

SUMMARY REPORT

NATIONAL HIGH SCHOOL SPORTS-RELATED INJURY SURVEILLANCE STUDY

2014-2015 School Year

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High School RIOTM

High School Sports-Related Injury Surveillance Study
presented by the Center for Injury Research & Policy



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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, Dr. R. Dawn Comstock, is happy to provide further information or to discuss research partnership opportunities upon request.

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I. Introduction & Methodology

1.1 Project Overview

To combat the epidemic of obesity among youth in the United States (US), adolescents must be encouraged to get up off the couch and participate in physically active sports, recreation, and leisure activities. Participation in high school sports, one of the most popular physical activities among adolescents, has grown rapidly from an estimated 4.0 million participants in 1971-72 to an estimated 7.8 million in 2013-14. 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, Dr. R. Dawn Comstock has conducted the National High School Sports-Related Injury Surveillance System to monitor 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 One) surveillance system. Through the generous contributions of the Centers for Disease Control and Prevention (CDC) and the National Federation of State High School Associations (NFHS), the National High School Sports-Related Injury Surveillance System was able to be continued during the 2014-15 school year. Previous study years were funded by the Centers for Disease Control and Prevention (CDC), National Federation of State High School Associations (NFHS), the National Operating Committee on Standards for Athletic Equipment (NOCSAE), the Research Institute at Nationwide Children's Hospital, DonJoy Orthotics, EyeBlack, and The Ohio State University.

1.3 Specific Aims

The continuing objectives of this study are to maintain the National High School Sports-Related Injury Surveillance System 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 2014-15 school years.

1.4 Project Design

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

- A) An injury that occurred as a result of participation in an organized high school competition or practice and
- B) Required medical attention by a team physician, certified athletic trainer, personal physician, or emergency department/urgent care facility and
- C) Resulted in restriction of the high school athlete's participation for one or more days beyond the day of injury 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 National Athletic Trainers' Association (NATA) affiliated 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 $\leq 1,000$ or $> 1,000$ students). Participant schools were then randomly selected from each substrata to obtain 100 study schools. To maintain a nationally representative sample, if a school dropped out of the study, another school from the same stratum was randomly selected for replacement. Participating ATs were offered a \$300-\$400 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 System 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 46 weekly exposure reports: one for each week from July 28, 2014 through June 28, 2015. 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 9.3 and SPSS, version 22.0. Although fractures, concussions, and dental injuries 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 $\leq 1,000$) west stratum:

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

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:

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

Injury proportions were compared using injury proportion ratios (IPR) and corresponding confidence intervals calculated using the Complex Samples module of SPSS in order 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:

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

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

Table 2.1 Injury Rates by Sport and Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2014-15 School Year*

	# Injuries	# Exposures	Injury rate (per 1,000 athlete- exposures)	Nationally Estimated # Injuries
Overall total	3,663	1,723,204	2.13	1,196,479
Competition	2,062	468,876	4.40	708,150
Practice	1,601	1,254,328	1.28	488,329
Boys' football total	1,816	486,471	3.73	529,483
Competition	982	82,067	11.97	286,421
Practice	834	404,404	2.06	243,062
Boys' soccer total	257	160,799	1.60	133,919
Competition	170	49,532	3.43	89,091
Practice	87	111,267	0.78	44,828
Girls' soccer total	391	148,225	2.64	217,546
Competition	279	45,691	6.11	158,078
Practice	112	102,534	1.09	59,468
Girls' volleyball total	178	161,050	1.11	46,807
Competition	74	53,337	1.39	19,373
Practice	104	107,713	0.97	27,434
Boys' basketball total	223	206,391	1.08	55,980
Competition	125	63,287	1.98	32,534
Practice	98	143,104	0.68	23,446
Girls' basketball total	254	153,720	1.65	64,491
Competition	153	46,818	3.27	38,803
Practice	101	106,902	0.94	25,688
Boys' wrestling total	276	129,884	2.12	60,253
Competition	117	31,092	3.76	32,728
Practice	159	98,792	1.61	27,525
Boys' baseball total	152	160,941	0.94	44,208
Competition	95	56,899	1.67	27,129
Practice	57	104,042	0.55	17,079
Girls' softball total	116	115,723	1.00	43,792
Competition	67	40,153	1.67	23,993
Practice	49	75,570	0.65	19,799

*Only includes injuries resulting in ≥ 1 days' time loss.

Table 2.2 Proportion of Injuries Resulting in Time Loss, High School Sports-Related Injury Surveillance Study, US, 2014-15 School Year*

	≥1 days time loss	<1 day time loss	Time loss data missing	Total
Overall	93.9%	0.9%	5.1%	100%
Boys' football	94.8%	0.4%	4.8%	100%
Boys' soccer	95.1%	0.5%	4.4%	100%
Girls' soccer	93.2%	1.0%	5.8%	100%
Girls' volleyball	91.4%	1.2%	7.4%	100%
Boys' basketball	90.4%	1.4%	8.2%	100%
Girls' basketball	92.3%	0.7%	7.0%	100%
Boys' wrestling	95.0%	1.3%	3.8%	100%
Boys' baseball	95.1%	1.6%	3.3%	100%
Girls' softball	93.9%	0.9%	5.1%	100%

*By study definition, non-time loss injuries were fractures, concussions, dental injuries, and exertional heat events. Because they accounted for only 0.9% of all injuries overall, they are not included in any other analyses.

Table 2.3 Demographic Characteristics of Injured Athletes by Sex, High School Sports-Related Injury Surveillance Study, US, 2014-15 School Year*

	Male n= 785,047	Female n= 363,216
Year in School		
Freshman	24.2%	25.6%
Sophomore	24.4%	29.1%
Junior	23.5%	21.2%
Senior	27.9%	24.1%
Total†	100%	100%
Age (years)		
Minimum	13	13
Maximum	19	19
Mean (St. Dev.)	16.0 (1.3)	15.8 (1.2)
BMI		
Minimum	16.1	15.3
Maximum	55.2	43.4
Mean (St. Dev.)	24.9 (4.8)	22.3 (3.5)

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

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

Figure 2.1 Injury Diagnosis by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2014-15 School Year

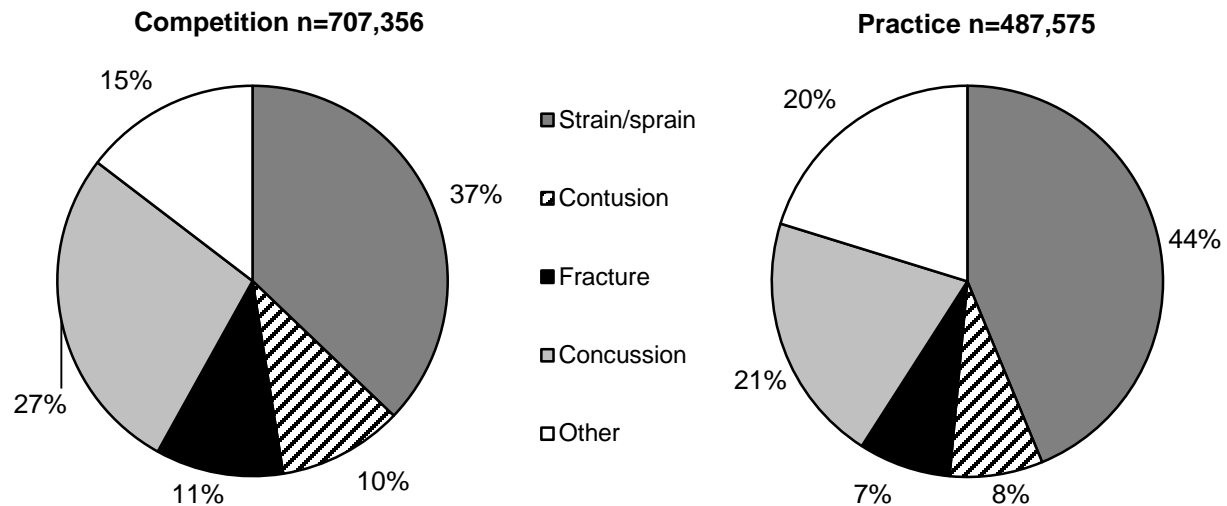


Table 2.4 Body Site of Injury by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2014-15 School Year*

	Competition		Practice		Overall	
	n	%	n	%	n	%
Body Site						
Head/face	210,761	29.8%	116,935	23.9%	327,696	27.4%
Ankle	97,953	13.8%	82,169	16.8%	180,122	15.1%
Knee	111,333	15.7%	52,756	10.8%	164,089	13.7%
Hip/thigh/upper leg	51,444	7.3%	56,215	11.5%	107,659	9.0%
Hand/wrist	51,249	7.2%	37,746	7.7%	88,995	7.4%
Shoulder	53,926	7.6%	31,971	6.5%	85,897	7.2%
Trunk	29,311	4.1%	22,459	4.6%	51,770	4.3%
Lower leg	26,609	3.8%	20,875	4.3%	47,484	4.0%
Foot	27,362	3.9%	19,839	3.1%	46,740	3.9%
Arm/elbow	23,792	3.4%	20,393	4.2%	44,185	3.7%
Neck	8,228	1.2%	14,042	2.9%	22,270	1.9%
Other	16,182	2.3%	13,310	2.7%	29,492	2.5%
Total	708,150	100%	488,249	100%	1,196,399	100%

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

Table 2.5 Most Commonly Injured Ankle Structures, High School Sports-Related Injury Surveillance Study, US, 2014-15 School Year*

	Male		Female		Total	
	n	% of Ankle Injuries	n	% of Ankle Injuries	n	% of Ankle Injuries
Ankle Ligament Injuries						
Anterior talofibular ligament	71,454	74.8%	59,557	74.0%	131,011	74.4%
Calcaneofibular ligament	23,763	24.9%	27,076	33.6%	50,839	28.9%
Anterior tibiofibular ligament	15,341	16.1%	17,556	21.8%	32,897	18.7%
Posterior talofibular ligament	9,709	10.2%	9,767	12.1%	19,476	11.1%
Deltoid ligament	4,344	4.5%	12,197	15.2%	16,541	9.4%
Posterior tibiofibular ligament	5,100	5.3%	8,107	10.1%	13,207	7.5%
Total Ankle Injuries	95,500		80,483		175,983	

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

Table 2.6 Most Commonly Injured Knee Structures, High School Sports-Related Injury Surveillance Study, US, 2014-15 School Year*

	Male		Female		Total	
	n	% of Knee Injuries	n	% of Knee Injuries	n	% of Knee Injuries
Knee Ligament Injuries						
Medial collateral ligament	31,731	29.9%	15,001	27.2%	46,732	29.0%
Anterior cruciate ligament	20,157	19.0%	19,348	35.1%	39,505	24.5%
Torn cartilage (meniscus)	18,599	17.5%	15,504	28.1%	34,103	21.1%
Patella and/or patellar tendon	20,255	19.1%	11,163	20.3%	31,418	19.5%
Lateral collateral ligament	7,745	7.3%	1,259	2.3%	9,004	5.6%
Posterior cruciate ligament	2,120	2.0%	0	0.0%	2,120	1.3%
Total Knee Injuries	106,197		55,110		161,307	

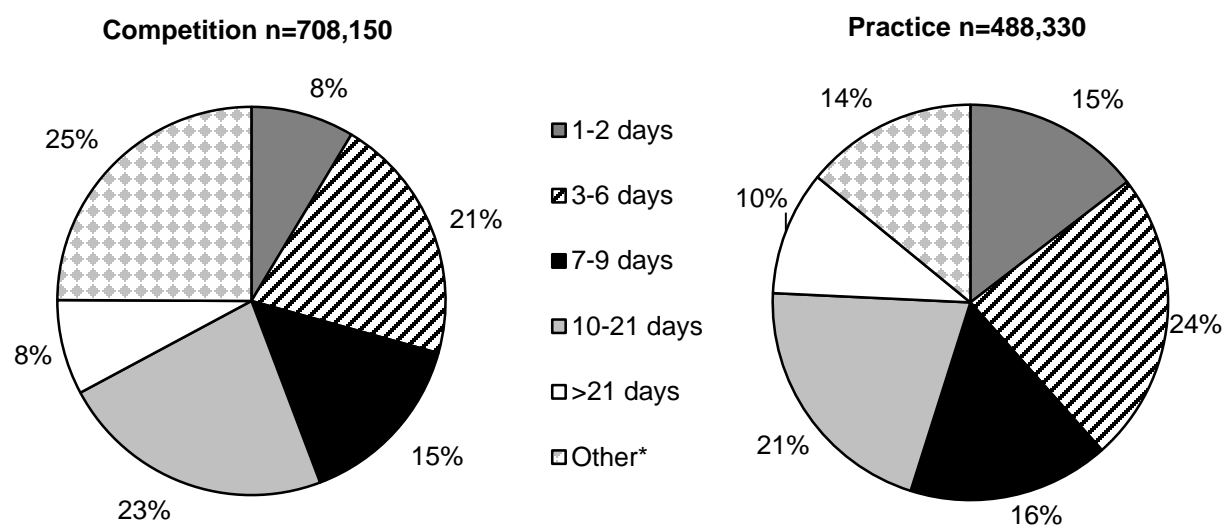
*Multiple ligament responses allowed per injury report. Totals and n's are not always equal due to slight rounding of the weighted number of injuries and missing responses. Due to a low level of non-response, these totals are always similar but are not always equal to the total number of injuries.

Table 2.7 Ten Most Common Injury Diagnoses by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2014-15 School Year*

Diagnosis	Competition n=707,357		Practice n=487,499		Overall n= 1,194,856	
	N	%	n	%	n	%
Head/face concussion	192,115	27.2%	100,516	20.6%	292,631	24.5%
Ankle strain/sprain	93,222	13.2%	76,228	15.6%	169,450	14.2%
Knee strain/sprain	64,954	9.2%	22,023	4.5%	86,977	7.3%
Hip/thigh/upper leg strain/sprain	32,850	4.6%	49,954	10.2%	82,804	6.9%
Knee other	32,036	4.5%	22,116	4.5%	54,152	4.5%
Shoulder other	29,140	4.1%	18,321	3.8%	47,461	4.0%
Hand/wrist fracture	27,005	3.8%	14,807	3.0%	41,812	3.5%
Shoulder strain/sprain	22,141	3.1%	9,439	1.9%	31,580	2.6%
Hand/wrist strain/sprain	10,728	1.5%	11,698	2.4%	22,426	1.9%
Trunk strain/sprain	12,523	1.8%	9,822	2.0%	22,345	1.9%

* 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.

Figure 2.2 Time Loss by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2014-15 School Year



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

Table 2.8 Injuries Requiring Surgery by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2014-15 School Year*

	Competition		Practice		Overall	
	n	%	n	%	n	%
Need for surgery						
Required surgery	60,721	8.6%	25,806	5.3%	86,527	7.3%
Did not require surgery	641,548	91.4%	458,863	94.7%	1,100,411	92.7%
Total*	702,269	100%	484,669	100%	1,186,938	100%

* 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.

Figure 2.3 New and Recurring Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2014-15 School Year

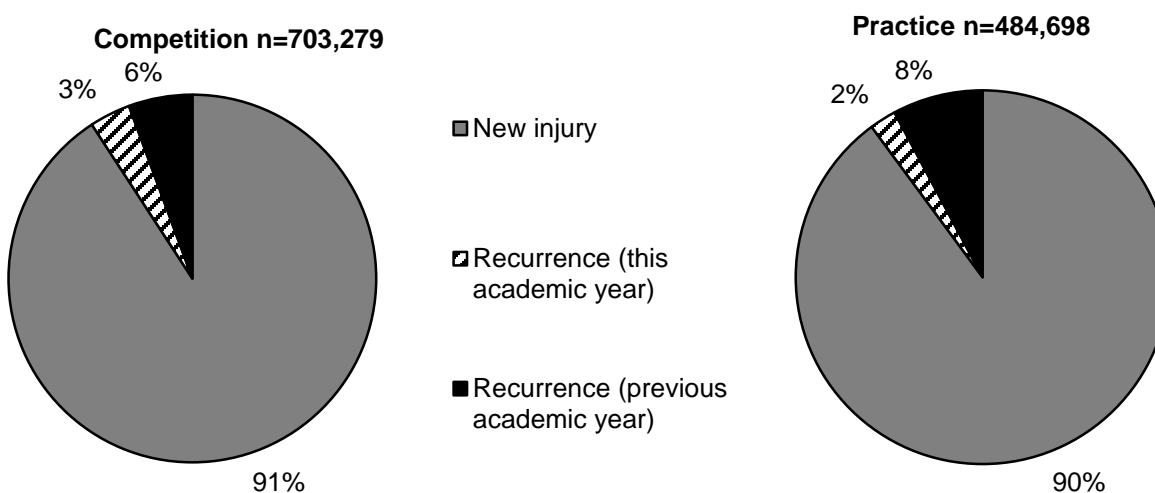


Table 2.9 Time during Season of Injury, High School Sports-Related Injury Surveillance Study, US, 2014-15 School Year*

	n	%
Time in Season		
Preseason	245,921	20.7%
Regular season	879,701	74.1%
Post season	62,107	5.2%
Total	1,187,729	100%

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

Table 2.10 Practice-Related Variables, High School Sports-Related Injury Surveillance Study, US, 2014-15 School Year*

	n	%
Time in Practice		
First ½ hour	45,790	10.1%
Second ½ hour	98,574	21.6%
1-2 hours into practice	271,763	59.7%
>2 hours into practice	39,450	8.7%
Total	455,577	100%

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

Table 2.11 Methods for Injury Evaluation and Assessment, High School Sports-Related Injury Surveillance Study, US, 2014-15 School Year

	n	%
Injuries Evaluated by:*		
Certified athletic trainer	1,107,328	92.5%
General physician	344,059	28.8%
Orthopedic physician	292,367	24.4%
Neurologist/neuropsychologist	8,926	0.7%
Physician's assistant	12,081	1.0%
Chiropractor	10,025	0.8%
Nurse practitioner	3,414	0.3%
Dentist/oral surgeon	3,340	0.3%
Other	19,276	1.6%
Total	1,196,479	
Injuries Assessed by:*		
Evaluation	1,165,225	97.4%
X-ray	446,477	37.3%
MRI	130,656	10.9%
CT-scan	36,658	3.1%
Surgery	0	0.0%
Blood work/lab test	9,458	0.8%
Other	11,994	1.0%
Total	1,196,479	

*Multiple responses allowed per injury report.

III. Boys' Football Injury Epidemiology

Table 3.1 Football Injury Rates by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2014-15 School Year

	# Injuries	# Exposures	Injury rate (per 1,000 athlete- exposures)	Nationally Estimated # Injuries
Total	1,816	486,471	3.73	529,483
Competition	982	82,067	11.97	286,421
Practice	834	404,404	2.06	243,062

Table 3.2 Demographic Characteristics of Injured Football Athletes, High School Sports-Related Injury Surveillance Study, US, 2014-15 School Year*

Year in School	n=517,840
Freshman	24.3%
Sophomore	25.7%
Junior	24.0%
Senior	26.0%
Total[†]	100%
Age (years)	
Minimum	13
Maximum	19
Mean (St. Dev.)	15.7 (1.3)
BMI	
Minimum	16.3
Maximum	55.2
Mean (St. Dev.)	25.8 (4.9)

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

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

Figure 3.1 Diagnosis of Football Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2014-15 School Year

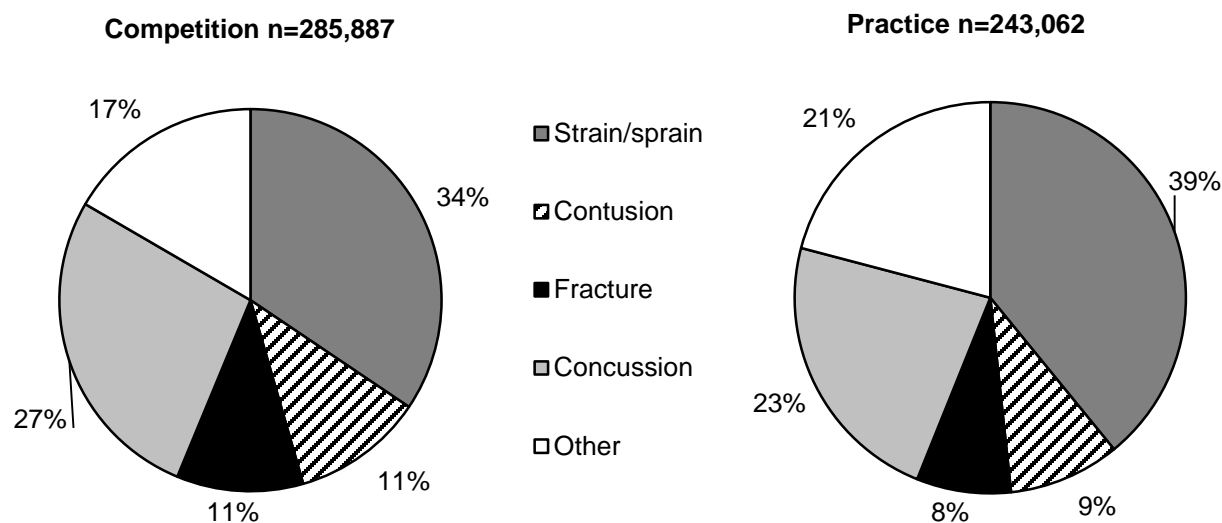


Table 3.3 Body Site of Football Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2014-15 School Year*

	Competition		Practice		Overall	
	n	%	n	%	n	%
Body Site						
Head/face	78,319	27.3%	59,564	24.5%	137,883	26.0%
Knee	40,936	14.3%	26,813	11.0%	67,749	12.8%
Ankle	32,848	11.5%	26,529	10.9%	59,377	11.2%
Shoulder	30,600	10.7%	22,833	9.4%	53,433	10.1%
Hand/wrist	29,274	10.2%	21,508	8.8%	50,782	9.6%
Hip/thigh/upper leg	16,716	5.8%	23,631	9.7%	40,347	7.6%
Lower leg	13,976	4.9%	11,480	4.7%	25,456	4.8%
Trunk	11,768	4.1%	12,995	5.3%	24,763	4.7%
Arm/elbow	9,383	3.3%	10,601	4.4%	19,984	3.8%
Neck	5,397	1.9%	11,319	4.7%	16,716	3.2%
Foot	9,749	3.4%	6,709	2.8%	16,458	3.1%
Other	7,456	2.6%	9,079	3.7%	16,535	3.1%
Total	286,422	100%	243,061	100%	529,483	100%

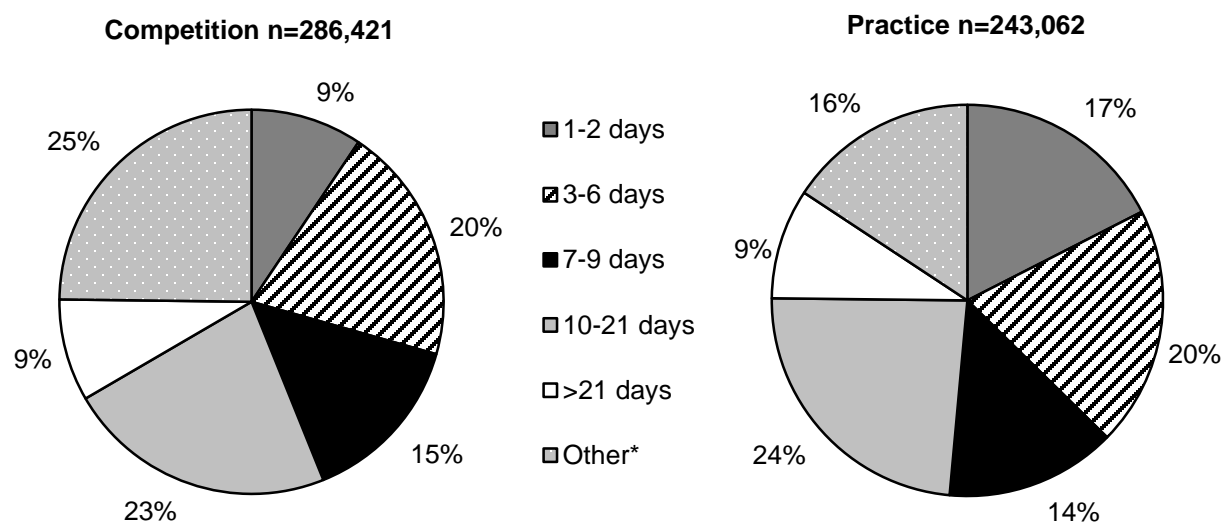
* Totals and n's are not always equal due to slight rounding of the weighted number of injuries and missing responses. Due to a low level of non-response, these totals are always similar but are not always equal to the total number of injuries.

