SUMMARY REPORT

NATIONAL HIGH SCHOOL SPORTS-RELATED INJURY SURVEILLANCE STUDY

2011-2012 School Year

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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 7.7 million in 2011-12. 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 Online) surveillance system. Through the generous contributions of the Centers for Disease Control 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 2011-12 school year.
Previous study years were funded by the Centers for Disease Control and Prevention, 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 2011-12 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, or dental injury 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 ≤ 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 45 weekly exposure reports: one for each week from August 1, 2011 through June 10, 2012. 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 19.0. 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 ≤ 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:

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

Injury proportions were compared using injury proportion ratios (IPR) and corresponding confidence intervals calculated using 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:

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

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

II. Overall Injury Epidemiology

Table 2.1 Injury Rates by Sport and Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2011-12 School Year*

	# Injuries	# Exposures	Injury rate (per 1,000 athlete-exposures)	Nationally Estimated # Injuries
Overall total	3,759	1,733,895	2.17	1,392,262
Competition	1,974	463,292	4.26	740,493
Practice	1,785	1,270,603	1.40	651,769
Boys' football total	1,778	469,815	3.78	559,064
Competition	925	74,547	12.41	287,710
Practice	853	395,268	2.16	271,354
Boys' soccer total	265	161,672	1.64	172,070
Competition	162	46,690	3.47	97,540
Practice	103	114,982	0.90	74,530
Girls' soccer total	330	136,276	2.42	222,679
Competition	224	39,411	5.68	145,469
Practice	106	96,865	1.09	77,210
Girls' volleyball total	164	164,710	1.00	52,662
Competition	71	55,890	1.27	24,439
Practice	93	108,820	0.85	28,223
Boys' basketball total	292	208,696	1.40	75,872
Competition	158	60,884	2.60	41,978
Practice	134	147,812	0.91	33,894
Girls' basketball total	263	167,052	1.57	67,280
Competition	147	48,561	3.03	37,213
Practice	116	118,491	0.98	30,067
Boys' wrestling total	359	143,849	2.50	107,992
Competition	138	38,784	3.56	40,235
Practice	221	105,065	2.10	67,757
Boys' baseball total	135	163,418	0.83	43,590
Competition	66	57,916	1.14	20,818
Practice	69	105,502	0.65	22,772
Girls' softball total	173	118,407	1.46	91,053
Competition	83	40,609	2.04	45,091
Practice	90	77,798	1.16	45,962

*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, 2011-12 School Year*

	≥1 days time loss	<1 day time loss	Total
Overall	98.7%	1.3%	**100%**
Boys' football	98.8%	1.2%	**100%**
Boys' soccer	98.1%	1.9%	**100%**
Girls' soccer	98.8%	1.2%	**100%**
Girls' volleyball	99.4%	0.6%	**100%**
Boys' basketball	99.3%	0.7%	**100%**
Girls' basketball	97.8%	2.2%	**100%**
Boys' wrestling	98.9%	1.1%	**100%**
Boys' baseball	97.1%	2.9%	**100%**
Girls' softball	97.7%	2.3%	**100%**

*By study definition, non-time loss injuries were fractures, concussions, and dental injuries. Because they accounted for less than 2% 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, 2011-12 School Year*

	Male n= 934,449	**Female n= 421,541**
Year in School		
Freshman	24.0%	32.3%
Sophomore	26.6%	25.6%
Junior	23.4%	23.3%
Senior	26.0%	18.8%
Total†	**100%**	**100%**
Age (years)		
Minimum	13	12
Maximum	19	19
Mean (St. Dev.)	15.9 (1.2)	15.7 (1.2)
BMI		
Minimum	10.6	14.0
Maximum	51.2	39.0
Mean (St. Dev.)	24.7 (4.6)	22.2 (3.3)

*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, 2011-12 School Year

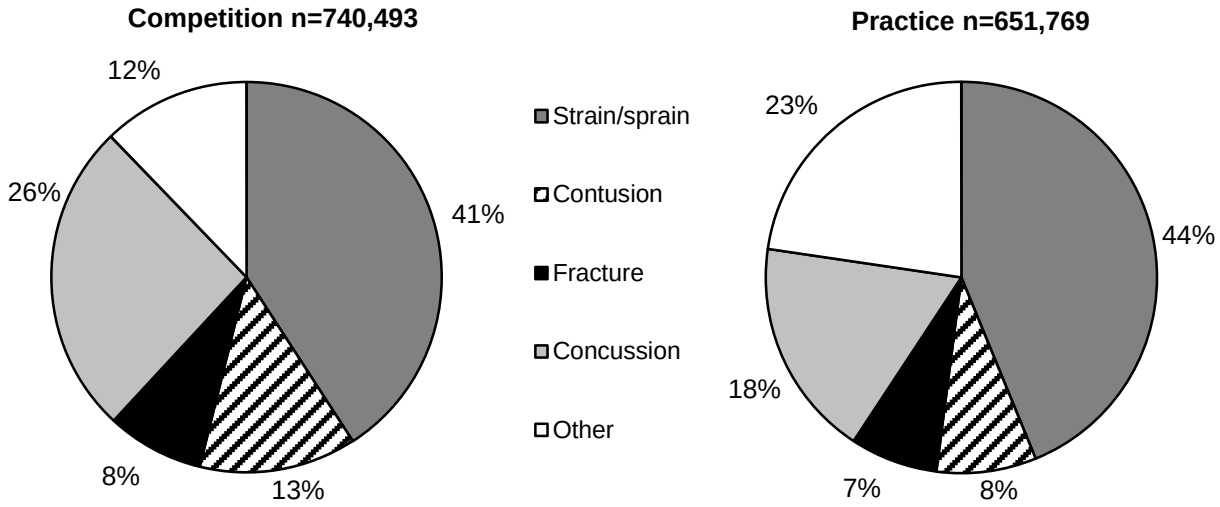


Table 2.4 Body Site of Injury by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2011-12 School Year*

	Competition		Practice		Overall	
	n	%	n	%	n	%
Body Site						
Head/face	210,662	28.4%	138,549	21.3%	349,211	25.1%
Ankle	127,266	17.2%	96,569	14.8%	223,835	16.1%
Knee	108,738	14.7%	77,516	11.9%	186,254	13.4%
Hip/thigh/upper leg	58,335	7.9%	78,684	12.1%	137,019	9.8%
Hand/wrist	59,059	8.0%	59,961	9.2%	119,020	8.6%
Shoulder	46,533	6.3%	44,849	6.9%	91,382	6.6%
Trunk	29,710	4.0%	39,178	6.0%	68,888	5.0%
Lower leg	26,588	3.6%	35,530	5.5%	62,118	4.5%
Arm/elbow	30,941	4.2%	24,589	3.8%	55,530	4.0%
Foot	20,625	2.8%	26,968	4.1%	47,593	3.4%
Neck	9,391	1.3%	13,757	2.1%	23,148	1.7%
Other	12,647	1.7%	14,933	2.3%	27,580	2.0%
Total	**740,493**	**100%**	**651,083**	**100%**	**1,391,576**	**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, 2011-12 School Year*

	Male		Female		Total	
	n	% of Ankle Injuries	n	% of Ankle Injuries	n	% of Ankle Injuries
Ankle Ligament Injuries						
Anterior talofibular ligament	92,553	74.4%	78,061	86.1%	170,614	79.3%
Calcaneofibular ligament	29,708	23.9%	17,006	18.8%	46,714	21.7%
Anterior tibiofibular ligament	16,825	13.5%	12,617	13.9%	29,442	13.7%
Posterior talofibular ligament	13,874	11.2%	9,221	10.2%	23,095	10.7%
Deltoid ligament	10,242	8.2%	2,668	2.9%	12,910	6.0%
Posterior tibiofibular ligament	2,604	2.1%	3,462	3.8%	6,066	2.8%
Total Ankle Injuries	**124,412**		**90,621**		**215,033**	

*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, 2011-12 School Year*

	Male		Female		Total	
	n	% of Knee Injuries	n	% of Knee Injuries	n	% of Knee Injuries
Knee Ligament Injuries						
Medial collateral ligament	36,621	31.8%	11,447	17.4%	48,068	26.6%
Anterior cruciate ligament	23,794	20.6%	19,547	29.8%	43,341	23.9%
Patella and/or patellar tendon	17,100	14.8%	21,509	32.8%	38,609	21.3%
Torn cartilage (meniscus)	20,071	17.4%	8,179	12.5%	28,250	15.6%
Lateral collateral ligament	9,750	8.5%	5,793	8.8%	15,543	8.6%
Posterior cruciate ligament	4,226	3.7%	1,671	2.5%	5,897	3.3%
Total Knee Injuries	**115,293**		**65,603**		**180,986**	

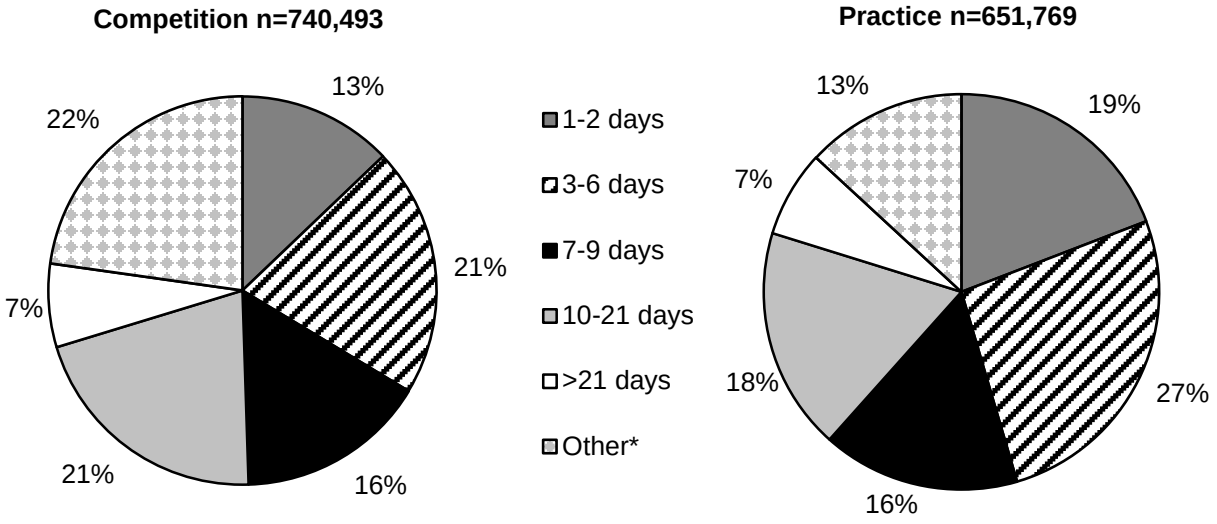
*Multiple ligament responses allowed per injury report. Totals and n's are not always equal due to slight rounding of the weighted number of injuries and missing responses. Due to a low level of non-response, these totals are always similar but are not always equal to the total number of injuries.

Table 2.7 Ten Most Common Injury Diagnoses by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2011-12 School Year*

	Competition n= 740,042		Practice n= 648,833		Overall n= 1,388,875	
	n	%	n	%	n	%
Diagnosis						
Head/face concussion	191,587	25.9%	117,375	18.1%	308,962	22.2%
Ankle strain/sprain	113,693	15.4%	90,436	13.9%	204,129	14.7%
Knee strain/sprain	72,766	9.8%	33,439	5.2%	106,205	7.6%
Hip/thigh/upper leg strain/sprain	32,306	4.4%	63,994	9.9%	96,300	6.9%
Knee other	22,209	3.0%	32,583	5.0%	54,792	3.9%
Hand/wrist fracture	24,261	3.3%	26,927	4.2%	51,188	3.7%
Shoulder other	22,322	3.0%	20,523	3.2%	42,845	3.1%
Hand/wrist strain/sprain	22,546	3.0%	19,253	3.0%	41,799	3.0%
Shoulder strain/sprain	19,518	2.6%	20,097	3.1%	39,615	2.9%
Hip/thigh/upper leg contusion	22,824	3.1%	9,963	1.5%	32,787	2.4%

* 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, 2011-12 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, 2011-12 School Year*

	Competition		Practice		Overall	
	n	%	n	%	n	%
Need for surgery						
Required surgery	57,964	8.0%	33,115	5.2%	91,079	6.7%
Did not require surgery	669,343	92.0%	607,573	94.8%	1,276,916	93.3%
Total*	**727,307**	**100%**	**640,688**	**100%**	**1,367,995**	**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, 2011-12 School Year

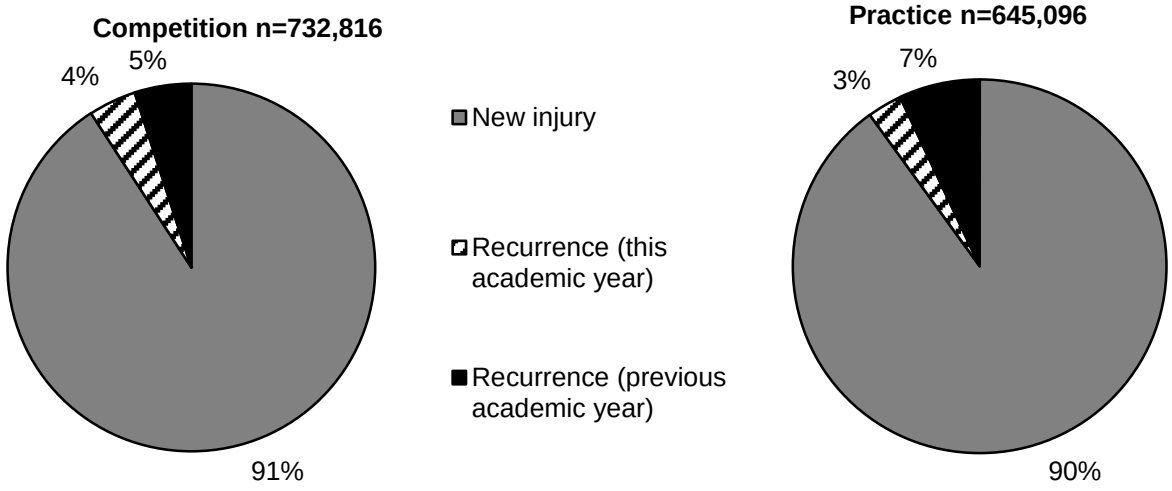


Table 2.9 Time during Season of Injury, High School Sports-Related Injury Surveillance Study, US, 2011-12 School Year*

	n	%
Time in Season		
Preseason	312,873	22.6%
Regular season	1,008,564	72.8%
Post season	63,250	4.6%
Total	**1,384,687**	**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, 2011-12 School Year*

	n	%
Time in Practice		
First ½ hour	66,185	11.3%
Second ½ hour	110,950	19.0%
1-2 hours into practice	339,216	58.1%
>2 hours into practice	67,006	11.5%
Total	**583,357**	**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, 2011-12 School Year

	n	%
Injuries Evaluated by:*		
Certified athletic trainer	1,305,457	93.8%
General physician	452,892	32.5%
Orthopedic physician	448,731	32.2%
Neurologist/neuropsychologist	37,073	2.7%
Chiropractor	12,833	0.9%
Physician's assistant	12,345	0.9%
Dentist/oral surgeon	2,075	0.1%
Nurse practitioner	1,811	0.1%
Other	43,322	3.1%
Total	**1,392,262**	**100%**
Injuries Assessed by:*		
Evaluation	1,360,704	97.7%
X-ray	457,344	32.8%
MRI	141,249	10.1%
CT-scan	62,892	4.5%
Surgery	17,688	1.3%
Blood work/lab test	10,493	0.8%
Other	12,067	0.9%
Total	**1,392,262**	**100%**

*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, 2011-12 School Year

	# Injuries	# Exposures	Injury rate (per 1,000 athlete-exposures)	Nationally Estimated # Injuries
Total	**1,778**	**469,815**	**3.78**	**559,064**
Competition	925	74,547	12.41	287,710
Practice	853	395,268	2.16	271,354

Table 3.2 Demographic Characteristics of Injured Football Athletes, High School Sports-Related Injury Surveillance Study, US, 2011-12 School Year*

Year in School	**n=552,365**
Freshman	25.2%
Sophomore	26.1%
Junior	22.1%
Senior	26.6%
Total†	**100%**
Age (years)	
Minimum	13
Maximum	18
Mean (St. Dev.)	15.9 (1.2)
BMI	
Minimum	10.6
Maximum	51.2
Mean (St. Dev.)	25.9 (4.8)

*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 3.1 Diagnosis of Football Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2011-12 School Year

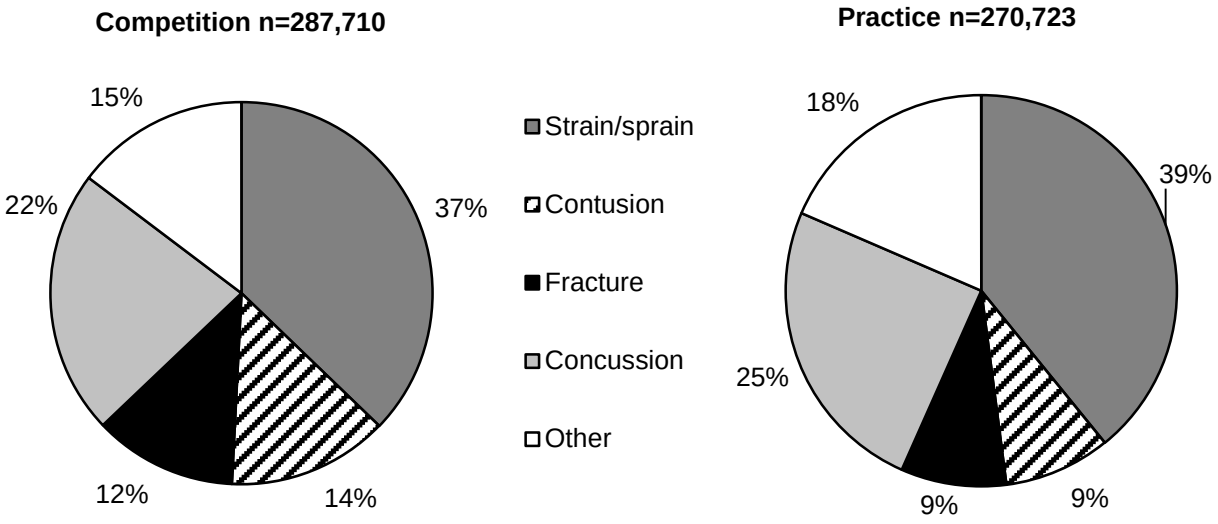


Table 3.3 Body Site of Football Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2011-12 School Year*

	Competition		Practice		Overall	
	n	%	n	%	n	%
Body Site						
Head/face	68,124	23.7%	69,300	25.6%	137,424	24.6%
Knee	42,208	14.7%	28,234	10.4%	70,442	12.6%
Ankle	36,682	12.7%	27,931	10.3%	64,613	11.6%
Hand/wrist	26,877	9.3%	31,801	11.7%	58,678	10.5%
Shoulder	29,308	10.2%	23,296	8.6%	52,604	9.4%
Hip/thigh/upper leg	19,212	6.7%	28,980	10.7%	48,192	8.6%
Trunk	14,911	5.2%	15,260	5.6%	30,171	5.4%
Arm/elbow	15,226	5.3%	9,223	3.4%	24,449	4.4%
Lower leg	12,956	4.5%	8,098	3.0%	21,054	3.8%
Foot	5,910	2.1%	12,256	4.5%	18,166	3.3%
Neck	7,046	2.4%	8,066	3.0%	15,112	2.7%
Other	9,250	3.2%	8,559	3.2%	17,809	3.2%
Total	**287,710**	**100%**	**271,004**	**100%**	**558,714**	**100%**

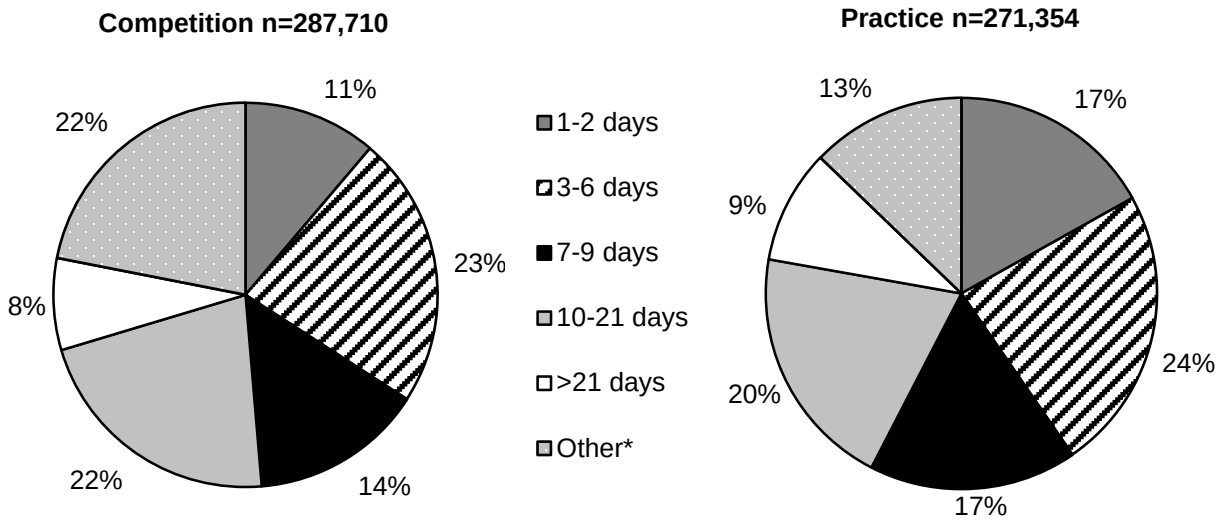
* Totals and n's are not always equal due to slight rounding of the weighted number of injuries and missing responses. Due to a low level of non-response, these totals are always similar but are not always equal to the total number of injuries.

