CONVENIENCE SAMPLE SUMMARY REPORT

NATIONAL HIGH SCHOOL SPORTS-RELATED INJURY SURVEILLANCE STUDY

2016-2017 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 over 7.9 million in 2016-17. 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, boys' and girls' volleyball, boys' and girls' basketball, boys' wrestling, boys' baseball, girls' softball, girls' field hockey, girls' gymnastics, boys' ice hockey, boys' and girls' lacrosse, boys' and girls' swimming & diving, boys' and girls' track & field, boys' and girls' cross country, boys' and girls' tennis, and cheerleading. Due to decreasing numbers of high school participants across the US, boys' volleyball and girls' gymnastics have been dropped from the surveillance. This surveillance has been conducted using the time- and cost-efficient RIO^{TM} (Reporting Information Online) surveillance system. This study during the 2016-17 academic year was funded by the Centers for Disease Control and Prevention (CDC), National Operating Committee on Standards for Athletic Equipment (NOCSAE), and the National Federation of State High School Associations (NFHS).

1.3 Specific Aims

The continuing objectives of this study are to continue 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, girls' softball, girls' field hockey, boys' ice hockey, boys' and girls' lacrosse, boys' and girls' swimming & diving, boys' and girls' track & field, boys' and girls' cross country, boys' and girls' tennis, and cheerleading 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 22 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.

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, practice, or performance 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, heat illness, 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, competition or performance where he or she is exposed to the possibility of athletic injury. Exposure was expressed in three 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.

C) Number of athlete-performances = the sum of the number of cheerleading athletes at each performance during the past week. For example, if 9 cheerleading athletes performed 3 times in one weekend, the number of athlete-performances would equal 27.

1.5 Sample Recruitment

The National Athletic Trainers' Association (NATA) membership list was used to identify eligible reporters - certified athletic trainers (AT) who provide care for high school athletes and who have a valid e-mail address. Each eligible reporter received an e-mail introducing the study and inviting them to participate. A three stage sampling methodology was used to select study schools from all schools with ATs who expressed an interest in participating as reporters.

1) All schools 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 report for each of the 9 sports included in the original National High School Sports-Related Injury Surveillance Study (boys' football, soccer, basketball, wrestling, and baseball and girls' soccer, volleyball, basketball, and softball). This subset of 100 study schools were the randomly selected, nationally representative sample.

2) All schools not selected in step 1 who offered any of the more rarely offered 9 sports included in the expansion of the National High School Sports-Related Injury Surveillance Study (girls' field hockey, and lacrosse and boys' ice hockey and lacrosse) were selected for the convenience sample in an attempt to obtain as large a sample as possible reporting for these more rarely offered sports.
3) A random sample of all schools not selected in step 1 or step 2 who offered the remaining sports of interest in the expansion of the National High School Sports-Related Injury Surveillance Study (boys' and girls' track & field, swimming & diving, cross country, and cheerleading) were selected in an attempt to ensure at least 100 schools were reporting for each of the 22 sports of interest.

This three step sampling methodology resulted in a large, nationally disperse convenience sample of US high schools. 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.

As a result of the convenience sample methodology, different schools reported for the different sports of interest. See table below:

School Participation by Sport, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year.*

	# Schools in Random Sample	# Schools in Convenience Sample	# Schools Total
Original Sports			
Football	88	57	145
Boys' Soccer	89	44	133
Girls' Soccer	85	47	132
Girls' Volleyball	89	52	141
Boys' Basketball	93	48	141
Girls' Basketball	90	51	141
Wrestling	90	36	126
Baseball	84	42	126
Softball	**85**	**47**	132
New Sports			
Field Hockey	17	20	37
Ice hockey	12	10	22
Boys' Lacrosse	34	25	59
Girls' Lacrosse	32	25	57
Boys' Swimming and Diving	46	43	89
Girls' Swimming and Diving	47	43	90
Boys' Track and Field	66	56	122
Girls' Track and Field	63	62	125
Boys' Cross Country	60	58	118
Girls' Cross Country	59	60	119
Boys' Tennis	46	32	78
Girls' Tennis	49	30	79
Cheerleading	61	57	118
Total	**96**	**87**	**183**

*Numbers only include schools who actually reported data for the 2016-17 school year.

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 43 weekly exposure reports: one for each week from July 25, 2016 through June 4, 2017. Exposure reports collected exposure information (number of athlete-competitions and

athlete-practices) and the number of reportable injuries sustained by student athletes of each sport that was currently in session at their school. For each reportable injury, the AT was asked to complete an injury report. The injury report collected detailed information about the injured player (e.g., age, year in school, etc.), the injury (e.g. site, type, severity, etc.) and the injury event (e.g., position played, phase of play, etc.). This internet-based surveillance tool provided ATs with the ability to view all their submitted data throughout the study and update reports as needed (e.g., need for surgery, days till resuming play, etc.).

1.7 Data Management

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

1.8 Data Analysis

Data were analyzed using SAS software, version 9.4 and SPSS, version 22.0. Although fractures, concussions, heat illnesses and dental injuries resulting in <1 day time loss were collected, unless otherwise noted, analyses in this report excluded these injuries.

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. 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

II. Overall Injury Epidemiology

Table 2.1 Injury Rates by Sport and Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year*

	# Injuries	# Exposures	Injury rate (per 1,000 AEs)
Overall total	**6,846**	**4,006,889**	**1.71**
Competition	**3,669**	**974,333**	**3.77**
Practice	**3,151**	**2,989,138**	**1.05**
Performance	**26**	**43,418**	**0.60**
Boys' football total	2,588	676,339	3.83
Competition	1,479	113,877	12.99
Practice	1,147	562,462	2.04
Boys' soccer total	432	246,595	1.75
Competition	289	75,751	3.82
Practice	143	170,844	0.84
Girls' soccer total	502	199,915	2.51
Competition	384	61,967	6.20
Practice	118	137,948	0.86
Girls' volleyball total	240	227,698	1.05
Competition	122	74,068	1.65
Practice	118	153,630	0.77
Boys' basketball total	430	292,675	1.47
Competition	226	89,868	2.51
Practice	204	202,807	1.01
Girls' basketball total	394	212,426	1.85
Competition	248	67,368	3.68
Practice	146	145,058	1.01
Boys' wrestling total	425	200,994	2.11
Competition	195	49,986	3.90
Practice	230	151,008	1.52
Boys' baseball total	198	221,948	0.89
Competition	121	78,353	1.54
Practice	77	143,595	0.54
Girls' softball total	207	168,496	1.23
Competition	95	58,686	1.62
Practice	112	109,810	1.02
Girls' Field Hockey total	96	56,112	1.71
Competition	50	17,797	2.81
Practice	46	38,315	1.20

Table 2.1 (Continued) Injury Rates by Sport and Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year*

	# Injuries	# Exposures	Injury rate (per 1,000 AEs)
Boys' Ice Hockey total	80	45,425	1.76
Competition	69	16.110	4.28
Practice	11	29,315	0.38
Boys' Lacrosse total	248	111,700	2.22
Competition	143	32,656	4.38
Practice	105	79,044	1.33
Girls' Lacrosse total	132	85,970	1.54
Competition	82	26,482	3.10
Practice	50	59,488	0.84
Boys' Swimming total	20	95,651	0.21
Competition	5	18,811	0.27
Practice	15	76,840	0.20
Girls' Swimming total	29	104,467	0.28
Competition	4	21,286	0.19
Practice	25	83,181	0.30
Boys' Track total	176	258,222	0.68
Competition	57	46,523	1.23
Practice	119	211,699	0.56
Girls' Track total	220	216,213	1.02
Competition	52	39,966	1.30
Practice	168	176,247	0.95
Cheerleading total	191	230,207	0.83
Competition	17	9,651	1.76
Practice	148	177,138	0.84
Performance	26	43,418	0.60
Boys' Cross Country total	85	126,659	0.67
Competition	16	20,793	0.77
Practice	69	105,866	0.65
Girls' Cross Country total	111	109,061	1.02
Competition	23	18,240	1.26
Practice	88	90,821	0.97

Boys' Tennis total	22	59,489	0.37
Competition	10	17,813	0.56
Practice	12	41,685	0.29
Girls' Tennis total	20	60,618	0.33
Competition	5	18,281	0.27
Practice	15	42,337	0.35

*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, 2016-17 School Year*

	<1 day time loss	≥1 day time loss	Time loss data missing	Total
Overall				
Boys' football	1.1%	92.7%	6.2%	**100.0%**
Boys' soccer	0.4%	95.9%	3.7%	**100.0%**
Girls' soccer	0.4%	93.3%	6.3%	**100.0%**
Girls' volleyball	0.0%	93.8%	6.2%	**100.0%**
Boys' basketball	0.3%	94.5%	5.2%	**100.0%**
Girls' basketball	0.3%	91.1%	8.6%	**100.0%**
Boys' wrestling	0.5%	92.5%	7.1%	**100.0%**
Boys' baseball	0.9%	96.1%	3.0%	**100.0%**
Girls' softball	0.4%	94.4%	5.3%	**100.0%**
Girls' field hockey	0.0%	96.2%	3.8%	**100.0%**
Boys' ice hockey	0.0%	94.9%	5.1%	**100.0%**
Boys' lacrosse	0.0%	94.7%	5.3%	**100.0%**
Girls' lacrosse	0.5%	94.6%	4.9%	**100.0%**
Boys' swimming	0.0%	94.4%	5.6%	**100.0%**
Girls' swimming	0.0%	87.5%	12.5%	**100.0%**
Boys' track	0.0%	96.1%	3.9%	**100.0%**
Girls' track	0.4%	94.3%	5.3%	**100.0%**
Cheerleading	0.5%	90.2%	9.3%	**100.0%**
Boys' cross country	0.0%	96.6%	3.4%	**100.0%**
Girls' cross country	0.0%	96.5%	3.5%	**100.0%**
Boys' tennis	0.0%	92.3%	7.7%	**100.0%**
Girls' tennis	0.0%	100.0%	0.0%	**100.0%**
Total	**0.5%**	**94.0%**	**5.5%**	**100.0%**

*By study definition, non-time loss injuries were fractures, concussions, heat illnesses and dental injuries. Because they accounted for less than 1% of all injuries, 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, 2016-17 School Year*

	Male	Female
Year in School	**n=4,431**	**n=2,011**
Freshman	22.0%	25.8%
Sophomore	22.5%	26.5%
Junior	26.7%	24.6%
Senior	26.1%	23.1%
Total†	**100.0%**	**100.0%**
Age (years)		
Minimum	12	12
Maximum	19	19
Mean (St. Dev.)	15.9 (1.3)	15.8 (1.2)
BMI		
Minimum	14.2	15.18
Maximum	55.2	40.4
Mean (St. Dev.)	24.8 (6.3)	22.5 (4.4)

*All analyses in this report present un-weighted data.
†Throughout this report, totals and n's represent the total un-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, 2016-17 School Year

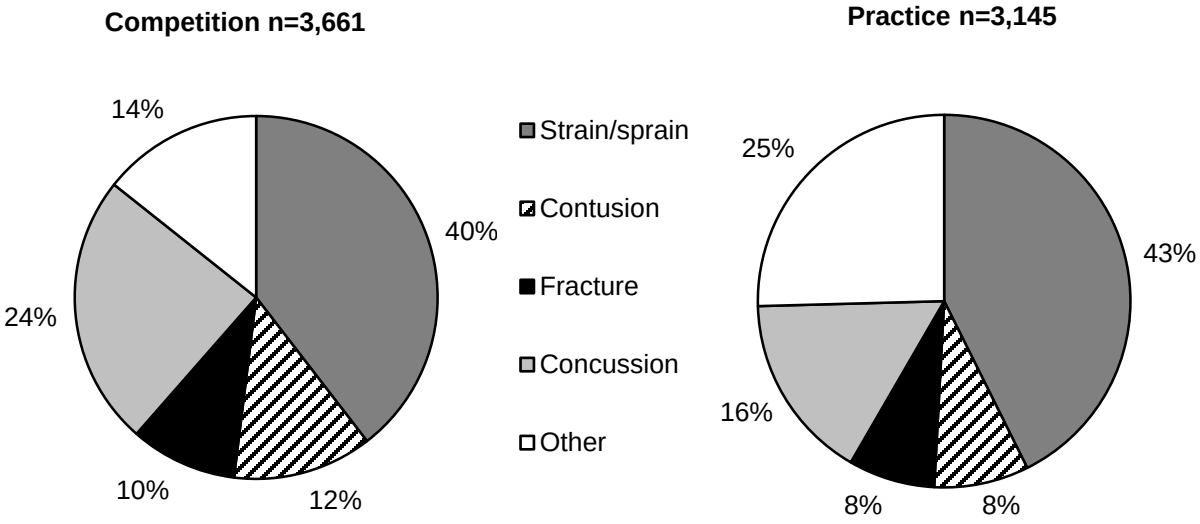


Table 2.4 Body Site of Injury by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

	Competition		Practice		Overall*	
	n	**%**	**n**	**%**	**n**	**%**
Body Site						
Head/face	985	26.8%	585	18.6%	1,580	23.1%
Ankle	592	16.1%	493	15.7%	1,090	15.9%
Knee	546	14.9%	368	11.7%	917	13.4%
Hip/thigh/upper leg	292	8.0%	423	13.4%	715	10.4%
Hand/wrist	305	8.3%	254	8.1%	560	8.2%
Shoulder	242	6.6%	223	7.1%	468	6.8%
Lower leg	145	4.0%	243	7.7%	388	5.7%
Trunk	168	4.6%	185	5.9%	354	5.2%
Arm/elbow	140	3.8%	118	3.7%	260	3.8%
Foot	112	3.1%	112	3.6%	224	3.3%
Other	87	2.4%	89	2.8%	177	2.6%
Neck	55	1.5%	57	1.8%	112	1.6%
Total	**3,669**	**100.0%**	**6,150**	**100.0%**	**6,845**	**100.0%**

*Overall includes cheerleading performance related injuries however performance injuries do not have an individual column due to them totaling less than 1.0% of all injuries.
†Totals and n's are not always equal due to slight rounding or missing responses.

Table 2.5 Most Commonly Injured Ankle Structures, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

	Male		Female		Total	
	n	% of ankle injuries	n	% of ankle injuries	n	% of ankle injuries
Ankle Ligament						
Anterior talofibular ligament	415	67.4%	335	76.7%	750	49.3%
Calcaneofibular ligament	164	26.6%	143	32.7%	307	13.4%
Anterior tibiofibular ligament	129	20.9%	86	19.7%	215	5.0%
Posterior talofibular ligament	70	11.4%	57	13.0%	127	1.5%
Deltoid ligament	52	8.4%	26	5.9%	78	0.5%
Posterior tibiofibular ligament	30	4.9%	13	3.0%	43	0.1%
Total Ankle Injuries	**616**		**437**		**1,053**	

*Multiple responses allowed per injury report.
†Totals and n's are not always equal due to slight rounding or missing responses.

Table 2.6 Most Commonly Injured Knee Structures, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

	Male		Female		Total	
	n	% of knee injuries	n	% of knee injuries	n	% of knee injuries
Knee Ligament						
Medial collateral ligament	170	27.8%	53	18.9%	223	25.0%
Patella/patellar tendon	133	21.7%	93	33.2%	226	25.3%
Anterior cruciate ligament	105	17.2%	75	26.8%	178	20.0%
Torn cartilage (meniscus)	119	19.4%	52	18.6%	171	19.2%
Lateral collateral ligament	34	5.6%	14	5.0%	48	5.4%
Posterior cruciate ligament	12	2.0%	4	1.4%	16	1.8%
Total Knee Injuries	**612**		**280**		**892**	

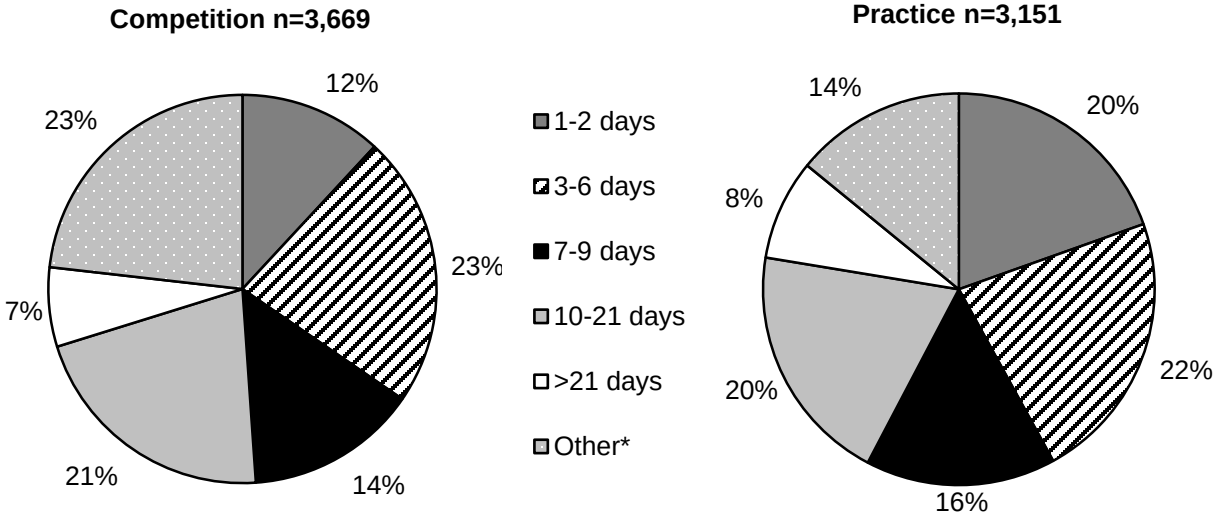
*Multiple responses allowed per injury report.
†Totals and n's are not always equal due to slight rounding or missing responses.

Table 2.7 Ten Most Common Injury Diagnoses by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

	Competition n=3,661		Practice n=3,144		Overall n=6,831	
	n	%	n	%	n	%
Diagnosis						
Head/face concussion	878	24.0%	505	16.1%	1,383	20.2%
Ankle strain/sprain	546	14.9%	453	14.4%	999	14.6%
Hip/thigh/upper leg strain/sprain	178	4.9%	326	10.4%	504	7.4%
Knee strain/sprain	297	8.1%	152	4.8%	449	6.6%
Knee other	159	4.3%	167	5.3%	326	4.8%
Hand/wrist fracture	132	3.6%	119	3.8%	251	3.7%
Shoulder sprain/strain	106	2.9%	112	3.6%	218	3.2%
Shoulder other	113	3.1%	100	3.2%	213	3.1%
Lower Leg other	27	0.7%	147	4.7%	174	2.5%
Hand wrist strain/sprain	95	2.6%	68	2.2%	163	2.4%

†Totals and n's are not always equal due to slight rounding or missing responses.

Figure 2.2 Time Loss by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2016-17 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, 2016-17 School Year

	Competition		Practice		Overall	
	n	%	n	%	n	%
Need for surgery						
Required surgery	296	8.1%	141	4.5%	437	6.5%
Did not require surgery	3,348	91.9%	2,979	95.5%	6,322	93.5%
Total	**3,644**	**100.0%**	**3,105**	**100.0%**	**6,759**	**100.0%**

†Totals and n's are not always equal due to slight rounding or missing responses.

Figure 2.3 New and Recurring Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

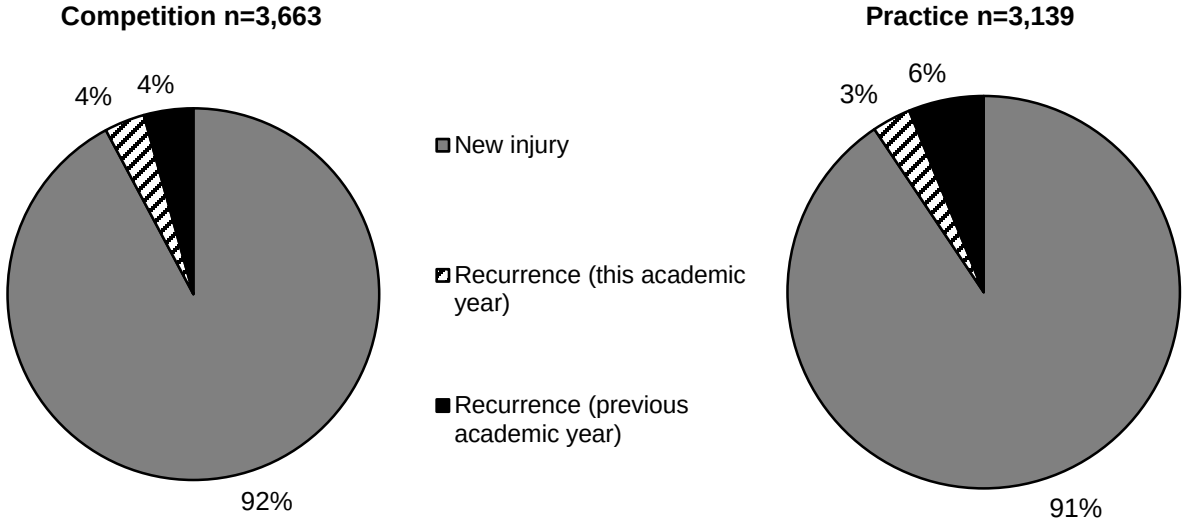


Table 2.9 Time during Season of Injury, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

	n	%
Time in Season		
Preseason	1,371	20.1%
Regular season	5,198	76.1%
Post season	253	3.7%
Total	**6,884**	**100.0%**

†Totals and n's are not always equal due to slight rounding or missing responses.

Table 2.10 Practice-Related Variables, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

	n	%
Time in Practice		
First ½ hour	292	9.5%
Second ½ hour	548	17.9%
1-2 hours into practice	1,516	49.6%
> 2 hours into practice	205	6.7%
Unknown	498	16.3%
Total	**3,059**	**100.0%**

†Totals and n's are not always equal due to slight rounding or missing responses.

Table 2.11 Methods for Injury Evaluation and Assessment, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

	n	%
% of Injuries Evaluated by:*		
Certified athletic trainer	6,366	93.0%
General physician	1,746	25.5%
Orthopedic physician	1,406	20.5%
Chiropractor	68	1.0%
Physician's assistant	63	0.9%
Neurologist	34	0.5%
Nurse practitioner	15	0.2%
Dentist/oral surgeon	7	0.1%
Other	128	1.9%
Total	**6,846**	
% of Injuries Assessed by:*		
Evaluation	6,700	97.9%
X-ray	2,237	32.7%
MRI	674	9.8%
CT-scan	160	2.3%
Blood work/lab test	56	0.8%
Other	68	1.0%
Total	**6,846**	

*Multiple responses allowed per injury report.
†Totals and n's are not always equal due to slight rounding or missing responses.

III. Boys' Football Injury Epidemiology

Table 3.1 Football Injury Rates by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

	# Injuries	# Exposures	Injury rate (per 1,000 athlete-exposures)
Total	**2,582**	**676,339**	**3.82**
Competition	1,453	113,877	12.76
Practice	1,129	562,462	2.01

Table 3.2 Demographic Characteristics of Injured Football Athletes, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year*

Year in School	**n=2,503**
Freshman	23.1%
Sophomore	23.5%
Junior	27.3%
Senior	26.0%
Total†	**100.0%**
Age (years)	
Minimum	12
Maximum	19
Mean (St. Dev.)	15.8 (1.2)
BMI	
Minimum	14.5
Maximum	55.2
Mean (SE)	26.2 (5.0)

*All analyses in this report present un-weighted data
†Throughout this report, totals and n's represent the total un-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, 2016-17 School Year

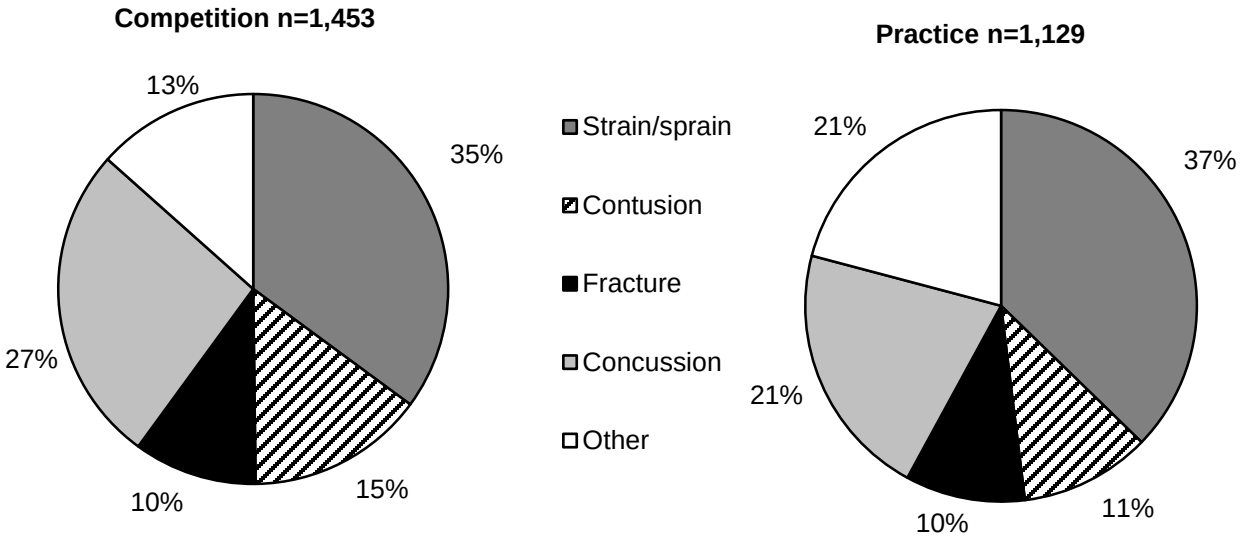


Table 3.3 Body Site of Football Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

	Competition		Practice		Overall	
	n	**%**	**n**	**%**	**n**	**%**
Body Site						
Head/face	393	27.0%	255	22.5%	648	25.0%
Knee	242	16.6%	141	12.5%	383	14.8%
Ankle	176	12.1%	127	11.2%	303	11.7%
Shoulder	126	8.7%	91	8.0%	217	8.4%
Hand/wrist	124	8.5%	138	12.2%	262	10.1%
Hip/thigh/upper leg	82	5.6%	119	10.5%	201	7.8%
Trunk	76	5.2%	73	6.4%	149	5.8%
Lower leg	63	4.3%	37	3.3%	100	3.9%
Arm/elbow	67	4.6%	44	3.9%	111	4.3%
Foot	33	2.3%	33	2.9%	66	2.6%
Neck	34	2.3%	26	2.3%	60	2.3%
Other	40	2.7%	48	4.2%	88	3.4%
Total	**1,456**	**100.0%**	**1,132**	**100.0%**	**2,588**	**100.0%**

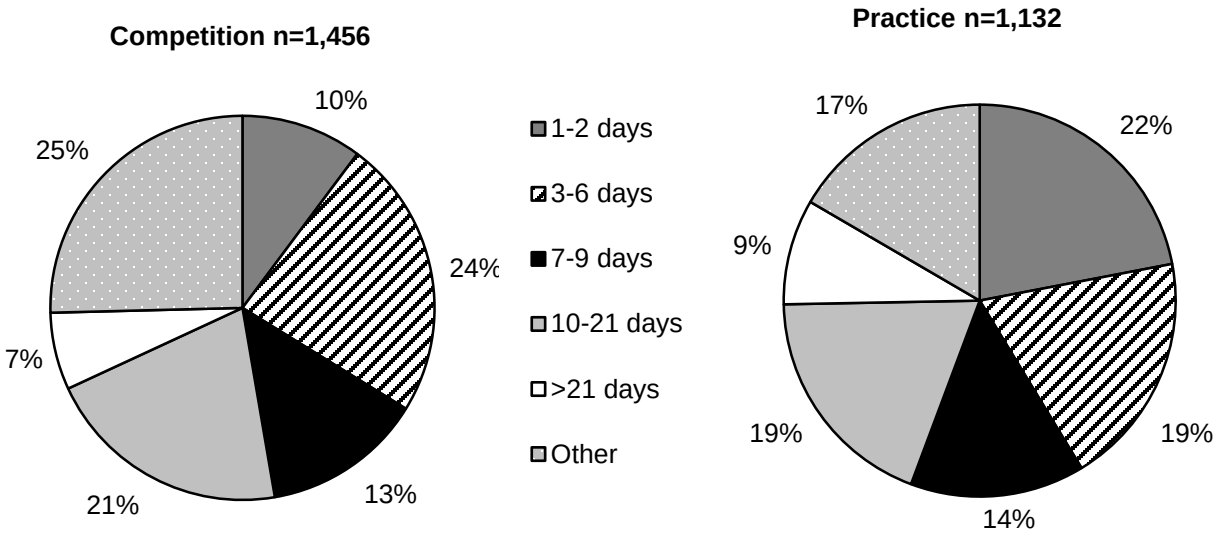
†Totals and n's are not always equal due to slight rounding or missing responses.

Table 3.4 Ten Most Common Football Injury Diagnoses by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

	Competition n=1,453		Practice n=1,129		Total n=2,582	
	n	%	n	%	n	%
Diagnosis						
Head/face concussion	381	26.2%	237	21.0%	618	23.9%
Ankle strain/sprain	154	10.6%	118	10.5%	272	10.5%
Knee strain/sprain	141	9.7%	75	6.6%	216	8.4%
Hip/thigh/upper leg strain/sprain	34	2.3%	87	7.7%	121	4.7%
Hand/wrist fracture	54	3.7%	62	5.5%	116	4.5%
Knee other	59	4.1%	42	3.7%	101	3.9%
Shoulder strain/sprain	57	3.9%	43	3.8%	100	3.9%
Shoulder other	53	3.6%	44	3.9%	97	3.8%
Hand/wrist strain/sprain	34	2.3%	32	2.8%	66	2.6%
Knee contusion	40	2.8%	20	1.8%	60	2.3%

†Totals and n's are not always equal due to slight rounding or missing responses.

Figure 3.2 Time Loss of Football Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year



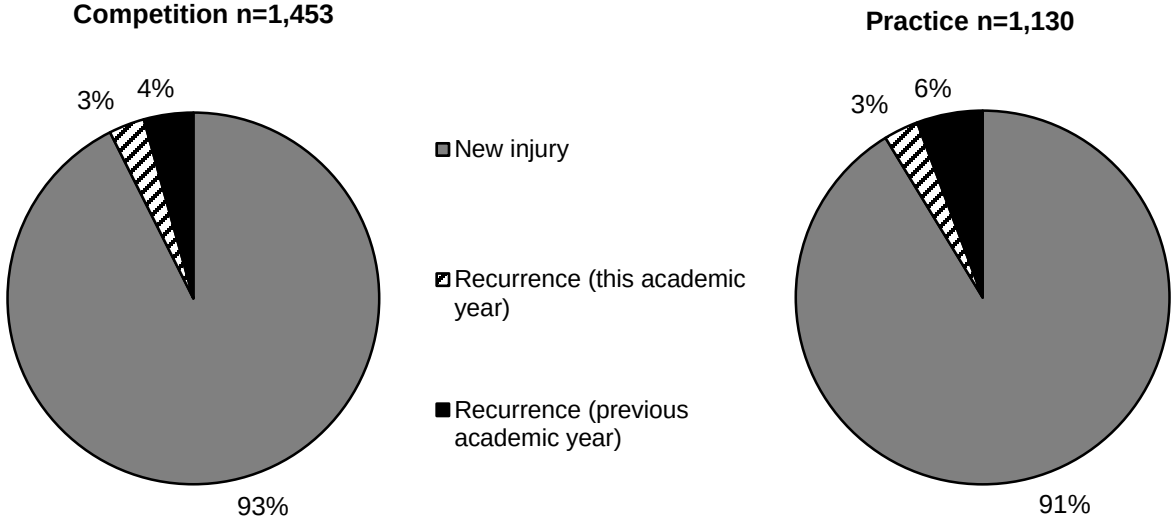
*Other category is made up of medical disqualification for season, medical disqualification for career, athlete chooses not to continue, and season ended before athlete returned to play

Table 3.5 Football Injuries Requiring Surgery by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

	Competition		Practice		Overall	
	n	%	n	%	n	%
Need for surgery						
Required surgery	136	9.5%	64	5.7%	200	7.9%
Did not require surgery	1,295	90.5%	1,050	94.3%	2,345	92.1%
Total	**1,431**	**100.0%**	**1,114**	**100.0%**	**2,545**	**100.0%**

†Totals and n's are not always equal due to slight rounding or missing responses.

Figure 3.3 History of Football Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year



† An answer of "unknown" was selected 0.1%.

Table 3.6 Time during Season of Football Injuries, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

	n	%
Time in Season		
Preseason	609	23.6%
Regular season	1867	72.3%
Post season	102	4.0%
Total	**2,578**	**100.0%**

†Totals and n's are not always equal due to slight rounding or missing responses.

Table 3.7 Competition-Related Variables for Football Injuries, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

	n	%
Time in Competition		
Pre-competition/warm-ups	9	0.7%
First quarter	157	11.8%
Second quarter	398	30.0%
Third quarter	407	30.7%
Fourth quarter	351	26.5%
Overtime	4	0.3%
Total	**1,326**	**100.0%**
Field Location		
Between the 20 yard lines	886	65.4%
Red zone (20 yard line to goal line)	242	17.9%
End zone	25	1.8%
Off the field	10	0.7%
Unknown	192	14.2%
Total	**1,355**	**100.0%**

†Totals and n's are not always equal due to slight rounding or missing responses.

Table 3.8 Practice-Related Variables for Football Injuries, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

	n	%
Time in Practice		
First 1/2 hour	96	8.7%
Second 1/2 hour	185	16.7%
1-2 hours into practice	614	55.6%
>2 hours into practice	109	9.9%
Unknown	101	9.1%
Total	**1,105**	**100.0%**

†Totals and n's are not always equal due to slight rounding or missing responses.

Figure 3.4 Player Position of Football Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

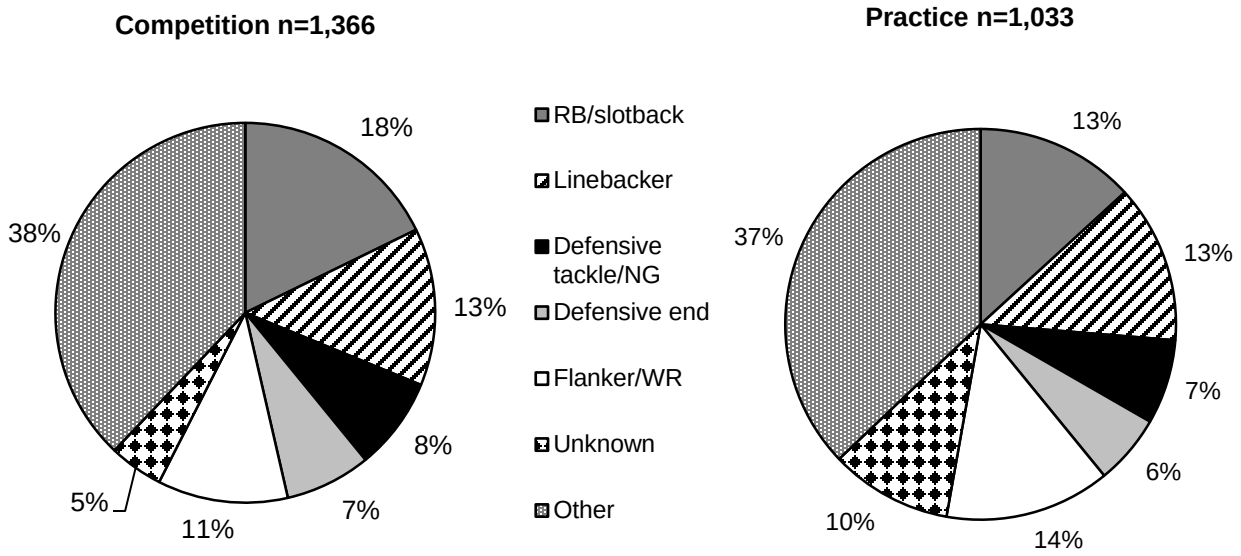


Table 3.9 Activities Leading to Football Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

	Competition		Practice		Overall	
	n	**%**	**n**	**%**	**n**	**%**
Activity						
Being tackled	455	32.9%	193	18.0%	648	26.4%
Tackling	331	23.9%	169	15.8%	500	20.4%
Blocking	208	15.0%	193	18.0%	401	16.3%
Being blocked	113	8.3%	74	6.9%	187	7.6%
N/A (e.g., overuse, heat illness, etc.)	23	1.7%	113	10.6%	136	5.5%
Stepped on/fell on/kicked	78	5.6%	63	5.9%	141	5.7%
Rotation around a planted foot/inversion	34	2.5%	54	5.0%	88	3.6%
Contact with ball	4	0.3%	29	2.7%	33	1.3%
Uneven playing surface	4	0.3%	16	1.5%	20	0.8%
Contact with blocking sled/dummy	0	0.0%	19	1.8%	19	0.8%
Contact with goal posts/yard marker/etc.	0	0.0%	3	0.3%	3	0.1%
Unknown	88	6.4%	74	6.9%	162	6.6%
Other	47	3.4%	71	6.6%	118	4.8%
Total	**1,385**	**100.0%**	**1,071**	**100.0%**	**2,456**	**100.0%**

†Totals and n's are not always equal due to slight rounding or missing responses.

Table 3.10 Activity Resulting in Football Injuries by Injury Diagnosis, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

	Diagnosis									
	Strain/Sprain		Contusion		Fracture		Concussion		Other	
	n	%	n	%	n	%	n	%	n	%
Activity										
Being tackled	206	22.8%	121	37.8%	78	31.3%	165	28.9%	76	18.7%
Tackling	156	17.2%	62	19.4%	49	19.7%	158	27.7%	75	18.4%
Blocking	154	17.0%	54	16.9%	29	11.6%	109	19.1%	54	13.3%
Being blocked	50	5.5%	35	10.9%	17	6.8%	57	10.0%	28	6.9%
No contact (overuse/illness)	52	5.7%	0	0.0%	2	0.8%	0	0.0%	82	20.1%
Unknown	48	5.3%	12	3.8%	13	5.2%	63	11.0%	26	6.4%
Other	239	26.4%	36	11.3%	61	24.5%	19	3.3%	66	16.2%
Total	**905**	**100.0%**	**320**	**100.0%**	**249**	**100.0%**	**571**	**100.0%**	**407**	**100.0%**

IV. Boys' Soccer Injury Epidemiology

Table 4.1 Boys' Soccer Injury Rates by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

	# Injuries	# Exposures	Injury rate (per 1,000 athlete-exposures)
Total	**432**	**246,595**	**1.75**
Competition	289	75,751	3.82
Practice	143	170,844	0.84

Table 4.2 Demographic Characteristics of Injured Boys' Soccer Athletes, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year*

Year in School	**n=420**
Freshman	20.5%
Sophomore	25.2%
Junior	23.6%
Senior	30.7%
Total†	**100.0%**
Age (years)	
Minimum	12
Maximum	19
Mean (St. Dev.)	15.9 (1.30)
BMI	
Minimum	16.3
Maximum	37.8
Mean (St. Dev.)	22.9 (3.2)

*All analyses in this report present data un-weighted
†Throughout this report, totals and n's represent the total un-weighted numbers 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, 2016-17 School Year

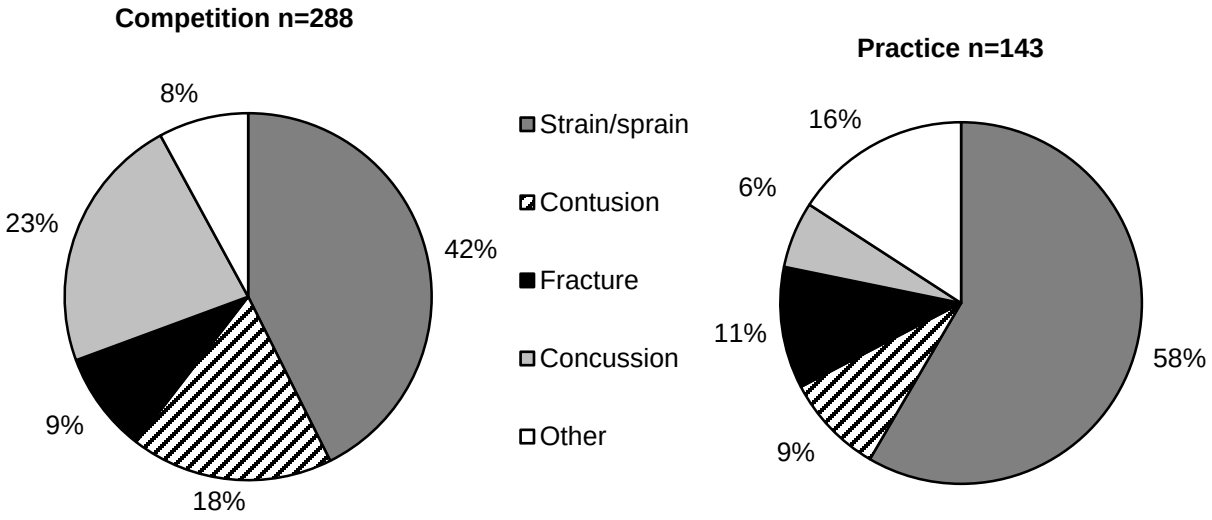


Table 4.3 Body Site of Boys' Soccer Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

	Competition		Practice		Overall	
	n	**%**	**n**	**%**	**n**	**%**
Body Site						
Hip/thigh/upper leg	39	13.5%	47	32.9%	86	19.9%
Head/face	74	25.65	10	7.0%	84	19.4%
Ankle	56	12.1%	22	15.4%	78	18.1%
Knee	35	12.1%	18	12.6%	53	12.3%
Lower leg	17	5.9%	13	9.1%	30	6.9%
Foot	19	6.6%	7	4.9%	26	6.0%
Trunk	18	6.2%	7	4.9%	25	5.8%
Hand/wrist	13	4.5%	11	7.7%	24	5.6%
Shoulder	7	2.4%	3	2.1%	10	2.3%
Arm/elbow	4	1.4%	3	2.1%	7	1.6%
Neck	1	0.3%	0	0.0%	1	0.2%
Other	6	2.1%	2	1.4%	8	1.9%
Total	**289**	**100.0%**	**143**	**100.0%**	**432**	**100.0%**

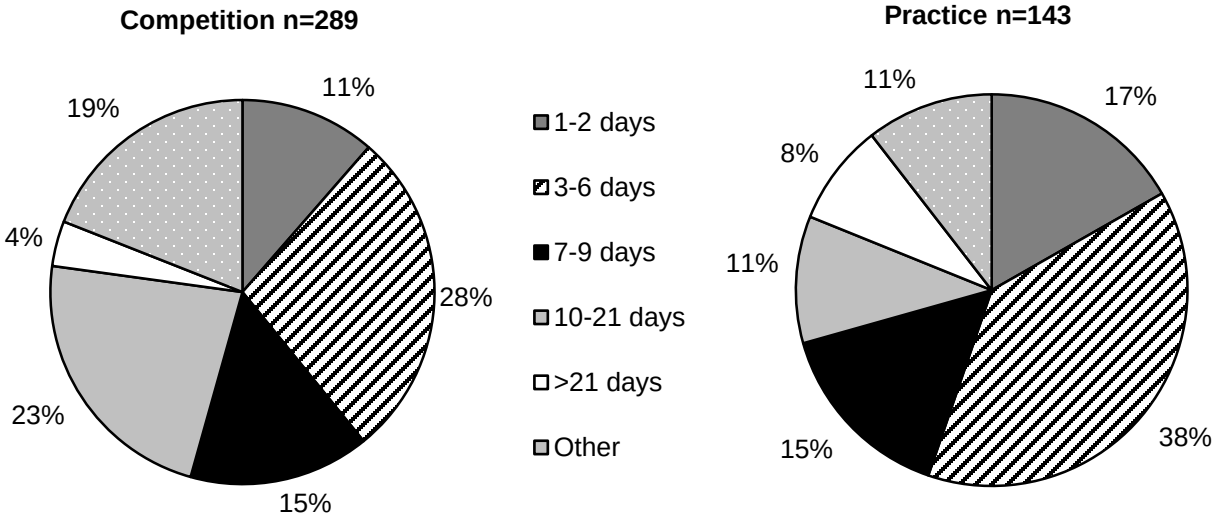
†Totals and n's are not always equal due to slight rounding or missing responses.

Table 4.4 Ten Most Common Boys' Soccer Injury Diagnoses by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

	Competition n=288		Practice n=143		Total n=432	
	n	%	n	%	n	%
Diagnosis						
Head/face concussion	73	21.3%	33	17.0%	106	19.7%
Ankle strain/sprain	68	19.8%	28	14.4%	96	17.9%
Hip/thigh/upper leg strain/sprain	30	8.7%	37	19.1%	67	12.5%
Knee strain/sprain	22	6.4%	11	5.7%	33	6.1%
Knee other	16	4.7%	11	5.7%	27	5.0%
Lower leg strain/sprain	9	2.6%	7	3.6%	16	3.0%
Hip/thigh/upper leg contusion	11	3.2%	4	2.1%	15	2.8%
Lower leg contusion	12	3.5%	2	1.0%	14	2.6%
Trunk strain/sprain	6	1.7%	7	3.6%	13	2.4%
Knee contusion	12	3.5%	1	0.5%	13	2.4%

†Totals and n's are not always equal due to slight rounding or missing responses.

Figure 4.2 Time Loss of Boys' Soccer Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2016-17 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, 2016-17 School Year

	Competition		Practice		Overall	
	n	%	n	%	n	%
Need for surgery						
Required surgery	13	4.5%	6	4.3%	19	4.4%
Did not require surgery	273	95.5%	135	95.7%	408	95.6%
Total	**286**	**100.0%**	**141**	**100.0%**	**427**	**100.0%**

†Totals and n's are not always equal due to slight rounding or missing responses.