Table 3.4 Ten Most Common Football Injury Diagnoses by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2014-15 School Year*

Diagnosis	Competition n=285,889		Practice n=243,064		Total n=538,953	
	n	%	n	%	n	%
Head/face concussion	77,566	27.1%	55,595	22.9%	133,161	25.2%
Ankle strain/sprain	30,890	10.8%	24,754	10.2%	55,644	10.5%
Knee strain/sprain	24,909	8.7%	13,293	5.5%	38,202	7.2%
Hip/thigh/upper leg strain/sprain	8,514	3.0%	19,671	8.1%	28,185	5.3%
Shoulder other	18,706	6.5%	13,315	5.5%	32,021	6.1%
Hand/wrist fracture	12,629	4.4%	8,172	3.4%	27,559	4.5%
Knee other	11,443	4.0%	9,832	4.0%	21,275	4.0%
Shoulder strain/sprain	9,560	3.3%	6,045	2.5%	15,605	3.0%
Neck strain/sprain	3,185	1.1%	7,177	3.0%	10,363	2.0%
Hand/wrist strain/sprain	7,948	2.8%	5,662	2.3%	13,610	2.6%

* 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.

Figure 3.2 Time Loss of Football Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2014-15 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, 2014-15 School Year*

	Competition		Practice		Overall	
	n	%	n	%	n	%
Need for surgery						
Required surgery	27,618	9.7%	12,291	5.1%	39,909	7.6%
Did not require surgery	255,860	90.3%	229,556	94.9%	485,416	92.4%
Total	283,478	100%	241,847	100%	525,325	100%

* 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.

Figure 3.3 History of Football Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2014-15 School Year

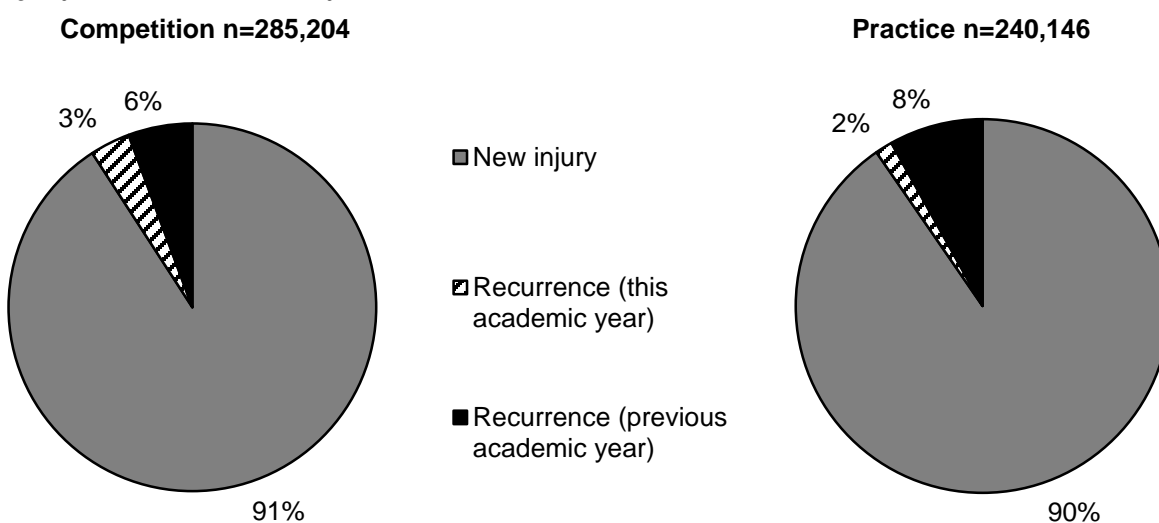


Table 3.6 Time during Season of Football Injuries, High School Sports-Related Injury Surveillance Study, US, 2014-15 School Year*

	n	%
Time in Season		
Preseason	129,545	24.6%
Regular season	369,799	70.3%
Post season	26,951	5.1%
Total	526,296	100%

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

Table 3.7 Competition-Related Variables for Football Injuries, High School Sports-Related Injury Surveillance Study, US, 2014-15 School Year*

	n	%
Time in Competition		
Pre-competition/warm-ups	3,177	1.2%
First quarter	31,696	11.7%
Second quarter	82,408	30.4%
Third quarter	78,390	28.9%
Fourth quarter	74,766	27.6%
Overtime	352	0.1%
Total	270,790	100.0%
Field Location		
Between the 20 yard lines	220,724	81.1%
Red zone (20 yard line to goal line)	44,540	16.4%
Off the field	3,534	1.3%
End zone	3,441	1.3%
Total	272,239	100%

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

Table 3.8 Practice-Related Variables for Football Injuries, High School Sports-Related Injury Surveillance Study, US, 2014-15 School Year*

	n	%
Time in Practice		
First 1/2 hour	19,513	8.6%
Second 1/2 hour	52,675	23.2%
1-2 hours into practice	129,302	56.9%
>2 hours into practice	25,589	11.3%
Total	227,080	100%

* 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.

Figure 3.4 Player Position of Football Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2014-15 School Year

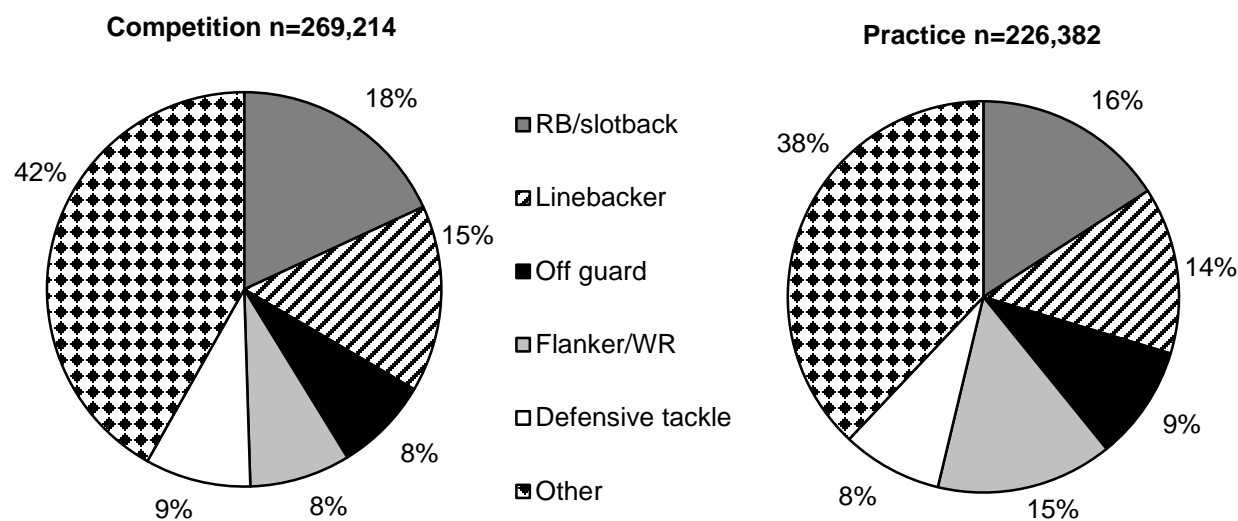


Table 3.9 Activities Leading to Football Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2014-15 School Year*

Activity	Competition		Practice		Overall	
	n	%	n	%	n	%
Being tackled	87,548	31.6%	46,394	19.9%	133,942	26.3%
Tackling	80,958	29.2%	42,213	18.1%	123,171	24.1%
Blocking	37,643	13.6%	38,851	16.7%	76,494	15.0%
Being blocked	24,574	8.9%	20,219	8.7%	44,793	8.8%
N/A (e.g., overuse, heat illness, etc.)	4,662	1.7%	30,309	13.0%	34,971	6.9%
Stepped on/fell on/kicked	14,050	5.1%	14,428	6.2%	28,478	5.6%
Rotation around a planted foot	13,478	4.9%	14,823	6.4%	28,301	5.5%
Uneven playing surface	1,480	0.5%	2,987	1.3%	4,467	0.9%
Contact with ball	1,395	0.5%	2,633	1.1%	4,028	0.8%
Contact with blocking sled/dummy	0	0.0%	2,268	1.0%	2,268	0.4%
Contact with out of bounds	0	0.0%	748	0.3%	748	0.1%
Other	11,113	4.0%	17,295	7.4%	28,408	5.6%
Total	276,901	100%	233,168	100%	510,069	100%

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

Table 3.10 Activity Resulting in Football Injuries by Injury Diagnosis, High School Sports-Related Injury Surveillance Study, US, 2014-15 School Year

	Diagnosis									
	Strain/Sprain		Contusion		Fracture		Concussion		Other	
	n	%	n	%	n	%	n	%	n	%
Activity										
Being tackled	37,618	20.4%	16,968	32.0%	12,573	26.8%	45,987	35.4%	20,507	21.6%
Tackling	33,747	18.3%	13,361	25.2%	12,865	27.4%	41,201	31.7%	21,752	22.9%
Blocking	28,268	15.3%	8,204	15.5%	6,562	14.0%	19,124	14.7%	14,335	15.1%
Being blocked	12,565	6.8%	5,240	9.9%	2,893	6.2%	18,574	14.3%	5,520	5.8%
No contact (overuse/illness)	18,204	9.9%	380	0.7%	791	1.7%	74	0.1%	15,522	16.4%
Other	54,384	29.4%	8,893	16.8%	11,205	23.9%	5,029	3.9%	17,187	18.1%
Total	184,786	100%	53,046	100%	46,889	100%	129,989	100%	94,823	100%

IV. Boys' Soccer Injury Epidemiology

Table 4.1 Boys' Soccer Injury Rates by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2014-15 School Year

	# Injuries	# Exposures	Injury rate (per 1,000 athlete- exposures)	Nationally Estimated # Injuries
Total	257	160,799	1.60	133,919
Competition	170	49,532	3.43	89,091
Practice	87	111,267	0.78	44,828

Table 4.2 Demographic Characteristics of Injured Boys' Soccer Athletes, High School Sports-Related Injury Surveillance Study, US, 2014-15 School Year*

Year in School	n= 125,583
Freshman	23.9%
Sophomore	16.6%
Junior	21.5%
Senior	38.1%
Total†	100%
Age (years)	
Minimum	13
Maximum	19
Mean (St. Dev.)	15.9 (1.4)
BMI	
Minimum	16.1
Maximum	32.6
Mean (St. Dev.)	22.4 (2.8)

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

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

Figure 4.1 Diagnosis of Boys' Soccer Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2014-15 School Year

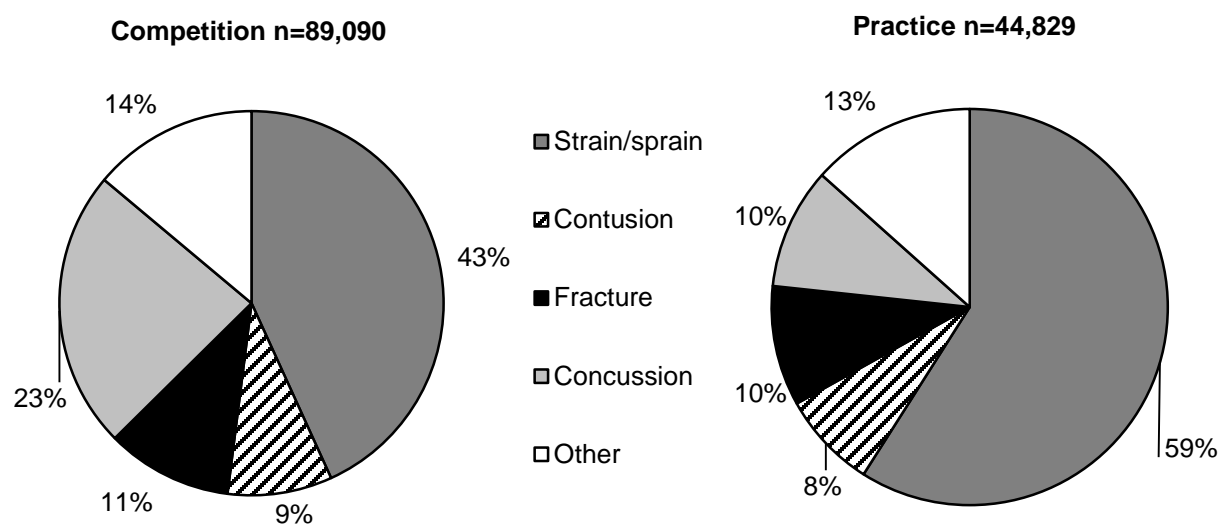


Table 4.3 Body Site of Boys' Soccer Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2014-15 School Year*

	Competition		Practice		Overall	
	n	%	n	%	n	%
Body Site						
Head/face	25,846	29.0%	5,241	11.7%	31,087	23.2%
Hip/thigh/upper leg	12,375	13.9%	15,422	34.4%	27,797	20.8%
Knee	15,762	17.7%	3,655	8.2%	19,417	14.5%
Ankle	8,681	9.7%	5,436	12.1%	14,117	10.5%
Foot	3,972	4.5%	4,998	11.1%	8,970	6.7%
Trunk	6,671	7.5%	1,264	2.8%	7,935	5.9%
Lower leg	4,183	4.7%	3,438	7.7%	7,621	5.7%
Shoulder	4,911	5.5%	854	1.9%	5,765	4.3%
Hand/wrist	2,004	2.2%	1,404	3.1%	3,408	2.5%
Neck	826	0.9%	826	1.8%	1,652	1.2%
Arm/elbow	1,052	1.2%	394	0.9%	1,446	1.1%
Other	2,807	3.2%	1,896	4.2%	4,703	3.5%
Total	89,090	100%	44,828	100%	133,918	100%

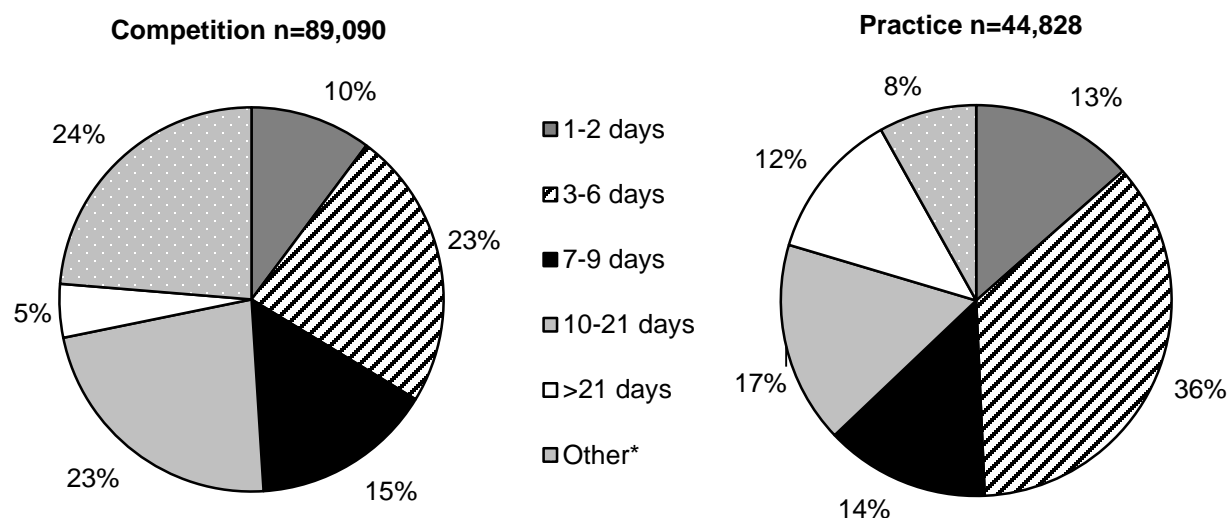
* Totals and n's are not always equal due to slight rounding of the weighted number of injuries and missing responses. Due to a low level of non-response, these totals are always similar but are not always equal to the total number of injuries.

Table 4.4 Ten Most Common Boys' Soccer Injury Diagnoses by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2014-15 School Year*

Diagnosis	Competition n=89,088		Practice n=44,828		Total n=133,916	
	n	%	n	%	n	%
Hip/thigh/upper leg strain/sprain	10,581	11.9%	15,285	34.1%	25,866	19.3%
Head/face concussion	20,938	23.5%	4,421	9.9%	25,359	18.9%
Ankle strain/sprain	8,473	9.5%	3,551	7.9%	12,024	9.0%
Knee strain/sprain	10,171	11.4%	1,199	2.7%	11,370	8.5%
Knee other	5,454	6.1%	1,630	3.6%	7,084	5.3%
Trunk strain/sprain	4,139	4.6%	1,196	2.7%	5,335	4.0%
Foot contusion	2,376	2.7%	2,281	5.1%	4,657	3.5%
Head/face other	3,110	3.5%	820	1.8%	3,930	2.9%
Foot fracture	1,595	1.8%	1,521	3.4%	3,116	2.3%
Shoulder strain/sprain	2,588	2.9%	427	1.0%	3,015	2.3%

* 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.

Figure 4.2 Time Loss of Boys' Soccer Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2014-15 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, 2014-15 School Year*

	Competition		Practice		Overall	
	n	%	n	%	n	%
Need for surgery						
Required surgery	7,426	8.4%	820	1.9%	8,246	6.2%
Did not require surgery	80,964	91.6%	43,113	98.1%	124,077	93.8%
Total	88,390	100%	43,933	100%	132,323	100%

* 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.

Figure 4.3 History of Boys' Soccer Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2014-15 School Year

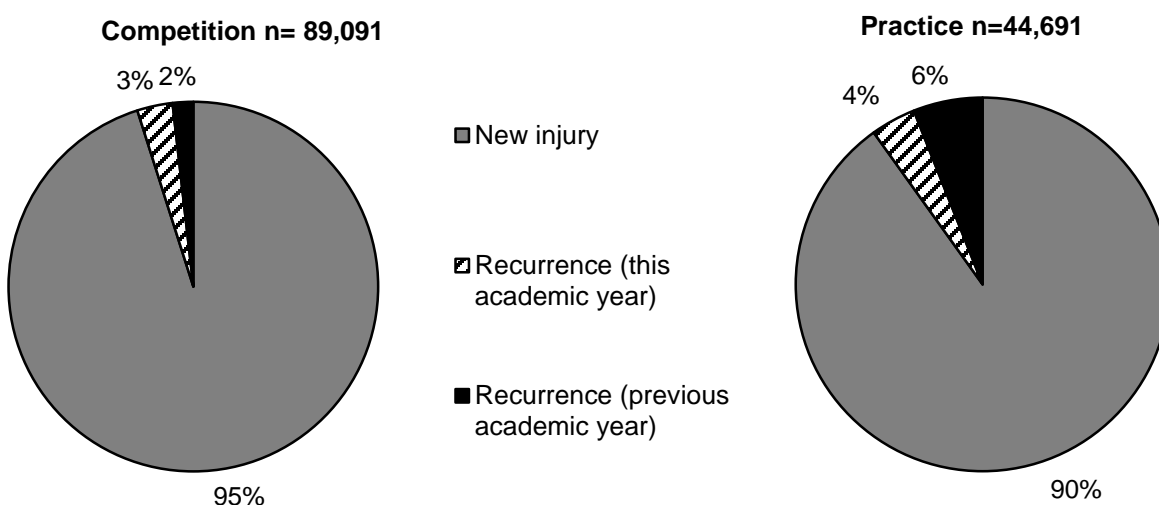


Table 4.6 Time during Season of Boys' Soccer Injuries, High School Sports-Related Injury Surveillance Study, US, 2014-15 School Year*

	n	%
Time in Season		
Preseason	27,879	21.0%
Regular season	100,192	75.5%
Post season	4,652	3.5%
Total	132,723	100%

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

Table 4.7 Competition-Related Variables for Boys' Soccer Injuries, High School Sports-Related Injury Surveillance Study, US, 2014-15 School Year*

	n	%
Time in Competition		
Pre-competition/warm-ups	0	0.0%
First half	23,398	28.3%
Second half	57,521	69.7%
Overtime	1,646	2.0%
Total	82,565	100%
Field Location		
Top of goal box extended to center line (offense)	28,459	38.4%
Top of goal box extended to center line (defense)	20,413	27.6%
Side of goal box (offense)	8,198	11.1%
Goal box (defense)	5,195	7.0%
Goal box (offense)	5,195	7.0%
Side of goal box (defense)	4,431	6.0%
Off the field	208	0.3%
Total	74,087	100%

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

Table 4.8 Practice-Related Variables for Boys' Soccer Injuries, High School Sports-Related Injury Surveillance Study, US, 2014-15 School Year*

	n	%
Time in Practice		
First 1/2 hour	2,833	6.9%
Second 1/2 hour	9,578	23.4%
1-2 hours into practice	24,533	60.0%
>2 hours into practice	3,966	9.7%
Total	40,910	100%

* 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.

