

CONVENIENCE SAMPLE SUMMARY REPORT

NATIONAL HIGH SCHOOL SPORTS-RELATED INJURY SURVEILLANCE STUDY

2018-19 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 2018-19. While the health benefits of a physically active lifestyle including participating in sports are undeniable, high school athletes are at risk of sports-related injury because a certain endemic level of injury can be expected among participants of any physical activity. The challenge to injury epidemiologists is to reduce injury rates among high school athletes to the lowest possible level without discouraging adolescents from engaging in this important form of physical activity. This goal can best be accomplished by investigating the etiology of preventable injuries; by developing, implementing, and evaluating protective interventions using such science-based evidence; and by responsibly reporting epidemiologic findings while promoting a physically active lifestyle among adolescents.

1.2 Background and Significance

High school sports play an important role in the adoption and maintenance of a physically active lifestyle among millions of US adolescents. Too often injury prevention in this population is overlooked as sports-related injuries are thought to be unavoidable. In reality, sports-related injuries are largely preventable through the application of preventive interventions based on evidence-based science. The morbidity, mortality, and disability caused by high school sports-related injuries can be reduced through the development of effective prevention strategies and through programmatic decisions based on injury prevention. However, such efforts rely upon accurate national estimates of injury incidence, injury rate calculations, and risk and protective

factor data. Previously, no injury surveillance system capable of providing researchers with the needed quality of injury and exposure data for high school sports-related injuries existed.

Since the 2005-06 school year, 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' tennis, boys' and girls' cross country, and cheerleading. Due to decreasing numbers of high school participants across the US, boys' volleyball and girls' gymnastics have been dropped from the surveillance. Due to very low injury rates boys' and girls' tennis have been dropped from the surveillance. This surveillance has been conducted using the time- and cost-efficient RIO™ (Reporting Information One) surveillance system. This study during the 2018-19 academic year was funded by 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, 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 20 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 $\leq 1,000$ 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 20 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 \$200-\$300 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, 2018-19 School Year.*

	# Schools in Random Sample	# Schools in Convenience Sample	# Schools Total
Original Sports			
Football	94	46	140
Boys' Soccer	94	43	137
Girls' Soccer	93	41	134
Girls' Volleyball	92	52	144
Boys' Basketball	93	55	148
Girls' Basketball	93	56	149
Wrestling	84	50	134
Baseball	92	47	139
Softball	91	50	141
New Sports			
Field Hockey	25	24	49
Ice hockey	13	11	24
Boys' Lacrosse	37	26	63
Girls' Lacrosse	36	29	65
Boys' Swimming and Diving	39	37	76
Girls' Swimming and Diving	38	37	75
Boys' Track and Field	59	49	108
Girls' Track and Field	59	50	109
Boys' Cross Country	49	58	107
Girls' Cross Country	50	57	107
Cheerleading	46	41	87
Total	95	80	175

*Numbers only include schools who actually reported data for the 2018-19 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 49 weekly exposure reports: one for each week from July 23, 2018 through June 2, 2019. 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:

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

Injury proportions were compared using injury proportion ratios (IPR) and corresponding confidence intervals. Following is an example of the IPR calculation comparing the proportion of male soccer concussions to the proportion of female soccer concussions:

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

An RR or IPR >1.00 suggests a risk association while an RR or IPR <1.00 suggests a protective association. CI not including 1.00 were considered statistically significant

II. Overall Injury Epidemiology

Table 2.1 Injury Rates by Sport and Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2018-19 School Year*

	# Injuries	# Exposures	Injury rate (per 1,000 AEs)
Overall total	7,253	4,003,991	1.81
Competition	3,904	1,002,942	3.89
Practice	3,331	2,962,253	1.12
Performance	18	38,796	0.46
Boys' football total	2,328	621,653	3.74
Competition	1,360	111,867	12.16
Practice	968	509,786	1.90
Boys' soccer total	519	278,500	1.86
Competition	335	85,490	3.92
Practice	184	193,010	0.95
Girls' soccer total	591	235,653	2.51
Competition	400	73,106	5.47
Practice	191	162,547	1.18
Girls' volleyball total	323	252,227	1.28
Competition	127	84,717	1.50
Practice	196	167,510	1.17
Boys' basketball total	567	312,149	1.82
Competition	316	93,688	3.37
Practice	251	218,461	1.15
Girls' basketball total	442	230,514	1.92
Competition	255	69,942	3.65
Practice	187	160,572	1.16
Boys' wrestling total	528	213,076	2.48
Competition	239	55,326	4.32
Practice	289	157,750	1.83
Boys' baseball total	244	241,993	1.01
Competition	140	86,762	1.61
Practice	104	155,231	0.67
Girls' softball total	243	172,851	1.41
Competition	140	62,593	2.24
Practice	103	110,258	0.93
Girls' Field Hockey total	120	71,442	1.68
Competition	61	23,496	2.60
Practice	59	47,946	1.23

Table 2.1 (Continued) Injury Rates by Sport and Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2018-19 School Year*

	# Injuries	# Exposures	Injury rate (per 1,000 AEs)
Boys' Ice Hockey total	126	52,032	2.42
Competition	105	17,745	5.92
Practice	21	34,287	0.61
Boys' Lacrosse total	275	132,645	2.07
Competition	167	38,333	4.36
Practice	108	94,312	1.15
Girls' Lacrosse total	177	105,532	1.68
Competition	101	32,319	3.13
Practice	76	73,213	1.04
Boys' Swimming total	14	85,434	0.16
Competition	4	15,444	0.26
Practice	10	69,990	0.14
Girls' Swimming total	28	106,201	0.26
Competition	2	20,500	0.10
Practice	26	85,701	0.30
Boys' Track total	164	260,689	0.63
Competition	53	46,570	1.14
Practice	111	214,119	0.52
Girls' Track total	230	220,562	1.04
Competition	57	39,358	1.45
Practice	173	181,204	0.95
Cheerleading total	119	178,077	0.67
Competition	4	8,689	0.46
Practice	97	130,592	0.74
Performance	18	38,796	0.46
Boys' Cross Country total	101	126,692	0.80
Competition	19	20,394	0.93
Practice	82	106,298	0.77
Girls' Cross Country total	114	106,069	1.07
Competition	19	16,603	1.14
Practice	95	89,466	1.06

*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, 2018-19 School Year*

	<1 day time loss	≥1 day time loss	Time loss data missing	Total
Overall				
Boys' football	2.2%	93.0%	4.7%	100.0%
Boys' soccer	1.5%	94.2%	4.4%	100.0%
Girls' soccer	2.0%	93.1%	4.9%	100.0%
Girls' volleyball	1.2%	95.6%	3.3%	100.0%
Boys' basketball	0.7%	95.0%	4.4%	100.0%
Girls' basketball	1.2%	91.1%	7.6%	100.0%
Boys' wrestling	1.2%	92.5%	6.3%	100.0%
Boys' baseball	0.8%	94.6%	4.7%	100.0%
Girls' softball	1.2%	96.4%	2.4%	100.0%
Girls' field hockey	0.8%	94.5%	4.7%	100.0%
Boys' ice hockey	0.7%	94.0%	5.2%	100.0%
Boys' lacrosse	1.4%	93.5%	5.1%	100.0%
Girls' lacrosse	0.5%	95.2%	4.3%	100.0%
Boys' swimming	0.0%	87.5%	12.5%	100.0%
Girls' swimming	0.0%	90.3%	9.7%	100.0%
Boys' track	0.0%	95.9%	4.1%	100.0%
Girls' track	0.0%	97.9%	2.1%	100.0%
Cheerleading	0.8%	89.5%	9.8%	100.0%
Boys' cross country	0.0%	98.1%	1.9%	100.0%
Girls' cross country	0.0%	95.8%	4.2%	100.0%
Total	1.4%	93.7%	4.8%	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, 2018-19 School Year*

	Male	Female
Year in School	n=4,561	n=2,260
Freshman	22.4%	27.6%
Sophomore	24.2%	26.5%
Junior	25.8%	25.0%
Senior	27.6%	21.0%
Total†	100.0%	100.0%
Age (years)		
Minimum	12	12
Maximum	19	19
Mean (St. Dev.)	15.9 (1.3)	15.6 (1.2)
BMI		
Minimum	15.8	15.5
Maximum	56.7	53.0
Mean (St. Dev.)	24.5 (4.9)	22.1 (3.6)

*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, 2018-19 School Year

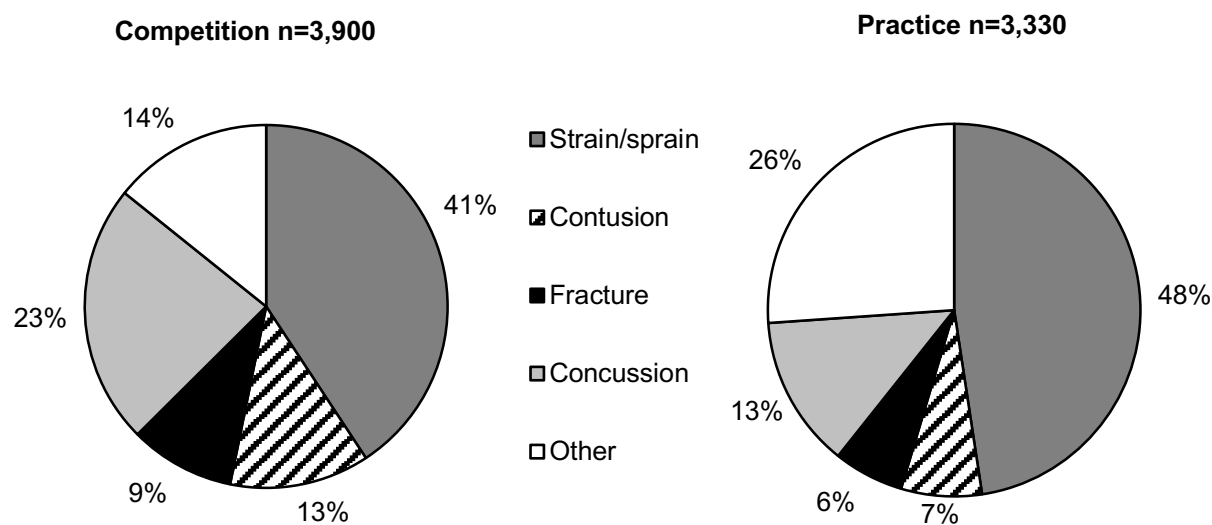


Table 2.4 Body Site of Injury by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2018-19 School Year