Figure 4.3 History of Boys' Soccer Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

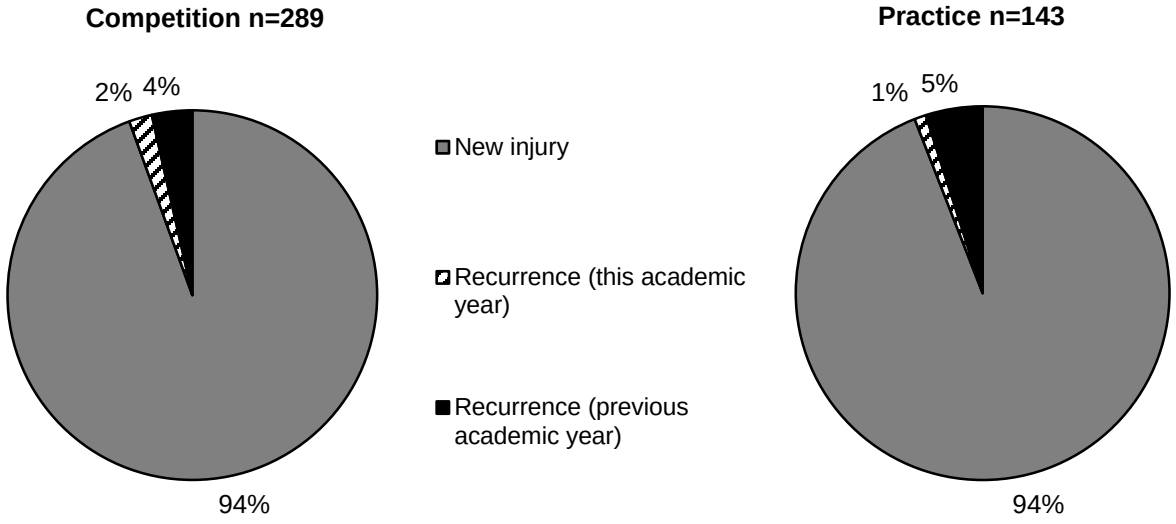


Table 4.6 Time during Season of Boys' Soccer Injuries, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

	n	%
Time in Season		
Preseason	81	18.8%
Regular season	323	75.1%
Post season	26	6.0%
Total	**430**	**100.0%**

†Totals and n's are not always equal due to slight rounding or missing responses.

Table 4.7 Competition-Related Variables for Boys' Soccer Injuries, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

	n	%
Time in Competition		
Pre-competition/warm-ups	12	4.3%
First half	62	22.1%
Second half	160	57.1%
Overtime	2	0.7%
Unknown	44	15.7%
Total	**280**	**100.0%**
Field Location		
Top of goal box extended to center line (offense)	50	18.2%
Top of goal box extended to center line (defense)	48	17.5%
Goal box (defense)	38	13.8%
Side of goal box (offense)	24	8.7%
Side of goal box (defense)	17	6.2%
Goal box (offense)	15	5.5%
Off the field	2	0.7%
Unknown	81	29.5%
Total	**275**	**100.0%**

†Totals and n's are not always equal due to slight rounding or missing responses.

Table 4.8 Practice-Related Variables for Boys' Soccer Injuries, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

	n	%
Time in Practice		
First 1/2 hour	17	12.1%
Second 1/2 hour	30	21.4%
1-2 hours into practice	67	47.9%
>2 hours into practice	6	4.3%
Unknown	20	14.3%
Total	**140**	**100.0%**

†Totals and n's are not always equal due to slight rounding or missing responses.

Figure 4.4 Player Position of Boys' Soccer Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

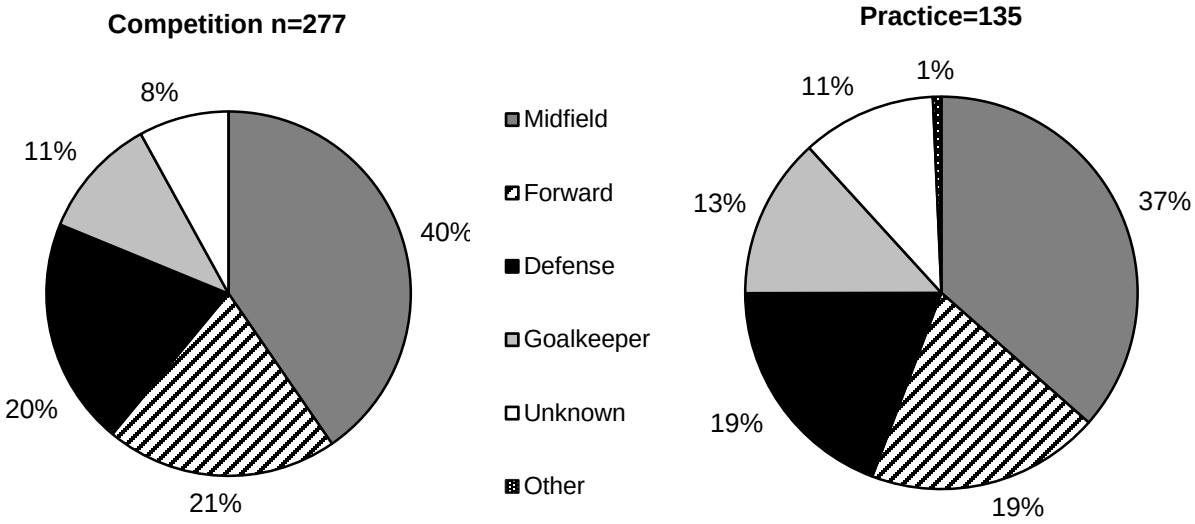


Table 4.9 Activities Leading to Boys' Soccer Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

	Competition		Practice		Overall	
	n	**%**	**n**	**%**	**n**	**%**
Activity						
General play	51	18.3%	44	32.6%	95	22.9%
Defending	38	13.6%	10	7.4%	48	11.6%
Ball handling/dribbling	28	10.0%	9	6.7%	37	8.9%
Chasing loose ball	27	9.7%	10	7.4%	37	8.9%
Goaltending	21	7.5%	15	11.1%	36	8.7%
Heading ball	26	9.3%	3	2.2%	29	7.0%
Shooting (foot)	12	5.4%	7	5.2%	22	5.3%
Passing (foot)	12	4.3%	6	4.4%	18	4.3%
Conditioning	1	0.4%	17	12.6%	18	4.3%
Receiving pass	11	3.9%	0	0.0%	11	2.7%
Blocking shot	7	2.5%	2	1.5%	9	2.2%
Receiving a slide tackle	5	1.8%	1	0.7%	6	1.4%
Attempting a slide tackle	2	0.7%	1	0.7%	3	0.7%
Other	6	2.2%	2	1.5%	8	1.9%
Unknown	29	10.4%	8	5.9%	37	8.9%
Total	**276**	**100.0%**	**135**	**100.0%**	**414**	**100.0%**

†Totals and n's are not always equal due to slight rounding or missing responses.

Table 4.10 Activity Resulting in Boys' Soccer Injuries by Injury Diagnosis, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

	Diagnosis									
	Strain/Sprain		Contusion		Fracture		Concussion		Other	
	n	%	n	%	n	%	n	%	n	%
Activity										
General play	63	32.0%	9	14.1%	5	13.5%	6	8.6%	11	24.4%
Defending	20	10.2%	10	15.6%	6	16.2%	10	14.3%	2	4.4%
Ball handling/ dribbling	17	8.6%	9	14.1%	4	10.8%	4	5.7%	3	6.7%
Chasing loose ball	18	9.1%	5	7.8%	5	13.5%	5	7.1%	4	8.9%
Heading ball	3	1.5%	4	6.3%	1	2.7%	20	28.6%	1	2.2%
Other	64	32.5%	22	34.4%	13	35.1%	17	24.3%	15	33.3%
Unknown	12	6.1%	5	7.8%	3	8.1%	8	11.4%	9	20.0%
Total	**197**	**100.0%**	**64**	**100.0%**	**37**	**100.0%**	**70**	**100.0%**	**45**	**100.0%**

†Totals and n's are not always equal due to slight rounding or missing responses.

V. Girls' Soccer Injury Epidemiology

Table 5.1 Girls' Soccer Injury Rates by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

	# Injuries	# Exposures	Injury rate (per 1,000 athlete-exposures)
Total	**502**	**199,915**	**2.51**
Competition	384	61,967	6.20
Practice	118	137,948	0.86

Table 5.2 Demographic Characteristics of Injured Girls' Soccer Athletes, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year*

Year in School	**n=486**
Freshman	25.1%
Sophomore	23.7%
Junior	25.7%
Senior	25.5%
Total†	**100.0%**
Age (years)	
Minimum	13
Maximum	18
Mean (St. Dev.)	15.8 (1.2)
BMI	
Minimum	15.9
Maximum	36.7
Mean (St. Dev.)	22.4 (3.1)

*All analyses in this report present un-weighted data
†Throughout this report, totals and n's represent the total un-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, 2016-17 School Year

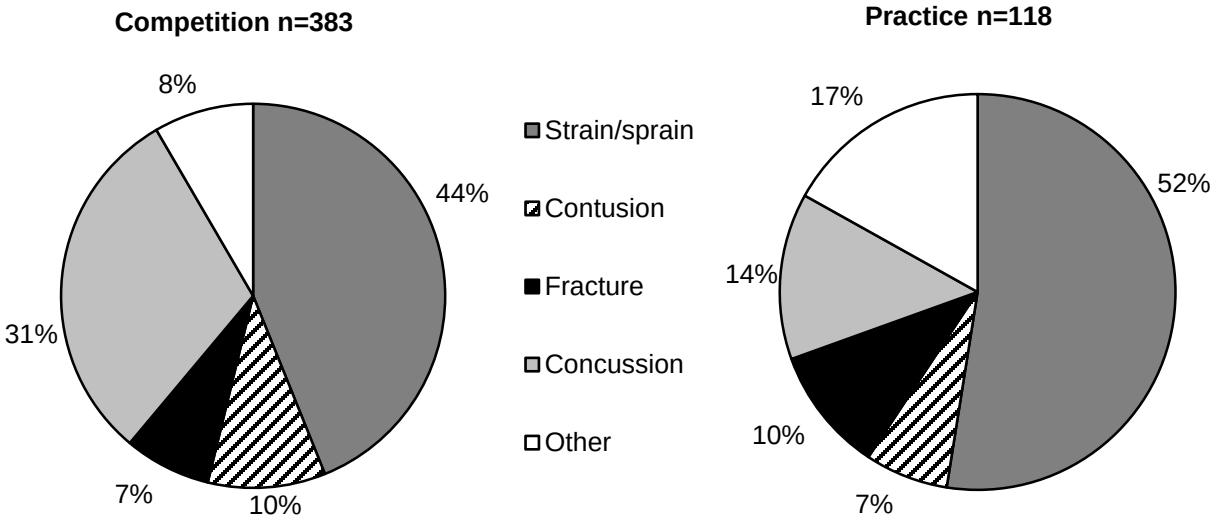


Table 5.3 Body Site of Girls' Soccer Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

	Competition		Practice		Overall	
	n	**%**	**n**	**%**	**n**	**%**
Body Site						
Head/face	126	32.8%	18	15.3%	144	28.7%
Ankle	92	24.0%	32	27.1%	124	24.7%
Knee	66	17.2%	15	12.7%	81	16.1%
Hip/thigh/upper leg	26	6.8%	24	20.3%	50	10.0%
Lower leg	16	4.2%	12	10.2%	28	5.6%
Hand/wrist	13	3.4%	7	5.9%	20	4.0%
Foot	16	4.2%	4	3.4%	20	4.0%
Trunk	10	2.6%	4	3.4%	14	2.8%
Arm/elbow	6	1.6%	1	0.8%	7	1.4%
Shoulder	5	1.3%	1	0.8%	6	1.2%
Neck	4	1.0%	0	0.0%	4	0.8%
Other	4	1.0%	0	0.0%	4	0.8%
Total	**384**	**100.0%**	**118**	**100.0%**	**502**	**100.0%**

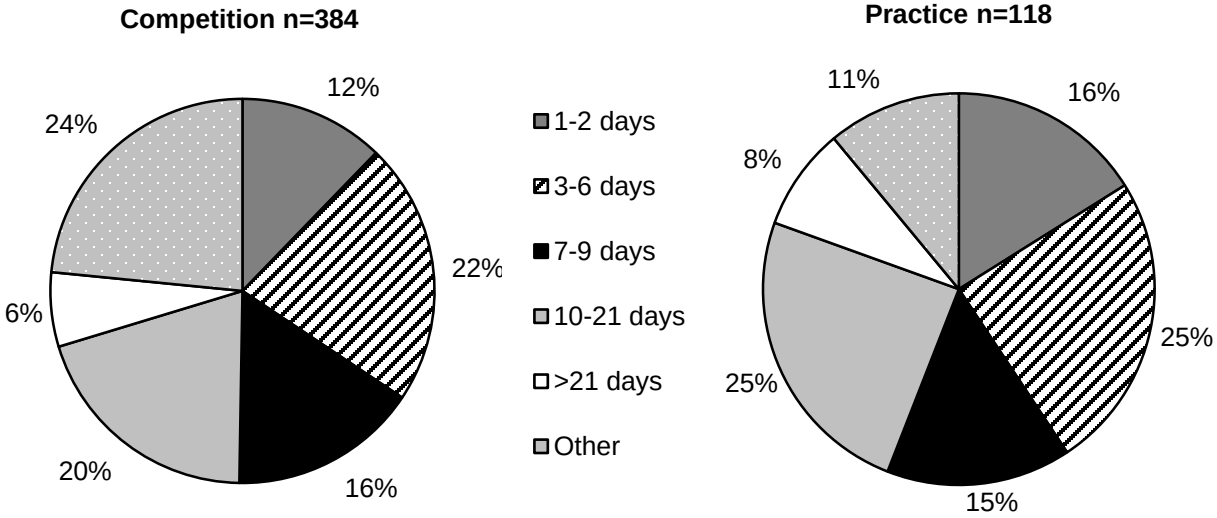
†Totals and n's are not always equal due to slight rounding or missing responses.

Table 5.4 Ten Most Common Girls' Soccer Injury Diagnoses by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

	Competition n=383		Practice n=118		Total n=501	
	n	%	n	%	n	%
Diagnosis						
Head/face concussion	117	30.5%	16	13.6%	133	26.5%
Ankle strain/sprain	86	22.5%	28	23.7%	114	22.8%
Hip/thigh/upper leg strain/sprain	22	5.7%	23	19.5%	45	9.0%
Knee strain/sprain	39	10.2%	5	4.2%	44	8.8%
Knee other	16	4.2%	6	5.1%	22	4.4%
Knee contusion	10	2.6%	4	3.4%	14	2.8%
Hand/wrist fracture	8	2.1%	6	5.1%	14	2.8%
Lower leg other	5	1.3%	8	6.8%	13	2.6%
Lower leg contusion	8	2.1%	1	0.8%	9	1.8%
Foot strain/sprain	6	1.6%	1	0.8%	7	1.4%

†Totals and n's are not always equal due to slight rounding or missing responses.

Figure 5.2 Time Loss of Girls' Soccer Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2016-17 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, 2016-17 School Year

	Competition		Practice		Overall	
	n	%	n	%	n	%
Need for surgery						
Required surgery	28	7.4%	5	4.3%	33	6.7%
Did not require surgery	350	92.6%	111	95.7%	461	93.3%
Total	**378**	**100.0%**	**116**	**100.0%**	**494**	**100.0%**

†Totals and n's are not always equal due to slight rounding or missing responses.

Figure 5.3 History of Girls' Soccer Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

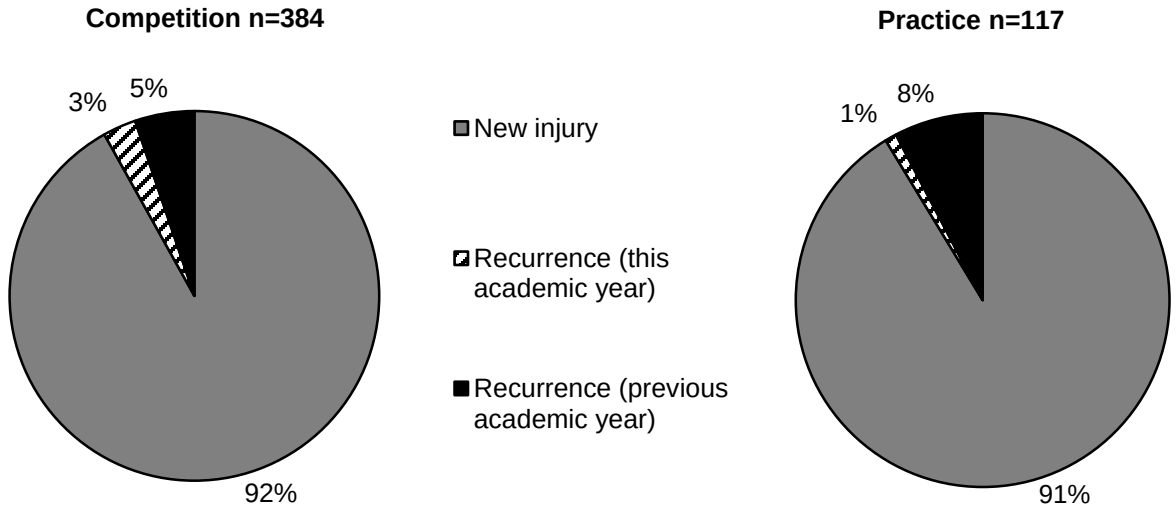


Table 5.6 Time during Season of Girls' Soccer Injuries, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

	n	%
Time in Season		
Preseason	74	14.8%
Regular season	416	83.0%
Post season	10	2.0%
Unknown	1	0.2%
Total	**501**	**100.0%**

†Totals and n's are not always equal due to slight rounding or missing responses.

Table 5.7 Competition-Related Variables for Girls' Soccer Injuries, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

	n	%
Time in Competition		
Pre-competition/warm-ups	16	4.4%
First half	101	28.0%
Second half	195	54.0%
Overtime	1	0.3%
Unknown	48	13.3%
Total	**361**	**100.0%**
Field Location		
Top of goal box extended to center line (defense)	68	18.9%
Goal box (defense)	65	18.1%
Top of goal box extended to center line (offense)	59	16.4%
Side of goal box (defense)	25	7.0%
Goal box (offense)	23	6.4%
Side of goal box (offense)	12	3.3%
Off the field	4	1.1%
Unknown	103	28.7%
Total	**359**	**100.0%**

†Totals and n's are not always equal due to slight rounding or missing responses.

Table 5.8 Practice-Related Variables for Girls' Soccer Injuries, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

	n	%
Time in Practice		
First 1/2 hour	13	11.6%
Second 1/2 hour	18	16.1%
1-2 hours into practice	45	40.2%
>2 hours into practice	9	8.0%
Unknown	27	24.1%
Total	**112**	**100.0%**

†Totals and n's are not always equal due to slight rounding or missing responses.

Figure 5.4 Player Position of Girls' Soccer Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

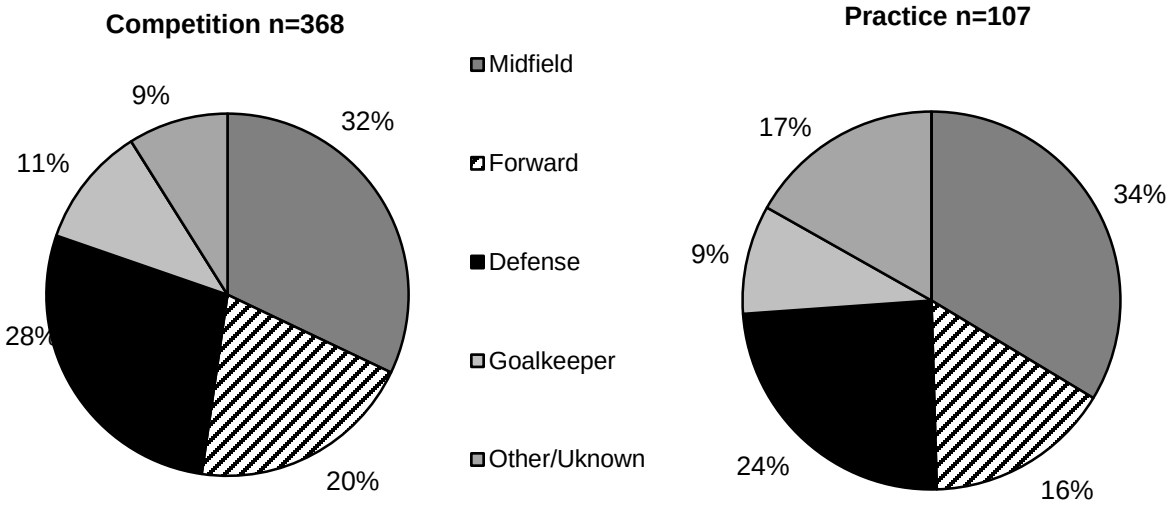


Table 5.9 Activities Leading to Girls' Soccer Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

	Competition		Practice		Overall	
	n	%	n	%	n	%
Activity						
Defending	73	20.1%	7	6.5%	80	17.0%
General play	52	14.3%	21	19.6%	73	15.5%
Chasing loose ball	41	11.3%	10	9.3%	51	10.8%
Ball handling/dribbling	31	8.5%	15	14.0%	46	9.8%
Heading ball	38	10.4%	5	4.7%	43	9.1%
Goaltending	31	8.5%	6	5.6%	37	7.9%
Passing (foot)	16	4.4%	7	6.5%	23	4.9%
Receiving pass	15	4.1%	2	1.9%	17	3.6%
Shooting (foot)	12	3.3%	5	4.7%	17	3.6%
Blocking shot	10	2.7%	3	2.8%	13	2.8%
Conditioning	0	0.0%	11	10.3%	11	2.3%
Attempting a slide tackle	4	1.1%	0	0.0%	4	0.8%
Receiving a slide tackle	4	1.1%	0	0.0%	4	0.8%
Other	2	0.5%	3	2.8%	5	1.1%
Unknown	35	9.6%	12	11.2%	47	10.0%
Total	**364**	**100.0%**	**107**	**100.0%**	**471**	**100.0%**

†Totals and n's are not always equal due to slight rounding or missing responses.

Table 5.10 Activity Resulting in Girls' Soccer Injuries by Injury Diagnosis, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

	Diagnosis									
	Strain/Sprain		Contusion		Fracture		Concussion		Other	
	n	%	n	%	n	%	n	%	n	%
Activity										
General play	33	15.5%	8	17.4%	5	13.2%	11	8.7%	16	33.3%
Defending	34	16.0%	7	15.2%	9	23.7%	25	19.8%	5	10.4%
Chasing loose ball	28	13.1%	6	13.0%	3	7.9%	11	8.7%	3	6.3%
Heading ball	5	2.3%	1	2.2%	3	7.9%	31	24.6%	3	6.3%
Ball handling /dribbling	36	16.9%	2	4.3%	3	7.9%	3	2.4%	2	4.2%
Other	66	31.0%	21	45.7%	11	28.9%	25	19.8%	8	16.7%
Unknown	11	5.2%	1	2.2%	4	10.5%	20	15.9%	11	22.9%
Total	**213**	**100.0%**	**46**	**100.0%**	**38**	**100.0%**	**126**	**100.0%**	**48**	**100.0%**

†Totals and n's are not always equal due to slight rounding or missing responses.

VI. Girls' Volleyball Injury Epidemiology

Table 6.1 Girls' Volleyball Injury Rates by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

	# Injuries	# Exposures	Injury rate (per 1,000 athlete-exposures)
Total	**240**	**227,698**	**1.05**
Competition	122	74,068	1.65
Practice	118	153,630	0.77

Table 6.2 Demographic Characteristics of Injured Girls' Volleyball Athletes, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year*

Year in School	**n=228**
Freshman	27.6%
Sophomore	28.9%
Junior	14.5%
Senior	28.9%
Total†	**100.0%**
Age (years)	
Minimum	13
Maximum	18
Mean (St. Dev.)	15.5 (1.2)
BMI	
Minimum	16.3
Maximum	40.2
Mean (St. Dev.)	22.3 (3.4)

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

Figure 6.1 Diagnosis of Girls' Volleyball Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

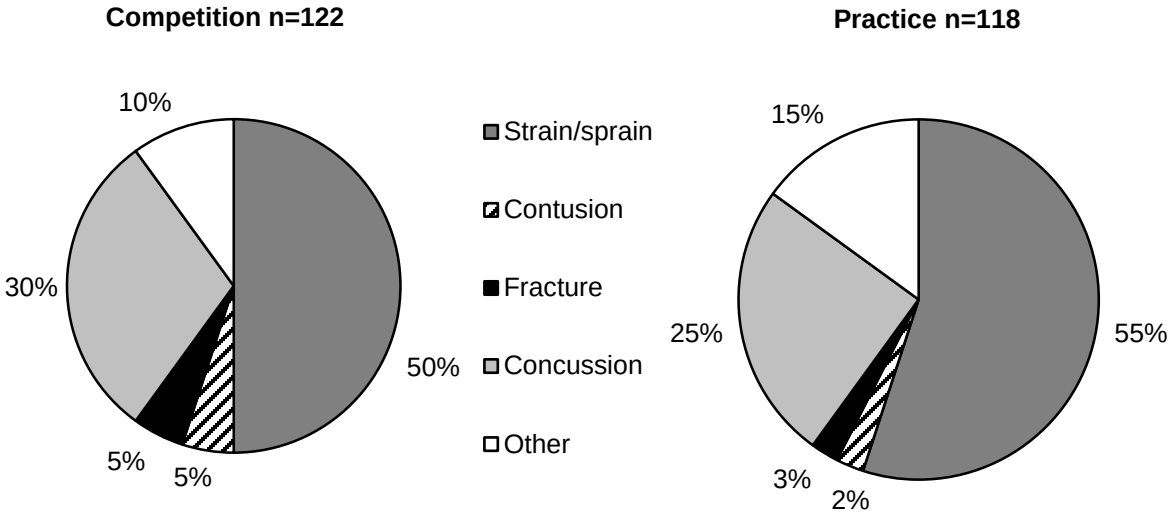


Table 6.3 Body Site of Girls' Volleyball Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

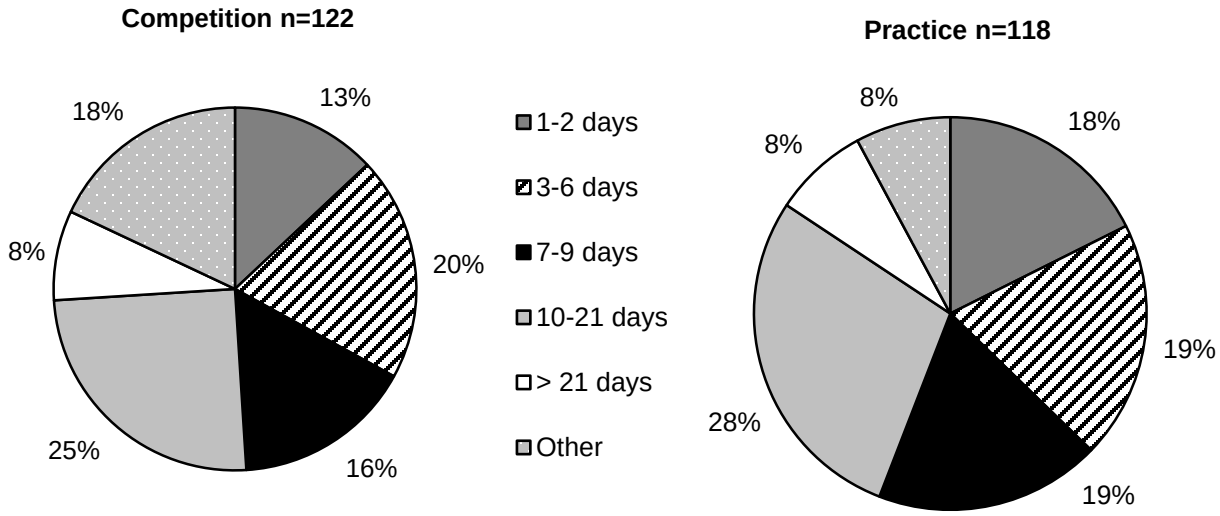
	Competition		Practice		Overall	
	n	**%**	**n**	**%**	**n**	**%**
Body Site						
Ankle	37	30.3%	36	30.5%	73	30.4%
Head/face	43	35.2%	30	25.4%	73	30.4%
Hand/wrist	8	6.6%	2	1.7%	10	4.2%
Knee	13	10.7%	11	9.3%	24	10.0%
Shoulder	4	3.3%	17	14.4%	21	8.8%
Trunk	5	4.1%	6	5.1%	11	4.6%
Hip/thigh/upper leg	6	4.9%	5	4.2%	11	4.6%
Foot	2	1.6%	2	1.7%	4	1.7%
Lower leg	1	0.8%	4	3.4%	5	2.1%
Neck	1	0.8%	4	3.4%	5	2.1%
Arm/elbow	2	1.6%	0	0.0%	2	0.8%
Other	0	0.0%	1	0.8%	1	0.4%
Total	**122**	**100.0%**	**118**	**100.0%**	**240**	**100.0%**

†Totals and n's are not always equal due to slight rounding or missing responses.

Table 6.4 Ten Most Common Girls' Volleyball Injury Diagnoses by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

	Competition n=122		Practice n=118		Total n=240	
	n	%	n	%	n	%
Diagnosis						
Ankle strain/sprain	36	29.5%	35	29.7%	71	29.6%
Head/face concussion	37	30.3%	29	24.6%	66	27.5%
Shoulder strain/sprain	0	0.0%	14	11.9%	14	5.8%
Knee strain/sprain	11	9.0%	2	1.7%	13	5.4%
Knee other	2	1.6%	7	5.9%	9	3.8%
Hip/thigh/upper leg strain/sprain	5	4.1%	3	2.5%	8	3.3%
Trunk strain/sprain	3	2.5%	4	3.4%	7	2.9%
Shoulder other	4	3.3%	3	2.5%	7	2.9%
Hand/wrist strain/sprain	4	3.3%	1	0.8%	5	2.1%
Neck other	0	0.0%	5	4.2%	5	2.1%

Figure 6.2 Time Loss of Girls' Volleyball Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year



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

Table 6.5 Girls' Volleyball Injuries Requiring Surgery by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

	Competition		Practice		Overall	
	n	%	n	%	n	%
Need for surgery						
Required surgery	7	5.8%	0	0.0%	7	2.9%
Did not require surgery	114	94.2%	116	100.0%	230	97.1%
Total	**121**	**100.0%**	**116**	**100.0%**	**237**	**100.0%**

†Totals and n's are not always equal due to slight rounding or missing responses.

Figure 6.3 History of Girls' Volleyball Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

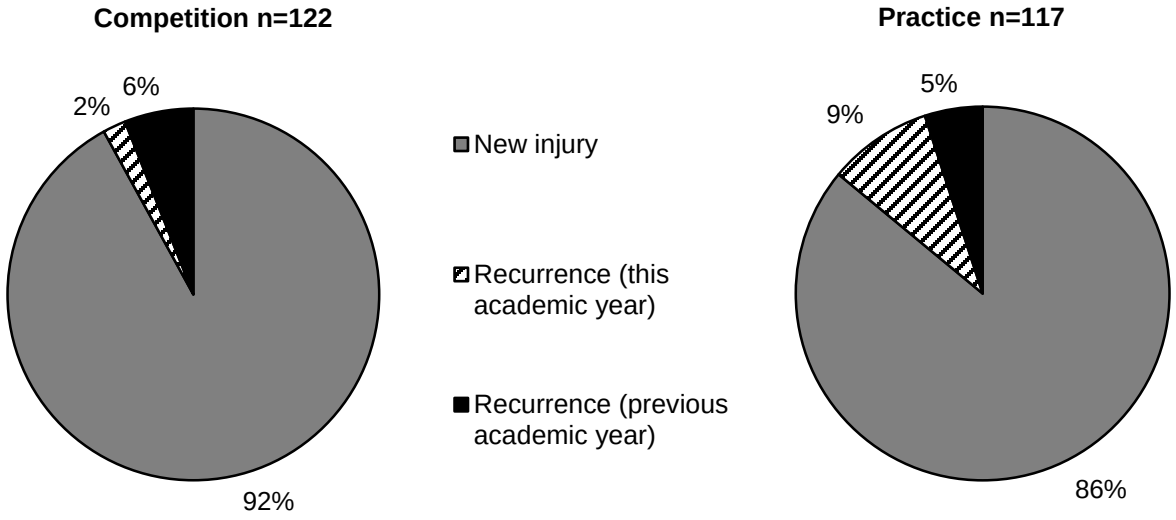


Table 6.6 Time during Season of Girls' Volleyball Injuries, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

	n	%
Time in Season		
Preseason	44	18.3%
Regular season	190	79.2%
Post season	6	2.5%
Total	**240**	**100.0%**

†Totals and n's are not always equal due to slight rounding or missing responses.

Table 6.7 Competition-Related Variables for Girls' Volleyball Injuries, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

	n	%
Time in Competition		
Pre-competition/warm-ups	16	14.2%
First set	15	13.3%
Second set	30	26.5%
Third set	19	16.8%
Fourth set	3	2.7%
Fifth set	2	1.8%
Unknown	28	24.8%
Total	**113**	**100.0%**
Court Location		
Unknown	37	33.0%
Left forward	16	14.3%
Right forward	16	14.3%
Middle forward	13	11.6%
Left back	11	9.8%
At the net	8	7.1%
Outside the playable area	7	6.3%
Right back (server)	3	2.7%
Outside court (your side)	1	0.9%
Total	**112**	**100.0%**

†Totals and n's are not always equal due to slight rounding or missing responses.

Table 6.8 Practice-Related Variables for Girls' Volleyball Injuries, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

	n	%
Time in Practice		
First 1/2 hour	10	8.8%
Second 1/2 hour	22	19.5%
1-2 hours into practice	58	51.3%
>2 hours into practice	11	9.7%
Unknown	12	10.6%
Total	**113**	**100.0%**

†Totals and n's are not always equal due to slight rounding or missing responses.

Figure 6.4 Player Position of Girls' Volleyball Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

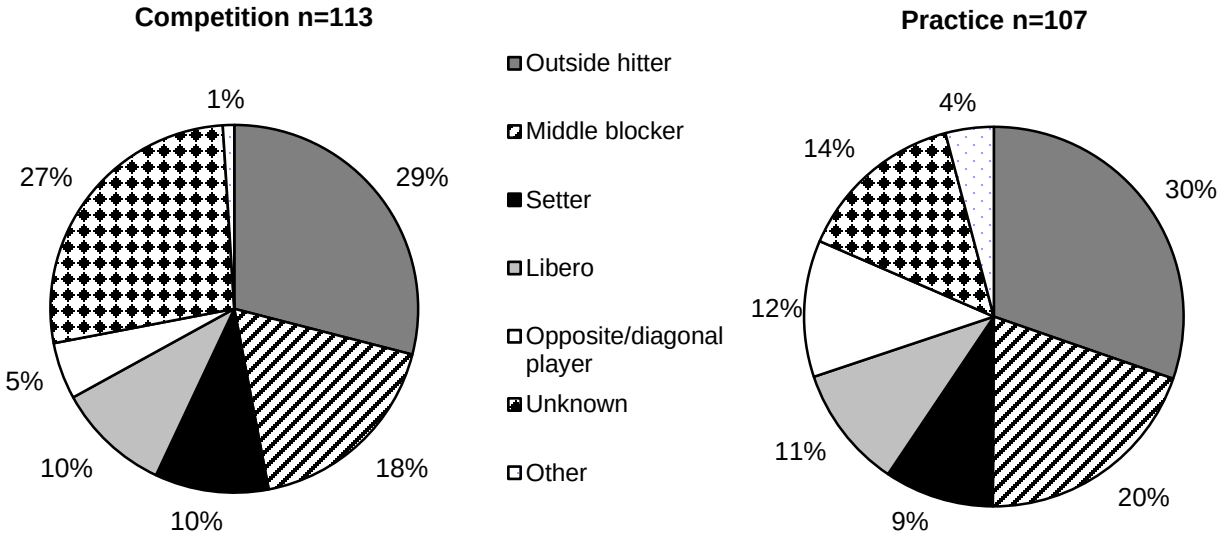


Table 6.9 Activities Leading to Girls' Volleyball Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

	Competition		Practice		Overall	
	n	%	n	%	n	%
Activity						
Blocking	32	27.6%	17	15.6%	49	21.8%
Digging	36	31.0%	12	11.0%	48	21.3%
General play	12	10.3%	23	21.1%	35	15.6%
Spiking	10	8.6%	21	19.3%	31	13.8%
Passing	10	8.6%	15	13.8%	25	11.1%
Serving	2	1.7%	8	7.3%	10	4.4%
Conditioning	0	0.0%	6	5.5%	6	2.7%
Setting	1	0.9%	2	1.8%	3	1.3%
Other	3	2.6%	1	0.9%	4	1.8%
Unknown	10	8.6%	4	3.7%	14	6.2%
Total	**116**	**100.0%**	**109**	**100.0**	**225**	**100.0%**

†Totals and n's are not always equal due to slight rounding or missing responses.

Table 6.10 Activity Resulting in Girls' Volleyball Injuries by Injury Diagnosis, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

	Diagnosis									
	Strain/Sprain		Contusion		Fracture		Concussion		Other	
	n	%	n	%	n	%	n	%	n	%
Activity										
General play	13	11.2%	1	11.1%	1	11.1%	10	16.4%	10	33.3%
Blocking	42	36.2%	2	22.2%	3	33.3%	1	1.6%	1	3.3%
Digging	12	10.3%	4	44.4%	3	33.3%	24	39.3%	5	16.7%
Spiking	26	22.4%	0	0.0%	1	11.1%	1	1.6%	3	10.0%
Passing	8	6.9%	1	11.1%	0	0.0%	15	24.6%	3	10.0%
Other	12	10.3%	0	0.0%	1	10.3%	5	8.2%	3	10.3%
Unknown	3	2.6%	1	11.1%	0	0.0%	5	8.2%	5	16.7%
Total	**116**	**100.0%**	**9**	**100.0%**	**9**	**100.0%**	**61**	**100.0%**	**30**	**100.0%**

†Totals and n's are not always equal due to slight rounding or missing responses.

VII. Boys' Basketball Injury Epidemiology

Table 7.1 Boys' Basketball Injury Rates by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

	# Injuries	# Exposures	Injury rate (per 1,000 athlete-exposures)
Total	**430**	**292,675**	**1.47**
Competition	226	89,868	2.51
Practice	204	202,807	1.01

Table 7.2 Demographic Characteristics of Injured Boys' Basketball Athletes, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year*

Year in School	**n=416**
Freshman	22.4%
Sophomore	21.6%
Junior	27.2%
Senior	28.8%
Total†	**100.0%**
Age (years)	
Minimum	12
Maximum	19
Mean (St. Dev.)	16.2 (1.2)
BMI	
Minimum	15.0
Maximum	43.3
Mean (St. Dev.)	24.0 (3.7)

*All analyses in this report present un-weighted data.
†Throughout this report, totals and n's represent the total un-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, 2016-17 School Year

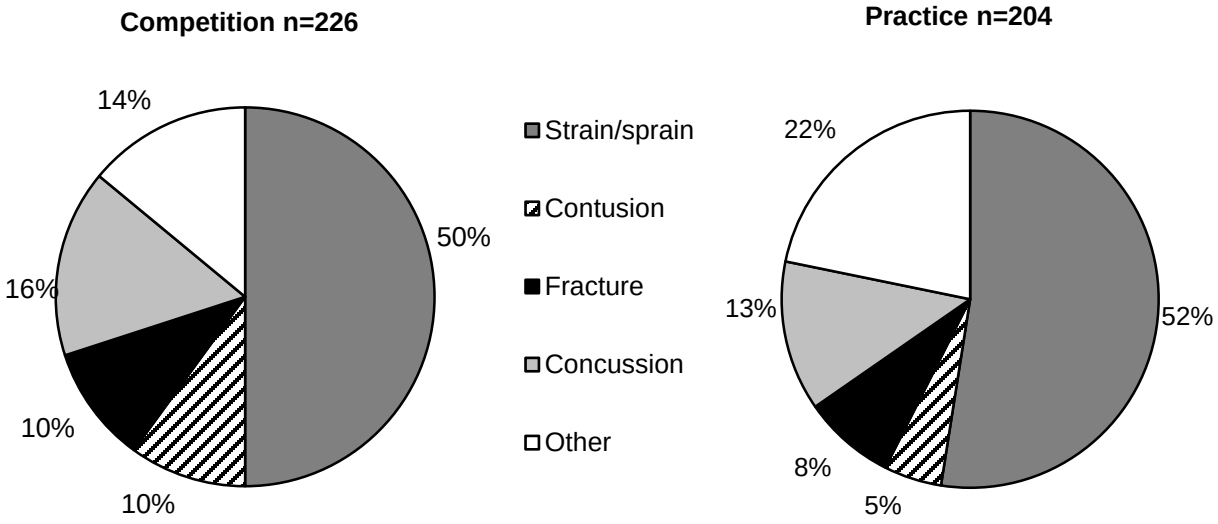


Table 7.3 Body Site of Boys' Basketball Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

	Competition		Practice		Overall	
	n	**%**	**n**	**%**	**n**	**%**
Body Site						
Ankle	70	31.0%	79	38.7%	149	34.7%
Head/face	54	23.9%	39	19.1%	93	21.6%
Knee	30	13.3%	17	8.3%	47	10.9%
Hand/wrist	22	9.7%	16	7.8%	38	8.8%
Hip/thigh/upper leg	15	6.6%	13	6.4%	28	6.5%
Lower leg	11	4.9%	13	6.4%	24	5.6%
Foot	11	4.9%	4	2.0%	15	3.5%
Shoulder	6	2.7%	8	3.9%	14	3.3%
Trunk	4	1.8%	7	3.4%	11	2.6%
Arm/elbow	3	1.3%	4	2.0%	7	1.6%
Other	0	0.0%	3	1.5%	3	0.7%
Neck	0	0.0%	1	0.5%	1	0.2%
Total	**226**	**100.0%**	**204**	**100.0%**	**430**	**100.0%**

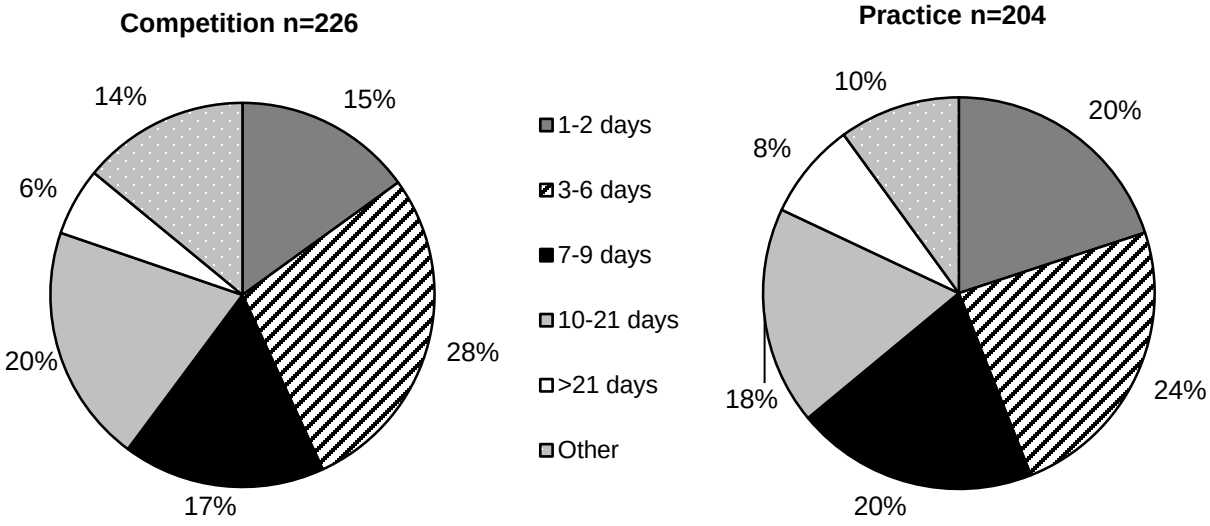
†Totals and n's are not always equal due to slight rounding or missing responses.

Table 7.4 Ten Most Common Boys' Basketball Injury Diagnoses by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

	Competition n=226		Practice n=204		Total n=430	
	n	%	n	%	n	%
Diagnosis						
Ankle strain/sprain	67	29.6%	72	35.3%	139	32.3%
Head/face Concussion	36	15.9%	26	12.7%	62	14.4%
Knee other	12	5.3%	11	5.4%	23	5.3%
Head/face other	10	4.4%	9	4.4%	19	4.4%
Hand/wrist strain/sprain	12	5.3%	7	3.4%	19	4.4%
Knee strain/sprain	13	5.8%	5	2.5%	18	4.2%
Hip/thigh/upper leg strain/sprain	8	3.5%	7	3.4%	15	3.5%
Hand/wrist fracture	7	3.1%	8	3.9%	15	3.5%
Lower leg strain/sprain	4	1.8%	7	3.4%	11	2.6%
Hip/thigh/upper leg contusion	6	2.7%	3	1.5%	9	2.1%

†Totals and n's are not always equal due to slight rounding or missing responses.

Figure 7.2 Time Loss of Boys' Basketball Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year



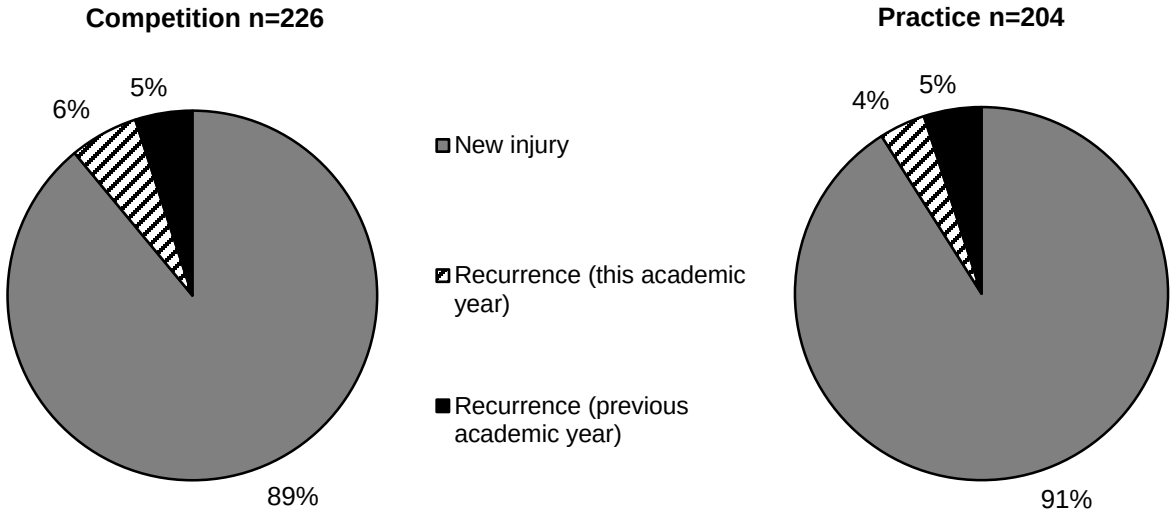
*Other category is made up of medical disqualification for season, medical disqualification for career, athlete chooses not to continue, and season ended before athlete returned to play

Table 7.5 Boys' Basketball Injuries Requiring Surgery by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

	Competition		Practice		Overall	
	n	%	n	%	n	%
Need for surgery						
Required surgery	20	8.9%	11	5.4%	31	7.3%
Did not require surgery	205	91.1%	191	94.6%	396	92.7%
Total	**225**	**100.0%**	**202**	**100.0%**	**427**	**100.0%**

†Totals and n's are not always equal due to slight rounding or missing responses.