Table 3.4 Ten Most Common Football Injury Diagnoses by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2011-12 School Year*

	Competition n=287,710		Practice n=270,374		Total n=558,085	
	n	%	n	%	n	%
Diagnosis						
Head/face concussion	64,311	22.4%	67,255	24.9%	131,566	23.6%
Ankle strain/sprain	29,949	10.4%	25,451	9.4%	55,400	9.9%
Knee strain/sprain	29,813	10.4%	16,058	5.9%	45,871	8.2%
Hip/thigh/upper leg strain/sprain	8,787	3.1%	22,289	8.2%	31,076	5.6%
Hand/wrist fracture	14,102	4.9%	12,046	4.5%	26,148	4.7%
Shoulder other	15,027	5.2%	9,297	3.4%	24,324	4.4%
Shoulder strain/sprain	11,171	3.9%	9,844	3.6%	21,015	3.8%
Hand/wrist strain/sprain	6,008	2.1%	10,644	3.9%	16,652	3.0%
Knee other	8,034	2.8%	8,164	3.0%	16,198	2.9%
Hip/thigh/upper leg contusion	9,757	3.4%	4,861	1.8%	14,618	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, 2011-12 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, 2011-12 School Year*

	Competition		Practice		Overall	
	n	%	n	%	n	%
Need for surgery						
Required surgery	24,842	8.8%	16,692	6.3%	41,534	7.6%
Did not require surgery	257,084	91.2%	249,851	93.7%	506,935	92.4%
Total	**281,926**	**100%**	**266,543**	**100%**	**548,469**	**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, 2011-12 School Year

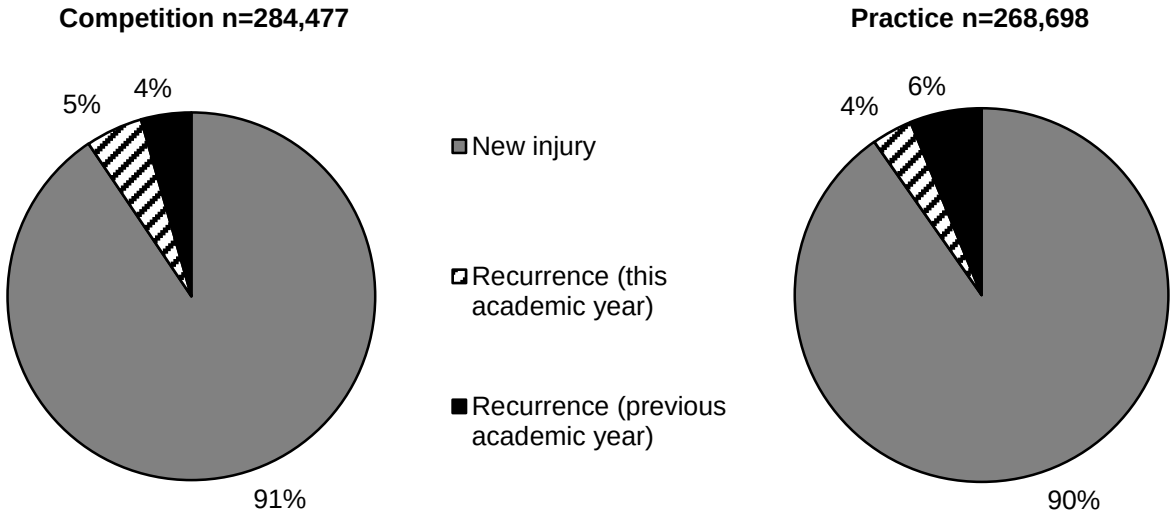


Table 3.6 Time during Season of Football Injuries, High School Sports-Related Injury Surveillance Study, US, 2011-12 School Year*

	n	%
Time in Season		
Preseason	158,195	28.4%
Regular season	366,251	65.8%
Post season	32,424	5.8%
Total	**556,870**	**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, 2011-12 School Year*

	n	%
Time in Competition		
Pre-competition/warm-ups	3,320	1.2%
First quarter	26,838	9.8%
Second quarter	84,463	30.8%
Third quarter	91,366	33.3%
Fourth quarter	67,838	24.7%
Overtime	741	0.3%
Total	**274,566**	**100%**
Field Location		
Between the 20 yard lines	229,687	83.4%
Red zone (20 yard line to goal line)	41,642	15.1%
Off the field	2,589	0.9%
End zone	1,625	0.6%
Total	**275,543**	**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, 2011-12 School Year*

	n	%
Time in Practice		
First 1/2 hour	22,925	9.0%
Second 1/2 hour	46,051	18.1%
1-2 hours into practice	149,961	59.0%
>2 hours into practice	35,359	13.9%
Total	**254,296**	**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.

Figure 3.4 Player Position of Football Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2011-12 School Year

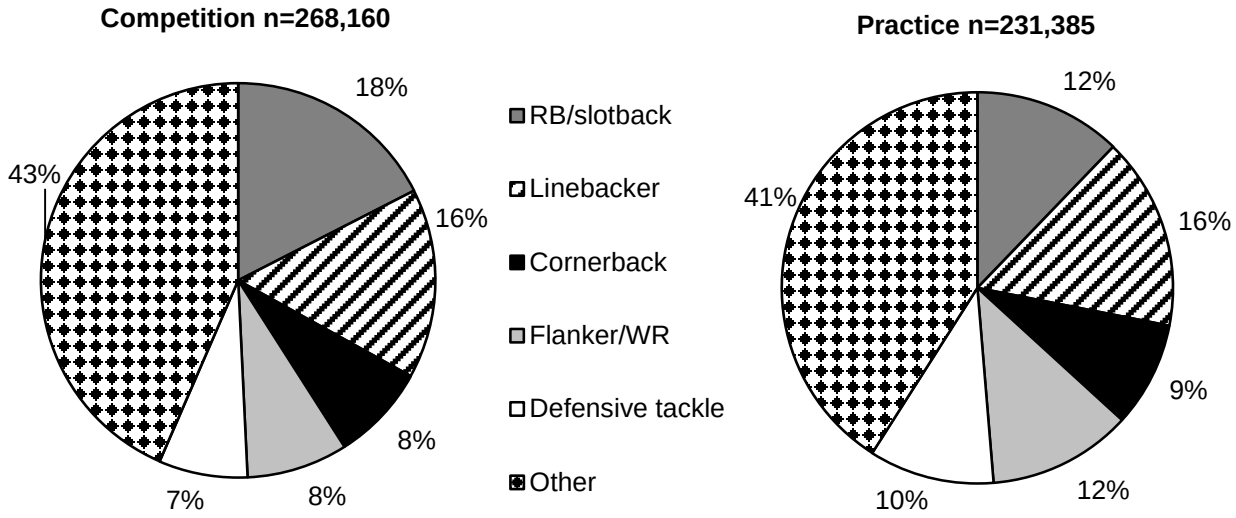
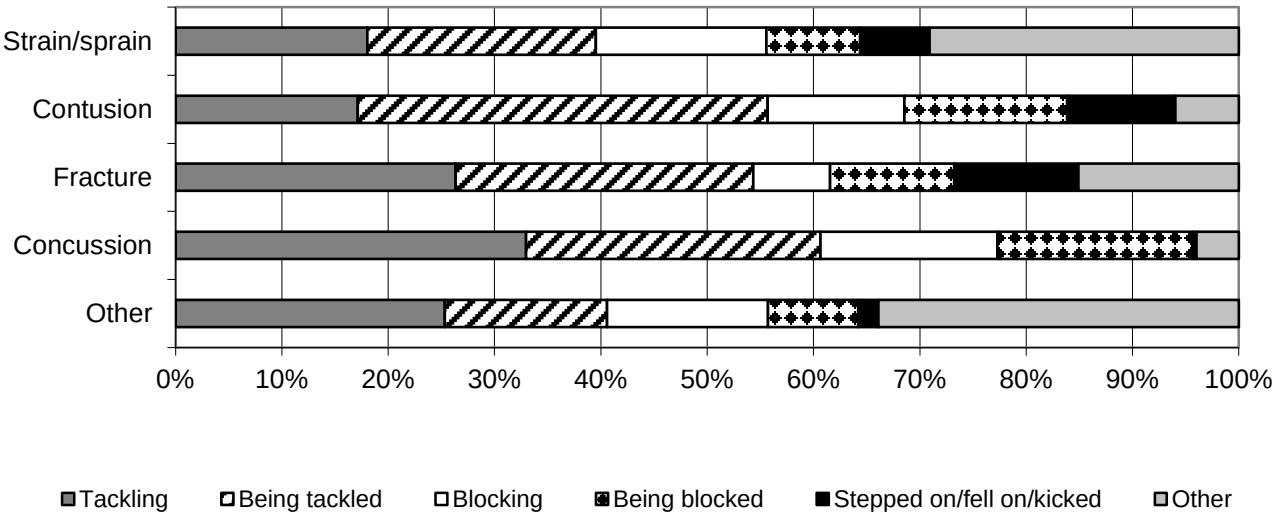


Table 3.9 Activities Leading to Football Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2011-12 School Year*

	Competition		Practice		Overall	
	n	%	n	%	n	%
Activity						
Being tackled	83,180	29.4%	50,595	19.2%	133,775	24.5%
Tackling	65,426	23.2%	63,092	24.0%	128,518	23.5%
Blocking	37,506	13.3%	43,052	16.3%	80,558	14.8%
Being blocked	41,204	14.6%	24,662	9.4%	65,866	12.1%
N/A (e.g., overuse, heat illness, etc.)	6,103	2.2%	33,005	12.5%	39,108	7.2%
Stepped on/fell on/kicked	14,137	5.0%	14,008	5.3%	28,145	5.2%
Rotation around a planted foot	16,510	5.8%	10,763	4.1%	27,273	5.0%
Contact with ball	1,792	0.6%	4,942	1.9%	6,734	1.2%
Uneven playing surface	2,682	0.9%	1,617	0.6%	4,299	0.8%
Contact with blocking sled/dummy	0	0.0%	1,990	0.8%	1,990	0.4%
Contact with out of bounds	632	0.2%	484	0.2%	1,116	0.2%
Other	13,393	4.7%	15,184	5.8%	28,577	5.2%
Total	**282,565**	**100%**	**263,394**	**100%**	**545,959**	**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 3.5 Activity Resulting in Football Injuries by Injury Diagnosis, High School Sports-Related Injury Surveillance Study, US, 2011-12 School Year



IV. Boys' Soccer Injury Epidemiology

Table 4.1 Boys' Soccer Injury Rates by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2011-12 School Year

	# Injuries	# Exposures	Injury rate (per 1,000 athlete-exposures)	Nationally Estimated # Injuries
Total	**265**	**161,672**	**1.64**	**172,070**
Competition	162	46,690	3.47	97,540
Practice	103	114,982	0.90	74,530

Table 4.2 Demographic Characteristics of Injured Boys' Soccer Athletes, High School Sports-Related Injury Surveillance Study, US, 2011-12 School Year*

Year in School	**n= 169,958**
Freshman	18.3%
Sophomore	24.7%
Junior	30.1%
Senior	26.8%
Total†	**100%**
Age (years)	
Minimum	14
Maximum	18
Mean (St. Dev.)	16.1 (1.3)
BMI	
Minimum	13.0
Maximum	36.4
Mean (St. Dev.)	22.1 (2.7)

*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, 2011-12 School Year

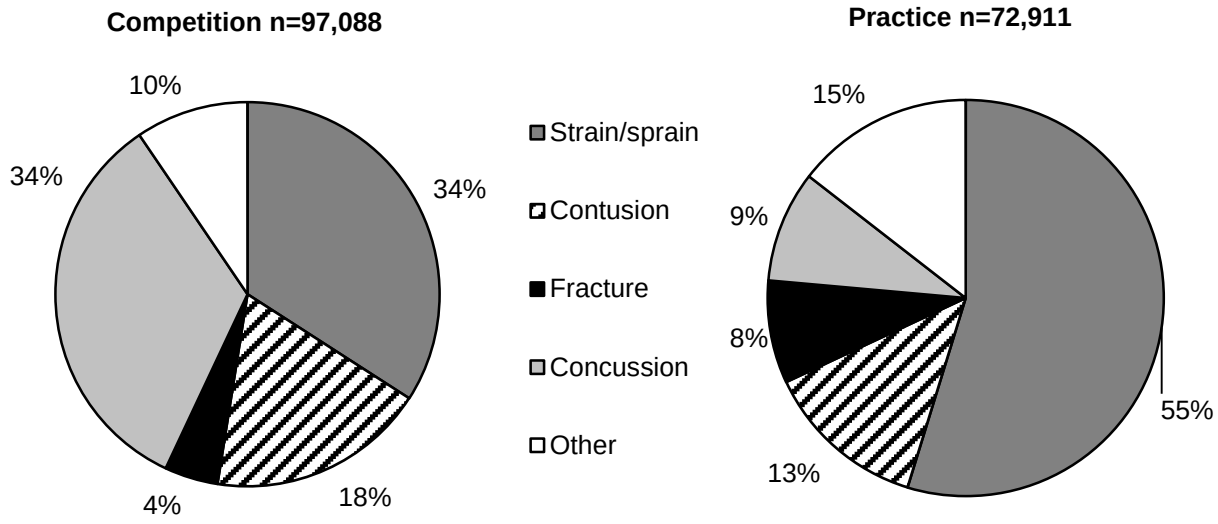


Table 4.3 Body Site of Boys' Soccer Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2011-12 School Year*

	Competition		Practice		Overall	
	n	%	n	%	n	%
Body Site						
Head/face	35,404	36.3%	10,436	14.0%	45,840	26.6%
Hip/thigh/upper leg	15,754	16.2%	21,271	28.5%	37,025	21.5%
Ankle	14,546	14.9%	10,988	14.7%	25,534	14.8%
Knee	12,361	12.7%	7,322	9.8%	19,683	11.4%
Lower leg	3,114	3.2%	7,492	10.1%	10,606	6.2%
Trunk	4,486	4.6%	4,247	5.7%	8,733	5.1%
Foot	4,604	4.7%	3,730	5.0%	8,334	4.8%
Hand/wrist	2,346	2.4%	5,315	7.1%	7,661	4.5%
Shoulder	2,855	2.9%	527	0.7%	3,382	2.0%
Arm/elbow	982	1.0%	1,240	1.7%	2,222	1.3%
Neck	453	0.5%	982	1.3%	1,619	0.8%
Other	637	0.7%	982	1.3%	1,435	0.9%
Total	**97,540**	**100%**	**74,530**	**100%**	**172,070**	**100%**

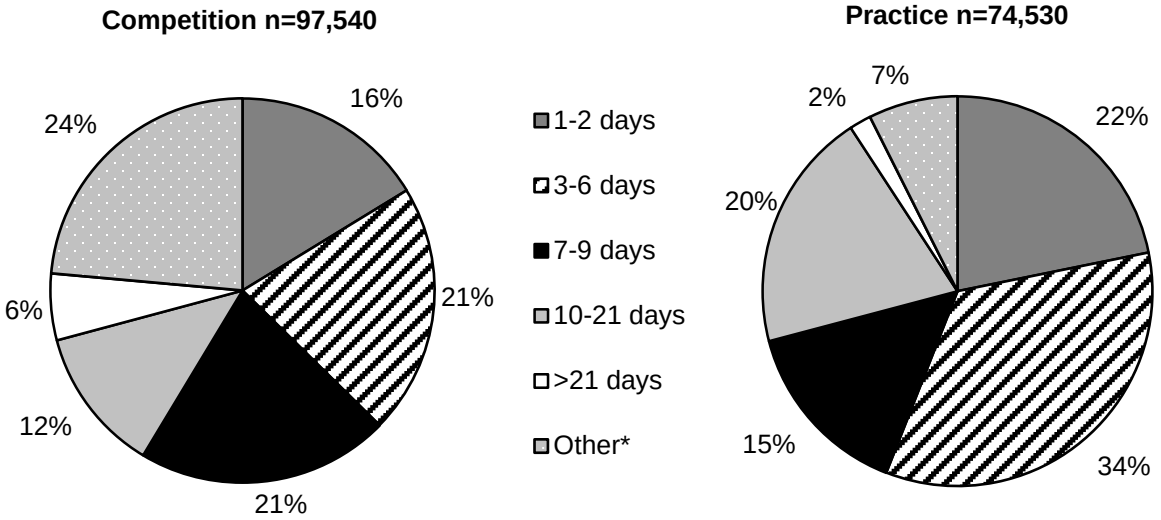
* Totals and n's are not always equal due to slight rounding of the weighted number of injuries and missing responses. Due to a low level of non-response, these totals are always similar but are not always equal to the total number of injuries.

Table 4.4 Ten Most Common Boys' Soccer Injury Diagnoses by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2011-12 School Year*

	Competition n=97,091		Practice n=72,913		Total n=170,004	
	n	%	n	%	n	%
Diagnosis						
Head/face concussion	32,485	33.5%	6,609	9.1%	39,094	23.0%
Hip/thigh/upper leg strain/sprain	8,117	8.4%	18,533	25.4%	26,650	15.7%
Ankle strain/sprain	11,798	12.2%	10,988	15.1%	22,786	13.4%
Knee strain/sprain	7,892	8.1%	1,830	2.5%	9,722	5.7%
Hip/thigh/upper leg contusion	6,352	6.5%	2,738	3.8%	9,090	5.3%
Hand/wrist fracture	2,088	2.2%	4,672	6.4%	6,760	4.0%
Knee other	3,117	3.2%	2,255	3.1%	5,372	3.2%
Lower leg other	0	0.0%	5,074	7.0%	5,074	3.0%
Foot contusion	1,300	1.3%	3,398	4.7%	4,698	2.8%
Head/face other	1,937	2.0%	2,392	3.3%	4,329	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 4.2 Time Loss of Boys' Soccer Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2011-12 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, 2011-12 School Year*

	Competition		Practice		Overall	
	n	%	n	%	n	%
Need for surgery						
Required surgery	7,505	7.9%	1,361	1.9%	8,866	5.3%
Did not require surgery	88,084	92.1%	70,067	98.1%	158,151	94.7%
Total	**95,589**	**100%**	**71,428**	**100%**	**167,017**	**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, 2011-12 School Year

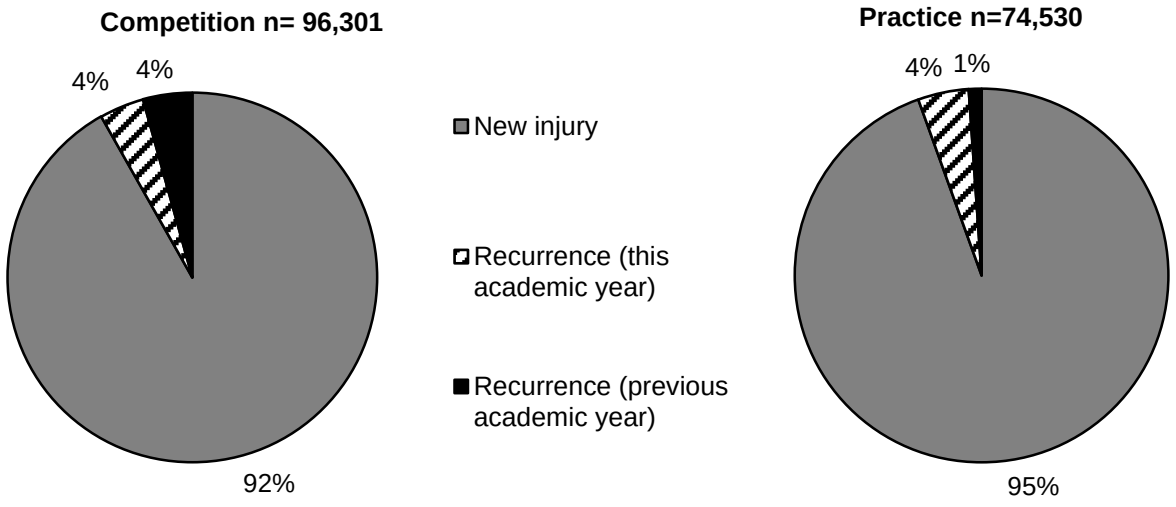


Table 4.6 Time during Season of Boys' Soccer Injuries, High School Sports-Related Injury Surveillance Study, US, 2011-12 School Year*

	n	%
Time in Season		
Preseason	39,293	22.8%
Regular season	123,176	71.6%
Post season	9,527	5.5%
Total	**171,996**	**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, 2011-12 School Year*

	n	%
Time in Competition		
Pre-competition/warm-ups	5,319	6.3%
First half	27,254	32.3%
Second half	51,428	61.0%
Overtime	321	0.4%
Total	**84,322**	**100%**
Field Location		
Top of goal box extended to center line (offense)	42,563	52.4%
Goal box (defense)	9,991	12.3%
Top of goal box extended to center line (defense)	6,268	7.7%
Goal box (offense)	6,141	7.6%
Off the field	5,725	7.0%
Side of goal box (defense)	5,657	7.0%
Side of goal box (offense)	4,925	6.1%
Total	**81,270**	**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, 2011-12 School Year*

	n	%
Time in Practice		
First 1/2 hour	6,502	10.4%
Second 1/2 hour	19,356	31.1%
1-2 hours into practice	28,266	45.4%
>2 hours into practice	8,142	13.1%
Total	**62,266**	**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, 2011-12 School Year

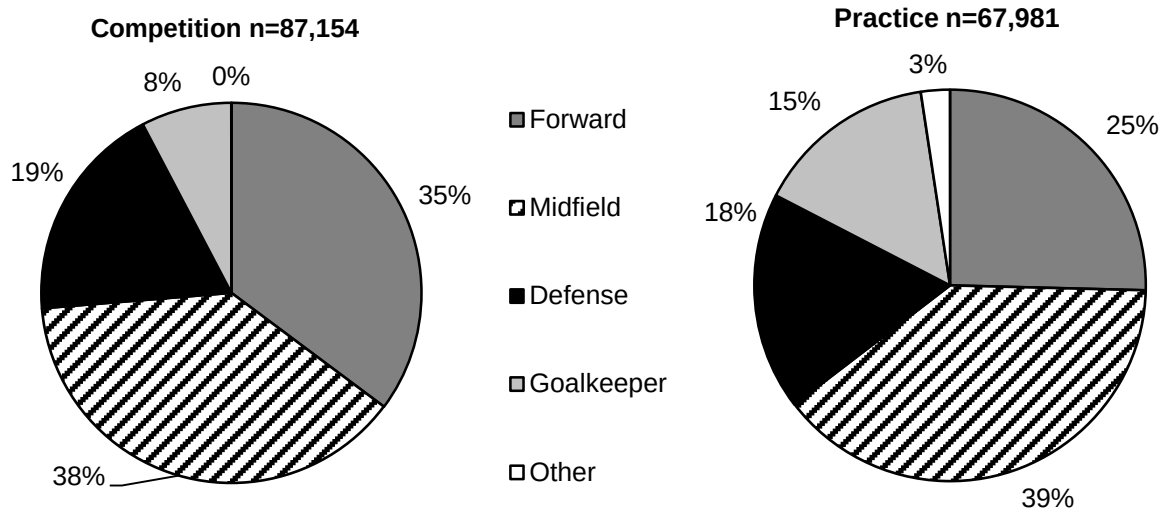
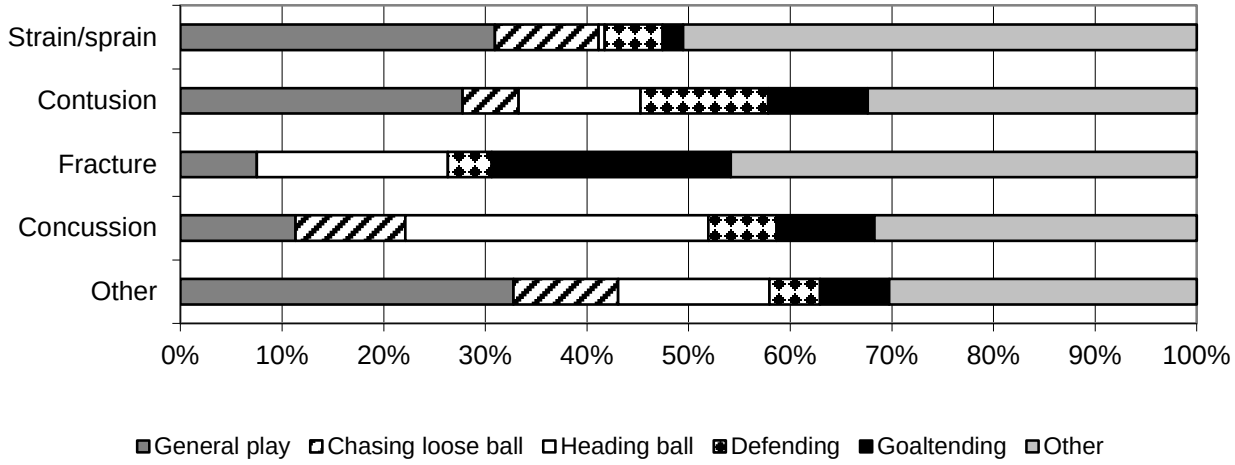