	Competition		Practice		Overall*	
	n	%	n	%	n	%
Body Site						
Head/face	1,047	26.8%	520	15.6%	1,572	21.7%
Ankle	717	18.4%	564	16.9%	1,283	17.7%
Knee	558	14.3%	428	12.9%	988	13.6%
Hip/thigh/upper leg	308	7.9%	432	13.0%	740	10.2%
Hand/wrist	308	7.9%	264	7.9%	576	7.9%
Shoulder	279	7.2%	225	6.8%	506	7.0%
Trunk	168	4.3%	239	7.2%	408	5.6%
Lower leg	123	3.2%	269	8.1%	392	5.4%
Foot	103	2.6%	161	4.8%	264	3.6%
Arm/elbow	137	3.5%	116	3.5%	254	3.5%
Other	101	2.6%	75	2.3%	177	2.4%
Neck	53	1.4%	37	1.1%	90	1.2%
Total	3,902	100.0%	3,330	100.0%	7,250	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, 2018-19 School Year

	Male		Female		Total	
	n	% of ankle injuries	n	% of ankle injuries	n	% of ankle injuries
Ankle Ligament						
Anterior talofibular ligament	521	70.8%	363	73.2%	884	71.8%
Calcaneofibular ligament	228	31.0%	166	33.5%	394	32.0%
Anterior tibiofibular ligament	124	16.8%	77	15.5%	201	16.3%
Posterior talofibular ligament	74	10.5%	54	10.9%	128	10.4%
Deltoid ligament	47	6.4%	26	5.2%	73	5.9%
Posterior tibiofibular ligament	20	2.7%	19	3.8%	39	3.2%
Total Ankle Injuries	736		496		1,232	

*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, 2018-19 School Year

	Male		Female		Total	
	n	% of knee injuries	n	% of knee injuries	n	% of knee injuries
Knee Ligament						
Patella/patellar tendon	141	22.3%	100	31.1%	241	25.3%
Medial collateral ligament	171	27.1%	60	18.6%	231	24.2%
Anterior cruciate ligament	115	18.2%	82	25.5%	197	20.7%
Torn cartilage (meniscus)	116	18.4%	65	20.2%	181	19.0%
Lateral collateral ligament	35	5.5%	13	4.0%	48	5.0%
Posterior cruciate ligament	15	2.4%	8	2.5%	23	2.4%
Total Knee Injuries	631		322		953	

*Multiple responses allowed per injury report.

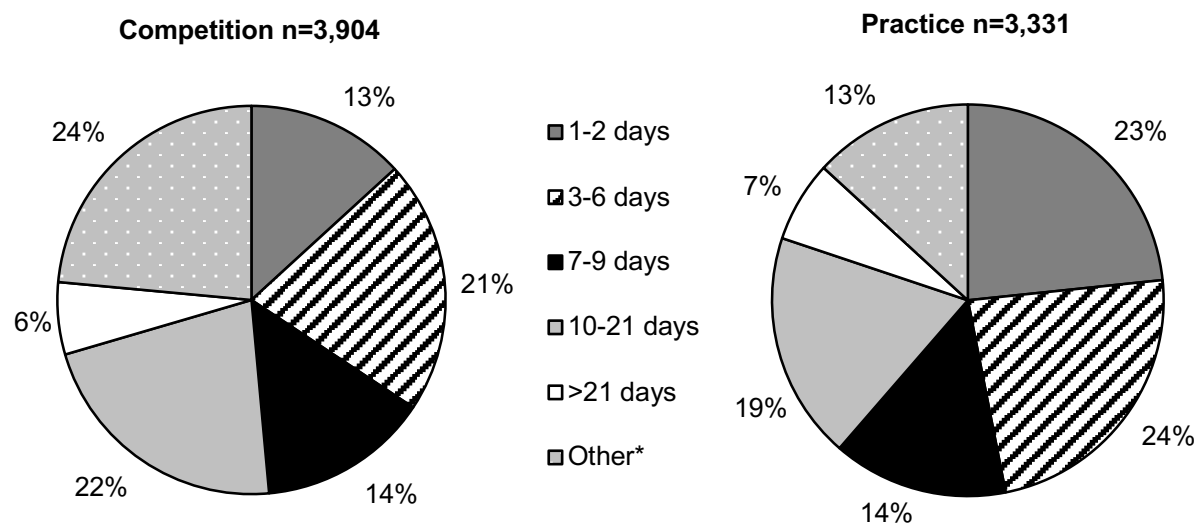
†Totals and n's are not always equal due to slight rounding or missing responses.

Table 2.7 Ten Most Common Injury Diagnoses by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2018-19 School Year

Diagnosis	Competition n=3,898		Practice n=3,329		Overall n=7,245	
	n	%	n	%	n	%
Head/face concussion	910	23.3%	441	13.2%	1,355	18.7%
Ankle strain/sprain	647	16.6%	513	15.4%	1,162	16.0%
Hip/thigh/upper leg strain/sprain	209	5.4%	359	10.8%	568	7.8%
Knee strain/sprain	317	8.1%	163	4.9%	480	6.6%
Knee other	153	3.9%	223	6.7%	378	5.2%
Hand/wrist fracture	156	4.0%	93	2.8%	249	3.4%
Shoulder other	123	3.2%	104	3.1%	227	3.1%
Shoulder strain/sprain	123	3.2%	101	3.0%	226	3.1%
Trunk strain/sprain	56	1.4%	139	4.2%	196	2.7%
Lower Leg other	21	0.5%	174	5.2%	195	2.7%

†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, 2018-19 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, 2018-19 School Year

	Competition		Practice		Overall	
	n	%	n	%	n	%
Need for surgery						
Required surgery	289	7.5%	139	4.2%	429	6.0%
Did not require surgery	3551	92.5%	3,166	95.8%	6,734	94.0%
Total	3,840		3,305		7,163	

†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, 2018-19 School Year

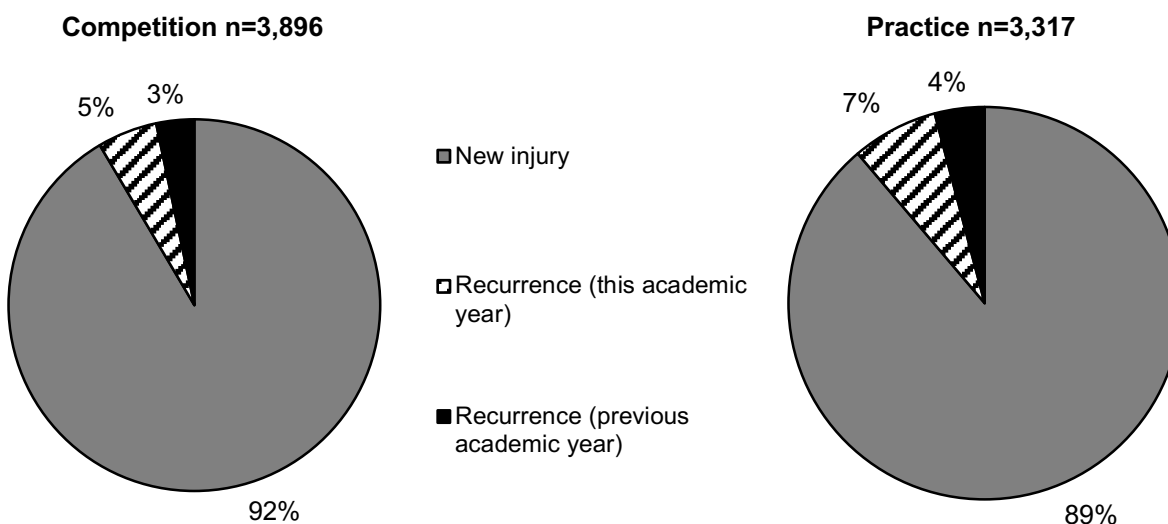


Table 2.9 Time during Season of Injury, High School Sports-Related Injury Surveillance Study, US, 2018-19 School Year

	n	%
Time in Season		
Preseason	1,408	19.5%
Regular season	5,524	76.4%
Post season	302	4.2%
Total	7,234	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, 2018-19 School Year

	n	%
Time in Practice		
First ½ hour	283	8.8%
Second ½ hour	517	16.1%
1-2 hours into practice	1,525	47.4%
> 2 hours into practice	125	3.9%
Unknown	769	23.9%
Total	3,219	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, 2018-19 School Year

	n	%
% of Injuries Evaluated by:*		
Certified athletic trainer	6,681	92.1%
General physician	1,517	20.9%
Orthopedic physician/Sports medicine	1,399	19.3%
Physician's assistant	90	1.2%
Chiropractor	61	0.8%
Neurologist	49	0.7%
Nurse practitioner	30	0.4%
Dentist/oral surgeon	12	0.2%
Other	139	1.9%
Total	7,253	
% of Injuries Assessed by:*		
Evaluation	7,128	98.2%
X-ray	2,438	33.6%
MRI	681	9.4%
CT-scan	139	1.9%
Blood work/lab test	67	0.9%
Other	45	0.6%
Total	7,253	100.0%

*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, 2018-19 School Year

	# Injuries	# Exposures	Injury rate (per 1,000 athlete- exposures)
Total	2,328	621,653	3.74
Competition	1,360	111,867	12.16
Practice	968	509,786	1.90