Figure 4.4 Player Position of Boys' Soccer Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2014-15 School Year

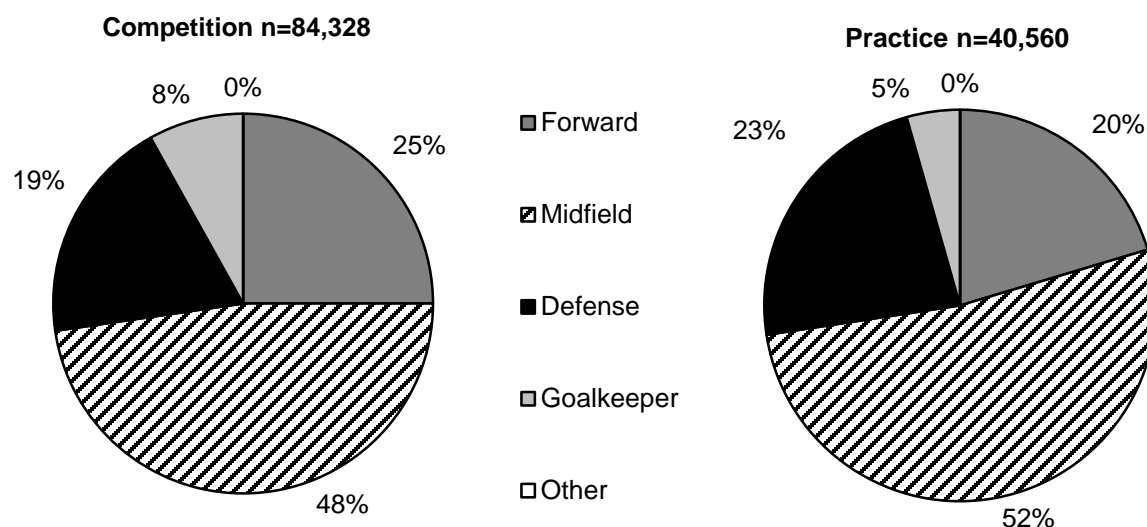


Table 4.9 Activities Leading to Boys' Soccer Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2014-15 School Year*

Activity	Competition		Practice		Overall	
	n	%	n	%	n	%
General play	20,862	24.0%	14,559	32.8%	35,421	27.0%
Chasing loose ball	13,295	15.3%	4,404	9.9%	17,699	13.5%
Defending	8,867	10.2%	3,202	7.2%	12,069	9.2%
Shooting (foot)	5,428	6.2%	4,858	10.9%	10,286	7.8%
Heading ball	8,714	10.0%	1,196	2.7%	9,910	7.5%
Receiving pass	6,749	7.8%	1,954	4.4%	8,703	6.6%
Passing (foot)	7,085	8.1%	1,264	2.8%	8,349	6.4%
Goaltending	6,739	7.8%	1,521	3.4%	8,260	6.3%
Conditioning	0	0.0%	7,810	17.6%	7,810	5.9%
Ball handling/dribbling	5,550	6.4%	1,458	3.3%	7,008	5.3%
Receiving a slide tackle	2,055	2.4%	854	1.9%	2,909	2.2%
Blocking shot	375	0.4%	208	0.5%	583	0.4%
Attempting a slide tackle	0	0.0%	0	0.0%	0	0.0%
Other	1,220	1.4%	1,127	2.5%	2,347	1.8%
Total	86,939	100%	44,415	100%	131,354	100%

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

Table 4.10 Activity Resulting in Boys' Soccer Injuries by Injury Diagnosis, High School Sports-Related Injury Surveillance Study, US, 2014-15 School Year

	Diagnosis									
	Strain/Sprain		Contusion		Fracture		Concussion		Other	
	n	%	n	%	n	%	n	%	n	%
Activity										
General Play	19,595	30.3%	1,953	17.7%	3,283	24.8%	3,715	14.9%	6,875	39.1%
Chasing loose ball	8,376	13.0%	1,607	14.6%	3,099	23.4%	1,635	6.6%	2,982	17.0%
Defending	4,067	6.3%	2,449	22.2%	375	2.8%	4,692	18.9%	485	2.8%
Shooting	7,238	11.2%	1,127	10.2%	394	3.0%	1,220	4.9%	307	1.7%
Heading ball	1,127	1.7%	1,029	9.3%	307	2.3%	6,558	26.4%	889	5.1%
Other	24,242	37.5%	2,878	26.1%	5,760	43.6%	7,053	28.4%	6,033	34.3%
Total	64,645	100%	11,043	100%	13,218	100%	24,873	100%	17,571	100%

V. Girls' Soccer Injury Epidemiology

Table 5.1 Girls' Soccer Injury Rates by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2014-15 School Year

	# Injuries	# Exposures	Injury rate (per 1,000 athlete- exposures)	Nationally Estimated # Injuries
Total	391	148,225	2.64	217,546
Competition	279	45,691	6.11	158,078
Practice	112	102,534	1.09	59,468

Table 5.2 Demographic Characteristics of Injured Girls' Soccer Athletes, High School Sports-Related Injury Surveillance Study, US, 2014-15 School Year*

Year in School	n=213,897
Freshman	26.1%
Sophomore	27.7%
Junior	19.9%
Senior	26.3%
Total[†]	100%
Age (years)	
Minimum	13
Maximum	18
Mean (St. Dev.)	15.9 (1.2)
BMI	
Minimum	15.3
Maximum	32.6
Mean (St. Dev.)	22.0 (3.4)

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

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

Figure 5.1 Diagnosis of Girls' Soccer Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2014-15 School Year

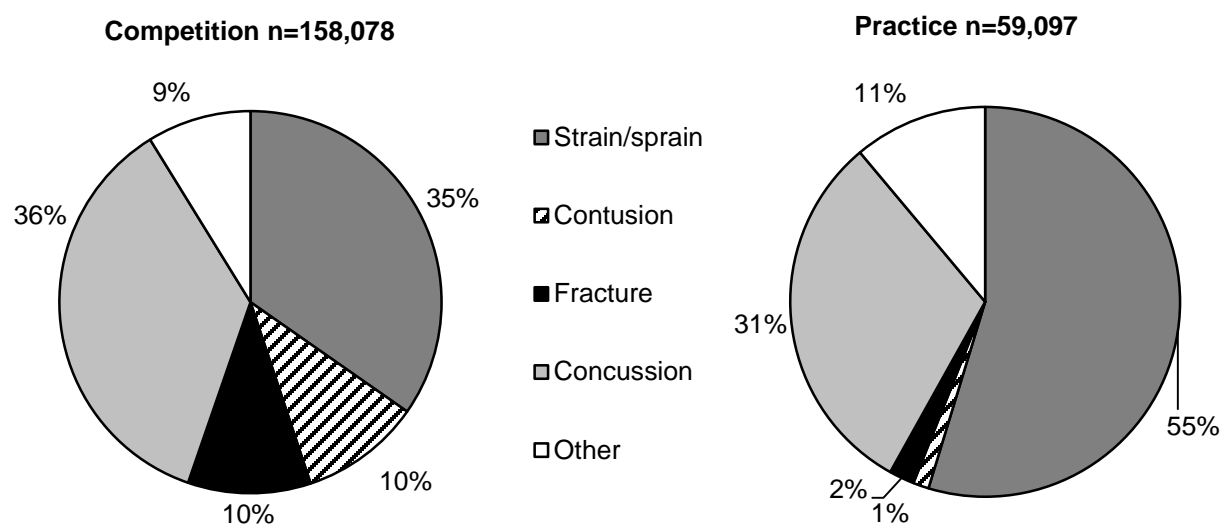


Table 5.3 Body Site of Girls' Soccer Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2014-15 School Year*

	Competition		Practice		Overall	
	n	%	n	%	n	%
Body Site						
Head/face	59,781	37.8%	19,045	32.0%	78,826	36.2%
Ankle	25,162	15.9%	21,475	36.1%	46,637	21.4%
Knee	27,911	17.7%	3,779	6.4%	31,690	14.6%
Hip/thigh/upper leg	13,010	8.2%	6,550	11.0%	19,560	9.0%
Foot	9,853	6.2%	3,117	5.2%	12,970	6.0%
Lower leg	6,403	4.1%	2,651	4.5%	9,054	4.2%
Shoulder	6,687	4.2%	0	0.0%	6,687	3.1%
Arm/elbow	2,033	1.3%	436	0.7%	2,469	1.1%
Hand/wrist	1,544	1.0%	371	0.6%	1,915	0.9%
Trunk	1,568	1.0%	416	0.7%	1,984	0.9%
Neck	0	0.0%	371	0.6%	371	0.2%
Other	4,126	2.6%	1,256	2.1%	5,382	2.5%
Total	158,078	100%	59,467	100%	217,545	100%

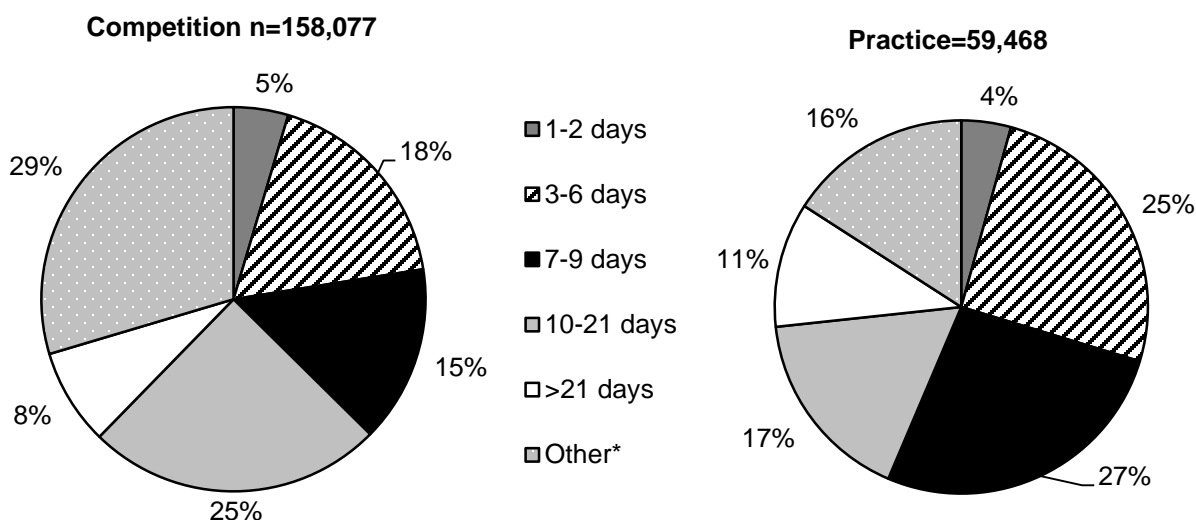
* Totals and n's are not always equal due to slight rounding of the weighted number of injuries and missing responses. Due to a low level of non-response, these totals are always similar but are not always equal to the total number of injuries.

Table 5.4 Ten Most Common Girls' Soccer Injury Diagnoses by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2014-15 School Year*

	Competition n=158,077		Practice n=59,097		Total n=217,174	
	n	%	n	%	n	%
Diagnosis						
Head/face concussion	56,710	35.9%	18,221	30.8%	74,931	34.5%
Ankle strain/sprain	23,775	15.0%	20,820	35.2%	44,595	20.5%
Knee strain/sprain	18,114	11.5%	1,589	2.7%	19,703	9.1%
Hip/thigh/upper leg strain/sprain	5,580	3.5%	6,123	10.4%	11,703	5.4%
Knee other	3,856	2.4%	1,820	3.1%	5,676	2.6%
Foot strain/sprain	3,228	2.0%	2,014	3.4%	5,242	2.4%
Knee Contusion	5,183	3.3%	0	0.0%	5,183	2.4%
Hip/thigh/upper leg other	4,257	2.7%	427	0.7%	4,684	2.2%
Other fracture	4,126	2.6%	0	0.0%	4,126	1.9%
Foot fracture	3,929	2.5%	66	0.1%	3,995	1.8%

* 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.

Figure 5.2 Time Loss of Girls' Soccer Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2014-15 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, 2014-15 School Year*

	Competition		Practice		Overall	
	n	%	n	%	n	%
Need for surgery						
Required surgery	12,740	8.1%	2,894	4.9%	15,634	7.2%
Did not require surgery	144,754	91.9%	56,575	95.1%	201,329	92.8%
Total	157,494	100%	59,469	100%	216,963	100%

* 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.

Figure 5.3 History of Girls' Soccer Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2014-15 School Year

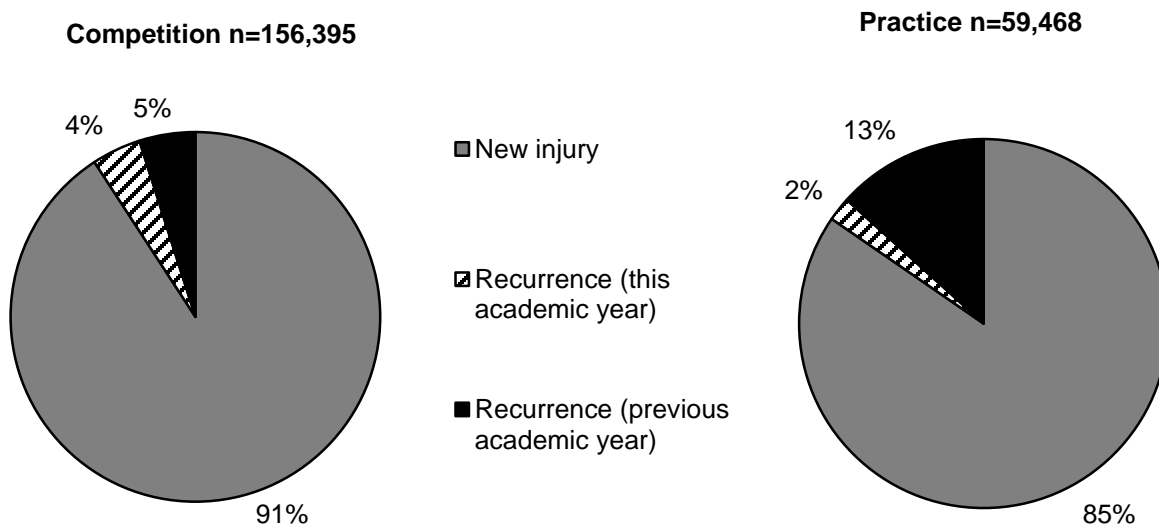


Table 5.6 Time during Season of Girls' Soccer Injuries, High School Sports-Related Injury Surveillance Study, US, 2014-15 School Year*

	n	%
Time in Season		
Preseason	35,866	16.5%
Regular season	161,950	74.7%
Post season	19,009	8.8%
Total	216,825	100%

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

Table 5.7 Competition-Related Variables for Girls' Soccer Injuries, High School Sports-Related Injury Surveillance Study, US, 2014-15 School Year*

	n	%
Time in Competition		
Pre-competition/warm-ups	1,541	1.0%
First half	59,477	39.7%
Second half	88,652	59.2%
Overtime	0	0.0%
Total	149,670	100%
Field Location		
top of goal box extended to center line (offense)	46,588	32.8%
goal box (defense)	26,691	18.8%
top of goal box extended to center line (defense)	20,201	14.2%
goal box (offense)	20,193	14.2%
side of goal box (offense)	15,394	10.8%
side of goal box (defense)	13,180	9.3%
off the field	0	0.0%
Total	142,247	100%

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

Table 5.8 Practice-Related Variables for Girls' Soccer Injuries, High School Sports-Related Injury Surveillance Study, US, 2014-15 School Year*

	n	%
Time in Practice		
First 1/2 hour	4,749	8.4%
Second 1/2 hour	10,770	19.1%
1-2 hours into practice	39,382	70.0%
>2 hours into practice	1,340	2.4%
Total	56,241	100%

* 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.

Figure 5.4 Player Position of Girls' Soccer Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2014-15 School Year

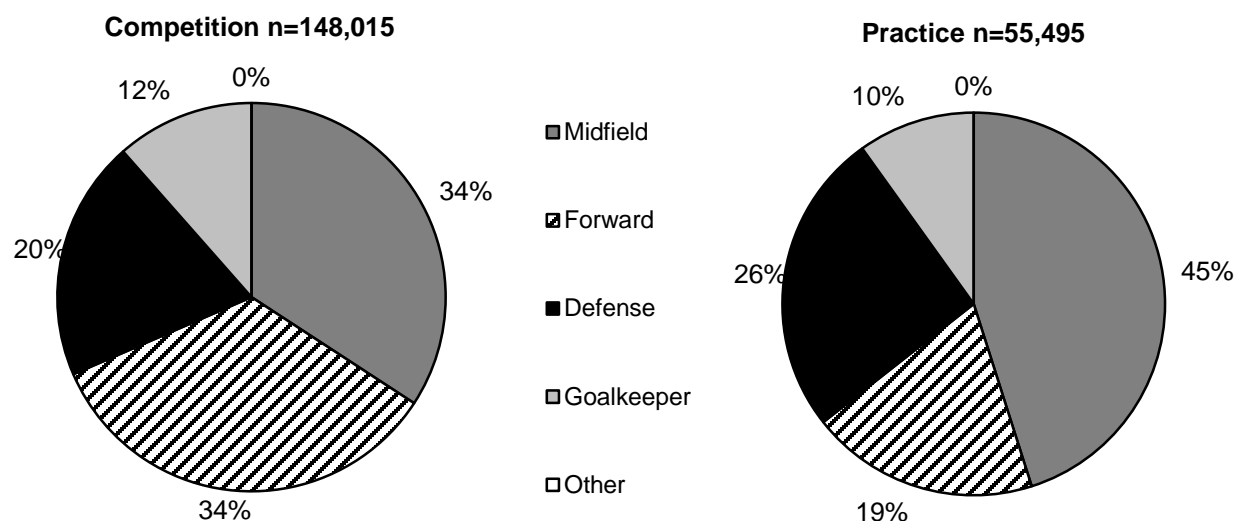


Table 5.9 Activities Leading to Girls' Soccer Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2014-15 School Year*

	Competition		Practice		Overall	
	n	%	n	%	n	%
Activity						
General play	21,107	13.7%	14,705	25.9%	35,812	17.0%
Defending	29,000	18.8%	4,865	8.6%	33,865	16.0%
Chasing loose ball	16,820	10.9%	831	1.5%	17,651	8.4%
Receiving pass	9,997	6.5%	2,299	4.0%	12,296	5.8%
Heading ball	24,905	16.2%	4,863	8.6%	29,768	14.1%
Ball handling/dribbling	16,824	10.9%	4,544	8.0%	21,368	10.1%
Goaltending	14,597	9.5%	2,063	3.6%	16,660	7.9%
Passing (foot)	7,953	5.2%	5,871	10.3%	13,824	6.6%
Conditioning	0	0.0%	3,141	5.5%	3,141	1.5%
Shooting (foot)	7,967	5.2%	8,982	15.8%	16,949	8.0%
Blocking shot	2,858	1.9%	786	1.4%	3,644	1.7%
Attempting a slide tackle	1,322	0.9%	481	0.8%	1,803	0.9%
Receiving a slide tackle	786	0.5%	284	0.5%	1,070	0.5%
Other	0	0.0%	3,150	5.5%	3,150	1.5%
Total	154,136	100%	56,865	100%	211,001	100%

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

Table 5.10 Activity Resulting in Girls' Soccer Injuries by Injury Diagnosis, High School Sports-Related Injury Surveillance Study, US, 2014-15 School Year

	Diagnosis									
	Strain/Sprain		Contusion		Fracture		Concussion		Other	
	n	%	n	%	n	%	n	%	n	%
Activity										
General Play	15,402	18.0%	765	4.9%	655	3.9%	9,957	13.6%	9,032	45.8%
Defending	14,402	16.8%	6,430	41.0%	1,342	8.0%	10,385	14.2%	1,305	6.6%
Heading ball	371	0.4%	371	2.4%	284	1.7%	28,743	39.3%	-	0.0%
Ball handling	7,852	9.2%	842	5.4%	4,081	24.2%	5,295	7.2%	3,297	16.7%
Chasing loose ball	9,250	10.8%	2,544	16.2%	2,664	15.8%	2,980	4.1%	213	1.1%
Other	38,332	44.8%	4,713	30.1%	7,839	46.5%	15,794	21.6%	5,859	29.7%
Total	85,609	100%	15,665	100%	16,865	100%	73,154	100%	19,706	100%

VI. Volleyball Injury Epidemiology

Table 6.1 Volleyball Injury Rates by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2014-15 School Year

	# Injuries	# Exposures	Injury rate (per 1,000 athlete- exposures)	Nationally Estimated # Injuries
Total	178	161,050	1.11	46,807
Competition	74	53,337	1.39	19,373
Practice	104	107,713	0.97	27,434

Table 6.2 Demographic Characteristics of Injured Volleyball Athletes, High School Sports-Related Injury Surveillance Study, US, 2014-15 School Year*

Year in School	n=44,652
Freshman	23.4%
Sophomore	34.2%
Junior	23.7%
Senior	20.4%
Total[†]	100%
Age (years)	
Minimum	13
Maximum	18
Mean (St. Dev.)	15.5 (1.2)
BMI	
Minimum	16.5
Maximum	36.0
Mean (St. Dev.)	21.7 (2.9)

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

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

Figure 6.1 Diagnosis of Volleyball Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2014-15 School Year

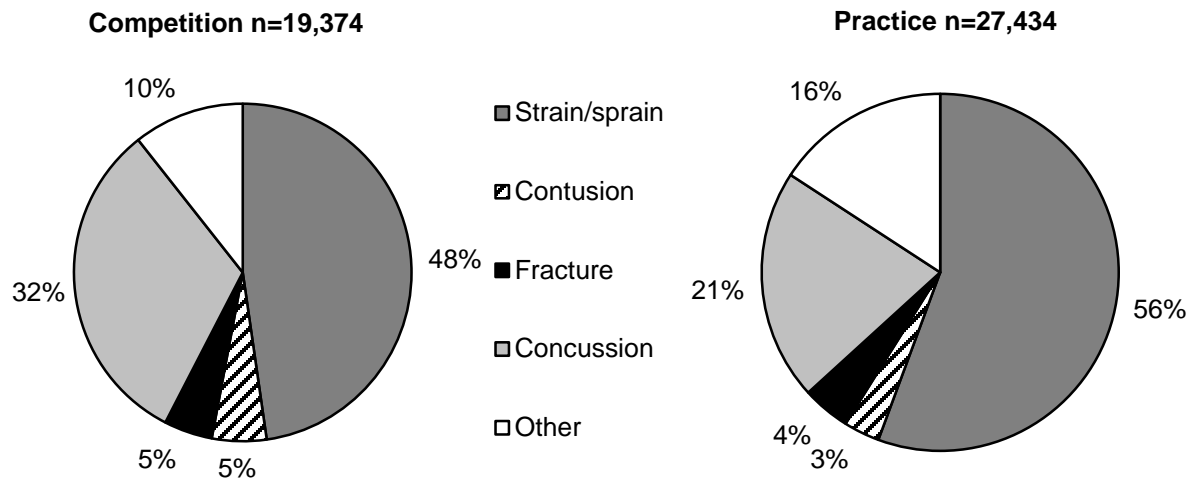


Table 6.3 Body Site of Volleyball Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2014-15 School Year*

	Competition		Practice		Overall	
	n	%	n	%	n	%
Body Site						
Ankle	6,835	35.3%	10,814	39.4%	17,649	37.7%
Head/face	6,528	33.7%	6,247	22.8%	12,775	27.3%
Knee	1,838	9.5%	2,040	7.4%	3,878	8.3%
Shoulder	1,208	6.2%	2,066	7.5%	3,274	7.0%
Hip/thigh/upper leg	627	3.2%	1,806	6.6%	2,433	5.2%
Trunk	906	4.7%	1,103	4.0%	2,009	4.3%
Hand/wrist	497	2.6%	962	3.5%	1,459	3.1%
Lower leg	621	3.2%	571	2.1%	1,192	2.5%
Foot	0	0.0%	917	3.3%	917	2.0%
Arm/elbow	313	1.6%	571	2.1%	884	1.9%
Other	0	0.0%	337	1.2%	337	0.7%
Total	19,373	100%	27,434	100%	46,807	100%

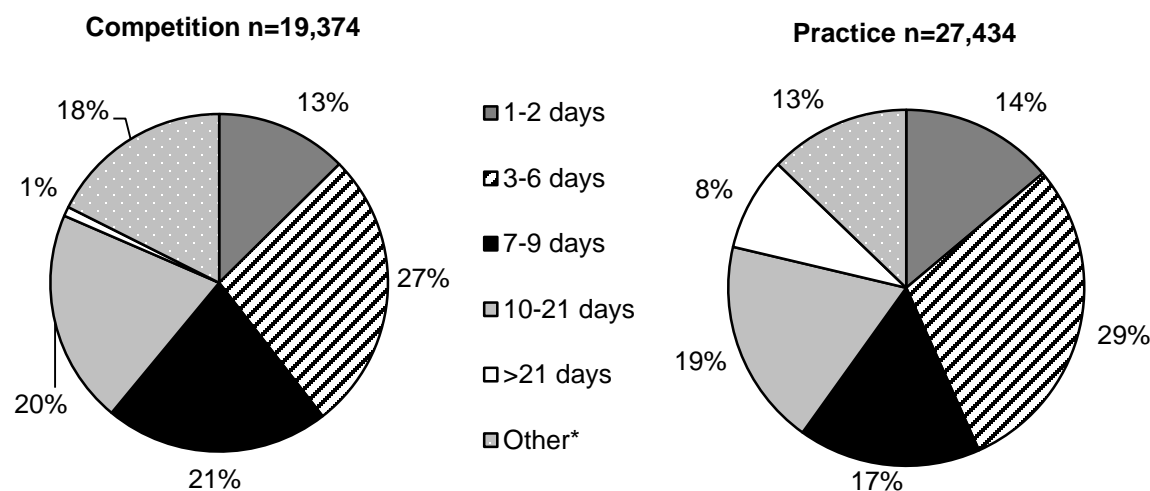
* Totals and n's are not always equal due to slight rounding of the weighted number of injuries and missing responses. Due to a low level of non-response, these totals are always similar but are not always equal to the total number of injuries.