Figure 7.3 History of Boys' Basketball Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year



† An answer of "unknown" was selected in 0.4% of competition and in 0.0% of practice injuries.

Table 7.6 Time during Season of Boys' Basketball Injuries, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

	n	%
Time in Season		
Preseason	83	19.3%
Regular season	337	78.4%
Post season	10	2.3%
Total	**430**	**100.0%**

†Totals and n's are not always equal due to slight rounding or missing responses.

Table 7.7 Competition-Related Variables for Boys' Basketball Injuries, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

	n	%
Time in Competition		
Pre-competition-warm-ups	6	2.8%
First quarter	15	7.0%
Second quarter	47	22.0%
Third quarter	63	29.4%
Fourth quarter	47	22.0%
Overtime	1	0.5%
Unknown	35	16.4%
Total	**214**	**100.0%**
Court Location		
Inside lane (defense)	49	22.9%
Inside lane (offense)	49	22.9%
Between 3 pt arc and lane (defense)	16	7.5%
Between 3 pt arc and lane (offense)	14	6.5%
Outside 3 point arc-offense	11	5.1%
Out of bounds	8	3.7%
Outside 3 point arc-defense	7	3.3%
Backcourt	5	2.3%
Off the court	1	0.5%
Unknown	54	25.2%
Total	**214**	**100.0%**

†Totals and n's are not always equal due to slight rounding or missing responses.

Table 7.8 Practice-Related Variables for Boys' Basketball Injuries, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

	n	%
Time in Practice		
First 1/2 hour	22	11.2%
Second 1/2 hour	27	13.7%
1-2 hours into practice	113	57.4%
>2 hours into practice	8	4.1%
Unknown	27	13.7%
Total	**197**	**100.0%**

†Totals and n's are not always equal due to slight rounding or missing responses.

Figure 7.4 Player Position of Boys' Basketball Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

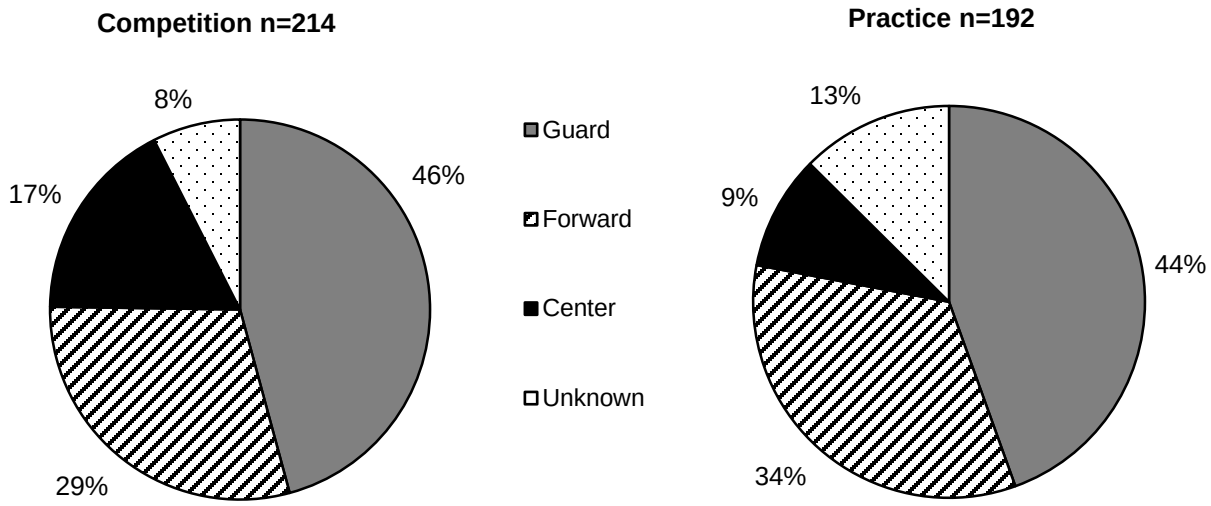


Table 7.9 Activities Leading to Boys' Basketball Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

	Competition		Practice		Overall	
	n	%	n	%	n	%
Activity						
Rebounding	64	29.8%	59	30.4%	123	30.1%
General play	26	12.1%	47	24.2%	73	17.8%
Defending	30	14.0%	17	8.8%	47	11.5%
Shooting	26	12.1%	18	9.3%	44	10.8%
Chasing loose ball	19	8.8%	12	6.2%	31	7.6%
Ball handling/dribbling	17	7.9%	8	4.1%	25	6.1%
Receiving pass	6	2.8%	2	1.0%	8	2.0%
Conditioning	0	0.0%	4	2.1%	4	1.0%
Passing	1	0.5%	1	0.5%	2	0.5%
Screening	1	0.5%	1	0.5%	2	0.5%
Other	4	1.9%	9	4.6%	13	3.2%
Unknown	21	9.8%	16	8.2%	37	9.0%
Total	**215**	**100.0%**	**194**	**100.0%**	**409**	**100.0%**

†Totals and n's are not always equal due to slight rounding or missing responses.

Table 7.10 Activity Resulting in Boys' Basketball Injuries by Injury Diagnosis, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

	Diagnosis									
	Strain/Sprain		Contusion		Fracture		Concussion		Other	
	n	%	n	%	n	%	n	%	n	%
Activity										
Rebounding	73	34.8%	6	18.8%	8	21.6%	20	35.7%	16	21.6%
General play	36	17.1%	4	12.5%	4	10.8%	8	14.3%	21	28.4%
Defending	16	7.6%	6	18.8%	5	13.5%	8	14.3%	12	16.2%
Shooting	26	12.4%	6	18.8%	4	10.4%	2	3.6%	6	8.1%
Chasing loose ball	11	5.2%	1	3.1%	4	10.8%	9	16.1%	6	8.1%
Passing	2	1.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Receiving Pass	4	1.9%	0	0.0%	3	8.1%	0	0.0%	1	1.4%
Ball handling/dribbling	14	6.7%	5	15.6%	3	8.1%	1	1.4%	2	2.7%
Screening	0	0.0%	1	3.1%	0	0.0%	0	0.0%	1	1.4%
Conditioning	2	1.0%	0	0.0%	0	0.0%	0	0.0%	2	2.7%
Other	3	1.4%	2	6.3%	3	8.1%	3	5.4%	2	2.7%
Unknown	23	11.0%	1	3.1%	3	8.1%	5	8.9%	5	6.8%
Total	**210**	**100.0%**	**32**	**100.0%**	**37**	**100.0%**	**56**	**100.0%**	**74**	**100.0%**

†Totals and n's are not always equal due to slight rounding or missing responses.

VIII. Girls' Basketball Injury Epidemiology

Table 8.1 Girls' Basketball Injury Rates by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

	# Injuries	# Exposures	Injury rate (per 1,000 athlete-exposures)
Total	**394**	**212,426**	**1.85**
Competition	248	67,368	3.68
Practice	146	145,058	1.01

Table 8.2 Demographic Characteristics of Injured Girls' Basketball Athletes, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year*

Year in School	**n=375**
Freshman	25.3%
Sophomore	30.4%
Junior	25.9%
Senior	18.4%
Total†	**100.0%**
Age (years)	
Minimum	13
Maximum	18
Mean (St. Dev.)	15.7 (1.2)
BMI	
Minimum	15.6
Maximum	40.28
Mean (St. Dev.)	22.9 (3.7)

*All analyses in this report present un-weighted data.
†Throughout this report, totals and n's represent the total un-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, 2016-17 School Year

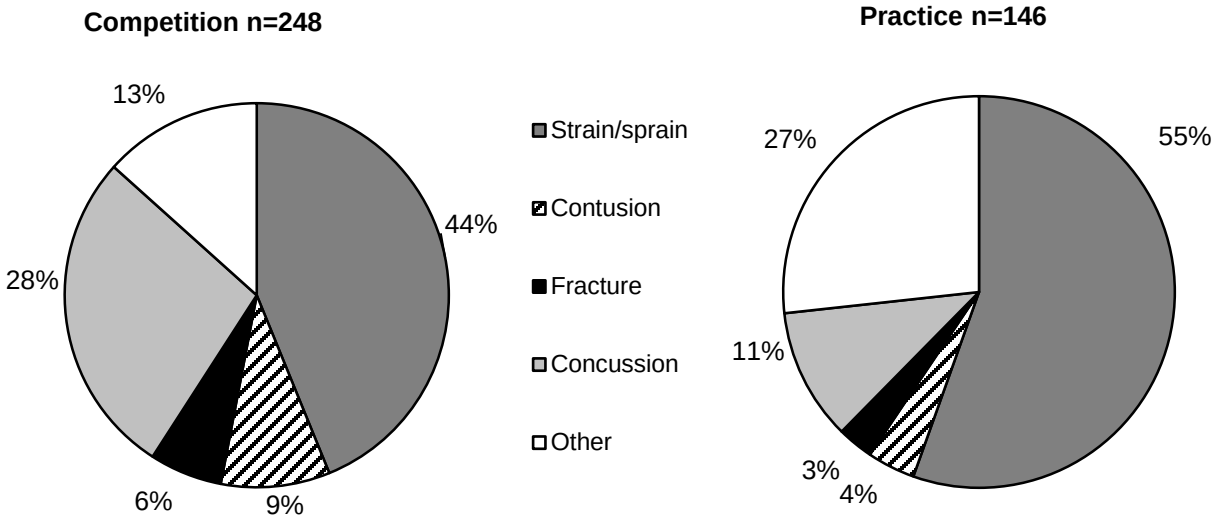


Table 8.3 Body Site of Girls' Basketball Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

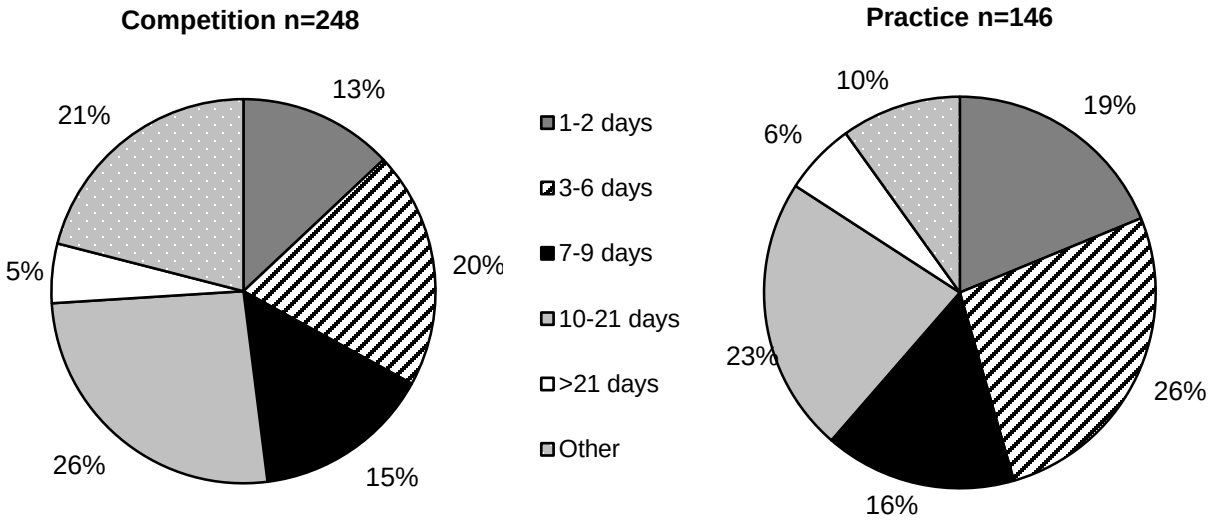
	Competition		Practice		Overall	
	n	**%**	**n**	**%**	**n**	**%**
Body Site						
Ankle	59	23.8%	44	30.1%	103	26.1%
Head/face	77	31.0%	19	13.0%	96	24.4%
Knee	42	16.9%	21	14.4%	63	16.0%
Hand/wrist	25	10.1%	10	6.8%	35	8.9%
Trunk	7	2.8%	10	6.8%	17	4.3%
Hip/thigh/upper leg	13	5.2%	12	8.2%	25	6.3%
Lower leg	2	0.8%	18	12.3%	20	5.1%
Shoulder	9	3.6%	4	2.7%	13	3.3%
Foot	6	2.4%	6	4.1%	12	3.0%
Arm/elbow	4	1.6%	0	0.0%	4	1.0%
Neck	0	0.0%	1	0.7%	1	0.3%
Other	4	1.6%	1	0.7%	5	1.3%
Total	**248**	**100.0%**	**146**	**100.0%**	**394**	**100.0%**

†Totals and n's are not always equal due to slight rounding or missing responses.

Table 8.4 Ten Most Common Girls' Basketball Injury Diagnoses by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

	Competition n=248		Practice n=146		Total n=394	
	n	%	n	%	n	%
Diagnosis						
Ankle strain/sprain	56	22.6%	43	29.5%	99	25.1%
Knee strain/sprain	22	8.9%	8	5.5%	30	7.6%
Knee other	16	6.5%	12	8.2%	28	7.1%
Hip/thigh/upper leg strain/sprain	8	3.2%	11	7.5%	19	4.8%
Lower leg other	1	0.4%	14	9.6%	15	3.8%
Hand/wrist fracture	10	4.0%	4	2.7%	14	3.6%
Hand/wrist strain/sprain	10	4.0%	4	2.7%	14	3.6%
Trunk strain/sprain	2	0.8%	7	4.8%	9	2.3%
Shoulder other	6	2.4%	3	2.1%	9	2.3%
Foot strain/sprain	5	2.0%	3	2.1%	8	2.0%

Figure 8.2 Time Loss of Girls' Basketball Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2016-17 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, 2016-17 School Year

	Competition		Practice		Overall	
	n	%	n	%	N	%
Need for surgery						
Required surgery	22	9.0%	9	6.3%	31	8.0%
Did not require surgery	223	91.0%	134	93.7%	357	92.0%
Total	**245**	**100.0%**	**143**	**100.0%**	**388**	**100.0%**

†Totals and n's are not always equal due to slight rounding or missing responses.

Figure 8.3 History of Girls' Basketball Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

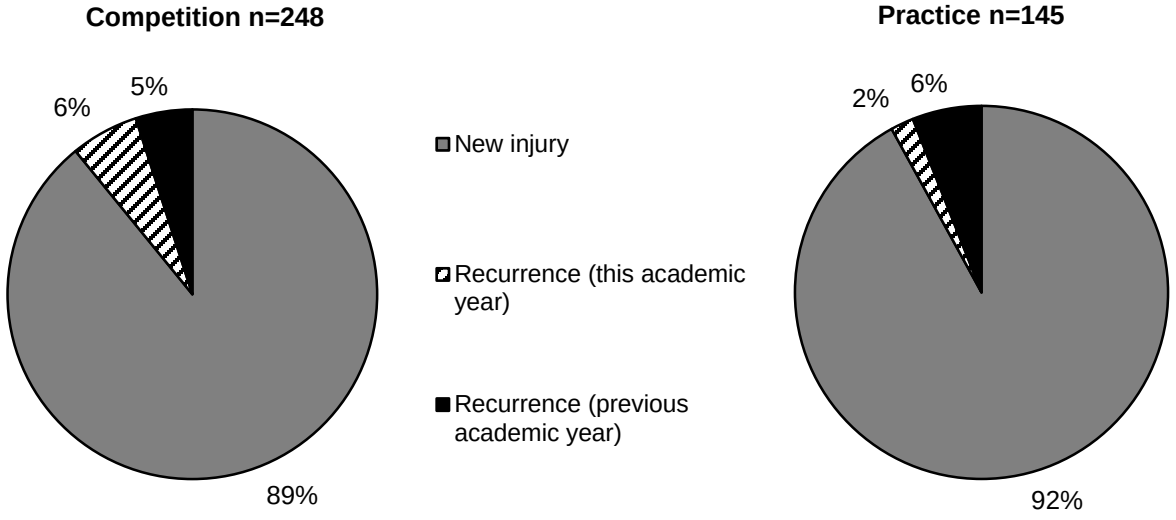


Table 8.6 Time during Season of Girls' Basketball Injuries, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

	n	%
Time in Season		
Preseason	72	18.4%
Regular season	312	79.6%
Post season	8	2.0%
Total	**392**	**100.0%**

†Totals and n's are not always equal due to slight rounding or missing responses.

Table 8.7 Competition-Related Variables for Girls' Basketball Injuries, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

	n	%
Time in Competition		
Pre-competition/Warm-ups	6	2.5%
First quarter	15	6.4%
Second quarter	65	27.5%
Third quarter	58	24.6%
Fourth quarter	39	16.5%
Unknown	53	22.5%
Total	**236**	**100.0%**
Court Location		
Inside lane (offense)	39	17.0%
Inside lane (defense)	36	15.7%
Between 3 point arc and lane (defense)	21	9.1%
Between 3 point arc and lane (offense)	22	9.6%
Outside 3 point arc - offense	17	7.4%
Outside 3 point arc - defense	15	6.5%
Backcourt	6	2.6%
Out of bounds	5	2.2%
Off the court	4	1.7%
Unknown	65	28.3%
Total	**230**	**100.0%**

†Totals and n's are not always equal due to slight rounding or missing responses.

Table 8.8 Practice-Related Variables for Girls' Basketball Injuries, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

	n	%
Time in Practice		
First 1/2 hour	12	8.5%
Second 1/2 hour	35	24.8%
1-2 hours into practice	72	51.1%
>2 hours into practice	4	2.8%
Unknown	18	12.8%
Total	**141**	**100.0%**

†Totals and n's are not always equal due to slight rounding or missing responses.

Figure 8.4 Player Position of Girls' Basketball Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

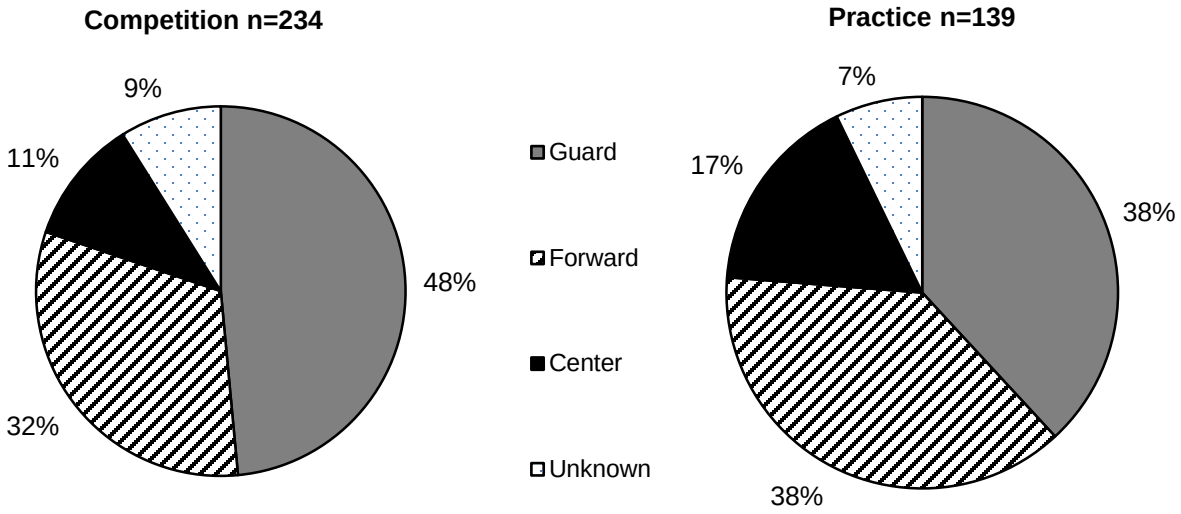


Table 8.9 Activities Leading to Girls' Basketball Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

	Competition		Practice		Overall	
	n	%	n	%	n	%
Activity						
General play	38	16.2%	33	23.9%	71	19.1%
Rebounding	40	17.1%	20	14.5%	60	16.1%
Defending	38	16.2%	19	13.8%	57	15.2%
Chasing loose ball	31	13.2%	11	8.0%	42	11.3%
Shooting	23	9.8%	12	8.7%	35	9.4%
Ball handling/dribbling	21	9.0%	4	2.9%	25	6.7%
Receiving pass	9	3.8%	10	7.2%	19	5.1%
Conditioning	0	0.0%	12	8.7%	12	3.2%
Passing	6	2.6%	1	0.7%	7	1.9%
Screening	2	0.9%	0	0.0%	2	0.5%
Other	5	2.1%	3	2.2%	8	2.2%
Unknown	21	9.0%	13	9.4%	34	9.1%
Total	**234**	**100.0%**	**138**	**100.0%**	**372**	**100.0%**

†Totals and n's are not always equal due to slight rounding or missing responses.

Table 8.10 Activity Resulting in Girls' Basketball Injuries by Injury Diagnosis, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

	Diagnosis									
	Strain/Sprain		Contusion		Fracture		Concussion		Other	
	n	%	n	%	n	%	n	%	n	%
Activity										
Shooting	23	12.6%	2	7.7%	0	0.0%	3	3.8%	7	10.1%
Passing	4	2.2%	1	3.8%	1	5.9%	0	0.0%	1	1.4%
Receiving pass	9	4.9%	0	0.0%	1	5.9%	5	6.4%	4	5.8%
Ball handling/dribbling	21	11.5%	0	0.0%	1	5.9%	2	2.6%	1	1.4%
Defending	21	11.5%	6	23.1%	6	35.3%	14	17.9%	10	14.5%
Chasing loose ball	15	8.2%	5	19.2%	2	11.8%	16	20.5%	4	5.8%
Screening	0	0.0%	0	0.0%	0	0.0%	1	1.3%	1	1.4%
Rebounding	28	15.4%	6	23.1%	4	23.5%	14	17.9%	8	11.6%
Conditioning	8	4.4%	0	0.0%	0	0.0%	1	1.3%	3	4.3%
General Play	35	19.2%	3	11.5%	0	0.0%	10	12.8%	23	33.3%
Other	4	2.2%	0	0.0%	0	0.0%	3	3.8%	1	1.4%
Unknown	14	7.7%	3	11.5%	2	11.8%	9	11.5%	6	8.7%
Total	**182**	**100.0%**	**26**	**100.0%**	**17**	**100.0%**	**78**	**100.0%**	**69**	**100.0%**

†Totals and n's are not always equal due to slight rounding or missing responses.

IX. Wrestling Injury Epidemiology

Table 9.1 Wrestling Injury Rates by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

	# Injuries	# Exposures	Injury rate (per 1,000 athlete-exposures)
Total	**425**	**200,994**	**2.11**
Competition	195	49,986	3.90
Practice	230	151,008	1.52

Table 9.2 Demographic Characteristics of Injured Wrestlers, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year*

Year in School	**n=410**
Freshman	24.4%
Sophomore	22.0%
Junior	29.8%
Senior	23.9%
Total†	**100.0%**
Age (years)	
Minimum	14
Maximum	18
Mean (St. Dev.)	16.0 (1.2)
BMI	
Minimum	16.1
Maximum	46.8
Mean (St. Dev.)	24.5 (5.1)

*All analyses in this chapter present un-weighted data.
†Throughout this report, totals and n's represent the total un-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, 2016-17 School Year

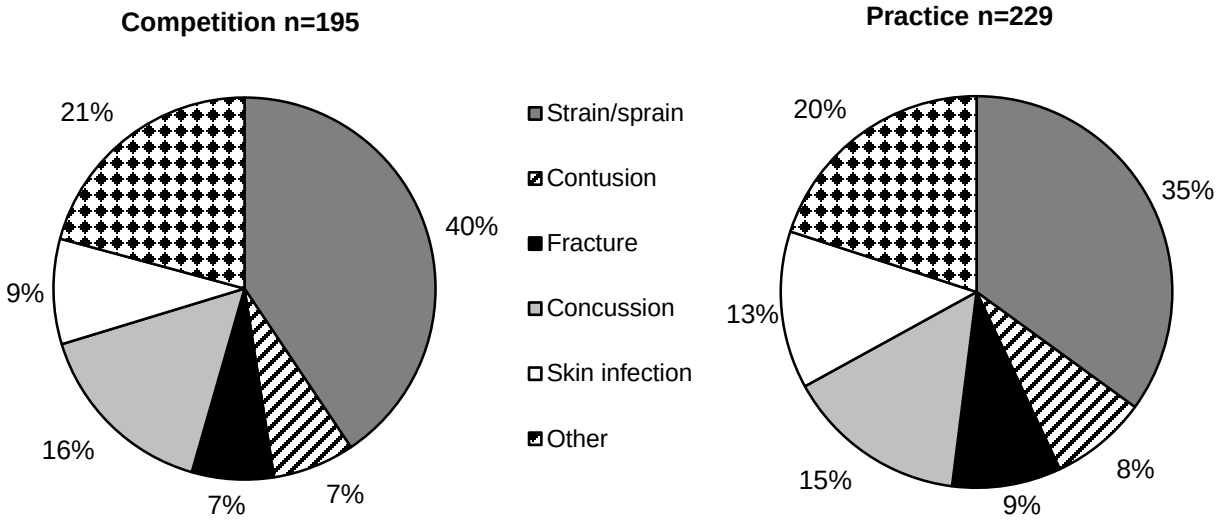


Table 9.3 Body Site of Wrestling Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

	Competition		Practice		Overall	
	n	%	n	%	n	%
Body Site						
Head/face	41	21.0%	48	20.9%	89	20.9%
Shoulder	32	16.4%	33	14.3%	65	15.3%
Knee	25	12.8%	33	14.3%	58	13.6%
Trunk	20	10.3%	23	10.0%	43	10.1%
Arm/elbow	18	9.2%	22	9.6%	40	9.4%
Hand/wrist	17	8.7%	16	7.0%	33	7.8%
Ankle	11	5.6%	13	5.7%	24	5.6%
Hip/thigh/upper let	10	5.1%	11	4.8%	21	4.9%
Neck	9	4.6%	7	3.0%	16	3.8%
Lower leg	0	0.0%	11	4.8%	11	2.6%
Foot	3	1.5%	5	2.2%	8	1.9%
Other	9	4.6%	8	3.5%	17	4.0%
Total	**195**	**100.0%**	**230**	**100.0%**	**425**	**100.0%**

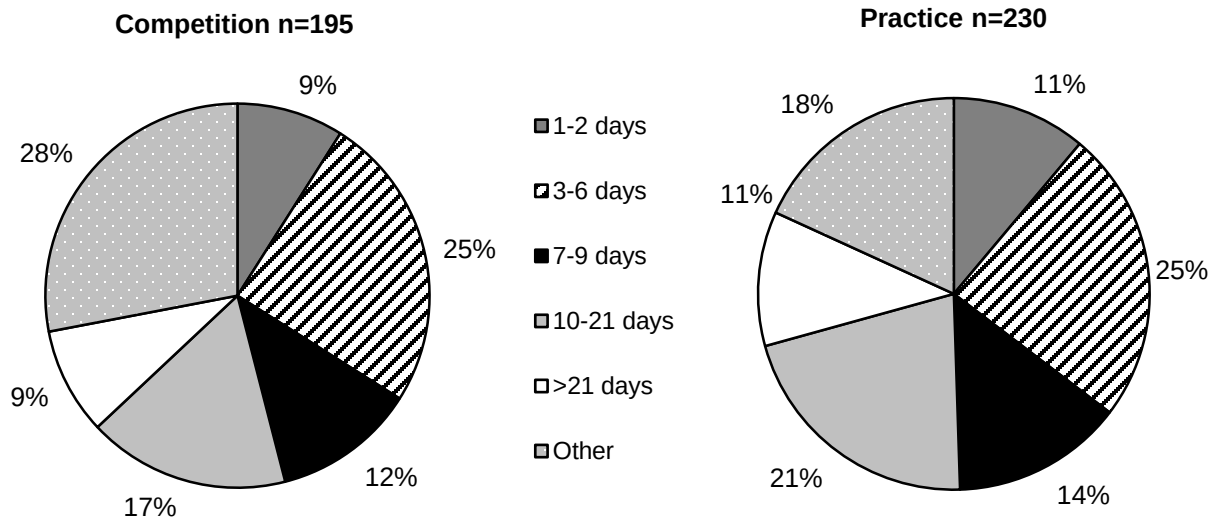
†Totals and n's are not always equal due to slight rounding or missing responses.

Table 9.4 Ten Most Common Wrestling Injury Diagnoses by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

	Competition n=195		Practice n=229		Total n=424	
	n	%	n	%	n	%
Diagnosis						
Head/face concussion	32	16.4%	35	15.3%	67	15.8%
Shoulder strain/sprain	19	9.7%	19	8.3%	38	9.0%
Knee strain/sprain	12	6.2%	14	6.1%	26	6.1%
Ankle strain/sprain	10	5.1%	13	5.7%	23	5.4%
Shoulder other	13	6.7%	10	4.4%	23	5.4%
Knee other	10	5.1%	12	5.2%	22	5.2%
Trunk contusion	10	5.1%	7	3.1%	17	4.0%
Arm/elbow strain/sprain	9	4.6%	7	3.1%	16	3.8%
Head/face other	2	1.0%	14	6.1%	16	3.8%
Hand/wrist strain/sprain	9	4.6%	5	2.2%	14	3.3%

†Totals and n's are not always equal due to slight rounding or missing responses.

Figure 9.2 Time Loss of Wrestling Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year



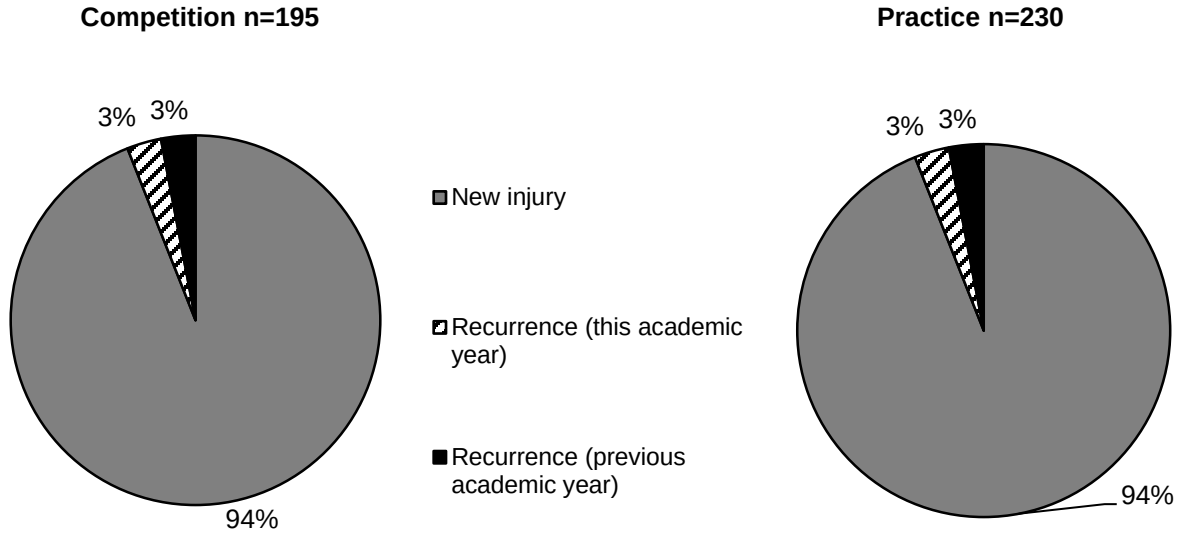
*Other category is made up of medical disqualification for season, medical disqualification for career, athlete chooses not to continue, and season ended before athlete returned to play

Table 9.5 Wrestling Injuries Requiring Surgery by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

	Competition		Practice		Overall	
	n	%	n	%	n	%
Need for surgery						
Required surgery	20	10.4%	18	8.0%	38	9.1%
Did not require surgery	172	89.6%	206	92.0%	378	90.9%
Total	**192**	**100.0%**	**224**	**100.0%**	**416**	**100.0%**

†Totals and n's are not always equal due to slight rounding or missing responses.

Figure 9.3 History of Wrestling Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year



† An answer of "unknown" was selected in 0.0% of competition and in 0.4% of practice injuries.

Table 9.6 Time during Season of Wrestling Injuries, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

	n	%
Time in Season		
Preseason	63	14.9%
Regular season	337	79.5%
Post season	24	5.7%
Total	**424**	**100.0%**

†Totals and n's are not always equal due to slight rounding or missing responses.

Table 9.7 Competition-Related Variables for Wrestling Injuries, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

	n	%
Time in Competition		
Pre-competition/warm-ups	3	1.7%
First period	17	9.6%
Second period	46	26.0%
Third period	29	16.4%
Overtime	1	0.6%
Unknown	81	45.8%
Total	**177**	**100.0%**
Mat Location*		
Within 28 ft. circle	245	64.0%
Out of bounds	10	2.6%
Off the mat	12	3.1%
Unknown	116	30.3%
Total	**383**	**100.0%**

*Mat location question consists of competition and practice related injuries.
†Totals and n's are not always equal due to slight rounding or missing responses.

Table 9.8 Practice-Related Variables for Wrestling Injuries, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

	n	%
Time in Practice		
First 1/2 hour	16	7.2%
Second 1/2 hour	40	17.9%
1-2 hours into practice	106	47.5%
>2 hours into practice	19	8.5%
Unknown	42	18.8%
Total	**223**	**100.0%**

†Totals and n's are not always equal due to slight rounding or missing responses.

Table 9.9 Activities Leading to Wrestling Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

	Competition		Practice		Overall	
	n	%	n	%	n	%
Activity						
Takedown	85	46.4%	70	34.1%	155	39.9%
Sparring	12	6.6%	44	21.5%	56	14.4%
N/A (e.g., skin infection, overuse, heat illness, etc.)	14	7.7%	19	9.3%	33	8.5%
Conditioning	0	0.0%	16	7.8%	16	4.1%
Near fall	12	6.6%	3	1.5%	15	3.9%
Escape	6	3.3%	9	4.4%	15	3.9%
Fall	6	3.3%	8	3.9%	14	3.6%
Riding	7	3.8%	4	2.0%	11	2.8%
Reversal	4	2.2%	5	2.4%	9	2.3%
Other	3	1.6%	9	4.4%	12	3.1%
Unknown	34	18.6%	18	8.8%	52	13.4%
Total	**183**	**100.0%**	**205**	**100.0%**	**388**	**100.0%**

†Totals and n's are not always equal due to slight rounding or missing responses.

Table 9.10 Activities Resulting in Wrestling Injuries by Injury Diagnosis, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

	Diagnosis											
	Strain/Sprain		Contusion		Fracture		Concussion		Skin Infection		Other	
	n	%	n	%	n	%	n	%	n	%	n	%
Activity												
Takedown	62	41.6%	17	56.7%	12	38.7%	37	58.7%	0	0.0%	27	34.2%
Near fall	10	6.7%	1	3.3%	1	3.2%	2	3.2%	0	0.0%	1	1.3%
Riding	8	5.4%	0	0.0%	1	3.2%	1	1.6%	0	0.0%	1	1.3%
Sparring	24	16.1%	7	23.3%	7	22.6%	6	9.5%	1	2.9%	10	12.7%
Reversal	5	3.4%	1	3.3%	0	0.0%	0	0.0%	0	0.0%	3	3.8%
Escape	6	4.0%	1	3.3%	1	3.2%	0	0.0%	0	0.0%	7	8.9%
Fall	4	2.7%	3	10.0%	1	3.2%	1	1.6%	0	0.0%	5	6.3%
Conditioning	5	3.4%	0	0.0%	1	3.2%	4	6.3%	0	0.0%	6	7.6%
N/A*	0	0.0%	0	0.0%	0	0.0%	0	0.0%	30	85.7%	3	3.8%
Other	5	3.4%	0	0.0%	3	9.7%	1	1.6%	0	0.0%	3	3.8%
Unknown	20	13.4%	0	0.0%	4	12.9%	11	17.5%	4	11.4%	13	16.5%
Total	**149**	**100.0%**	**30**	**100.0%**	**31**	**100.0%**	**63**	**100.0%**	**35**	**100.0%**	**79**	**100.0%**

* Skin infection, overuse, heat illness, etc.

†Totals and n's are not always equal due to slight rounding or missing responses.

X. Baseball Injury Epidemiology

Table 10.1 Baseball Injury Rates by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

	# Injuries	# Exposures	Injury rate (per 1,000 athlete-exposures)
Total	**198**	**221,948**	**0.89**
Competition	121	78,353	1.54
Practice	77	143,595	0.54

Table 10.2 Demographic Characteristics of Injured Baseball Athletes, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year*

Year in School	**n=192**
Freshman	19.3%
Sophomore	18.8%
Junior	31.8%
Senior	30.2%
Total†	**100.0%**
Age (years)	
Minimum	12
Maximum	19
Mean (St. Dev.)	16.2 (1.2)
BMI	
Minimum	15.8
Maximum	32.5
Mean (St. Dev.)	23.5 (2.9)

*All analyses in this chapter present un-weighted data.
†Throughout this report, totals and n's represent the total un-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, 2016-17 School Year

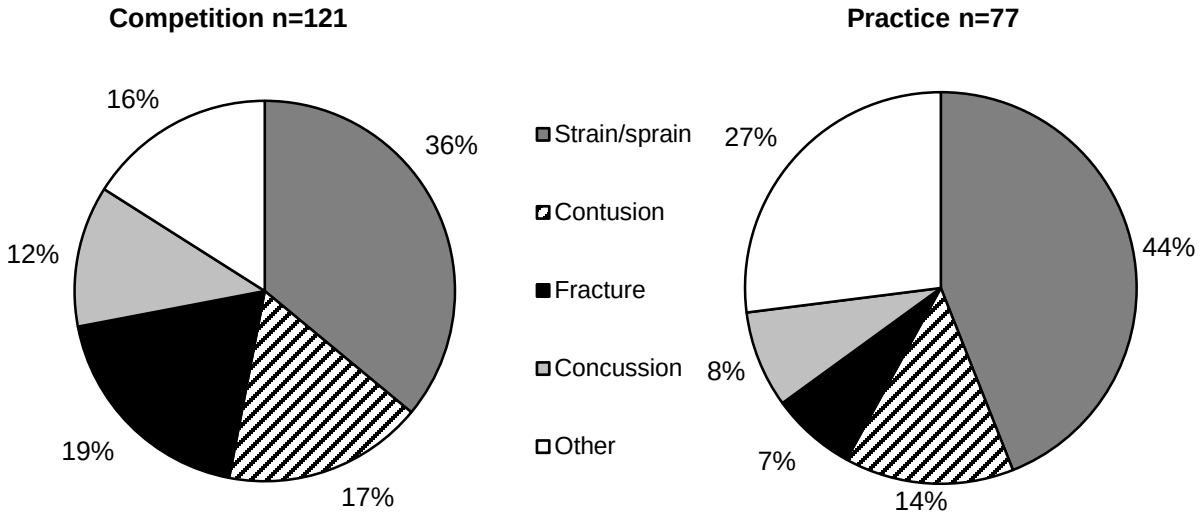


Table 10.3 Body Site of Baseball Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

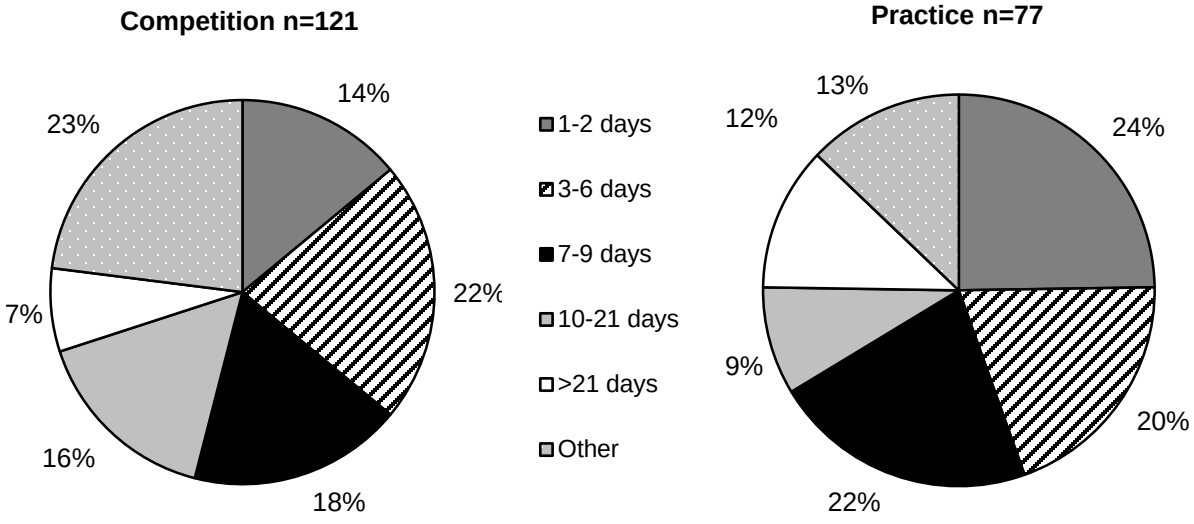
	Competition		Practice		Overall	
	n	**%**	**n**	**%**	**n**	**%**
Body Site						
Head/face	27	22.3%	12	15.3%	39	19.7%
Arm/elbow	15	12.4%	15	19.5%	30	15.2%
Hand/wrist	23	19.0%	5	6.5%	28	14.1%
Hip/thigh/upper leg	14	11.6%	13	16.9%	27	13.6%
Shoulder	13	10.7%	11	14.3%	24	12.1%
Knee	10	8.3%	9	11.7%	19	9.6%
Ankle	7	5.8%	7	9.1%	14	7.1%
Lower leg	5	4.1%	4	5.2%	9	4.5%
Trunk	4	3.3%	0	0.0%	4	2.0%
Foot	2	1.7%	1	1.3%	3	1.5%
Other	1	0.8%	0	0.0%	1	0.5%
Total	**121**	**100.0%**	**77**	**100.0%**	**198**	**100.0%**

†Totals and n's are not always equal due to slight rounding or missing responses.

Table 10.4 Ten Most Common Baseball Injury Diagnoses by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

	Competition n=121		Practice n=77		Total n=198	
	n	%	n	%	n	%
Diagnosis						
Hip/thigh/upper leg strain/sprain	11	9.1%	13	16.9%	24	12.1%
Head/face concussion	14	11.6%	6	7.8%	20	10.1%
Hand/wrist fracture	11	9.1%	2	2.6%	13	6.6%
Arm/elbow strain/sprain	6	5.0%	6	7.8%	12	6.1%
Shoulder other	6	5.0%	6	7.8%	12	6.1%
Ankle strain/sprain	5	4.1%	6	7.8%	11	5.6%
Shoulder strain/sprain	6	5.0%	5	6.5%	11	5.6%
Arm/elbow other	3	2.5%	8	10.4%	11	5.6%
Knee strain/sprain	5	4.1%	4	5.2%	9	4.5%
Head/face other	6	5.0%	1	1.3%	7	3.5%

Figure 10.2 Time Loss of Baseball Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2016-17 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, 2015-16 School Year

	Competition		Practice		Overall	
	n	%	n	%	n	%
Need for surgery						
Required surgery	12	10.0%	3	3.9%	15	7.6%
Did not require surgery	108	90.0%	74	96.1%	182	92.4%
Total	**120**	**100.0%**	**77**	**100.0%**	**197**	**100.0%**

†Totals and n's are not always equal due to slight rounding or missing responses.

Figure 10.3 History of Baseball Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

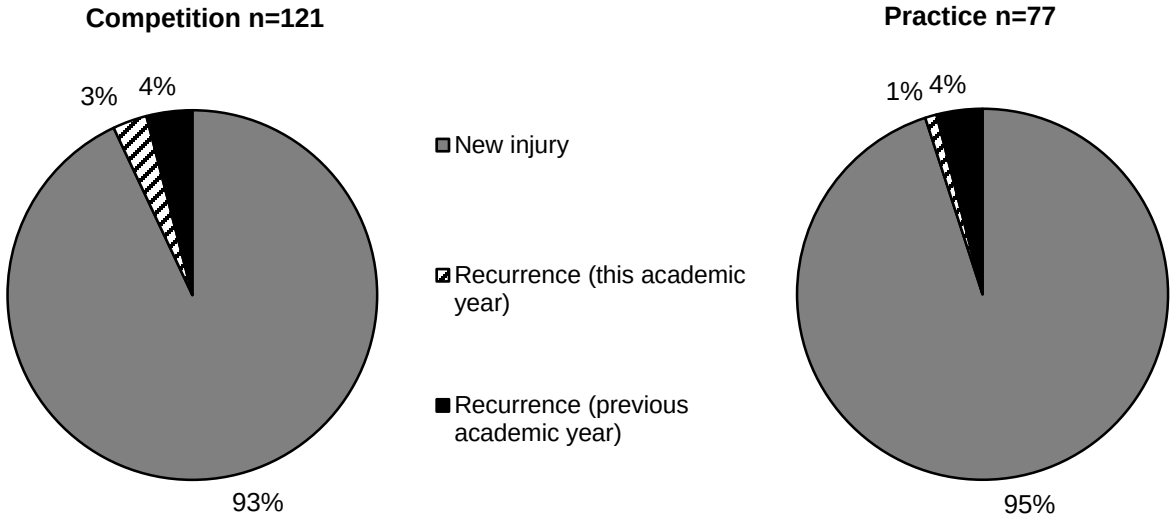


Table 10.6 Time during Season of Baseball Injuries, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

	n	%
Time in Season		
Preseason	42	21.2%
Regular season	145	73.2%
Post season	11	5.6%
Total	**198**	**100.0%**

†Totals and n's are not always equal due to slight rounding or missing responses.