Table 4.9 Activities Leading to Boys' Soccer Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2011-12 School Year*

	Competition		Practice		Overall	
	n	%	n	%	n	%
Activity						
General play	13,672	15.0%	25,440	35.7%	39,112	24.1%
Ball handling/dribbling	17,501	19.2%	4,143	5.8%	21,644	13.3%
Heading ball	12,561	13.8%	6,806	9.6%	19,367	11.9%
Chasing loose ball	10,051	11.1%	4,396	6.2%	14,447	8.9%
Goaltending	5,018	5.5%	6,030	8.5%	11,048	6.8%
Defending	7,004	7.7%	3,774	5.3%	10,778	6.6%
Conditioning	982	1.1%	9,435	13.2%	10,417	6.4%
Receiving pass	7,593	8.3%	2,600	3.7%	10,193	6.3%
Passing (foot)	4,743	5.2%	2,416	3.4%	7,159	4.4%
Blocking shot	3,310	3.6%	3,637	5.1%	6,947	4.3%
Shooting (foot)	4,957	5.5%	1,181	1.7%	6,138	3.8%
Attempting a slide tackle	1,484	1.6%	982	1.4%	2,466	1.5%
Receiving a slide tackle	453	0.5%	379	0.5%	832	0.5%
Other	1,619	1.8%	0	0.0%	1,619	1.0%
Total	**90,948**	**100%**	**71,219**	**100%**	**162,167**	**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 4.5 Activity Resulting in Boys' Soccer Injuries by Injury Diagnosis, High School Sports-Related Injury Surveillance Study, US, 2011-12 School Year



V. Girls' Soccer Injury Epidemiology

Table 5.1 Girls' Soccer Injury Rates by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2011-12 School Year

	# Injuries	# Exposures	Injury rate (per 1,000 athlete-exposures)	Nationally Estimated # Injuries
Total	**330**	**136,276**	**2.42**	**222,679**
Competition	224	39,411	5.68	145,469
Practice	106	96,865	1.09	77,210

Table 5.2 Demographic Characteristics of Injured Girls' Soccer Athletes, High School Sports-Related Injury Surveillance Study, US, 2011-12 School Year*

Year in School	**n=220,557**
Freshman	32.1%
Sophomore	23.6%
Junior	23.9%
Senior	20.4%
Total†	**100%**
Age (years)	
Minimum	12
Maximum	19
Mean (St. Dev.)	15.7 (1.2)
BMI	
Minimum	15.8
Maximum	34.9
Mean (St. Dev.)	21.8 (3.0)

*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, 2011-12 School Year

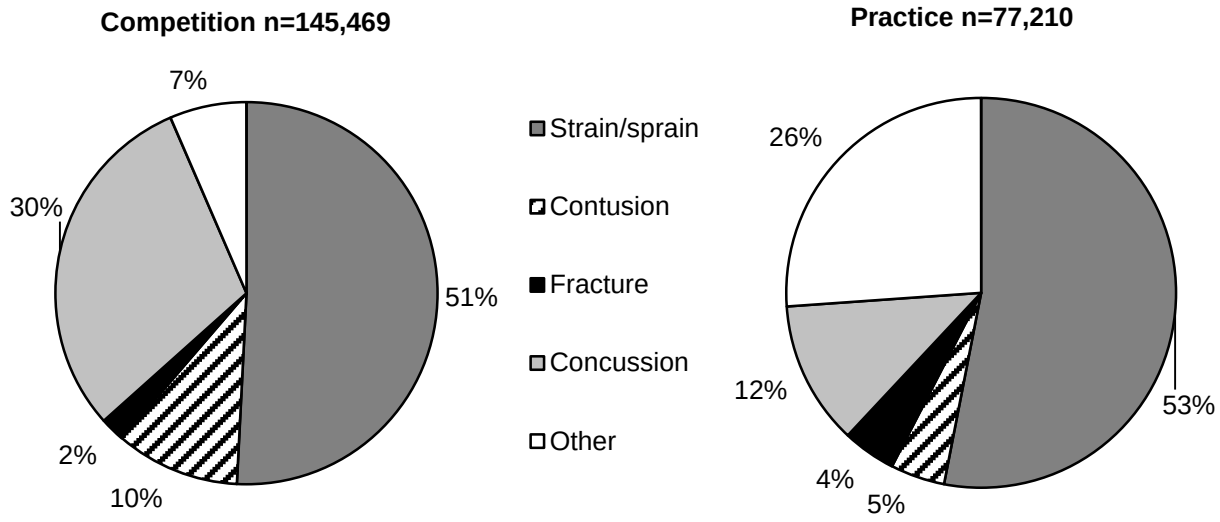


Table 5.3 Body Site of Girls' Soccer Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2011-12 School Year*

	Competition		Practice		Overall	
	n	%	n	%	n	%
Body Site						
Ankle	37,628	25.9%	17,841	23.1%	55,469	24.9%
Head/face	45,627	31.4%	9,389	12.2%	55,016	24.7%
Knee	27,390	18.8%	11,485	14.9%	38,875	17.5%
Hip/thigh/upper leg	11,081	7.6%	12,407	16.1%	23,488	10.5%
Lower leg	4,670	3.2%	12,251	15.9%	16,921	7.6%
Foot	6,367	4.4%	6,232	8.1%	12,599	5.7%
Hand/wrist	5,901	4.1%	2,704	3.5%	8,605	3.9%
Trunk	2,674	1.8%	2,028	2.6%	4,702	2.1%
Shoulder	1,588	1.1%	845	1.1%	2,433	1.1%
Arm/elbow	679	0.5%	165	0.2%	844	0.4%
Neck	422	0.3%	0	0.0%	422	0.2%
Other	1,441	1.0%	1,864	2.4%	3,305	1.5%
Total	**145,468**	**100%**	**77,210**	**100%**	**222,678**	**100%**

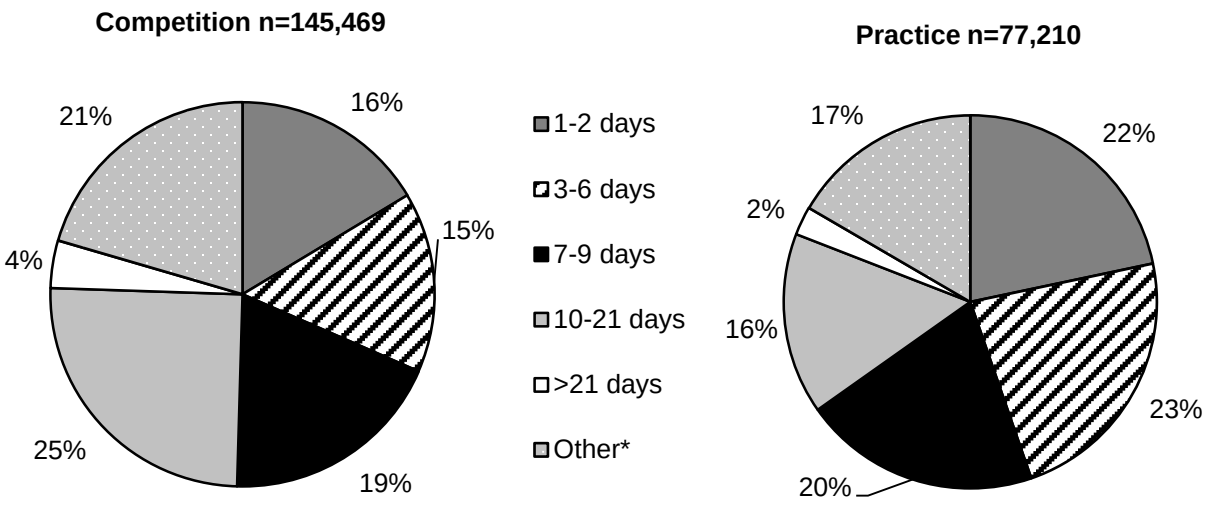
* Totals and n's are not always equal due to slight rounding of the weighted number of injuries and missing responses. Due to a low level of non-response, these totals are always similar but are not always equal to the total number of injuries.

Table 5.4 Ten Most Common Girls' Soccer Injury Diagnoses by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2011-12 School Year*

	Competition n=145,468		Practice n=77,210		Total n=222,678	
	n	%	n	%	n	%
Diagnosis						
Head/face concussion	43,852	30.1%	9,225	11.9%	53,077	23.8%
Ankle strain/sprain	37,041	25.5%	17,285	22.4%	54,326	24.4%
Knee strain/sprain	20,404	14.0%	2,145	2.8%	22,549	10.1%
Hip/thigh/upper leg strain/sprain	8,658	6.0%	12,078	15.6%	20,736	9.3%
Knee other	3,665	2.5%	7,938	10.3%	11,603	5.2%
Lower leg other	679	0.5%	8,133	10.5%	8,812	4.0%
Foot contusion	4,880	3.4%	1,233	1.6%	6,113	2.7%
Hand/wrist strain/sprain	4,888	3.4%	0	0.0%	4,888	2.2%
Knee Contusion	3,321	2.3%	1,401	1.8%	4,722	2.1%
Lower leg strain/sprain	557	0.4%	3,439	4.5%	3,996	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, 2011-12 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, 2011-12 School Year*

	Competition		Practice		Overall	
	n	%	n	%	n	%
Need for surgery						
Required surgery	10,761	7.5%	3,421	4.4%	14,182	6.4%
Did not require surgery	132,777	92.5%	73,789	95.6%	206,566	93.6%
Total	**143,538**	**100%**	**77,210**	**100%**	**220,748**	**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, 2011-12 School Year

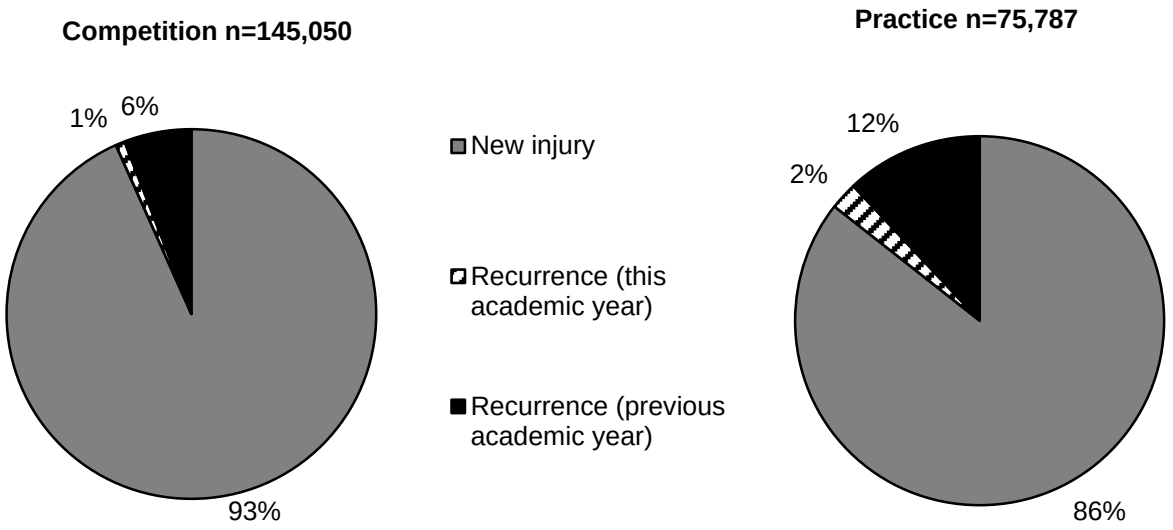


Table 5.6 Time during Season of Girls' Soccer Injuries, High School Sports-Related Injury Surveillance Study, US, 2011-12 School Year*

	n	%
Time in Season		
Preseason	34,330	15.5%
Regular season	182,100	82.5%
Post season	4,385	2.0%
Total	**220,815**	**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, 2011-12 School Year*

	n	%
Time in Competition		
Pre-competition/warm-ups	587	0.4%
First half	49,144	34.5%
Second half	92,279	64.9%
Overtime	254	0.2%
Total	**142,264**	**100%**
Field Location		
top of goal box extended to center line (offense)	43,219	32.4%
top of goal box extended to center line (defense)	29,559	22.1%
side of goal box (defense)	22,355	16.8%
side of goal box (offense)	14,869	11.1%
goal box (offense)	11,254	8.4%
goal box (defense)	10,759	8.1%
off the field	1,441	1.1%
Total	**133,456**	**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, 2011-12 School Year*

	n	%
Time in Practice		
First 1/2 hour	12,374	17.3%
Second 1/2 hour	16,371	22.8%
1-2 hours into practice	40,251	56.1%
>2 hours into practice	2,732	3.8%
Total	**71,728**	**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, 2011-12 School Year

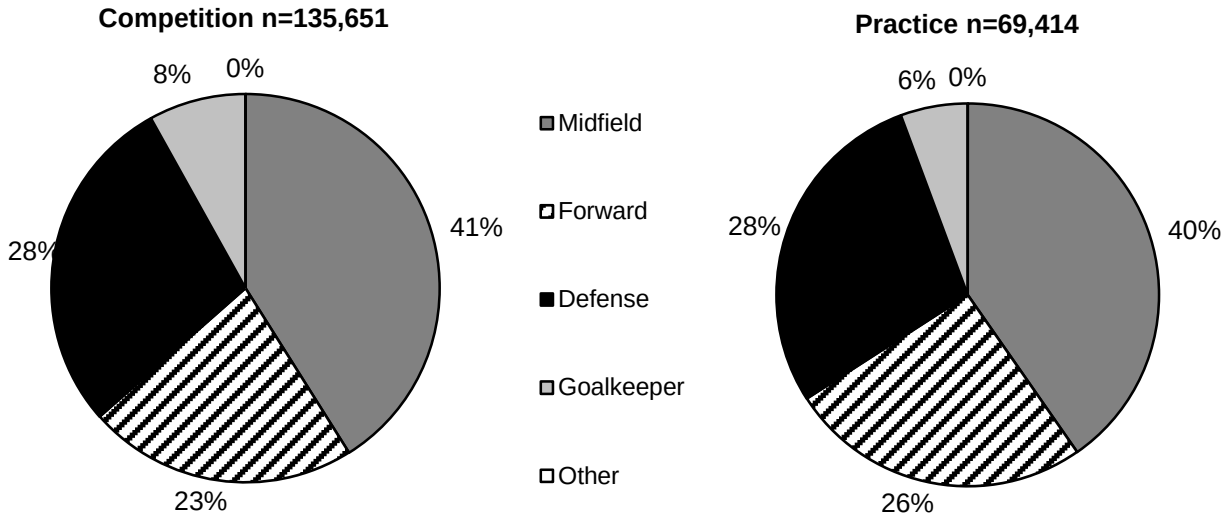
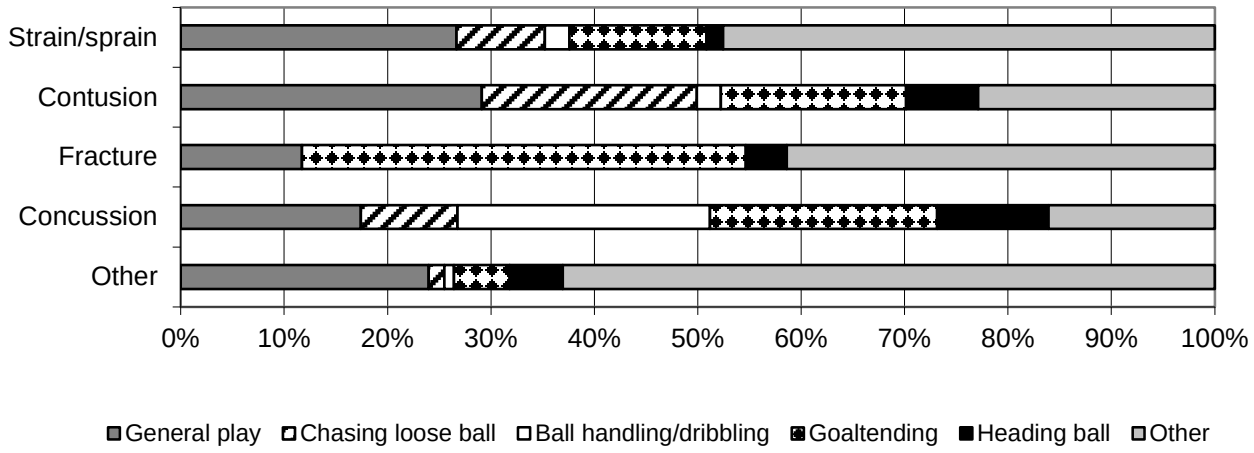


Table 5.9 Activities Leading to Girls' Soccer Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2011-12 School Year*

	Competition		Practice		Overall	
	n	%	n	%	n	%
Activity						
General play	27,535	19.2%	24,557	32.8%	52,092	23.9%
Defending	21,594	15.1%	12,390	16.6%	33,984	15.6%
Ball handling/dribbling	16,786	11.7%	3,094	4.1%	19,880	9.1%
Chasing loose ball	16,284	11.4%	2,522	3.4%	18,806	8.6%
Conditioning	426	0.3%	16,393	21.9%	16,819	7.7%
Heading ball	14,758	10.3%	1,267	1.7%	16,025	7.3%
Passing (foot)	6,886	4.8%	6,973	9.3%	13,859	6.4%
Receiving a slide tackle	11,781	8.2%	0	0.0%	11,781	5.4%
Goaltending	6,871	4.8%	3,523	4.7%	10,394	4.8%
Shooting (foot)	6,696	4.7%	919	1.2%	7,615	3.5%
Other	13,662	9.5%	3,119	4.2%	16,781	7.7%
Total	**143,279**	**100%**	**74,757**	**100%**	**218,036**	**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 5.5 Activity Resulting in Girls' Soccer Injuries by Injury Diagnosis, High School Sports-Related Injury Surveillance Study, US, 2011-12 School Year



VI. Volleyball Injury Epidemiology

Table 6.1 Volleyball Injury Rates by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2011-12 School Year

	# Injuries	# Exposures	Injury rate (per 1,000 athlete-exposures)	Nationally Estimated # Injuries
Total	**164**	**164,710**	**1.00**	**52,662**
Competition	71	55,890	1.27	24,439
Practice	93	108,820	0.85	28,223

Table 6.2 Demographic Characteristics of Injured Volleyball Athletes, High School Sports-Related Injury Surveillance Study, US, 2011-12 School Year*

Year in School	**n=51,783**
Freshman	32.1%
Sophomore	23.4%
Junior	26.7%
Senior	17.9%
Total†	**100%**
Age (years)	
Minimum	13
Maximum	18
Mean (St. Dev.)	15.5 (1.2)
BMI	
Minimum	17.0
Maximum	36.2
Mean (St. Dev.)	22.2 (3.0)

*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, 2011-12 School Year

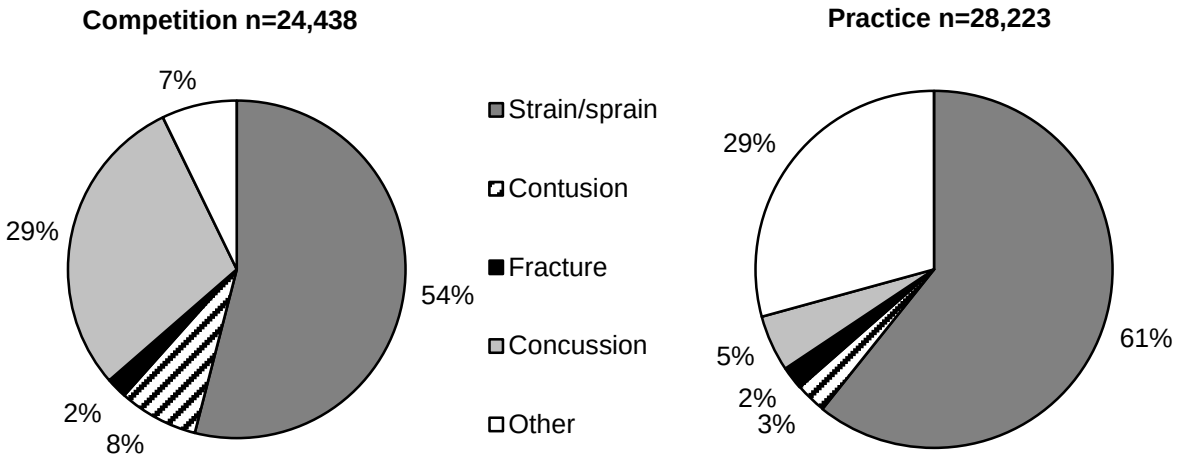


Table 6.3 Body Site of Volleyball Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2011-12 School Year*

	Competition		Practice		Overall	
	n	%	n	%	n	%
Body Site						
Ankle	7,425	30.4%	9,182	32.5%	16,607	31.5%
Head/face	7,746	31.7%	1,426	5.0%	9,172	17.4%
Hand/wrist	3,503	14.3%	4,309	15.3%	7,812	14.8%
Knee	1,755	7.2%	2,999	10.6%	4,754	9.0%
Shoulder	974	4.0%	3,310	11.7%	4,284	8.1%
Trunk	547	2.2%	3,119	11.0%	3,666	7.0%
Arm/elbow	1,903	7.8%	974	3.4%	2,877	5.5%
Hip/thigh/upper leg	491	2.0%	974	3.4%	1,465	2.8%
Foot	0	0.0%	801	2.8%	801	1.5%
Neck	0	0.0%	639	2.3%	639	1.2%
Other	95	0.4%	491	1.7%	586	1.1%
Total	**24,439**	**100%**	**28,223**	**100%**	**52,662**	**100%**

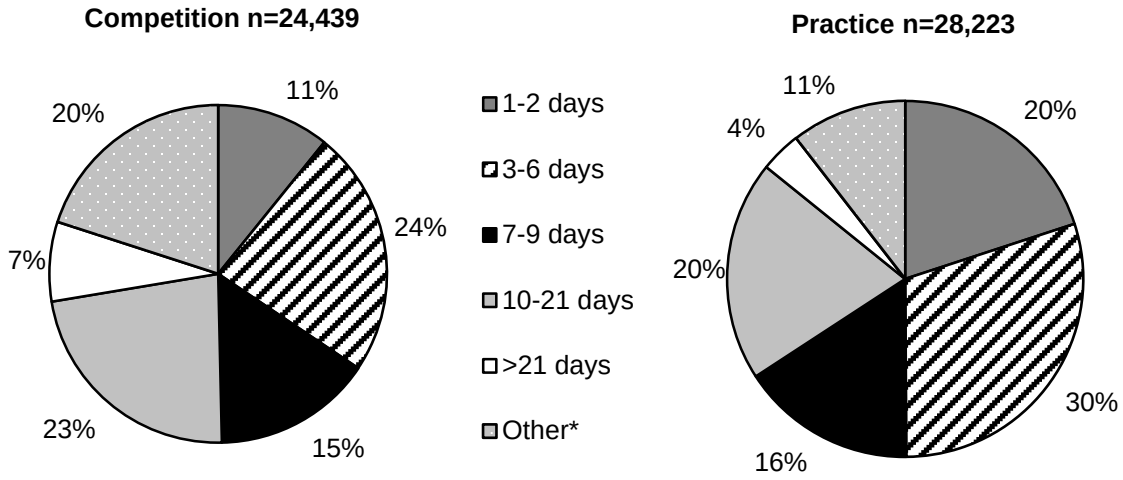
* Totals and n's are not always equal due to slight rounding of the weighted number of injuries and missing responses. Due to a low level of non-response, these totals are always similar but are not always equal to the total number of injuries.