Table 3.2 Demographic Characteristics of Injured Football Athletes, High School Sports-Related Injury Surveillance Study, US, 2018-19 School Year*

Year in School	n=3,013
Freshman	23.1%
Sophomore	24.3%
Junior	24.7%
Senior	27.8%
Total[†]	100.0%
Age (years)	
Minimum	12
Maximum	19
Mean (St. Dev.)	15.8 (1.3)
BMI	
Minimum	16.0
Maximum	56.7
Mean (SE)	25.8 (5.4)

*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 3.1 Diagnosis of Football Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2018-19 School Year

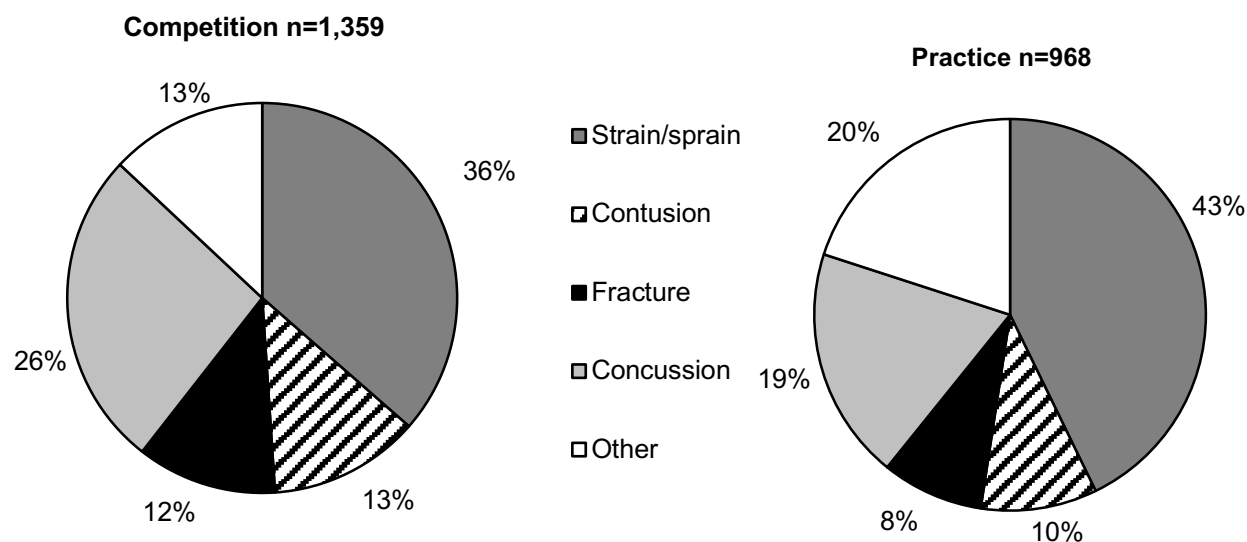


Table 3.3 Body Site of Football Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2018-19 School Year

	Competition		Practice		Overall	
	n	%	n	%	n	%
Body Site						
Head/face	375	27.6%	196	20.2%	571	24.5%
Knee	205	15.1%	131	13.5%	336	14.4%
Ankle	214	15.7%	120	12.4%	334	14.4%
Hand/wrist	120	8.8%	107	11.1%	227	9.8%
Shoulder	138	10.2%	86	8.9%	224	9.6%
Hip/thigh/upper leg	73	5.4%	99	10.2%	172	7.4%
Trunk	58	4.3%	64	6.6%	122	5.2%
Lower leg	37	2.7%	39	4.0%	76	3.3%
Arm/elbow	35	2.6%	37	3.8%	72	3.1%
Foot	32	2.4%	34	3.5%	66	2.8%
Neck	19	1.4%	17	1.8%	36	1.5%
Other	53	3.9%	38	3.9%	91	3.9%
Total	1,359	100.0%	968	100.0%	2,327	100.0%

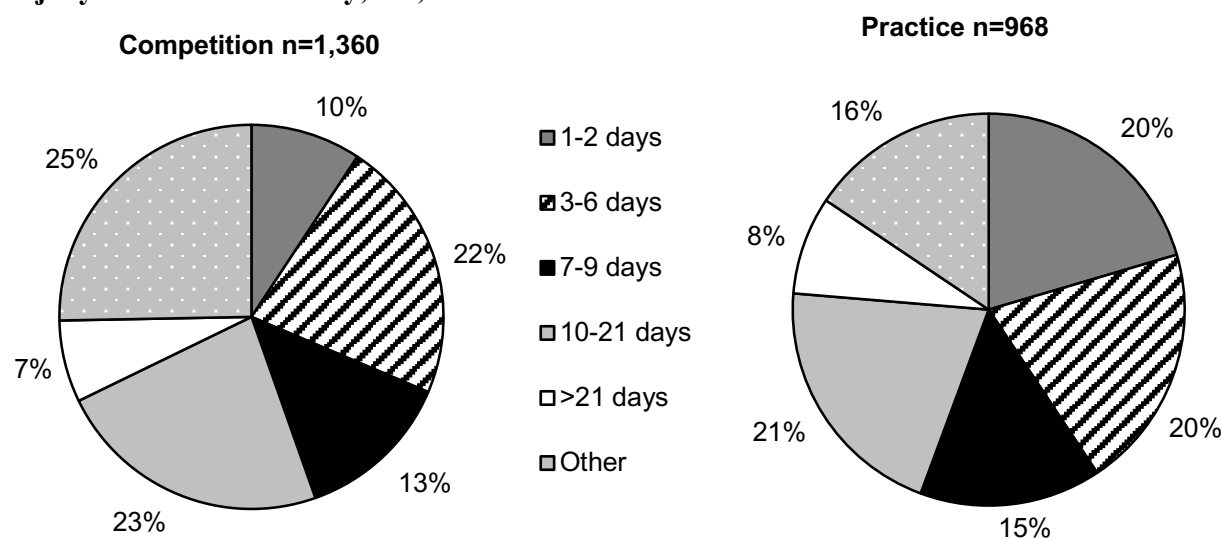
†Totals and n's are not always equal due to slight rounding or missing responses.

Table 3.4 Ten Most Common Football Injury Diagnoses by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2018-19 School Year

Diagnosis	Competition n=1,358		Practice n=968		Total n=2,326	
	n	%	n	%	n	%
Head/face concussion	360	26.5%	186	19.2%	546	23.5%
Ankle strain/sprain	184	13.5%	106	11.0%	290	12.5%
Knee strain/sprain	133	9.8%	60	6.2%	193	8.3%
Hip/thigh/upper leg strain/sprain	29	2.7%	83	8.6%	112	4.8%
Knee other	46	3.4%	53	5.5%	99	4.3%
Shoulder other	56	4.1%	42	4.3%	98	4.2%
Hand/wrist fracture	60	4.4%	37	3.8%	97	4.2%
Shoulder strain/sprain	64	4.7%	30	3.1%	94	4.0%
Hand/wrist strain/sprain	24	1.8%	49	5.1%	73	3.1%
Trunk strain/sprain	12	0.9%	41	4.2%	53	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, 2018-19 School Year



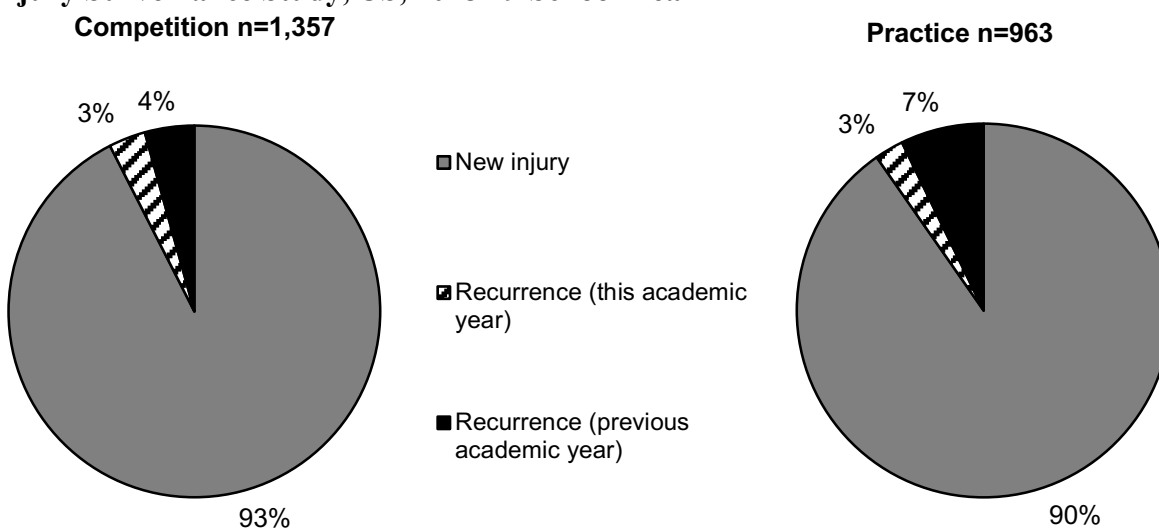
*Other category is made up of medical disqualification for season, medical disqualification for career, athlete chooses not to continue, and season ended before athlete returned to play

Table 3.5 Football Injuries Requiring Surgery by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2018-19 School Year