Table 10.7 Competition-Related Variables for Baseball Injuries, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

	n	%
Time in Competition		
Pre-competition/warm-ups	4	3.4%
First inning	8	6.7%
Second inning	6	5.0%
Third inning	20	16.8%
Fourth inning	18	15.1%
Fifth inning	15	12.6%
Sixth inning	12	10.1%
Seventh inning	4	3.4%
Extra innings	2	1.7%
Unknown	30	25.2%
Total	**119**	**100.0%**
Field Location		
Home plate	34	28.6%
First base	16	13.4%
Second base	20	16.8%
Third base	12	10.1%
Infield	3	2.5%
Pitcher's mound	9	7.6%
Outfield	15	12.6%
Foul territory	1	0.8%
Other	2	1.7%
Unknown	7	5.9%
Total	**119**	**100.0%**

†Totals and n's are not always equal due to slight rounding or missing responses.

Table 10.8 Practice-Related Variables for Baseball Injuries, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

	n	%
Time in Practice		
First 1/2 hour	7	9.2%
Second 1/2 hour	15	19.7%
1-2 hours into practice	30	39.5%
>2 hours into practice	5	6.6%
Unknown	19	25.0%
Total	**76**	**100.0%**

†Totals and n's are not always equal due to slight rounding or missing responses.

Figure 10.4 Player Position of Baseball Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

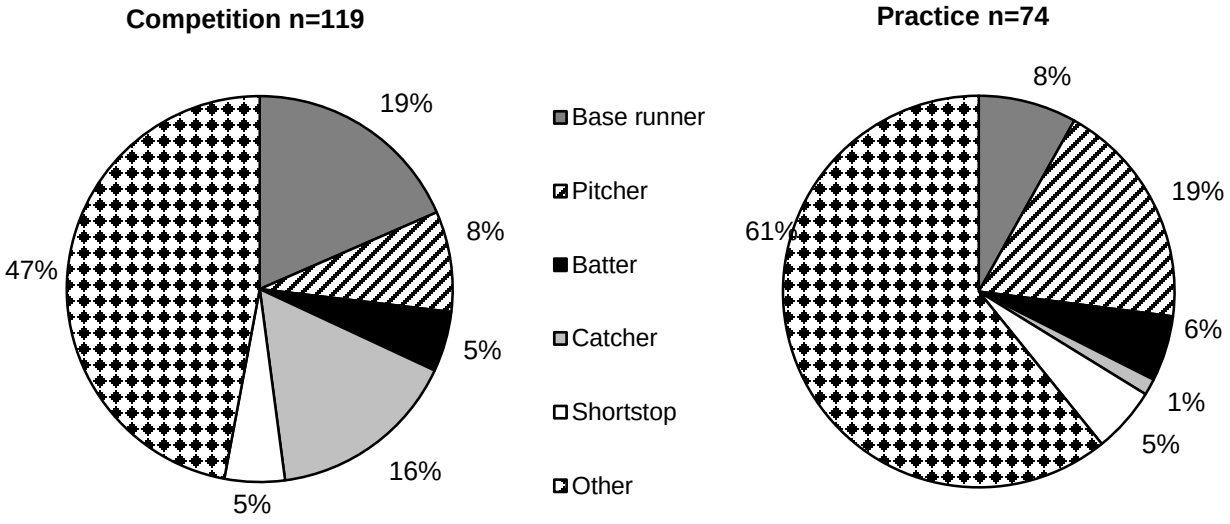


Table 10.9 Activities Leading to Baseball Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

	Competition		Practice		Overall	
	n	%	n	%	n	%
Activity						
Running bases	21	17.6%	11	14.7%	32	16.5%
Pitching	9	7.6%	15	20.0%	24	12.4%
Fielding a batted ball	15	12.6%	7	9.3%	22	11.3%
Throwing (not pitching)	8	5.7%	11	14.7%	19	9.8%
Sliding	17	14.3%	2	2.7%	19	9.8%
Batting	14	11.8%	3	4.0%	17	8.8%
Catching	11	9.2%	5	6.7%	16	8.2%
Fielding thrown ball	10	8.4%	5	6.7%	15	7.7%
General play	3	2.5%	5	6.7%	8	4.1%
Conditioning	0	0.0%	4	5.3%	4	2.1%
Other	9	7.6%	4	5.3%	13	6.7%
Unknown	2	1.7%	3	4.0%	5	2.6%
Total	**119**	**100.0%**	**75**	**100.0%**	**194**	**100.0%**

†Totals and n's are not always equal due to slight rounding or missing responses.

Figure 10.10 Activity Resulting in Baseball Injuries by Injury Diagnosis, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

	Diagnosis									
	Strain/Sprain		Contusion		Fracture		Concussion		Other	
	n	%	n	%	n	%	n	%	n	%
Activity										
Pitching	9	11.8%	2	6.5%	1	3.6%	0	0.0%	12	30.8%
Throwing (not pitching)	10	13.2%	0	0.0%	1	3.6%	1	5.0%	7	17.9%
Batting	3	3.9%	9	29.0%	1	3.6%	2	10.0%	2	5.1%
Running bases	23	30.3%	2	6.5%	6	21.4%	0	0.0%	1	2.6%
Sliding	6	7.9%	5	16.1%	6	21.4%	1	5.0%	1	2.6%
Catching	7	9.2%	5	16.1%	1	3.6%	2	10.0%	1	2.6%
Conditioning	3	3.9%	1	3.2%	0	0.0%	0	0.0%	0	0.0%
General play	2	2.6%	0	0.0%	0	0.0%	3	15.0%	3	7.7%
Fielding a thrown ball	2	2.6%	3	9.7%	4	14.3%	3	15.0%	3	7.7%
Fielding a batted ball	8	10.5%	3	9.7%	4	14.3%	3	15.0%	4	10.3%
Other	3	3.9%	1	3.2%	3	10.7%	4	20.0%	2	5.1%
Unknown	0	0.0%	0	0.0%	1	3.6%	1	5.0%	3	7.7%
Total	**76**	**100.0%**	**31**	**100.0%**	**28**	**100.0%**	**20**	**100.0%**	**39**	**100.0%**

†Totals and n's are not always equal due to slight rounding or missing responses.

XI. Softball Injury Epidemiology

Table 11.1 Softball Injury Rates by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

	# Injuries	# Exposures	Injury rate (per 1,000 athlete-exposures)
Total	**207**	**168,496**	**1.23**
Competition	95	58,686	1.62
Practice	112	109,810	1.02

Table 11.2 Demographic Characteristics of Injured Softball Athletes, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year*

Year in School	**n=201**
Freshman	27.4%
Sophomore	32.8%
Junior	21.4%
Senior	18.4%
Total†	**100.0%**
Age (years)	
Minimum	13
Maximum	19
Mean (St. Dev.)	16.0 (1.2)
BMI	
Minimum	17.2
Maximum	40.4
Mean (St. Dev.)	23.9 (5.5)

*All analyses in this chapter present un-weighted data.
†Throughout this report, totals and n's represent the total un-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, 2016-17 School Year

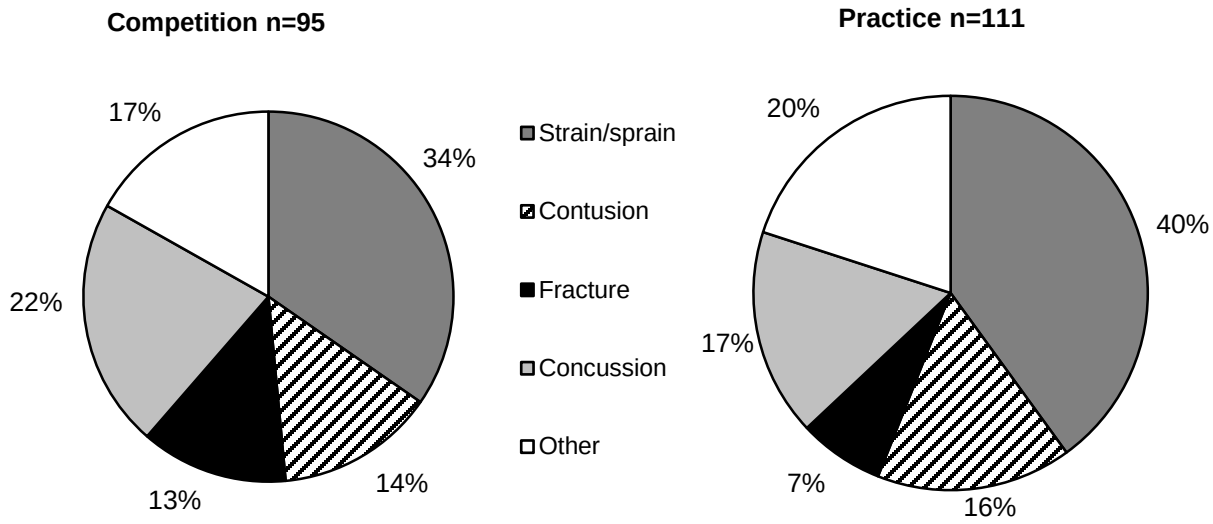


Table 11.3 Body Site of Softball Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

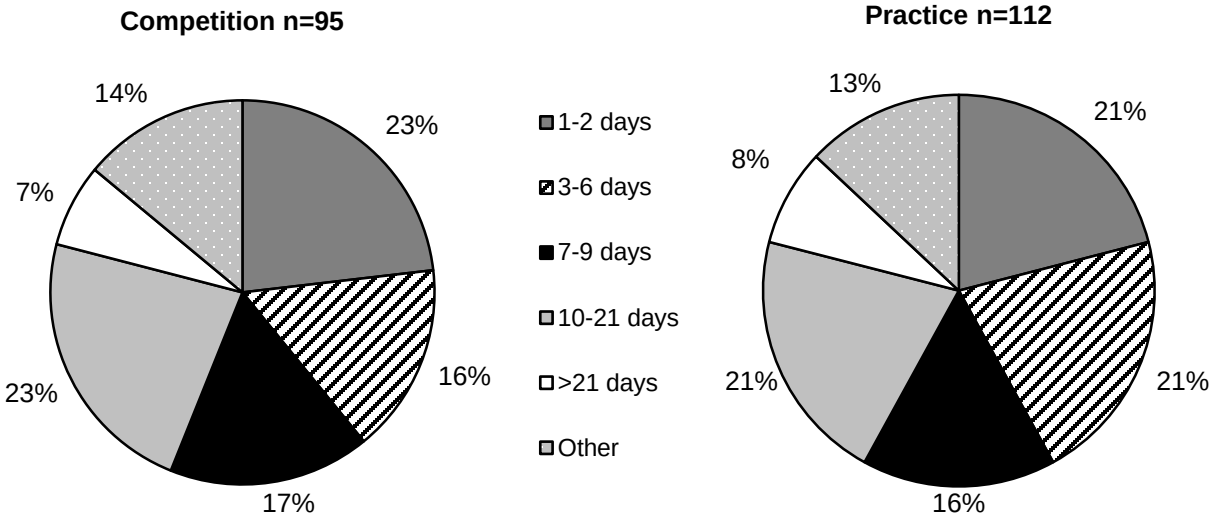
	Competition		Practice		Overall	
	n	%	n	%	n	%
Body Site						
Head/face	27	28.4%	29	25.9%	56	27.1%
Ankle	16	16.8%	18	16.1%	34	16.4%
Hand/wrist	19	20.0%	14	12.5%	33	15.9%
Knee	11	11.6%	12	10.7%	23	11.1%
Shoulder	5	5.3%	13	11.6%	18	8.7%
Hip/thigh/upper leg	8	8.4%	6	5.4%	14	6.8%
Trunk	4	4.2%	5	4.5%	9	4.3%
Lower leg	2	2.1%	4	3.6%	6	2.9%
Arm/elbow	0	0.0%	6	5.4%	6	2.9%
Neck	1	1.1%	2	1.8%	3	1.4%
Foot	1	1.1%	1	0.9%	2	1.0%
Other	1	1.1%	2	1.8%	3	1.4%
Total	**95**	**100.0%**	**112**	**100.0%**	**207**	**100.0%**

†Totals and n's are not always equal due to slight rounding or missing responses.

Table 11.4 Ten Most Common Softball Injury Diagnoses by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

	Competition n=95		Practice n=111		Total n=206	
	n	%	n	%	n	%
Diagnosis						
Head/face concussion	20	21.1%	19	17.1%	39	18.9%
Ankle strain/sprain	15	15.8%	15	13.5%	30	14.6%
Knee other	9	9.5%	4	3.6%	13	6.3%
Hand/wrist fracture	7	7.4%	6	5.4%	13	6.3%
Hip/thigh/upper leg strain/sprain	6	6.3%	5	4.5%	11	5.3%
Should strain/sprain	2	2.1%	8	7.2%	10	4.9%
Head/face contusion	2	2.1%	7	6.3%	9	4.4%
Hand/wrist contusion	6	6.3%	3	2.7%	9	4.4%
Knee strain/sprain	3	3.2%	4	3.6%	7	3.4%
Hand/wrist strain/sprain	3	3.2%	4	3.6%	7	3.4%

Figure 11.2 Time Loss of Softball Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year



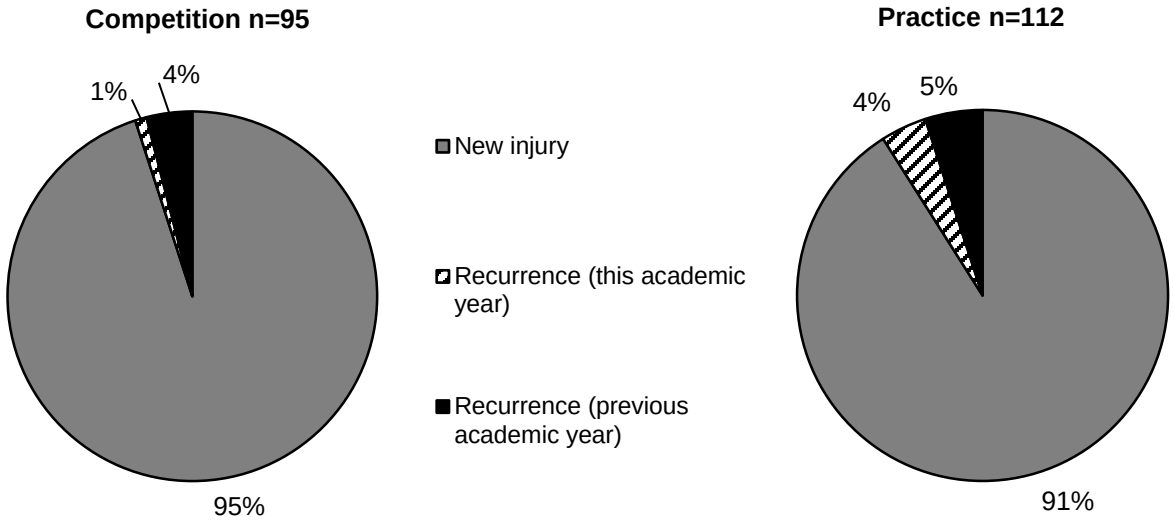
*Other category is made up of medical disqualification for season, medical disqualification for career, athlete chooses not to continue, and season ended before athlete returned to play

Table 11.5 Softball Injuries Requiring Surgery by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

	Competition		Practice		Overall	
	n	%	n	%	n	%
Need for surgery						
Required surgery	5	5.3%	3	2.7%	8	3.9%
Did not require surgery	90	94.7%	109	97.3%	199	96.1%
Total	**95**	**100.0%**	**112**	**100.0%**	**207**	**100.0%**

†Totals and n's are not always equal due to slight rounding or missing responses.

Figure 11.3 History of Softball Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2015-16 School Year



† An answer of "unknown" was selected in 0.0% of competition and in 0.9% of practice injuries.

Table 11.6 Time during Season of Softball Injuries, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

	n	%
Time in Season		
Preseason	41	19.8%
Regular season	157	75.8%
Post season	8	3.9%
Unknown	1	0.5%
Total	**207**	**100.0%**

†Totals and n's are not always equal due to slight rounding or missing responses.

Table 11.7 Competition-Related Variables for Softball Injuries, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

	n	%
Time in Competition		
Pre-competition/warm-ups	9	9.8%
First inning	2	2.2%
Second inning	12	13.0%
Third inning	10	10.9%
Fourth inning	13	14.1%
Fifth inning	10	10.9%
Sixth inning	7	7.6%
Seventh inning	5	5.4%
Extra innings	1	1.1%
Unknown	23	25.0%
Total	**92**	**100.0%**
Field Location		
Home plate	15	16.3%
First base	11	12.0%
Second base	17	18.5%
Third base	14	15.2%
Outfield	17	18.5%
Pitcher's mound	5	5.4%
Infield	4	4.3%
Other	3	3.3%
Unknown	6	6.5%
Total	**92**	**100.0%**

†Totals and n's are not always equal due to slight rounding or missing responses.

Table 11.8 Practice-Related Variables for Softball Injuries, High School Sports-Related Injury Surveillance Study, US, 2016-17 **School Year**

	n	%
Time in Practice		
First 1/2 hour	9	8.3%
Second 1/2 hour	24	22.0%
1-2 hours into practice	53	48.6%
>2 hours into practice	8	7.3%
Unknown	15	13.8%
Total	**109**	**100.0%**

†Totals and n's are not always equal due to slight rounding or missing responses.

Figure 11.4 Player Position of Softball Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

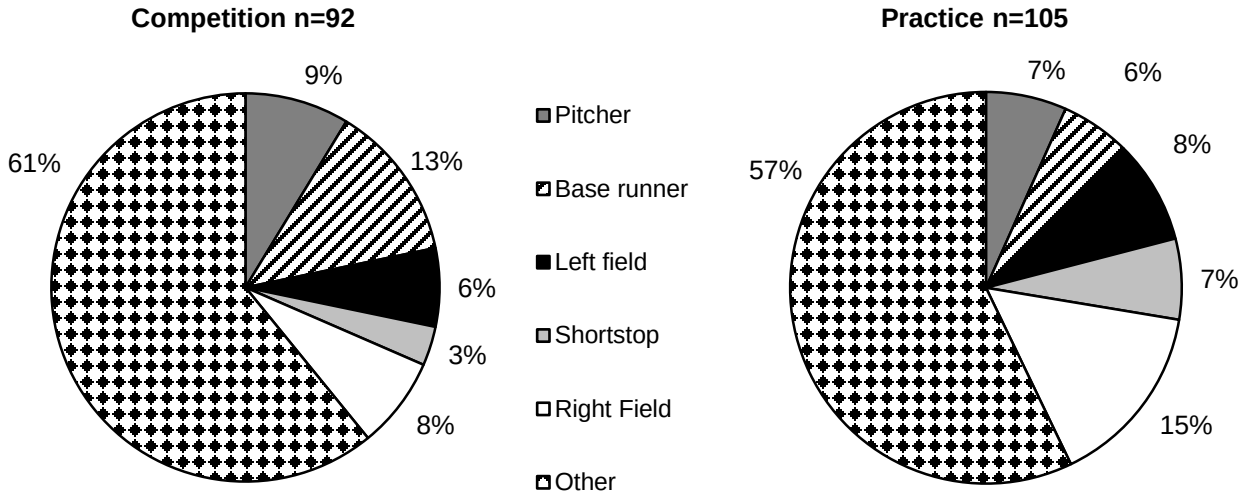


Table 11.9 Activities Leading to Softball Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

	Competition		Practice		Overall	
	n	%	n	%	n	%
Activity						
Fielding a batted ball	17	18.3%	22	20.6%	39	19.5%
General Play	3	3.2%	14	13.1%	17	8.5%
Running bases	23	24.7%	6	5.6%	29	14.5%
Catching	12	12.9%	9	8.4%	21	10.5%
Sliding	10	10.8%	9	8.4%	19	9.5%
Fielding a thrown ball	8	8.6%	9	8.4%	17	8.5%
Batting	6	6.5%	8	7.5%	14	7.0%
Throwing (not pitching)	3	3.2%	10	9.3%	13	6.5%
Pitching	4	4.3%	2	1.9%	6	3.0%
Conditioning	0	0.0%	4	3.7%	4	2.0%
Other	3	3.2%	9	8.4%	12	6.0%
Unknown	4	4.3%	5	4.7%	9	4.5%
Total	**93**	**100.0%**	**107**	**100.0%**	**200**	**100.0%**

†Totals and n's are not always equal due to slight rounding or missing responses.

Table 11.10 Activity Resulting in Softball Injuries by Injury Diagnosis, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

	Diagnosis									
	Strain/Sprain		Contusion		Fracture		Concussion		Other	
	n	%	n	%	n	%	n	%	n	%
Activity										
Pitching	0	0.0%	4	12.9%	0	0.0%	0	0.0%	2	5.4%
Throwing (not pitching)	8	10.8%	1	3.2%	0	0.0%	1	2.6%	3	8.1%
Batting	3	4.1%	5	16.1%	0	0.0%	2	5.1%	4	10.8%
Running bases	18	24.3%	1	3.2%	2	10.5%	3	7.7%	5	13.5%
Sliding	13	17.6%	1	3.2%	2	10.5%	1	2.6%	2	5.4%
Catching	3	4.1%	2	6.5%	5	26.3%	6	15.4%	5	13.5%
Conditioning	3	4.1%	0	0.0%	0	0.0%	0	0.0%	1	2.7%
General play	6	8.1%	4	12.9%	1	5.3%	0	0.0%	6	16.2%
Fielding a thrown ball	3	4.1%	3	9.7%	2	10.5%	7	17.9%	2	5.4%
Fielding a batted ball	12	16.2%	5	16.1%	6	31.6%	12	30.8%	4	10.8%
Other	3	4.1%	3	9.7%	1	5.3%	5	12.8%	0	0.0%
Unknown	2	2.7%	2	6.5%	0	0.0%	2	5.1%	3	8.1%
Total	**74**	**100.0%**	**31**	**100.0%**	**19**	**100.0%**	**39**	**100.0%**	**37**	**100.0%**

XII. Girls' Field Hockey Injury Epidemiology

Table 12.1 Girls' Field Hockey Injury Rates by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

	# Injuries	# Exposures	Injury rate (per 1,000 athlete-exposures)
Total	**96**	**56,112**	**1.71**
Competition	50	17,797	2.81
Practice	46	38,315	1.20

Table 12.2 Demographic Characteristics of Injured Girls' Field Hockey Athletes, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year*

Year in School	**n=90**
Freshman	20.0%
Sophomore	13.3%
Junior	33.3%
Senior	33.3%
Total†	**100.0%**
Age (years)	
Minimum	14
Maximum	18
Mean (St. Dev.)	15.9 (1.1)
BMI	
Minimum	13.6
Maximum	31.2
Mean (St. Dev.)	22.2 (3.4)

*All analyses in this chapter present un-weighted data.
†Throughout this report, totals and n's represent the total un-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 12.1 Diagnosis of Girls' Field Hockey Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

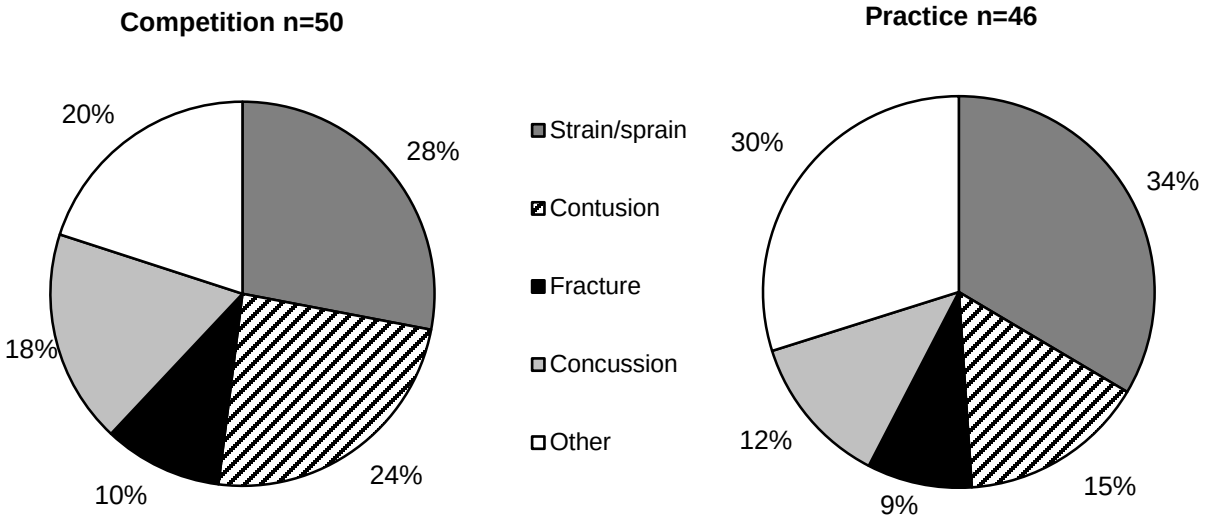


Table 12.3 Body Site of Girls' Field Hockey Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

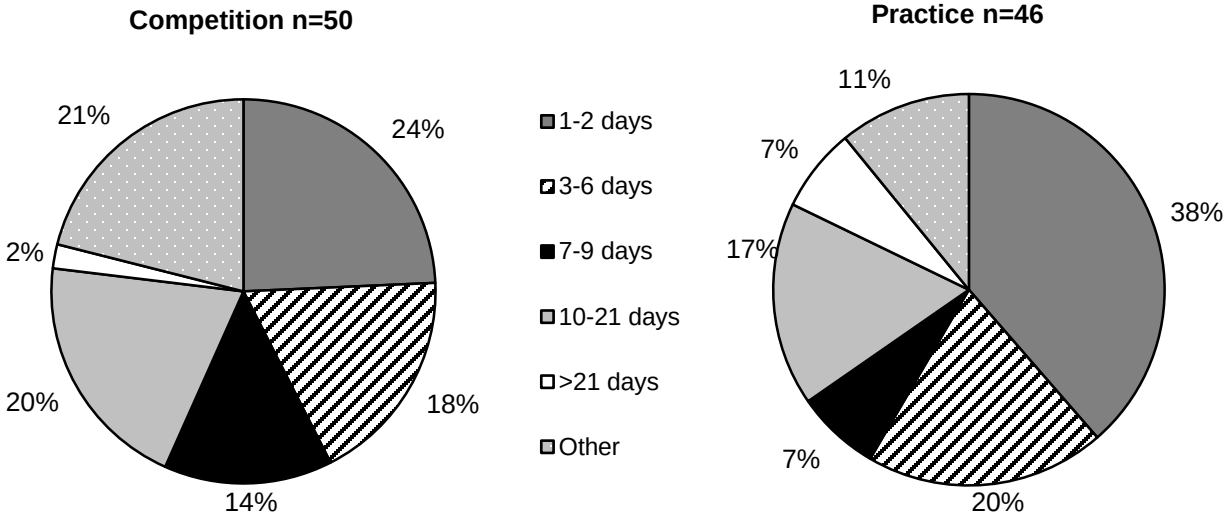
	Competition		Practice		Overall	
	n	%	n	%	n	%
Body Site						
Head/face	16	32.0%	5	10.9%	21	21.9%
Hand/wrist	8	16.0%	5	10.9%	13	13.5%
Knee	9	18.0%	3	6.5%	12	12.5%
Ankle	5	10.0%	7	15.2%	12	12.5%
Lower leg	3	6.0%	6	13.0%	9	9.4%
Hip/thigh/upper leg	2	4.0%	6	13.0%	8	8.3%
Trunk	2	4.0%	4	8.7%	6	6.3%
Arm/elbow	2	4.0%	3	6.5%	5	5.2%
Foot	2	4.0%	1	2.2%	3	3.1%
Shoulder	0	0.0%	2	4.3%	2	2.1%
Other	1	2.0%	4	8.7%	5	5.2%
Total	**50**	**100.0%**	**46**	**100.0%**	**96**	**100.0%**

†Totals and n's are not always equal due to slight rounding or missing responses.

Table 12.4 Ten Most Common Girls' Field Hockey Injury Diagnoses by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

	Competition n=50		Practice n=46		Total n=96	
	n	%	n	%	n	%
Diagnosis						
Head/face concussion	9	18.0%	3	6.5%	12	12.5%
Ankle strain/sprain	4	8.0%	6	13.0%	10	10.4%
Head/face other	5	10.0%	2	4.3%	7	7.3%
Hip/thigh/upper leg strain/sprain	2	4.0%	4	8.7%	6	6.3%
Lower leg other	1	2.0%	5	10.9%	6	6.3%
Hand/wrist fracture	3	6.0%	3	6.5%	6	6.3%
Hand/wrist contusion	3	6.0%	2	4.3%	5	5.2%
Knee other	3	6.0%	2	4.3%	5	5.2%
Other other	0	0.0%	4	8.7%	4	4.2%
Trunk strain/sprain	1	2.0%	2	4.3%	3	3.1%

Figure 12.2 Time Loss of Girls' Field Hockey Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2016-17 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 12.5 Girls' Field Hockey Injuries Requiring Surgery by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

	Competition		Practice		Overall	
	n	%	n	%	n	%
Need for surgery						
Required surgery	1	2.0%	2	4.3%	2	3.2%
Did not require surgery	48	98.0%	44	95.7%	92	96.8%
Total	**49**	**100.0%**	**46**	**100.0%**	**95**	**100.0%**

†Totals and n's are not always equal due to slight rounding or missing responses.

Figure 12.3 History of Girls' Field Hockey Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

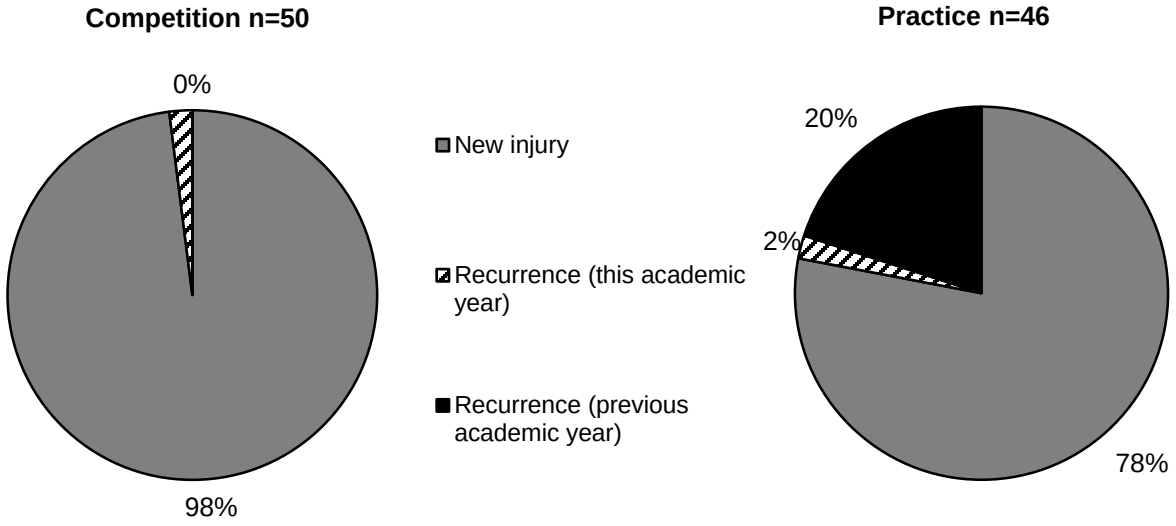


Table 12.6 Time during Season of Girls' Field Hockey Injuries, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

	n	%
Time in Season		
Preseason	33	34.4%
Regular season	60	62.5%
Post season	3	3.1%
Total	**96**	**100.0%**

†Totals and n's are not always equal due to slight rounding or missing responses.

Table 12.7 Competition-Related Variables for Girls' Field Hockey Injuries, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

	n	%
Time in Competition		
Pre-competition/warm-ups	2	4.2%
First half	10	20.8%
Second half	29	60.4%
Overtime	1	2.1%
Unknown	6	12.5%
Total	**48**	**100.0%**
Field Location		
Between 25-yard line and center line	15	31.9%
Within 25-yard line	5	10.6%
Within 16-yard arc	2	4.3%
Goal area/circle	6	12.8%
Sideline	2	4.3%
Unknown	17	36.2%
Total	**47**	**100.0%**

†Totals and n's are not always equal due to slight rounding or missing responses.

Table 12.8 Practice-Related Variables for Girls' Field Hockey Injuries, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

	n	%
Time in Practice		
First 1/2 hour	4	9.1%
Second 1/2 hour	6	13.6%
1-2 hours into practice	28	63.6%
>2 hours into practice	1	2.3%
Unknown	5	11.4%
Total	**44**	**100.0%**

†Totals and n's are not always equal due to slight rounding or missing responses.

Figure 12.4 Player Position of Girls' Field Hockey Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

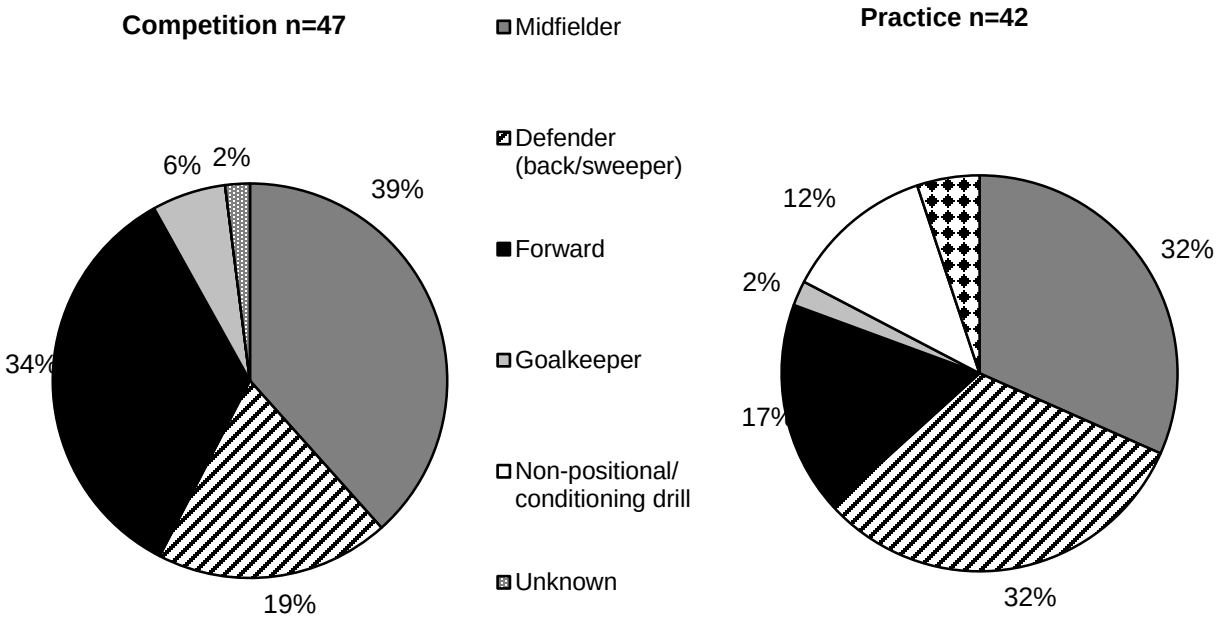


Table 12.9 Activities Leading to Girls' Field Hockey Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

	Competition		Practice		Overall	
	n	%	n	%	n	%
Activity						
Defending	14	29.8%	8	19.0%	22	24.7%
General play	6	12.8%	9	21.4%	15	16.9%
Conditioning	0	0.0%	11	26.2%	11	12.4%
Ball handling/dribbling	7	14.9%	1	2.4%	8	9.0%
Receiving pass	5	10.6%	1	2.4%	6	6.7%
Chasing a loose ball	4	8.5%	1	2.4%	5	5.6%
Passing	2	4.3%	2	4.8%	4	4.5%
Goaltending	3	6.4%	1	2.4%	4	4.5%
Shooting	1	2.1%	1	2.4%	2	2.2%
Blocking shot	1	2.1%	1	2.4%	2	2.2%
Other	1	2.1%	2	4.8%	3	3.4%
Unknown	3	6.4%	4	9.5%	7	7.9%
Total	**47**	**100.0%**	**42**	**100.0%**	**89**	**100.0%**

†Totals and n's are not always equal due to slight rounding or missing responses.

Table 12.10 Activity Resulting in Girls' Field Hockey Injuries by Injury Diagnosis, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

	Diagnosis									
	Strain/Sprain		Contusion		Fracture		Concussion		Other	
	n	%	n	%	n	%	n	%	n	%
Activity										
Shooting	1	3.8%	0	0.0%	0	0.0%	1	8.3%	0	0.0%
Passing	3	11.5%	1	6.7%	0	0.0%	0	0.0%	0	0.0%
Receiving pass	0	0.0%	2	13.3%	2	22.2%	1	8.3%	1	3.7%
Ball handling/dribbling	3	11.5%	1	6.7%	2	22.2%	1	8.3%	1	3.7%
Defending	4	15.4%	7	46.5%	3	33.3%	4	33.3%	4	14.8%
Blocking shot	1	3.8%	1	6.7%	0	0.0%	0	0.0%	0	0.0%
Chasing a loose ball	2	7.7%	1	6.7%	0	0.0%	0	0.0%	2	7.4%
Goaltending	3	11.5%	0	0.0%	0	0.0%	1	8.3%	0	0.0%
Conditioning	3	11.5%	1	6.7%	0	0.0%	0	0.0%	7	25.9%
General play	2	7.7%	1	6.7%	2	22.2%	2	16.7%	8	29.6%
Other	0	0.0%	0	0,0%	0	0.0%	0	0.0%	3	11.1%
Unknown	4	15.4%	0	0.0%	0	0.0%	2	16.7%	1	3.7%
Total	**26**	**100.0%**	**15**	**100.0%**	**9**	**100.0%**	**12**	**100.0%**	**27**	**100.0%**

†Totals and n's are not always equal due to slight rounding or missing responses.

XIII. Boys' Ice Hockey Injury Epidemiology

Table 13.1 Boys' Ice Hockey Injury Rates by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

	# Injuries	# Exposures	Injury rate (per 1,000 athlete-exposures)
Total	**80**	**45,425**	**1.76**
Competition	69	16.110	4.28
Practice	11	29,315	0.38

Table 13.2 Demographic Characteristics of Injured Boys' Ice Hockey Athletes, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year*

Year in School	**n=79**
Freshman	16.9%
Sophomore	29.9%
Junior	24.7%
Senior	28.6%
Total†	**100.0%**
Age (years)	
Minimum	143
Maximum	19
Mean (St. Dev.)	16.0 (1.2)
BMI	
Minimum	18.2
Maximum	29.0
Mean (St. Dev.)	22.3 (2.2)

*All analyses in this chapter present un-weighted data.
†Throughout this report, totals and n's represent the total un-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 13.1 Diagnosis of Boys' Ice Hockey Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

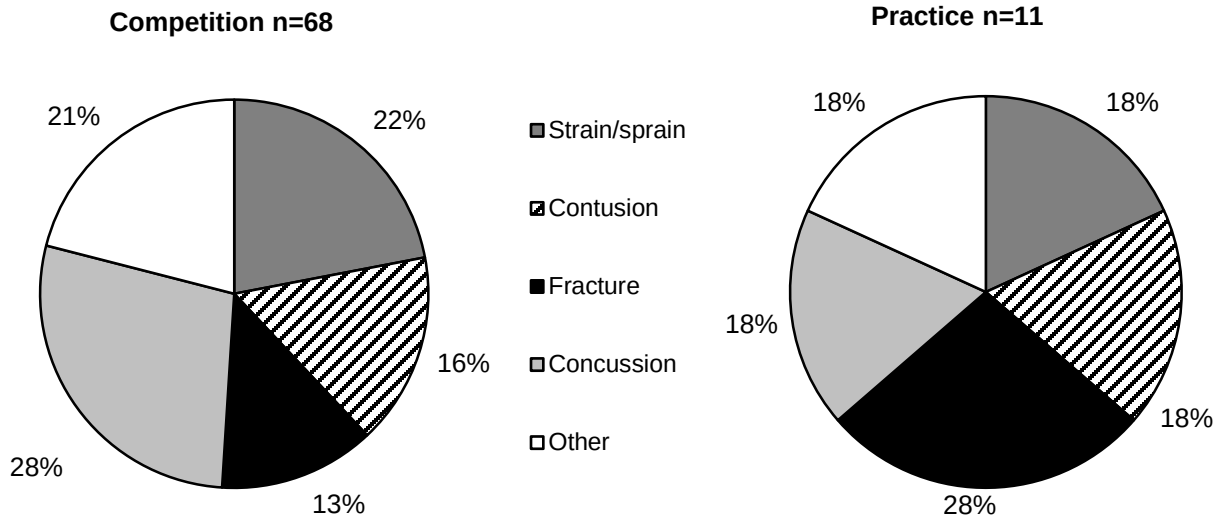


Table 13.3 Body Site of Boys' Ice Hockey Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

	Competition		Practice		Overall	
	n	%	n	%	n	%
Body Site						
Head/face	19	27.5%	2	18.2%	21	26.3%
Shoulder	15	21.7%	0	0.0%	15	18.8%
Knee	6	8.7%	1	9.1%	7	8.8%
Hand/wrist	6	8.7%	1	9.1%	7	8.8%
Hip/thigh/upper leg	4	5.8%	2	18.2%	6	7.5%
Ankle	4	5.8%	2	18.2%	6	7.5%
Trunk	4	5.8%	1	9.1%	5	6.3%
Arm/elbow	3	4.3%	0	0.0%	3	3.8%
Neck	2	2.9%	1	9.1%	3	3.8%
Lower leg	1	1.4%	0	0.0%	1	1.3%
Foot	1	1.4%	0	0.0%	1	1.3%
Other	4	5.8%	1	9.1%	5	6.3%
Total	**69**	**100.0%**	**11**	**100.0%**	**80**	**100.0%**

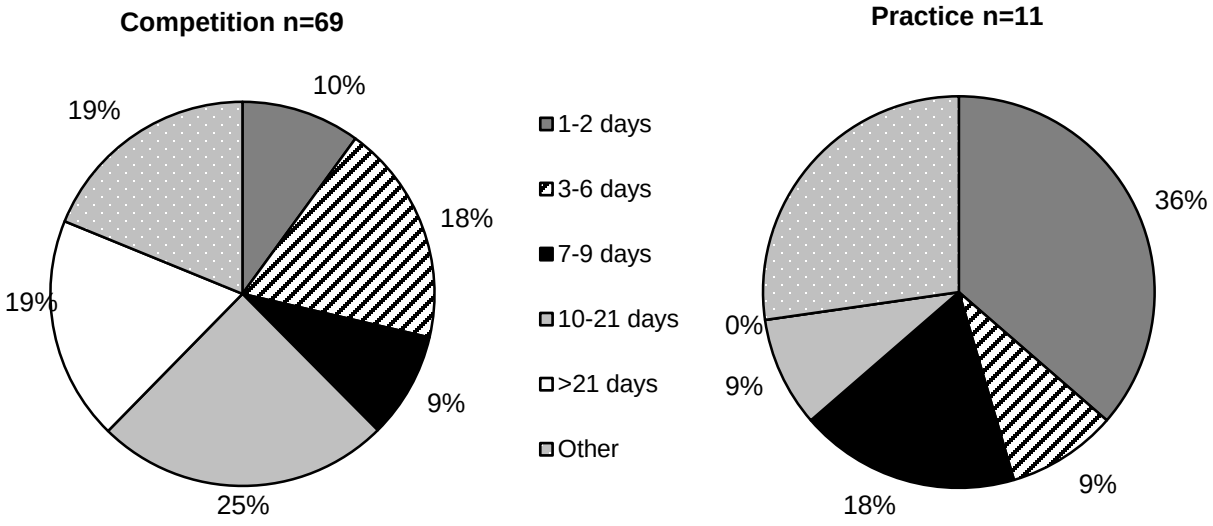
†Totals and n's are not always equal due to slight rounding or missing responses.

Table 13.4 Ten Most Common Boys' Ice Hockey Injury Diagnoses by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

	Competition n=68		Practice n=21		Total n=79	
	n	%	n	%	n	%
Diagnosis						
Head/face concussion	19	27.9%	2	9.5%	21	26.6%
Shoulder other	9	13.2%	0	0.0%	9	11.4%
Shoulder strain/sprain	6	8.8%	0	0.0%	6	7.6%
Ankle strain/sprain	4	5.9%	1	4.8%	5	6.3%
Hand/wrist fracture	4	5.9%	1	4.8%	5	6.3%
Hip/thigh/upper leg contusion	2	2.9%	1	4.8%	3	3.8%
Trunk contusion	2	2.9%	1	4.8%	3	3.8%
Knee other	2	2.9%	1	4.8%	3	3.8%
Knee strain/sprain	2	2.9%	0	0.0%	2	2.5%
Neck strain/sprain	1	1.5%	1	4.8%	2	2.5%

†Totals and n's are not always equal due to slight rounding or missing responses.

Figure 13.2 Time Loss of Boys' Ice Hockey Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2016-17 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 13.5 Boys' Ice Hockey Injuries Requiring Surgery by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

	Competition		Practice		Overall	
	n	%	n	%	n	%
Need for surgery						
Required surgery	5	6.4%	1	9.1%	6	7.6%
Did not require surgery	63	92.6%	10	90.9%	73	92.4%
Total	**68**	**100.0%**	**11**	**100.0%**	**79**	**100.0%**

†Totals and n's are not always equal due to slight rounding or missing responses.