Table 6.4 Ten Most Common Volleyball Injury Diagnoses by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2011-12 School Year*

	Competition n=24,439		Practice n=28,223		Total n=52,662	
	n	%	n	%	n	%
Diagnosis						
Ankle strain/sprain	7,277	29.8%	8,833	31.3%	16,110	30.6%
Head/face concussion	7,146	29.2%	1,426	5.1%	8,572	16.3%
Hand/wrist strain/sprain	2,369	9.7%	3,070	10.9%	5,439	10.3%
Knee other	617	2.5%	2,704	9.6%	3,321	6.3%
Shoulder other	452	1.8%	2,266	8.0%	2,718	5.2%
Trunk strain/sprain	452	1.8%	2,017	7.1%	2,469	4.7%
Arm/elbow strain/sprain	1,554	6.4%	522	1.8%	2,076	3.9%
Shoulder strain/sprain	522	2.1%	1,044	3.7%	1,566	3.0%
Hip/thigh/upper leg strain/sprain	491	2.0%	974	3.5%	1,465	2.8%
Trunk other	95	0.4%	1,102	3.9%	1,197	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 6.2 Time Loss of Volleyball Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2011-12 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, 2011-12 School Year*

	Competition		Practice		Overall	
	n	%	n	%	n	%
Need for surgery						
Required surgery	1,192	5.1%	1,150	4.2%	2,342	4.6%
Did not require surgery	22,175	94.9%	26,552	95.8%	48,727	95.4%
Total	**23,367**	**100%**	**27,702**	**100%**	**51,069**	**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.

Figure 6.3 History of Volleyball Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2011-12 School Year

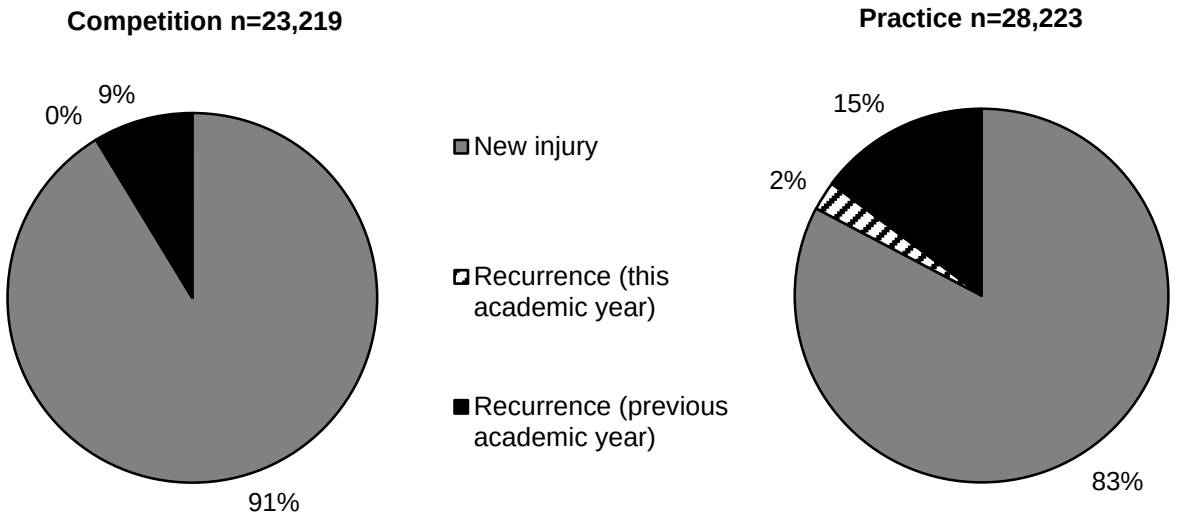


Table 6.6 Time during Season of Volleyball Injuries, High School Sports-Related Injury Surveillance Study, US, 2011-12 School Year*

	n	%
Time in Season		
Preseason	10,721	20.7%
Regular season	39,728	76.9%
Post season	1,238	2.4%
Total	**51,687**	**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, 2011-12 School Year*

	n	%
Time in Competition		
Pre-competition/warm-ups	3,371	14.7%
First game	1,314	5.7%
Second game	11,138	48.6%
Third game	5,730	25.0%
Fourth game	1.362	5.9%
Total	**22,915**	**100%**
Court Location		
Right forward	5,995	25.5%
Left back	5,744	24.4%
Middle forward	4,231	18.0%
Left forward	2,811	12.0%
Off the court	1,536	6.5%
At the net	1,139	4.8%
Right back (server)	879	3.7%
Outside court (your side)	581	2.5%
Outside court (opponent's side)	581	2.5%
Total	**23,497**	**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, 2011-12 School Year*

	n	%
Time in Practice		
First 1/2 hour	3,502	13.1%
Second 1/2 hour	3,235	12.1%
1-2 hours into practice	18,329	68.5%
>2 hours into practice	1,688	6.3%
Total	**26,754**	**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, 2011-12 School Year

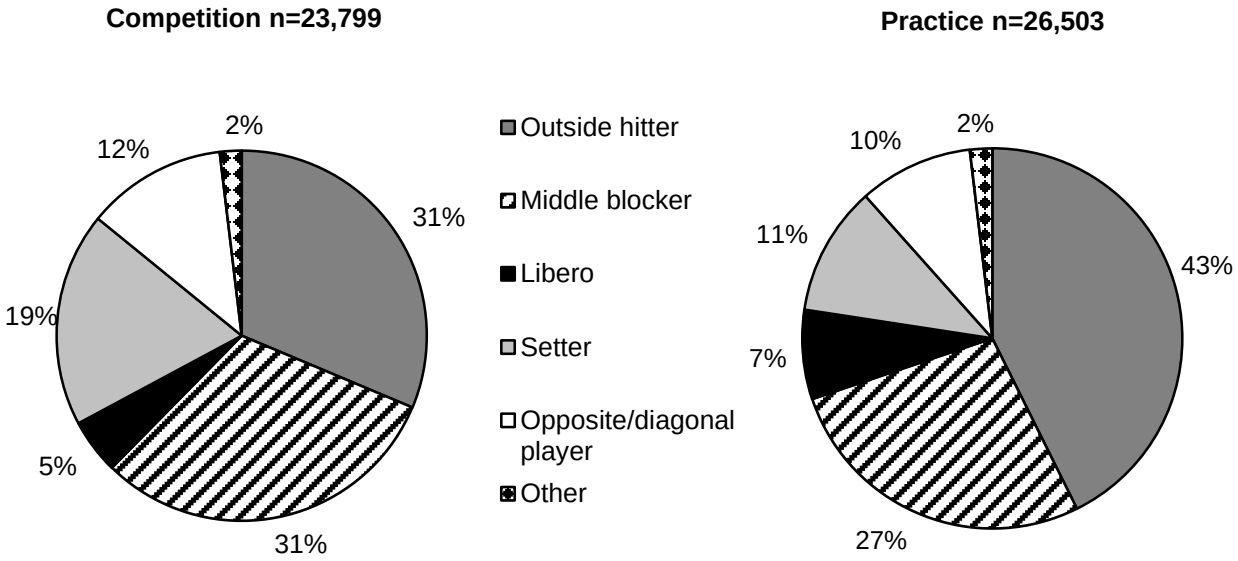
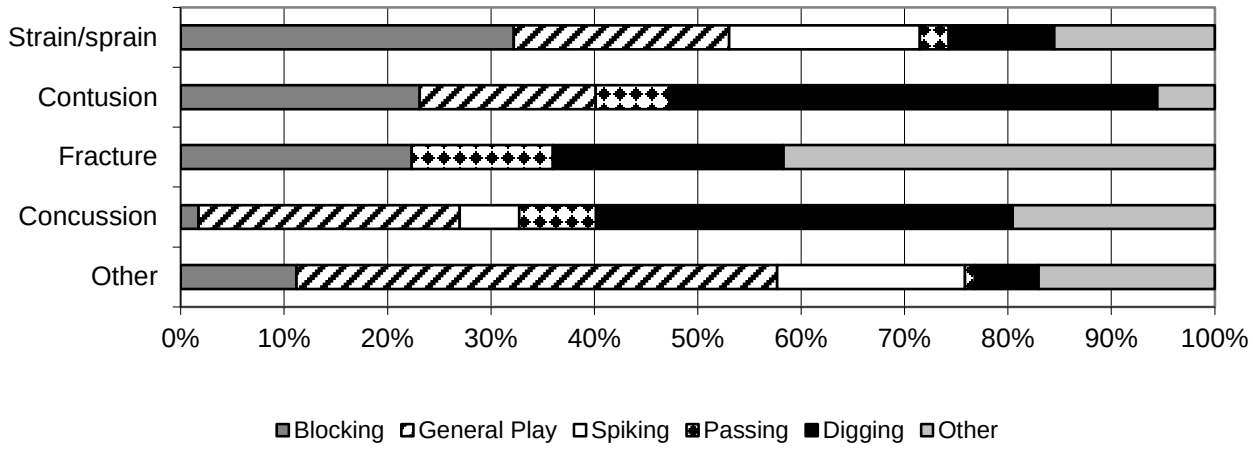


Table 6.9 Activities Leading to Volleyball Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2011-12 School Year*

	Competition		Practice		Overall	
	n	%	n	%	n	%
Activity						
General play	5,191	21.7%	8,246	29.5%	13,437	25.9%
Blocking	4,840	20.2%	6,819	24.4%	11,659	22.5%
Digging	5,747	24.0%	2,846	10.2%	8,593	16.5%
Spiking	3,787	15.8%	3,984	14.2%	7,771	15.0%
Setting	2,767	11.6%	2,160	7.7%	4,927	9.5%
Passing	1,016	4.2%	882	3.2%	1,898	3.7%
Serving	0	0.0%	1,261	4.5%	1,261	2.4%
Conditioning	0	0.0%	770	2.8%	770	1.5%
Other	599	2.5%	1,016	3.6%	1,615	3.1%
Total	**23,947**	**100%**	**27,984**	**100%**	**51,931**	**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 6.5 Activity Resulting in Volleyball Injuries by Injury Diagnosis, High School Sports-Related Injury Surveillance Study, US, 2011-12 School Year



VII. Boys' Basketball Injury Epidemiology

Table 7.1 Boys' Basketball Injury Rates by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2011-12 School Year

	# Injuries	# Exposures	Injury rate (per 1,000 athlete-exposures)	Nationally Estimated # Injuries
Total	**292**	**208,696**	**1.40**	**75,872**
Competition	158	60,884	2.60	41,978
Practice	134	147,812	0.91	33,894

Table 7.2 Demographic Characteristics of Injured Boys' Basketball Athletes, High School Sports-Related Injury Surveillance Study, US, 2011-12 School Year*

Year in School	**n=74,222**
Freshman	23.7%
Sophomore	31.3%
Junior	21.9%
Senior	23.0%
Total†	**100%**
Age (years)	
Minimum	13
Maximum	19
Mean (St. Dev.)	15.9 (1.2)
BMI	
Minimum	17.5
Maximum	47.4
Mean (St. Dev.)	23.3 (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 7.1 Diagnosis of Boys' Basketball Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2011-12 School Year

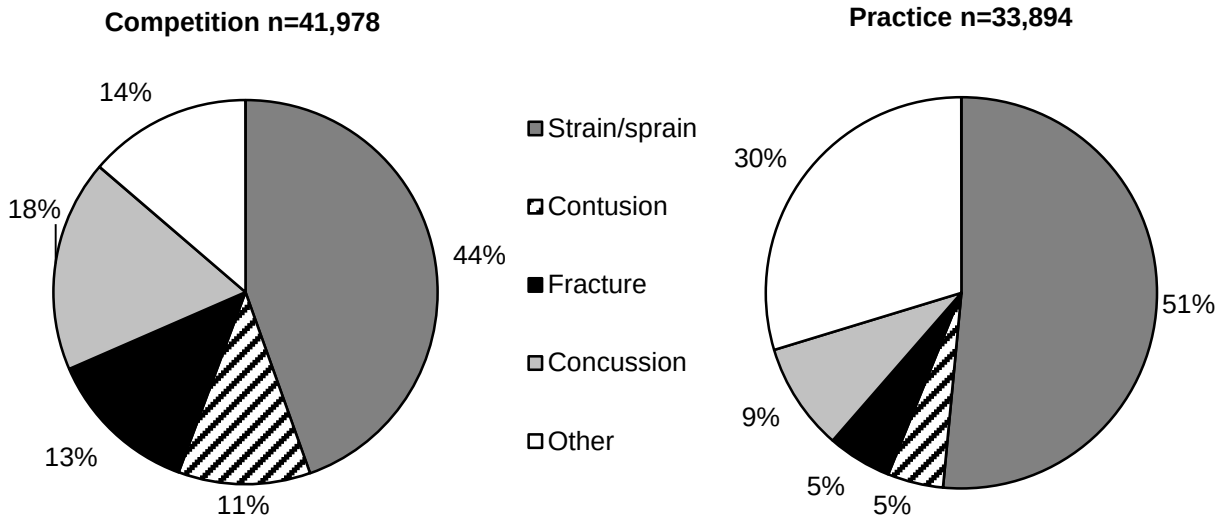


Table 7.3 Body Site of Boys' Basketball Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2011-12 School Year*

	Competition		Practice		Overall	
	n	%	n	%	n	%
Body Site						
Ankle	13,164	31.4%	11,655	34.6%	24,819	32.8%
Head/face	9,726	23.2%	5,045	15.0%	14,771	19.5%
Knee	5,779	13.8%	5,610	16.7%	11,389	15.1%
Hand/wrist	3,464	8.3%	3,080	9.2%	6,544	8.7%
Trunk	1,823	4.3%	3,010	8.9%	4,833	6.4%
Hip/thigh/upper leg	1,986	4.7%	2,480	7.4%	4,466	5.9%
Foot	2,895	6.9%	601	1.8%	3,496	4.6%
Lower leg	0	0.0%	1,743	5.2%	1,743	2.3%
Arm/elbow	1,203	2.9%	420	1.2%	1,623	2.1%
Shoulder	1,471	3.5%	0	0.0%	1,471	1.9%
Neck	466	1.1%	0	0.0%	466	0.6%
Total	**41,977**	**100%**	**33,644**	**100%**	**75,621**	**100%**

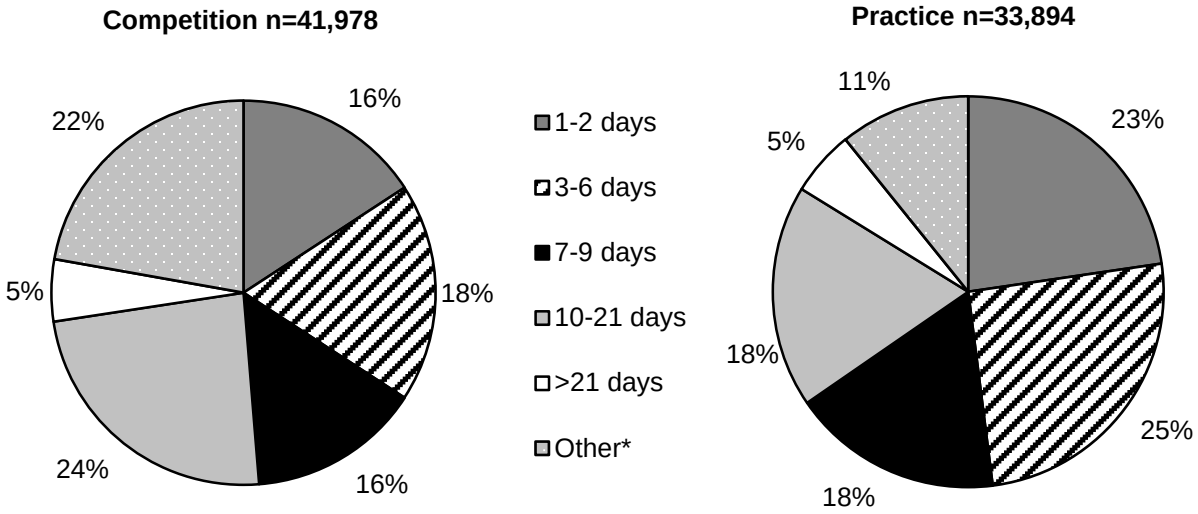
* Totals and n's are not always equal due to slight rounding of the weighted number of injuries and missing responses. Due to a low level of non-response, these totals are always similar but are not always equal to the total number of injuries.

Table 7.4 Ten Most Common Boys' Basketball Injury Diagnoses by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2011-12 School Year*

	Competition n=41,976		Practice n=33,642		Total n=75,618	
	n	%	n	%	n	%
Diagnosis						
Ankle strain/sprain	12,801	30.5%	10,996	32.7%	23,797	31.5%
Head/face concussion	7,461	17.8%	3,013	9.0%	10,474	13.9%
Knee other	2,727	6.5%	3,465	10.3%	6,192	8.2%
Knee strain/sprain	2,042	4.9%	1,681	5.0%	3,723	4.9%
Hand/wrist fracture	1,650	3.9%	1,516	4.5%	3,166	4.2%
Hand/wrist strain/sprain	1,532	3.6%	1,394	4.1%	2,926	3.9%
Trunk other	633	1.5%	2,114	6.3%	2,747	3.6%
Head/face other	568	1.4%	1,845	5.5%	2,413	3.2%
Hip/thigh/upper leg contusion	1,636	3.9%	576	1.7%	2,212	2.9%
Knee contusion	1,010	2.4%	350	1.0%	1,360	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 7.2 Time Loss of Boys' Basketball Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2011-12 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, 2011-12 School Year*

	Competition		Practice		Overall	
	n	%	n	%	n	%
Need for surgery						
Required surgery	2,865	6.9%	1,499	4.4%	4,364	5.8%
Did not require surgery	38,830	93.1%	32,395	95.6%	71,225	94.2%
Total	**41,695**	**100%**	**33,894**	**100%**	**75,589**	**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, 2011-12 School Year

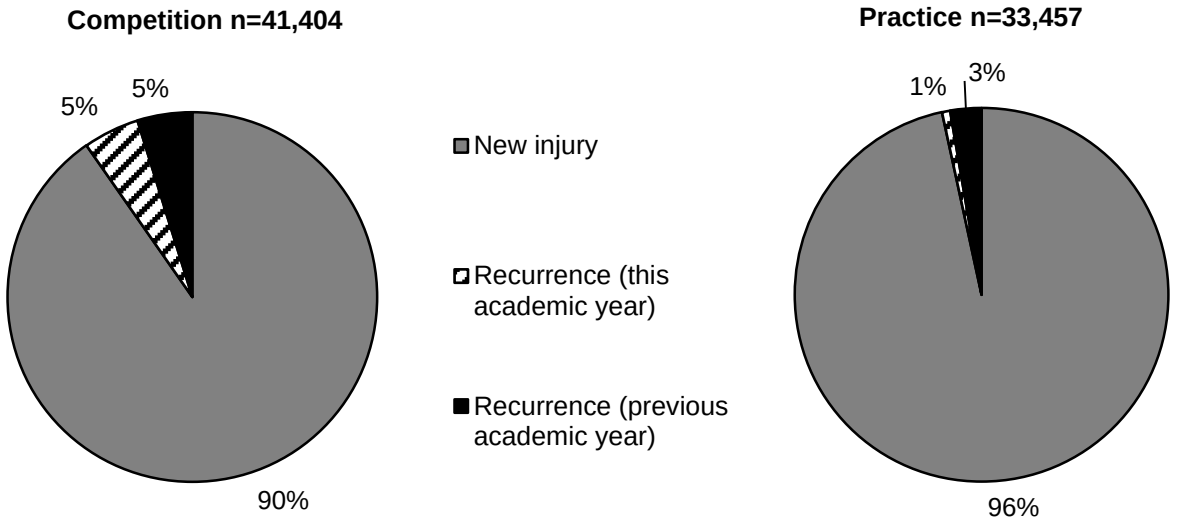


Table 7.6 Time during Season of Boys' Basketball Injuries, High School Sports-Related Injury Surveillance Study, US, 2011-12 School Year*

	n	%
Time in Season		
Preseason	10,670	14.1%
Regular season	60,289	79.5%
Post season	4,913	6.5%
Total	**75,872**	**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, 2011-12 School Year*

	n	%
Time in Competition		
Pre-competition/warm-ups	476	1.2%
First quarter	3,086	8.0%
Second quarter	7,230	18.6%
Third quarter	15,700	40.4%
Fourth quarter	12,323	31.7%
Total	**38,815**	**100%**
Court Location		
Inside lane (defense)	10,351	27.4%
Inside lane (offense)	9,842	26.0%
Between 3 point arc and lane (defense)	4,859	12.8%
Backcourt	3,685	9.7%
Between 3 point arc and lane (offense)	2,807	7.4%
Outside 3 point arc - offense	2,231	5.9%
Outside 3 point arc - defense	2,202	5.8%
Out of bounds	1,793	4.7%
Off the court	74	0.2%
Total	**37,844**	**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, 2011-12 School Year*

	n	%
Time in Practice		
First 1/2 hour	3,935	13.2%
Second 1/2 hour	6,521	21.9%
1-2 hours into practice	18,886	63.5%
>2 hours into practice	396	1.3%
Total	**29,738**	**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, 2011-12 School Year

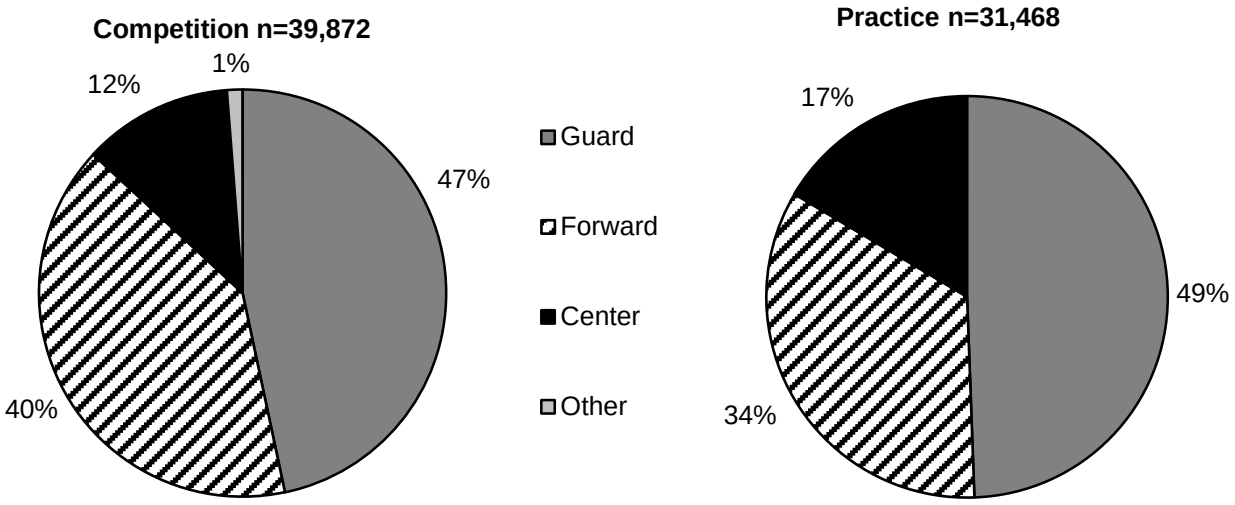
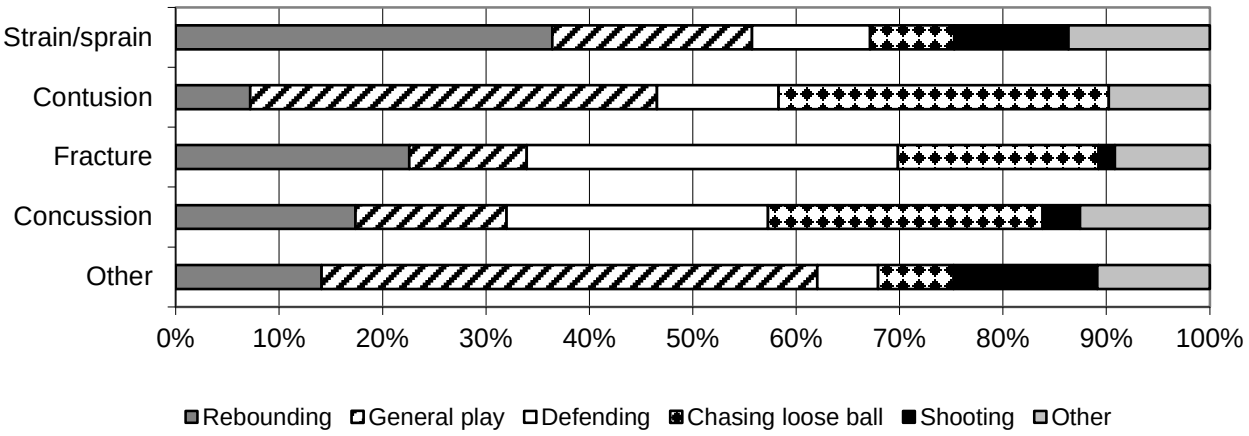


