the Likert scale, respectively), with ATs being either very satisfied (84.2%) or somewhat satisfied (10.5%) with the study (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 2021-22 school year.

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/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 training, 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 changes in coaching habits, increased use of protective equipment, and rule changes which have had proven success in reducing injuries among collegiate athletes.

For example, NCAA ISP data has 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 hour 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 best be 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.