Figure 13.3 History of Boys' Ice Hockey Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

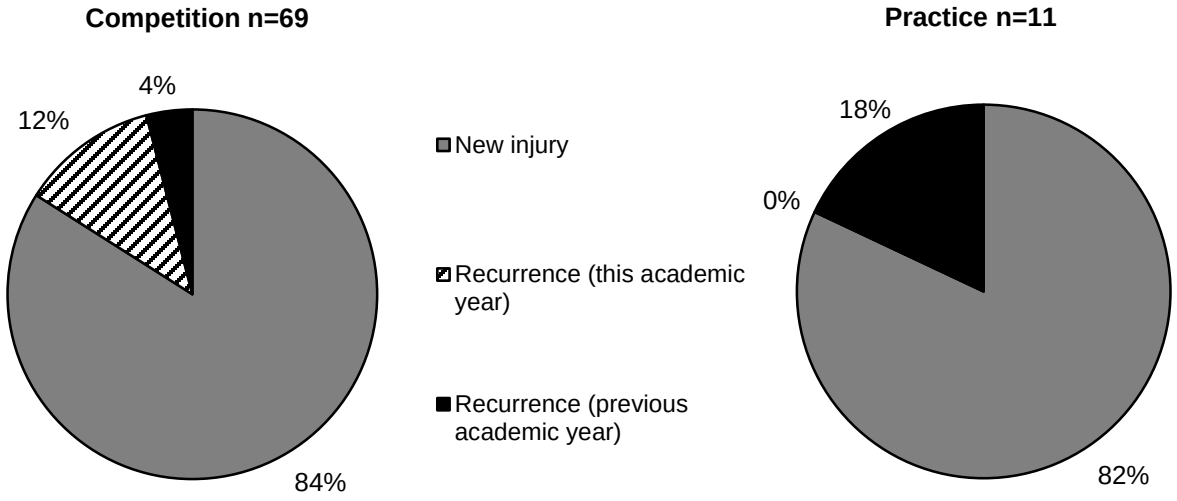


Table 13.6 Time during Season of Boys' Ice Hockey Injuries, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

	n	%
Time in Season		
Preseason	8	10.0%
Regular season	69	86.3%
Post season	3	3.8%
Total	**80**	**100.0%**

†Totals and n's are not always equal due to slight rounding or missing responses.

Table 13.7 Competition-Related Variables for Boys' Ice Hockey Injuries, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

	n	%
Time in Competition		
Warm-ups	0	0.0%
First period	6	8.7%
Second period	26	37.7%
Third period	29	42.0%
Unknown	8	11.6%
Total	**69**	**100.0%**
Rink Location		
Between goal line and blue line	14	20.3%
Neutral zone	7	10.1%
Behind goal	8	11.6%
Corner	15	21.7%
Goal area	7	10.1%
Face-off circle	0	0.0%
Bench	1	1.4%
Other	1	1.4%
Unknown	16	23.2%
Total	**69**	**100.0%**

†Totals and n's are not always equal due to slight rounding or missing responses.

Table 13.8 Practice-Related Variables for Boys' Ice Hockey Injuries, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

	n	%
Time in Practice		
First 1/2 hour	2	18.2%
Second 1/2 hour	2	18.2%
1-2 hours into practice	6	54.5%
>2 hours into practice	0	0.0%
Unknown	1	9.1%
Total	**11**	**100.0%**

†Totals and n's are not always equal due to slight rounding or missing responses.

Figure 13.4 Player Position of Boys' Ice Hockey Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

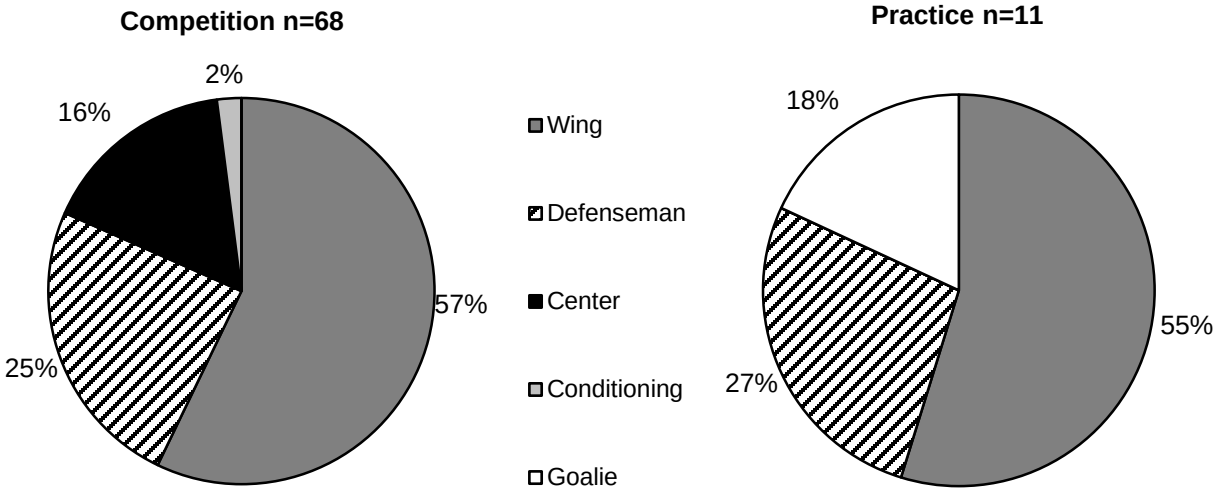


Table 13.9 Activities Leading to Boys' Ice Hockey Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

	Competition		Practice		Overall	
	n	%	n	%	n	%
Activity						
Being checked	25	36.2%	3	27.3%	28	35.0%
Skating	17	24.6%	4	36.4%	21	26.3%
Passing	9	13.0%	0	0.0%	9	11.3%
Chasing loose puck	5	7.2%	1	9.1%	6	7.5%
Shooting	5	7.2%	0	0.0%	5	6.3%
Goaltending	0	0.0%	2	18.2%	2	2.5%
Checking	1	1.4%	0	0.0%	1	1.3%
Other	1	1.4%	0	0.0%	1	1.3%
Unknown	6	8.7%	1	9.1%	7	8.8%
Total	**69**	**100.0%**	**11**	**100.0%**	**80**	**100.0%**

†Totals and n's are not always equal due to slight rounding or missing responses.

Table 13.10 Activity Resulting in Boys' Ice Hockey Injuries by Injury Diagnosis, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

	Diagnosis									
	Strain/Sprain		Contusion		Fracture		Concussion		Other	
	n	%	n	%	n	%	n	%	n	%
Activity										
Skating	5	29.4%	5	38.5%	3	25.0%	5	23.8%	3	18.8%
Shooting	1	5.9%	2	15.4%	1	8.3%	0	0.0%	1	6.3%
Passing	3	17.6%	0	0.0%	0	0.0%	2	9.5%	4	25.0%
Checking	1	5.9%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Being checked	5	29.4%	4	30.8%	5	41.7%	8	38.1%	5	31.3%
Chasing loose puck	1	5.9%	0	0.0%	0	0.0%	3	14.3%	2	12.5%
Goaltending	0	0.0%	0	0.0%	1	8.3%	0	0.0%	1	6.3%
Other	0	0.0%	0	0.0%	1	8.3%	0	0.0%	0	0.0%
Unknown	1	5.9%	2	15.4%	1	8.3%	3	14.3%	0	0.0%
Total	**17**	**100.0%**	**13**	**100.0%**	**12**	**100.0%**	**21**	**100.0%**	**16**	**100.0%**

†Totals and n's are not always equal due to slight rounding or missing responses.

XIV. Boys' Lacrosse Injury Epidemiology

Table 14.1 Boys' Lacrosse Injury Rates by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

	# Injuries	# Exposures	Injury rate (per 1,000 athlete-exposures)
Total	**248**	**111,700**	**2.22**
Competition	143	32,656	4.38
Practice	105	79,044	1.33

Table 14.2 Demographic Characteristics of Injured Boys' Lacrosse Athletes, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year*

Year in School	**n=241**
Freshman	21.6%
Sophomore	24.5%
Junior	30.7%
Senior	23.2%
Total†	**100.0%**
Age (years)	
Minimum	14
Maximum	19
Mean (St. Dev.)	16.2 (1.3)
BMI	
Minimum	16.2
Maximum	34.1
Mean (St. Dev.)	23.5 (3.2)

*All analyses in this chapter present un-weighted data.
†Throughout this report, totals and n's represent the total un-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 14.1 Diagnosis of Boys' Lacrosse Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

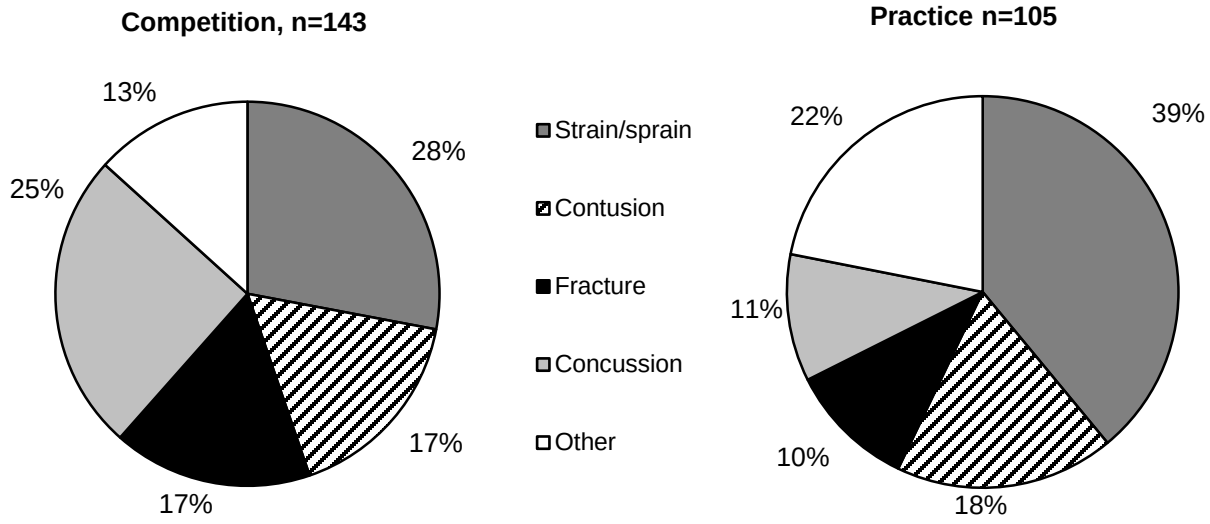


Table 14.3 Body Site of Boys' Lacrosse Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

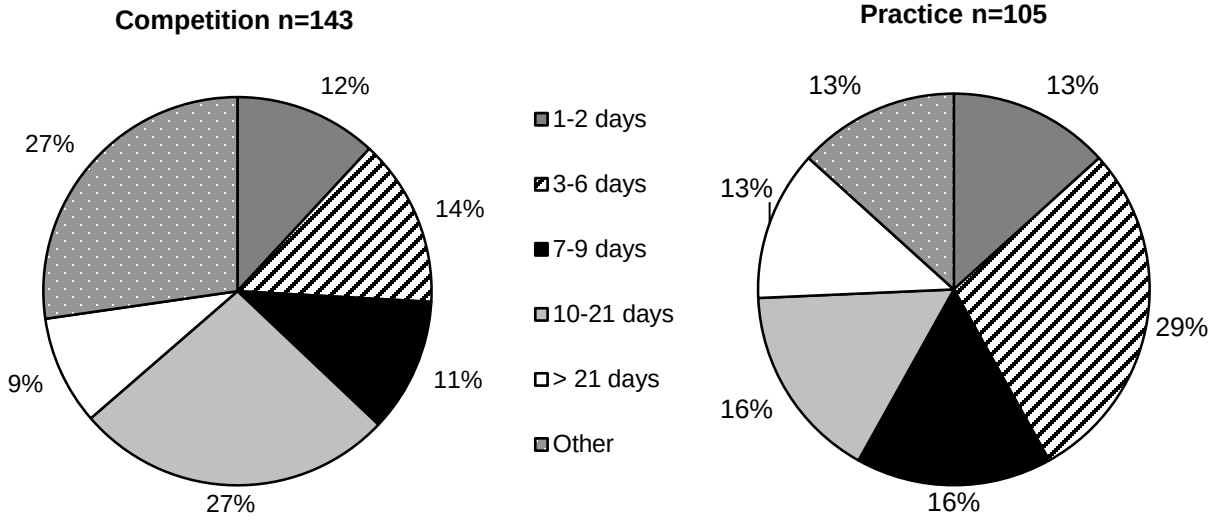
	Competition		Practice		Overall	
	n	%	n	%	n	%
Body Site						
Head/face	40	28.0%	14	13.3%	54	21.8%
Hip/thigh/upper leg	15	10.5%	19	18.1%	34	13.7%
Knee	17	11.9%	15	14.3%	32	12.9%
Hand/wrist	17	11.9%	9	8.6%	26	10.5%
Ankle	13	9.1%	7	6.7%	20	8.1%
Shoulder	8	5.6%	10	9.5%	18	7.3%
Trunk	8	5.6%	10	9.5%	18	7.3%
Arm/elbow	11	7.7%	3	2.9%	14	5.6%
Lower leg	5	3.5%	7	6.7%	12	4.8%
Foot	0	0.0%	7	6.7%	7	2.8%
Neck	2	1.4%	2	1.9%	4	1.6%
Other	7	4.9%	2	1.9%	9	3.6%
Total	**143**	**100.0%**	**105**	**100.0%**	**248**	**100.0%**

†Totals and n's are not always equal due to slight rounding or missing responses.

Table 14.4 Ten Most Common Boys' Lacrosse Injury Diagnoses by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

	Competition n=143		Practice n=105		Total n=248	
	n	%	n	%	n	%
Diagnosis						
Head/face concussion	36	25.2%	11	10.5%	47	19.0%
Hip/thigh/upper leg strain/sprain	7	4.9%	14	13.3%	21	8.5%
Ankle strain/sprain	13	9.1%	7	6.7%	20	8.1%
Knee strain/sprain	7	4.9%	9	8.6%	16	6.5%
Hand/wrist fracture	9	6.3%	5	4.8%	14	5.6%
Shoulder other	3	2.1%	8	7.6%	11	4.4%
Lower leg strain/sprain	4	2.8%	4	3.8%	8	3.2%
Arm/elbow contusion	6	4.2%	2	1.9%	8	3.2%
Knee contusion	3	2.1%	4	3.8%	7	2.8%
Hand/wrist contusion	5	3.5%	2	1.9%	7	2.8%

Figure 14.2 Time Loss of Boys' Lacrosse Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2016-17 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 14.5 Boys' Lacrosse Injuries Requiring Surgery by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

	Competition		Practice		Overall	
	n	%	n	%	n	%
Need for surgery						
Required surgery	9	6.3%	9	8.7%	13	5.3%
Did not require surgery	133	93.7%	94	91.3%	227	92.7%
Total	**142**	**100.0%**	**103**	**100.0%**	**245**	**100.0%**

†Totals and n's are not always equal due to slight rounding or missing responses.

Figure 14.3 History of Boys' Lacrosse Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

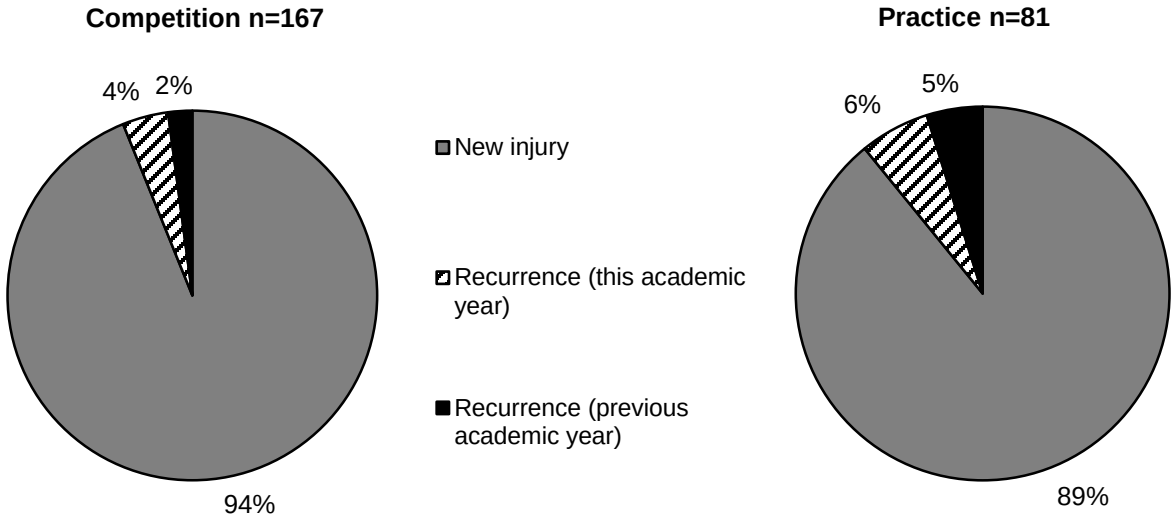


Table 14.6 Time during Season of Boys' Lacrosse Injuries, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

	n	%
Time in Season		
Preseason	45	18.1%
Regular season	199	80.2%
Post season	3	1.2%
Unknown	1	0.4%
Total	**248**	**100.0%**

†Totals and n's are not always equal due to slight rounding or missing responses.

Table 14.7 Competition-Related Variables for Boys' Lacrosse Injuries, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

	n	%
Time in Competition		
Pre-competition/warm-ups	3	2.2%
First quarter	10	7.4%
Second quarter	29	21.5%
Third quarter	33	24.4%
Fourth quarter	24	17.8%
Unknown	36	26.7%
Total	**135**	**100.0%**
Field Location		
Midfield	35	25.5%
Goal area	30	21.9%
Defensive area	13	9.5%
Wing area	11	8.0%
Crease area	7	5.1%
Sideline	1	0.7%
Unknown	40	29.2%
Total	**137**	**100.0%**

†Totals and n's are not always equal due to slight rounding or missing responses.

Table 14.8 Practice-Related Variables for Boys' Lacrosse Injuries, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

	n	%
Time in Practice		
First ½ hour	10	9.5%
Second ½ hour	18	17.1%
1-2 hours into practice	53	50.5%
> 2 hours into practice	7	6.7%
Unknown	17	16.2%
Total	**105**	**100.0%**

†Totals and n's are not always equal due to slight rounding or missing responses.

Figure 14.4 Player Position of Boys' Lacrosse Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

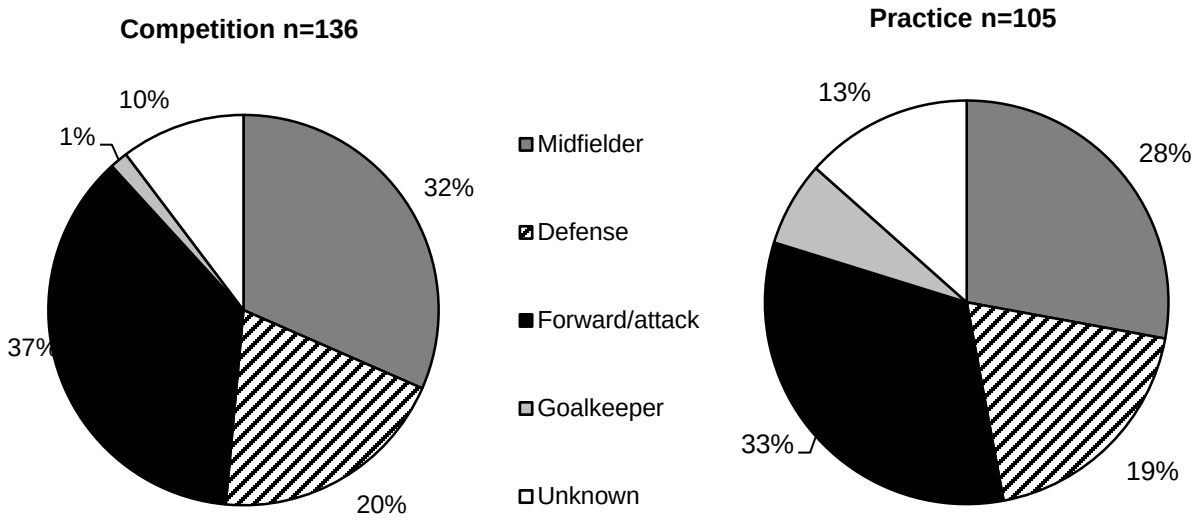


Table 14.9 Activities Leading to Boys' Lacrosse Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

	Competition		Practice		Overall	
	n	%	n	%	n	%
Activity						
General play	19	14.0%	32	30.5%	51	21.2%
Being body checked	20	14.7%	6	5.7%	26	10.8%
Being crosse/stick checked	18	13.2%	8	7.6%	26	10.8%
Chasing loose ball	17	12.5%	7	6.7%	24	10.0%
Defending	7	5.1%	10	9.5%	17	7.1%
Shooting	5	3.7%	4	3.8%	9	3.7%
Receiving pass	4	2.9%	5	4.8%	9	3.7%
Ball handling/cradling	7	5.1%	1	1.0%	8	3.3%
Blocking shot	4	2.9%	3	2.9%	7	2.9%
Goaltending	2	1.5%	5	4.8%	7	2.9%
Body checking	4	2.9%	2	1.9%	6	2.5%
Conditioning	0	0.0%	5	4.8%	5	2.1%
Crosse/stick checking	2	1.5%	1	1.0%	3	1.2%
Face-off	3	2.2%	0	0.0%	3	1.2%
Passing	1	0.7%	0	0.0%	1	0.4%
Other	2	1.5%	0	0.0%	2	0.8%
Unknown	21	15.4%	16	15.2%	37	15.4%
Total	**136**	**100.0%**	**105**	**100.0%**	**241**	**100.0%**

†Totals and n's are not always equal due to slight rounding or missing responses.

Table 14.10 Activity Resulting in Boys' Lacrosse Injuries by Injury Diagnosis, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

	Diagnosis									
	Strain/Sprain		Contusion		Fracture		Concussion		Other	
	n	%	n	%	n	%	n	%	n	%
Activity										
General Play	24	30.0%	4	9.8%	3	9.1%	7	14.9%	13	32.5%
Being Body Checked	7	8.8%	7	17.1%	2	6.1%	7	14.9%	3	7.5%
Shooting	4	5.0%	1	2.4%	1	3.0%	2	4.3%	1	2.5%
Being Crosse/Stick Checked	0	0.0%	11	26.8%	6	18.2%	7	14.9%	2	5.0%
Chasing Loose Ball	11	13.8%	2	4.9%	4	12.1%	6	12.8%	1	2.5%
Other	23	28.8%	14	34.1%	11	33.3%	7	14.9%	13	32.5%
Unknown	11	13.8%	2	4.9%	6	18.2%	11	23.4%	7	17.5%
Total	**80**	**100.0%**	**41**	**100.0%**	**33**	**100.0%**	**47**	**100.0%**	**40**	**100.0%**

†Totals and n's are not always equal due to slight rounding or missing responses.

XV. Girls' Lacrosse Injury Epidemiology

Table 15.1 Girls' Lacrosse Injury Rates by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

	# Injuries	# Exposures	Injury rate (per 1,000 athlete-exposures)
Total	**132**	**85,970**	**1.54**
Competition	82	26,482	3.10
Practice	50	59,488	0.84

Table 15.2 Demographic Characteristics of Injured Girls' Lacrosse Athletes, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year*

Year in School	**n=129**
Freshman	24.0%
Sophomore	26.4%
Junior	25.6%
Senior	24.0%
Total	**100.0%**
Age (years)	
Minimum	14
Maximum	18
Mean (St. Dev.)	16.1 (1.3)
BMI	
Minimum	16.2
Maximum	31.4
Mean (St. Dev.)	21.9 (2.6)

*All analyses in this chapter present un-weighted data.
†Throughout this report, totals and n's represent the total un-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 15.1 Diagnosis of Girls' Lacrosse Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

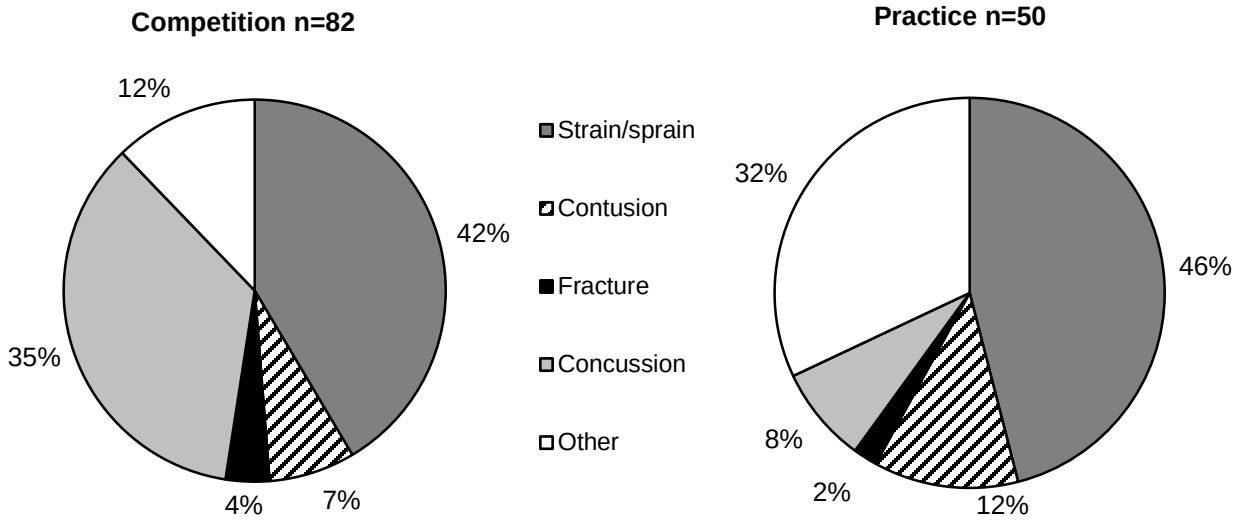


Table 15.3 Body Site of Girls' Lacrosse Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

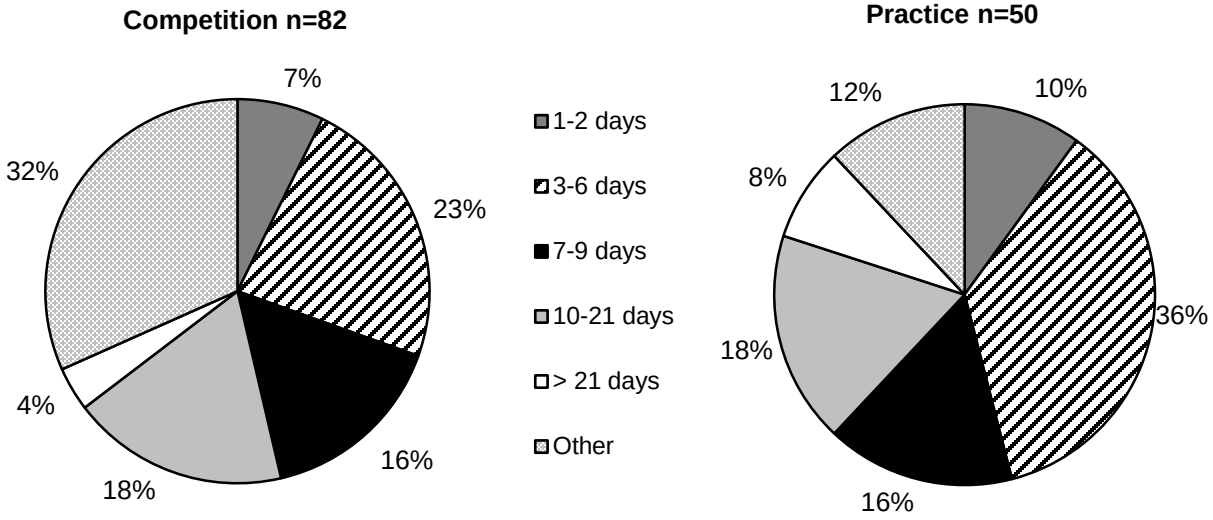
	Competition		Practice		Overall	
	n	%	n	%	n	%
Body Site						
Head/face	32	39.0%	5	10.0%	37	28.0%
Knee	17	20.7%	7	14.0%	24	18.2%
Ankle	10	12.2%	13	26.0%	23	17.4%
Hip/thigh/upper leg	7	8.5%	9	18.0%	16	12.1%
Trunk	3	3.7%	3	6.0%	6	4.5%
Lower leg	2	2.4%	4	8.0%	6	4.5%
Foot	2	2.4%	4	8.0%	6	4.5%
Shoulder	2	2.4%	3	6.0%	5	3.8%
Hand/wrist	4	4.9%	0	0.0%	4	3.0%
Arm/elbow	1	1.2%	0	0.0%	1	0.8%
Other	2	2.4%	2	4.0%	4	3.0%
Total	**82**	**100.0%**	**50**	**100.0%**	**132**	**100.0%**

†Totals and n's are not always equal due to slight rounding or missing responses.

Table 15.4 Ten Most Common Girls' Lacrosse Injury Diagnoses by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

	Competition n=82		Practice n=50		Total n=132	
	n	%	n	%	n	%
Diagnosis						
Head/face concussion	29	35.37%	4	8.00%	33	25.00%
Ankle strain/sprain	10	12.20%	12	24.00%	22	16.67%
Knee strain/sprain	13	15.85%	1	2.00%	14	10.61%
Hip/thigh/upper leg strain/sprain	6	7.32%	8	16.00%	14	10.61%
Knee other	3	3.66%	5	10.00%	8	6.06%
Lower leg other	1	1.22%	4	8.00%	5	3.79%
Head/face contusion	2	2.44%	1	2.00%	3	2.27%
Trunk contusion	1	1.22%	2	4.00%	3	2.27%
Shoulder other	1	1.22%	2	4.00%	3	2.27%
Other other	1	1.22%	2	4.00%	3	2.27%

Figure 15.2 Time Loss of Girls' Lacrosse Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2016-17 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 15.5 Girls' Lacrosse Injuries Requiring Surgery by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

	Competition		Practice		Overall	
	n	%	n	%	n	%
Need for surgery						
Required surgery	8	9.9%	2	4.0%	10	7.6%
Did not require surgery	73	90.1%	48	96.0%	121	92.4%
Total	**81**	**100.0%**	**50**	**100.0%**	**131**	**100.0%**

†Totals and n's are not always equal due to slight rounding or missing responses.

Figure 15.3 History of Girls' Lacrosse Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

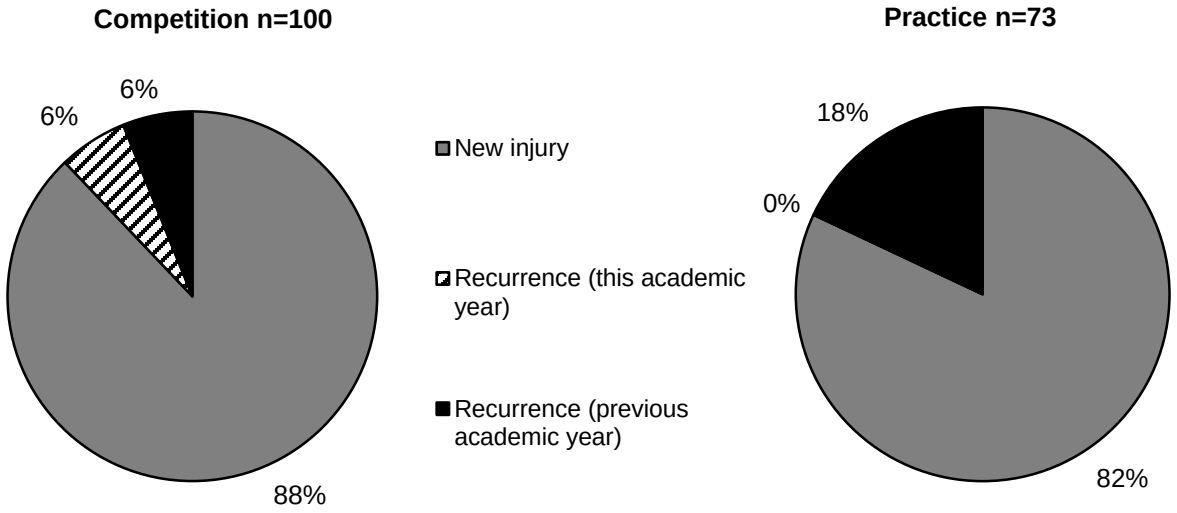


Table 15.6 Time during Season of Girls' Lacrosse Injuries, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

	n	%
Time in Season		
Preseason	25	18.9%
Regular season	100	75.8%
Post season	7	5.3%
Total	**132**	**100.0%**

†Totals and n's are not always equal due to slight rounding or missing responses.

Table 15.7 Competition-Related Variables for Girls' Lacrosse Injuries, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

	n	%
Time in Competition		
Pre-Competition-Warm-ups	1	1.3%
First half	15	19.2%
Second half	44	56.4%
Overtime	-	-
Unknown	18	23.1%
Total	**78**	**100.0%**
Field Location		
Critical scoring area (including the fan and arc)	18	23.4%
Midfield (between restraining lines)	15	19.5%
Goal circle	9	11.7%
Center circle	5	6.5%
Sideline	2	2.6%
Endline	1	1.3%
Unknown	27	35.1%
Total	**77**	**100.0%**

†Totals and n's are not always equal due to slight rounding or missing responses.

Table 15.8 Practice-Related Variables for Girls' Lacrosse Injuries, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

	n	%
Time in Practice		
First 1/2 hour	3	6.4%
Second 1/2 hour	4	8.5%
1-2 hours into practice	29	61.7%
>2 hours into practice	0	0.0%
Unknown	11	23.4%
Total	**47**	**100.0%**

†Totals and n's are not always equal due to slight rounding or missing responses.

Figure 15.4 Player Position of Girls' Lacrosse Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

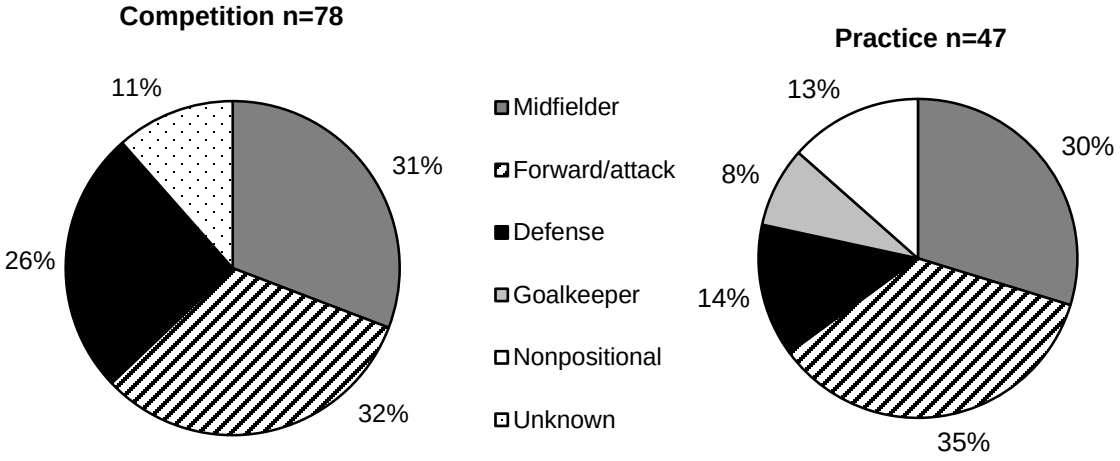


Table 15.9 Activities Leading to Girls' Lacrosse Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

	Competition		Practice		Overall	
	n	**%**	**n**	**%**	**n**	**%**
Activity						
General play	11	14.1%	19	39.6%	30	23.8%
Defending	15	19.2%	1	2.1%	16	12.7%
Shooting	10	12.8%	1	2.1%	11	8.7%
Being crosse/stick checked	6	7.7%	2	4.2%	8	6.3%
Ball handling/cradling	4	5.1%	4	8.3%	8	6.3%
Chasing loose ball	5	6.4%	3	6.3%	8	6.3%
Receiving pass	2	2.6%	3	6.3%	5	4.0%
Conditioning	0	0.0%	4	8.3%	4	3.2%
Passing	2	2.6%	1	2.1%	3	2.4%
Being body checked	3	3.8%	0	0.0%	3	2.4%
Body Checking	2	2.6%	0	0.0%	2	1.6%
Blocking Shot	1	1.3%	1	2.1%	2	1.6%
Goaltending	0	0.0%	2	4.2%	2	1.6%
Face-off	1	1.3%	0	0.0%	1	0.8%
Other	0	0.0%	2	4.2%	2	1.6%
Unknown	16	20.5%	5	10.4%	21	16.7%
Total	**78**	**100.0%**	**48**	**100.0%**	**126**	**100.0%**

†Totals and n's are not always equal due to slight rounding or missing responses.

Table 15.10 Activity Resulting in Girls' Lacrosse Injuries by Injury Diagnosis, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

	Diagnosis									
	Strain/Sprain		Contusion		Fracture		Concussion		Other	
	n	%	n	%	n	%	n	%	n	%
Activity										
Shooting	7	13.0%	0	0.0%	0	0.0%	3	9.7%	1	4.0%
Ball handling/cradling	6	11.1%	0	0.0%	0	0.0%	0	0.0%	2	8.0%
Defending	6	11.1%	3	25.0%	1	25.0%	6	19.4%	0	0.0%
Chasing loose ball	5	9.3%	1	8.3%	0	0.0%	2	6.5%	0	0.0%
Passing	2	3.7%	1	8.3%	0	0.0%	0	0.0%	0	0.0%
Receiving pass	2	3.7%	0	0.0%	0	0.0%	2	6.5%	1	4.0%
Blocking shot	2	3.7%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Conditioning	2	3.7%	0	0.0%	1	25.0%	0	0.0%	1	4.0%
Being body checked	1	1.9%	2	16.7%	0	0.0%	0	0.0%	0	0.0%
Face-off	1	1.9%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Body checking	0	0.0%	1	8.3%	0	0.0%	1	3.2%	0	0.0%
Being crosse checked	0	0.0%	2	16.7%	0	0.0%	6	19.4%	0	0.0%
Goaltending	0	0.0%	0	0.0%	0	0.0%	1	3.2%	1	4.0%
General play	13	24.1%	2	16.7%	0	0.0%	2	6.5%	13	52.0%
Other	0	0.0%	0	0.0%	0	0.0%	1	3.2%	1	4.0%
Unknown	7	13.0%	0	0.0%	2	50.0%	7	22.6%	5	20.0%
Total	**54**	**100.0%**	**12**	**100.0%**	**4**	**0.0%**	**31**	**100.0%**	**25**	**100.0%**

†Totals and n's are not always equal due to slight rounding or missing responses.

XVI. Boys' Swimming and Diving Injury Epidemiology

Table 16.1 Boys' Swimming and Diving Injury Rates by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

	# Injuries	# Exposures	Injury rate (per 1,000 athlete-exposures)
Total	**20**	**95,651**	**0.21**
Competition	5	18,811	0.27
Practice	15	76,840	0.20

Table 16.2 Demographic Characteristics of Injured Boys' Swimming and Diving Athletes, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year*

Year in School	**n=14**
Freshman	14.3%
Sophomore	28.6%
Junior	35.7%
Senior	21.4%
Total†	**100.0%**
Age (years)	
Minimum	13
Maximum	18
Mean (St. Dev.)	15.9 (1.3)
BMI	
Minimum	18.5
Maximum	27.5
Mean (St. Dev.)	23.2 (2.9)

*All analyses in this chapter present un-weighted data.
†Throughout this report, totals and n's represent the total un-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 16.1 Diagnosis of Boys' Swimming and Diving Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

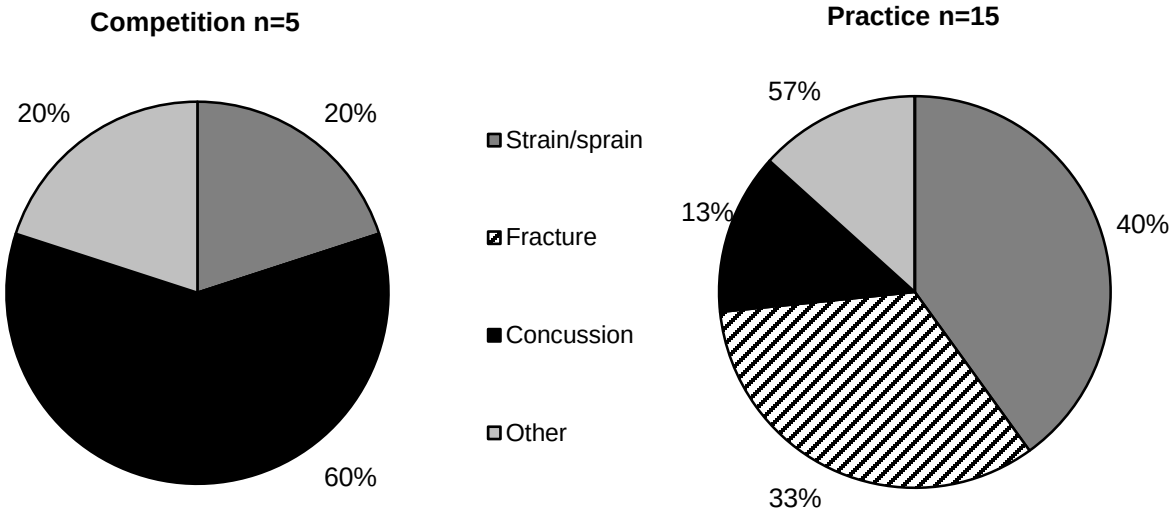


Table 16.3 Body Site of Boys' Swimming and Diving Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

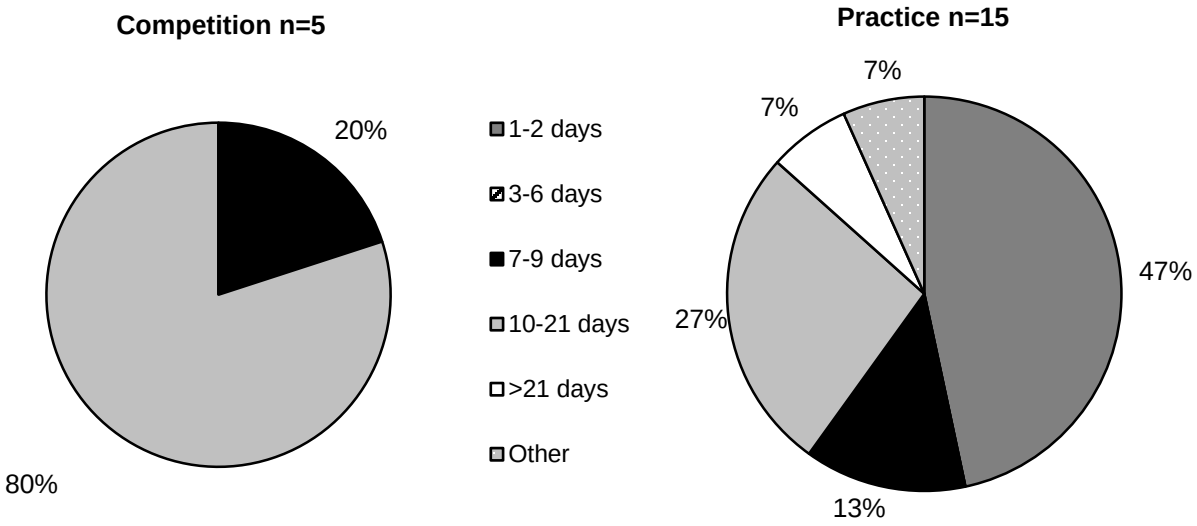
	Competition		Practice		Overall	
	n	**%**	**n**	**%**	**n**	**%**
Body Site						
Head/face	3	60.0%	5	33.3%	8	40.0%
Shoulder	1	20.0%	4	26.7%	5	25.0%
Hand/wrist	1	20.0%	1	6.7%	2	10.0%
Hip/thigh/upper leg	0	0.0%	1	6.7%	1	5.0%
Ankle	0	0.0%	1	6.7%	1	5.0%
Trunk	0	0.0%	1	6.7%	1	5.0%
Foot	0	0.0%	1	6.7%	1	5.0%
Other	0	0.0%	1	6.7%	1	5.0%
Total	**5**	**100.0%**	**15**	**100.0%**	**20**	**100.0%**

†Totals and n's are not always equal due to slight rounding or missing responses.

Table 16.4 Ten Most Common Boys' Swimming and Diving Injury Diagnoses by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

	Competition n=5		Practice n=15		Total n=20	
	n	%	n	%	n	%
Diagnosis						
Head/face concussion	3	60.0%	5	33.3%	8	40.0%
Shoulder strain/sprain	0	0.0%	3	20.0%	3	15.0%
Shoulder other	1	20.0%	1	6.7%	2	10.0%
Hip/thigh/upper leg strain/sprain	0	0.0%	1	6.7%	1	5.0%
Ankle strain/sprain	0	0.0%	1	6.7%	1	5.0%
Hand/wrist sprain/strain	1	20.0%	0	0.0%	1	5.0%
Trunk sprain/strain	0	0.0%	1	6.7%	1	5.0%
Foot fracture	0	0.0%	1	6.7%	1	5.0%
Hand/wrist fracture	0	0.0%	1	6.7%	1	5.0%
Other fracture	0	0.0%	1	6.7%	1	5.0%

Figure 16.2 Time Loss of Boys' Swimming and Diving Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2016-17 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 16.5 Boys' Swimming and Diving Injuries Requiring Surgery by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

	Competition		Practice		Overall	
	n	%	n	%	n	%
Need for surgery						
Required surgery	0	0.0%	0	0.0%	0	0.0%
Did not require surgery	5	100.0%	15	100.0%	20	100.0%
Total	**5**	**100.0%**	**15**	**100.0%**	**20**	**100.0%**

†Totals and n's are not always equal due to slight rounding or missing responses.