Table 6.4 Ten Most Common Volleyball Injury Diagnoses by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2014-15 School Year*

	Competition n=19,374		Practice n=27,434		Total n=46,808	
	n	%	n	%	n	%
Diagnosis						
Ankle strain/sprain	6,522	33.7%	10,372	37.8%	16,894	36.1%
Head/face concussion	6,376	32.9%	5,828	21.2%	12,204	26.1%
Trunk strain/sprain	906	4.7%	1,103	4.0%	2,009	4.3%
Hip/thigh/upper leg strain/sprain	152	0.8%	1,806	6.6%	1,958	4.2%
Knee other	788	4.1%	985	3.6%	1,773	3.8%
Shoulder other	1,362	5.0%	1,362	5.0%	1,780	3.8%
Shoulder strain/sprain	791	4.1%	703	2.6%	1,494	3.2%
Knee strain/sprain	475	2.5%	580	2.1%	1,055	2.3%
Knee contusion	574	3.0%	475	1.7%	1,049	2.2%
Hand/wrist strain/sprain	267	1.4%	627	2.3%	894	1.9%

* 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.

Figure 6.2 Time Loss of Volleyball Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2014-15 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 Volleyball Injuries Requiring Surgery by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2014-15 School Year*

	Competition		Practice		Overall	
	n	%	n	%	n	%
Need for surgery						
Required surgery	1,420	7.4%	1,630	5.9%	3,050	6.5%
Did not require surgery	17,848	92.6%	25,805	94.1%	43,653	93.5%
Total	19,268	100%	27,435	100%	46,703	100%

* 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.

Figure 6.3 History of Volleyball Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2014-15 School Year

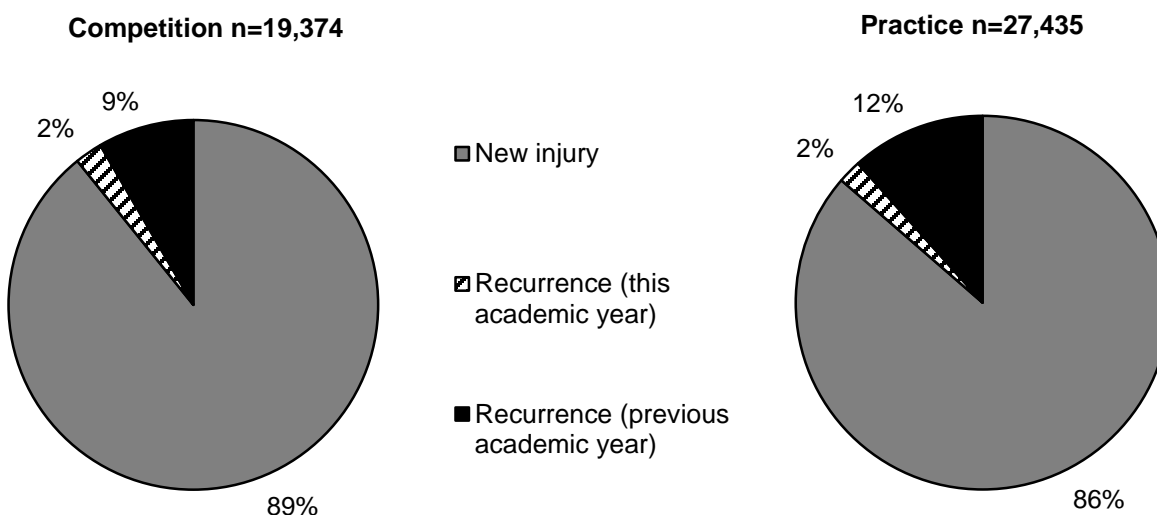


Table 6.6 Time during Season of Volleyball Injuries, High School Sports-Related Injury Surveillance Study, US, 2014-15 School Year*

	n	%
Time in Season		
Preseason	7,859	17.2%
Regular season	36,477	79.8%
Post season	1,398	3.1%
Total	45,734	100%

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

Table 6.7 Competition-Related Variables for Volleyball Injuries, High School Sports-Related Injury Surveillance Study, US, 2014-15 School Year*

	n	%
Time in Competition		
Pre-competition/warm-ups	3,975	21.9%
First set	1,648	9.1%
Second set	6,399	35.3%
Third set	4,677	25.8%
Fourth set	946	5.2%
Fifth set	470	2.6%
Total	18,115	100%
Court Location		
Middle forward	6,473	38.7%
Right forward	2,657	15.9%
Left forward	2,481	14.8%
Left back	1,303	7.8%
At the net	1,127	6.7%
Right back (server)	893	5.3%
Outside court (your side)	466	2.8%
Off the court	0	0.0%
Outside court (opponent's side)	0	0.0%
Total	16,712	100%

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

Table 6.8 Practice-Related Variables for Volleyball Injuries, High School Sports-Related Injury Surveillance Study, US, 2014-15 School Year*

	n	%
Time in Practice		
First 1/2 hour	4,768	19.0%
Second 1/2 hour	5,047	20.1%
1-2 hours into practice	14,530	57.8%
>2 hours into practice	791	3.1%
Total	25,136	100%

* 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.

Figure 6.4 Player Position of Volleyball Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2014-15 School Year

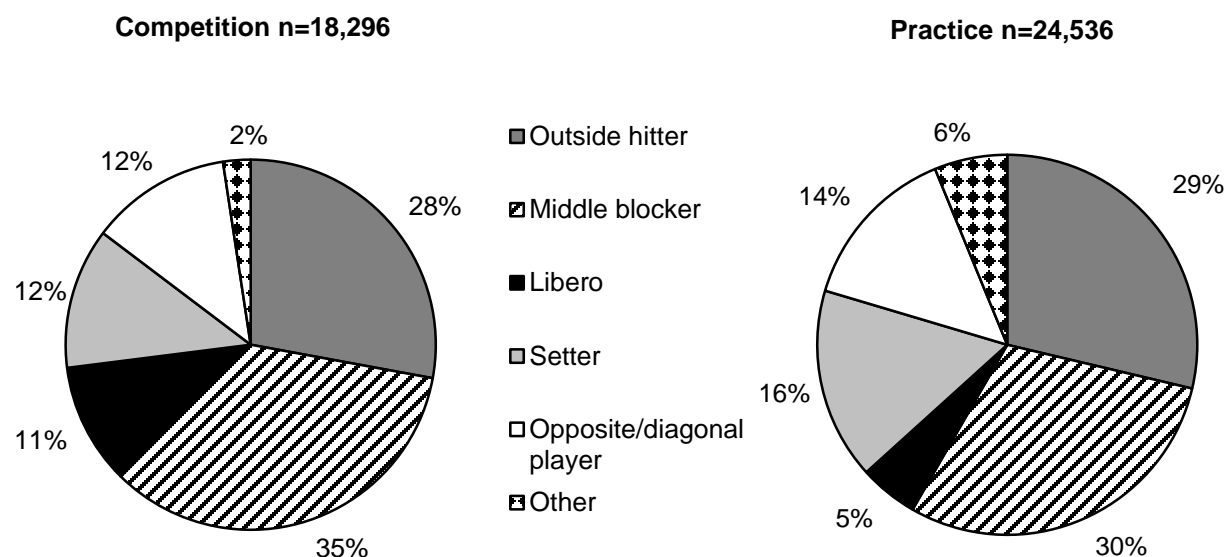


Table 6.9 Activities Leading to Volleyball Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2014-15 School Year*

Activity	Competition		Practice		Overall	
	n	%	n	%	n	%
Blocking	5,121	27.3%	6,728	25.8%	11,849	26.4%
General play	3,250	17.3%	5,349	20.5%	8,599	19.2%
Digging	2,942	15.7%	3,563	13.7%	6,505	14.5%
Spiking	2,772	14.8%	1,827	7.0%	4,599	10.3%
Conditioning	0	0.0%	3,273	12.6%	3,273	7.3%
Passing	1,516	8.1%	1,277	4.9%	2,793	6.2%
Setting	1,029	5.5%	1,542	5.9%	2,571	5.7%
Serving	1,219	6.5%	1,284	4.9%	2,503	5.6%
Other	917	4.9%	1,211	4.6%	2,128	4.7%
Total	18,766	100%	26,054	100%	44,820	100%

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

Table 6.10 Activity Resulting in Volleyball Injuries by Injury Diagnosis, High School Sports-Related Injury Surveillance Study, US, 2014-15 School Year

	Diagnosis									
	Strain/Sprain		Contusion		Fracture		Concussion		Other	
	n	%	n	%	n	%	n	%	n	%
Activity										
Blocking	9,639	39.7%	475	24.2%	887	41.6%	372	3.1%	475	10.4%
General play	3,298	13.6%	475	24.2%	152	7.1%	2,786	23.4%	1,888	41.4%
Digging	1,777	7.3%	257	13.1%	105	4.9%	4,214	35.4%	152	3.3%
Spiking	2,558	10.5%	-	0.0%	-	0.0%	1,624	13.6%	418	9.2%
Conditioning	2,123	8.7%	-	0.0%	337	15.8%	475	4.0%	337	7.4%
Other	4,870	20.1%	758	38.6%	650	30.5%	2,430	20.4%	1,287	28.2%
Total	24,265	100%	1,965	100%	2,131	100%	11,901	100%	4,557	100%

VII. Boys' Basketball Injury Epidemiology

Table 7.1 Boys' Basketball Injury Rates by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2014-15 School Year

	# Injuries	# Exposures	Injury rate (per 1,000 athlete- exposures)	Nationally Estimated # Injuries
Total	223	206,391	1.08	55,980
Competition	125	63,287	1.98	32,534
Practice	98	143,104	0.68	23,446

Table 7.2 Demographic Characteristics of Injured Boys' Basketball Athletes, High School Sports-Related Injury Surveillance Study, US, 2014-15 School Year*

Year in School	n=53,999
Freshman	29.4%
Sophomore	25.4%
Junior	20.5%
Senior	24.7%
Total[†]	100%
Age (years)	
Minimum	14
Maximum	19
Mean (St. Dev.)	15.7 (1.3)
BMI	
Minimum	17.49
Maximum	33.65
Mean (St. Dev.)	22.5 (2.8)

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

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

Figure 7.1 Diagnosis of Boys' Basketball Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2014-15 School Year

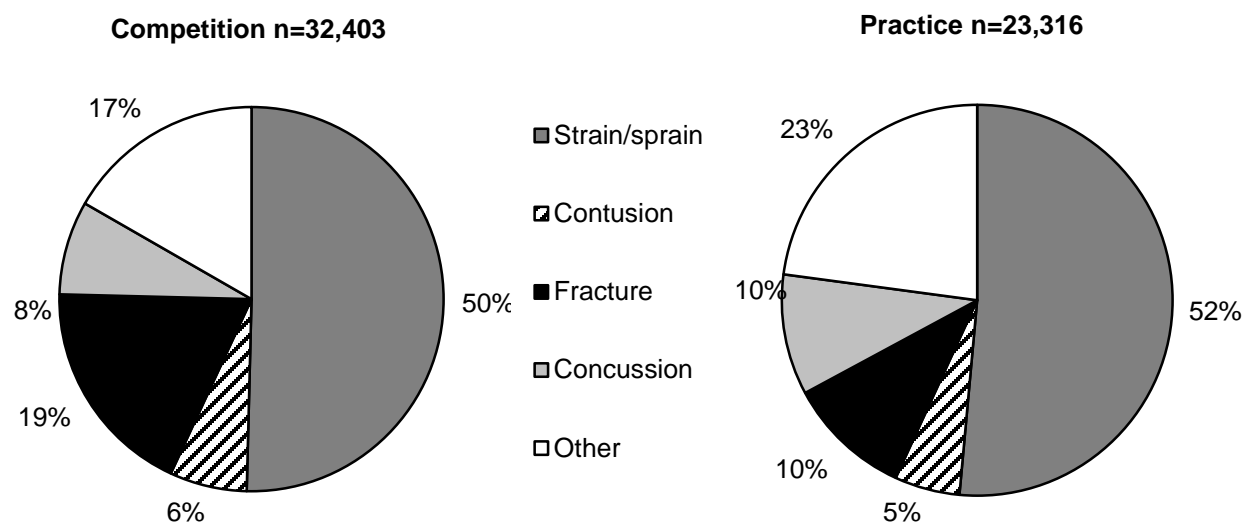


Table 7.3 Body Site of Boys' Basketball Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2014-15 School Year*

	Competition		Practice		Overall	
	n	%	n	%	n	%
Body Site						
Ankle	10,818	33.3%	7,791	33.2%	18,609	33.2%
Head/face	5,603	17.2%	3,632	15.5%	9,235	16.5%
Hand/wrist	5,438	16.7%	3,399	14.5%	8,837	15.8%
Knee	4,524	13.9%	3,496	14.9%	8,020	14.3%
Foot	1,417	4.4%	1,368	5.8%	2,785	5.0%
Hip/thigh/upper leg	1,005	3.1%	1,242	5.3%	2,247	4.0%
Trunk	967	3.0%	1,074	4.6%	2,041	3.6%
Shoulder	1,149	3.5%	566	2.4%	1,715	3.1%
Lower leg	748	2.3%	763	3.3%	1,511	2.7%
Arm/elbow	1,275	2.9%	191	0.5%	1,466	1.7%
Neck	901	2.0%	0	0.0%	901	1.0%
Other	0	0.0%	115	0.5%	115	0.2%
Total	32,532	100%	23,446	100%	55,978	100%

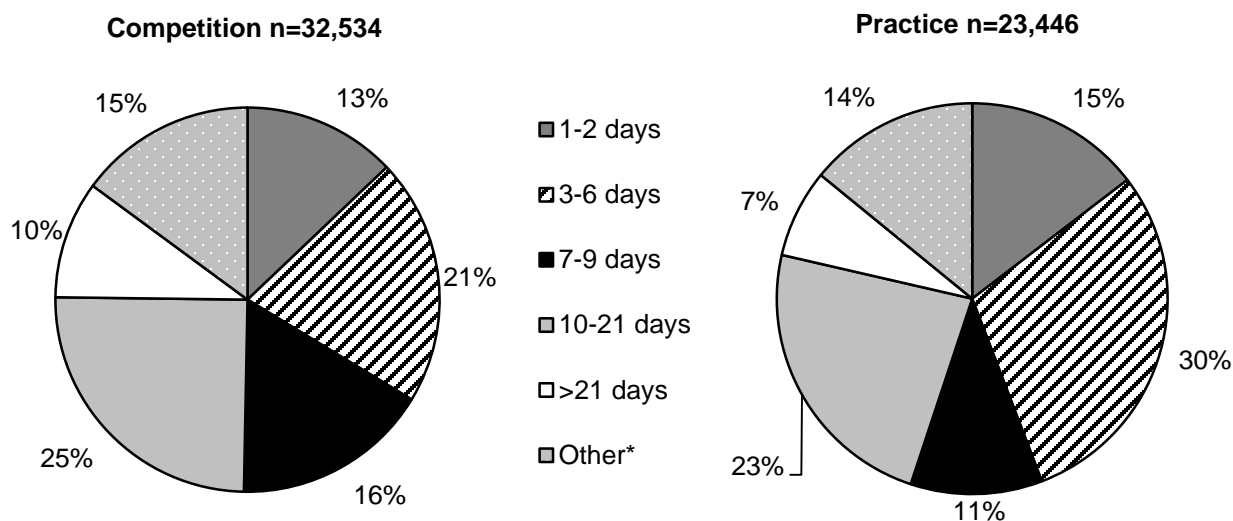
* Totals and n's are not always equal due to slight rounding of the weighted number of injuries and missing responses. Due to a low level of non-response, these totals are always similar but are not always equal to the total number of injuries.

Table 7.4 Ten Most Common Boys' Basketball Injury Diagnoses by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2014-15 School Year*

	Competition n=32,403		Practice n=23,314		Total n=55,717	
	n	%	n	%	n	%
Diagnosis						
Ankle strain/sprain	10,818	33.4%	7,661	32.9%	18,479	33.2%
Hand/wrist fracture	3,803	11.7%	2,021	8.7%	5,824	10.5%
Knee other	2,380	7.3%	2,657	11.4%	5,037	9.0%
Head/face concussion	2,557	7.9%	2,332	10.0%	4,889	8.8%
Knee strain/sprain	1,612	5.0%	594	2.5%	2,206	4.0%
Head/face other	1,209	3.7%	865	3.7%	2,074	3.7%
Hip/thigh/upper leg strain/sprain	875	2.7%	1,112	4.8%	1,987	3.6%
Foot strain/sprain	800	2.5%	1,170	5.0%	1,970	3.5%
Hand/wrist other	808	2.5%	812	3.5%	1,620	2.9%
Hand/wrist strain/sprain	828	2.6%	565	2.4%	1,393	2.5%

* 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.

Figure 7.2 Time Loss of Boys' Basketball Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2014-15 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, 2014-15 School Year*

	Competition		Practice		Overall	
	n	%	n	%	n	%
Need for surgery						
Required surgery	2,475	7.6%	763	3.3%	3,238	5.8%
Did not require surgery	29,929	92.4%	22,306	96.7%	52,235	94.2%
Total	32,404	100%	23,069	100%	55,473	100%

* 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.

Figure 7.3 History of Boys' Basketball Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2014-15 School Year

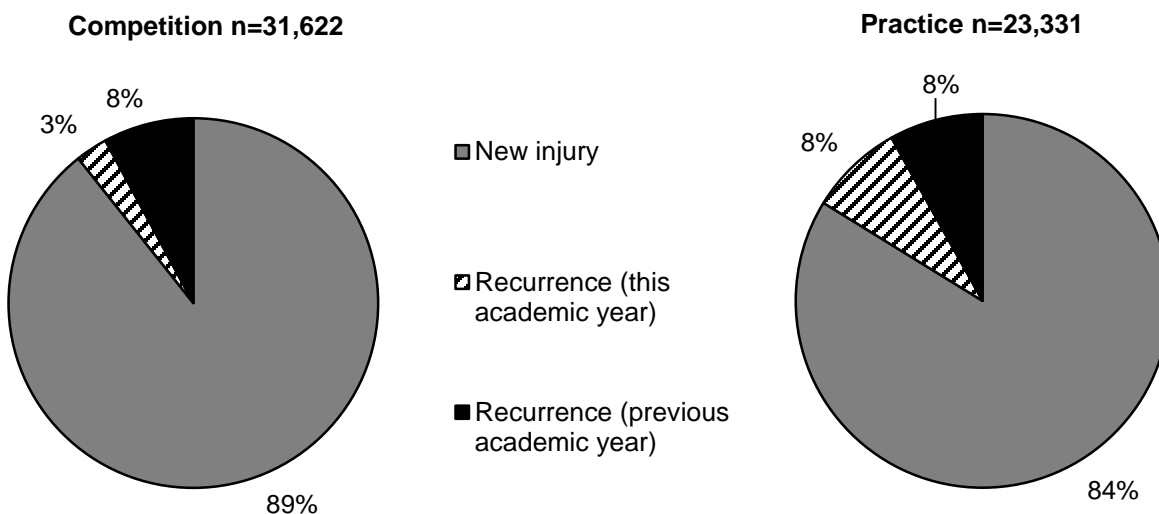


Table 7.6 Time during Season of Boys' Basketball Injuries, High School Sports-Related Injury Surveillance Study, US, 2014-15 School Year*

	n	%
Time in Season		
Preseason	8,828	15.8%
Regular season	45,080	80.5%
Post season	2,072	3.7%
Total	55,980	100%

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

Table 7.7 Competition-Related Variables for Boys' Basketball Injuries, High School Sports-Related Injury Surveillance Study, US, 2014-15 School Year*

	n	%
Time in Competition		
Pre-competition/warm-ups	1,006	3.4%
First quarter	4,515	15.2%
Second quarter	8,805	29.7%
Third quarter	7,837	26.4%
Fourth quarter	7,531	25.4%
Total	29,694	100%
Court Location		
Inside lane (defense)	9,221	33.6%
Inside lane (offense)	7,695	28.0%
Between 3 point arc and lane (defense)	3,636	13.3%
Between 3 point arc and lane (offense)	2,514	9.2%
Outside 3 point arc - offense	1,942	7.1%
Outside 3 point arc - defense	1,257	4.6%
Backcourt	837	3.1%
Out of bounds	334	1.2%
Total	27,436	100%

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

Table 7.8 Practice-Related Variables for Boys' Basketball Injuries, High School Sports-Related Injury Surveillance Study, US, 2014-15 School Year*

	n	%
Time in Practice		
First 1/2 hour	12,600	56.4%
Second 1/2 hour	5,431	24.3%
1-2 hours into practice	2,809	12.6%
>2 hours into practice	1,504	6.7%
Total	22,343	100%

* 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.