Table 7.9 Activities Leading to Boys' Basketball Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2011-12 School Year*

	Competition		Practice		Overall	
	n	%	n	%	n	%
Activity						
Rebounding	10,657	25.9%	8,150	25.3%	18,807	25.6%
General play	8,936	21.7%	9,613	29.9%	18,549	25.3%
Defending	6,515	15.8%	4,211	13.1%	10,726	14.6%
Chasing loose ball	7,401	18.0%	2,554	7.9%	9,955	13.6%
Shooting	3,853	9.3%	2,579	8.0%	6,432	8.8%
Ball handling/dribbling	738	1.8%	2,195	6.8%	2,933	4.0%
Receiving pass	1,386	3.4%	1,153	3.6%	2,539	3.5%
Passing	420	1.0%	489	1.5%	909	1.2%
Conditioning	0	0.0%	396	1.2%	396	0.5%
Screening	0	0.0%	170	0.5%	170	0.2%
Other	1,320	3.2%	693	2.2%	2,013	2.7%
Total	**41,226**	**100%**	**32,203**	**100%**	**73,429**	**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 7.5 Activity Resulting in Boys' Basketball Injuries by Injury Diagnosis, High School Sports-Related Injury Surveillance Study, US, 2011-12 School Year



VIII. Girls' Basketball Injury Epidemiology

Table 8.1 Girls' Basketball Injury Rates by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2011-12 School Year

	# Injuries	# Exposures	Injury rate (per 1,000 athlete-exposures)	Nationally Estimated # Injuries
Total	**263**	**167,052**	**1.57**	**67,280**
Competition	147	48,561	3.03	37,213
Practice	116	118,491	0.98	30,067

Table 8.2 Demographic Characteristics of Injured Girls' Basketball Athletes, High School Sports-Related Injury Surveillance Study, US, 2011-12 School Year*

Year in School	**n=67,122**
Freshman	31.3%
Sophomore	31.8%
Junior	17.5%
Senior	19.4%
Total†	**100%**
Age (years)	
Minimum	14
Maximum	18
Mean (St. Dev.)	15.7 (1.1)
BMI	
Minimum	14.0
Maximum	36.9
Mean (St. Dev.)	22.2 (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 8.1 Diagnosis of Girls' Basketball Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2011-12 School Year

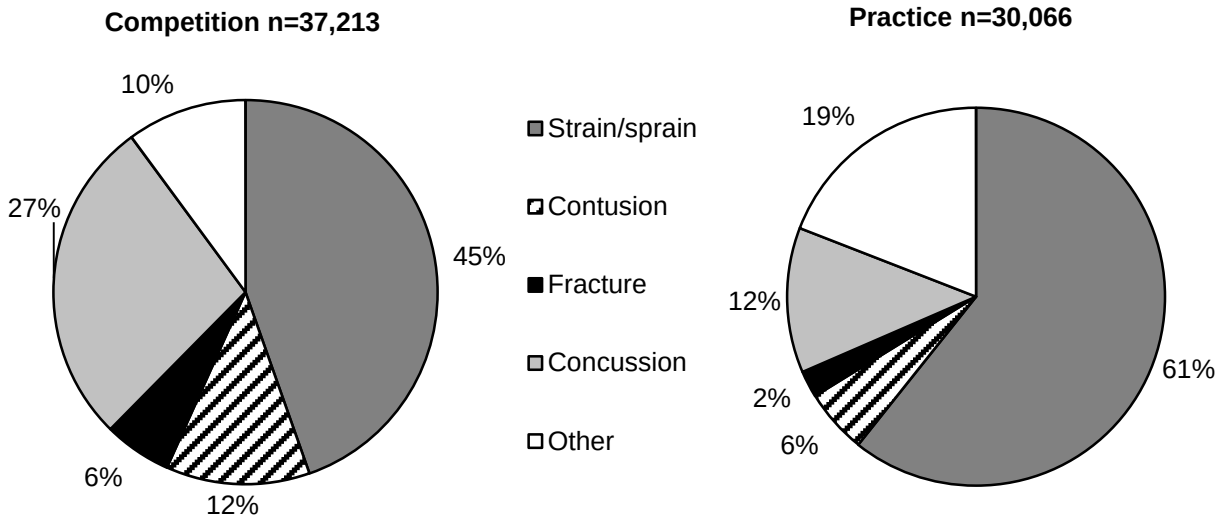


Table 8.3 Body Site of Girls' Basketball Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2011-12 School Year*

	Competition		Practice		Overall	
	n	%	n	%	n	%
Body Site						
Head/face	11,638	31.3%	4,066	13.6%	15,704	23.4%
Knee	9,165	24.6%	5,813	19.4%	14,978	22.3%
Ankle	5,519	14.8%	7,473	24.9%	12,992	19.3%
Hand/wrist	3,859	10.4%	2,537	8.5%	6,396	9.5%
Hip/thigh/upper leg	1,865	5.0%	1,962	6.5%	3,827	5.7%
Lower leg	1,755	4.7%	1,759	5.9%	3,514	5.2%
Trunk	1,575	4.2%	1,772	5.9%	3,347	5.0%
Shoulder	587	1.6%	2,601	8.7%	3,188	4.7%
Arm/elbow	979	2.6%	518	1.7%	1,497	2.2%
Foot	271	0.7%	859	2.9%	1,130	1.7%
Neck	0	0.0%	350	1.2%	350	0.5%
Other	0	0.0%	271	0.9%	271	0.4%
Total	**37,213**	**100%**	**29,981**	**100%**	**67,194**	**100%**

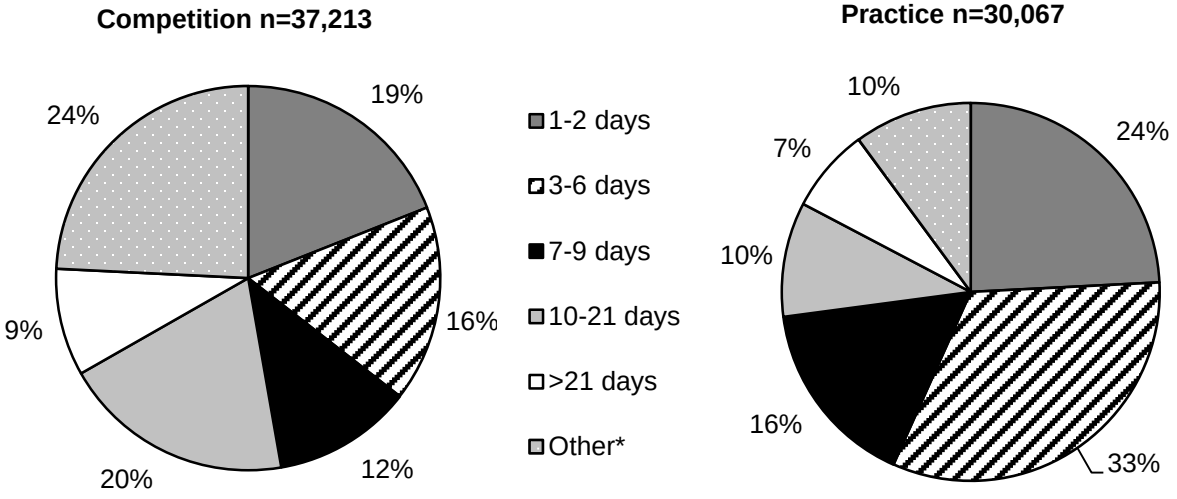
* Totals and n's are not always equal due to slight rounding of the weighted number of injuries and missing responses. Due to a low level of non-response, these totals are always similar but are not always equal to the total number of injuries.

Table 8.4 Ten Most Common Girls' Basketball Injury Diagnoses by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2011-12 School Year*

	Competition n=37,211		Practice n=29,980		Total n=67,191	
	n	%	n	%	n	%
Diagnosis						
Head/face concussion	10,231	27.5%	3,715	12.4%	13,946	20.8%
Ankle strain/sprain	4,888	13.1%	7,473	24.9%	12,361	18.4%
Knee strain/sprain	5,813	15.6%	3,702	12.3%	9,515	14.2%
Hand/wrist strain/sprain	3,365	9.0%	1,514	5.1%	4,879	7.3%
Knee other	1,852	5.0%	1,368	4.6%	3,220	4.8%
Hip/thigh/upper leg strain/sprain	944	2.5%	1,850	6.2%	2,794	4.2%
Knee contusion	1,387	3.7%	743	2.5%	2,130	3.2%
Lower leg strain/sprain	1,405	3.8%	668	2.2%	2,073	3.1%
Shoulder other	474	1.3%	1,148	3.8%	1,622	2.4%
Shoulder strain/sprain	112	0.3%	1,453	4.8%	1,565	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 8.2 Time Loss of Girls' Basketball Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2011-12 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, 2011-12 School Year*

	Competition		Practice		Overall	
	n	%	n	%	n	%
Need for surgery						
Required surgery	4,634	12.8%	1,672	5.7%	6,306	9.6%
Did not require surgery	31,625	87.2%	27,528	94.3%	59,153	90.4%
Total	**36,259**	**100%**	**29,200**	**100%**	**65,459**	**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, 2011-12 School Year

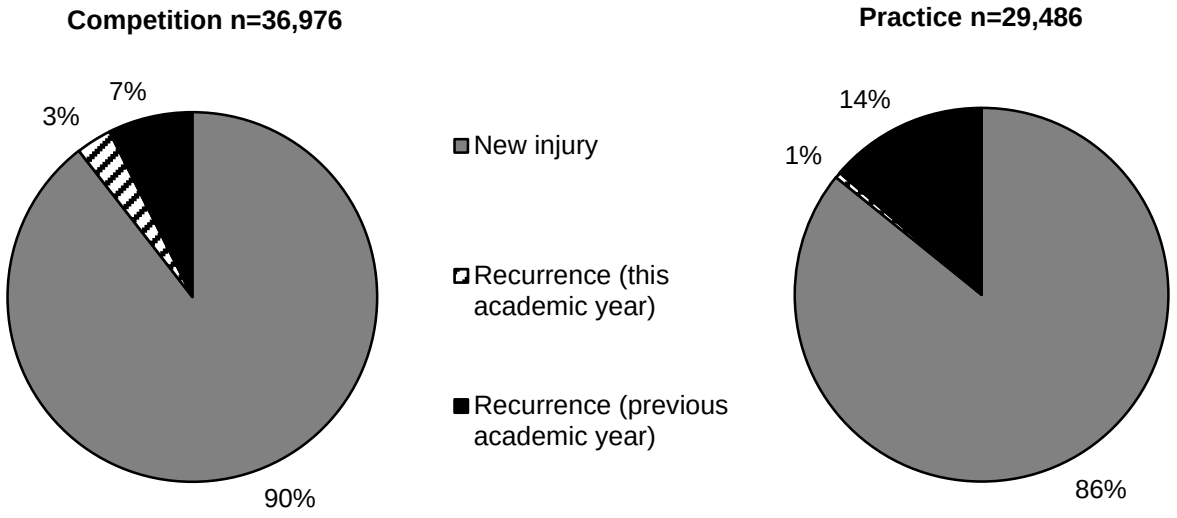


Table 8.6 Time during Season of Girls' Basketball Injuries, High School Sports-Related Injury Surveillance Study, US, 2011-12 School Year*

	n	%
Time in Season		
Preseason	10,358	15.6%
Regular season	53,817	81.1%
Post season	2,162	3.3%
Total	**66,337**	**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, 2011-12 School Year*

	n	%
Time in Competition		
Pre-competition/warm-ups	1,474	4.2%
First quarter	2,869	8.1%
Second quarter	6,098	17.2%
Third quarter	13,447	37.9%
Fourth quarter	11,580	32.6%
Total	**35,468**	**100.0%**
Court Location		
Inside lane (defense)	9,090	26.1%
Inside lane (offense)	7,265	20.9%
Between 3 point arc and lane (defense)	5,330	15.3%
Outside 3 point arc - defense	3,792	10.9%
Outside 3 point arc - offense	3,757	10.8%
Between 3 point arc and lane (offense)	3,432	9.9%
Backcourt	1,637	4.7%
Off the court	350	1.0%
Out of bounds	112	0.3%
Total	**34,765**	**100.0%**

* 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.

Table 8.8 Practice-Related Variables for Girls' Basketball Injuries, High School Sports-Related Injury Surveillance Study, US, 2011-12 School Year*

	n	%
Time in Practice		
First 1/2 hour	2,928	12.2%
Second 1/2 hour	4,872	20.2%
1-2 hours into practice	16,126	67.0%
>2 hours into practice	159	0.7%
Total	**24,085**	**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, 2011-12 School Year

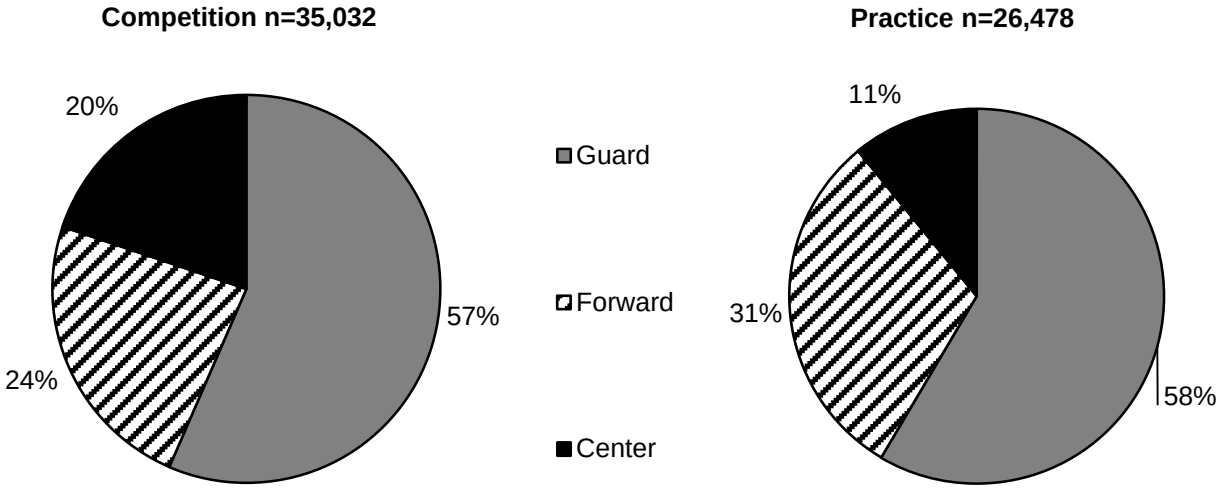
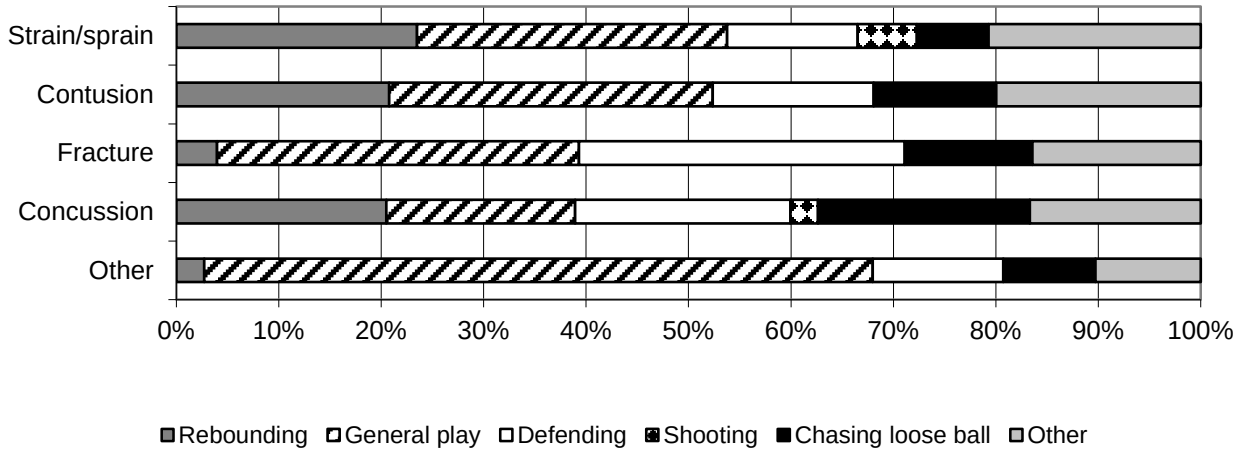


Table 8.9 Activities Leading to Girls' Basketball Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2011-12 School Year*

	Competition		Practice		Overall	
	n	%	n	%	n	%
Activity						
General play	9,689	27.1%	10,831	41.1%	20,520	33.0%
Rebounding	5,818	16.3%	5,866	22.2%	11,684	18.8%
Defending	8,436	23.6%	1,267	4.8%	9,703	15.6%
Chasing loose ball	5,264	14.7%	1,477	5.6%	6,741	10.9%
Ball handling/dribbling	2,826	7.9%	1,106	4.2%	3,932	6.3%
Receiving pass	813	2.3%	2,241	8.5%	3,054	4.9%
Conditioning	0	0.0%	2,766	10.5%	2,766	4.5%
Shooting	1,740	4.9%	463	1.8%	2,203	3.5%
Passing	1,163	3.3%	0	0.0%	1,163	1.9%
Other	0	0.0%	350	1.3%	350	0.6%
Total	**35,749**	**100%**	**26,367**	**100%**	**62,116**	**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 8.5 Activity Resulting in Girls' Basketball Injuries by Injury Diagnosis, High School Sports-Related Injury Surveillance Study, US, 2011-12 School Year



IX. Wrestling Injury Epidemiology

Table 9.1 Wrestling Injury Rates by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2011-12 School Year

	# Injuries	# Exposures	Injury rate (per 1,000 athlete-exposures)	Nationally Estimated # Injuries
Total	**359**	**143,849**	**2.50**	**107,992**
Competition	138	38,784	3.56	40,235
Practice	221	105,065	2.10	67,757

Table 9.2 Demographic Characteristics of Injured Wrestlers, High School Sports-Related Injury Surveillance Study, US, 2011-12 School Year*

Year in School	**n=107,055**
Freshman	24.1%
Sophomore	30.2%
Junior	21.8%
Senior	23.8%
Total†	**100%**
Age (years)	
Minimum	13
Maximum	18
Mean (St. Dev.)	15.9 (1.2)
BMI	
Minimum	16.7
Maximum	42.2
Mean (St. Dev.)	23.1 (4.5)

*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 9.1 Diagnosis of Wrestling Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2011-12 School Year

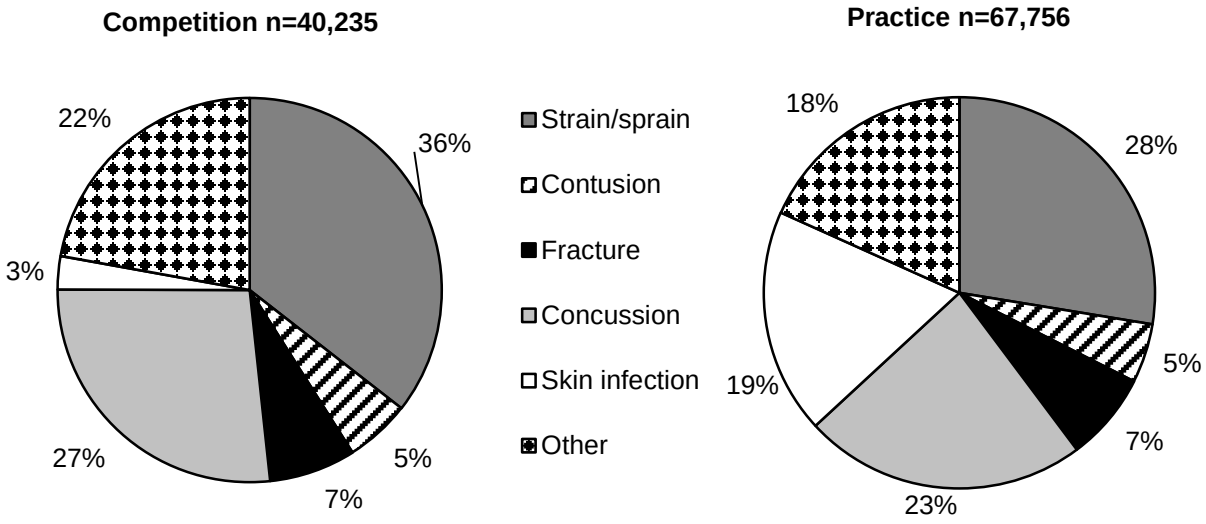


Table 9.3 Body Site of Wrestling Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2011-12 School Year*

	Competition		Practice		Overall	
	n	%	n	%	n	%
Body Site						
Head/face	12,247	30.4%	21,571	31.8%	33,818	31.3%
Knee	4,981	12.4%	8,503	12.5%	13,484	12.5%
Shoulder	5,635	14.0%	7,194	10.6%	12,829	11.9%
Arm/elbow	3,504	8.7%	5,507	8.1%	9,011	8.3%
Ankle	5,126	12.7%	3,706	5.5%	8,832	8.2%
Hand/wrist	3,703	9.2%	3,489	5.1%	7,192	6.7%
Trunk	1,408	3.5%	3,872	5.7%	5,280	4.9%
Hip/thigh/upper leg	1,121	2.8%	3,420	5.0%	4,541	4.2%
Neck	809	2.0%	3,720	5.5%	4,529	4.2%
Lower leg	1,020	2.5%	2,080	3.1%	3,100	2.9%
Foot	0	0.0%	2,018	3.0%	2,018	1.9%
Other	681	1.7%	2,677	4.0%	3,358	3.1%
Total	**40,235**	**100%**	**67,757**	**100%**	**107,992**	**100%**

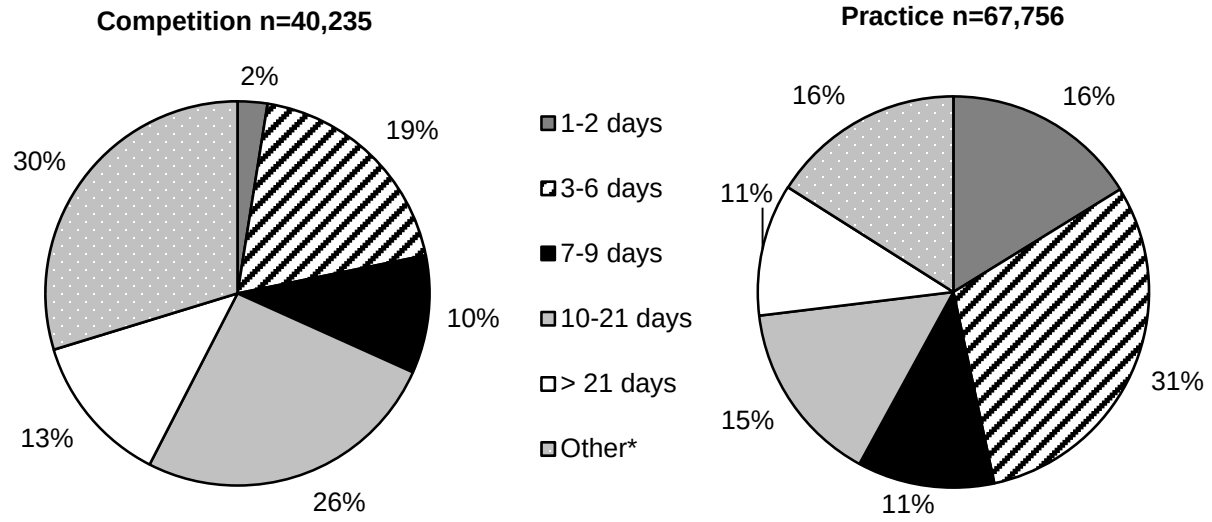
* Totals and n's are not always equal due to slight rounding of the weighted number of injuries and missing responses. Due to a low level of non-response, these totals are always similar but are not always equal to the total number of injuries.