	Competition		Practice		Overall	
	n	%	n	%	n	%
Need for surgery						
Required surgery	107	8.0%	65	6.8%	172	7.5%
Did not require surgery	1,224	92.0%	895	93.2%	2,119	92.5%
Total	1,331	100.0%	960	100.0%	2,291	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, 2018-19 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, 2018-19 School Year

	n	%
Time in Season		
Preseason	506	21.8%
Regular season	1732	74.6%
Post season	83	3.6%
Total	2,321	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, 2018-19 School Year

	n	%
Time in Competition		
Pre-competition/warm-ups	15	1.2%
First quarter	134	10.8%
Second quarter	368	29.7%
Third quarter	393	31.7%
Fourth quarter	327	26.3%
Overtime	4	0.3%
Total	1,241	100.0%
Field Location		
Between the 20 yard lines	743	58.0%
Red zone (20 yard line to goal line)	201	15.7%
End zone	17	1.3%
Off the field	12	0.9%
Unknown	307	24.0%
Total	1,280	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, 2018-19 School Year

	n	%
Time in Practice		
First 1/2 hour	71	7.6%
Second 1/2 hour	146	15.6%
1-2 hours into practice	506	53.9%
>2 hours into practice	51	5.4%
Unknown	164	17.5%
Total	938	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, 2018-19 School Year

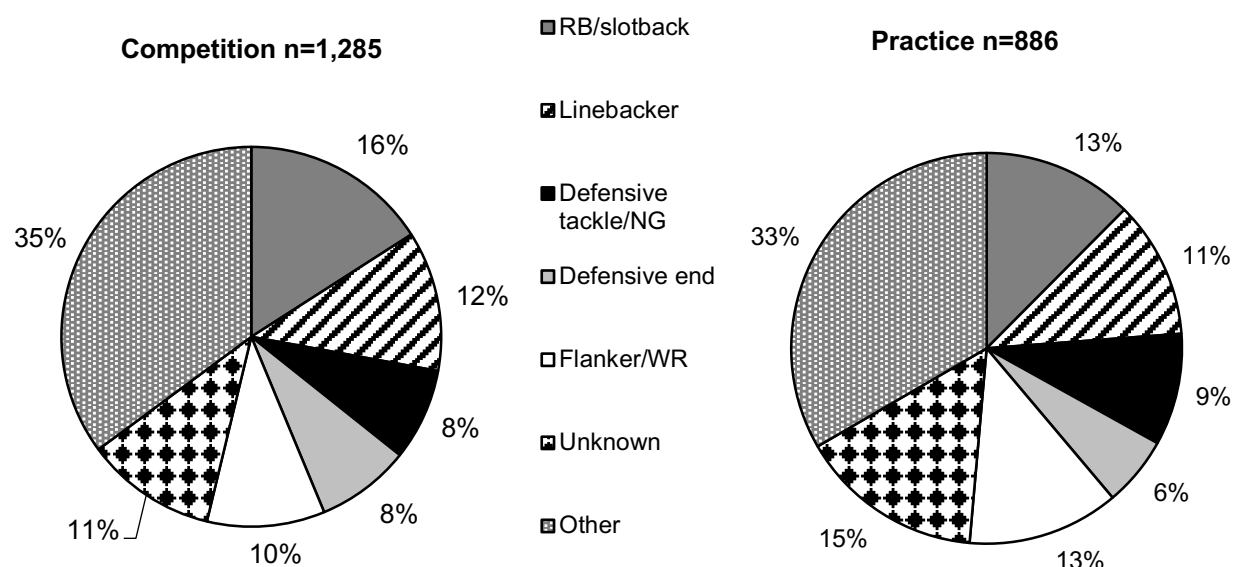


Table 3.9 Activities Leading to Football Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2018-19 School Year

	Competition		Practice		Overall	
	n	%	n	%	n	%
Activity						
Being tackled	397	30.8%	161	18.0%	558	25.5%
Tackling	310	24.0%	131	14.6%	441	20.2%
Blocking	180	14.0%	130	14.5%	310	14.2%
Being blocked	116	9.0%	77	8.6%	193	8.8%
Stepped on/fell on/kicked	59	4.6%	43	4.8%	102	4.7%
N/a (e.g., overuse, heat illness, conditioning, etc.)	17	1.3%	88	9.8%	105	4.8%
Rotation around a planted foot/inversion	43	3.3%	64	7.1%	107	4.9%
Contact with ball	6	0.5%	24	2.7%	30	1.4%
Uneven playing surface	6	0.5%	13	1.5%	19	0.9%
Contact with blocking sled/dummy	0	0.0%	8	0.9%	8	0.4%
Other	27	2.1%	66	7.4%	93	4.3%
Unknown	129	10.0%	89	9.9%	218	10.0%
Total	1,290	100.0%	896	100.0%	2,186	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, 2018-19 School Year

	Diagnosis									
	Strain/Sprain		Contusion		Fracture		Concussion		Other	
	n	%	n	%	n	%	n	%	n	%
Activity										
Being tackled	188	21.9%	102	41.0%	69	29.7%	145	28.8%	54	15.9%
Tackling	144	16.7%	39	15.7%	58	25.6%	129	25.6%	71	20.9%
Blocking	139	16.2%	22	8.8%	25	10.8%	73	14.5%	51	15.0%
Being blocked	69	8.0%	18	7.2%	14	6.0%	73	14.5%	19	5.6%
Stepped on/fell on/kicked	45	5.2%	31	12.4%	14	6.0%	4	0.8%	8	2.4%
Other	51	22.9%	9	3.6%	14	6.0%	5	1.0%	14	4.1%
Unknown	78	9.1%	23	9.2%	16	6.9%	70	13.9%	31	9.1%
Total	860	100.0%	249	100.0%	232	100.0%	504	100.0%	340	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, 2018-19 School Year

	# Injuries	# Exposures	Injury rate (per 1,000 athlete- exposures)
Total	519	278,500	1.86
Competition	335	85,490	3.92
Practice	184	193,010	0.95

Table 4.2 Demographic Characteristics of Injured Boys' Soccer Athletes, High School Sports-Related Injury Surveillance Study, US, 2018-19 School Year*

Year in School	n=495
Freshman	17.4%
Sophomore	24.8%
Junior	28.3%
Senior	29.5%
Total†	100.0%
Age (years)	
Minimum	13
Maximum	19
Mean (St. Dev.)	15.9 (1.2)
BMI	
Minimum	15.8
Maximum	33.2
Mean (St. Dev.)	22.2 (2.6)

*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, 2018-19 School Year

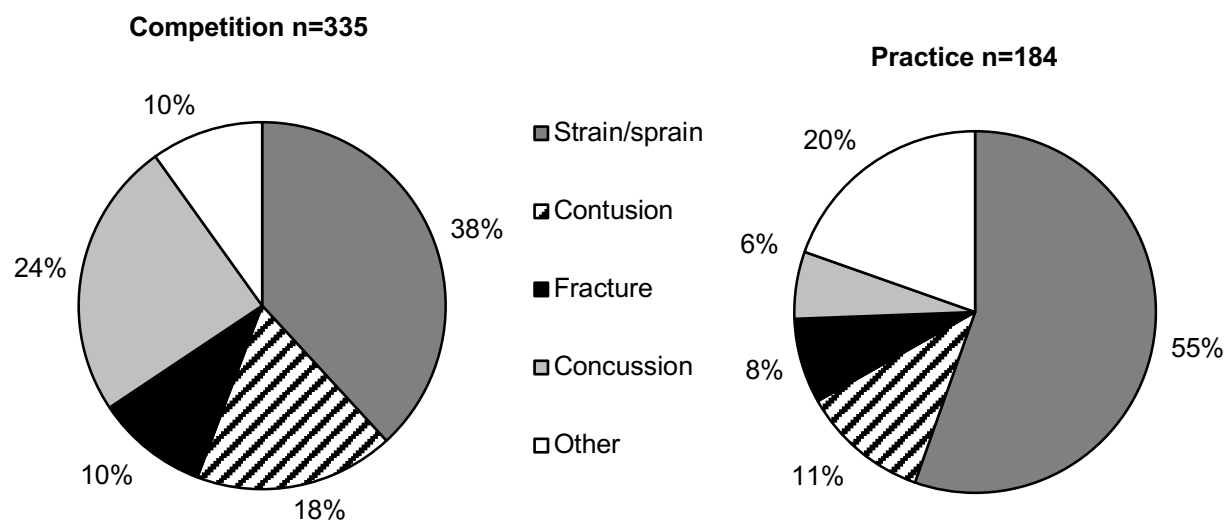


Table 4.3 Body Site of Boys' Soccer Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2018-19 School Year

	Competition		Practice		Overall	
	n	%	n	%	n	%
Body Site						
Head/face	97	29.0%	13	7.1%	110	21.2%
Hip/thigh/upper leg	41	12.2%	44	23.9%	85	16.4%
Ankle	51	15.2%	27	14.7%	78	15.0%
Knee	41	12.2%	25	13.6%	66	12.7%
Foot	25	7.5%	15	8.2%	40	7.7%
Lower leg	19	5.7%	20	10.9%	39	7.5%
Trunk	18	5.4%	18	9.8%	36	6.9%
Hand/wrist	16	4.8%	14	7.6%	30	5.8%
Shoulder	10	3.0%	1	0.5%	11	2.1%
Arm/elbow	6	1.8%	1	0.5%	7	1.3%
Neck	5	1.5%	0	0.0%	5	1.0%
Other	6	1.8%	6	3.3%	12	2.3%
Total	335	100.0%	184	100.0%	519	100.0%

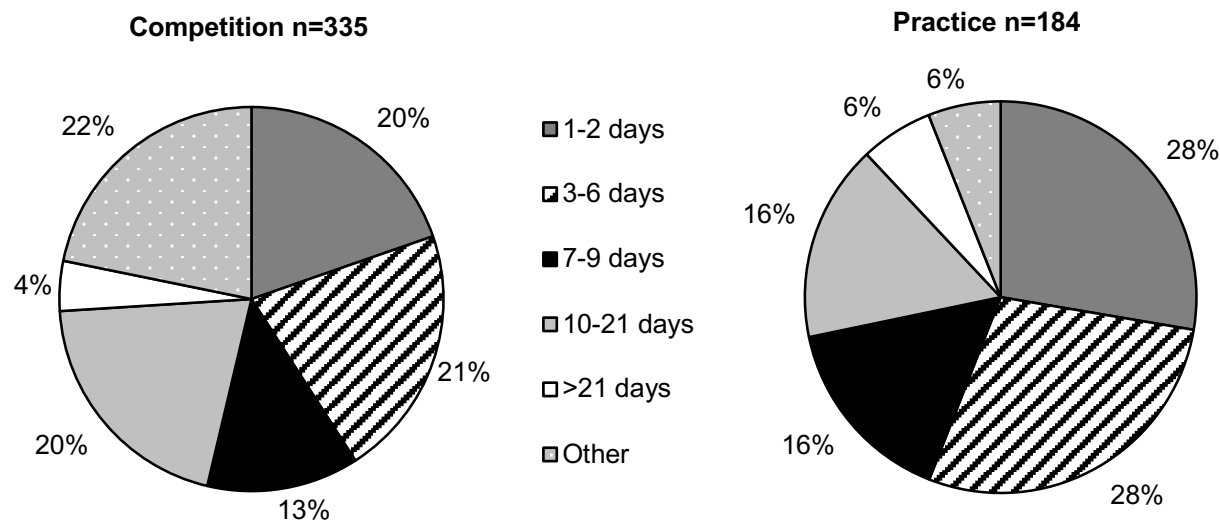
†Totals and n's are not always equal due to slight rounding or missing responses.