Figure 16.3 History of Boys' Swimming and Diving Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

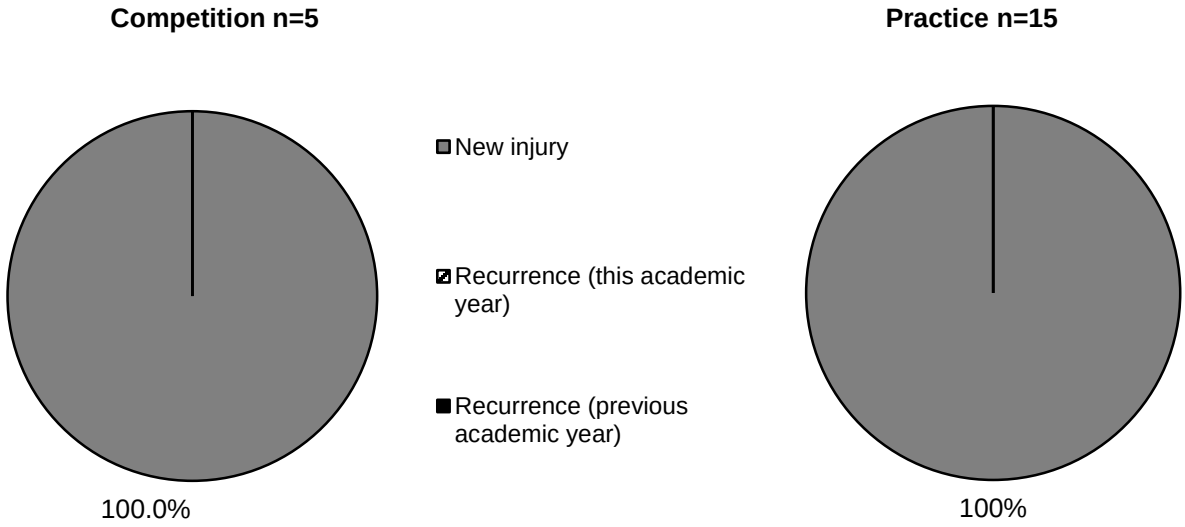


Table 16.6 Time during Season of Boys' Swimming and Diving Injuries, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

	n	%
Time in Season		
Preseason	5	25.0%
Regular season	14	70.0%
Post season	1	5.0%
Total	**20**	**100.0%**

†Totals and n's are not always equal due to slight rounding or missing responses.

Table 16.7 Pool Location for Boys' Swimming and Diving Injuries, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

	n	%
Pool Location		
In pool	14	73.7%
Unknown	1	5.3%
Other	4	21.1%
Total	**19**	**100.0%**

†Totals and n's are not always equal due to slight rounding or missing responses.

Table 16.8 Practice-Related Variables for Boys' Swimming and Diving Injuries, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

	n	%
Time in Practice		
First 1/2 hour	1	7.1%
Second 1/2 hour	2	14.3%
1-2 hours into practice	6	42.9%
>2 hours into practice	1	7.1%
Unknown	4	28.6%
Total	**14**	**100.0%**

†Totals and n's are not always equal due to slight rounding or missing responses.

Table 16.9 Activities Leading to Boys' Swimming and Diving Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

	Competition		Practice		Overall	
	n	%	n	%	n	%
Activity						
Swimming	3	75.0%	7	46.7%	10	52.6%
Conditioning	0	0.0%	3	20.0%	3	15.8%
Diving off board/platform/block	0	0.0%	2	13.3%	2	10.5%
Unknown	0	0.0%	1	6.7%	1	5.3%
Other	1	25.0%	2	13.3%	3	15.8%
Total	**4**	**100.0%**	**15**	**100.0%**	**19**	**100.0%**

†Totals and n's are not always equal due to slight rounding or missing responses.

Table 16.10 Activity Resulting in Boys' Swimming and Diving Injuries by Injury Diagnosis, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

	Diagnosis									
	Strain/Sprain		Contusion		Fracture		Concussion		Other	
	n	%	n	%	n	%	n	%	n	%
Activity										
Swimming	3	42.9%	0	0.0%	0	0.0%	4	57.1%	3	100.0
Diving off board/platform/block	0	0.0%	0	0.0%	0	0.0%	2	28.6%	0	0.0%
Conditioning	2	28.6%	0	0.0%	1	50.0%	0	0.0%	0	0.0%
Other	1	14.3%	0	0.0%	1	50.0%	1	14.3	0	0.0%
Unknown	1	14.3%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Total	**7**	**100.0%**	**0**	**0.0%**	**2**	**100.0%**	**7**	**100.0%**	**3**	**100.0%**

†Totals and n's are not always equal due to slight rounding or missing responses.

XVII. Girls' Swimming and Diving Injury Epidemiology

Table 17.1 Girls' Swimming and Diving Injury Rates by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

	# Injuries	# Exposures	Injury rate (per 1,000 athlete-exposures)
Total	**29**	**104,467**	**0.28**
Competition	4	21,286	0.19
Practice	25	83,181	0.30

Table 17.2 Demographic Characteristics of Injured Girls' Swimming and Diving Athletes, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year*

Year in School	**n=29**
Freshman	24.1%
Sophomore	31.0%
Junior	27.6%
Senior	17.2%
Total†	**100.0%**
Age (years)	
Minimum	14
Maximum	17
Mean (St. Dev.)	15.5 (1.0)
BMI	
Minimum	18.54
Maximum	33.54
Mean (St. Dev.)	22.3 (3.8)

*All analyses in this chapter present un-weighted data.
†Throughout this report, totals and n's represent the total un-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 17.1 Diagnosis of Girls' Swimming and Diving Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

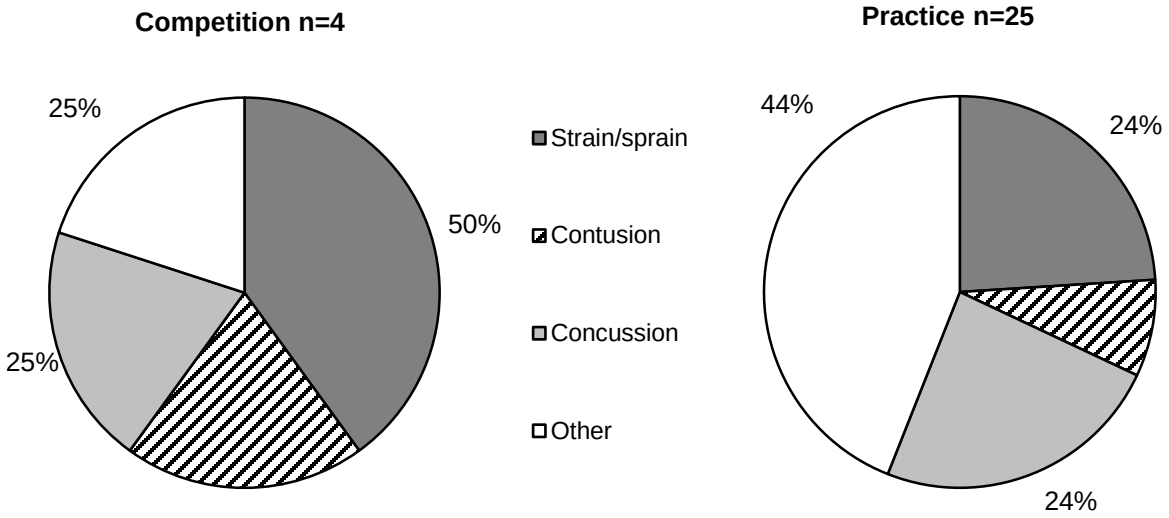


Table 17.3 Body Site of Girls' Swimming and Diving Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

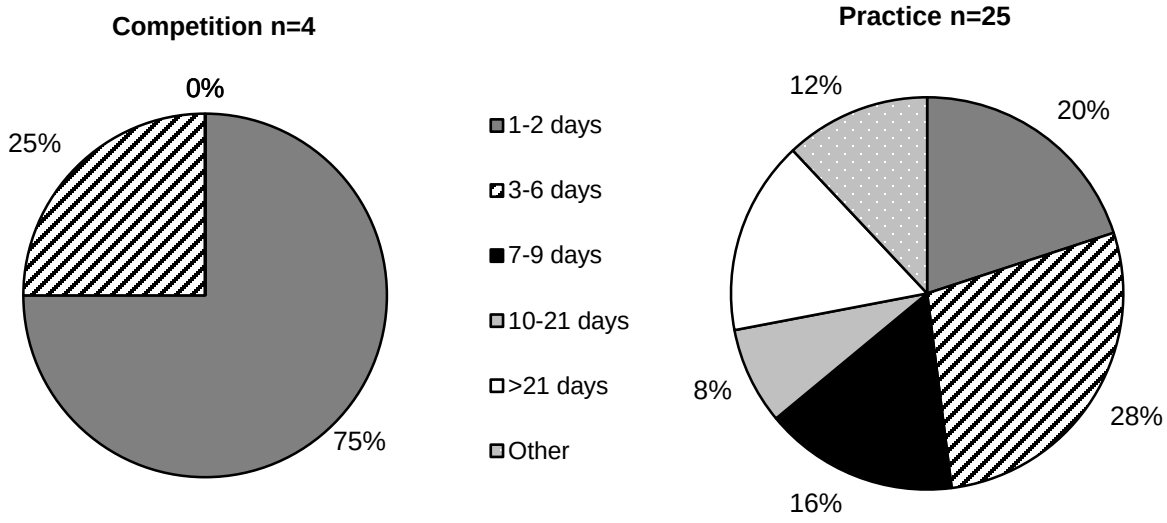
	Competition		Practice		Overall	
	n	%	n	%	n	%
Body Site						
Shoulder	2	50.0%	10	40.0%	12	41.4%
Head/face	0	0.0%	7	28.0%	7	24.1%
Foot	0	0.0%	2	8.0%	2	6.9%
Hip/thigh/upper leg	0	0.0%	1	4.0%	1	3.4%
Knee	1	25.0%	0	0.0%	1	3.4%
Ankle	0	0.0%	1	4.0%	1	3.4%
Hand/wrist	0	0.0%	1	4.0%	1	3.4%
Trunk	0	0.0%	1	4.0%	1	3.4%
Lower Leg	0	0.0%	1	4.0%	1	3.4%
Arm/elbow	0	0.0%	1	4.0%	1	3.4%
Neck	1	25.0%	0	0.0%	1	3.4%
Total	**4**	**100.0%**	**25**	**100.0%**	**29**	**100.0%**

†Totals and n's are not always equal due to slight rounding or missing responses.

Table 17.4 Ten Most Common Girls' Swimming and Diving Injury Diagnoses by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

	Competition n=4		Practice n=25		Total n=29	
	n	%	n	%	n	%
Diagnosis						
Shoulder other	1	25.0%	6	24.0%	7	24.1%
Head/face concussion	0	0.0%	6	24.0%	6	20.7%
Shoulder sprain/strain	1	25.0%	4	16.0%	5	17.2%
Knee contusion	1	25.0%	0	0.0%	1	3.4%
Ankle contusion	0	0.0%	1	4.0%	1	3.4%
Hand/wrist	0	0.0%	1	4.0%	1	3.4%
Foot contusion	0	0.0%	1	4.0%	1	3.4%
Neck Sprain/strain	1	25.0%	0	0.0%	1	3.4%
Head/face other	0	0.0%	1	4.0%	1	3.4%

Figure 17.2 Time Loss of Girls' Swimming and Diving Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2016-17 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 17.5 Girls' Swimming and Diving Injuries Requiring Surgery by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

	Competition		Practice		Overall	
	n	%	n	%	n	%
Need for surgery						
Required surgery	0	0.0%	0	0.0%	0	0.0%
Did not require surgery	4	100.0%	25	100.0%	29	100.0
Total	**4**	**100.0%**	**25**	**100.0%**	**29**	**100.0%**

†Totals and n's are not always equal due to slight rounding or missing responses.

Figure 17.3 History of Girls' Swimming and Diving Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

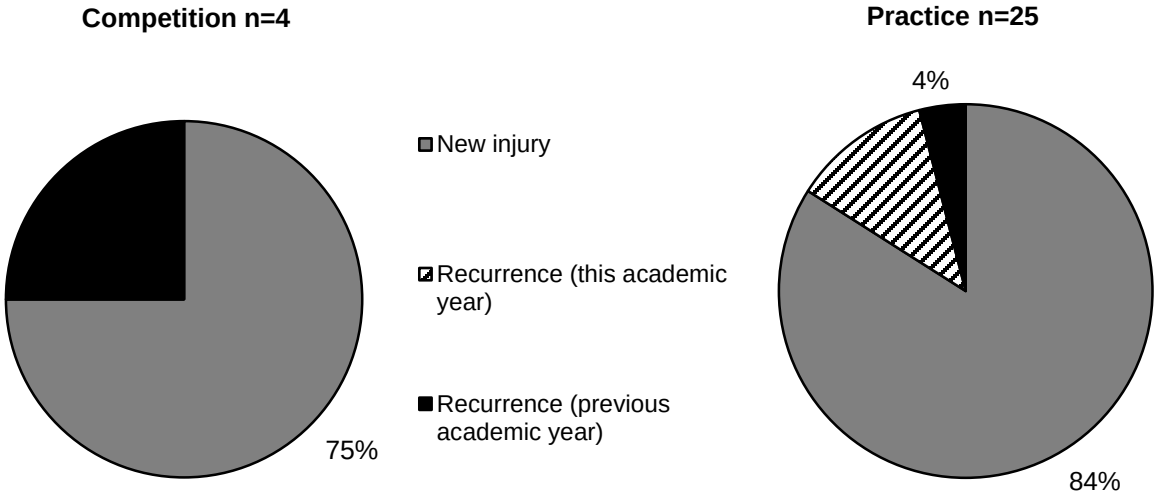


Table 17.6 Time during Season of Girls' Swimming and Diving Injuries, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

	n	%
Time in Season		
Preseason	4	13.8%
Regular season	25	86.2%
Post season	0	0.0%
Total	**29**	**100.0%**

†Totals and n's are not always equal due to slight rounding or missing responses.

Table 17.7 Competition-Related Variables for Girls' Swimming and Diving Injuries, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

	n	%
Pool Location		
In pool	19	65.5%
Starting platform/board/blocks	3	10.3%
Unknown	6	20.7%
Other	1	3.4%
Total	**29**	**100.0%**

†Totals and n's are not always equal due to slight rounding or missing responses.

Table 17.8 Practice-Related Variables for Girls' Swimming and Diving Injuries, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

	n	%
Time in Practice		
First 1/2 hour	3	12.0%
Second 1/2 hour	5	20.0%
1-2 hours into practice	6	24.0%
>2 hours into practice	2	8.0%
Unknown	9	36.0%
Total	**25**	**100.0%**

†Totals and n's are not always equal due to slight rounding or missing responses.

Table 17.9 Activities Leading to Girls' Swimming and Diving Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

	Competition		Practice		Overall	
	n	%	n	%	n	%
Activity						
Swimming	1	25.0%	14	56.0%	15	51.7%
Diving off board/platform	2	50.0%	4	16.0%	6	20.7%
Flip turn off wall	0	0.0%	3	12.0%	3	10.3%
Conditioning	0	0.0%	2	8.0%	2	6.9%
Touch turn off wall	0	0.0%	1	4.0%	1	3.4%
Unknown	1	25.0%	1	4.0%	2	6.9%
Total	**4**	**100.0%**	**25**	**100.0%**	**29**	**100.0%**

†Totals and n's are not always equal due to slight rounding or missing responses.

Table 17.10 Activity Resulting in Girls' Swimming and Diving Injuries by Injury Diagnosis, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

	Diagnosis									
	Strain/Sprain		Contusion		Fracture		Concussion		Other	
	n	%	n	%	n	%	n	%	n	%
Activity										
Swimming	3	37.5%	1	33.3%	0	0.0%	2	33.3%	9	75.0%
Flip turn off wall	0	0.0%	1	33.3%	0	0.0%	2	33.3%	0	0.0%
Diving off board/platform/block	2	25.0%	1	33.3%	0	0.0%	2	33.3%	1	8.3%
Touch turn off wall	0	0.0%	0	0.0%	0	0.0%	0	0.0%	1	8.3%
Conditioning	1	12.5%	0	0.0%	0	0.0%	0	0.0%	1	8.3%
Unknown	2	25.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Total	**8**	**100.0%**	**3**	**100.0%**	**0**	**0.0%**	**6**	**100.0%**	**12**	**100.0%**

†Totals and n's are not always equal due to slight rounding or missing responses.

XVIII. Boys' Track and Field Injury Epidemiology

Table 18.1 Boys' Track and Field Injury Rates by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

	# Injuries	# Exposures	Injury rate (per 1,000 athlete-exposures)
Total	**176**	**258,222**	**0.68**
Competition	57	46,523	1.23
Practice	119	211,699	0.56

Table 18.2 Demographic Characteristics of Injured Boys' Track and Field Athletes, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year*

Year in School	**n=176**
Freshman	22.9%
Sophomore	23.5%
Junior	27.6%
Senior	25.9%
Total†	**100.0%**
Age (years)	
Minimum	14
Maximum	19
Mean (St. Dev.)	16.1 (1.3)
BMI	
Minimum	14.6
Maximum	34.4
Mean (St. Dev.)	22.4 (3.3)

*All analyses in this chapter present un-weighted data.
†Throughout this report, totals and n's represent the total un-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 18.1 Diagnosis of Boys' Track and Field Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

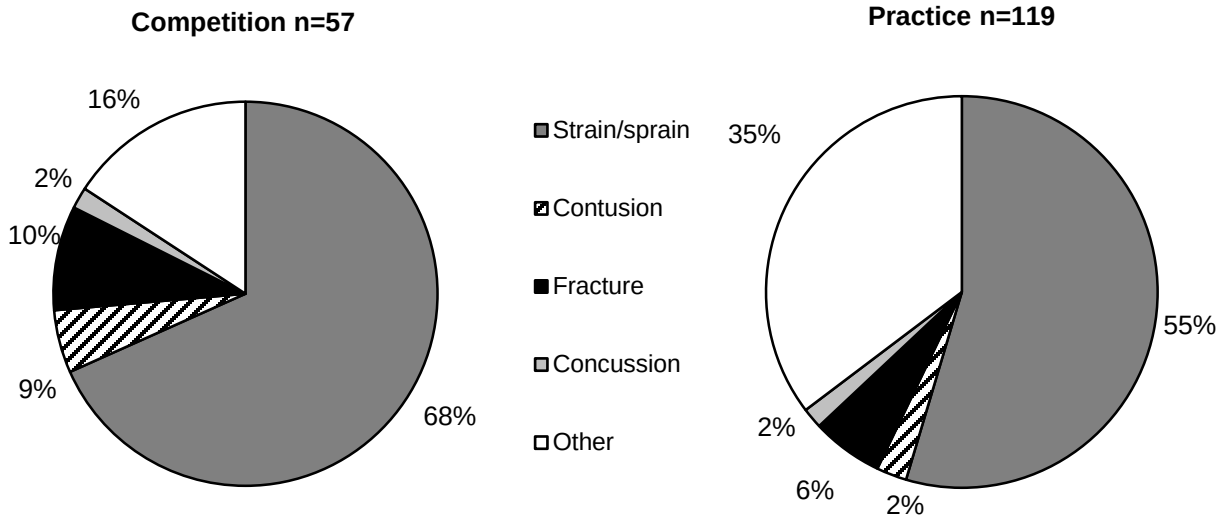


Table 18.3 Body Site of Boys' Track and Field Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

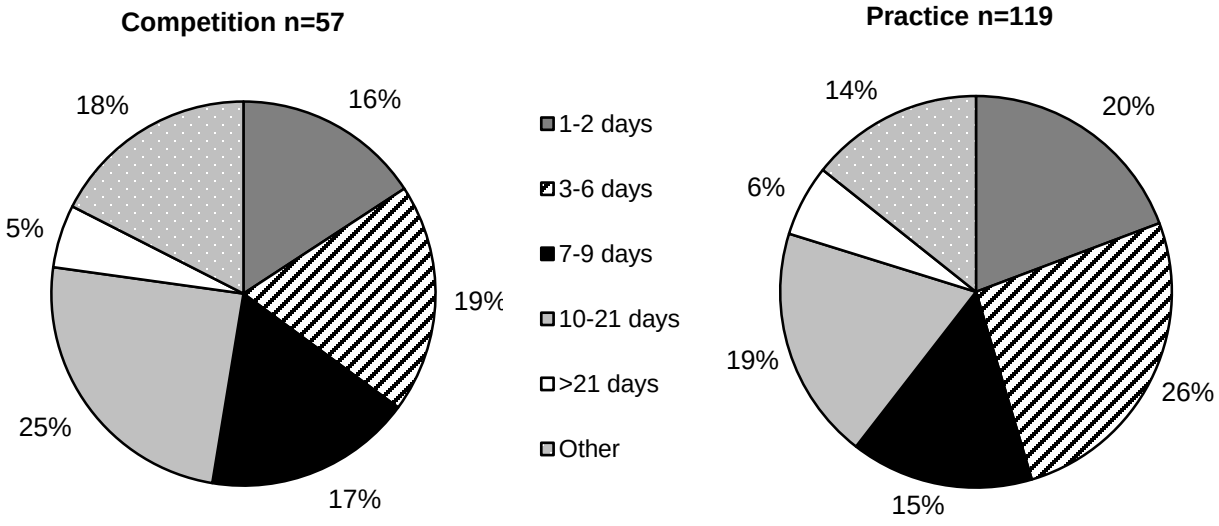
	Competition		Practice		Overall	
	n	**%**	**n**	**%**	**n**	**%**
Body Site						
Hip/thigh/upper leg	29	50.9%	39	32.8%	68	38.6%
Lower leg	0	0.0%	26	21.8%	26	14.8%
Ankle	8	14.0%	17	14.3%	25	14.2%
Knee	6	10.5%	11	9.2%	17	9.7%
Foot	6	10.5%	7	5.9%	13	7.4%
Arm/elbow	1	1.8%	5	4.2%	6	3.4%
Hand/wrist	1	1.8%	4	3.4%	5	2.8%
Trunk	0	0.0%	5	4.2%	5	2.8%
Head/face	1	1.8%	2	1.7%	3	1.7%
Shoulder	1	1.8%	1	0.8%	2	1.1%
Other	4	7.0%	2	1.7%	6	3.4%
Total	**57**	**100.0%**	**119**	**100.0%**	**176**	**100.0%**

†Totals and n's are not always equal due to slight rounding or missing responses.

Table 18.4 Ten Most Common Boys' Track and Field Injury Diagnoses by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

	Competition n=57		Practice n=119		Total n=176	
	n	%	n	%	n	%
Diagnosis						
Hip/thigh/upper leg strain/sprain	27	47.4%	35	29.4%	62	35.2%
Lower leg other	0	0.0%	19	16.0%	19	10.8%
Ankle strain/sprain	5	8.8%	14	11.8%	19	10.8%
Knee other	2	3.5%	7	5.9%	9	5.1%
Hip/thigh/upper leg other	2	3.5%	4	3.4%	6	3.4%
Foot strain/sprain	3	5.3%	3	2.5%	6	3.4%
Knee strain/sprain	3	5.3%	2	1.7%	5	2.8%
Ankle other	2	3.5%	3	2.5%	5	2.8%
Lower leg strain/sprain	0	0.0%	5	4.2%	5	2.8%
Foot other	2	3.5%	2	1.7%	4	2.3%

Figure 18.2 Time Loss of Boys' Track and Field Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2016-17 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 18.5 Boys' Track and Field Injuries Requiring Surgery by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

	Competition		Practice		Overall	
	n	%	n	%	n	%
Need for surgery						
Required surgery	4	7.1%	1	0.9%	5	2.9%
Did not require surgery	52	92.9%	114	99.1%	166	97.1%
Total	**56**	**100.0%**	**115**	**100.0%**	**171**	**100.0%**

†Totals and n's are not always equal due to slight rounding or missing responses.

Figure 18.3 History of Boys' Track and Field Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

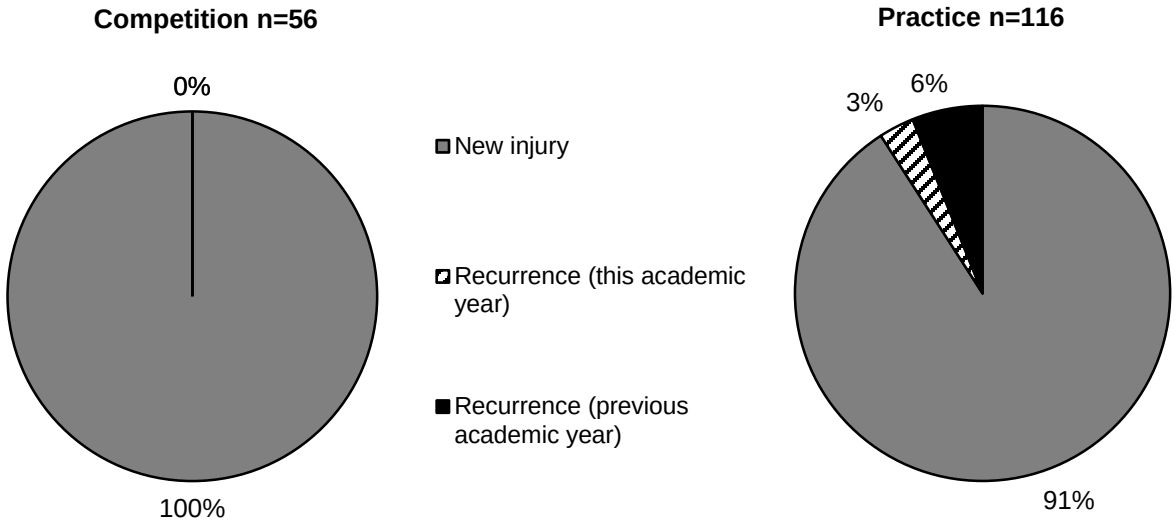


Table 18.6 Time during Season of Boys' Track and Field Injuries, High School Sports-Related Injury Surveillance Study, US, 2015-16 School Year

	n	%
Time in Season		
Preseason	29	16.7%
Regular season	140	80.5%
Post season	5	2.9%
Total	**174**	**100.0%**

†Totals and n's are not always equal due to slight rounding or missing responses.

Table 18.7 Practice-Related Variables for Boys' Track and Field Injuries, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

	n	%
Time in Practice		
First 1/2 hour	18	15.8%
Second 1/2 hour	23	20.2%
1-2 hours into practice	39	34.2%
>2 hours into practice	4	3.5%
Unknown	30	26.3%
Total	**114**	**100.0%**

†Totals and n's are not always equal due to slight rounding or missing responses.

Table 18.8 Activities Leading to Boys' Track and Field Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

	Competition		Practice		Overall	
	n	%	n	%	n	%
Activity						
Running	33	57.9%	79	68.1%	112	64.7%
Jumping/landing	15	26.3%	10	8.6%	25	14.5%
Running hurdles	3	5.3%	6	5.2%	9	5.2%
Throwing	0	0.0%	6	5.2%	6	3.5%
Conditioning	0	0.0%	5	4.3%	5	2.9%
Warming up	3	5.3%	0	0.0%	3	1.7%
Leaving block	0	0.0%	2	1.7%	2	1.2%
Hit by shot/discus/javelin	0	0.0%	1	0.9%	1	0.6%
Baton hand off	0	0.0%	1	0.9%	1	0.6%
Other	2	3.5%	2	1.7%	4	2.3%
Unknown	1	1.8%	4	3.4%	5	2.9%
Total	**57**	**100.0%**	**116**	**100.0%**	**173**	**100.0%**

†Totals and n's are not always equal due to slight rounding or missing responses.

Table 18.10 Activity Resulting in Boys' Track and Field Injuries by Injury Diagnosis, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

	Diagnosis									
	Strain/Sprain		Contusion		Fracture		Concussion		Other	
	n	%	n	%	n	%	n	%	n	%
Activity										
Running	67	64.4%	4	66.7%	4	36.4%	1	50.0%	36	72.0%
Jumping/landing	16	15.4%	1	16.7%	3	27.3%	0	0.0%	5	10.0%
Throwing	3	2.9%	0	0.0%	0	0.0%	0	0.0%	3	6.0%
Running hurdles	3	2.9%	1	16.7%	2	18.2	1	50.0%	2	4.0%
Warming up	3	2.9%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Conditioning	2	1.9%	0	0.0%	0	0.0%	0	0.0%	3	6.0%
Leaving block	2	1.9%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Baton hand off	1	1.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Hit by shot put/discus	0	0.0%	0	0.0%	1	9.1%	0	0.0%	0	0.0%
Other	2	1.9%	0	0.0%	1	9.1%	0	0.0%	1	2.0%
Unknown	5	4.8%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Total	**104**	**100.0%**	**6**	**100.0%**	**11**	**100.0%**	**2**	**100.0%**	**50**	**100.0%**

†Totals and n's are not always equal due to slight rounding or missing responses.

XIX. Girls' Track and Field Injury Epidemiology

Table 19.1 Girls' Track and Field Injury Rates by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

	# Injuries	# Exposures	Injury rate (per 1,000 athlete-exposures)
Total	**220**	**216,213**	**1.02**
Competition	52	39,966	1.30
Practice	168	176,247	0.95

Table 19.2 Demographic Characteristics of Injured Girls' Track and Field Athletes, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year*

Year in School	**n=220**
Freshman	32.4%
Sophomore	27.6%
Junior	26.2%
Senior	13.8%
Total†	**100.0%**
Age (years)	
Minimum	13
Maximum	18
Mean (St. Dev.)	15.6 (1.2)
BMI	
Minimum	15.2
Maximum	32.61
Mean (St. Dev.)	21.8 (3.2)

*All analyses in this chapter present un-weighted data.
†Throughout this report, totals and n's represent the total un-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 19.1 Diagnosis of Girls' Track and Field Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

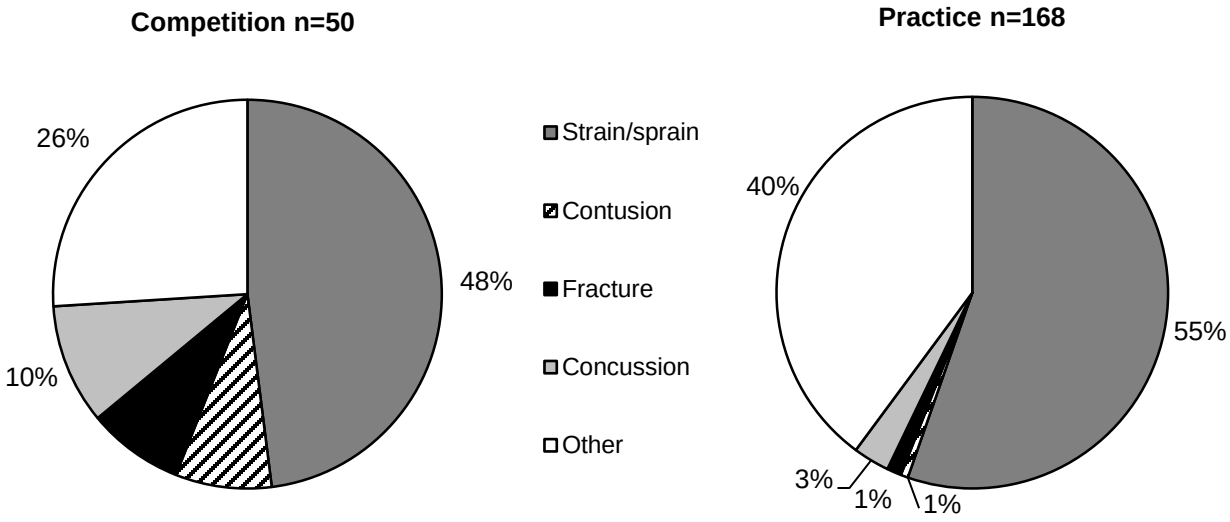


Table 19.3 Body Site of Girls' Track and Field Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

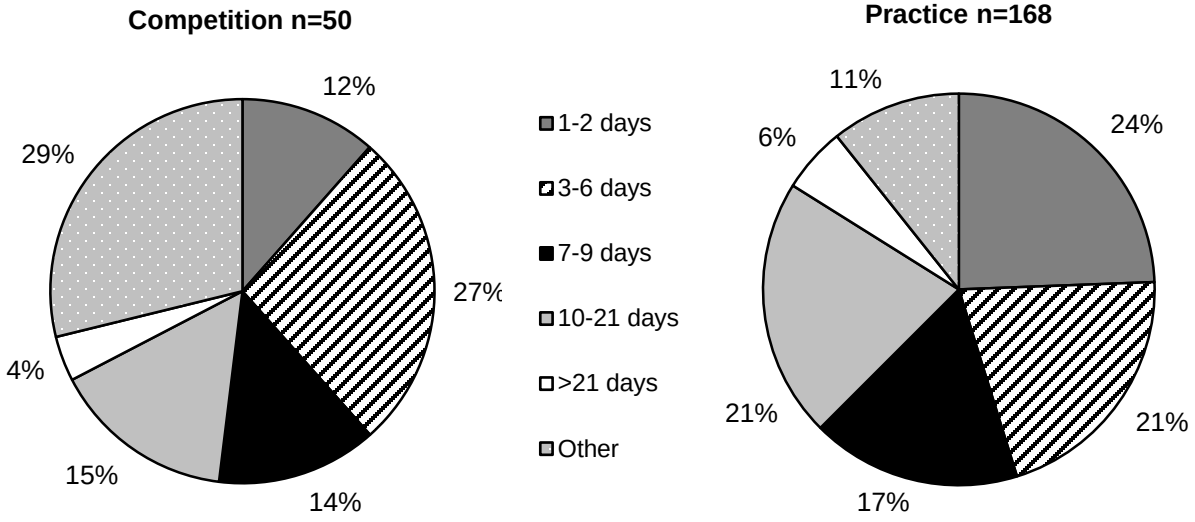
	Competition		Practice		Overall	
	n	**%**	**n**	**%**	**n**	**%**
Body Site						
Hip/thigh/upper leg	12	23.1%	55	32.7%	67	30.5%
Lower leg	9	17.3%	38	22.6%	47	21.4%
Ankle	10	19.2%	25	14.9%	35	15.9%
Knee	7	13.5%	14	8.3%	21	9.5%
Foot	4	7.7%	11	6.5%	15	6.8%
Head/face	5	9.6%	5	3.0%	10	4.5%
Trunk	1	1.9%	7	4.2%	8	3.6%
Shoulder	3	5.8%	3	1.8%	6	2.7%
Hand/wrist	0	0.0%	3	1.8%	3	1.4%
Arm/elbow	1	1.9%	1	0.6%	2	0.9%
Other	0	0.0%	6	3.6%	6	2.7%
Total	**52**	**100.0%**	**168**	**100.0%**	**220**	**100.0%**

†Totals and n's are not always equal due to slight rounding or missing responses.

Table 19.4 Ten Most Common Girls' Track and Field Injury Diagnoses by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

	Competition n=50		Practice n=168		Total n=218	
	n	%	n	%	n	%
Diagnosis						
Hip/thigh/upper leg strain/sprain	8	16.0%	46	27.4%	54	24.8%
Lower leg other	6	12.0%	29	17.3%	35	16.1%
Ankle strain/sprain	9	18.0%	25	14.9%	34	15.6%
Knee other	3	6.0%	11	6.5%	14	6.4%
Hip/thigh/upper leg other	3	6.0%	9	5.4%	12	5.5%
Lower leg strain/sprain	2	4.0%	9	5.4%	11	5.0%
Head/face concussion	5	10.0%	5	3.0%	10	4.6%
Foot other	0	0.0%	7	4.2%	7	3.2%
Other other	0	0.0%	6	3.6%	6	2.8%
Knee strain/sprain	2	4.0%	3	1.8%	5	2.3%

Figure 19.2 Time Loss of Girls' Track and Field Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2016-17 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 19.5 Girls' Track and Field Injuries Requiring Surgery by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

	Competition		Practice		Overall	
	n	%	n	%	n	%
Need for surgery						
Required surgery	3	5.9%	1	0.6%	4	1.8%
Did not require surgery	48	94.1%	165	99.4%	213	98.2%
Total	**51**	**100.0%**	**166**	**100.0%**	**217**	**100.0%**

†Totals and n's are not always equal due to slight rounding or missing responses.

Figure 19.3 History of Girls' Track and Field Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

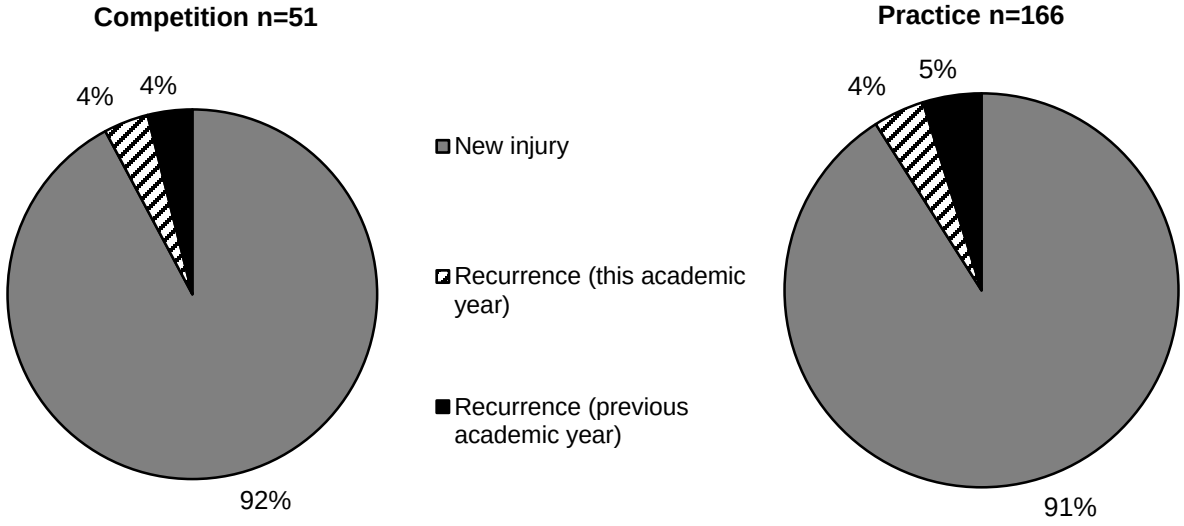


Table 19.6 Time during Season of Girls' Track and Field Injuries, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

	n	%
Time in Season		
Preseason	52	23.6%
Regular season	161	73.2%
Post season	6	2.7%
Unknown	1	0.5%
Total	**220**	**100.0%**

†Totals and n's are not always equal due to slight rounding or missing responses.

Table 19.7 Practice-Related Variables for Girls' Track and Field Injuries, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

	n	%
Time in Practice		
First 1/2 hour	20	12.3%
Second 1/2 hour	37	22.8%
1-2 hours into practice	53	32.7%
>2 hours into practice	6	3.7%
Unknown	46	28.4%
Total	**162**	**100.0%**

†Totals and n's are not always equal due to slight rounding or missing responses.

Table 19.8 Activities Leading to Girls' Track and Field Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

	Competition		Practice		Overall	
	n	%	n	%	n	%
Activity						
Running	21	41.2%	106	64.6%	127	59.1%
Jumping/landing	10	19.6%	15	9.1%	25	11.6%
Other	5	9.8%	8	4.9%	13	6.0%
Conditioning	0	0.0%	12	7.3%	12	5.6%
Throwing	5	9.8%	5	3.0%	10	4.7%
Running Hurdles	4	7.8%	6	3.7%	10	4.7%
Warming up	3	5.9%	5	3.0%	8	3.7%
Unknown	1	2.0%	6	3.7%	7	3.3%
Leaving block	0	0.0%	1	0.6%	1	0.5%
Hit by shot put/discus/javelin/hammer	1	2.0%	0	0.0%	1	0.5%
Baton hand off	1	2.0%	0	0.0%	1	0.5%
Total	**51**	**100.0%**	**164**	**100.0%**	**215**	**100.0%**

†Totals and n's are not always equal due to slight rounding or missing responses.

Table 19.10 Activity Resulting in Girls' Track and Field Injuries by Injury Diagnosis, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

	Diagnosis									
	Strain/Sprain		Contusion		Fracture		Concussion		Other	
	n	%	n	%	n	%	n	%	n	%
Activity										
Running	71	61.2%	0	0.0%	0	0.0%	2	20.0%	54	69.2%
Leaving block	1	0.9%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Jumping/landing	16	13.8%	1	25.0%	1	20.0%	1	10.0%	6	7.7%
Throwing	4	3.4%	0	0.0%	0	0.0%	3	30.0%	2	2.6%
Hit by shotput	0	0.0%	0	0.0%	0	0.0%	1	10.0%	0	0.0%
Baton hand off	0	0.0%	0	0.0%	0	0.0%	1	10.0%	0	0.0%
Warming up	6	5.2%	0	0.0%	1	20.0%	0	0.0%	1	1.3%
Conditioning	4	3.4%	0	0.0%	0	0.0%	0	0.0%	8	10.3%
Running hurdles	5	4.3%	1	25.0%	1	20.0%	0	0.0%	3	3.8%
Other	7	6.0%	2	50.0%	2	40.0%	2	20.0%	0	0.0%
Unknown	2	1.7%	0	0.0%	0	0.0%	0	0.0%	4	5.1%
Total	**116**	**100.0%**	**4**	**100.0%**	**5**	**100.0%**	**10**	**100.0%**	**78**	**100.0%**

†Totals and n's are not always equal due to slight rounding or missing responses.

XX. Boys' Cross Country Injury Epidemiology

Table 20.1 Boys' Cross Country Injury Rates by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

	# Injuries	# Exposures	Injury rate (per 1,000 athlete-exposures)
Total	**85**	**126,659**	**0.67**
Competition	16	20,793	0.77
Practice	69	105,866	0.65

Table 20.2 Demographic Characteristics of Injured Boys' Cross Country Athletes, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year*

Year in School	**n=85**
Freshman	24.4%
Sophomore	21.8%
Junior	20.5%
Senior	33.3%
Total†	**100.0%**
Age (years)	
Minimum	13
Maximum	18
Mean (St. Dev.)	15.9 (1.2)
BMI	
Minimum	14.2
Maximum	27.9
Mean (St. Dev.)	21.0 (2.7)

*All analyses in this chapter present un-weighted data.
†Throughout this report, totals and n's represent the total un-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 20.1 Diagnosis of Boys' Cross Country Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

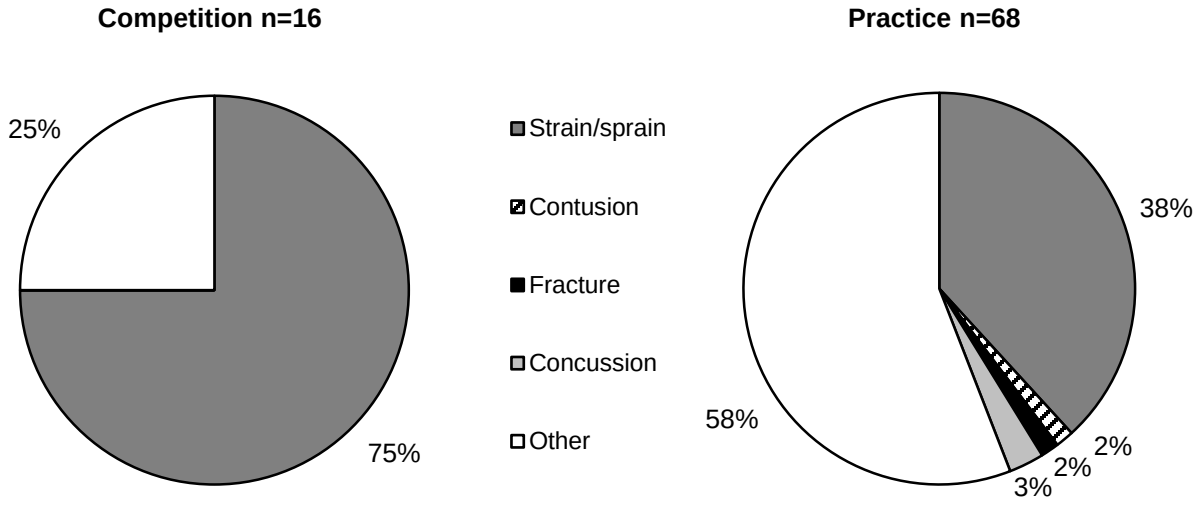


Table 20.3 Body Site of Boys' Cross Country Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

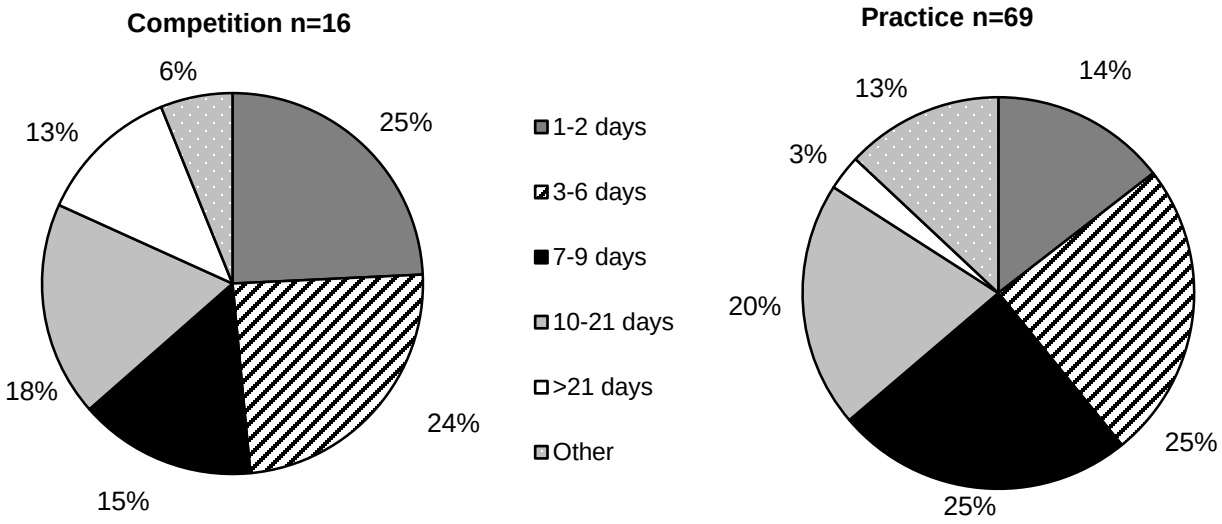
	Competition		Practice		Overall	
	n	%	n	%	n	%
Body Site						
Lower leg	4	25.0%	18	26.1%	22	25.9%
Ankle	4	25.0%	11	15.9%	15	17.6%
Hip/thigh/upper leg	2	12.5%	12	17.4%	14	16.5%
Knee	1	6.3%	12	17.4%	13	15.3%
Foot	3	18.8%	10	14.5%	13	15.3%
Other	2	12.5%	1	1.4%	3	3.5%
Head/face	0	0.0%	2	2.9%	2	2.4%
Trunk	0	0.0%	2	2.9%	2	2.4%
Arm/elbow	0	0.0%	1	1.4%	1	1.2%
Total	**16**	**100.0%**	**69**	**100.0%**	**85**	**100.0%**

†Totals and n's are not always equal due to slight rounding or missing responses.