Table 9.4 Ten Most Common Wrestling Injury Diagnoses by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2011-12 School Year*

	Competition n=40,235		Practice n=67,755		Total n=107,990	
	n	%	n	%	n	%
Diagnosis						
Head/face concussion	10,773	26.8%	15,827	23.4%	26,600	24.6%
Ankle strain/sprain	4,189	10.4%	3,436	5.1%	7,625	7.1%
Shoulder strain/sprain	3,653	9.1%	3,599	5.3%	7,252	6.7%
Knee strain/sprain	2,106	5.2%	3,182	4.7%	5,288	4.9%
Head/face skin infection	478	1.2%	4,722	7.0%	5,200	4.8%
Knee other	1,754	4.4%	3,403	5.0%	5,157	4.8%
Shoulder other	1,983	4.9%	2,631	3.9%	4,614	4.3%
Hand/wrist fracture	2,033	5.1%	1,734	2.6%	3,767	3.5%
Arm/elbow other	1,894	4.7%	1,751	2.6%	3,645	3.4%
Hand/wrist strain/sprain	1,551	3.9%	1,442	2.1%	2,993	2.8%

* 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 9.2 Time Loss of Wrestling Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2011-12 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, 2011-12 School Year*

	Competition		Practice		Overall	
	n	%	n	%	n	%
Need for surgery						
Required surgery	1,879	4.7%	2,918	4.4%	4,797	4.5%
Did not require surgery	38,237	95.3%	63,442	95.6%	101,679	95.5%
Total	**40,116**	**100%**	**66,360**	**100%**	**106,476**	**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, 2011-12 School Year

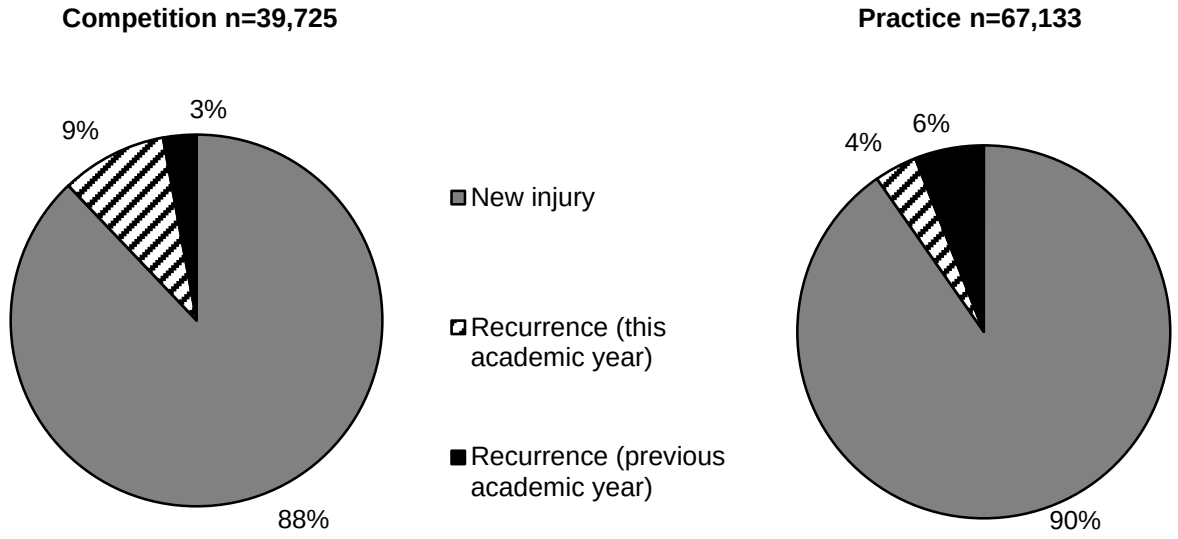


Table 9.6 Time during Season of Wrestling Injuries, High School Sports-Related Injury Surveillance Study, US, 2011-12 School Year*

	n	%
Time in Season		
Preseason	17,369	16.3%
Regular season	86,842	80.6%
Post season	3,255	3.1%
Total	**107,466**	**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, 2011-12 School Year*

	n	%
Time in Competition		
Pre-competition/warm-ups	1,389	3.9%
First period	7,322	20.6%
Second period	17,797	50.0%
Third period	9,056	25.5%
Total	**35,564**	**100%**
Mat Location		
Within 28 ft. circle	34,541	94.6%
Off the mat	426	1.2%
Out of bounds	1,558	4.3%
Total	**36,525**	**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, 2011-12 School Year*

	n	%
Time in Practice		
First 1/2 hour	5,275	9.6%
Second 1/2 hour	5,589	10.2%
1-2 hours into practice	32,468	59.1%
>2 hours into practice	11,621	21.1%
Total	**54,953**	**100%**

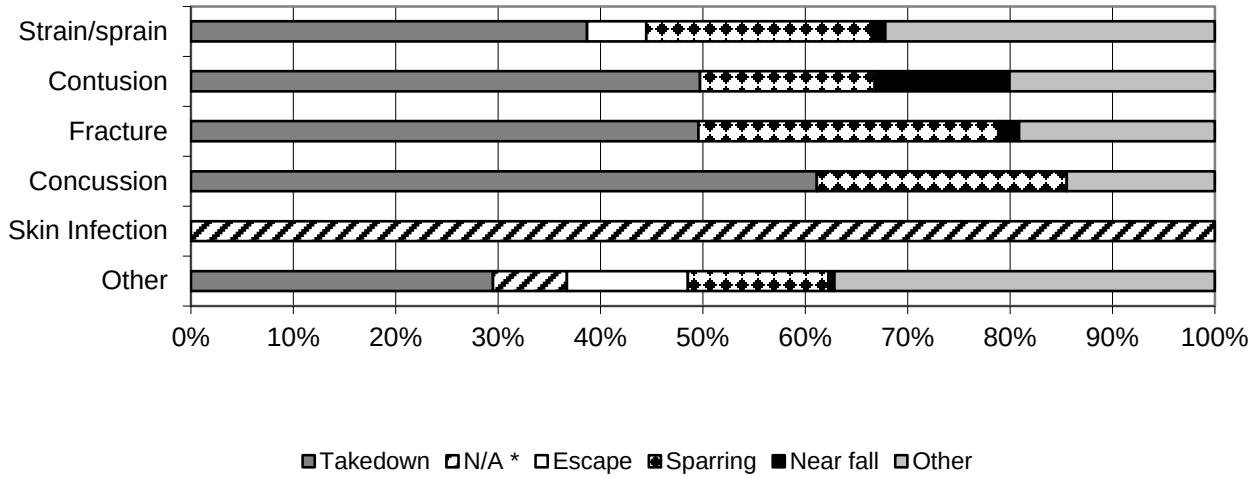
* Totals and n's are not always equal due to slight rounding of the weighted number of injuries and missing responses. Due to a low level of non-response, these totals are always similar but are not always equal to the total number of injuries.

Table 9.9 Activities Leading to Wrestling Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2011-12 School Year*

	Competition		Practice		Overall	
	n	%	n	%	n	%
Activity						
Takedown	19,682	52.1%	19,842	31.6%	39,524	39.3%
Sparring	5,343	14.1%	13,381	21.3%	18,724	18.6%
N/A (e.g., skin infection, overuse, etc.)	1,113	2.9%	12,539	20.0%	13,652	13.6%
Riding	4,526	12.0%	1,396	2.2%	5,922	5.9%
Fall	1,829	4.8%	3,318	5.3%	5,147	5.1%
Conditioning	0	0.0%	4,112	6.5%	4,112	4.1%
Escape	3,107	8.2%	970	1.5%	4,077	4.1%
Reversal	902	2.4%	1,102	1.8%	2,004	2.0%
Near fall	275	0.7%	1,083	1.7%	1,358	1.4%
Other	991	2.6%	5,060	8.1%	6,051	6.0%
Total	**37,768**	**100%**	**62,803**	**100%**	**100,571**	**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 9.4 Activities Resulting in Wrestling Injuries by Injury Diagnosis, High School Sports-Related Injury Surveillance Study, US, 2011-12 School Year



*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, 2011-12 School Year

	# Injuries	# Exposures	Injury rate (per 1,000 athlete-exposures)	Nationally Estimated # Injuries
Total	**135**	**163,418**	**0.83**	**43,590**
Competition	66	57,916	1.14	20,818
Practice	69	105,502	0.65	22,772

Table 10.2 Demographic Characteristics of Injured Baseball Athletes, High School Sports-Related Injury Surveillance Study, US, 2011-12 School Year*

Year in School	**n=42,156**
Freshman	24.9%
Sophomore	19.3%
Junior	27.1%
Senior	28.6%
Total†	**100%**
Age (years)	
Minimum	14
Maximum	18
Mean (St. Dev.)	16.2 (1.3)
BMI	
Minimum	17.3
Maximum	38.7
Mean (St. Dev.)	24.4 (3.7)

*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, 2011-12 School Year

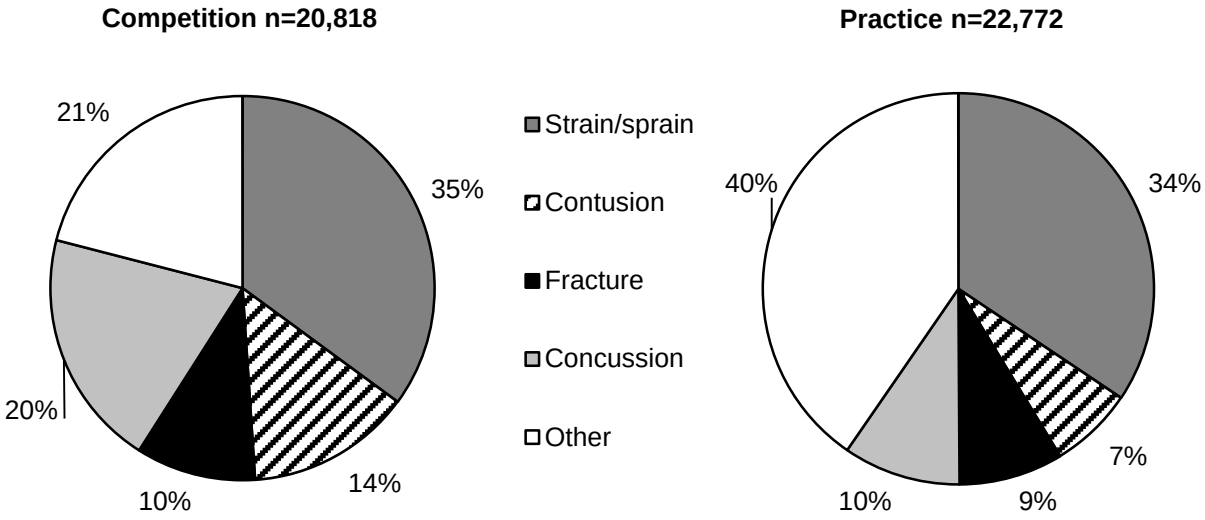


Table 10.3 Body Site of Baseball Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2011-12 School Year*

	Competition		Practice		Overall	
	n	%	n	%	n	%
Body Site						
Head/face	5,332	25.6%	4,054	17.8%	9,386	21.5%
Arm/elbow	3,002	14.4%	4,209	18.5%	7,211	16.5%
Shoulder	1,458	7.0%	4,899	21.5%	6,357	14.6%
Hand/wrist	3,376	16.2%	1,911	8.4%	5,287	12.1%
Trunk	1,345	6.5%	2,841	12.5%	4,186	9.6%
Hip/thigh/upper leg	2,726	13.1%	999	4.4%	3,725	8.5%
Knee	1,309	6.3%	1,896	8.3%	3,205	7.4%
Ankle	1,345	6.5%	1,387	6.1%	2,732	6.3%
Foot	382	1.8%	383	1.7%	765	1.8%
Other	543	2.6%	0	0.0%	543	1.2%
Lower leg	0	0.0%	192	0.8%	192	0.4%
Total	**20,818**	**100%**	**22,771**	**100%**	**43,589**	**100%**

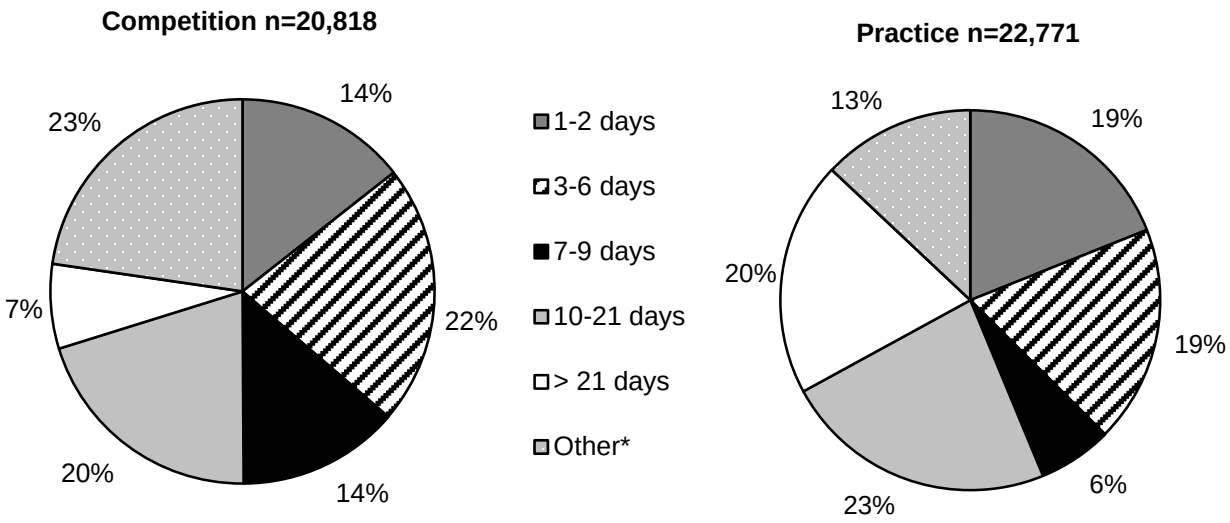
* Totals and n's are not always equal due to slight rounding of the weighted number of injuries and missing responses. Due to a low level of non-response, these totals are always similar but are not always equal to the total number of injuries.

Table 10.4 Ten Most Common Baseball Injury Diagnoses by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2011-12 School Year*

	Competition n=20,818		Practice n=22,772		Total n=43,590	
	n	%	n	%	n	%
Diagnosis						
Head/face concussion	4,163	20.0%	2,199	9.7%	6,362	14.6%
Shoulder other	1,191	5.7%	2,616	11.5%	3,807	8.7%
Arm/elbow other	1,571	7.5%	2,201	9.7%	3,772	8.7%
Hip/thigh/upper leg strain/sprain	2,344	11.3%	999	4.4%	3,343	7.7%
Ankle strain/sprain	1,345	6.5%	1,387	6.1%	2,732	6.3%
Shoulder strain/sprain	267	1.3%	2,283	10.0%	2,550	5.8%
Hand/wrist fracture	1,573	7.6%	743	3.3%	2,316	5.3%
Trunk other	192	0.9%	1,917	8.4%	2,109	4.8%
Arm/elbow strain/sprain	965	4.6%	1,086	4.8%	2,051	4.7%
Knee strain/sprain	1,154	5.5%	670	2.9%	1,824	4.2%

* 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, 2011-12 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, 2011-12 School Year*

	Competition		Practice		Overall	
	n	%	n	%	n	%
Need for surgery						
Required surgery	898	4.5%	1493	6.7%	2391	5.6%
Did not require surgery	19,111	95.5%	20,896	93.3%	40,007	94.4%
Total	**20,009**	**100%**	**22,389**	**100%**	**42,398**	**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, 2011-12 School Year

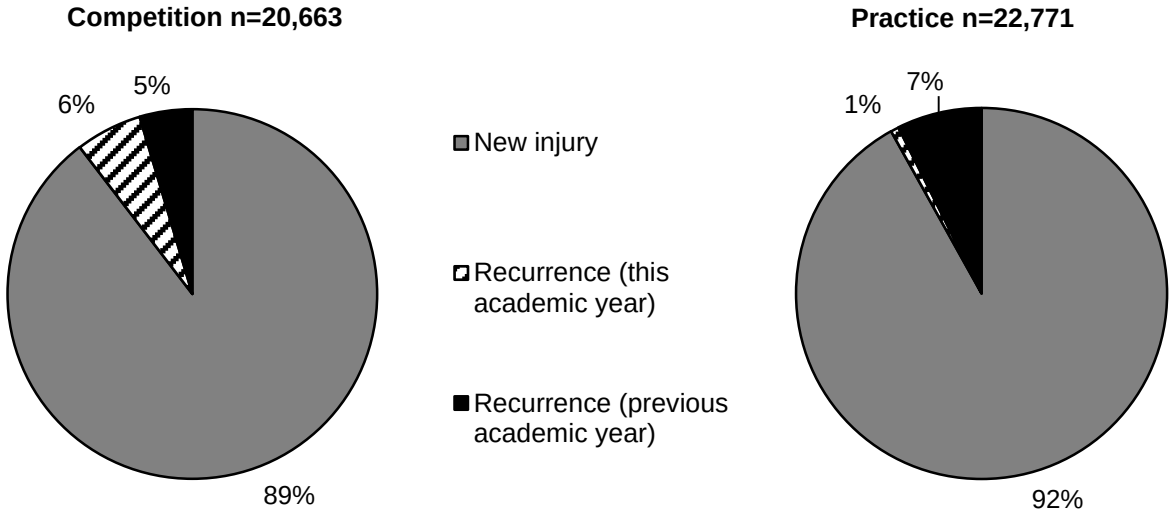


Table 10.6 Time during Season of Baseball Injuries, High School Sports-Related Injury Surveillance Study, US, 2011-12 School Year*

	n	%
Time in Season		
Preseason	12,702	29.1%
Regular season	29,164	66.9%
Post season	1,724	4.0%
Total	**43,590**	**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, 2011-12 School Year*

	n	%
Time in Competition		
Pre-competition/warm-ups	1,464	4.9%
First inning	454	7.7%
Second inning	2,773	8.0%
Third inning	2,047	15.9%
Fourth inning	5,519	22.6%
Fifth inning	3,187	19.9%
Sixth inning	1,165	15.8%
Seventh inning	2,814	5.1%
Extra innings	155	0.8%
Total	**19,578**	**100%**
Field Location		
Home plate	4,137	20.0%
Pitcher's mound	3,931	19.0%
First base	2,947	14.3%
Outfield	2,298	11.1%
Second base	2,263	11.0%
Infield	1,958	9.5%
Third base	1,546	7.5%
Foul territory	853	4.1%
Other	729	3.5%
Total	**20,662**	**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, 2011-12 School Year*

	n	%
Time in Practice		
First 1/2 hour	1,133	6.0%
Second 1/2 hour	3,268	17.2%
1-2 hours into practice	11,259	59.2%
>2 hours into practice	3,372	17.7%
Total	**19,032**	**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, 2011-12 School Year

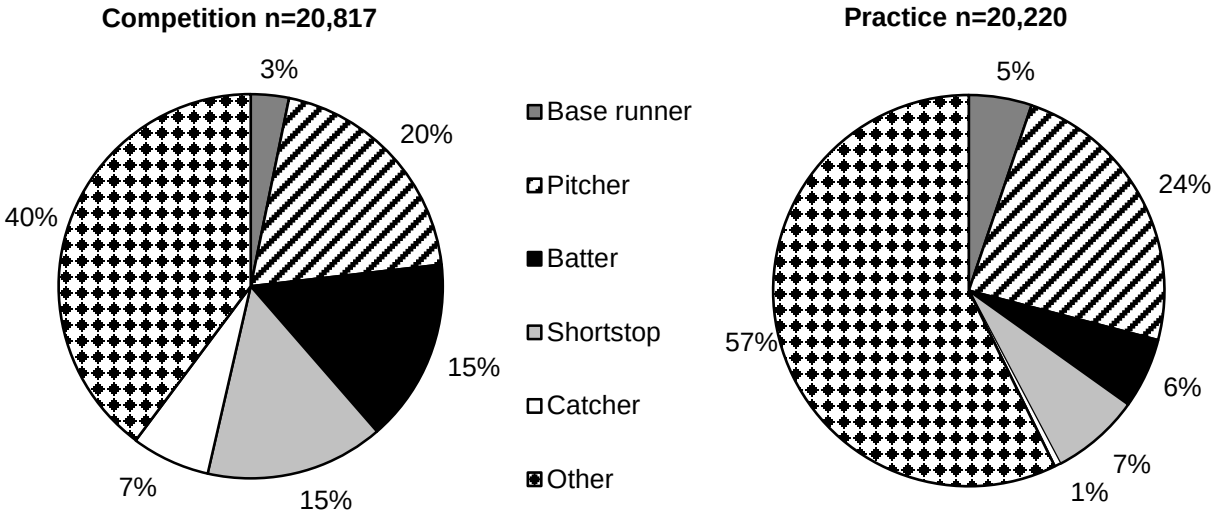
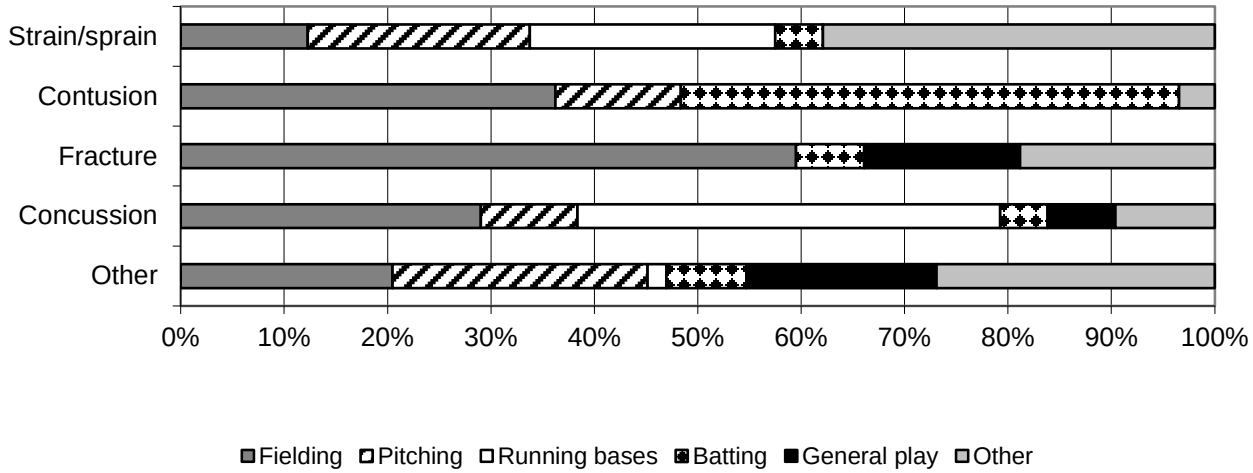