Table 4.4 Ten Most Common Boys' Soccer Injury Diagnoses by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2018-19 School Year

Diagnosis	Competition n=335		Practice n=184		Total n=519	
	n	%	n	%	n	%
Head/face concussion	82	24.5%	11	6.0%	93	17.9%
Hip/thigh/upper leg strain/sprain	31	9.3%	41	22.3%	72	13.9%
Ankle strain/sprain	46	13.7%	23	12.5%	69	13.3%
Knee strain/sprain	22	6.6%	9	4.9%	31	6.0%
Foot contusion	15	4.5%	7	3.8%	22	4.2%
Trunk strain/sprain	6	1.8%	15	8.2%	21	4.0%
Knee other	9	2.7%	12	6.5%	21	4.0%
Hand/wrist fracture	12	3.6%	8	4.3%	20	3.9%
Lower leg strain/sprain	6	1.8%	7	3.8%	13	2.5%
Knee contusion	8	2.4%	4	2.2%	12	2.3%

†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, 2018-19 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, 2018-19 School Year

	Competition		Practice		Overall	
	n	%	n	%	n	%
Need for surgery						
Required surgery	16	4.8%	6	3.3%	22	4.3%
Did not require surgery	315	95.2%	177	96.7%	492	95.7%
Total	331	100.0%	183	100.0%	514	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, 2018-19 School Year

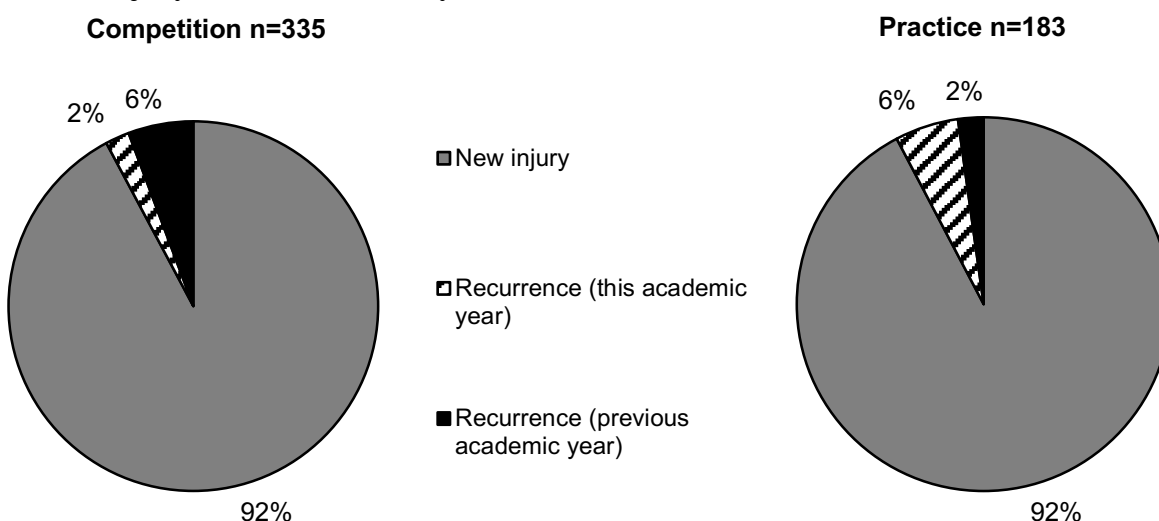


Table 4.6 Time during Season of Boys' Soccer Injuries, High School Sports-Related Injury Surveillance Study, US, 2018-19 School Year

	n	%
Time in Season		
Preseason	99	19.1%
Regular season	394	76.2%
Post season	24	4.6%
Total	517	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, 2018-19 School Year

	n	%
Time in Competition		
Pre-competition/warm-ups	6	1.9%
First half	74	23.9%
Second half	181	58.4%
Overtime	2	0.6%
Unknown	47	15.2%
Total	310	100.0%
Field Location		
Top of goal box extended to center line (offense)	56	18.1%
Goal box (defense)	43	13.9%
Top of goal box extended to center line (defense)	42	13.6%
Goal box (offense)	26	8.4%
Side of goal box (offense)	19	6.1%
Side of goal box (defense)	18	5.8%
Off the field	3	1.0%
Unknown	102	33.0%
Total	309	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, 2018-19 School Year

	n	%
Time in Practice		
First 1/2 hour	17	9.8%
Second 1/2 hour	21	12.1%
1-2 hours into practice	78	44.8%
>2 hours into practice	4	2.3%
Unknown	54	31.0%
Total	174	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, 2018-19 School Year

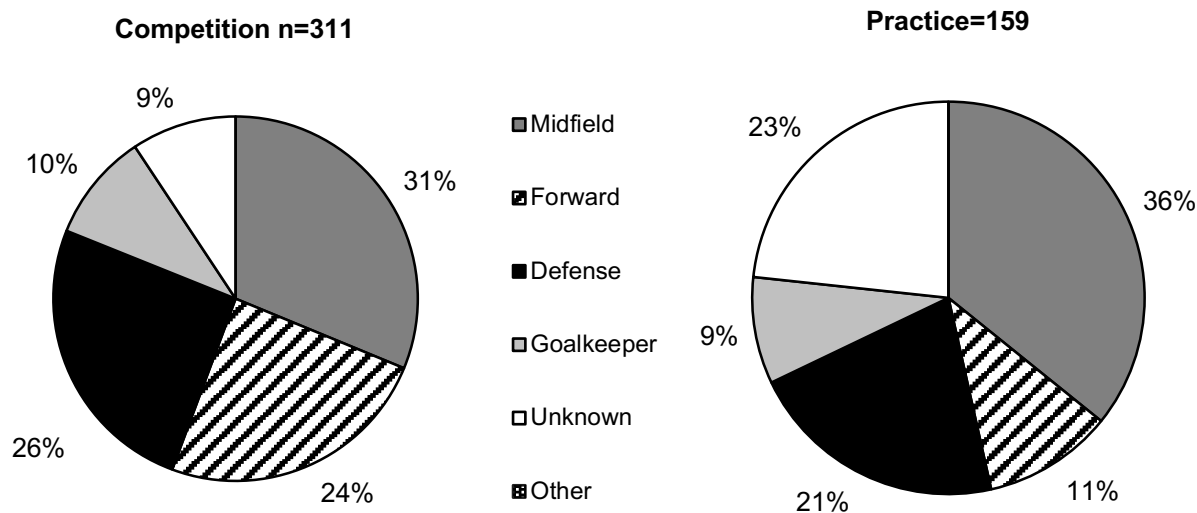


Table 4.9 Activities Leading to Boys' Soccer Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2018-19 School Year

Activity	Competition		Practice		Overall	
	n	%	n	%	n	%
General play	58	18.6%	62	39.0%	120	25.5%
Defending	52	16.7%	10	6.3%	62	13.2%
Ball handling/dribbling	40	12.8%	7	4.4%	47	10.0%
Chasing loose ball	34	10.9%	2	1.3%	36	7.6%
Heading ball	27	8.7%	6	3.8%	33	7.0%
Goaltending	23	7.4%	7	4.4%	30	6.4%
Shooting (foot)	16	5.1%	8	5.0%	24	5.1%
Conditioning	1	0.3%	15	9.4%	16	3.4%
Passing (foot)	11	3.5%	3	1.9%	14	3.0%
Receiving pass	8	2.6%	5	3.1%	13	2.8%
Blocking shot	7	2.2%	3	1.9%	10	2.1%
Receiving a slide tackle	4	1.3%	0	0.0%	4	0.8%
Attempting a slide tackle	1	0.3%	3	1.9%	4	0.8%
Other	0	0.0%	4	2.5%	4	0.8%
Unknown	30	9.6%	24	15.1%	54	11.5%
Total	312	100.0%	159	100.0%	471	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, 2018-19 School Year

	Diagnosis									
	Strain/Sprain		Contusion		Fracture		Concussion		Other	
	n	%	n	%	n	%	n	%	n	%
Activity										
General play	69	32.7%	13	17.8%	7	15.2%	11	12.8%	20	36.4%
Defending	21	10.0%	11	15.1%	6	13.0%	18	20.9%	6	10.9%
Chasing loose ball	10	4.7%	9	12.3%	6	13.0%	6	7.0%	5	9.1%
Ball handling/dribbling	28	13.3%	9	12.3%	5	10.9%	2	2.3%	3	5.5%
Goaltending	8	3.8%	6	8.2%	4	8.7%	9	10.5%	3	5.5%
Other	54	25.6%	15	20.5%	12	26.1%	29	33.7%	12	21.8%
Unknown	21	10.0%	10	13.7%	6	13.0%	11	12.8%	6	10.9%
Total	211	100.0%	73	100.0%	46	100.0%	86	100.0%	55	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, 2018-19 School Year