Figure 7.4 Player Position of Boys' Basketball Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2014-15 School Year

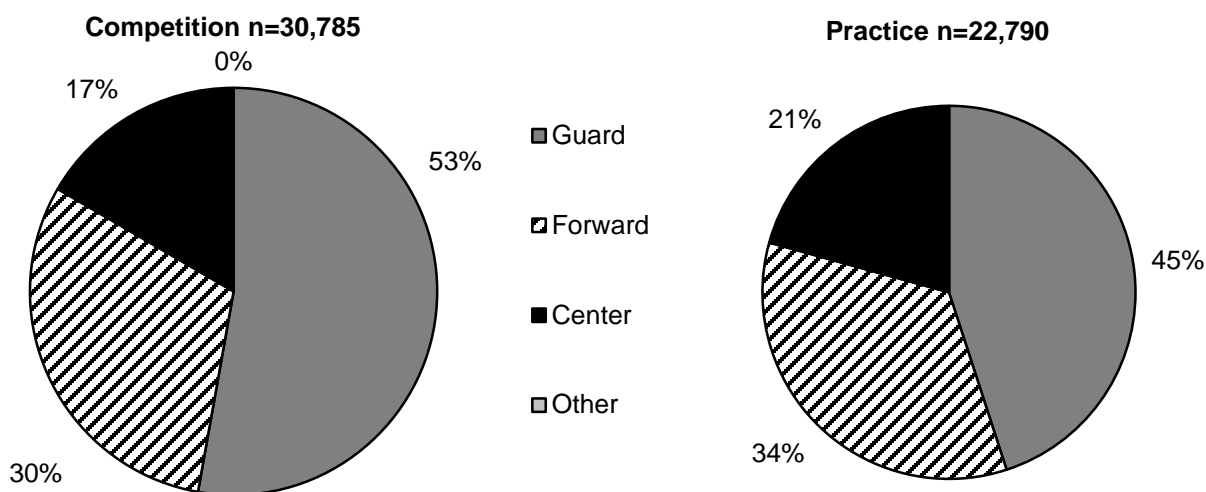


Table 7.9 Activities Leading to Boys' Basketball Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2014-15 School Year*

Activity	Competition		Practice		Overall	
	n	%	n	%	n	%
Rebounding	6,456	21.6%	7,502	33.1%	13,958	26.6%
General play	4,753	15.9%	5,614	24.8%	10,367	19.7%
Defending	6,151	20.6%	1,341	5.9%	7,492	14.3%
Shooting	4,107	13.8%	1,720	7.6%	5,827	11.1%
Chasing loose ball	2,455	8.2%	1,714	7.6%	4,169	7.9%
Ball handling/dribbling	2,443	8.2%	618	2.7%	3,061	5.8%
Receiving pass	1,408	4.7%	1,012	4.5%	2,420	4.6%
Conditioning	0	0.0%	1,982	8.7%	1,982	3.8%
Passing	706	2.4%	334	1.5%	1,040	2.0%
Other	1,378	4.6%	837	3.7%	2,215	4.2%
Total	29,857	100%	22,674	100%	52,531	100%

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

Table 7.10 Activity Resulting in Boys' Basketball Injuries by Injury Diagnosis, High School Sports-Related Injury Surveillance Study, US, 2014-15 School Year

	Diagnosis									
	Strain/Sprain		Contusion		Fracture		Concussion		Other	
	n	%	n	%	n	%	n	%	n	%
Activity										
Rebounding	10,272	38.6%	1,058	36.4%	449	5.4%	1,074	22.5%	1,105	11.2%
General play	4,548	17.1%	503	17.3%	2,012	24.4%	260	5.4%	2,914	29.6%
Defending	1,867	7.0%	680	23.4%	1,068	12.9%	2,489	52.1%	1,388	14.1%
Shooting	3,633	13.6%	-	0.0%	826	10.0%	-	0.0%	1,368	13.9%
Chasing loose ball	897	3.4%	-	0.0%	1,324	16.0%	951	19.9%	997	10.1%
Other	5,408	20.3%	662	22.8%	2,579	31.2%	-	0.0%	2,069	21.0%
Total	26,625	100%	2,903	100%	8,258	100%	4,774	100%	9,841	100%

VIII. Girls' Basketball Injury Epidemiology

Table 8.1 Girls' Basketball Injury Rates by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2014-15 School Year

	# Injuries	# Exposures	Injury rate (per 1,000 athlete- exposures)	Nationally Estimated # Injuries
Total	254	153,720	1.65	64,491
Competition	153	46,818	3.27	38,803
Practice	101	106,902	0.94	25,688

Table 8.2 Demographic Characteristics of Injured Girls' Basketball Athletes, High School Sports-Related Injury Surveillance Study, US, 2014-15 School Year*

Year in School	n=62,726
Freshman	22.3%
Sophomore	25.9%
Junior	24.4%
Senior	27.3%
Total[†]	100%
Age (years)	
Minimum	13
Maximum	19
Mean (St. Dev.)	15.8 (1.3)
BMI	
Minimum	16.6
Maximum	35.6
Mean (St. Dev.)	22.8 (3.1)

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

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

Figure 8.1 Diagnosis of Girls' Basketball Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2014-15 School Year

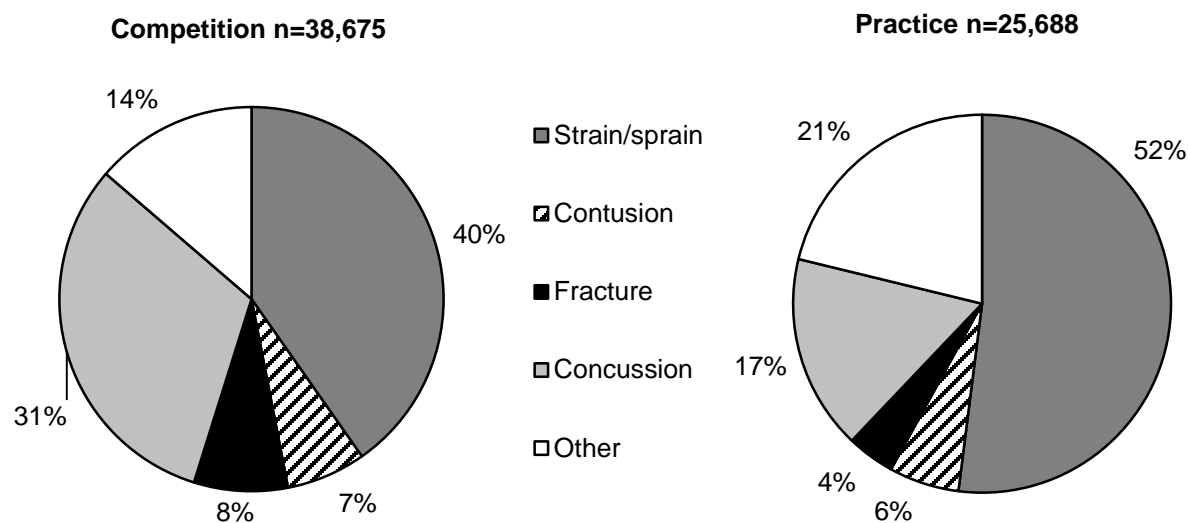


Table 8.3 Body Site of Girls' Basketball Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2014-15 School Year*

	Competition		Practice		Overall	
	n	%	n	%	n	%
Body Site						
Head/face	13,299	34.3%	4,546	17.7%	17,845	27.7%
Ankle	8,390	21.6%	6,290	24.5%	14,680	22.8%
Knee	7,973	20.5%	6,714	26.1%	14,687	22.8%
Hip/thigh/upper leg	987	2.5%	3,517	13.7%	4,504	7.0%
Hand/wrist	2,214	5.7%	1,392	5.4%	3,606	5.6%
Trunk	1,762	4.5%	1,482	5.8%	3,244	5.0%
Arm/elbow	1,230	3.2%	499	1.9%	1,729	2.7%
Lower leg	374	1.0%	1,035	4.0%	1,409	2.2%
Foot	1,046	2.7%	214	0.8%	1,260	2.0%
Shoulder	1,117	2.9%	0	0.0%	1,117	1.7%
Neck	410	1.1%	0	0.0%	410	0.6%
Other	0	0.0%	0	0.0%	0	0.0%
Total	38,802	100%	25,689	100%	64,491	100%

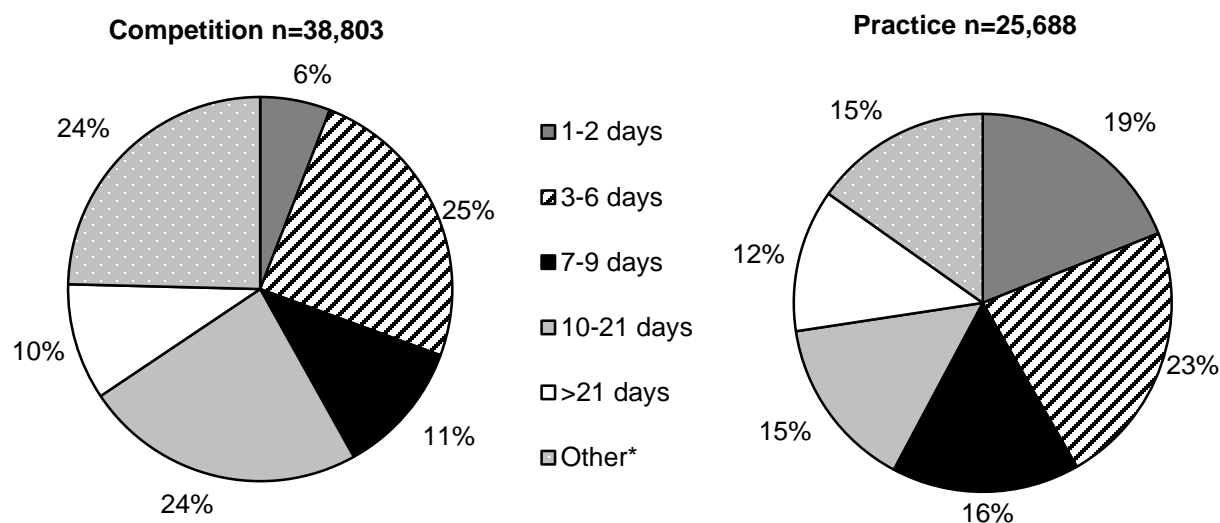
* Totals and n's are not always equal due to slight rounding of the weighted number of injuries and missing responses. Due to a low level of non-response, these totals are always similar but are not always equal to the total number of injuries.

Table 8.4 Ten Most Common Girls' Basketball Injury Diagnoses by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2014-15 School Year*

	Competition n=38,676		Practice n=25,688		Total n=64,364	
	n	%	n	%	n	%
Diagnosis						
Head/face concussion	12,178	31.5%	4,290	16.7%	16,468	25.6%
Ankle strain/sprain	8,262	21.4%	5,742	22.4%	14,004	21.8%
Knee strain/sprain	3,978	10.3%	3,213	12.5%	7,191	11.2%
Knee other	3,180	8.2%	2,196	8.5%	5,376	8.4%
Hip/thigh/upper leg strain/sprain	912	2.4%	3,045	11.9%	3,957	6.1%
Knee contusion	815	2.1%	1,304	5.1%	2,119	3.3%
Hand/wrist fracture	1,596	4.1%	311	1.2%	1,907	3.0%
Trunk other	472	1.2%	979	3.8%	1,451	2.3%
Hand/wrist sprain/strain	618	1.6%	748	2.9%	1,366	2.1%
Trunk strain/sprain	574	1.5%	502	2.0%	1,076	1.7%

* 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.

Figure 8.2 Time Loss of Girls' Basketball Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2014-15 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, 2014-15 School Year*

	Competition		Practice		Overall	
	n	%	n	%	n	%
Need for surgery						
Required surgery	4,583	11.9%	2,420	9.8%	7,003	11.1%
Did not require surgery	33,985	88.1%	22,386	90.2%	56,371	88.9%
Total	38,568	100%	24,806	100%	63,374	100%

* 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.

Figure 8.3 History of Girls' Basketball Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2014-15 School Year

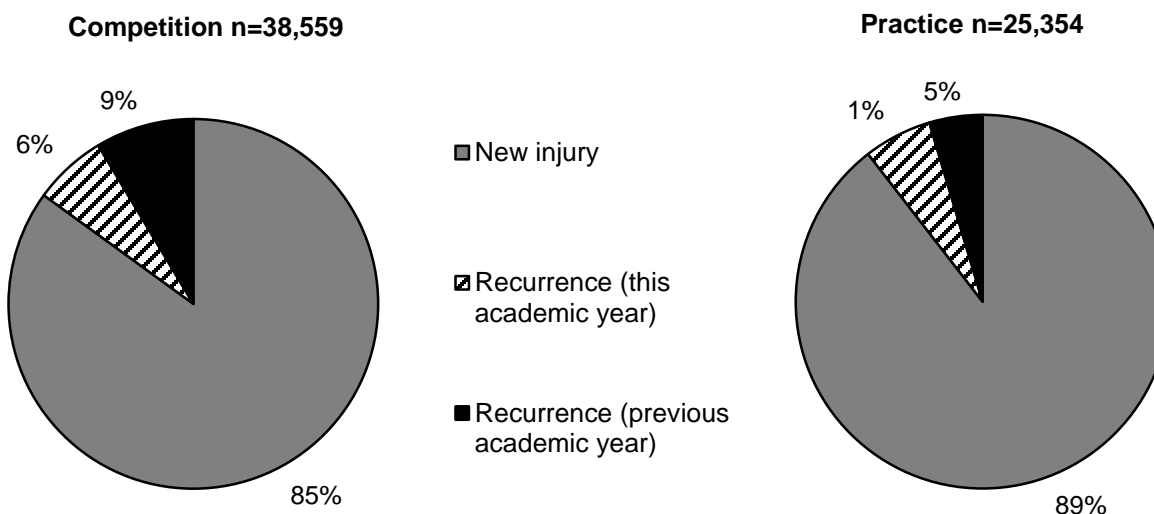


Table 8.6 Time during Season of Girls' Basketball Injuries, High School Sports-Related Injury Surveillance Study, US, 2014-15 School Year*

	n	%
Time in Season		
Preseason	12,671	19.7%
Regular season	48,697	75.9%
Post season	2,803	4.4%
Total	64,171	100%

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

Table 8.7 Competition-Related Variables for Girls' Basketball Injuries, High School Sports-Related Injury Surveillance Study, US, 2014-15 School Year*

	n	%
Time in Competition		
Pre-competition/warm-ups	457	1.3%
First quarter	4,010	11.2%
Second quarter	11,264	31.4%
Third quarter	13,157	36.7%
Fourth quarter	6,899	19.2%
Overtime	107	0.3%
Total	35,895	100%
Court Location		
Inside lane (defense)	9,775	28.2%
Between 3 point arc and lane (defense)	7,595	21.9%
Inside lane (offense)	6,148	17.8%
Between 3 point arc and lane (offense)	4,339	12.5%
Outside 3 point arc - offense	1,939	5.6%
Outside 3 point arc - defense	1,956	5.6%
Backcourt	1,482	4.3%
Out of bounds	806	2.3%
Off the court	579	1.7%
Total	34,618	100%

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

Table 8.8 Practice-Related Variables for Girls' Basketball Injuries, High School Sports-Related Injury Surveillance Study, US, 2014-15 School Year*

	n	%
Time in Practice		
First 1/2 hour	3,334	13.8
Second 1/2 hour	3,216	13.3
1-2 hours into practice	16,245	67.3
>2 hours into practice	1,357	5.6
Total	24,152	100%

* 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.

Figure 8.4 Player Position of Girls' Basketball Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2014-15 School Year

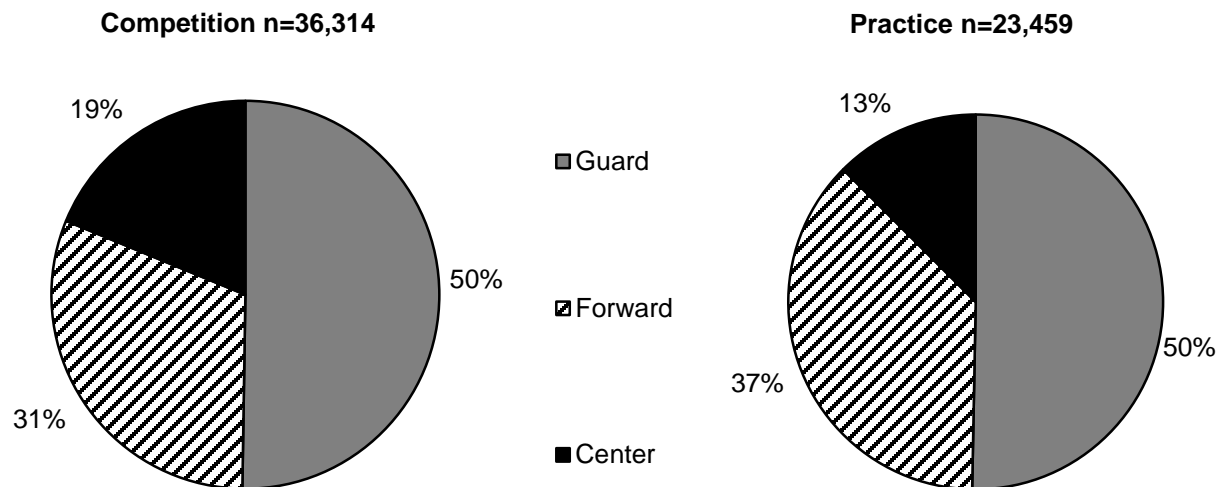


Table 8.9 Activities Leading to Girls' Basketball Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2014-15 School Year*

	Competition		Practice		Overall	
	n	%	n	%	n	%
Activity						
Defending	12,603	33.6%	2,438	10.2%	15,041	24.5%
General play	6,367	17.0%	6,997	29.3%	13,364	21.8%
Rebounding	6,721	17.9%	1,804	7.6%	8,525	13.9%
Chasing loose ball	5,028	13.4%	2,406	10.1%	7,434	12.1%
Shooting	1,824	4.9%	3,111	13.0%	4,935	8.0%
Ball handling/dribbling	2,054	5.5%	2,244	9.4%	4,298	7.0%
Conditioning	0	0.0%	3,199	13.4%	3,199	5.2%
Receiving pass	1,317	3.5%	1,157	4.9%	2,474	4.0%
Passing	244	0.7%	0	0.0%	244	0.4%
Screening	76	0.2%	0	0.0%	76	0.1%
Other	1,304	3.5%	499	2.1%	1,803	2.9%
Total	37,538	100%	23,855	100%	61,393	100%

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

Table 8.10 Activity Resulting in Girls' Basketball Injuries by Injury Diagnosis, High School Sports-Related Injury Surveillance Study, US, 2014-15 School Year

	Diagnosis									
	Strain/Sprain		Contusion		Fracture		Concussion		Other	
	n	%	n	%	n	%	n	%	n	%
Activity										
Defending	6,843	25.3%	983	23.8%	744	18.7%	4,559	28.7%	1,912	6,843
General play	4,511	16.7%	846	20.5%	244	6.1%	3,337	21.0%	4,425	4,511
Rebounding	3,071	11.4%	815	19.8%	500	12.6%	2,370	14.9%	1,769	3,071
Chasing loose ball	2,629	9.7%	472	11.4%	351	8.8%	3,609	22.7%	374	2,629
Shooting	3,871	14.3%	76	1.8%	-	0.0%	988	6.2%	-	3,871
Other	6,110	22.6%	931	22.6%	2,144	53.8%	1,026	6.5%	1,883	6,110
Total	27,035	100%	4,123	100%	3,983	100%	15,889	100%	10,363	100%

IX. Wrestling Injury Epidemiology

Table 9.1 Wrestling Injury Rates by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2014-15 School Year

	# Injuries	# Exposures	Injury rate (per 1,000 athlete- exposures)	Nationally Estimated # Injuries
Total	276	129,884	2.12	60,253
Competition	117	31,092	3.76	32,728
Practice	159	98,792	1.61	27,525

Table 9.2 Demographic Characteristics of Injured Wrestlers, High School Sports-Related Injury Surveillance Study, US, 2014-15 School Year*

Year in School	n=57,534
Freshman	25.1%
Sophomore	26.6%
Junior	27.1%
Senior	21.2%
Total[†]	100%
Age (years)	
Minimum	14
Maximum	18
Mean (St. Dev.)	15.8 (1.2)
BMI	
Minimum	17.6
Maximum	42.7
Mean (St. Dev.)	24.4 (4.6)

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

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

Figure 9.1 Diagnosis of Wrestling Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2014-15 School Year

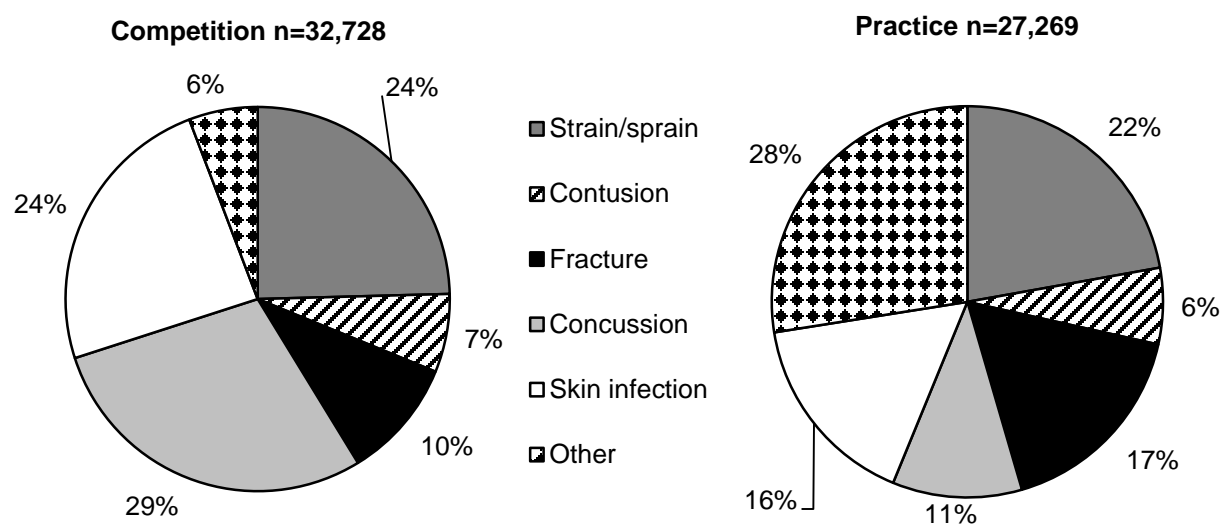


Table 9.3 Body Site of Wrestling Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2014-15 School Year*

	Competition		Practice		Overall	
	n	%	n	%	n	%
Body Site						
Head/face	11,291	34.5%	5,518	20.1%	16,809	27.9%
Knee	5,051	15.4%	2,592	9.4%	7,643	12.7%
Trunk	3,680	11.2%	2,844	10.4%	6,524	10.8%
Shoulder	4,337	13.3%	1,909	7.0%	6,246	10.4%
Hand/wrist	1,977	6.0%	4,274	15.6%	6,251	10.4%
Arm/elbow	1,124	3.4%	3,748	13.7%	4,872	8.1%
Ankle	1,131	3.5%	2,079	7.6%	3,210	5.3%
Neck	1,401	4.3%	1,526	5.6%	2,927	4.9%
Foot	1,250	3.8%	589	2.1%	1,839	3.1%
Hip/thigh/upper leg	162	0.5%	804	2.9%	966	1.6%
Lower leg	-	0.0%	936	3.4%	936	1.6%
Other	1,325	4.0%	626	2.3%	1,951	3.2%
Total	32,729	100%	27,445	100%	60,174	100%

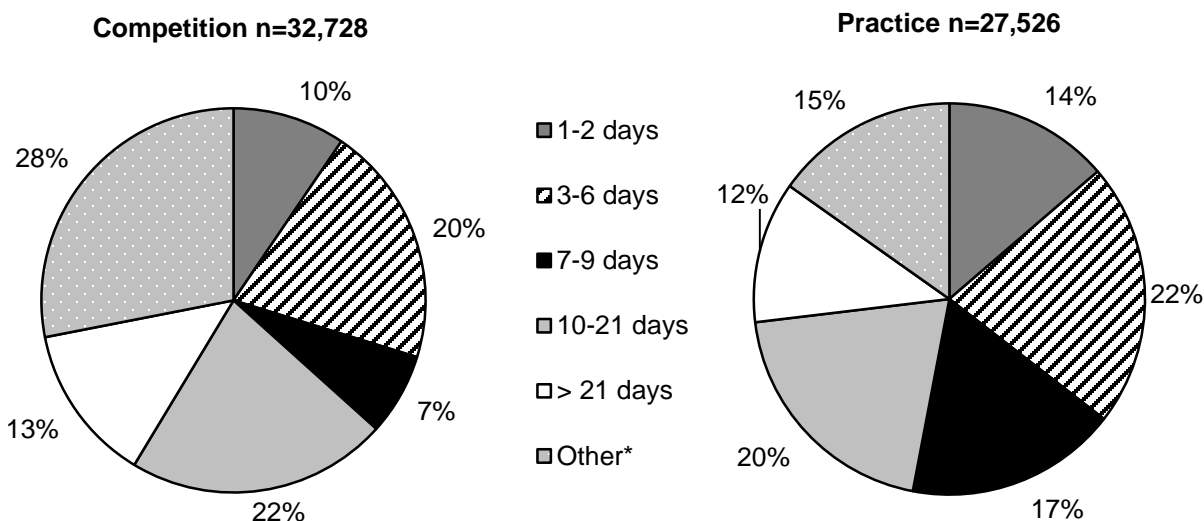
* Totals and n's are not always equal due to slight rounding of the weighted number of injuries and missing responses. Due to a low level of non-response, these totals are always similar but are not always equal to the total number of injuries.