Table 20.4 Ten Most Common Boys' Cross Country Injury Diagnoses by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

	Competition n=16		Practice n=68		Total n=84	
	n	%	n	%	n	%
Diagnosis						
Ankle strain/sprain	4	25.00%	11	16.18%	15	17.86%
Lower leg other	1	6.25%	14	20.59%	15	17.86%
Knee other	1	6.25%	8	11.76%	9	10.71%
Hip/thigh/upper leg strain/sprain	2	12.50%	6	8.82%	8	9.52%
Lower leg sprain/strain	3	18.75%	4	5.88%	7	8.33%
Hip/thigh/upper leg other	0	0.00%	6	8.82%	6	7.14%
Foot sprain/strain	3	18.75%	1	1.47%	4	4.76%
Knee sprain/strain	0	0.00%	3	4.41%	3	3.57%
Other other	2	12.50%	1	1.47%	3	3.57%
Head/face concussion	0	0.00%	2	2.94%	2	2.38%

Figure 20.2 Time Loss of Boys' Cross Country Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2016-17 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 20.5 Boys' Cross Country Injuries Requiring Surgery by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

	Competition		Practice		Overall	
	n	%	n	%	n	%
Need for surgery						
Required surgery	0	0.0%	0	0.0%	0	0.0%
Did not require surgery	15	100.0%	68	100.0%	83	100.0%
Total	**15**	**100.0%**	**68**	**100.0%**	**83**	**100.0%**

†Totals and n's are not always equal due to slight rounding or missing responses.

Figure 20.3 History of Boys' Cross Country Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2015-16 School Year

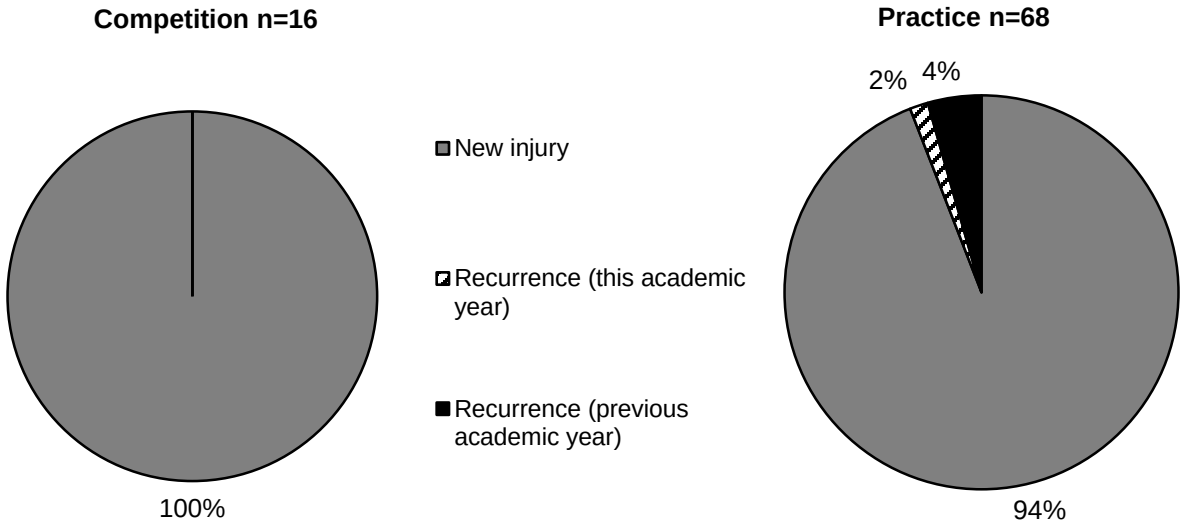


Table 20.6 Time during Season of Boys' Cross Country Injuries, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

	n	%
Time in Season		
Preseason	7	8.2%
Regular season	75	88.2%
Post season	3	3.5%
Total	**85**	**100.0%**

†Totals and n's are not always equal due to slight rounding or missing responses.

Table 20.7 Practice-Related Variables for Boys' Cross Country Injuries, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

	n	%
Time in Practice		
First 1/2 hour	7	10.4%
Second 1/2 hour	7	10.4%
1-2 hours into practice	25	37.3%
>2 hours into practice	1	1.5%
Unknown	27	40.3%
Total	**67**	**100.0%**

†Totals and n's are not always equal due to slight rounding or missing responses.

Table 20.8 Activities Leading to Boys' Cross Country Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

	Competition		Practice		Overall	
	n	%	n	%	n	%
Activity						
Running	14	87.5%	45	70.3%	59	73.8%
Conditioning	0	0.0%	6	9.4%	6	7.5%
Warming up	1	6.3%	3	4.7%	4	5.0%
Cooling down	1	6.3%	1	1.6%	2	2.5%
Other	0	0.0%	2	3.1%	2	2.5%
Unknown	0	0.0%	7	10.9%	7	8.8%
Total	**16**	**100.0%**	**64**	**100.0%**	**80**	**100.0%**

†Totals and n's are not always equal due to slight rounding or missing responses.

Table 20.10 Activity Resulting in Boys' Cross Country Injuries by Injury Diagnosis, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

	Diagnosis									
	Strain/Sprain		Contusion		Fracture		Concussion		Other	
	n	%	n	%	n	%	n	%	n	%
Activity										
Running	32	86.5%	1	100.0%	1	100.0%	1	50%	24	63.2%
Conditioning	2	5.4%	0	0.0%	0	0.0%	1	50%	2	5.3%
Warming up	2	5.5%	0	0.0%	0	0.0%	0	0.0%	2	5.3%
Cooling down	0	0.0%	0	0.0%	0	0.0%	0	0.0%	2	5.3%
Other	0	0.0%	0	0.0%	0	0.0%	0	0.0%	2	5.3%
Unknown	1	2.7%	0	0.0%	0	0.0%	0	0.0%	6	15.8%
Total	**37**	**100.0%**	**1**	**100.0%**	**1**	**100.0%**	**2**	**100.0%**	**38**	**100.0%**

†Totals and n's are not always equal due to slight rounding or missing responses.

XXI. Girls' Cross Country Injury Epidemiology

Table 21.1 Girls' Cross Country Injury Rates by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

	# Injuries	# Exposures	Injury rate (per 1,000 athlete-exposures)
Total	**111**	**109,061**	**1.02**
Competition	23	18,240	1.26
Practice	88	90,821	0.97

Table 21.2 Demographic Characteristics of Injured Girls' Cross Country Athletes, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year*

Year in School	**n=111**
Freshman	21.4%
Sophomore	21.4%
Junior	27.6%
Senior	29.6%
Total†	**100.0%**
Age (years)	
Minimum	14
Maximum	18
Mean (St. Dev.)	15.9 (1.1)
BMI	
Minimum	16.1
Maximum	31.3
Mean (St. Dev.)	22.2 (3.1)

*All analyses in this chapter present un-weighted data.
†Throughout this report, totals and n's represent the total un-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 21.1 Diagnosis of Girls' Cross Country Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

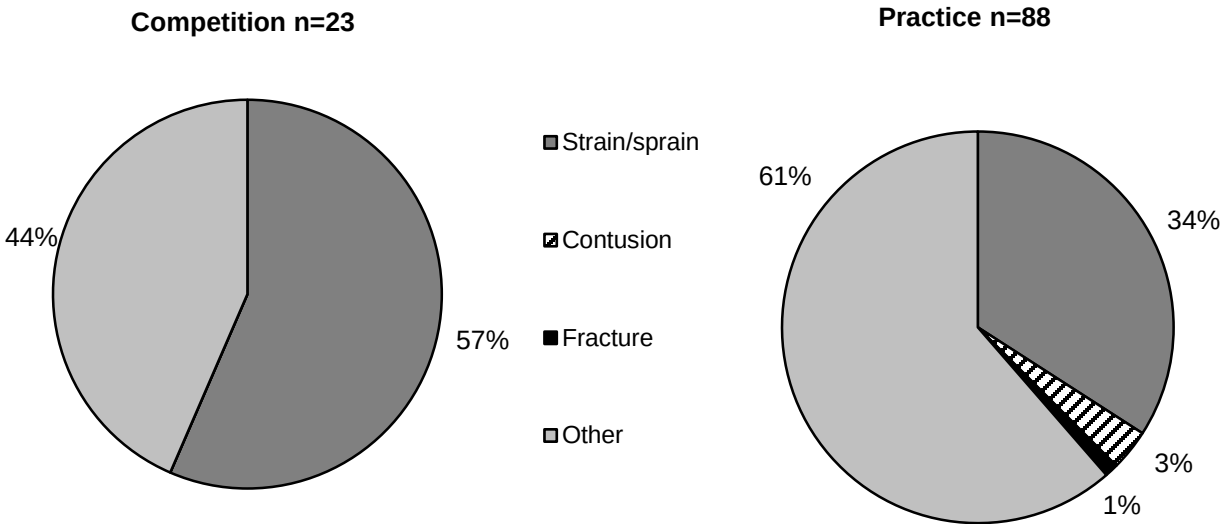


Table 21.3 Body Site of Girls' Cross Country Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

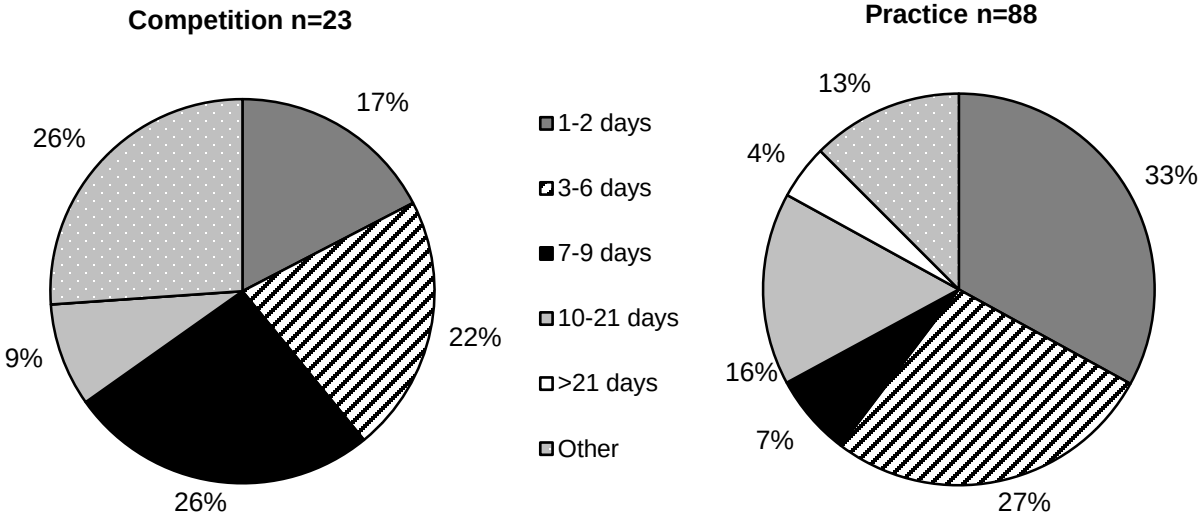
	Competition		Practice		Overall	
	n	**%**	**n**	**%**	**n**	**%**
Body Site						
Hip/thigh/upper leg	6	26.1%	28	32.2%	34	30.9%
Lower leg	2	8.7%	27	31.0%	29	26.4%
Ankle	9	39.1%	11	12.6%	20	18.2%
Knee	3	13.0%	13	14.9%	16	14.5%
Foot	1	4.3%	2	2.3%	3	2.7%
Head/face	0	0.0%	1	1.1%	1	0.9%
Trunk	0	0.0%	1	1.1%	1	0.9%
Arm/elbow	0	0.0%	1	1.1%	1	0.9%
Other	2	8.7%	3	3.4%	5	4.5%
Total	**23**	**100.0%**	**87**	**100.0%**	**110**	**100.0%**

†Totals and n's are not always equal due to slight rounding or missing responses.

Table 21.4 Ten Most Common Girls' Cross Country Injury Diagnoses by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

	Competition n=23		Practice n=87		Total n=110	
	n	%	n	%	n	%
Diagnosis						
Lower leg other	2	8.7%	23	26.4%	25	22.7%
Ankle strain/sprain	9	39.1%	10	11.5%	19	17.3%
Hip/thigh/upper leg strain/sprain	3	13.0%	15	17.2%	18	16.4%
Hip/thigh/upper leg other	3	13.0%	11	12.6%	14	12.7%
Knee other	3	13.0%	11	12.6%	14	12.7%
Other other	2	8.7%	3	3.5%	5	4.6%
Lower leg strain/sprain	0	0.0%	3	3.5%	3	2.7%
Hip/thigh/upper leg contusion	0	0.0%	2	2.3%	2	1.8%
Lower leg contusion	0	0.0%	1	1.2%	1	0.9%
Ankle other	0	0.0%	1	1.2%	1	0.9%

Figure 21.2 Time Loss of Girls' Cross Country Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2016-17 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 21.5 Girls' Cross Country Injuries Requiring Surgery by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

	Competition		Practice		Overall	
	n	%	n	%	n	%
Need for surgery						
Required surgery	1	4.3%	0	0.0%	1	0.9%
Did not require surgery	22	95.7%	88	100.%	110	99.1%
Total	**23**	**100.0%**	**88**	**100.0%**	**111**	**100.0%**

†Totals and n's are not always equal due to slight rounding or missing responses.

Figure 21.3 History of Girls' Cross Country Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

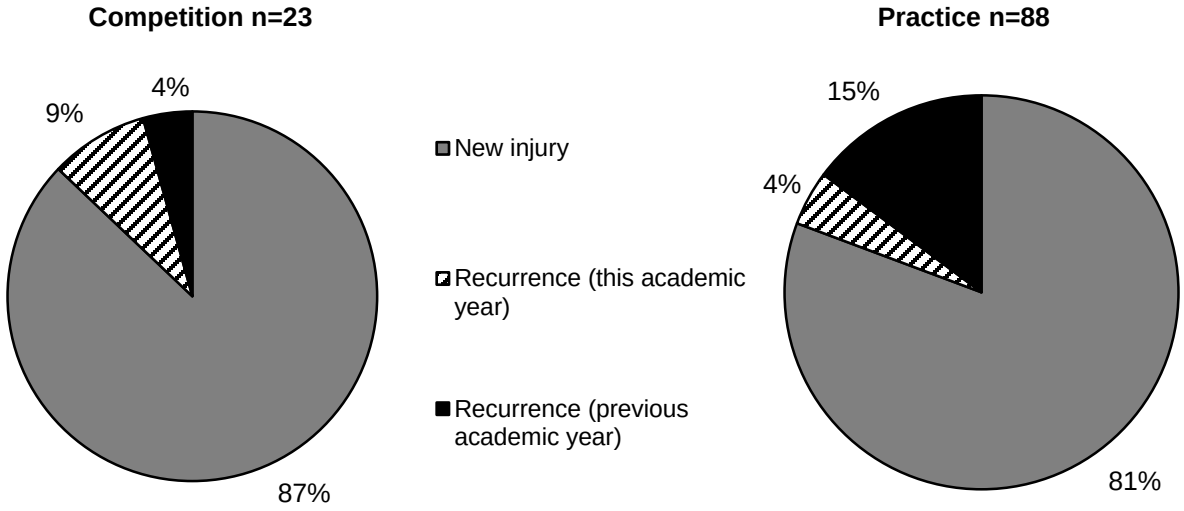


Table 21.6 Time during Season of Girls' Cross Country Injuries, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

	n	%
Time in Season		
Preseason	21	18.9%
Regular season	84	75.7%
Post season	6	5.4%
Total	**111**	**100.0%**

†Totals and n's are not always equal due to slight rounding or missing responses.

Table 21.7 Practice-Related Variables for Girls' Cross Country Injuries, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

	n	%
Time in Practice		
First 1/2 hour	10	11.8%
Second 1/2 hour	12	14.1%
1-2 hours into practice	30	35.3%
>2 hours into practice	1	1.2%
Unknown	32	37.6%
Total	**85**	**100.0%**

†Totals and n's are not always equal due to slight rounding or missing responses.

Table 21.8 Activities Leading to Girls' Cross Country Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

	Competition		Practice		Overall	
	n	%	n	%	n	%
Activity						
Running	18	81.8%	51	63.8%	68	67.6%
Conditioning	0	0.0%	8	10.0%	8	7.8%
Warming up	0	0.0%	4	5.0%	4	3.9%
Cooling down	0	0.0%	0	0.0%	0	0.0%
Other	0	0.0%	0	0.0%	0	0.0%
Unknown	4	18.2%	17	21.3%	21	20.6%
Total	**22**	**100.0%**	**80**	**100.0%**	**102**	**100.0%**

†Totals and n's are not always equal due to slight rounding or missing responses.

Table 21.9 Activity Resulting in Girls' Cross Country Injuries by Injury Diagnosis, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

	Diagnosis									
	Strain/Sprain		Contusion		Fracture		Concussion		Other	
	n	%	n	%	n	%	n	%	n	%
Activity										
Running	33	82.5%	3	100.0%	0	0.0%	0	0.0%	33	55.9%
Conditioning	1	2.5%	0	0.0%	0	0.0%	0	0.0%	7	11.9%
Warming up	1	2.5%	0	0.0%	0	0.0%	0	0.0%	3	5.1%
Cooling down	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Unknown	5	12.5%	0	0.0%	0	0.0%	0	0.0%	16	27.1%
Total	**40**	**100.0%**	**3**	**100.0%**	**0**	**0.0%**	**0**	**0.0%**	**59**	**100.0%**

†Totals and n's are not always equal due to slight rounding or missing responses.

XXII. Boys' Tennis Injury Epidemiology

Table 22.1 Boys' Tennis Injury Rates by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

	# Injuries	# Exposures	Injury rate (per 1,000 athlete-exposures)
Total	**22**	**59,498**	**0.37**
Competition	10	17,813	0.56
Practice	12	41,685	0.29

Table 22.2 Demographic Characteristics of Injured Boys' Tennis Athletes, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year*

Year in School	**n=22**
Freshman	15.0%
Sophomore	15.0%
Junior	30.0%
Senior	40.0%
Total†	**100.0%**
Age (years)	
Minimum	14
Maximum	18
Mean (St. Dev.)	16.9 (1.1)
BMI	
Minimum	17.2
Maximum	27.7
Mean (St. Dev.)	21.9 (2.8)

*All analyses in this chapter present un-weighted data.
†Throughout this report, totals and n's represent the total un-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 22.1 Diagnosis of Boys' Tennis Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

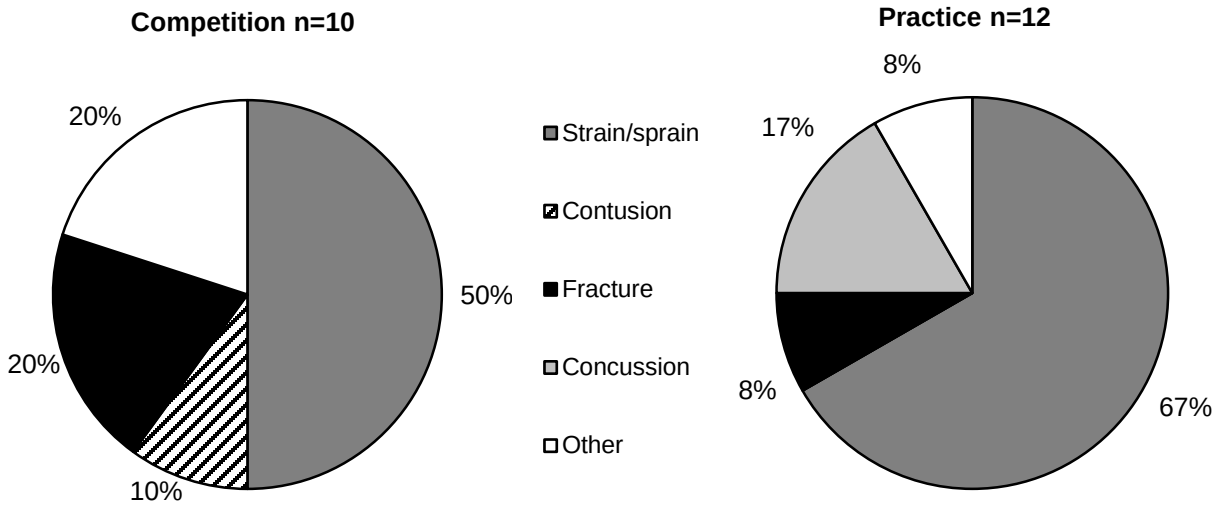


Table 22.3 Body Site of Boys' Tennis Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

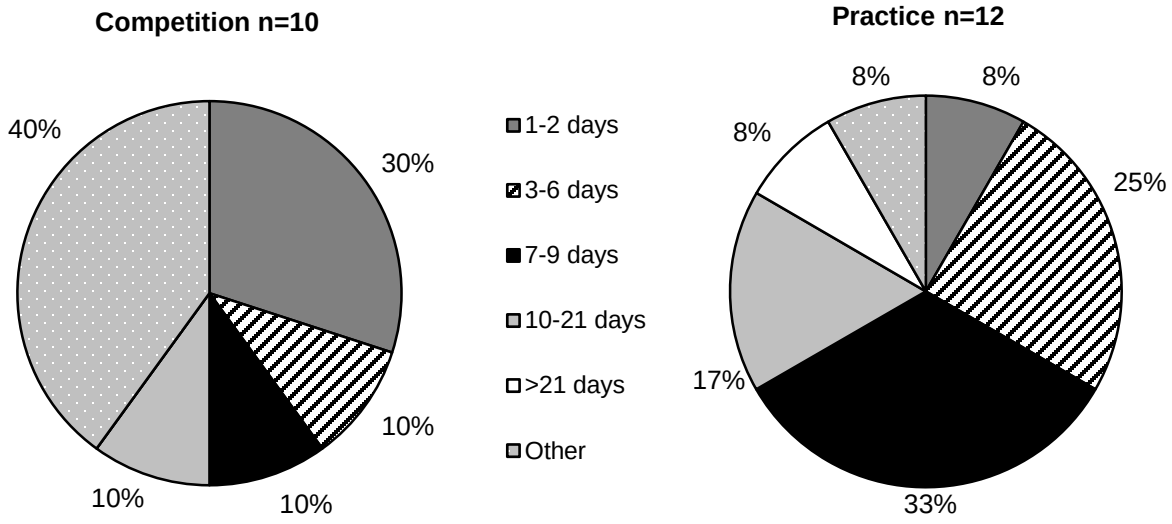
	Competition		Practice		Overall	
	n	**%**	**n**	**%**	**n**	**%**
Body Site						
Ankle	2	20.0%	4	33.3%	6	27.3%
Trunk	1	10.0%	2	16.7%	3	13.6%
Foot	0	0.0%	2	16.7%	2	9.7%
Head/face	0	0.0%	2	16.7%	2	9.1%
Knee	2	20.0%	0	0.0%	2	9.1%
Hand/wrist	0	0.0%	2	16.7%	2	9.1%
Arm/elbow	2	20.0%	0	0.0%	2	9.1%
Shoulder	2	20.0%	0	0.0%	2	9.1%
Hip/thigh/upper leg	1	10.0%	0	0.0%	1	4.5%
Total	**10**	**100.0%**	**12**	**100.0%**	**22**	**100.0%**

†Totals and n's are not always equal due to slight rounding or missing responses.

Table 22.4 Ten Most Common Boys' Tennis Injury Diagnoses by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

	Competition n=10		Practice n=12		Total n=22	
	n	%	n	%	n	%
Diagnosis						
Ankle strain/sprain	2	20.00%	4	33.33%	6	27.27%
Trunk strain/sprain	1	10.00%	2	16.67%	3	13.64%
Hand/wrist strain/sprain	0	0.00%	2	16.67%	2	9.09%
Shoulder strain/sprain	2	20.00%	0	0.00%	2	9.09%
Arm/elbow fracture	2	20.00%	0	0.00%	2	9.09%
Head/face concussion	0	0.00%	2	16.67%	2	9.09%
Knee contusion	1	10.00%	0	0.00%	1	4.55%
Knee other	1	10.00%	0	0.00%	1	4.55%
Foot fracture	0	0.00%	1	8.33%	1	4.55%
Foot other	0	0.00%	1	8.33%	1	4.55%

Figure 22.2 Time Loss of Boys' Tennis Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2016-17 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 22.5 Boys' Tennis Injuries Requiring Surgery by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

	Competition		Practice		Overall	
	n	%	n	%	n	%
Need for surgery						
Required surgery	0	0.0%	0	0.0%	0	0.0%
Did not require surgery	10	100.0%	12	100.0%	22	100.0%
Total	**10**	**100.0%**	**12**	**100.0%**	**22**	**100.0%**

†Totals and n's are not always equal due to slight rounding or missing responses.

Figure 22.3 History of Boys' Tennis Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

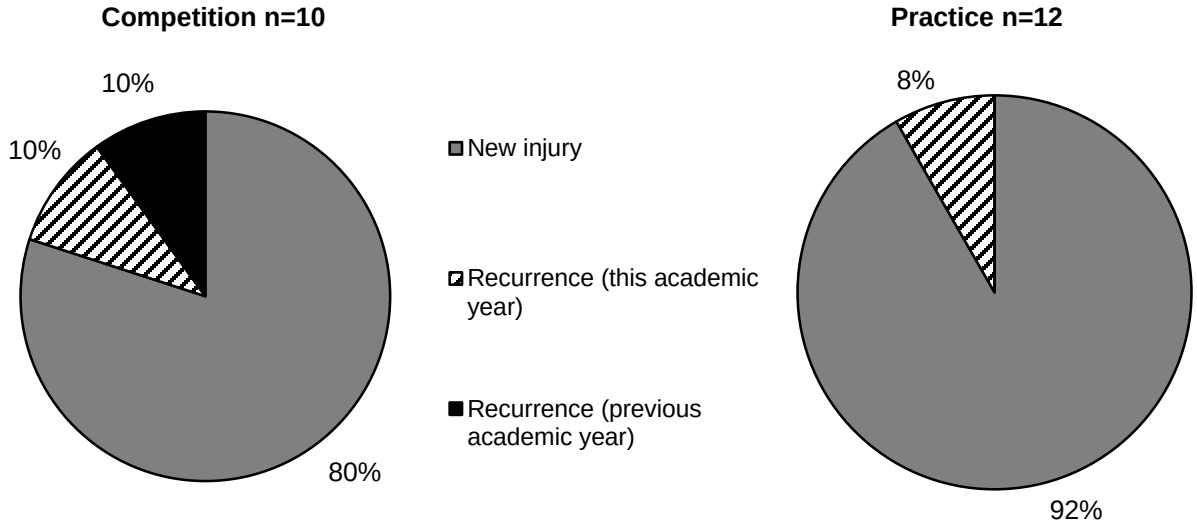


Table 22.6 Time during Season of Boys' Tennis Injuries, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

	n	%
Time in Season		
Preseason	2	9.1%
Regular season	18	81.8%
Post season	2	9.1%
Total	**22**	**100.0%**

†Totals and n's are not always equal due to slight rounding or missing responses.

Table 22.7 Practice-Related Variables for Boys' Tennis Injuries, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

	n	%
Time in Practice		
First 1/2 hour	0	0.0%
Second 1/2 hour	6	50.0%
1-2 hours into practice	4	33.3%
>2 hours into practice	0	0.0%
Unknown	2	16.7%
Total	**12**	**100.0%**

†Totals and n's are not always equal due to slight rounding or missing responses.

Table 22.8 Activities Leading to Boys' Tennis Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

	Competition		Practice		Overall	
	n	%	n	%	n	%
Activity						
Chasing-running after to hit ball	2	20.0%	5	41.7%	7	31.8%
General play	2	20.0%	3	25.0%	5	22.7%
Conditioning	0	0.0%	1	8.3%	1	4.5%
One-handed backhand	0	0.0%	1	8.3%	1	4.5%
Two-handed backhand volley	0	0.0%	1	8.3%	1	4.5%
Serve	1	10.0%	0	0.0%	1	4.5%
Overhead stroke	1	10.0%	0	0.0%	1	4.5%
Other	1	10.0%	0	0.0%	1	4.5%
Unknown	3	30.0%	1	8.3%	4	18.2%
Total	**10**	**100.0%**	**12**	**100.0%**	**22**	**100.0%**

†Totals and n's are not always equal due to slight rounding or missing responses.

Table 22.9 Activity Resulting in Boys' Tennis Injuries by Injury Diagnosis, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

	Diagnosis									
	Strain/Sprain		Contusion		Fracture		Concussion		Other	
	n	%	n	%	n	%	n	%	n	%
Activity										
Conditioning	0	0.0%	0	0.0%	0	0.0%	0	0.0%	1	33.3%
Running to hit ball	3	23.1%	0	0.00%	3	100.0%	1	50.0%	0	0.0%
One handed backhand	1	7.7%	0	0.%	0	0.%	0	0.0%	0	0.0%
Two-handed backhand	1	7.7%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Serve	1	7.7%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Overhead stroke	1	7.7%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
General play	3	23.1%	1	100.0%	0	0.0%	0	0.0%	1	33.3%
Other	1	7.7%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Unknown	2	15.4%	0	0.0%	0	0.0%	1	50.0%	1	33.3%
Total	**13**	**100.0%**	**1**	**100.0%**	**3**	**100.0%**	**2**	**100.0%**	**3**	**100.0%**

†Totals and n's are not always equal due to slight rounding or missing responses.

XXIII. Girls' Tennis Injury Epidemiology

Table 23.1 Girls' Tennis Injury Rates by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

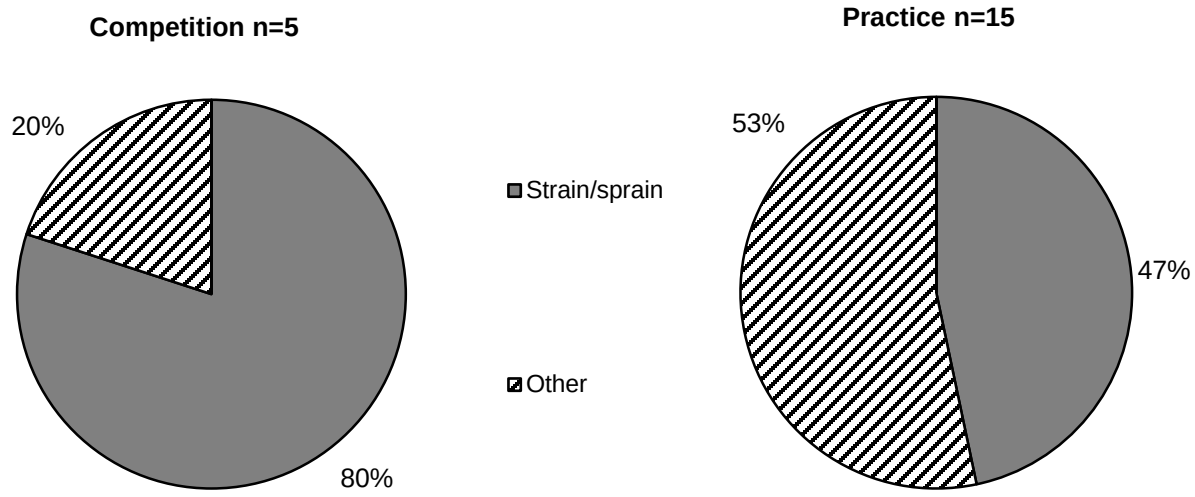
	# Injuries	# Exposures	Injury rate (per 1,000 athlete-exposures)
Total	**20**	**60,618**	**0.33**
Competition	5	18,281	0.27
Practice	15	42,337	0.35

Table 23.2 Demographic Characteristics of Injured Girls' Tennis Athletes, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year*

Year in School	**n=20**
Freshman	20.0%
Sophomore	25.0%
Junior	20.0%
Senior	35.0%
Total†	**100.0%**
Age (years)	
Minimum	14
Maximum	18
Mean (St. Dev.)	16.1 (1.3)
BMI	
Minimum	18.6
Maximum	30.9
Mean (St. Dev.)	24.3 (4.1)

*All analyses in this chapter present un-weighted data.
†Throughout this report, totals and n's represent the total un-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 23.1 Diagnosis of Girls' Tennis Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year



†Strain/sprain and other were the only types of injuries reported in 2016-17.

Table 23.3 Body Site of Girls' Tennis Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

	Competition		Practice		Overall	
	n	**%**	**n**	**%**	**n**	**%**
Body Site						
Ankle	2	40.0%	4	26.7%	6	25.7%
Hand/wrist	0	0.0%	4	26.7%	4	20.0%
Knee	1	20.0	2	13.3%	3	15.0%
Shoulder	0	0.0%	3	20.0%	3	15.0%
Lower Leg	2	40.0%	0	0.0%	2	10.0%
Trunk	0	0.0%	2	13.3%	2	10.0%
Hip/thigh/upper leg	0	0.0%	0	0.0%	0	0.0%
Head/face	0	0.0%	0	0.0%	0	0.0%
Foot	0	0.0%	0	0.0%	0	0.0%
Other	0	0.0%	0	0.0%	0	0.0%
Total	**5**	**100.0%**	**15**	**100.0%**	**20**	**100.0%**

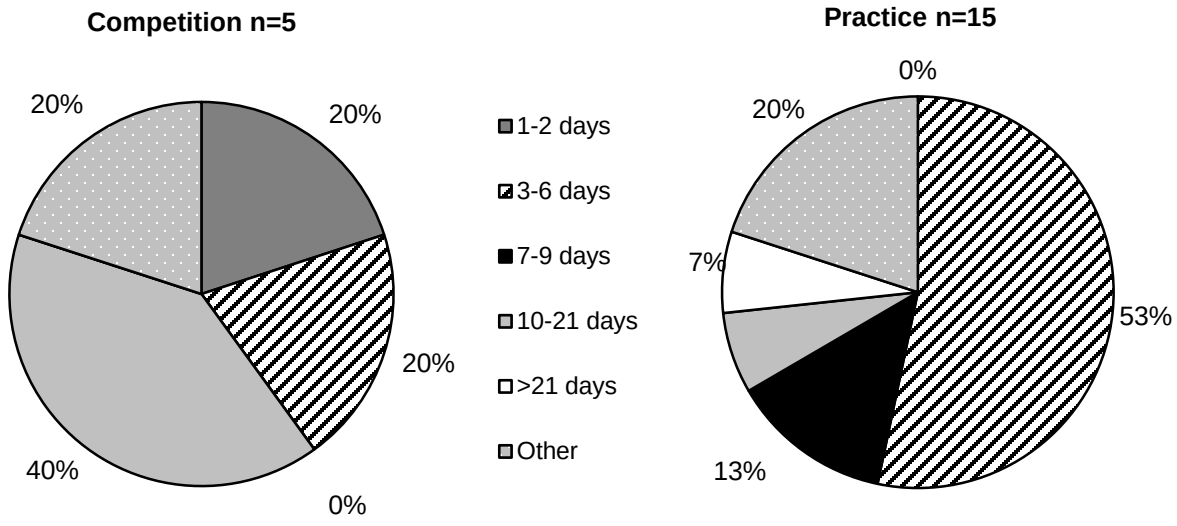
†Totals and n's are not always equal due to slight rounding or missing responses.

Table 23.4 Ten Most Common Girls' Tennis Injury Diagnoses by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

	Competition n=5		Practice n=15		Total n=20	
	n	%	n	%	n	%
Diagnosis						
Ankle strain/sprain	2	40.0%	4	26.7%	6	30.0%
Hand/wrist strain/sprain	0	0.0%	2	13.3%	2	10.0%
Hand/wrist other	0	0.0%	2	13.3%	2	10.0%
Shoulder other	0	0.0%	2	13.3%	2	10.0%
Trunk other	0	0.0%	2	13.3%	2	10.0%
Knee other	0	0.0%	2	13.3%	2	10.0%
Knee strain/sprain	1	20.0%	0	0.0%	2	10.0%
Lower leg strain/sprain	1	20.0%	0	0.0%	1	5.0%
Lower leg other	1	20.0%	0	0.0%	1	5.0%
Shoulder strain/sprain	0	0.0%	1	6.7%	1	5.0%

†Strain/Sprain and other were the only injuries reported in 2016-2017.

Figure 23.2 Time Loss of Girls' Tennis Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2016-17 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 23.5 Girls' Tennis Injuries Requiring Surgery by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

	Competition		Practice		Overall	
	n	%	n	%	n	%
Need for surgery						
Required surgery	1	20.0%	0	0.0%	1	5.0%
Did not require surgery	4	80.0%	15	100.0%	19	95.0%
Total	**5**	**100.0%**	**15**	**100.0%**	**20**	**100.0%**

†Totals and n's are not always equal due to slight rounding or missing responses.

Figure 23.3 History of Girls' Tennis Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

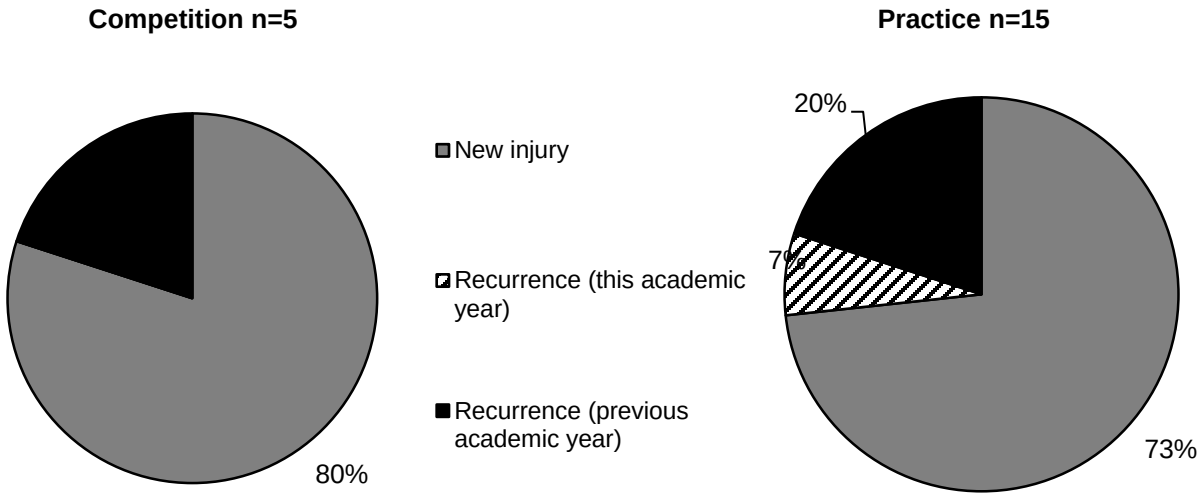


Table 23.6 Time during Season of Girls' Tennis Injuries, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

	n	%
Time in Season		
Preseason	7	35.0%
Regular season	13	65.0%
Post season	0	0.0%
Total	**20**	**100.0%**

†Totals and n's are not always equal due to slight rounding or missing responses.

Table 23.7 Practice-Related Variables for Girls' Tennis Injuries, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

	n	%
Time in Practice		
First 1/2 hour	2	13.3%
Second 1/2 hour	2	13.3%
1-2 hours into practice	5	33.3%
>2 hours into practice	0	0.0%
Unknown	6	40.0%
Total	**15**	**100.0%**

†Totals and n's are not always equal due to slight rounding or missing responses.

Table 23.8 Activities Leading to Girls' Tennis Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

	Competition		Practice		Overall	
	n	%	n	%	n	%
Activity						
General Play	1	20.0%	6	40.0%	7	35.0%
Chasing-running after to hit ball	2	40.0%	3	20.0%	5	25.0%
Serve	0	0.0%	2	13.3%	2	10.0%
Conditioning	1	20.0%	0	0.0%	1	5.0%
Forehand ground stroke	0	0.0%	1	6.7%	1	5.0%
Two handed backhand	0	0.0%	1	6.7%	1	5.0%
Warm up	0	0.0%	1	6.7%	1	5.0%
Unknown	1	20.0%	1	6.7%	2	10.0%
Total	**5**	**100.0%**	**15**	**100.0%**	**20**	**100.0%**

†Totals and n's are not always equal due to slight rounding or missing responses.

Table 23.9 Activity Resulting in Girl' Tennis Injuries by Injury Diagnosis, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

	Strain/Sprain		Other	
	n	**%**	**n**	**%**
Activity				
General Play	2	18.2%	5	55.6%
Chasing-running after to hit ball	5	45.5%	0	0.0%
Forehand ground stroke	1	9.1%	0	0.0%
Conditioning	0	0.0%	1	11.1%
Two-handed backhand	0	0.0%	1	11.1%
Serve	1	9.1%	1	11.1%
Warm-up	0	0.0%	1	11.1%
Unknown	2	18.2%	0	0.0%
Total	**11**	**100.0%**	**9**	**100.0%**

†Strain/Sprain and other were the only injuries reported in 2016-2017

XXIV. Cheerleading Injury Epidemiology

Table 24.1 Cheerleading Injury Rates by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

	# Injuries	# Exposures	Injury rate (per 1,000 athlete-exposures)
Total	**191**	**230,207**	**0.83**
Competition	17	9,651	1.76
Practice	148	177,138	0.84
Performance	26	43,418	0.60

Table 24.2 Demographic Characteristics of Injured Cheerleading Athletes, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year*

Year in School	**n=157**
Freshman	28.2%
Sophomore	22.7%
Junior	23.2%
Senior	26.0%
Total†	**100.0%**
Age (years)	
Minimum	14
Maximum	18
Mean (St. Dev.)	15.7 (1.2)
BMI	
Minimum	15.2
Maximum	33.9
Mean (St. Dev.)	22.2 (3.5)

*All analyses in this chapter present un-weighted data.
†Throughout this report, totals and n's represent the total un-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 24.1 Diagnosis of Cheerleading Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

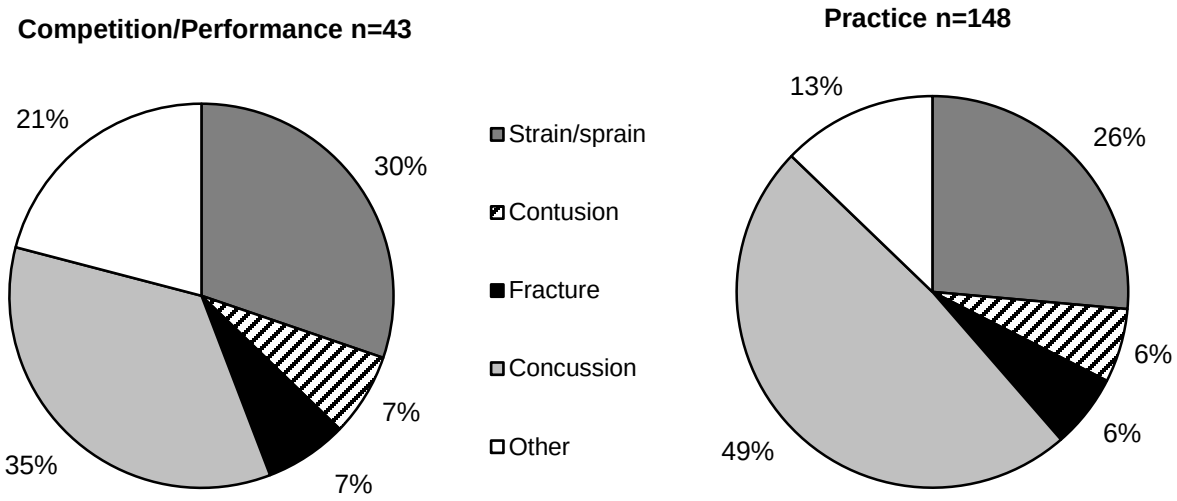


Table 24.3 Body Site of Cheerleading Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

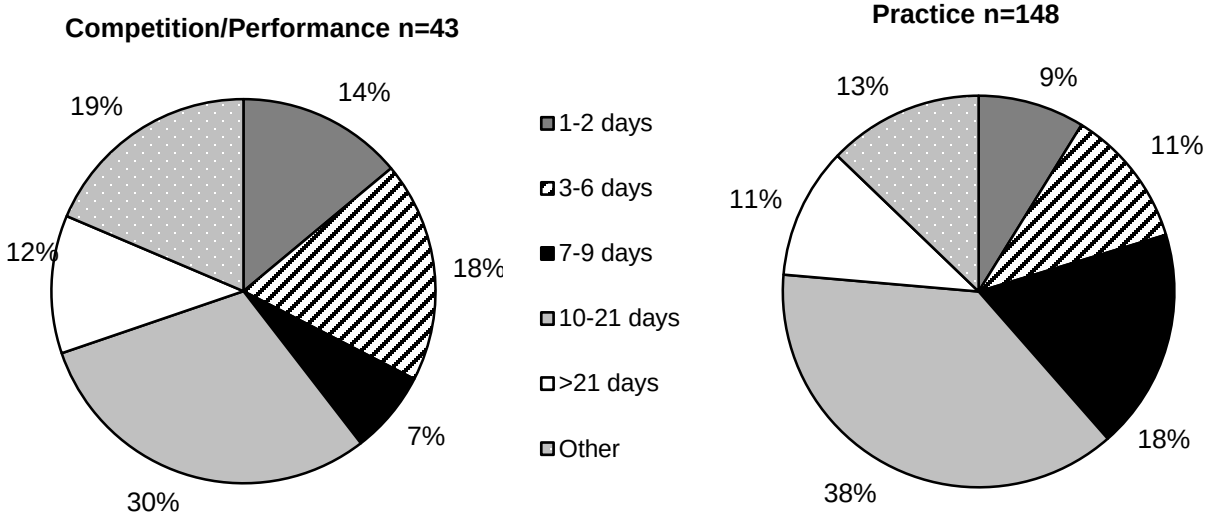
	Competition		Practice		Performance		Overall	
	n	%	n	%	n	%	n	%
Body Site								
Head/face	7	41.2%	75	50.7%	10	38.5%	92	48.2%
Ankle	1	5.9%	12	8.1%	5	19.2%	18	9.4%
Knee	2	11.8%	13	8.8%	3	11.5%	18	9.4%
Trunk	1	5.9%	11	7.4%	1	3.8%	13	6.8%
Neck	0	0.0%	13	8.8%	0	0.0%	13	6.8%
Shoulder	1	5.9%	6	4.1%	3	11.5%	10	5.2%
Hand/wrist	4	23.5%	5	3.4%	1	3.8%	10	5.2%
Arm/elbow	0	0.0%	8	5.4%	2	7.7%	10	5.2%
Foot	0	0.0%	2	1.4%	0	0.0%	2	1.0%
Hip/thigh/upper leg	1	5.9%	1	0.7%	0	0.0%	2	1.0%
Other	0	0.0%	2	1.4%	1	3.8%	3	1.6%
Total	**17**	**100.0%**	**148**	**100.0%**	**26**	**100.0%**	**191**	**100.0%**

†Totals and n's are not always equal due to slight rounding or missing responses.