	# Injuries	# Exposures	Injury rate (per 1,000 athlete-exposures)
Total	591	235,653	2.51
Competition	400	73,106	5.47
Practice	191	162,547	1.18

Table 5.2 Demographic Characteristics of Injured Girls' Soccer Athletes, High School Sports-Related Injury Surveillance Study, US, 2018-19 School Year*

Year in School	n=571
Freshman	25.6%
Sophomore	26.1%
Junior	25.7%
Senior	22.6%
Total†	100.0%
Age (years)	
Minimum	13
Maximum	18
Mean (St. Dev.)	15.7 (1.2)
BMI	
Minimum	15.5
Maximum	38.4
Mean (St. Dev.)	22.2 (3.2)

*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, 2018-19 School Year

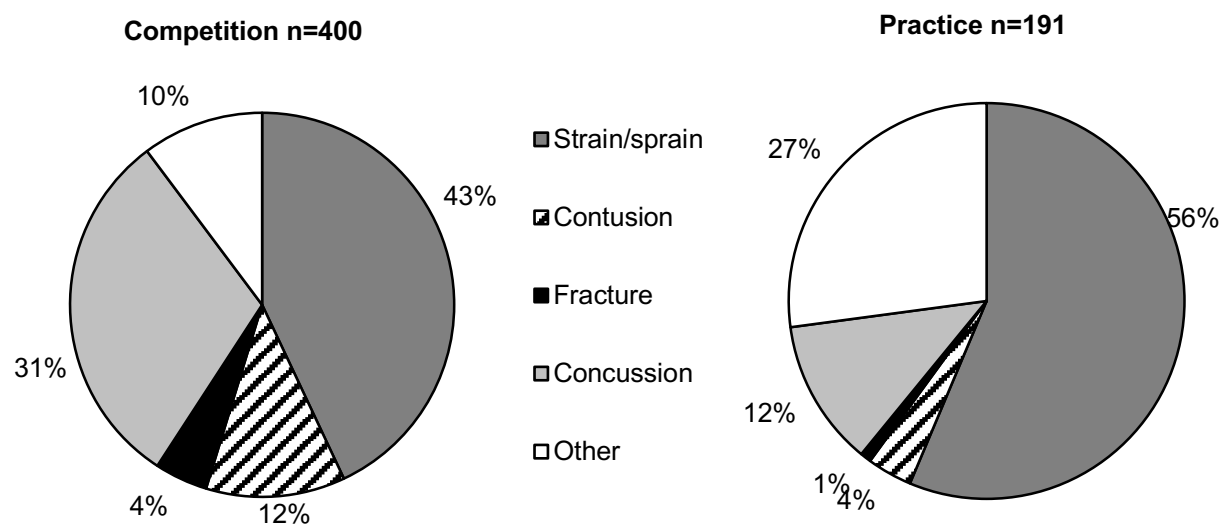


Table 5.3 Body Site of Girls' Soccer Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2018-19 School Year

	Competition		Practice		Overall	
	n	%	n	%	n	%
Body Site						
Head/face	138	34.5%	24	12.6%	162	27.4%
Ankle	97	24.3%	37	19.4%	134	22.7%
Knee	71	17.8%	38	19.9%	109	18.4%
Hip/thigh/upper leg	35	8.8%	48	25.1%	83	14.0%
Lower leg	13	3.3%	16	8.4%	29	4.9%
Foot	13	3.3%	9	4.7%	22	3.7%
Hand/wrist	6	1.5%	7	3.7%	13	2.2%
Trunk	7	1.8%	5	2.6%	12	2.0%
Arm/elbow	10	2.5%	0	0.0%	10	1.7%
Neck	6	1.5%	1	0.5%	7	1.2%
Shoulder	1	0.3%	5	2.6%	6	1.0%
Other	3	0.8%	1	0.5%	4	0.7%
Total	400	100.0%	191	100.0%	591	100.0%

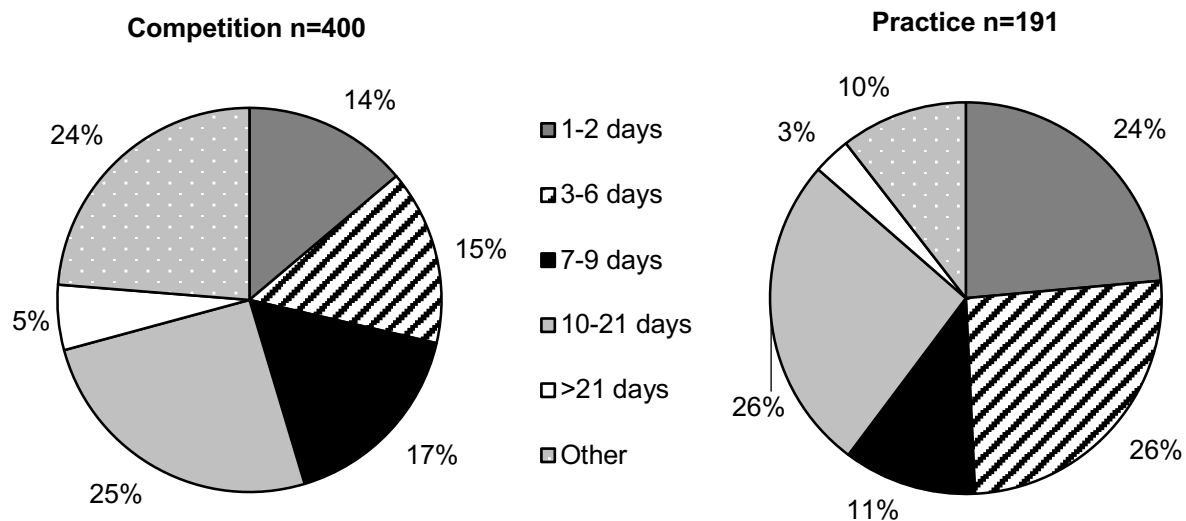
†Totals and n's are not always equal due to slight rounding or missing responses.

Table 5.4 Ten Most Common Girls' Soccer Injury Diagnoses by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2018-19 School Year

	Competition n=400		Practice n=191		Total n=591	
	n	%	n	%	n	%
Diagnosis						
Head/face concussion	121	30.3%	23	12.0%	144	24.4%
Ankle strain/sprain	89	22.3%	32	16.8%	121	20.5%
Hip/thigh/upper leg strain/sprain	28	7.0%	41	21.5%	69	11.7%
Knee strain/sprain	42	10.5%	15	7.9%	57	9.6%
Knee other	18	4.5%	22	11.5%	40	6.8%
Lower leg other	2	0.5%	10	5.2%	12	2.0%
Knee contusion	11	2.8%	1	0.5%	12	2.0%
Head/face contusion	10	2.5%	0	0.0%	10	1.7%
Lower leg strain/sprain	4	1.0%	5	2.6%	9	1.5%
Hip/thigh/upper leg other	3	0.8%	6	3.1%	9	1.5%

†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, 2018-19 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, 2018-19 School Year

	Competition		Practice		Overall	
	n	%	n	%	n	%
Need for surgery						
Required surgery	24	6.0%	5	2.6%	29	4.9%
Did not require surgery	373	94.0%	185	97.4%	558	95.1%
Total	397	100.0%	190	100.0%	587	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, 2018-19 School Year

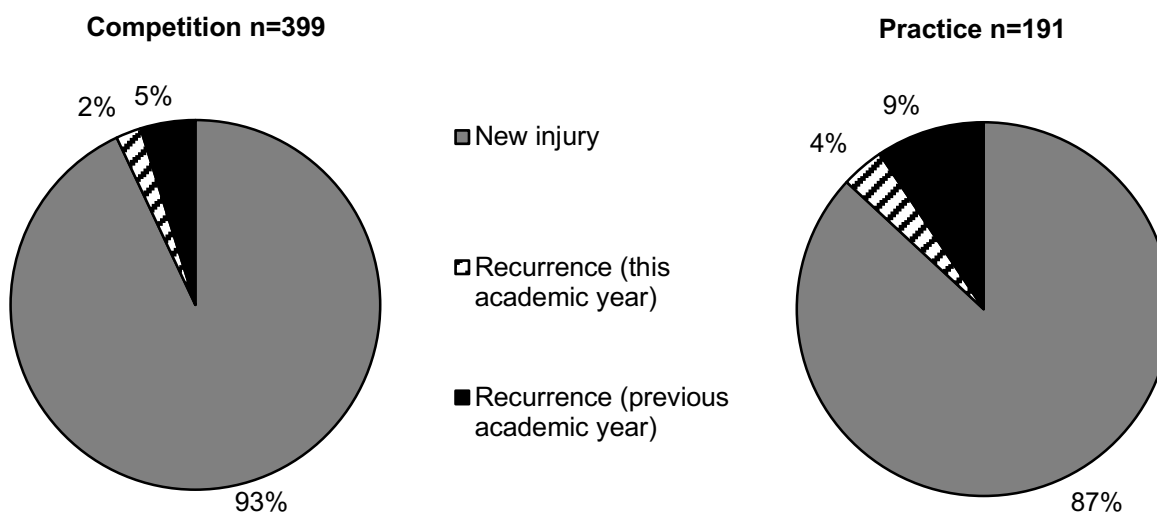


Table 5.6 Time during Season of Girls' Soccer Injuries, High School Sports-Related Injury Surveillance Study, US, 2018-19 School Year

	n	%
Time in Season		
Preseason	117	19.8%
Regular season	441	74.7%
Post season	32	5.4%
Total	590	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, 2018-19 School Year

	n	%
Time in Competition		
Pre-competition/warm-ups	10	2.8%
First half	91	25.1%
Second half	190	52.5%
Overtime	0	0.0%
Unknown	71	19.6%
Total	362	100.0%
Field Location		
Top of goal box extended to center line (offense)	63	17.4%
Top of goal box extended to center line (defense)	56	15.5%
Goal box (defense)	44	12.2%
Side of goal box (offense)	15	4.1%
Side of goal box (defense)	15	4.1%
Goal box (offense)	19	3.2%
Off the field	5	1.4%
Unknown	145	40.1%
Total	362	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, 2018-19 School Year

	n	%
Time in Practice		
First 1/2 hour	15	8.1%
Second 1/2 hour	24	13.0%
1-2 hours into practice	89	48.1%
>2 hours into practice	6	3.2%
Unknown	51	27.6%
Total	185	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, 2018-19 School Year