Table 10.9 Activities Leading to Baseball Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2011-12 School Year*

	Competition		Practice		Overall	
	n	%	n	%	n	%
Activity						
Fielding a batted ball	3,884	18.7%	4,233	19.0%	8,117	18.9%
Pitching	3,931	18.9%	3,749	16.9%	7,680	17.8%
Running bases	4,483	21.5%	1,732	7.8%	6,215	14.4%
Throwing (not pitching)	1,034	5.0%	4,847	21.8%	5,881	13.7%
Batting	2,441	11.7%	1,999	9.0%	4,440	10.3%
General play	764	3.7%	2,724	12.3%	3,488	8.1%
Fielding a thrown ball	1,344	6.5%	898	4.0%	2,242	5.2%
Sliding	1,018	4.9%	764	3.4%	1,782	4.1%
Catching	1,034	5.0%	93	0.4%	1,127	2.6%
Conditioning	155	0.7%	844	3.8%	999	2.3%
Other	729	3.5%	347	1.6%	1,076	2.5%
Total	**20,817**	**100%**	**22,230**	**100%**	**43,047**	**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, 2011-12 School Year



XI. Softball Injury Epidemiology

Table 11.1 Softball Injury Rates by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2011-12 School Year

	# Injuries	# Exposures	Injury rate (per 1,000 athlete-exposures)	Nationally Estimated # Injuries
Total	**173**	**118,407**	**1.46**	**91,053**
Competition	83	40,609	2.04	45,091
Practice	90	77,798	1.16	45,962

Table 11.2 Demographic Characteristics of Injured Softball Athletes, High School Sports-Related Injury Surveillance Study, US, 2011-12 School Year*

Year in School	**n=89,743**
Freshman	32.3%
Sophomore	30.0%
Junior	23.3%
Senior	14.3%
Total†	**100%**
Age (years)	
Minimum	13
Maximum	19
Mean (St. Dev.)	15.7 (1.2)
BMI	
Minimum	17.6
Maximum	39.0
Mean (St. Dev.)	23.0 (3.3)

*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, 2011-12 School Year

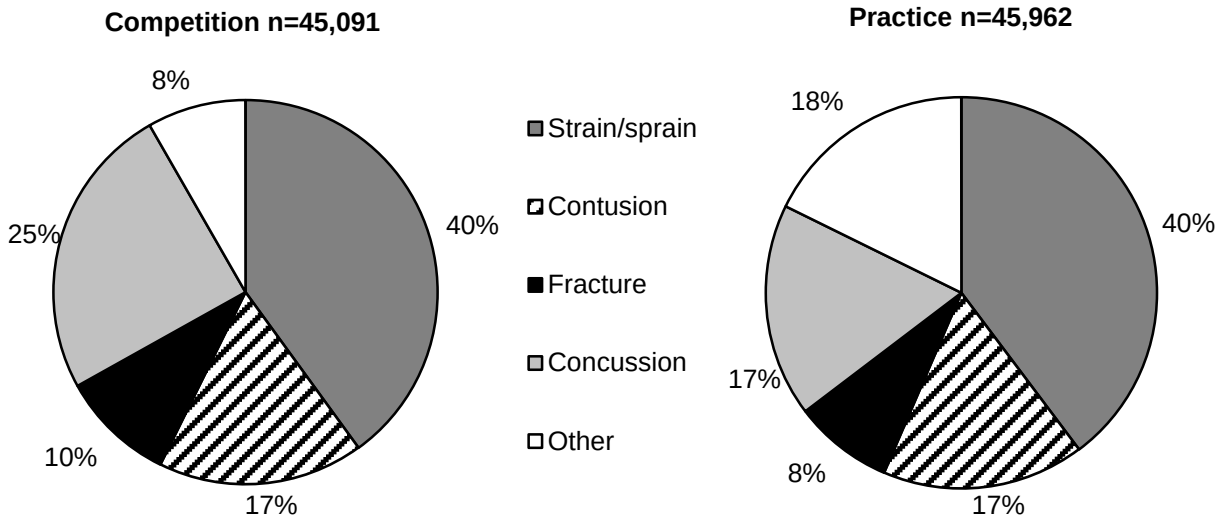


Table 11.3 Body Site of Softball Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2011-12 School Year*

	Competition		Practice		Overall	
	n	%	n	%	n	%
Body Site						
Head/face	14,819	32.9%	13,262	28.9%	28,081	30.8%
Ankle	5,832	12.9%	6,406	13.9%	12,238	13.4%
Hand/wrist	6,031	13.4%	4,815	10.5%	10,846	11.9%
Hip/thigh/upper leg	4,099	9.1%	6,191	13.5%	10,290	11.3%
Knee	3,788	8.4%	5,654	12.3%	9,442	10.4%
Arm/elbow	3,463	7.7%	2,334	5.1%	5,797	6.4%
Lower leg	3,072	6.8%	1,915	4.2%	4,987	5.5%
Shoulder	2,657	5.9%	2,177	4.7%	4,834	5.3%
Trunk	940	2.1%	3,029	6.6%	3,969	4.4%
Foot	195	0.4%	89	0.2%	284	0.3%
Neck	195	0.4%	0	0.0%	195	0.2%
Other	0	0.0%	89	0.2%	89	0.1%
Total	**45,091**	**100%**	**45,961**	**100%**	**91,052**	**100%**

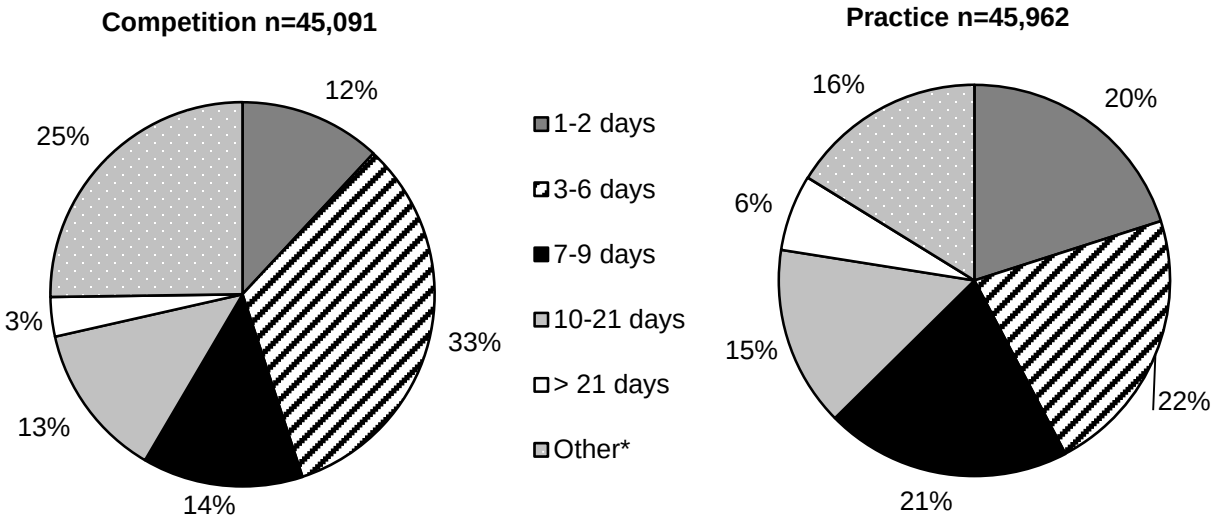
* Totals and n's are not always equal due to slight rounding of the weighted number of injuries and missing responses. Due to a low level of non-response, these totals are always similar but are not always equal to the total number of injuries.

Table 11.4 Ten Most Common Softball Injury Diagnoses by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2011-12 School Year*

	Competition n=45,091		Practice n=45,962		Total n=91,053	
	n	%	n	%	n	%
Diagnosis						
Head/face concussion	11,165	24.8%	8,106	17.6%	19,271	21.2%
Ankle strain/sprain	4,404	9.8%	4,587	10.0%	8,991	9.9
Knee strain/sprain	3,020	6.7%	4,022	8.8%	7,042	7.7%
Hip/thigh/upper leg strain/sprain	1,651	3.7%	4,679	10.2%	6,330	7.0%
Arm/elbow strain/sprain	3,268	7.2%	2,048	4.5%	5,316	5.8%
Head/face contusion	577	1.3%	4,092	8.9%	4,669	5.1%
Hand/wrist contusion	2,355	5.2%	1,716	3.7%	4,071	4.5%
Hand/wrist fracture	1,712	3.8%	2,325	5.1%	4,037	4.4%
Hip/thigh/upper leg contusion	2,160	4.8%	1,512	3.3%	3,672	4.0%
Trunk other	940	2.1%	1,964	4.3%	2,904	3.2%

* 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, 2011-12 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, 2011-12 School Year*

	Competition		Practice		Overall	
	n	%	n	%	n	%
Need for surgery						
Required surgery	3,388	7.6%	2,909	6.3%	6,297	6.9%
Did not require surgery	41,419	92.4%	43,053	93.7%	84,472	93.1%
Total	**44,807**	**100%**	**45,962**	**100%**	**90,769**	**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, 2011-12 School Year

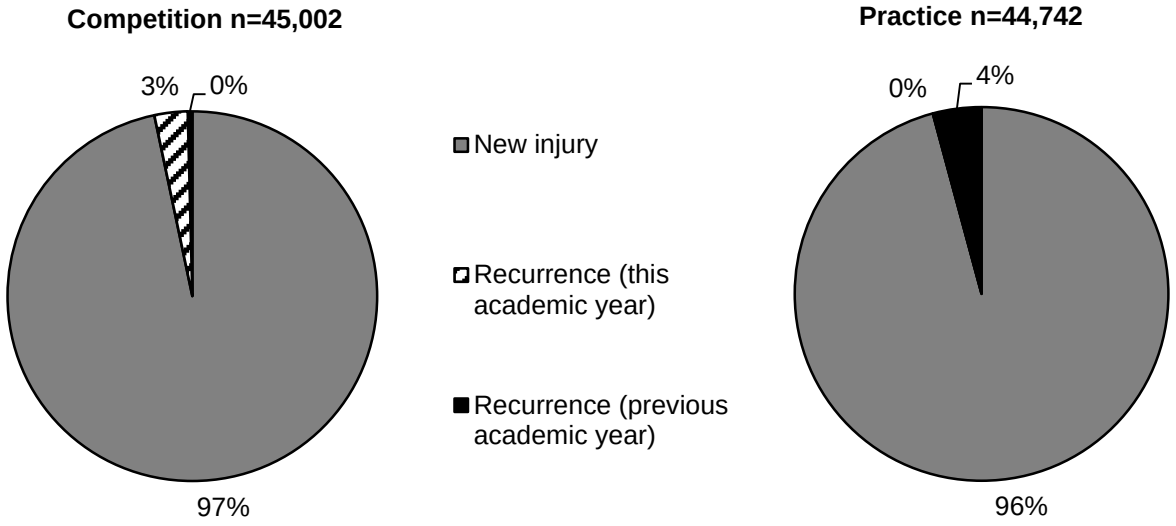


Table 11.6 Time during Season of Softball Injuries, High School Sports-Related Injury Surveillance Study, US, 2011-12 School Year*

	n	%
Time in Season		
Preseason	19,236	21.1%
Regular season	68,197	74.9%
Post season	3,620	4.0%
Total	**91,053**	**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, 2011-12 School Year*

	n	%
Time in Competition		
Pre-competition/warm-ups	2,785	6.7%
First inning	2,048	4.9%
Second inning	878	2.1%
Third inning	7,631	18.4%
Fourth inning	14,554	35.1%
Fifth inning	6,879	16.6%
Sixth inning	2,871	6.9%
Seventh inning	3,277	7.9%
Extra innings	488	1.2%
Total	**41,411**	**100%**
Field Location		
Home plate	9,703	21.5%
Infield	7,660	17.0%
Third base	6,969	15.5%
Outfield	4,981	11.0%
First base	4,497	10.0%
Pitcher's mound	3,732	8.3%
Second base	3,507	7.8%
Foul territory	3,268	7.2%
Other	774	1.7%
Total	**45,091**	**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, 2011-12 School Year*

	n	%
Time in Practice		
First 1/2 hour	7,611	18.8%
Second 1/2 hour	5,687	14.0%
1-2 hours into practice	23,671	58.4%
>2 hours into practice	3,539	8.7%
Total	**40,508**	**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, 2011-12 School Year

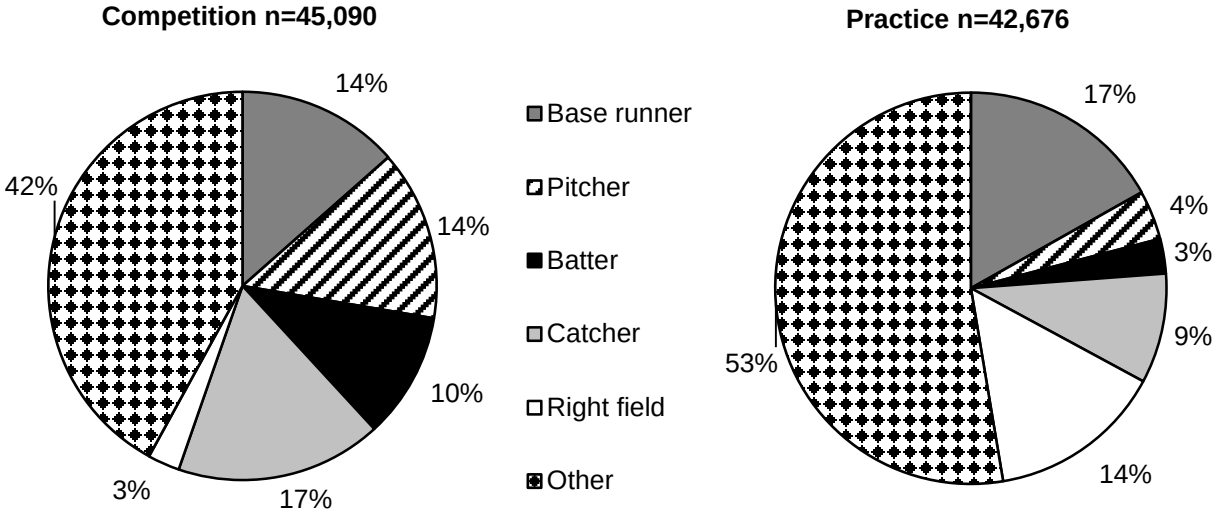
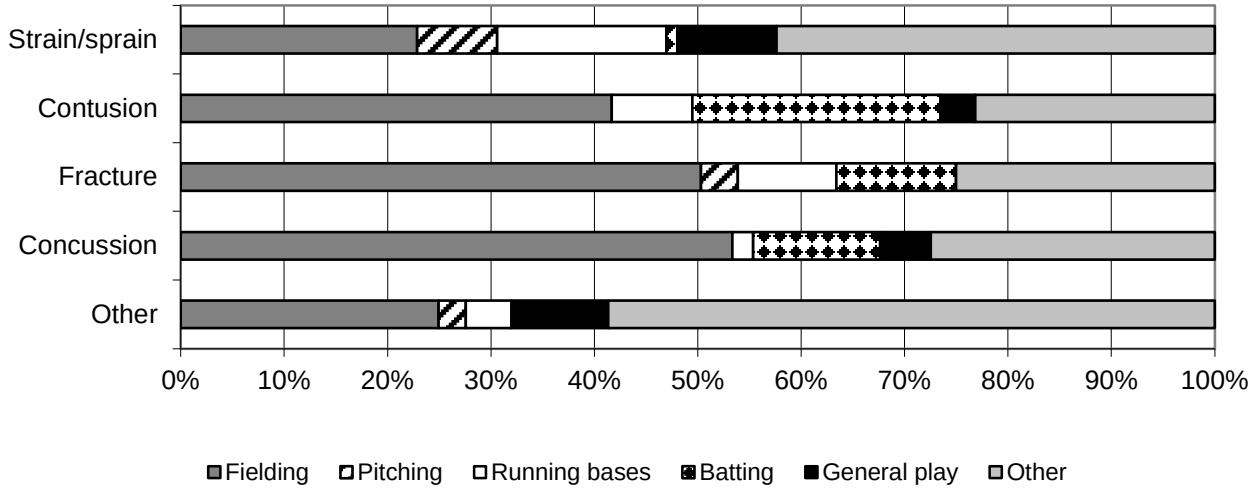


Table 11.9 Activities Leading to Softball Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2011-12 School Year*

	Competition		Practice		Overall	
	n	%	n	%	n	%
Activity						
Fielding a batted ball	15,261	33.8%	10,159	23.1%	25,420	28.5%
Sliding	6,709	14.9%	6,212	14.1%	12,921	14.5%
Running bases	5,262	11.7%	3,455	7.9%	8,717	9.8%
Batting	6,147	13.6%	1,029	2.3%	7,176	8.1%
Throwing (not pitching)	2,160	4.8%	4,374	9.9%	6,534	7.3%
Fielding a thrown ball	1,507	3.3%	4,497	10.2%	6,004	6.7%
General play	2,364	5.2%	3,560	8.1%	5,924	6.6%
Catching	1,145	2.5%	2,376	5.4%	3,521	4.0%
Pitching	2,513	5.6%	861	2.0%	3,374	3.8%
Conditioning	0	0.0%	3,134	7.1%	3,134	3.5%
Other	2,025	4.5%	4,335	9.9%	6,360	7.1%
Total	**45,091**	**100%**	**43,992**	**100%**	**89,083**	**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, 2011-12 School Year



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, 2011-12 School Year

	Boys' soccer	Girls' soccer*	RR (95% CI)†
Total	1.64	**2.42**	**1.48 (1.26-1.74)**
Competition	3.47	**5.68**	**1.64 (1.34-2.00)**
Practice	0.90	**1.09**	1.22 (0.93-1.60)

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

Table 12.2 Comparison of Body Sites of Boys' and Girls' Soccer Injuries, High School Sports-Related Injury Surveillance Study, US, 2011-12 School Year

	Boys' soccer	Girls' soccer	IPR (95% CI)
Body Site			
Hip/thigh/upper leg	**21.5%**	10.5%	**2.04 (1.19-3.49)**
Head/face	**26.6%**	24.7%	1.08 (0.75-1.55)
Ankle	14.8%	**24.9%**	**1.68 (1.04-2.71)**
Knee	11.4%	**17.5%**	1.53 (0.89-2.61)
Hand/wrist	**4.5%**	3.9%	1.15 (0.39-3.42)
Foot	4.8%	**5.7%**	1.17 (0.51-2.70)
Lower leg	6.2%	**7.6%**	1.23 (0.54-2.81)
Trunk	**5.1%**	2.1%	2.40 (0.80-7.23)
Arm/elbow	**1.3%**	0.4%	3.41 (0.60-19.38)
Shoulder	**2.0%**	1.1%	1.80 (0.41-7.97)
Neck	**0.8%**	0.2%	4.40 (0.37-51.62)
Other	0.9%	**1.5%**	1.58 (0.27-9.41)
Total	**100%**	**100%**	---

Table 12.3 Comparison of Diagnoses of Boys' and Girls' Soccer Injuries, High School Sports-Related Injury Surveillance Study, US, 2011-12 School Year

	Boys' soccer	Girls' soccer	IPR (95% CI)
Diagnosis			
Strain/sprain	43.0%	**51.6%**	1.20 (0.95-1.51)
Contusion	**16.2%**	8.4%	**1.93 (1.12-3.30)**
Fracture	**6.1%**	2.9%	2.13 (0.86-5.31)
Concussion	23.0%	**23.8%**	1.04 (0.70-1.53)
Other	11.7%	**13.3%**	1.14 (0.65-2.00)
Total	**100%**	**100%**	---

Table 12.4 Most Common Boys' and Girls' Soccer Injury Diagnoses*, High School Sports-Related Injury Surveillance Study, US, 2011-12 School Year

	Boys' soccer	Girls' soccer	IPR (95% CI)
Diagnosis			
Ankle strain/sprain	13.2%	**24.4%**	**1.84 (1.12-3.03)**
Head/face concussion	22.7%	**23.8%**	1.05 (0.71-1.55)
Hip/thigh/upper leg strain/sprain	**15.5%**	9.3%	1.66 (0.91-3.04)
Knee strain/sprain	5.7%	**10.1%**	1.79 (0.86-3.75)
Knee other	3.1%	**5.2%**	1.67 (0.54-5.12)

*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, 2011-12 School Year

	Boys' soccer	Girls' soccer	IPR (95% CI)
Time Loss			
1-2 days	**18.7%**	18.2%	1.03 (0.63-1.67)
3-6 days	**26.7%**	17.9%	1.50 (0.99-2.25)
7-9 days	18.5%	**19.5%**	1.05 (0.66-1.68)
10-21 days	15.5%	**21.8%**	1.41 (0.92-2.17)
22 days or more	**4.0%**	3.5%	1.15 (0.45-2.90)
Other	16.6%	**19.1%**	1.16 (0.74-1.81)
Total	**100%**	**100%**	---

Table 12.6 Comparison of Mechanisms of Boys' and Girls' Soccer Injuries, High School Sports-Related Injury Surveillance Study, US, 2011-12 School Year

	Boys' soccer	Girls' soccer	IPR (95% CI)
Soccer Mechanism			
Contact with another player	27.9%	**30.1%**	1.08 (0.77-1.52)
Stepped on/fell on/kicked	**11.3%**	11.2%	1.01 (0.57-1.80)
Rotation around a planted foot/inversion	**10.5%**	9.8%	1.08 (0.58-2.01)
Overuse, heat illness, conditioning, etc.	**18.8%**	16.9%	1.11 (0.68-1.83)
Contact with ball	**11.9%**	9.5%	1.25 (0.73-2.15)
Uneven playing surface	1.7%	**4.1%**	2.35 (0.54-10.16)
Slide tackle	4.2%	**11.1%**	**2.62 (1.10-6.24)**
Contact with goal	**0.6%**	0.1%	8.04 (0.82-79.22)
Other	**13.0%**	7.3%	1.78 (0.98-3.23)
Total	**100%**	**100%**	---