Table 9.4 Ten Most Common Wrestling Injury Diagnoses by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2014-15 School Year*

Diagnosis	Competition n=32,730		Practice n=27,186		Total n=59,916	
	n	%	n	%	n	%
Head/face concussion	8,350	25.5%	2,926	10.8%	11,276	18.8%
Ankle strain/sprain	1,131	3.5%	1,866	6.9%	2,997	5.0%
Knee skin infection	3,006	9.2%	1,227	4.5%	4,233	7.1%
Shoulder strain/sprain	3,108	9.5%	959	3.5%	4,067	6.8%
Hand/wrist fracture	1,705	5.2%	1,940	7.1%	3,645	6.1%
Head/face other	1,548	4.7%	1,481	5.4%	3,029	5.1%
Arm/elbow other	81	0.2%	2,230	8.2%	2,311	3.9%
Knee strain/sprain	1,649	5.0%	599	2.2%	2,248	3.8%
Trunk fracture	1,064	3.3%	975	3.6%	2,039	3.4%
Trunk contusion	1,230	3.8%	589	2.2%	1,819	3.0%

* 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.

Figure 9.2 Time Loss of Wrestling Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2014-15 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 Wrestling Injuries Requiring Surgery by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2014-15 School Year*

	Competition		Practice		Overall	
	n	%	n	%	n	%
Need for surgery						
Required surgery	2,227	7.6%	1,862	7.3%	4,089	7.5%
Did not require surgery	30,033	92.4%	25,246	92.7%	55,279	92.5%
Total	32,515	100%	27,232	100%	59,747	100%

* 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.

Figure 9.3 History of Wrestling Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2014-15 School Year

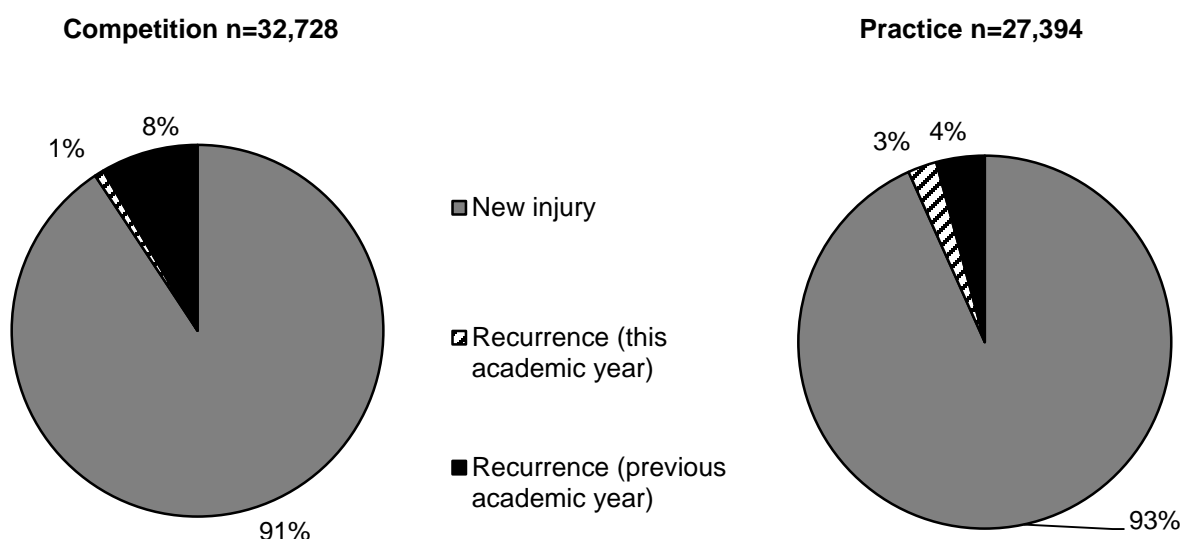


Table 9.6 Time during Season of Wrestling Injuries, High School Sports-Related Injury Surveillance Study, US, 2014-15 School Year*

	n	%
Time in Season		
Preseason	9,809	16.4
Regular season	47,356	78.9
Post season	2,825	4.7
Total	59,991	100%

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

Table 9.7 Competition-Related Variables for Wrestling Injuries, High School Sports-Related Injury Surveillance Study, US, 2014-15 School Year*

	n	%
Time in Competition		
Pre-competition/warm-ups	804	2.7
First period	6,266	20.8
Second period	14,124	47.0
Third period	8,871	29.5
Overtime	0	0.0%
Total	30,066	100%
Mat Location		
Within 28 ft. circle	47,598	89.2%
Off the mat	3,100	5.8%
Out of bounds	2,688	5.0%
Total	53,387	100%

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

Table 9.8 Practice-Related Variables for Wrestling Injuries, High School Sports-Related Injury Surveillance Study, US, 2014-15 School Year*

	n	%
Time in Practice		
First 1/2 hour	4,188	17.7
Second 1/2 hour	4,444	18.7
1-2 hours into practice	12,793	53.9
>2 hours into practice	2,289	9.7
Total	23,714	100%

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

Table 9.9 Activities Leading to Wrestling Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2014-15 School Year*

	Competition		Practice		Overall	
	n	%	n	%	n	%
Activity						
Takedown	15,886	51.4%	7,510	31.1%	23,396	42.5%
Sparring	3,404	11.0%	5,641	23.4%	9,045	16.4%
N/A (e.g., skin infection, overuse, etc.)	1,517	4.9%	5,638	23.4%	7,155	13.0%
Escape	1,180	3.8%	2,115	8.8%	3,295	6.0%
Riding	2,845	9.2%	205	0.8%	3,050	5.5%
Reversal	2,121	6.9%	81	0.3%	2,202	4.0%
Conditioning	851	2.8%	1,038	4.3%	1,889	3.4%
Fall	326	1.1%	375	1.6%	701	1.3%
Near fall	730	2.4%	-	0.0%	730	1.3%
Other	2,050	6.6%	1,536	6.4%	3,586	6.5%
Total	30,910	100%	24,139	100%	55,049	100%

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

Table 9.10 Activities Resulting in Wrestling Injuries by Injury Diagnosis, High School Sports-Related Injury Surveillance Study, US, 2014-15 School Year

Activity	Diagnosis									
	Strain/Sprain		Contusion		Fracture		Concussion		Other	
	n	%	n	%	n	%	n	%	n	%
Takedown	5,931	44.5%	2,828	88.4%	3,444	44.3%	5,339	47.9%	5,853	48.9%
Sparring	2,648	19.9%	124	3.9%	1,178	15.1%	2,402	21.6%	2,294	19.1%
N/A*	131	1.0%	-	0.0%	-	0.0%	-	0.0%	213	1.8%
Escape	205	1.5%	124	3.9%	2,098	27.0%	613	5.5%	255	2.1%
Riding	2,447	18.3%	124	3.9%	-	0.0%	-	0.0%	480	4.0%
Other	1,975	14.8%	-	0.0%	1,059	13.6%	2,788	25.0%	2,885	24.1%
Total	13,337	100%	3,200	100%	7,779	100%	11,142	100%	11,980	100%

*N/A category consists of skin infections, overuse injuries, heat illness, etc.

X. Baseball Injury Epidemiology

Table 10.1 Baseball Injury Rates by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2014-15 School Year

	# Injuries	# Exposures	Injury rate (per 1,000 athlete- exposures)	Nationally Estimated # Injuries
Total	152	160,941	0.94	44,208
Competition	95	56,899	1.67	27,129
Practice	57	104,042	0.55	17,079

Table 10.2 Demographic Characteristics of Injured Baseball Athletes, High School Sports-Related Injury Surveillance Study, US, 2014-15 School Year*

Year in School	n=43,121
Freshman	18.2%
Sophomore	26.8%
Junior	20.4%
Senior	34.6%
Total[†]	100%
Age (years)	
Minimum	14
Maximum	18
Mean (St. Dev.)	16.2 (1.3)
BMI	
Minimum	16.5
Maximum	37.3
Mean (St. Dev.)	24.1 (4.1)

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

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

Figure 10.1 Diagnosis of Baseball Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2014-15 School Year

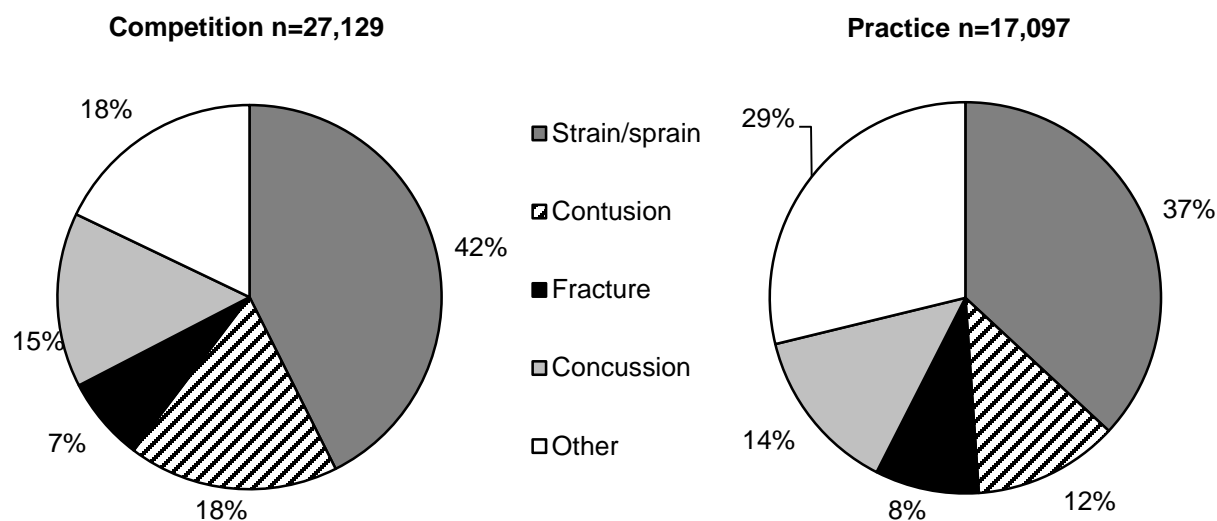


Table 10.3 Body Site of Baseball Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2014-15 School Year*

	Competition		Practice		Overall	
	n	%	n	%	n	%
Body Site						
Head/face	5,185	19.10%	5,957	34.90%	11,142	25.20%
Arm/elbow	5,420	20.00%	1,591	9.30%	7,011	15.90%
Hip/thigh/upper leg	3,812	14.10%	2,189	12.80%	6,001	13.60%
Shoulder	3,222	11.90%	2,737	16.00%	5,959	13.50%
Knee	3,314	12.20%	1,263	7.40%	4,577	10.40%
Hand/wrist	3,536	13.00%	837	4.90%	4,373	9.90%
Ankle	1,801	6.60%	496	2.90%	2,297	5.20%
Trunk	263	1.00%	1,283	7.50%	1,546	3.50%
Foot	-	0.00%	728	4.30%	728	1.60%
Lower leg	109	0.40%	-	0.00%	109	0.20%
Neck	0	0.00%	0	0.00%	0	0.00%
Other	468	1.70%	-	0.00%	468	1.10%
Total	27,130	100%	17,081	100%	44,211	100%

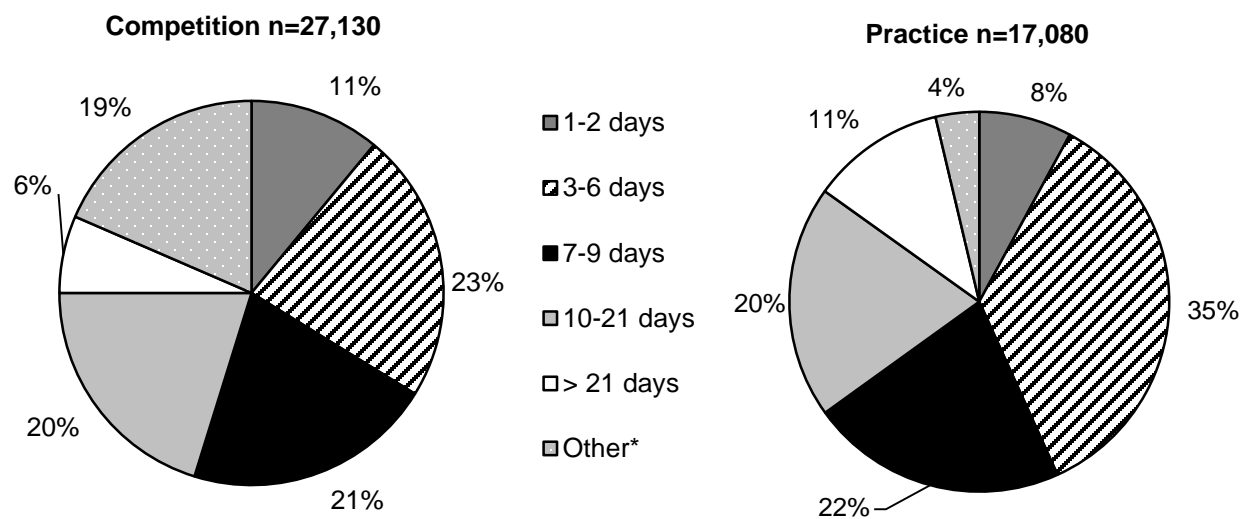
* Totals and n's are not always equal due to slight rounding of the weighted number of injuries and missing responses. Due to a low level of non-response, these totals are always similar but are not always equal to the total number of injuries.

Table 10.4 Ten Most Common Baseball Injury Diagnoses by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2014-15 School Year*

Diagnosis	Competition n=27,130		Practice n=17,080		Total n=44,210	
	n	%	n	%	n	%
Head/face concussion	3,999	14.7%	2,338	13.7%	6,337	14.3%
Hip/thigh/upper leg strain/sprain	3,326	12.3%	1,721	10.1%	5,047	11.4%
Arm/elbow strain/sprain	3,136	11.6%	919	5.4%	4,055	9.2%
Shoulder other	1,907	7.0%	1,836	10.7%	3,743	8.5%
Arm/elbow other	2,175	8.0%	563	3.3%	2,738	6.2%
Ankle strain/sprain	1,801	6.6%	496	2.9%	2,297	5.2%
Head/face contusion	1,031	3.8%	1,214	7.1%	2,245	5.1%
Hand/wrist fracture	1,652	6.1%	369	2.2%	2,021	4.6%
Knee strain/sprain	1,498	5.5%	468	2.7%	1,966	4.4%
Shoulder strain/sprain	1,005	3.7%	901	5.3%	1,906	4.3%

* 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.

Figure 10.2 Time Loss of Baseball Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2014-15 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 Baseball Injuries Requiring Surgery by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2014-15 School Year*

	Competition		Practice		Overall	
	n	%	n	%	n	%
Need for surgery						
Required surgery	925	3.4%	1,509	8.8%	2,434	5.5%
Did not require surgery	25,972	96.6%	15,570	91.2%	41,542	94.5%
Total	26,897	100%	17,079	100%	43,976	100%

* 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.

Figure 10.3 History of Baseball Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2014-15 School Year

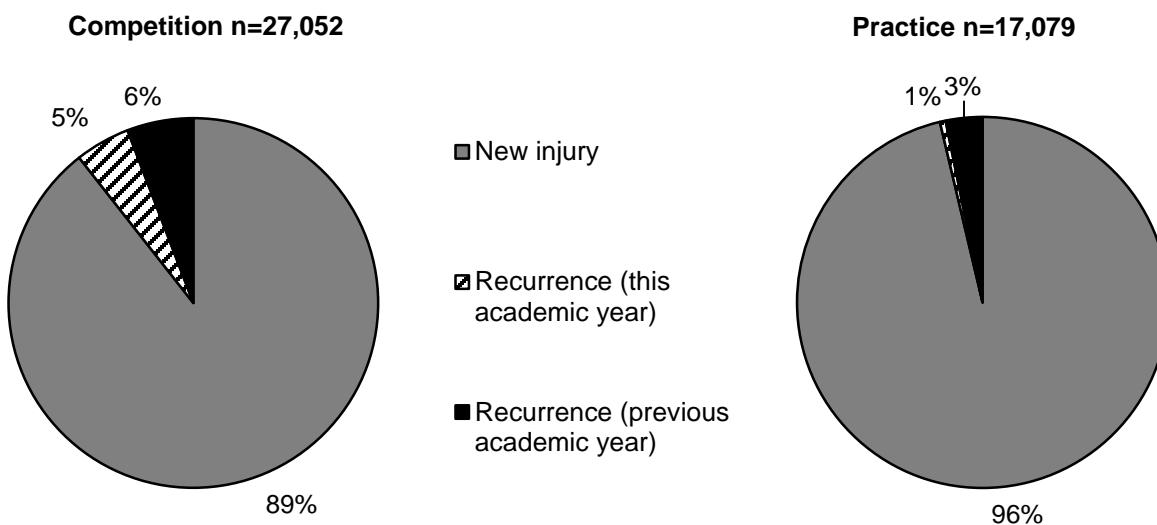


Table 10.6 Time during Season of Baseball Injuries, High School Sports-Related Injury Surveillance Study, US, 2014-15 School Year*

	n	%
Time in Season		
Preseason	7,372	17.1%
Regular season	33,845	78.5%
Post season	1,886	4.4%
Total	43,103	100%

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

Table 10.7 Competition-Related Variables for Baseball Injuries, High School Sports-Related Injury Surveillance Study, US, 2014-15 School Year*

	n	%
Time in Competition		
Pre-competition/warm-ups	684	2.7%
First inning	1,098	4.4%
Second inning	2,445	9.8%
Third inning	6,772	27.2%
Fourth inning	4,852	19.5%
Fifth inning	4,670	18.8%
Sixth inning	3,760	15.1%
Seventh inning	109	0.4%
Extra innings	486	2.0%
Total	24,875	100%
Field Location		
Home plate	6,662	25.3%
First base	5,761	21.9%
Pitcher's mound	3,994	15.2%
Second base	3,616	13.7%
Outfield	3,428	13.0%
Third base	1,400	5.3%
Infield	1,227	4.7%
Foul territory	109	0.4%
Other	109	0.4%
Total	26,306	100%

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

Table 10.8 Practice-Related Variables for Baseball Injuries, High School Sports-Related Injury Surveillance Study, US, 2014-15 School Year*

	n	%
Time in Practice		
First 1/2 hour	1,642	10.0%
Second 1/2 hour	5,418	33.1%
1-2 hours into practice	8,823	54.0%
>2 hours into practice	468	2.9%
Total	16,351	100%

* 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.

Figure 10.4 Player Position of Baseball Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2014-15 School Year

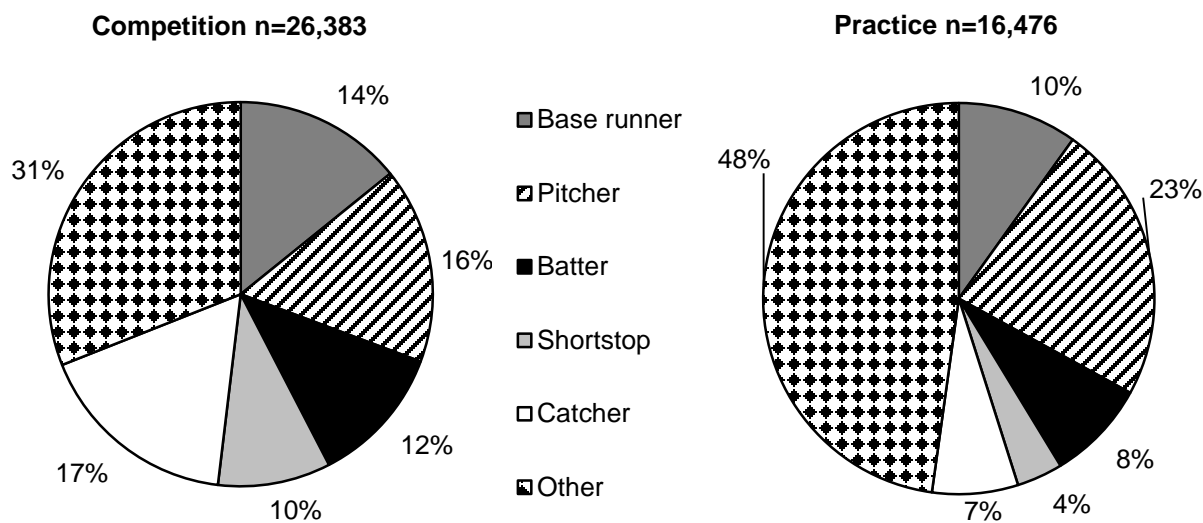


Table 10.9 Activities Leading to Baseball Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2014-15 School Year*

	Competition		Practice		Overall	
	n	%	n	%	n	%
Activity						
Fielding a batted ball	3,738	14.2%	2,758	16.7%	6,496	15.2%
Running bases	4,737	18.0%	1,366	8.3%	6,103	14.2%
Pitching	3,917	14.8%	2,113	12.8%	6,030	14.1%
Batting	3,497	13.3%	2,104	12.8%	5,601	13.1%
Sliding	3,395	12.9%	936	5.7%	4,331	10.1%
Catching	1,696	6.4%	2,109	12.8%	3,805	8.9%
Fielding a thrown ball	2,796	10.6%	813	4.9%	3,609	8.4%
Throwing (not pitching)	977	3.7%	1,400	8.5%	2,377	5.5%
General play	1,521	5.8%	759	4.6%	2,280	5.3%
Conditioning	109	0.4%	813	4.9%	922	2.2%
Other	109	0.4%	813	4.9%	922	2.2%
Total	26,383	100%	16,476	100%	42,859	100%

* 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.