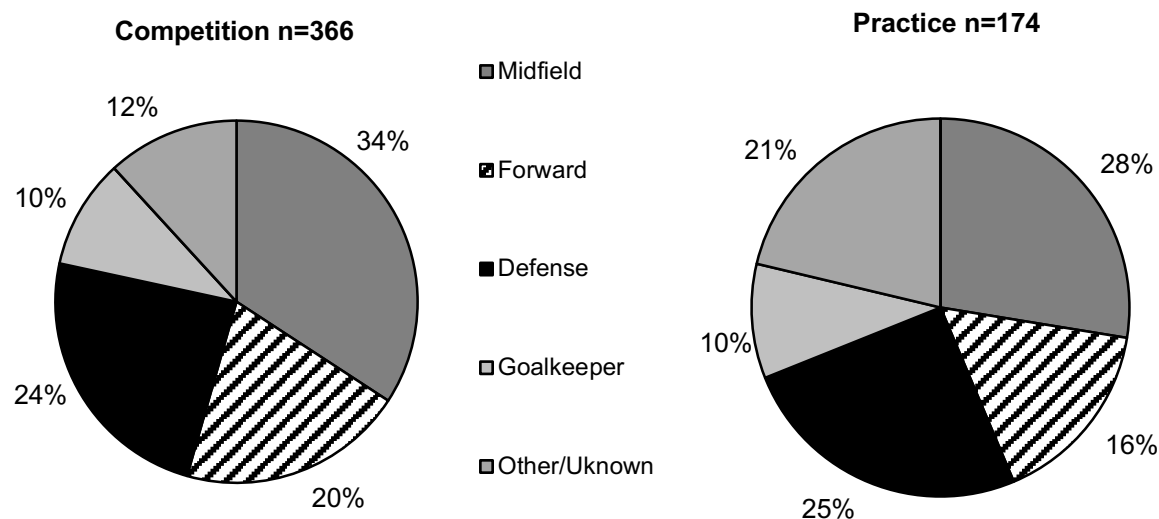


Table 5.9 Activities Leading to Girls' Soccer Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2018-19 School Year

	Competition		Practice		Overall	
	n	%	n	%	n	%
Activity						
General play	80	21.8%	55	31.3%	135	24.9%
Defending	70	19.1%	17	9.7%	87	16.0%
Ball handling/dribbling	32	8.7%	8	4.5%	40	7.4%
Chasing loose ball	24	6.5%	6	3.4%	30	5.5%
Goaltending	30	8.2%	12	6.8%	42	7.7%
Heading ball	21	5.7%	4	2.3%	25	4.6%
Shooting (foot)	8	2.2%	18	10.2%	26	4.8%
Conditioning	0	0.0%	21	11.9%	21	3.9%
Passing (foot)	16	4.4%	4	2.3%	20	3.7%
Receiving pass	17	4.6%	3	1.7%	20	3.7%
Blocking shot	5	1.4%	3	1.7%	8	1.5%
Receiving a slide tackle	3	0.8%	0	0.0%	3	0.6%
Attempting a slide tackle	4	1.1%	0	0.0%	4	0.7%
Other	8	2.2%	5	2.8%	13	2.4%
Unknown	49	13.4%	20	11.4%	69	12.7%
Total	367	100.0%	176	100.0%	543	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, 2018-19 School Year

	Diagnosis									
	Strain/Sprain		Contusion		Fracture		Concussion		Other	
	n	%	n	%	n	%	n	%	n	%
Activity										
General play	67	25.7%	6	11.5%	6	37.5%	22	16.7%	34	41.5%
Defending	35	13.4%	14	26.9%	5	31.3%	27	20.5%	6	7.3%
Ball handling/dribbling	25	9.6%	7	13.5%	0	0.0%	3	2.3%	5	6.1%
Chasing loose ball	19	7.3%	2	3.8%	0	0.0%	5	3.8%	4	4.9%
Goaltending	10	3.8%	6	11.5%	1	6.3%	20	15.2%	5	6.1%
Other	78	29.9%	7	13.5%	1	6.3%	38	28.8%	16	19.5%
Unknown	27	10.3%	10	19.2%	3	18.8%	17	12.9%	12	14.6%
Total	261	100.0%	52	100.0%	16	100.0%	132	100.0%	82	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, 2018-19 School Year

	# Injuries	# Exposures	Injury rate (per 1,000 athlete- exposures)
Total	323	252,227	1.28
Competition	127	84,717	1.50
Practice	196	167,510	1.17

Table 6.2 Demographic Characteristics of Injured Girls' Volleyball Athletes, High School Sports-Related Injury Surveillance Study, US, 2018-19 School Year*

Year in School	n=314
Freshman	29.0%
Sophomore	29.9%
Junior	22.0%
Senior	19.1%
Total†	100.0%
Age (years)	
Minimum	13
Maximum	18
Mean (St. Dev.)	15.4 (1.2)
BMI	
Minimum	16.1
Maximum	53.0
Mean (St. Dev.)	22.3 (4.3)

*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, 2018-19 School Year

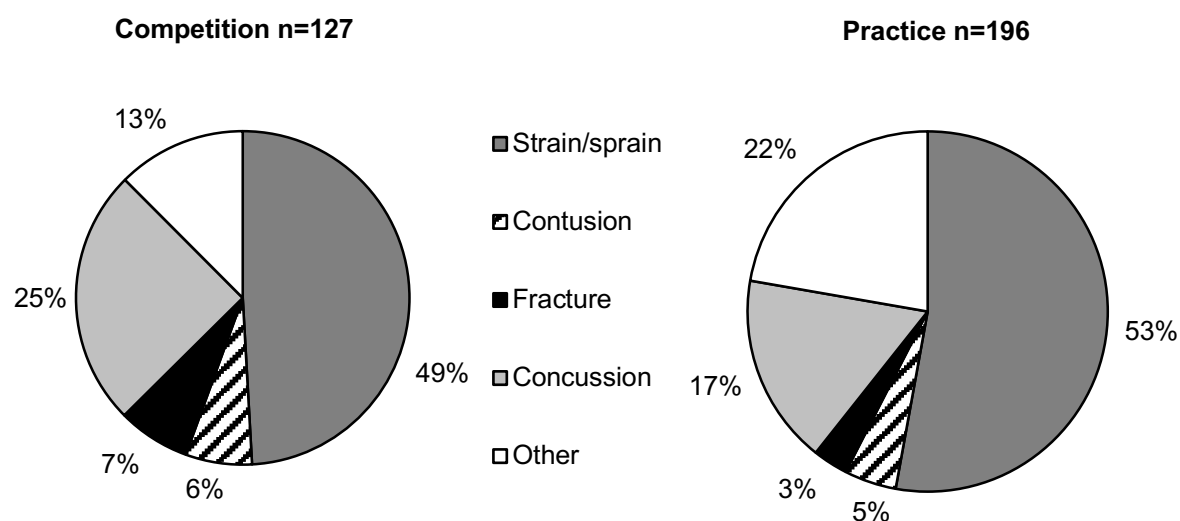


Table 6.3 Body Site of Girls' Volleyball Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2018-19 School Year

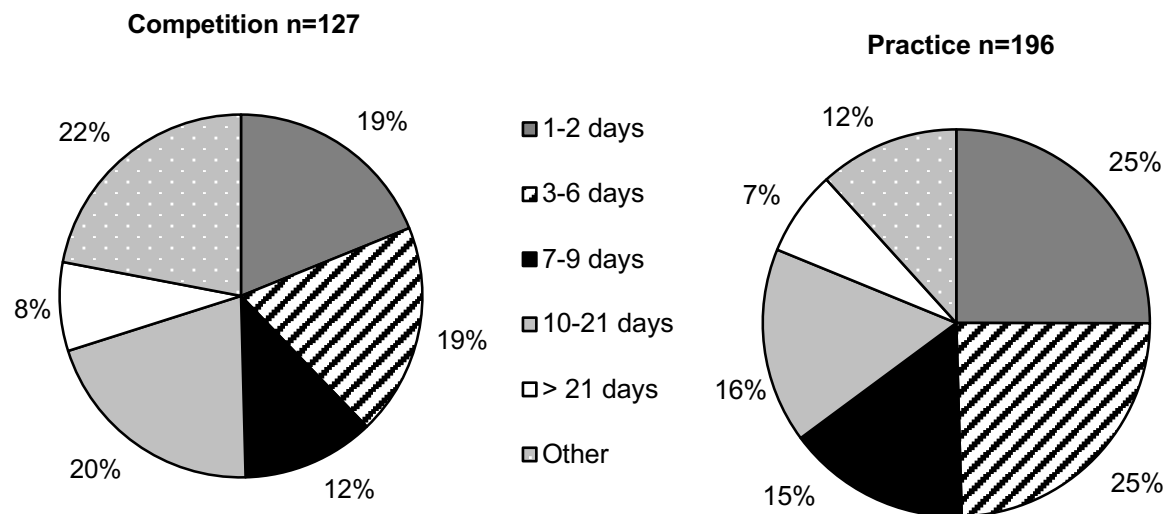
	Competition		Practice		Overall	
	n	%	n	%	n	%
Body Site						
Ankle	36	28.3%	58	29.6%	94	29.1%
Head/face	34	26.8%	35	17.9%	69	21.4%
Hand/wrist	20	15.7%	17	8.7%	37	11.5%
Knee	14	11.0%	16	8.2%	30	9.3%
Shoulder	5	3.9%	23	11.7%	28	8.7%
Trunk	7	5.5%	17	8.7%	24	7.4%
Hip/thigh/upper leg	0	0.0%	15	7.7%	15	4.6%
Foot	3	2.4%	8	4.1%	11	3.4%
Arm/elbow	6	4.7%	4	2.0%	10	3.1%
Lower leg	1	0.8%	1	0.5%	2	0.6%
Neck	1	0.8%	0	0.0%	1	0.3%
Other	0	0.0%	2	1.0%	2	0.6%
Total	127	100.0%	196	100.0%	323	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, 2018-19 School Year