Table 12.7 Comparison of Activities of Boys' and Girls' Soccer Injuries, High School Sports-Related Injury Surveillance Study, US, 2011-12 School Year

	Boys' soccer	Girls' soccer	IPR (95% CI)
Soccer Activity			
General play	**24.1%**	23.9%	1.01 (0.68-1.49)
Defending	6.6%	**15.6%**	**2.35 (1.27-4.35)**
Chasing loose ball	**8.9%**	8.6%	1.03 (0.53-2.01)
Ball handling/dribbling	**13.3%**	9.1%	1.46 (0.79-2.73)
Goaltending	**6.8%**	4.8%	1.43 (0.67-3.07)
Shooting (foot)	**3.8%**	3.5%	1.08 (0.39-3.01)
Heading ball	**11.9%**	7.4%	1.63 (0.85-3.12)
Passing (foot)	4.4%	**6.4%**	1.44 (0.59-3.52)
Receiving pass	**6.3%**	2.7%	2.34 (0.91-6.01)
Conditioning	6.4%	**7.7%**	1.20 (0.50-2.91)
Other	7.3%	**10.4%**	1.42 (0.67-3.04)
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, 2011-12 School Year

	Boys' basketball	Girls' basketball	RR (95% CI)*
Total	1.40	**1.57**	1.13 (0.95-1.33)
Competition	2.60	**3.03**	1.17 (0.93-1.46)
Practice	0.91	**0.98**	1.08 (0.84-1.39)

Table 12.9 Comparison of Body Sites of Boys' and Girls' Basketball Injuries, High School Sports-Related Injury Surveillance Study, US, 2011-12 School Year

	Boys' basketball	Girls' basketball	IPR (95% CI)
Body Site			
Ankle	**32.8%**	19.3%	**1.70 (1.20-2.40)**
Knee	15.1%	**22.3%**	1.48 (0.97-2.26)
Head/face	19.5%	**23.4%**	1.20 (0.83-1.73)
Hip/thigh/upper leg	**5.9%**	5.7%	1.04 (0.49-2.21)
Hand/wrist	8.7%	**9.5%**	1.10 (0.59-2.07)
Shoulder	1.9%	**4.7%**	2.44 (0.79-7.51)
Trunk	**6.4%**	5.0%	1.28 (0.56-2.93)
Lower leg	2.3%	**5.2%**	2.27 (0.74-7.00)
Arm/elbow	2.1%	**2.2%**	1.04 (0.26-4.13)
Foot	**4.6%**	1.7%	2.75 (0.92-8.25)
Neck	**0.6%**	0.5%	1.18 (0.7-18.7)
Other	---	**0.4%**	---
Total	**100%**	**100%**	---

Table 12.10 Comparison of Diagnoses of Boys' and Girls' Basketball Injuries, High School Sports-Related Injury Surveillance Study, US, 2011-12 School Year

	Boys' basketball	Girls' basketball	IPR (95% CI)
Diagnosis			
Strain/sprain	47.7%	**51.8%**	1.09 (0.89-1.33)
Contusion	8.2%	**9.2%**	1.12 (0.61-2.06)
Fracture	**9.5%**	4.2%	2.26 (0.99-5.18)
Concussion	13.8%	**20.7%**	1.50 (0.98-2.30)
Other	**20.8%**	14.1%	1.48 (0.96-2.27)
Total	**100%**	**100%**	---

Table 12.11 Most Common Boys' and Girls' Basketball Injury Diagnoses*, High School Sports-Related Injury Surveillance Study, US, 2011-12 School Year

	Boys' basketball	Girls' basketball	IPR (95% CI)
Diagnosis			
Ankle strain/sprain	**31.4%**	18.4%	**1.71 (1.20-2.43)**
Head/face concussion	13.8%	**20.7%**	1.50 (0.98-2.30)
Knee strain/sprain	4.9%	**14.1%**	**2.88 (1.42-5.87)**
Knee other	**8.2%**	4.8%	1.71 (0.81-3.60)

*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, 2011-12 School Year

	Boys' basketball	Girls' basketball	IPR (95% CI)
Time Loss			
1-2 days	18.9%	**21.4%**	1.13 (0.76-1.68)
3-6 days	21.5%	**23.7%**	1.10 (0.76-1.59)
7-9 days	**15.8%**	13.7%	1.15 (0.73-1.82)
10-21 days	**21.4%**	15.1%	1.42 (0.94-2.13)
22 days or more	5.3%	**8.2%**	1.54 (0.74-3.21)
Other	17.1%	**17.9%**	1.05 (0.67-1.63)
Total	**100%**	**100%**	---

Table 12.13 Comparison of Mechanisms of Boys' and Girls' Basketball Injuries, High School Sports-Related Injury Surveillance Study, US, 2011-12 School Year

	Boys' basketball	Girls' basketball	IPR (95% CI)
Basketball Mechanism			
Collision with another player	30.8%	**33.4%**	1.08 (0.81-1.44)
Jumping/landing	**25.2%**	16.6%	**1.51 (1.01-2.27)**
Overuse, heat illness, conditioning, etc.	8.9%	**13.1%**	1.47 (0.82-2.63)
Rotation around a planted foot/inversion	10.1%	**11.0%**	1.10 (0.62-1.94)
Stepped on/fell on/kicked	**11.9%**	7.7%	1.54 (0.82-2.91)
Contact with ball	3.5%	**7.9%**	2.27 (0.95-5.43)
Other	41.9%	**43.6%**	1.08 (0.86-1.36)
Total	**100%**	**100%**	---

Table 12.14 Comparison of Activities of Boys' and Girls' Basketball Injuries, High School Sports-Related Injury Surveillance Study, US, 2011-12 School Year

	Boys' basketball	Girls' basketball	IPR (95% CI)
Basketball Activity			
Rebounding	**25.6%**	18.8%	1.36 (0.91-2.03)
General play	25.3%	**33.0%**	1.31 (0.95-1.79)
Defending	14.6%	**15.6%**	1.07 (0.67-1.72)
Chasing loose ball	**13.6%**	10.9%	1.25 (0.72-2.17)
Shooting	**8.8%**	3.5%	**2.47 (1.04-5.89)**
Conditioning	0.5%	**4.5%**	**8.26 (2.18-31.29)**
Ball handling/dribbling	4.0%	**6.3%**	1.59 (0.70-3.61)
Receiving pass	3.5%	**4.9%**	1.42 (0.56-3.64)
Other	**4.2%**	3.4%	1.73 (0.54-5.49)
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, 2011-12 School Year

	Baseball	Softball	RR (95% CI)
Total	0.83	**1.46**	**1.77 (1.41-2.22)**
Competition	1.14	**2.04**	**1.79 (1.30-2.49)**
Practice	0.65	**1.16**	**1.77 (1.29-2.43)**

Table 12.16 Comparison of Body Sites of Baseball and Softball Injuries, High School Sports-Related Injury Surveillance Study, US, 2011-12 School Year

	Baseball	Softball	IPR (95% CI)
Body Site			
Ankle	6.3%	**13.4%**	2.14 (0.94-4.91)
Knee	7.4%	**10.4%**	1.41 (0.57-3.47)
Head/face	21.5%	**30.8%**	1.43 (0.90-2.27)
Hip/thigh/upper leg	8.5%	**11.3%**	1.32 (0.60-2.93)
Hand/wrist	12.1%	**11.9%**	1.02 (0.51-2.03)
Shoulder	**14.6%**	5.3%	**2.75 (1.09-6.93)**
Trunk	**9.6%**	4.4%	2.20 (0.75-6.48)
Lower leg	0.4%	**5.5%**	**12.46 (1.49-103.90)**
Arm/elbow	**16.5%**	6.4%	**2.60 (1.09-6.22)**
Foot	**1.8%**	0.3%	5.62 (0.84-37.85)
Neck	---	**0.2%**	---
Other	**1.2%**	0.1%	---
Total	**100%**	**100%**	---

Table 12.17 Comparison of Diagnoses of Baseball and Softball Injuries, High School Sports-Related Injury Surveillance Study, US, 2011-12 School Year

	Baseball	Softball	IPR (95% CI)
Diagnosis			
Strain/sprain	34.7%	**39.8%**	1.15 (0.81-1.63)
Contusion	10.3%	**17.0%**	1.66 (0.84-3.28)
Fracture	**9.3%**	8.9%	1.04 (0.47-2.31)
Concussion	14.6%	**21.2%**	1.45 (0.79-2.65)
Other	**31.1%**	13.1%	**2.38 (1.38-4.10)**
Total	**100%**	**100%**	---

Table 12.18 Most Common Baseball and Softball Injury Diagnoses*, High School Sports-Related Injury Surveillance Study, US, 2011-12 School Year

	Baseball	Softball	IPR (95% CI)
Diagnosis			
Ankle strain/sprain	6.3%	**9.9%**	1.58 (0.66-3.76)
Hand/wrist fracture	**5.3%**	4.4%	1.20 (0.43-3.34)
Head/face concussion	14.6%	**21.2%**	1.45 (0.79-2.65)
Hip/thigh/upper leg strain/sprain	**7.7%**	7.0%	1.10 (0.44-2.79)
Knee strain/sprain	4.2%	**7.7%**	1.85 (0.53-6.41)

*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, 2011-12 School Year

	Baseball	Softball	IPR (95% CI)
Time Loss			
1-2 days	**16.8%**	16.0%	1.05 (.57-1.91)
3-6 days	20.1%	**27.5%**	1.37 (0.83-2.26)
7-9 days	9.7%	**16.9%**	1.74 (0.85-3.55)
10-21 days	**21.9%**	13.9%	1.57 (0.90-2.72)
22 days or more	**13.8%**	4.8%	2.86 (1.25-6.54)
Other	17.7%	**20.7%**	1.17 (0.68-2.03)
Total	**100%**	**100%**	---

Table 12.20 Comparison of Mechanisms of Baseball and Softball Injuries, High School Sports-Related Injury Surveillance Study, US, 2011-12 School Year

	Baseball	Softball	IPR (95% CI)
Baseball/Softball Mechanism			
Overuse, heat illness, conditioning, etc.	9.4%	**10.7%**	1.14 (0.52-2.47)
Contact with another player	**17.0%**	16.1%	1.05 (0.57-1.97)
Contact with bases	4.0%	**14.4%**	**3.55 (1.50-8.44)**
Throwing - not pitching	**13.7%**	7.3%	1.86 (0.81-4.29)
Throwing - pitching	**16.0%**	2.7%	**5.97 (1.70-20.97)**
Contact with thrown ball (non-pitch)	3.8%	**10.3%**	**2.69 (1.14-6.34)**
Rotation around a planted foot/inversion	5.1%	**6.6%**	1.30 (0.42-4.04)
Hit by batted ball	9.9%	**13.3%**	1.34 (0.61-2.96)
Hit by pitch	4.2%	4.2%	1.01 (0.33-3.15)
Other	**20.0%**	15.9%	**1.25 (0.72-2.21)**
Total	**100%**	**100%**	---

Table 12.21 Comparison of Activities of Baseball and Softball Injuries, High School Sports-Related Injury Surveillance Study, US, 2011-12 School Year

	Baseball	Softball	IPR (95% CI)
Baseball/Softball Activity			
Fielding a batted ball	18.9%	**28.5%**	1.51 (0.91-2.51)
Fielding a thrown ball	5.2%	**6.7%**	1.29 (0.48-3.35)
Running bases	**14.4%**	9.8%	1.48 (0.73-2.97)
Pitching	**17.8%**	3.8%	**4.71 (1.76-12.59)**
Batting	**10.3%**	8.1%	1.28 (0.56-2.91)
Sliding	4.1%	**14.5%**	**3.50 (1.24-9.91)**
Throwing (not pitching)	**22.4%**	7.3%	1.86 (0.81-4.29)
General play	**8.1%**	6.6%	1.22 (0.44-3.40)
Conditioning	2.3%	**3.5%**	1.52 (0.32-7.21)
Catching	2.6%	**4.0%**	1.51 (0.38-5.99)
Other	2.5%	**7.1%**	2.86 (0.88-9.28)
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, 2005/06-2011/12 School Years

	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	p-value for trend*
Overall total	**2.51**	**2.59**	**2.31**	**2.01**	**2.10**	**1.97**	**2.17**	**0.016**
Competition	**4.63**	**4.88**	**4.45**	**4.05**	**4.19**	**4.10**	**4.26**	0.055
Practice	**1.69**	**1.75**	**1.52**	**1.26**	**1.32**	**1.16**	**1.40**	**0.012**
Boys' football total	4.36	4.45	4.18	3.50	3.81	3.50	3.78	**0.035**
Competition	12.09	13.50	12.80	11.26	12.95	12.30	12.41	0.765
Practice	2.54	2.68	2.47	1.92	2.06	1.74	2.16	**0.047**
Boys' soccer total	2.43	2.27	1.75	1.62	1.75	1.56	1.64	**0.016**
Competition	4.22	4.31	3.63	3.43	3.39	3.08	3.47	**0.017**
Practice	1.58	1.45	0.96	0.87	1.04	0.90	0.90	**0.027**
Girls' soccer total	2.36	2.51	2.35	2.07	2.00	1.93	2.42	0.313
Competition	5.21	5.43	5.15	4.59	4.67	4.13	5.68	0.606
Practice	1.10	1.31	1.16	1.00	0.85	0.93	1.09	0.194
Girls' volleyball total	1.64	1.37	1.22	0.89	0.99	0.96	1.00	**0.018**
Competition	1.92	1.40	1.43	0.90	1.00	1.18	1.27	0.116
Practice	1.48	1.36	1.12	0.88	0.99	0.85	0.85	**0.004**
Boys' basketball total	1.89	1.75	1.39	1.35	1.45	1.34	1.40	**0.036**
Competition	2.98	2.87	2.23	2.32	2.72	2.30	2.60	0.295
Practice	1.46	1.28	1.04	0.95	0.92	0.91	0.91	**0.008**
Girls' basketball total	2.01	2.09	1.61	1.54	1.58	1.73	1.57	0.076
Competition	3.60	3.60	3.30	3.13	2.84	3.59	3.03	0.206
Practice	1.37	1.44	0.90	0.87	1.02	0.92	0.98	0.087
Boys' wrestling total	2.50	2.51	2.27	2.17	1.98	2.01	2.50	0.338
Competition	3.93	3.80	3.70	3.35	3.09	3.32	3.56	0.084
Practice	2.04	2.06	1.76	1.75	1.56	1.55	2.10	0.454
Boys' baseball total	1.19	1.25	0.93	0.78	0.82	0.81	0.83	**0.024**
Competition	1.77	2.01	1.37	1.32	1.27	1.49	1.14	**0.046**
Practice	0.87	0.82	0.68	0.48	0.57	0.46	0.65	0.064
Girls' softball total	1.13	1.11	1.29	1.04	1.12	0.94	1.46	0.640
Competition	1.78	1.96	1.86	1.62	1.66	1.45	2.04	0.724
Practice	0.79	0.65	0.98	0.72	0.85	0.69	1.16	0.310

*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, 2005/06-2011/12 School Years

	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12
Overall total	**1,442,533**	**1,472,849**	**1,419,723**	**1,248,126**	**1,359,897**	**1,195,815**	**1,392,262**
Competition	**759,334**	**766,512**	**763,034**	**690,525**	**754,091**	**711,642**	**740,493**
Practice	**683,199**	**706,337**	**656,689**	**557,601**	**605,805**	**484,173**	**651,769**
Boys' football total	516,150	574,367	616,665	527,321	581,414	483,016	559,064
Competition	280,919	292,316	311,780	288,637	322,801	296,199	287,710
Practice	235,231	282,051	304,885	238,684	258,614	186,817	271,354
Boys' soccer total	218,760	171,874	159,351	149,229	153,485	138,974	172,070
Competition	119,703	93,295	99,785	87,082	83,985	81,238	97,540
Practice	99,058	78,579	59,566	62,147	69,500	57,736	74,530
Girls' soccer total	185,770	230,769	215,850	192,108	181,159	180,254	222,679
Competition	122,803	149,231	146,102	123,312	129,754	124,674	145,469
Practice	62,967	81,538	69,748	68,796	51,405	55,580	77,210
Girls' volleyball total	81,813	80,493	72,261	56,609	67,760	50,711	52,662
Competition	32,677	27,423	26,539	19,764	21,728	21,416	24,439
Practice	49,136	53,069	45,722	36,845	46,032	29,295	28,223
Boys' basketball total	100,058	96,670	82,612	79,230	85,063	79,762	75,872
Competition	44,826	46,109	36,766	40,152	46,787	41,252	41,978
Practice	55,232	50,561	45,846	39,078	38,276	38,510	33,894
Girls' basketball total	103,566	102,831	73,283	64,933	78,709	83,033	67,280
Competition	53,812	53,703	45,236	38,277	44,026	53,931	37,213
Practice	49,753	49,128	28,047	26,656	34,684	29,102	30,067
Boys' wrestling total	105,542	101,139	91,625	88,996	80,390	80,569	107,992
Competition	36,259	38,750	40,698	39,029	37,742	36536	40,235
Practice	69,283	62,389	50,927	49,967	42,647	44,033	67,757
Boys' baseball total	67,560	60,296	44,760	39,869	64,053	46,796	43,590
Competition	33,639	33,494	22,803	25,584	36,502	29,789	20,818
Practice	33,922	26,802	21,957	14,285	27,551	17,008	22,772
Girls' softball total	63,313	54,411	63,316	49,831	67,862	52,700	91,053
Competition	34,696	32,191	33,325	28,688	30,767	26,607	45,091
Practice	28,618	22,220	29,991	21,143	37,096	26,093	45,962

Table 13.3 Body Site of Injury by Year, High School Sports-Related Injury Surveillance Study, US, 2005/06-2011/12 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
Body Site							
Ankle	22.7%	19.8%	18.5%	16.4%	17.5%	17.7%	16.1%
Knee	14.2%	16.6%	14.6%	14.8%	15.7%	14.2%	13.4%
Head/face	12.3%	12.4%	12.4%	15.3%	17.2%	23.3%	25.1%
Hip/thigh/upper leg	10.8%	10.5%	10.2%	10.3%	9.2%	8.3%	9.8%
Shoulder	7.9%	8.0%	10.1%	9.3%	8.4%	7.0%	6.6%
Hand/wrist	8.0%	7.5%	9.1%	8.5%	10.3%	8.9%	8.5%
Trunk	6.2%	6.7%	6.5%	6.6%	5.8%	4.7%	4.9%
Lower leg	4.6%	5.2%	5.7%	5.8%	4.7%	5.0%	4.5%
Arm/elbow	4.1%	3.9%	4.6%	4.1%	4.0%	3.1%	4.0%
Foot	4.0%	4.0%	4.2%	5.0%	4.1%	4.0%	3.4%
Neck	2.2%	1.9%	1.8%	1.9%	1.9%	1.8%	1.7%
Other	3.2%	3.6%	2.4%	2.1%	1.2%	2.1%	2.0%
Total	**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, 2005/06-2011/12 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
Diagnosis							
Strain/sprain	52.0%	48.2%	48.3%	45.7%	44.7%	43.2%	42.2%
Contusion	12.2%	13.7%	12.4%	11.5%	14.0%	9.6%	10.8%
Fracture	9.8%	8.9%	10.2%	10.9%	9.9%	10.2%	7.7%
Concussion	9.1%	8.4%	9.2%	11.8%	14.0%	20.0%	22.2%
Other	16.8%	20.9%	19.9%	20.2%	17.5%	17.0%	17.1%
Total	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**

Table 13.5 Most Common Injury Diagnoses by Year, High School Sports-Related Injury Surveillance Study, US, 2005/06-2011/12School 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
Diagnosis							
Ankle strain/sprain	20.6%	17.8%	17.3%	15.0%	16.0%	16.3%	14.7%
Head/face concussion	9.0%	8.4%	9.2%	11.7%	13.9%	20.0%	22.2%
Knee strain/sprain	7.6%	8.8%	7.8%	7.9%	8.0%	7.7%	7.6%
Hip/thigh/upper leg strain/sprain	7.9%	7.7%	7.3%	7.7%	6.5%	6.4%	6.9%
Knee other	4.3%	4.9%	4.7%	4.5%	5.2%	4.8%	3.9%
Shoulder other	3.1%	3.7%	4.1%	4.0%	3.3%	3.7%	3.1%
Hand/wrist fracture	3.2%	3.3%	4.0%	4.0%	4.2%	4.0%	3.7%
Shoulder strain/sprain	3.4%	2.9%	3.4%	3.7%	3.3%	2.2%	2.9%
Trunk strain/sprain	2.8%	2.7%	3.2%	2.8%	2.5%	2.4%	1.9%
Hand/wrist strain/sprain	3.1%	2.5%	3.8%	2.9%	2.8%	2.8%	3.0%

Table 13.6 Time Loss of Injuries by Year, High School Sports-Related Injury Surveillance Study, US, 2005/06-2011/12 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
Time Loss							
1-2 days	22.5%	26.6%	22.8%	13.7%	14.7%	12.8%	15.9%
3-6 days	30.0%	28.5%	28.8%	28.5%	27.3%	25.2%	23.3%
7-9 days	15.3%	14.7%	15.8%	17.7%	16.1%	16.7%	16.1%
10-21 days	14.9%	14.1%	16.7%	19.7%	16.9%	19.2%	19.6%
≥22 days	17.2%	16.1%	15.9%	20.3%	25.0%	26.1%	25.0%
Total	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**

Table 13.7 Injuries Requiring Surgery by Year, High School Sports-Related Injury Surveillance Study, US, 2005/06-2011/12 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
Need for surgery							
Required surgery	5.3%	6.4%	6.1%	6.7%	8.0%	8.2%	93.3%
Did not require surgery	94.7%	93.6%	93.9%	93.3%	92.0%	91.8%	6.7%
Total	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**

XIV. Reporter Demographics & Compliance

During the 2011-12 school year, 112 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, 93 enrolled ATs reported an average of 41 study weeks. The majority of ATs (86.0%) reported all the weeks during which they were enrolled, with only 4 ATs (4.3%) missing over 10 weeks. Because internal validity checks conducted during the first six years of the study consistently found high sensitivity, specificity, positive predictive values, and negative predictive values, internal validity checks will be conducted every other year. Internal validity checks during the 2010-11 academic year yielded 96.3% sensitivity, 100.0% specificity, a positive predictive value of 100.0%, and a negative predictive value of 99.5%.

Prior to the start of the 2011-12 High School RIO™ study, participating ATs were asked to complete a short demographics survey. Three-quarters (80.2%) of participating high schools were public schools, with the remainder being private. All ATs except one provided services to athletes of their high school on 5 or more days each week. Over 80% (81.3%) of ATs participating during the 2011-12 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 (n=183 combined) the opportunity to provide feedback on their experiences with High School RIO™. This survey was completed by 132 ATs (72.1%). Average reporting time burdens were 19 minutes for the weekly exposure report and 9 minutes for the injury report form. Using a 5 point Likert scale, RIO™ was overwhelmingly reported to be either very easy (49.2%) or somewhat easy (42.4%) to use (5 and 4 on the Likert scale,

respectively), with ATs being either very satisfied (58.3%) or somewhat satisfied (33.3%) 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 2012-13 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.