Figure 10.5 Activity Resulting in Baseball Injuries by Injury Diagnosis, High School Sports-Related Injury Surveillance Study, US, 2014-15 School Year

	Diagnosis									
	Strain/Sprain		Contusion		Fracture		Concussion		Other	
	n	%	n	%	n	%	n	%	n	%
Activity										
Fielding	1,185	6.9%	2,513	36.7%	446	13.2%	1,624	27.5%	728	7.5%
Running	4,545	26.7%	109	1.6%	-	0.0%	109	1.8%	1,340	13.9%
Pitching	4,916	28.8%	369	5.4%	-	0.0%	109	1.8%	636	6.6%
Batting	864	5.1%	630	9.2%	758	22.4%	979	16.6%	2,370	24.5%
Sliding	1,831	10.7%	468	6.8%	233	6.9%	233	3.9%	1,565	16.2%
Other	3,712	21.8%	2,754	40.2%	1,953	57.6%	2,848	48.3%	3,033	31.4%
Total	17,053	100%	6,843	100%	3,390	100%	5,902	100%	9,672	100%

XI. Softball Injury Epidemiology

Table 11.1 Softball Injury Rates by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2014-15 School Year

	# Injuries	# Exposures	Injury rate (per 1,000 athlete- exposures)	Nationally Estimated # Injuries
Total	116	115,723	1.00	43,792
Competition	67	40,153	1.67	23,993
Practice	49	75,570	0.65	19,799

Table 11.2 Demographic Characteristics of Injured Softball Athletes, High School Sports-Related Injury Surveillance Study, US, 2014-15 School Year*

Year in School	n=43,550
Freshman	30.5%
Sophomore	38.8%
Junior	18.1%
Senior	12.5%
Total[†]	100%
Age (years)	
Minimum	14
Maximum	18
Mean (St. Dev.)	15.7 (1.1)
BMI	
Minimum	17.5
Maximum	43.4
Mean (St. Dev.)	24.0 (4.6)

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

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

Figure 11.1 Diagnosis of Softball Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2014-15 School Year

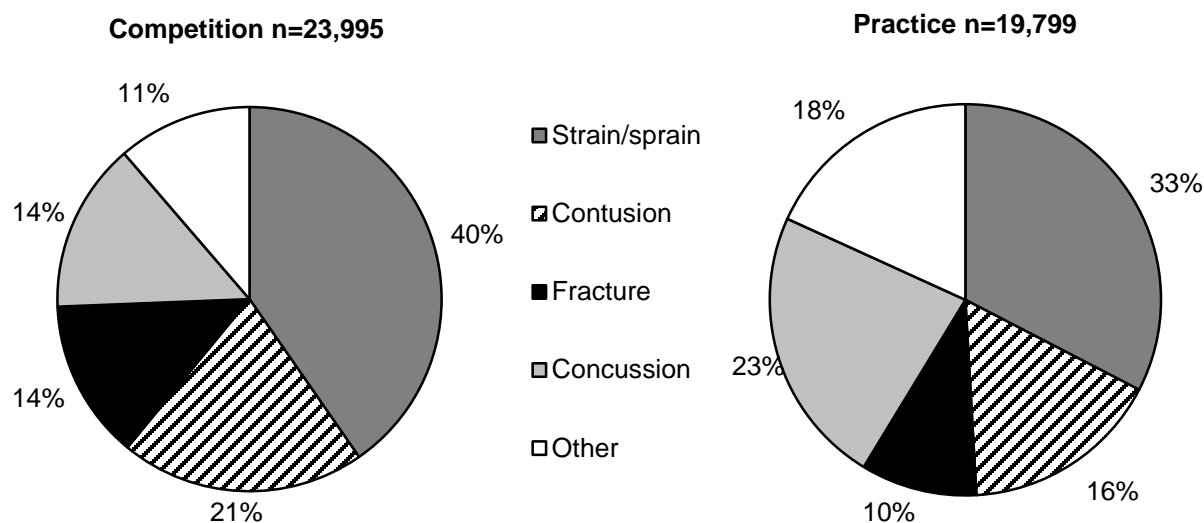


Table 11.3 Body Site of Softball Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2014-15 School Year*

	Competition		Practice		Overall	
	n	%	n	%	n	%
Body Site						
Head/face	4,909	20.5%	7,185	36.3%	12,094	27.6%
Hand/wrist	4,764	19.9%	3,599	18.2%	8,363	19.1%
Knee	4,025	16.8%	2,404	12.1%	6,429	14.7%
Arm/elbow	2,375	9.9%	2,554	12.9%	4,929	11.3%
Hip/thigh/upper leg	2,749	11.5%	1,054	5.3%	3,803	8.7%
Ankle	2,288	9.5%	1,260	6.4%	3,548	8.1%
Shoulder	695	2.9%	1,006	5.1%	1,701	3.9%
Trunk	1,726	7.2%	0	0.0%	1,726	3.9%
Foot	74	0.3%	738	3.7%	812	1.9%
Lower leg	195	0.8%	0	0.0%	195	0.4%
Neck	195	0.8%	0	0.0%	195	0.4%
Other	0	0.0%	0	0.0%	0	0.0%
Total	23,995	100%	19,800	100%	43,795	100%

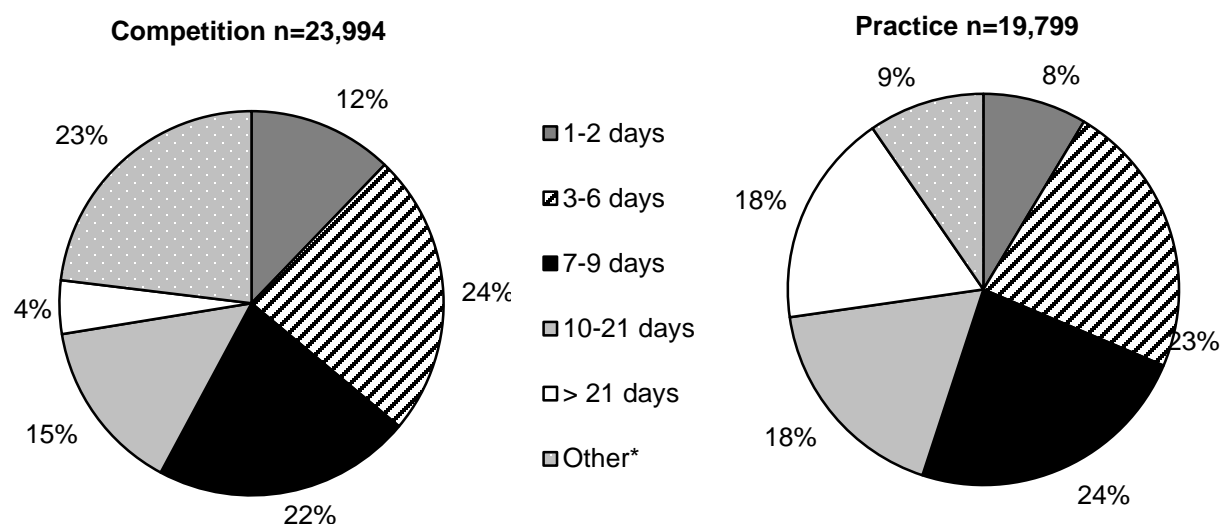
* Totals and n's are not always equal due to slight rounding of the weighted number of injuries and missing responses. Due to a low level of non-response, these totals are always similar but are not always equal to the total number of injuries.

Table 11.4 Ten Most Common Softball Injury Diagnoses by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2014-15 School Year*

Diagnosis	Competition n=23,997		Practice n=19,800		Total n=43,797	
	n	%	n	%	n	%
Head/face concussion	3,441	14.3%	4,566	23.1%	8,007	18.3%
Hand/wrist fracture	2,706	11.3%	1,415	7.1%	4,121	9.4%
Hip/thigh/upper leg strain/sprain	2,749	11.5%	812	4.1%	3,561	8.1%
Knee strain/sprain	2,548	10.6%	488	2.5%	3,036	6.9%
Head/face contusion	1,468	6.1%	1,540	7.8%	3,008	6.9%
Knee other	1,403	5.8%	1,178	5.9%	2,581	5.9%
Ankle strain/sprain	1,551	6.5%	966	4.9%	2,517	5.7%
Hand/wrist strain/sprain	269	1.1%	2,184	11.0%	2,453	5.6%
Trunk strain/sprain	1,726	7.2%	0	0.0%	1,726	3.9%
Arm/elbow other	74	0.3%	1,549	7.8%	1,623	3.7%

* 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.

Figure 11.2 Time Loss of Softball Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2014-15 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 Softball Injuries Requiring Surgery by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2014-15 School Year*

	Competition		Practice		Overall	
	n	%	n	%	n	%
Need for surgery						
Required surgery	1,052	4.5%	1,493	7.5%	2,545	5.9%
Did not require surgery	22,204	95.5%	18,306	92.5%	40,510	94.1%
Total	23,256	100%	19,799	100%	43,055	100%

* 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.

Figure 11.3 History of Softball Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2014-15 School Year

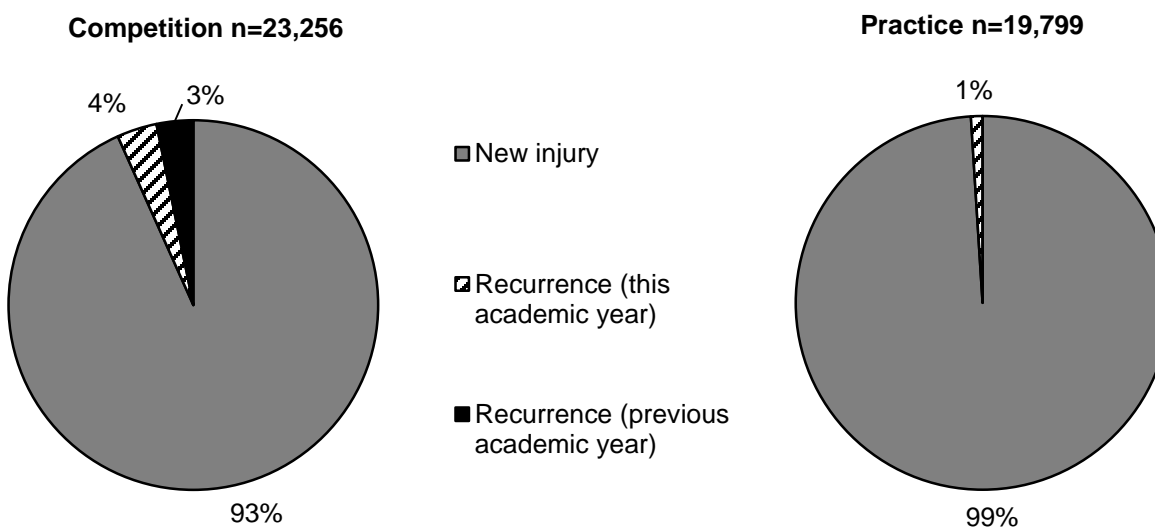


Table 11.6 Time during Season of Softball Injuries, High School Sports-Related Injury Surveillance Study, US, 2014-15 School Year*

	n	%
Time in Season		
Preseason	6,092	14.2%
Regular season	36,303	84.6%
Post season	511	1.2%
Total	42,906	100%

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

Table 11.7 Competition-Related Variables for Softball Injuries, High School Sports-Related Injury Surveillance Study, US, 2014-15 School Year*

	n	%
Time in Competition		
Pre-competition/warm-ups	3,834	17.7%
First inning	2,253	10.4%
Second inning	2,242	10.4%
Third inning	2,658	12.3%
Fourth inning	6,136	28.4%
Fifth inning	3,023	14.0%
Sixth inning	585	2.7%
Seventh inning	463	2.1%
Extra innings	437	2.0%
Total	21,631	100%
Field Location		
Home plate	5,746	24.6%
First base	5,670	24.3%
Second base	3,625	15.5%
Outfield	1,613	6.9%
Third base	1,447	6.2%
Pitcher's mound	1,437	6.2%
Foul territory	1,416	6.1%
Infield	1,226	5.2%
Other	1,183	5.1%
Total	23,362	100%

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

Table 11.8 Practice-Related Variables for Softball Injuries, High School Sports-Related Injury Surveillance Study, US, 2014-15 School Year*

	n	%
Time in Practice		
First 1/2 hour	1,954	9.9%
Second 1/2 hour	1,995	10.2%
1-2 hours into practice	13,554	69.0%
>2 hours into practice	2,147	10.9%
Total	19,650	100%

* 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.

Figure 11.4 Player Position of Softball Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2014-15 School Year

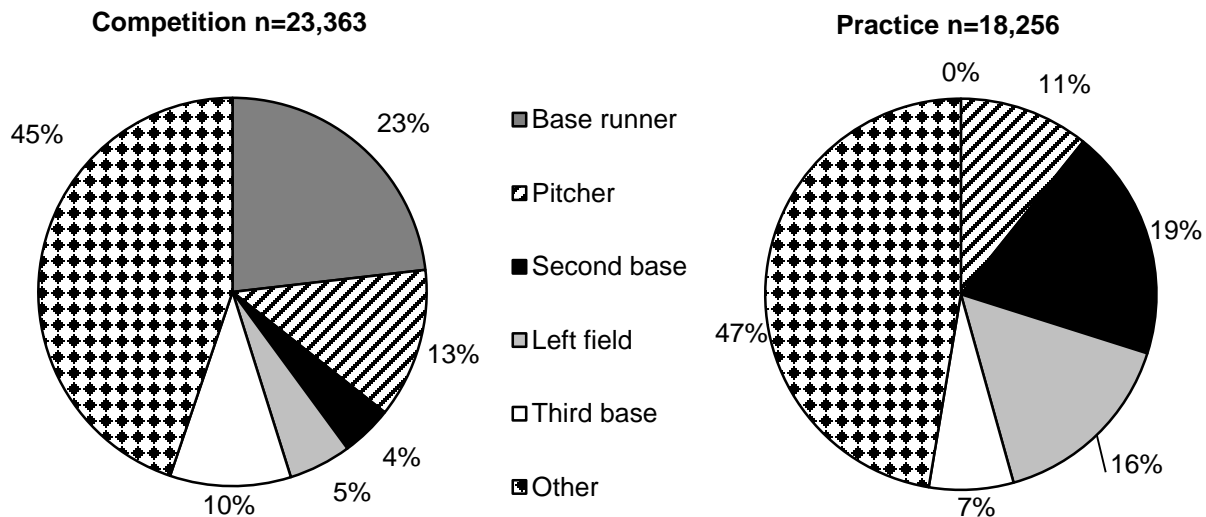


Table 11.9 Activities Leading to Softball Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2014-15 School Year*

	Competition		Practice		Overall	
	n	%	n	%	n	%
Activity						
Fielding a batted ball	5,081	21.7%	5,654	29.2%	10,735	25.1%
Running bases	5,084	21.8%	1,769	9.1%	6,853	16.0%
Fielding a thrown ball	3,507	15.0%	2,518	13.0%	6,025	14.1%
Catching	1,717	7.3%	2,258	11.7%	3,975	9.3%
Pitching	1,437	6.2%	2,213	11.4%	3,650	8.5%
Sliding	2,709	11.6%	294	1.5%	3,003	7.0%
Throwing (not pitching)	511	2.2%	2,021	10.5%	2,532	5.9%
Batting	1,938	8.3%	488	2.5%	2,426	5.7%
General Play	389	1.7%	1,484	7.7%	1,873	4.4%
Conditioning	74	0.3%	442	2.3%	516	1.2%
Other	915	3.9%	195	1.0%	1,110	2.6%
Total	23,362	100%	19,336	100%	42,698	100%

* 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.

Figure 11.5 Activity Resulting in Softball Injuries by Injury Diagnosis, High School Sports-Related Injury Surveillance Study, US, 2014-15 School Year

	Diagnosis									
	Strain/Sprain		Contusion		Fracture		Concussion		Other	
	n	%	n	%	n	%	n	%	n	%
Activity										
Fielding	4,706	30.7%	4,556	55.5%	1,921	37.5%	3,530	45.5%	2,047	32.7%
Running	3,645	23.7%	884	10.8%	242	4.7%	873	11.2%	1,208	19.3%
Catching	269	1.8%	1,717	20.9%	500	9.8%	679	8.7%	810	13.0%
Pitching	2,174	14.2%	-	0.0%	-	0.0%	-	0.0%	1,475	23.6%
Sliding	942	6.1%	-	0.0%	1,524	29.8%	242	3.1%	294	4.7%
Other	3,614	23.5%	1,054	12.8%	933	18.2%	2,441	31.4%	417	6.7%
Total	15,350	100%	8,211	100%	5,120	100%	7,765	100%	6,251	100%

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, 2014-15 School Year

	Boys' soccer	Girls' soccer*	RR (95% CI) [†]
Total	1.60	2.64	1.65 (1.49, 1.81)
Competition	3.43	6.11	1.78 (1.59, 1.97)
Practice	0.78	1.09	1.40 (1.12, 1.68)

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

[†]Throughout this chapter, statistically significant RR and IPR are bolded.

Table 12.2 Comparison of Body Sites of Boys' and Girls' Soccer Injuries, High School Sports-Related Injury Surveillance Study, US, 2014-15 School Year

	Boys' soccer	Girls' soccer	IPR (95% CI)
Body Site			
Hip/thigh/upper leg	20.8%	9.0%	2.31 (1.31, 4.06)
Head/face	23.2%	36.2%	1.56 (1.13, 2.16)
Ankle	10.5%	21.4%	2.03 (1.16, 3.58)
Knee	14.5%	14.6%	1.01 (0.59, 1.71)
Hand/wrist	2.5%	0.9%	2.89 (0.62, 13.40)
Foot	6.7%	6.0%	1.12 (0.48, 2.62)
Lower leg	5.7%	4.2%	1.37 (0.50, 3.76)
Trunk	5.9%	0.9%	6.50 (2.32, 18.22)
Arm/elbow	1.1%	1.1%	1.05 (0.27, 3.99)
Shoulder	4.3%	3.1%	1.40 (0.40, 4.91)
Neck	1.2%	0.2%	7.25 (0.66, 79.61)
Other	3.5%	2.5%	1.42 (0.40, 5.18)
Total	100%	100%	--

Table 12.3 Comparison of Diagnoses of Boys' and Girls' Soccer Injuries, High School Sports-Related Injury Surveillance Study, US, 2014-15 School Year

	Boys' soccer	Girls' soccer	IPR (95% CI)
Diagnosis			
Strain/sprain	48.5%	40.2%	1.21 (0.95, 1.53)
Contusion	8.5%	7.8%	1.10 (0.54, 2.22)
Fracture	10.3%	8.1%	1.27 (0.64, 2.52)
Concussion	18.9%	34.5%	1.82 (1.28, 2.60)
Other	13.8%	9.4%	1.46 (0.79, 2.69)
Total	100%	100%	---

Table 12.4 Most Common Boys' and Girls' Soccer Injury Diagnoses*, High School Sports-Related Injury Surveillance Study, US, 2014-15 School Year

	Boys' soccer	Girls' soccer	IPR (95% CI)
Diagnosis			
Ankle strain/sprain	9.0%	20.5%	2.28 (1.25, 4.17)
Head/face concussion	18.9%	34.4%	1.82 (1.27, 2.60)
Hip/thigh/upper leg strain/sprain	19.3%	5.4%	3.59 (1.92, 6.72)
Knee strain/sprain	8.5%	9.1%	1.07 (0.52, 2.17)
Knee other	5.3%	2.6%	2.03 (0.63, 6.50)

*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, 2014-15 School Year

	Boys' soccer	Girls' soccer	IPR (95% CI)
Time Loss			
1-2 days	11.3%	4.5%	2.51 (1.63, 5.43)
3-6 days	27.6%	20.0%	1.38 (0.92, 2.07)
7-9 days	14.7%	18.2%	1.24 (0.76, 2.01)
10-21 days	20.8%	22.7%	1.09 (0.75, 1.59)
22 days or more	7.1%	8.8%	1.24 (0.58, 2.65)
Other	18.5%	25.8%	1.40 (0.93, 2.10)
Total	100%	100%	---

Table 12.6 Comparison of Mechanisms of Boys' and Girls' Soccer Injuries, High School Sports-Related Injury Surveillance Study, US, 2014-15 School Year

	Boys' soccer	Girls' soccer	IPR (95% CI)
Soccer Mechanism			
Contact with another player	35.4%	31.5%	1.13 (0.83, 1.53)
Stepped on/fell on/kicked	10.9%	8.2%	1.32 (0.68, 2.55)
Rotation around a planted foot/inversion	5.0%	16.6%	3.33 (1.61, 6.86)
Overuse, heat illness, conditioning, etc.	17.7%	8.1%	2.18 (1.21, 3.93)
Contact with ball	10.0%	21.2%	2.13 (1.19, 3.82)
Uneven playing surface	4.1%	1.2%	3.32 (0.52, 21.41)
Slide tackle	6.4%	4.2%	1.52 (0.59, 3.95)
Contact with goal	0.5%	0.3%	1.34 (0.19, 9.56)
Other	10.1%	8.6%	1.18 (0.61, 2.26)
Total	100%	100%	---

Table 12.7 Comparison of Activities of Boys' and Girls' Soccer Injuries, High School Sports-Related Injury Surveillance Study, US, 2014-15 School Year

	Boys' soccer	Girls' soccer	IPR (95% CI)
Soccer Activity			
General play	27.0%	17.0%	1.56 (1.03, 2.46)
Defending	9.2%	16.0%	1.75 (1.02, 3.00)
Chasing loose ball	13.5%	8.4%	1.61 (0.85, 3.06)
Ball handling/dribbling	5.3%	10.1%	1.89 (0.83, 4.36)
Goaltending	6.3%	7.9%	1.26 (0.56, 2.80)
Shooting (foot)	7.8%	8.0%	1.03 (0.49, 2.16)
Heading ball	7.5%	14.1%	1.87 (1.03, 3.41)
Passing (foot)	6.4%	6.6%	1.03 (0.44, 2.40)
Receiving pass	6.6%	5.8%	1.14 (0.49, 2.64)
Conditioning	5.9%	1.5%	4.00 (1.23, 13.03)
Other	4.4%	4.6%	1.03 (0.44, 2.44)
Total	100%	100%	---

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, 2014-15 School Year

	Boys' basketball	Girls' basketball	RR (95% CI)*
Total	1.08	1.65	1.53 (1.35, 1.71)
Competition	1.98	3.27	1.65 (1.42, 1.89)
Practice	0.68	0.94	1.38 (1.10, 1.66)

Table 12.9 Comparison of Body Sites of Boys' and Girls' Basketball Injuries, High School Sports-Related Injury Surveillance Study, US, 2014-15 School Year

	Boys' basketball	Girls' basketball	IPR (95% CI)
Body Site			
Ankle	33.2%	22.8%	1.46 (1.04, 2.06)
Knee	14.3%	22.8%	1.60 (1.01, 2.52)
Head/face	16.5%	27.7%	1.68 (1.10, 2.55)
Hip/thigh/upper leg	4.0%	7.0%	1.74 (0.67, 4.51)
Hand/wrist	15.8%	5.6%	2.82 (1.48, 5.39)
Shoulder	3.1%	1.7%	1.77 (0.50, 6.22)
Trunk	3.6%	5.0%	1.38 (0.48, 3.95)
Lower leg	2.7%	2.2%	1.24 (0.32, 4.82)
Arm/elbow	1.5%	2.7%	1.74 (0.38, 8.01)
Foot	5.0%	2.0%	2.55 (0.81, 8.05)
Neck	0.0%	0.6%	---
Other	0.2%	0.0%	---
Total	100%	100%	---

Table 12.10 Comparison of Diagnoses of Boys' and Girls' Basketball Injuries, High School Sports-Related Injury Surveillance Study, US, 2014-15 School Year

	Boys' basketball	Girls' basketball	IPR (95% CI)
Diagnosis			
Strain/sprain	50.8%	44.9%	1.13 (0.91, 1.41)
Contusion	6.0%	6.4%	1.06 (0.47, 2.39)
Fracture	15.1%	6.4%	2.37 (1.26, 4.64)
Concussion	8.8%	25.6%	2.92 (1.68, 5.05)
Other	19.3%	16.7%	1.15 (0.73, 1.83)
Total	100%	100%	---

Table 12.11 Most Common Boys' and Girls' Basketball Injury Diagnoses*, High School Sports-Related Injury Surveillance Study, US, 2014-15 School Year

	Boys' basketball	Girls' basketball	IPR (95% CI)
Diagnosis			
Ankle strain/sprain	33.0%	21.7%	1.52 (1.07, 2.15)
Head/face concussion	8.7%	25.5%	2.92 (1.69, 5.07)
Knee strain/sprain	3.9%	11.2%	2.83 (1.25, 6.40)
Knee other	9.0%	8.3%	1.08 (0.53, 2.18)
Hand/wrist fracture	10.4%	3.0%	3.52 (1.56, 7.94)
Hip/thigh/upper leg strain/sprain	3.5%	6.1%	1.73 (0.61, 4.91)

*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, 2014-15 School Year

	Boys' basketball	Girls' basketball	IPR (95% CI)
Time Loss			
1-2 days	13.6%	11.1%	1.23 (0.71, 2.14)
3-6 days	24.5%	23.9%	1.03 (0.70, 1.49)
7-9 days	14.2%	13.3%	1.08 (0.63, 1.83)
10-21 days	24.3%	20.2%	1.21 (0.82, 1.78)
22 days or more	8.8%	10.8%	1.22 (0.64, 2.34)
Other	14.6%	20.9%	1.43 (0.90, 2.29)
Total	100%	100%	---

Table 12.13 Comparison of Mechanisms of Boys' and Girls' Basketball Injuries, High School Sports-Related Injury Surveillance Study, US, 2014-15 School Year