Table 24.4 Ten Most Common Cheerleading Injury Diagnoses by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

	Competition n=17		Practice n=148		Performance n=26		Total n=191	
	n	%	n	%	n	%	n	%
Diagnosis								
Head/face concussion	6	35.3%	71	48.0%	9	34.6%	86	45.0%
Ankle strain/sprain	1	5.9%	10	6.8%	5	19.2%	16	8.4%
Knee other	1	5.9%	6	4.1%	2	7.7%	9	4.7%
Knee strain/sprain	1	5.9%	7	4.7%	0	0.0%	8	4.2%
Trunk strain/sprain	0	0.0%	7	4.7%	1	3.8%	8	4.2%
Neck strain/sprain	0	0.0%	8	5.4%	0	0.0%	8	4.2%
Hand/wrist fracture	3	17.6%	4	2.7%	0	0.0%	7	3.7%
Arm/elbow strain/sprain	0	0.0%	3	2.0%	1	3.8%	4	2.1%
Head/face other	1	5.9%	3	2.0%	0	0.0%	4	2.1%
Shoulder other	1	5.9%	2	1.4%	1	3.8%	4	2.1%

Figure 24.2 Time Loss of Cheerleading Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2016-17 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 24.5 Cheerleading Injuries Requiring Surgery by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

	Competition		Practice		Performance		Overall	
	n	%	n	%	n	%	n	%
Need for surgery								
Required surgery	1	5.9%	6	4.1%	1	3.8%	8	4.2%
Did not require surgery	16	94.1%	140	95.9%	25	96.2%	181	95.8%
Total	**17**	**100.0%**	**146**	**100.0%**	**26**	**100.0%**	**189**	**100.0%**

†Totals and n's are not always equal due to slight rounding or missing responses.

Figure 24.3 History of Cheerleading Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

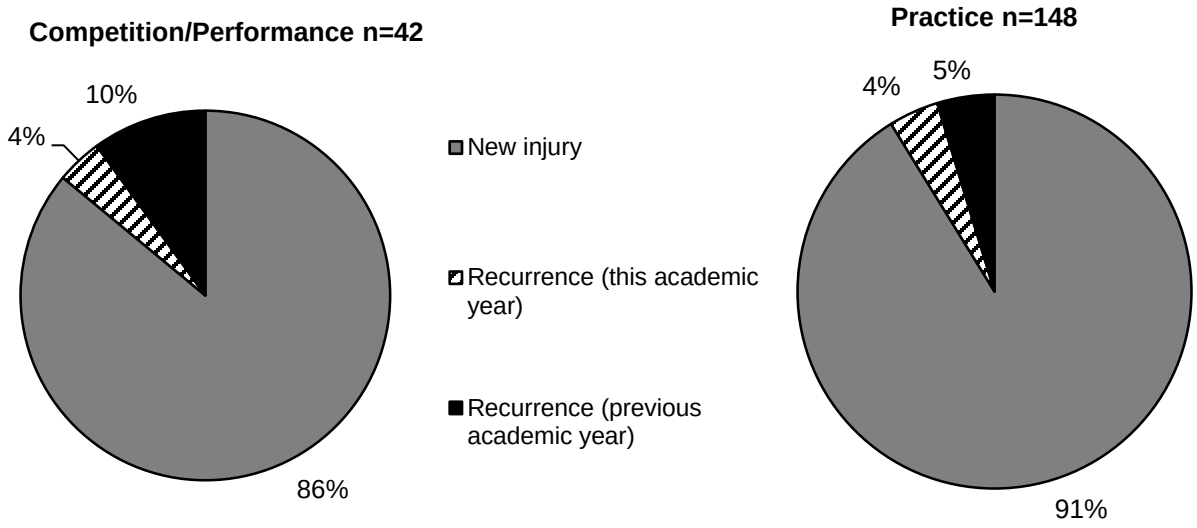


Table 24.6 Time during Season of Cheerleading Injuries, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

	n	%
Time in Season		
Preseason	24	12.6%
Regular season	156	81.7%
Post season	9	4.7%
Total	**190**	**100.0%**

†Totals and n's are not always equal due to slight rounding or missing responses.

Table 24.7 Practice-Related Variables for Cheerleading Injuries, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

	n	%
Time in Practice		
First 1/2 hour	10	7.0%
Second 1/2 hour	28	19.7%
1-2 hours into practice	74	52.1%
>2 hours into practice	3	2.1%
Unknown	27	19.0%
Total	**142**	**100.0%**

†Totals and n's are not always equal due to slight rounding or missing responses.

Table 24.8 Activities Leading to Cheerleading Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

	Competition		Practice		Performance		Overall	
	n	%	n	%	n	%	n	%
Activity								
Partner stunt	3	18.8%	48	34.8%	7	29.2%	58	32.6%
Moving tumbling	3	18.8%	6	4.3%	2	8.3%	11	6.2%
Standing tumbling	1	6.3%	10	7.2%	1	4.2%	12	6.7%
Toss	4	25.0%	36	26.1%	4	16.7%	44	24.7%
Pyramid	1	6.3%	14	10.1%	3	12.5%	18	10.1%
Jump	2	12.5%	3	2.2%	2	8.3%	7	3.9%
Warm-up	1	6.3%	2	1.4%	1	4.2%	4	2.2%
Other	0	0.0%	5	3.6%	3	12.5%	8	4.5%
Unknown	1	6.3%	14	10.1%	1	4.2%	16	9.0%
Total	**16**	**100.0%**	**138**	**100.0%**	**24**	**100.0%**	**178**	**100.0%**

†Totals and n's are not always equal due to slight rounding or missing responses.

Table 24.10 Activity Resulting in Cheerleading Injuries by Injury Diagnosis, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

	Diagnosis									
	Strain/Sprain		Contusion		Fracture		Concussion		Other	
	n	%	n	%	n	%	n	%	n	%
Activity										
Partner stunt	4	8.2%	1	8.3%	0	0.0%	8	10.1%	5	19.2%
Moving tumbling	2	4.1%	0	0.0%	4	33.3%	3	3.8%	2	7.7%
Standing tumbling	6	12.2%	1	8.3%	2	16.7%	2	2.5%	1	3.8%
Toss	9	18.4%	5	41.7%	3	25.0%	24	30.4%	3	11.5%
Pyramid	12	24.5%	3	25.0%	2	16.7%	37	46.8%	4	15.4%
Jump	5	10.2%	0	0.0%	0	0.0%	0	0.0%	2	7.7%
Warm up	3	6.1%	0	0.0%	1	8.3%	0	0.0%	0	0.0%
Other	1	2.0%	2	16.7%	0	0.0%	1	1.3%	4	15.4%
Unknown	7	14.3%	0	0.0%	0	0.0%	4	5.1%	5	19.2%
Total	**49**	**100.0%**	**12**	**100.0%**	**12**	**100.0%**	**79**	**100.0%**	**26**	**100.0%**

XXIII. Gender Differences within Sports

25.1 Boys' and Girls' Soccer

Table 25.1 Comparison of Boys' and Girls' Soccer Injury Rates, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

	Boys' soccer	Girls' soccer*	RR (95% CI)†
Total	1.75	**2.51**	**1.43 (1.26, 1.63)**
Competition	3.82	**6.20**	**1.63 (1.39, 1.89)**
Practice	0.84	**0.86**	1.02 (0.80, 1.30)

*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 25.10 Comparison of Body Sites of Boys' and Girls' Soccer Injuries, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

	Boys' soccer	Girls' soccer	IPR (95% CI)
Body Site			
Head/face	19.4%	**28.7%**	**1.48 (1.17, 1.87)**
Hip/thigh/upper leg	**19.9%**	10.0%	**2.00 (1.45, 2.76)**
Ankle	18.1%	**24.7%**	**1.37 (1.06, 1.76)**
Knee	12.3%	**16.1%**	1.32 (0.95, 1.81)
Foot	**6.0%**	4.0%	1.51 (0.86, 2.67)
Lower leg	**6.9%**	5.6%	1.25 (0.76, 2.05)
Hand/wrist	**5.6%**	4.0%	1.39 (0.78, 2.50)
Trunk	**5.8%**	2.8%	**2.08 (1.09, 3.94)**
Shoulder	**2.3%**	1.2%	1.94 (0.71, 5.29)
Arm/elbow	**1.6%**	1.4%	1.16 (0.41, 3.29)
Neck	0.2%	**0.8%**	3.44 (0.39, 30.68)
Other	**1.9%**	0.8%	2.32 (0.71, 7.67)
Total	**100.0%**	**100.0%**	--

†Totals do not always equal 100.0% due to slight rounding.

Table 25.11 Comparison of Diagnoses of Boys' and Girls' Soccer Injuries, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

	Boys' soccer	Girls' soccer	IPR (95% CI)
Diagnosis			
Strain/sprain	**48.0%**	45.9%	1.05 (0.91, 1.20)
Concussion	17.2%	**26.5%**	**1.55 (1.20, 2.00)**
Contusion	**14.8%**	9.2%	**1.62 (1.13, 2.31)**
Fracture	**9.3%**	8.0%	1.16 (0.77, 1.77)
Other	**10.7%**	10.4%	1.03 (0.71, 1.50)
Total	**100.0%**	**100.0%**	---

†Totals do not always equal 100.0% due to slight rounding.

Table 25.12 Most Common Boys' and Girls' Soccer Injury Diagnoses*, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

	Boys' soccer	Girls' soccer	IPR (95% CI)
Diagnosis			
Head/face concussion	17.1%	**26.5%**	**1.55 (1.20, 2.00)**
Hip/thigh/upper leg strain/sprain	**14.6%**	9.0%	**1.63 (1.14, 2.33)**
Ankle strain/sprain	16.7%	**22.7%**	**1.63 (1.05, 1.78)**
Knee strain/sprain	6.3%	**8.8%**	1.40 (0.88, 2.23)
Knee other	4.4%	4.4%	1.00 (0.97, 1.03)

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

Table 25.13 Comparison of Time Loss of Boys' and Girls' Soccer Injuries, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

	Boys' soccer	Girls' soccer	IPR (95% CI)
Time Loss			
1-2 days	**13.2%**	13.1%	1.00 (0.72, 1.39)
3-6 days	**31.3%**	22.7%	**1.38 (1.11, 1.70)**
7-9 days	15.3%	**15.7%**	1.03 (0.76, 1.39)
10-21 days	18.8%	**21.1%**	1.13 (0.87, 1.46)
22 days or more	5.3%	**6.8%**	1.27 (0.76, 2.13)
Other	16.2%	**20.5%**	1.27 (0.96, 1.67)
Total	**100.0%**	**100.0%**	--

†Totals do not always equal 100.0% due to slight rounding.

Table 25.14 Comparison of Mechanisms of Boys' and Girls' Soccer Injuries, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

Soccer Mechanism	Boys' soccer	Girls' soccer	IPR (95% CI)
Contact with another player	**27.7%**	27.1%	1.02 (0.83, 1.27)
N/A (overuse, heat illness, conditioning, etc.)	**16.1%**	8.4%	**1.92 (1.33, 2.78)**
Stepped on/fell on/kicked	**13.0%**	12.2%	1.07 (0.76, 1.51)
Contact with ball	13.0%	**21.2%**	**1.63 (1.20, 2.21)**
Rotation around planted foot/inversion	11.3%	**14.3%**	1.26 (0.89,1.79)
Slide tackle	**3.6%**	3.4%	1.08 (0.54, 2.15)
Uneven playing surface	0.7%	**2.9%**	4.07 (1.18, 14.06)
Contact with goal	0.2%	**--**	--
Other	**8.9%**	5.3%	**1.70 (1.04, 2.77)**
Unknown	**5.5%**	5.2%	--
Total	**100.0%**	**100.0%**	--

†Totals do not always equal 100.0% due to slight rounding.

Table 25.15 Comparison of Activities of Boys' and Girls' Soccer Injuries, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

Soccer Activity	Boys' soccer	Girls' soccer	IPR (95% CI)
General play	**22.9%**	15.5%	**1.48 (1.13, 1.95)**
Defending	11.6%	**17.0%**	**1.47 (1.05, 2.04)**
Heading ball	7.0%	**9.1%**	1.30 (0.83, 2.05)
Chasing loose ball	8.9%	**10.8%**	1.21 (0.81, 1.81)
Ball handling/dribbling	8.9%	**9.8%**	1.09 (0.72, 1.65)
Goaltending	**8.7%**	7.9%	1.11 (0.71, 1.72)
Shooting (foot)	**5.3%**	3.6%	1.47 (0.79, 2.73)
Passing (foot)	4.3%	**4.9%**	1.12 (0.62, 2.05)
Conditioning	**4.3%**	2.3%	1.82 (0.89, 3.90)
Receiving pass	2.7%	**3.6%**	1.36 (0.64, 2.87)
Blocking shot	2.2%	**2.8%**	1.27 (0.55, 2.94)
Attempting slide tackle	0.7%	**0.8%**	1.17 (0.26, 5.21)
Receiving slide tackle	**1.4%**	0.8%	1.71 (0.49, 6.01)
Other	**1.9%**	1.1%	1.82 (0.60, 5.52)
Unknown	9.2%	**10.0%**	--
Total	**100.0%**	**100.0%**	--

†Totals do not always equal 100.0% due to slight rounding.

25.2 Boys' and Girls' Basketball

Table 25.2 Comparison of Boys' and Girls' Basketball Injury Rates, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

	Boys' basketball	Girls' basketball	RR (95% CI)
Total	1.47	**1.85**	**1.26 (1.10, 1.45)**
Competition	2.51	**3.68**	**1.46 (1.22, 1.75)**
Practice	1.01	1.01	1.00 (0.81, 1.24)

Table 25.20 Comparison of Body Sites of Boys' and Girls' Basketball Injuries, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

	Boys' basketball	Girls' basketball	IPR (95% CI)
Body Site			
Ankle	**34.7%**	26.1%	**1.33 (1.07, 1.64)**
Head/face	21.6%	**24.4%**	1.13 (0.88, 1.45)
Knee	10.9%	**16.0%**	**1.46 (1.03, 2.08)**
Hand/wrist	8.8%	**8.9%**	1.01 (0.65, 1.56)
Hip/thigh/upper leg	**6.5%**	6.3%	1.03 (0.61, 1.73)
Trunk	2.6%	**4.3%**	1.69 (0.80. 3.56)
Lower leg	**5.6%**	5.1%	1.10 (0.62, 1.96)
Foot	**3.5%**	3.0%	1.15 (0.54, 2.42)
Shoulder	3.3%	3.3%	0.99 (0.47, 2.07)
Arm/elbow	**1.6%**	1.0%	1.60 (0.47, 5.44)
Neck	0.2%	**0.3%**	1.09 (0.07, 17.39)
Other	0.7%	**1.3%**	1.82 (0.44, 7.56)
Total	**100.0%**	**100.0%**	--

†Totals do not always equal 100.0% due to slight rounding.

Table 25.21 Comparison of Diagnoses of Boys' and Girls' Basketball Injuries, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

	Boys' basketball	Girls' basketball	IPR (95% CI)
Diagnosis			
Strain/sprain	**51.6%**	47.7%	1.08 (0.94, 1.24)
Concussion	14.4%	**21.1%**	**1.46 (1.08, 1.97)**
Fracture	**8.8%**	4.8%	**1.83 (1.08, 3.12)**
Contusion	**7.4%**	6.9%	1.09 (0.66, 1.78)
Other	17.7%	**19.5%**	1.11 (0.83, 1.47)
Total	**100.0%**	**100.0%**	--

†Totals do not always equal 100.0% due to slight rounding.

Table 25.22 Most Common Boys' and Girls' Basketball Injury Diagnoses*, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

	Boys' basketball	Girls' basketball	IPR (95% CI)
Diagnosis			
Ankle strain/sprain	**32.3%**	25.1%	**1.29 (1.03, 1.60)**
Head/face concussion	14.4%	**21.1%**	**1.46 (1.08, 1/97**
Knee strain/sprain	4.2%	**7.6%**	**1.82 (1.03, 3.21)**
Knee other	5.3%	**7.1%**	1.33 (0.78, 2.27)

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

Table 25.23 Comparison of Time Loss of Boys' and Girls' Basketball Injuries, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

	Boys' basketball	Girls' basketball	IPR (95% CI)
Time Loss			
1-2 days	**17.2%**	15.2%	1.13 (0.83, 1.54)
3-6 days	**26.3%**	22.3%	1.18 (0.92, 1.50)
7-9 days	**18.4%**	15.2%	1.21 (0.89, 1.64)
10-21 days	19.1%	**24.6%**	**1.29 (1.00, 1.68)**
22 days or more	**7.0%**	5.3%	1.31 (0.76, 2.25)
Other	12.1%	**17.3%**	**1.43 (1.02, 2.00)**
Total	**100.0%**	**100.0%**	--

†Totals do not always equal 100.0% due to slight rounding.

Table 25.24 Comparison of Mechanisms of Boys' and Girls' Basketball Injuries, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

	Boys' basketball	Girls' basketball	IPR (95% CI)
Basketball Mechanism			
Collision with another player	**27.1%**	25.6%	1.06 (0.84, 1.34)
Jumping/landing	**29.5%**	15.5%	**1.91 (1.44, 2.53)**
Stepped on/fell on/kicked	**8.0%**	6.4%	1.26 (0.76, 2.09)
Rotation around a planted foot/inversion	12.9%	**17.1%**	1.32 (0.94, 1.85)
N/A (e.g., overuse, heat illness, etc.)	6.1%	**12.5%**	**2.06 (1.30, 3.27)**
Contact with ball	3.4%	**4.8%**	1.41 (0.71, 2.79)
Other	11.2%	**13.3%**	1.19 (0.82, 1.73)
Total	**100.0%**	**100.0%**	--

†Totals do not always equal 100.0% due to slight rounding.

Table 25.35 Comparison of Activities of Boys' and Girls' Basketball Injuries, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

	Boys' basketball	Girls' basketball	IPR (95% CI)
Basketball Activity			
Rebounding	**30.1%**	16.1%	**1.87 (1.42, 2.54)**
General play	17.8%	**19.1%**	1.07 (0.80, 1.44)
Defending	11.5%	**15.3%**	1.33 (0.93, 1.91)
Shooting	**10.8%**	9.4%	1.14 (0.75, 1.74)
Chasing loose ball	7.6%	**11.3%**	1.49 (0.96, 2.32)
Ball handling/dribbling	6.1%	**6.7%**	1.10 (0.64, 1.88)
Receiving pass	2.0%	**5.1%**	**2.61 (1.16, 5.89)**
Conditioning	1.0%	**3.2%**	**3.30 (1.07, 10.14)**
Other	**4.2%**	4.6%	1.10 (0.57, 2.12)
Total	**100.0%**	**100.0%**	--

†Totals do not always equal 100.0% due to slight rounding.

25.3 Boys' Baseball and Girls' Softball

Table 25.3 Comparison of Baseball and Softball Injury Rates, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

	Baseball	Softball	RR (95% CI)
Total	0.89	**1.23**	**1.38 (1.13, 1.67)**
Competition	1.54	**1.62**	1.05 (0.80, 1.37)
Practice	0.54	**1.02**	**1.90 (1.42, 2.54)**

Table 25.30 Comparison of Body Sites of Baseball and Softball Injuries, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

	Baseball	Softball	IPR (95% CI)
Body Site			
Head/face	19.7%	**27.1%**	1.37 (0.96, 1.97)
Arm/elbow	**15.2%**	2.9%	**5.23 (2.22, 12.29)**
Hand/wrist	14.1%	**15.9%**	1.13 (0.71, 1.79)
Shoulder	**12.1%**	8.7%	1.39 (0.78, 2.49)
Hip/thigh/upper leg	**13.6%**	6.8%	**2.02 (1.09, 3.73)**
Ankle	7.1%	**16.4%**	**2.32 (1.29, 4.20)**
Trunk	2.0%	**4.3%**	2.15 (0.67, 6.88)
Knee	9.6%	**11.1%**	1.16 (0.65, 2.06)
Lower leg	**4.5%**	2.9%	1.57 (0.57, 4.33)
Foot	**1.5%**	1.0%	1.57 (0.27, 9.29)
Neck	--	1.4%	--
Other	0.5%	**1.4%**	2.87 (0.30, 27.36)
Total	**100.0%**	**100.0%**	--

†Totals do not always equal 100.0% due to slight rounding.

Table 25.31 Comparison of Diagnoses of Baseball and Softball Injuries, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

	Baseball	Softball	IPR (95% CI)
Diagnosis			
Strain/sprain	**39.4%**	37.4%	1.05 (0.82, 1.35)
Contusion	**16.2%**	15.0%	1.07 (0.68, 1.69)
Concussion	10.1%	**19.4%**	**1.92 (1.17, 3.17)**
Fracture	**14.1%**	9.7%	1.46 (0.85, 2.50)
Other	**20.2%**	18.4%	1.10 (0.74, 1.63)
Total	**100.0%**	**100.0%**	--

†Totals do not always equal 100.0% due to slight rounding.

Table 25.32 Most Common Baseball and Softball Injury Diagnoses*, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

	Baseball	Softball	IPR (95% CI)
Diagnosis			
Head/face concussion	10.1%	**18.8%**	**1.87 (1.13, 3.08)**
Hip/thigh/upper leg strain/sprain	**12.1%**	5.3%	**2.28 (1.15, 4.53)**
Ankle strain/sprain	5.6%	**14.5%**	**2.61 (1.35, 5.06)**
Shoulder other	**6.1%**	3.4%	1.79 (0.72, 4.46)
Hand/wrist fracture	**6.6%**	6.3%	1.05 (0.50, 2.20)

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

Table 25.33 Comparison of Time Loss of Baseball and Softball Injuries, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

	Baseball	Softball	IPR (95% CI)
Time Loss			
1-2 days	18.2%	**21.7%**	1.20 (0.81, 1.77)
3-6 days	**21.2%**	18.8%	1.13 (0.76, 1.66)
7-9 days	**19.7%**	16.4%	1.20 (0.79, 1.82)
10-21 days	13.1%	**21.7%**	**1.66 (1.06, 2.58)**
22 days or more	**8.6%**	7.7%	1.11 (0.58, 2.14)
Other	**19.2%**	13.5%	1.42 (0.91,2.22)
Total	**100.0%**	**100.0%**	--

†Totals do not always equal 100.0% due to slight rounding.

Table 25.34 Comparison of Mechanisms of Baseball and Softball Injuries, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

	Baseball	Softball	IPR (95% CI)
Baseball/Softball Mechanism			
Contact with another player	**12.9%**	11.5%	1.21 (0.66, 1.91)
Throwing - pitching	**9.3%**	1.0%	**9.28 (2.18, 39,45)**
N/A (overuse, heat illness, conditioning, etc.)	9.3%	**10.0%**	1.08 (0.59, 1.97)
Hit by batted ball	10.3%	**10.5%**	1.02 (0.57, 1.82)
Hit by pitch	4.6%	**5.5%**	1.19 (0.50, 2.80)
Contact with bases	**13.9%**	13.0%	1.07 (0.65, 1.77)
Contact with thrown ball (non-pitch)	5.2%	**14.0%**	**2.72 (1.36, 5.44)**
Throwing - not pitching	**7.7%**	4.5%	1.72 (0.77, 3.83)
Rotation around a planted foot/inversion	5.2%	**8.5%**	1.65 (0.77, 3.51)
Other	**19.1%**	16.5%	1.16 (0.76, 1.77)
Unknown	2.5%	**5.0%**	--
Total*	**100.0%**	**100.0%**	--

†Totals do not always equal 100.0% due to slight rounding.

Table 25.35 Comparison of Activities of Baseball and Softball Injuries, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

	Baseball	Softball	IPR (95% CI)
Baseball/Softball Activity			
Pitching	**12.4%**	3.0%	**4.12 (1.72, 9.87)**
Fielding a batted ball	11.3%	**19.5%**	**1.72 (1.06, 2.79)**
Running bases	14.5%	**16.5%**	1.14 (0.72, 1.81)
Batting	7.0%	**8.8%**	1.25 (0.63, 2.47)
Throwing (not pitching)	**9.8%**	6.5%	1.10 (0.57, 2.14)
Fielding a thrown ball	7.7%	**8.5%**	1.10 (0.57, 2.14)
General play	4.1%	**8.5%**	2.06 (0.91, 4.67)
Sliding	**9.8%**	9.5%	1.03 (0.56, 1.89)
Catching	8.2%	**10.5%**	1.27 (0.69, 2.37)
Conditioning	**2.1%**	2.0%	1.03 (0.26, 4.06)
Other	**6.7%**	6.0%	1.12 (0.52, 2.39)
Unknown	**6.4%**	0.7%	--
Total*	**100.0%**	**100.0%**	--

†Totals do not always equal 100.0% due to slight rounding.

25.4 Boys' and Girls' Swimming

Table 25.4 Comparison of Boys' and Girls' Swimming Injury Rates, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

	Boys' swimming	Girls' swimming	RR (95% CI)
Total	0.21	**0.28**	1.33 (0.75, 2.35)
Competition	**0.27**	0.19	1.41 (0.38, 5.27)
Practice	0.20	**0.30**	1.54 (0.81, 2.92)

Table 25.40 Comparison of Body Sites of Boys' and Girls' Swimming and Diving Injuries, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

	Boys' swimming	Girls' swimming	IPR (95% CI)
Body Site			
Shoulder	25.0%	**41.4%**	1.66 (0.69, 3.97)
Head/face	**40.0%**	24.1%	1.66 (0.72, 3.84)
Knee	--	**3.4%**	--
Hip/Thigh/upper leg	**5.0%**	3.4%	1.45 (0.1, 21.85)
Trunk	**5.0%**	3.4%	1.45 (0.1, 21.85)
Lower leg	--	**3.4%**	--
Foot	5.0%	**6.9%**	1.38 (0.13, 14.20)
Ankle	**5.0%**	3.4%	1.45 (0.1, 21.85)
Arm/elbow	--	**3.4%**	--
Hand/wrist	**10.0%**	3.4%	2.90 (0.28, 29.86)
Neck	--	**3.4%**	--
Other	**5.0%**	--	--
Total	**100.0%**	**100.0%**	**--**

†Totals do not always equal 100.0% due to slight rounding.

Table 25.41 Comparison of Diagnoses of Boys' and Girls' Swimming Injuries, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

	Boys' swimming	Girls' swimming	IPR (95% CI)
Diagnosis			
Strain/sprain	**35.0%**	27.6%	1.27 (0.55, 2.94)
Concussion	**40.0%**	20.7%	1.93 (0.79, 4.72)
Fracture	**10.0%**	--	--
Contusion	--	**10.3%**	--
Other	15.0%	**41.4%**	2.76 (0.89, 8.54)
Total	**100.0%**	**100.0%**	--

†Totals do not always equal 100.0% due to slight rounding.

Table 25.42 Most Common Boys' and Girls' Swimming Injury Diagnoses, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

	Boys' swimming	Girls' swimming	IPR (95% CI)
Diagnosis			
Shoulder other	10.0%	**24.1%**	2.41 (0.56, 10.44)
Head/face concussion	**40.0%**	20.7%	1.93 (0.79, 4.72)
Trunk other	--	**3.4%**	**--**
Trunk strain/sprain	**5.0%**	--	--
Shoulder strain/sprain	15.0%	**17.2%**	1.15 (0.31, 4.27)

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

Table 25.43 Comparison of Time Loss of Boys' and Girls' Swimming Injuries, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

	Boys' swimming	Girls' swimming	IPR (95% CI)
Time Loss			
1-2 days	**35.0%**	27.6%	1.27 (0.55, 2.94)
3-6 days	--	**27.6%**	--
7-9 days	**15.0%**	13.8%	1.09 (0.27, 4.34)
10-21 days	**40.0%**	6.9%	5.80 (1.37, 24.50)
22 days or more	5.0%	**13.8%**	2.76 (0.33, 22.89)
Other	5.0%	**10.3%**	2.07 (0.23, 18.49)
Total	**100.0%**	**100.0%**	--

†Totals do not always equal 100.0% due to slight rounding.

Table 25.44 Comparison of Mechanisms of Boys' and Girls' Swimming and Diving Injuries, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

	Boys' swimming	Girls' swimming	IPR (95% CI)
Swimming Mechanism			
N/A (overuse, heat illness, conditioning, etc.)	36.8%	**55.2%**	1.50 (0.76, 2.94)
Contact with wall	--	**13.8%**	--
Contact with another person	**21.1%**	6.9%	3.05 (0.62, 15.06)
Other	**42.1%**	24.1%	1.74 (0.76, 4.01)
Unknown	**21.1%**	13.9%	--
Total*	**100.0%**	**100.0%**	**--**

†Totals do not always equal 100.0% due to slight rounding. *21.1% of boys' and 13.9% of girls' swimming mechanisms of injury were unknown.

Table 25.45 Comparison of Activities of Boys' and Girls' Swimming and Diving Injuries, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

	Boys' swimming	Girls' swimming	IPR (95% CI)
Swimming Activity			
Swimming	**52.6%**	51.7%	1.02 (0.59, 1.77)
Flip turn off wall	**--**	**10.3%**	--
Diving off board/platform/starting platform	10.5%	**20.7%**	1.97 (0.44, 8.74)
Other	**15.8%**	3.4%	4.58 (0.51, 40.83)
Total	**100.0%**	**100.0%**	--

†Totals do not always equal 100.0% due to slight rounding.

25.5 Boys' and Girls' Track and Field

Table 25.5 Comparison of Boys' and Girls' Track and Field Injury Rates, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

	Boys' track	Girls' track	RR (95% CI)
Total	0.68	**1.02**	**1.49 (1.22, 1.82)**
Competition	1.23	**1.30**	1.06 (0.73, 1.55)
Practice	0.56	**0.95**	**1.70 (1.34, 2.15)**

Table 25.50 Comparison of Body Sites of Boys' and Girls' Track and Field Injuries, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

	Boys' track	Girls' track	IPR (95% CI)
Body Site			
Hip/thigh/upper leg	**38.6%**	30.5%	1.27 (0.97, 1.67)
Lower leg	14.8%	**21.4%**	1.45 (0.94, 2.24)
Ankle	14.2%	**15.9%**	1.12 (0.67, 1.79)
Knee	**9.7%**	9.5%	1.01 (0.55, 1.86)
Trunk	2.8%	**3.6%**	1.28 (0.43, 3.84)
Foot	**7.4%**	6.8%	1.08 (0.53, 2.22)
Shoulder	1.1%	**2.7%**	2.40 (0.49, 11.75)
Head/face	1.7%	**4.5%**	2.67 (0.75, 9.54)
Arm/elbow	**3.4%**	0.9%	3.75 (0.77, 18.35)
Hand/wrist	**2.8%**	1.4%	2.08 (0.51, 8.60)
Neck	--	--	--
Other	**3.4%**	2.7%	1.25 (0.41, 3.81)
Total	**100.0%**	**100.0%**	--

†Totals do not always equal 100.0% due to slight rounding.

Table 25.51 Comparison of Diagnoses of Boys' and Girls' Track and Field Injuries, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

	Boys' track	Girls' track	IPR (95% CI)
Diagnosis			
Strain/sprain	**59.1%**	53.7%	1.10 (0.93, 1.31)
Contusion	**3.4%**	2.3%	1.49 (0.46, 4.79)
Fracture	**6.8%**	2.8%	2.48 (0.95, 6.47)
Concussion	1.7%	**4.6%**	2.69 (0.75, 9.63)
Other	29.0%	**36.7%**	1.27 (0.95, 1.69)
Total	**100.0%**	**100.0%**	--

†Totals do not always equal 100.0% due to slight rounding.

Table 25.52 Most Common Boys' and Girls' Track and Field Injury Diagnoses, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

	Boys' track	Girls' track	IPR (95% CI)
Diagnosis			
Hip/thigh/upper leg strain/sprain	**35.2%**	24.5%	**1.44 (1.06, 1.95)**
Lower leg other	10.8%	**15.9%**	1.47 (0.87, 2.48)
Hip/thigh/upper leg other	3.4%	**5.5%**	1.60 (0.61, 4.18)
Ankle strain/sprain	10.8%	**15.5%**	1.43 (0.85, 2.42)
Knee other	5.1%	**6.4%**	1.24 (0.55, 2.81)

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

Table 25.53 Comparison of Time Loss of Boys' and Girls' Track and Field Injuries, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

	Boys' track	Girls' track	IPR (95% CI)
Time Loss			
1-2 days	18.2%	**21.4%**	1.18 (0.79, 1.76)
3-6 days	**23.9%**	22.3%	1.07 (0.75, 1.54)
7-9 days	15.9%	**16.4%**	1.03 (0.85, 1.62)
10-21 days	**21.0%**	20.0%	1.05 (0.71, 1.55)
22 days or more	**5.7%**	5.0%	1.14 (0.49, 2.61)
Other	**15.3%**	15.0%	1.02 (0.64, 1.63)
Total	**100.0%**	**100.0%**	--

†Totals do not always equal 100.0% due to slight rounding.

Table 25.54 Comparison of Mechanisms of Boys' and Girls' Track and Field Injuries, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

	Boys' track	Girls' track	IPR (95% CI)
Track Mechanism			
N/A (e.g., overuse, heat illness, conditioning, etc.)	46.8%	**52.8%**	1.13 (0.92, 1.38)
Contact with ground/track/surface	**12.1%**	8.9%	1.37 (0.76, 2.46)
Fall/trip	5.2%	**6.5%**	1.26 (0.56, 2.84)
Rotation around planted foot/inversion	**9.2%**	7.5%	1.24 (0.64, 2.40)
Contact with field equipment	5.2%	**6.5%**	1.26 (0.56, 2.84)
Uneven playing surface	0.6%	**2.8%**	4.85 (0.59, 39.91)
Stepped on/kicked	--	--	--
Contact with another person	--	**0.5%**	--
Other	**15.6%**	7.5%	**2.09 (1.16, 3.75)**
Unknown	5.3%	**7.0%**	--
Total	**100.0%**	**100.0%**	--

†Totals do not always equal 100.0% due to slight rounding.

Table 25.55 Comparison of Activities of Boys' and Girls' Track and Field Injuries, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

	Boys' track	Girls' track	IPR (95% CI)
Track Activity			
Running	**64.7%**	59.1%	1.10 (0.94, 1.28)
Jumping/landing	**14.5%**	11.6%	1.24 (0.74, 2.08)
Conditioning	2.9%	**5.6%**	1.93 (0.69, 5.38)
Throwing	3.5%	**4.7%**	1.34 (0.50, 3.62)
Running hurdles	**5.2%**	4.7%	1.12 (0.47, 2.69)
Warming up	1.7%	**3.7%**	2.15 (0.58, 7.97)
Leaving block	**1.2%**	0.5%	2.49 (0.23, 27.19)
Hit by shot put/discus/javelin/hammer	**0.6%**	0.5%	1.24 (0.08, 19,73)
Other	2.9%	**6.5%**	2.25 (0.83, 6.13)
Total	**100.0%**	**100.0%**	--

†Totals do not always equal 100.0% due to slight rounding.

25.6 Boys' and Girls' Cross Country

Table 25.6 Comparison of Boys' and Girls' Cross Country Injury Rates, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

	Boys' cross country	Girls' cross country	RR (95% CI)
Total	0.67	**1.02**	**1.52 (1.14, 2.01)**
Competition	0.77	**1.26**	1.64 (0.87, 3.1)
Practice	0.65	**0.97**	**1.49 (1.08, 2.04)**

Table 25.60 Comparison of Body Sites of Boys' and Girls' Cross Country Injuries, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

	Boys' cross country	Girls' cross country	IPR (95% CI)
Body Site			
Lower leg	25.9%	**26.4%**	1.02 (0.63, 1.64)
Hip/thigh/upper leg	16.5%	**30.9%**	1.88 (1.08, 3.27)
Knee	**15.3%**	14.5%	1.05 (0.54, 2.07)
Ankle	17.6%	**18.2%**	1.03 (0.56, 1.89)
Foot	**15.3%**	2.7%	5.61 (1.65, 19.05)
Trunk	--	--	--
Arm/elbow	0.9%	**1.2%**	1.29 (0.08, 20.39)
Head/face	**2.4%**	0.9%	2.59 (0.24, 29.07)
Hand/wrist	--	--	--
Shoulder	--	--	--
Neck	--	--	--
Other	3.5%	**4.5%**	
Total	**100.0%**	**100.0%**	--

†Totals do not always equal 100.0% due to slight rounding.

Table 25.61 Comparison of Diagnoses of Boys' and Girls' Cross Country Injuries, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

	Boys' cross country	Girls' cross country	IPR (95% CI)
Diagnosis			
Strain/sprain	**45.2%**	38.7%	1.17 (0.84, 1.63)
Contusion	1.2%	**2.7%**	2.27 (0.24, 21.44)
Fracture	**1.2%**	0.9%	1.32 (0.08, 20.82)
Concussion	**2.4%**	--	--
Other	50.0%	**57.7%**	1.15 (0.88, 1.51)
Total	**100.0%**	**100.0%**	--

†Totals do not always equal 100.0% due to slight rounding.

Table 25.62 Most Common Boys' and Girls' Cross Country Injury Diagnoses, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

	Boys' cross country	Girls' cross country	IPR (95% CI)
Diagnosis			
Lower leg other	17.6%	**22.5%**	1.27 (0.72, 2.27)
Hip/thigh/upper leg strain/sprain	9.4%	**16.2%**	1.72 (0.79, 3.77)
Lower leg strain/sprain	**8.2%**	2.7%	3.05 (0.81, 11.44)
Hip/thigh/upper leg other	7.1%	**12.6%**	1.79 (0.72, 4.46)
Ankle strain/sprain	**17.6%**	17.1%	1.03 (0.56, 1.91)
Knee other	10.6%	**12.6%**	1.19 (0.54, 2.62)

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

Table 25.63 Comparison of Time Loss of Boys' and Girls' Cross Country Injuries, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

	Boys' cross country	Girls' cross country	IPR (95% CI)
Time Loss			
1-2 days	16.5%	**29.7%**	**1.81 (1.03, 3.15)**
3-6 days	24.7%	**26.1%**	1.06 (0.65, 1.72)
7-9 days	**22.4%**	10.8%	**2.07 (1.06, 4.02)**
10-21 days	**20.0%**	14.4%	1.39 (0.75, 3.14)
22 days or more	**4.7%**	3.6%	1.31 (0.34, 5.07)
Other	11.8%	**15.3%**	1.30 (0.63, 2.70)
Total	**100.0%**	**100.0%**	--

†Totals do not always equal 100.0% due to slight rounding.

Table 25.64 Comparison of Mechanisms of Boys' and Girls' Cross Country Injuries, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

	Boys' cross country	Girls' cross country	IPR (95% CI)
Track Mechanism			
Overuse	48.8%	**60.2%**	1.24 (0.94, 1.62)
Contact with ground/track/surface	**10.0%**	3.9%	2.58 (0.80, 8.25)
Fall/trip	**8.8%**	4.9%	1.80 (0.59, 5.47)
Rotation around planted foot/inversion	**5.0%**	2.9%	1.72 (0.40, 7.45)
Contact with obstacle	**2.5%**	1.9%	1.29 (0.19, 8.94)
Uneven surface	10.0%	**11.7%**	1.17 (0.50, 2.71)
N/A (e.g., heat illness, conditioning, etc.)	7.5%	**7.8%**	1.04 (0.37, 2.86)
Contact with another person	--	--	--
Other	**2.5%**	1.0%	2.58 (0.24, 27.90)
Total	**100.0%**	**100.0%**	--

†Totals do not always equal 100.0% due to slight rounding.

Table 25.65 Comparison of Activities of Boys' and Girls' Cross Country Injuries, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

	Boys' cross country	Girls' cross country	IPR (95% CI)
Track Activity			
Running	**73.8%**	67.6%	1.09 (0.90, 1.32)
Conditioning	7.5%	**7.8%**	1.05 (0.38, 2.89)
Warming up	**5.0%**	3.9%	1.28 (0.33, 4.94)
Cooldown	**2.5%**	--	--
Other	**2.5%**	--	--
Total	**100.0%**	**100.0%**	--

†Totals do not always equal 100.0% due to slight rounding.

25.7 Boys' and Girls' Tennis

Table 25.7 Comparison of Boys' and Girls' Tennis Injury Rates, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

	Boys' tennis	Girls' tennis	RR (95% CI)
Total	**0.37**	0.33	1.12 (0.61, 2.05)
Competition	**0.56**	0.27	2.05 (0.70, 6.00)
Practice	0.29	**0.35**	1.23 (0.58, 2.63)

Table 25.70 Comparison of Body Sites of Boys' and Girls' Tennis Injuries, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

	Boys' tennis	Girls' tennis	IPR (95% CI)
Body Site			
Lower leg	--	**10.0%**	--
Hip/thigh/upper leg	**4.5%**	--	--
Knee	9.1%	**15.0%**	1.65 (0.31, 8.89)
Ankle	27.3%	**30.0%**	1.10 (0.42, 2.86)
Foot	**9.1%**	--	--
Trunk	**13.6%**	10.0%	1.36 (0.25, 7.34)
Head/face	**9.1%**	--	--
Arm/elbow	**9.1%**	--	--
Hand/wrist	9.1%	**20.0%**	2.20 (0.45, 10.74)
Shoulder	9.1%	**15.0%**	1.65 (0.31, 8.89)
Neck	--	--	--
Other	--	--	--
Total	**100.0%**	**100.0%**	--

†Totals do not always equal 100.0% due to slight rounding.

Table 25.71 Comparison of Diagnoses of Boys' and Girls' Tennis Injuries, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

	Boys' tennis	Girls' tennis	IPR (95% CI)
Diagnosis			
Strain/sprain	**59.1%**	55.0%	1.07 (0.63, 1.82)
Contusion	**4.5%**	--	--
Fracture	**13.6%**	--	--
Concussion	**9.1%**	**--**	--
Other	13.6%	**45.0%**	**3.30 (1.04, 10.50)**
Total	**100.0%**	**100.0%**	--

†Totals do not always equal 100.0% due to slight rounding.

Table 25.72 Most Common Boys' and Girls' Tennis Injury Diagnoses, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

	Boys' tennis	Girls' tennis	IPR (95% CI)
Diagnosis			
Ankle strain/sprain	27.3%	**30.0%**	1.10 (0.42, 2.86)
Knee other	4.5%	**10.0%**	2.20 (0.22, 22.45)

*Only includes diagnoses accounting for >5% of tennis injuries.

Table 25.73 Comparison of Time Loss of Boys' and Girls' Tennis Injuries, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

	Boys' tennis	Girls' tennis	IPR (95% CI)
Time Loss			
1-2 days	**18.2%**	5.0%	3.64 (0.44, 29.87)
3-6 days	18.2%	**45.0%**	2.48 (0.90, 6.80)
7-9 days	**22.7%**	10.0%	2.27 (0.50, 10.43)
10-21 days	13.6%	**15.0%**	1.10 (0.25, 4.84)
22 days or more	4.5%	**5.0%**	1.10 (0.07, 16.45)
Other	**22.7%**	20.0%	1.14 (0.35, 3.65)
Total	**100.0%**	**100.0%**	--

†Totals do not always equal 100.0% due to slight rounding.

Table 25.74 Comparison of Mechanisms of Boys' and Girls' Tennis Injuries, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

	Boys' tennis	Girls' tennis	IPR (95% CI)
Tennis Mechanism			
Rotation around a planted foot	**31.8%**	15.0%	2.12 (0.63, 7.11)
Non-contact	31.8%	**60.0%**	1.89 (0.93, 3.83)
Contact with racquet	**4.5%**	--	--
Contact with surface	**15.0%**	13.6%	1.10 (0.25, 4.84)
Contact with net	--	--	--
Stepped on ball	--	**5.0%**	--
Contact with out of bounds object	--	--	--
Other	**4.5%**	--	--
Total	**100.0%**	**100.0%**	--

†Totals do not always equal 100.0% due to slight rounding.

Table 25.75 Comparison of Activities of Boys' and Girls' Tennis Injuries, High School Sports-Related Injury Surveillance Study, US, 2016-17 School Year

	Boys' tennis	Girls' tennis	IPR (95% CI)
Tennis Activity			
General Play	22.7%	**35.0%**	1.54 (0.58, 4.08)
Chasing/running to hit ball	**31.8%**	25.0%	1.27 (0.48, 3.37)
Conditioning	4.5%	**5.0%**	1.10 (0.07, 16.45)
Forehand ground stroke	--	**5.0%**	--
One-handed backhand ground stroke	**4.5%**	--	--
Serve	31.8%	**60.0%**	1.89 (0.93, 3.83)
Two-handed backhand	--	**5.0%**	--
Overhead	**4.5%**	--	--
Warm up	--	**5.0%**	--
Other	**4.5%**	--	--
Total	**100.0%**	**100.0%**	--

†Totals do not always equal 100.0% due to slight rounding.

XXVII. Reporter Demographics & Compliance

During the 2016-17 school year, 242 ATs initially enrolled 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, 183 enrolled ATs reported an average of 41 study weeks. The majority of ATs (93.9%) reported for more than 20 weeks of the study. 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 2016-17 academic year yielded 82.6% sensitivity, 98.2% specificity, a positive predictive value of 90.5%, and a negative predictive value of 96.4%.

Prior to the start of the 2016-17 High School RIO™ study, participating ATs were asked to complete a short demographics survey. Over 80% (85.4%) of participating high schools were public schools, with the remainder being private. All ATs provided services to athletes of their high school on 5 or more days each week. Over 90% of ATs participating during the 2016-17 study year had previously participated in the High School RIO™ study.

An online "End of Season" survey gave all participating ATs (both in the original study as well as in the expanded study including those ATs who did not report any data) the opportunity to provide feedback on their experiences with High School RIO™. This survey was completed by 98 ATs (52.6%). Average reporting time burdens were 24 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 (53.1%) or somewhat easy (33.7%) to use (5 and 4 on the Likert scale, respectively), with ATs being either very satisfied (56.1%) or

somewhat satisfied (34.7%) 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 2017-18 school year.

XXV. 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 large nationally disperse 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.