	Boys' basketball	Girls' basketball	IPR (95% CI)
Basketball Mechanism			
Collision with another player	26.1%	29.8%	1.14 (0.81, 1.60)
Jumping/landing	29.6%	21.5%	1.38 (0.96, 1.99)
Overuse, heat illness, conditioning, etc.	5.0%	12.8%	2.54 (1.17, 5.52)
Rotation around a planted foot/inversion	11.3%	13.8%	1.23 (0.69, 2.18)
Stepped on/fell on/kicked	7.6%	7.2%	1.05 (0.49, 2.28)
Contact with ball	6.0%	7.5%	1.25 (0.55, 2.89)
Other	14.4%	7.5%	1.93 (1.00, 3.71)
Total	100%	100%	---

Table 12.14 Comparison of Activities of Boys' and Girls' Basketball Injuries, High School Sports-Related Injury Surveillance Study, US, 2014-15 School Year

	Boys' basketball	Girls' basketball	IPR (95% CI)
Basketball Activity			
Rebounding	26.6%	13.9%	1.91 (1.23, 2.98)
General play	19.7%	21.8%	1.10 (0.72, 1.70)
Defending	14.3%	24.5%	1.72 (1.09, 2.71)
Chasing loose ball	7.9%	12.1%	1.53 (0.79, 2.97)
Shooting	11.1%	8.0%	1.38 (0.69, 2.76)
Conditioning	3.8%	5.2%	1.38 (0.50, 3.82)
Ball handling/dribbling	5.8%	7.0%	1.20 (0.53, 2.71)
Receiving pass	4.6%	4.0%	1.14 (0.40, 3.31)
Other	6.2%	3.5%	1.79 (0.60, 5.35)
Total	100%	100%	---

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, 2014-15 School Year

	Baseball	Softball	RR (95% CI)
Total	0.94	1.00	1.06 (0.81, 1.30)
Competition	1.67	1.67	1.00 (0.69, 1.31)
Practice	0.55	0.65	1.18 (0.80, 1.57)

Table 12.16 Comparison of Body Sites of Baseball and Softball Injuries, High School Sports-Related Injury Surveillance Study, US, 2014-15 School Year

	Baseball	Softball	IPR (95% CI)
Body Site			
Ankle	5.2%	8.1%	1.56 (0.57, 4.26)
Knee	10.4%	14.7%	1.42 (0.65, 3.10)
Head/face	25.2%	27.6%	1.10 (0.69, 1.75)
Hip/thigh/upper leg	13.6%	8.7%	1.56 (0.64, 3.83)
Hand/wrist	9.9%	19.1%	1.93 (0.92, 4.05)
Shoulder	13.5%	3.9%	3.47 (1.08, 11.11)
Trunk	3.5%	3.9%	1.13 (0.29, 4.39)
Lower leg	0.2%	0.4%	1.80 (0.11, 29.07)
Arm/elbow	15.9%	11.3%	1.41 (0.64, 3.12)
Foot	1.6%	1.9%	1.13 (0.12, 10.97)
Neck	0.0%	0.4%	---
Other	1.1%	0.0%	---
Total	100%	100%	---

Table 12.17 Comparison of Diagnoses of Baseball and Softball Injuries, High School Sports-Related Injury Surveillance Study, US, 2014-15 School Year

	Baseball	Softball	IPR (95% CI)
Diagnosis			
Strain/sprain	40.4%	36.8%	1.10 (0.76, 1.58)
Contusion	15.5%	18.8%	1.21 (0.63, 2.33)
Fracture	7.7%	11.7%	1.53 (0.64, 3.64)
Concussion	14.3%	18.3%	1.28 (0.69, 2.35)
Other	22.1%	14.4%	1.53 (0.78, 3.00)
Total	100%	100%	---

Table 12.18 Most Common Baseball and Softball Injury Diagnoses*, High School Sports-Related Injury Surveillance Study, US, 2014-15 School Year

	Baseball	Softball	IPR (95% CI)
Diagnosis			
Ankle strain/sprain	5.2%	5.7%	1.28 (0.69, 2.35)
Hand/wrist fracture	4.6%	9.4%	1.36 (0.35, 5.28)
Head/face concussion	14.3%	18.3%	1.60 (0.76, 3.37)
Hip/thigh/upper leg strain/sprain	11.4%	8.1%	1.40 (0.54, 3.66)
Knee strain/sprain	4.4%	6.9%	1.56 (0.45, 5.38)
Shoulder other	8.5%	1.1%	7.41 (0.95, 58.05)
Head/face contusion	5.1%	6.9%	1.35 (0.43, 4.26)
Arm/elbow strain/sprain	9.2%	3.3%	2.79 (0.74, 10.57)
Arm/elbow other	6.2%	3.7%	1.67 (0.38, 7.28)
Knee other	1.9%	5.9%	3.05 (0.65, 14.25)

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

Table 12.19 Comparison of Time Loss of Baseball and Softball Injuries, High School Sports-Related Injury Surveillance Study, US, 2014-15 School Year

	Baseball	Softball	IPR (95% CI)
Time Loss			
1-2 days	9.8%	10.5%	1.07 (0.45, 2.54)
3-6 days	27.6%	23.4%	1.18 (0.70, 1.99)
7-9 days	21.3%	22.7%	1.06 (0.61, 1.85)
10-21 days	20.0%	16.0%	1.25 (0.70, 2.25)
22 days or more	8.4%	10.5%	1.25 (0.51, 3.05)
Other	12.8%	17.0%	1.33 (0.68, 2.59)
Total	100%	100%	---

Table 12.20 Comparison of Mechanisms of Baseball and Softball Injuries, High School Sports-Related Injury Surveillance Study, US, 2014-15 School Year

	Baseball	Softball	IPR (95% CI)
Baseball/Softball Mechanism			
Overuse, heat illness, conditioning, etc.	8.8%	17.5%	1.99 (0.88, 4.47)
Contact with another player	15.4%	10.7%	1.44 (0.66, 3.13)
Contact with bases	10.9%	6.0%	1.81 (0.70, 4.69)
Throwing - not pitching	5.5%	5.9%	1.07 (0.36, 3.22)
Throwing - pitching	11.2%	2.2%	5.00 (1.30, 19.21)
Contact with thrown ball (non-pitch)	9.4%	19.0%	2.03 (0.93, 4.41)
Rotation around a planted foot/inversion	4.4%	4.8%	1.10 (0.29, 4.23)
Hit by batted ball	6.4%	16.2%	2.55 (1.08, 6.03)
Hit by pitch	7.7%	0.0%	---
Other	20.9%	21.1%	1.00 (0.57, 1.79)
Total	100%	100%	---

Table 12.21 Comparison of Activities of Baseball and Softball Injuries, High School Sports-Related Injury Surveillance Study, US, 2014-15 School Year

	Baseball	Softball	IPR (95% CI)
Baseball/Softball Activity			
Fielding a batted ball	15.2%	25.1%	1.66 (0.92, 3.01)
Fielding a thrown ball	8.4%	14.1%	1.68 (0.70, 4.02)
Running bases	14.2%	16.0%	1.13 (0.56, 2.28)
Pitching	14.1%	8.5%	1.65 (0.67, 4.06)
Batting	13.1%	5.7%	2.30 (0.82, 6.45)
Sliding	10.1%	7.0%	1.44 (0.60, 3.47)
Throwing (not pitching)	5.5%	5.9%	1.07 (0.36, 3.22)
General play	5.3%	4.4%	1.21 (0.31, 4.81)
Conditioning	3.0%	1.2%	2.52 (0.50, 12.75)
Catching	8.9%	9.3%	1.05 (0.42, 2.64)
Other	2.2%	2.6%	1.21 (0.19, 7.59)
Total	100%	100%	---

XIII. Trends over Time

Table 13.1 Injury Rates by Sport, Type of Exposure, and Year, High School Sports-Related Injury Surveillance Study, US, 2005/06-2014/15 School Years

	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	p-value for trend*
Overall total	2.51	2.59	2.31	2.01	2.10	1.97	2.17	2.16	2.18	2.13	0.049
Competition	4.63	4.88	4.45	4.05	4.19	4.10	4.26	4.31	4.22	4.40	0.159
Practice	1.69	1.75	1.52	1.26	1.32	1.16	1.40	1.34	1.39	1.28	0.025
Boys' football total	4.36	4.45	4.18	3.50	3.81	3.50	3.78	3.87	3.74	3.73	0.051
Competition	12.09	13.50	12.80	11.26	12.95	12.30	12.41	12.53	11.38	11.97	0.564
Practice	2.54	2.68	2.47	1.92	2.06	1.74	2.16	2.08	2.15	2.06	0.049
Boys' soccer total	2.43	2.27	1.75	1.62	1.75	1.56	1.64	1.52	1.62	1.60	0.007
Competition	4.22	4.31	3.63	3.43	3.39	3.08	3.47	3.28	3.40	3.43	0.017
Practice	1.58	1.45	0.96	0.87	1.04	0.90	0.90	0.78	0.82	0.78	0.005
Girls' soccer total	2.36	2.51	2.35	2.07	2.00	1.93	2.42	2.29	2.47	2.64	0.822
Competition	5.21	5.43	5.15	4.59	4.67	4.13	5.68	5.54	5.72	6.11	0.376
Practice	1.10	1.31	1.16	1.00	0.85	0.93	1.09	0.92	1.04	1.09	0.213
Girls' volleyball total	1.64	1.37	1.22	0.89	0.99	0.96	1.00	0.89	0.99	1.11	0.030
Competition	1.92	1.40	1.43	0.90	1.00	1.18	1.27	1.08	1.15	1.39	0.201
Practice	1.48	1.36	1.12	0.88	0.99	0.85	0.85	0.78	0.91	0.97	0.007
Boys' basketball total	1.89	1.75	1.39	1.35	1.45	1.34	1.40	1.47	1.45	1.08	0.012
Competition	2.98	2.87	2.23	2.32	2.72	2.30	2.60	2.44	2.40	1.98	0.062
Practice	1.46	1.28	1.04	0.95	0.92	0.91	0.91	1.04	1.02	0.68	0.006
Girls' basketball total	2.01	2.09	1.61	1.54	1.58	1.73	1.57	1.83	1.88	1.65	0.192
Competition	3.60	3.60	3.30	3.13	2.84	3.59	3.03	3.13	3.66	3.27	0.205
Practice	1.37	1.44	0.90	0.87	1.02	0.92	0.98	1.24	1.08	0.94	0.230
Boys' wrestling total	2.50	2.51	2.27	2.17	1.98	2.01	2.50	2.33	2.48	2.12	0.308
Competition	3.93	3.80	3.70	3.35	3.09	3.32	3.56	3.54	3.95	3.76	0.432
Practice	2.04	2.06	1.76	1.75	1.56	1.55	2.10	1.88	1.95	1.61	0.323
Boys' baseball total	1.19	1.25	0.93	0.78	0.82	0.81	0.83	0.88	1.01	0.94	0.080
Competition	1.77	2.01	1.37	1.32	1.27	1.49	1.14	1.30	1.68	1.67	0.215
Practice	0.87	0.82	0.68	0.48	0.57	0.46	0.65	0.66	0.63	0.55	0.090
Girls' softball total	1.13	1.11	1.29	1.04	1.12	0.94	1.46	1.15	0.99	1.00	0.905
Competition	1.78	1.96	1.86	1.62	1.66	1.45	2.04	1.96	1.09	1.67	0.880
Practice	0.79	0.65	0.98	0.72	0.85	0.69	1.16	0.73	0.93	0.65	0.995

*Statistically significant tests for trend are bolded.

Table 13.2 Nationally Estimated Number of Injuries by Sport, Type of Exposure, and Year, High School Sports-Related Injury Surveillance Study, US, 2005/06-2014/15 School Years

	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15
Overall total	1,442,533	1,472,849	1,419,723	1,248,126	1,359,897	1,195,815	1,392,262	1,361,986	1,427,315	1,196,479
Competition	759,334	766,512	763,034	690,525	754,091	711,642	740,493	779,055	790,966	708,150
Practice	683,199	706,337	656,689	557,601	605,805	484,173	651,769	582,931	636,349	488,329
 Boys' football total	516,150	574,367	616,665	527,321	581,414	483,016	559,064	616,209	624,470	529,483
Competition	280,919	292,316	311,780	288,637	322,801	296,199	287,710	344,097	324,354	286,421
Practice	235,231	282,051	304,885	238,684	258,614	186,817	271,354	272,112	300,116	243,062
 Boys' soccer total	218,760	171,874	159,351	149,229	153,485	138,974	172,070	149,049	149,278	133,919
Competition	119,703	93,295	99,785	87,082	83,985	81,238	97,540	89,429	90,683	89,091
Practice	99,058	78,579	59,566	62,147	69,500	57,736	74,530	59,620	58,595	44,828
 Girls' soccer total	185,770	230,769	215,850	192,108	181,159	180,254	222,679	190,382	227,172	217,546
Competition	122,803	149,231	146,102	123,312	129,754	124,674	145,469	141,339	167,975	158,078
Practice	62,967	81,538	69,748	68,796	51,405	55,580	77,210	49,043	59,197	59,468
 Girls' volleyball total	81,813	80,493	72,261	56,609	67,760	50,711	52,662	44,064	45,144	46,807
Competition	32,677	27,423	26,539	19,764	21,728	21,416	24,439	19,150	16,430	19,373
Practice	49,136	53,069	45,722	36,845	46,032	29,295	28,223	24,914	28,714	27,434

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Table 13.2 Nationally Estimated Number of Injuries by Sport, Type of Exposure, and Year, High School Sports-Related Injury Surveillance Study, US, 2005/06-2014/15 School Years (continued)

	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15
Boys' basketball total	100,058	96,670	82,612	79,230	85,063	79,762	75,872	85,819	84,455	55,980
Competition	44,826	46,109	36,766	40,152	46,787	41,252	41,978	44,095	42,504	32,534
Practice	55,232	50,561	45,846	39,078	38,276	38,510	33,894	41,724	41,951	23,446
Girls' basketball total	103,566	102,831	73,283	64,933	78,709	83,033	67,280	83,107	89,451	64,491
Competition	53,812	53,703	45,236	38,277	44,026	53,931	37,213	45,645	50,864	38,803
Practice	49,753	49,128	28,047	26,656	34,684	29,102	30,067	37,462	38,587	25,688
Boys' wrestling total	105,542	101,139	91,625	88,996	80,390	80,569	107,992	85,485	91,203	60,253
Competition	36,259	38,750	40,698	39,029	37,742	36,536	40,235	35,016	39,378	32,728
Practice	69,283	62,389	50,927	49,967	42,647	44,033	67,757	50,469	51,825	27,525
Boys' baseball total	67,560	60,296	44,760	39,869	64,053	46,796	43,590	49,747	62,493	44,208
Competition	33,639	33,494	22,803	25,584	36,502	29,789	20,818	24,807	37,682	27,129
Practice	33,922	26,802	21,957	14,285	27,551	17,008	22,772	24,940	24,811	17,079
Girls' softball total	63,313	54,411	63,316	49,831	67,862	52,700	91,053	58,124	53,649	43,792
Competition	34,696	32,191	33,325	28,688	30,767	26,607	45,091	35,477	21,096	23,993
Practice	28,618	22,220	29,991	21,143	37,096	26,093	45,962	22,647	32,553	19,799

Table 13.3 Body Site of Injury by Year, High School Sports-Related Injury Surveillance Study, US, 2005/06-2014/15 School Years*

	2005-06 n=1,442,048	2006-07 n=1,464,926	2007-08 n=1,411,621	2008-09 n=1,248,126	2009-10 n=1,359,897	2010-11 n=1,194,319	2011-12 n=1,391,577	2012-13 n=1,361,584	2013-14 n=1,427,315	2014-15 n=1,196,398
Body Site										
Ankle	22.7%	19.8%	18.5%	16.4%	17.5%	17.7%	16.1%	15.5%	16.9%	15.1%
Knee	14.2%	16.6%	14.6%	14.8%	15.7%	14.2%	13.4%	14.8%	14.4%	13.7%
Head/face	12.3%	12.4%	12.4%	15.3%	17.2%	23.3%	25.1%	25.7%	25.3%	27.4%
Hip/thigh/upper leg	10.8%	10.5%	10.2%	10.3%	9.2%	8.3%	9.8%	9.5%	8.7%	9.0%
Shoulder	7.9%	8.0%	10.1%	9.3%	8.4%	7.0%	6.6%	6.5%	8.5%	7.2%
Hand/wrist	8.0%	7.5%	9.1%	8.5%	10.3%	8.9%	8.5%	7.4%	7.8%	7.4%
Trunk	6.2%	6.7%	6.5%	6.6%	5.8%	4.7%	4.9%	5.2%	4.1%	4.3%
Lower leg	4.6%	5.2%	5.7%	5.8%	4.7%	5.0%	4.5%	3.9%	4.9%	4.0%
Arm/elbow	4.1%	3.9%	4.6%	4.1%	4.0%	3.1%	4.0%	3.5%	3.1%	3.7%
Foot	4.0%	4.0%	4.2%	5.0%	4.1%	4.0%	3.4%	3.2%	2.8%	3.9%
Neck	2.2%	1.9%	1.8%	1.9%	1.9%	1.8%	1.7%	2.3%	1.2%	1.9%
Other	3.2%	3.6%	2.4%	2.1%	1.2%	2.1%	2.0%	2.5%	2.4%	2.5%
Total	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

*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.

Table 13.4 Injury Diagnosis by Year, High School Sports-Related Injury Surveillance Study, US, 2005/06-2014/15 School Years

	2005-06, n=1,444,172	2006-07, n=1,466,398	2007-08 n=1,414,139	2008-09 n=1,248,126	2009-10 n=1,359,897	2010-11 n=1,191,484	2011-12 n=1,392,262	2012-13 n=1,360,701	2013-14 n=1,427,315	2014-15 n=1,194,932
Diagnosis										
Strain/sprain	52.0%	48.2%	48.3%	45.7%	44.7%	43.2%	42.2%	42.3%	41.7%	39.8%
Contusion	12.2%	13.7%	12.4%	11.5%	14.0%	9.6%	10.8%	10.6%	9.4%	9.3%
Fracture	9.8%	8.9%	10.2%	10.9%	9.9%	10.2%	7.7%	7.8%	7.6%	9.4%
Concussion	9.1%	8.4%	9.2%	11.8%	14.0%	20.0%	22.2%	23.1%	21.9%	24.6%
Other	16.8%	20.9%	19.9%	20.2%	17.5%	17.0%	17.1%	16.2%	19.4%	16.9%
Total	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

Table 13.5 Most Common Injury Diagnoses by Year, High School Sports-Related Injury Surveillance Study, US, 2005/06-2014/15 School Years

	2005-06 n=1,435,954	2006-07 n=1,463,273	2007-08 n=1,410,654	2008-09 n=1,248,126	2009-10 n=1,359,897	2010-11 n=1,189,985	2011-12 n=1,388,873	2012-13 n=1,360,303	2013-14 n=1,426,018	2014-15 n=1,194,848
Diagnosis										
Ankle strain/sprain	20.6%	17.8%	17.3%	15.0%	16.0%	16.3%	14.7%	14.5%	15.6%	14.2%
Head/face concussion	9.0%	8.4%	9.2%	11.7%	13.9%	20.0%	22.2%	23.1%	21.9%	24.5%
Knee strain/sprain	7.6%	8.8%	7.8%	7.9%	8.0%	7.7%	7.6%	8.2%	7.8%	7.3%
Hip/thigh/upper leg strain/sprain	7.9%	7.7%	7.3%	7.7%	6.5%	6.4%	6.9%	6.7%	6.6%	6.9%
Knee other	4.3%	4.9%	4.7%	4.5%	5.2%	4.8%	3.9%	4.1%	4.7%	4.5%
Shoulder other	3.1%	3.7%	4.1%	4.0%	3.3%	3.7%	3.1%	3.4%	4.6%	4.0%
Hand/wrist fracture	3.2%	3.3%	4.0%	4.0%	4.2%	4.0%	3.7%	3.2%	3.3%	3.5%
Shoulder strain/sprain	3.4%	2.9%	3.4%	3.7%	3.3%	2.2%	2.9%	2.6%	3.3%	2.6%
Trunk strain/sprain	2.8%	2.7%	3.2%	2.8%	2.5%	2.4%	1.9%	2.3%	1.7%	1.9%
Hand/wrist strain/sprain	3.1%	2.5%	3.8%	2.9%	2.8%	2.8%	3.0%	2.5%	2.8%	1.9%

Table 13.6 Time Loss of Injuries by Year, High School Sports-Related Injury Surveillance Study, US, 2005/06-2014/15 School Years

	2005-06 n=1,378,145	2006-07 n=1,423,183	2007-08 n=1,355,981	2008-09 n= 1,248,126	2009-10 n= 1,359,897	2010-11 n=1,195,815	2011-12 n=1,392,262	2012-13 n=1,361,986	2013-14 n=1,427,312	2014-15 n=1,196,479
Time Loss										
1-2 days	22.5%	26.6%	22.8%	13.7%	14.7%	12.8%	15.9%	12.6%	14.9%	11.0%
3-6 days	30.0%	28.5%	28.8%	28.5%	27.3%	25.2%	23.3%	23.6%	21.8%	22.0%
7-9 days	15.3%	14.7%	15.8%	17.7%	16.1%	16.7%	16.1%	16.3%	16.7%	15.6%
10-21 days	14.9%	14.1%	16.7%	19.7%	16.9%	19.2%	19.6%	21.3%	21.1%	22.1%
≥22 days	17.2%	16.1%	15.9%	20.3%	25.0%	26.1%	25.0%	26.2%	25.5%	8.9%
Total	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

Table 13.7 Injuries Requiring Surgery by Year, High School Sports-Related Injury Surveillance Study, US, 2005/06-2014/15 School Years

	2005-06 n=1,429,072	2006-07 n=1,428,960	2007-08 n=1,380,872	2008-09 n= 1,248,126	2009-10 n= 1,359,897	2010-11 n=1,169,423	2011-12 n=1,392,262	2012-13 n=1,337,403	2013-14 n=1,407,594	2014-15 n=1,186,938
Required surgery	5.3%	6.4%	6.1%	6.7%	8.0%	8.2%	6.7%	7.3%	7.6%	7.3%
Did not require surgery	94.7%	93.6%	93.9%	93.3%	92.0%	91.8%	93.3%	92.7%	92.4%	92.7%
Total	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

XIV. Reporter Demographics & Compliance

During the 2014-15 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, 100 enrolled ATs reported an average of 42 study weeks. The majority of ATs (89.0%) reported all the weeks during which they were enrolled, with only 3 ATs (3.0%) missing over 10 weeks. Internal validity checks during the 2014-15 academic year yielded 90.9% sensitivity, 98.4% specificity, a positive predictive value of 95.2%, and a negative predictive value of 96.9%.

Prior to the start of the 2014-15 High School RIO™ study, participating ATs were asked to complete a short demographics survey. Over three-quarters (81.3%) of participating high schools were public schools, with the remainder being private. All ATs except for 1 provided services to athletes of their high school on 5 or more days each week. Over 90% (92.3%) of ATs participating during the 2014-15 study 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 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 143 ATs (59.0%). Average reporting time burdens were 22 minutes for the weekly exposure report and 10 minutes for the injury report form. Using a 5 point Likert scale, RIO™ was overwhelmingly reported to be either very easy (57.1%) or somewhat easy (37.9%) to use (5 and 4 on the Likert scale, respectively), with ATs being either very satisfied (66.0%) or somewhat satisfied (31.2%) 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 2015-16 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 High School Sports-Related Injury Surveillance Study by Dr. Comstock, 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). Data collected by the NCAA ISS since 1982 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 ISS 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 ISS 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 recent 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. Comstock 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.