Diagnosis	Competition n=127		Practice n=196		Total n=323	
	n	%	n	%	n	%
Ankle strain/sprain	55	43.3%	35	17.9%	90	27.9%
Head/face concussion	32	25.2%	33	16.8%	65	20.1%
Hand/wrist strain/sprain	10	7.9%	10	5.1%	20	6.2%
Knee other	7	5.5%	9	4.6%	16	5.0%
Trunk strain/sprain	4	3.1%	11	5.6%	15	4.6%
Shoulder other	0	0.0%	15	7.7%	15	4.6%
Shoulder strain/sprain	5	3.9%	8	4.1%	13	4.0%
Hip/thigh/upper leg strain/sprain	0	0.0%	11	5.6%	11	3.4%
Knee strain/sprain	6	4.7%	4	2.0%	10	3.1%
Hand/wrist fracture	7	5.5%	2	1.0%	9	2.9%

Figure 6.2 Time Loss of Girls' Volleyball Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2018-19 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, 2018-19 School Year

	Competition		Practice		Overall	
	n	%	n	%	n	%
Need for surgery						
Required surgery	9	7.3%	5	2.3%	14	4.4%
Did not require surgery	114	92.7%	191	97.4%	305	95.6%
Total	123	100.0%	196	100.0%	319	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, 2018-19 School Year

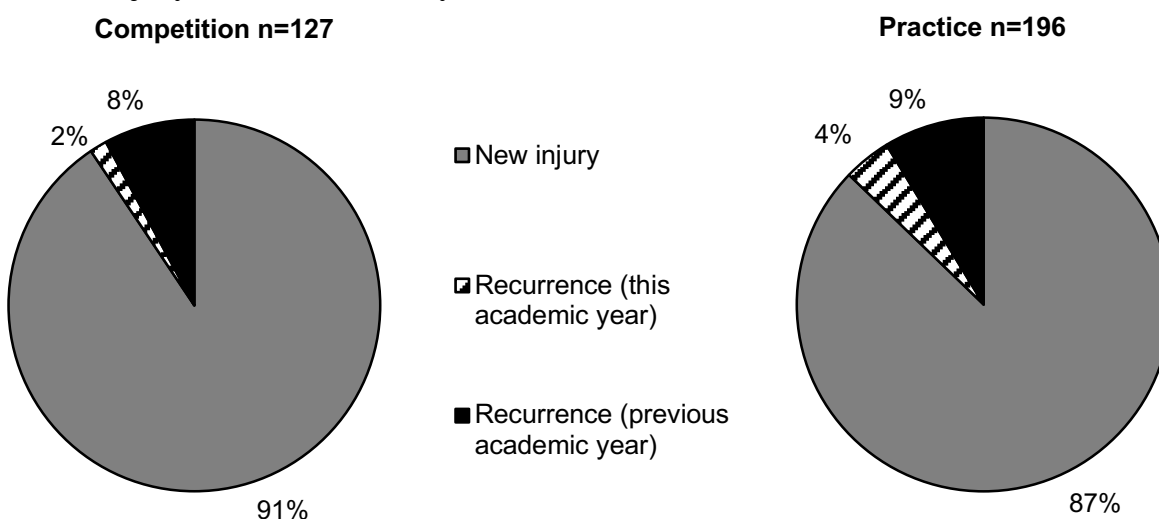


Table 6.6 Time during Season of Girls' Volleyball Injuries, High School Sports-Related Injury Surveillance Study, US, 2018-19 School Year

	n	%
Time in Season		
Preseason	69	21.4%
Regular season	239	74.2%
Post season	14	4.3%
Total	322	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, 2018-19 School Year

	n	%
Time in Competition		
Pre-competition/warm-ups	17	14.7%
First set	16	13.8%
Second set	24	20.7%
Third set	19	16.4%
Fourth set	4	3.4%
Fifth set	2	1.7%
Unknown	34	29.3%
Total	116	100.0%
Court Location		
middle forward	9	7.9%
right forward	15	13.2%
left forward	7	6.1%
at the net	7	6.1%
right back (server)	4	3.2%
left back	13	11.4%
outside the playable area	5	4.4%
outside court (opponents side)	0	0.0%
outside court (your side)	3	2.6%
Unknown	51	44.7%
Total	114	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, 2018-19 School Year

	n	%
Time in Practice		
First 1/2 hour	15	7.8%
Second 1/2 hour	40	20.8%
1-2 hours into practice	81	42.2%
>2 hours into practice	6	3.1%
Unknown	50	26.0%
Total	192	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, 2018-19 School Year

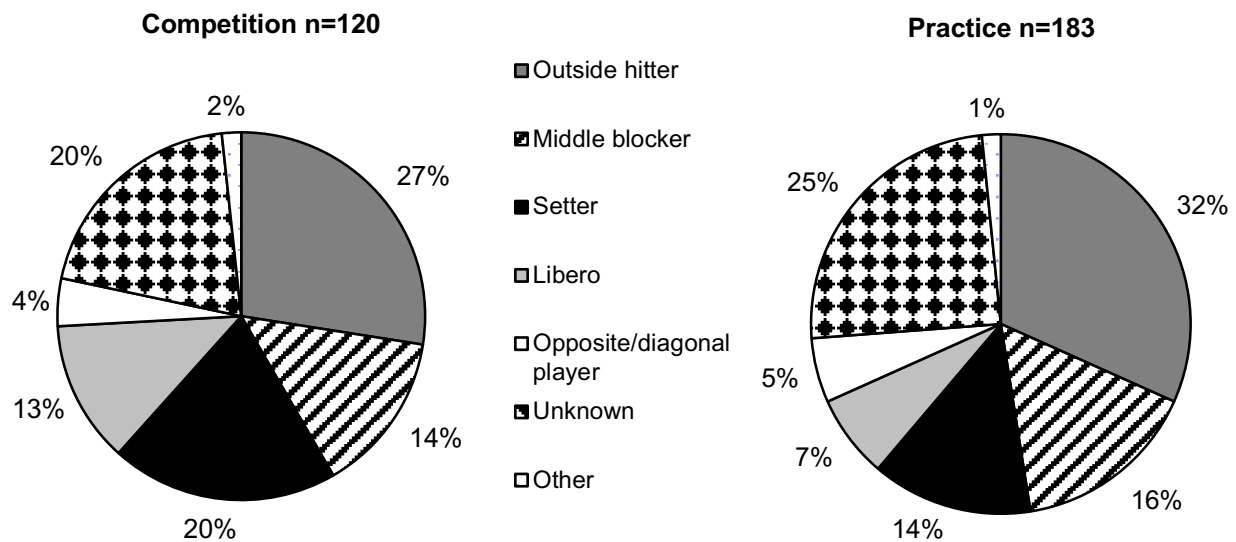


Table 6.9 Activities Leading to Girls' Volleyball Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2018-19 School Year

	Competition		Practice		Overall	
	n	%	n	%	n	%
Activity						
General play	17	14.0%	42	23.0%	59	19.4%
Blocking	22	18.2%	35	19.1%	57	18.8%
Digging	32	26.4%	22	12.0%	54	17.8%
Spiking	10	8.3%	18	9.8%	28	9.2%
Serving	5	4.1%	16	8.7%	21	6.9%
Passing	7	5.8%	11	6.0%	18	5.9%
Setting	7	5.8%	5	2.7%	12	3.9%
Conditioning	0	0.0%	11	6.0%	11	3.6%
Other	6	5.0%	6	3.3%	12	3.9%
Unknown	15	12.4%	17	9.3%	32	10.5%
Total	121	100.0%	183	100.0%	304	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, 2018-19 School Year

	Diagnosis									
	Strain/Sprain		Contusion		Fracture		Concussion		Other	
	n	%	n	%	n	%	n	%	n	%
Activity										
General play	30	19.0%	3	18.8%	1	7.1%	12	19.0%	13	24.5%
Blocking	44	27.8%	2	12.5%	1	7.1%	6	9.5%	4	7.5%
Digging	16	10.1%	6	37.5%	3	21.4%	22	34.9%	7	13.2%
Spiking	22	13.9%	0	0.0%	1	7.1%	0	0.0%	5	9.4%
Serving	9	5.7%	0	0.0%	0	0.0%	5	7.9%	7	13.2%
Passing	9	5.7%	1	6.3%	3	21.4%	5	7.9%	0	0.0%
Other	17	10.8%	1	6.3%	2	14.3%	8	12.7%	7	13.2%
Unknown	11	7.0%	3	18.8%	3	21.4%	5	7.9%	10	18.9%
Total	158	100.0%	16	100.0%	14	100.0%	63	100.0%	53	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, 2018-19 School Year

	# Injuries	# Exposures	Injury rate (per 1,000 athlete- exposures)
Total	567	312,149	1.82
Competition	316	93,688	3.37
Practice	251	218,461	1.15

Table 7.2 Demographic Characteristics of Injured Boys' Basketball Athletes, High School Sports-Related Injury Surveillance Study, US, 2018-19 School Year*

Year in School	n=548
Freshman	24.8%
Sophomore	25.2%
Junior	21.7%
Senior	28.3%
Total†	100.0%
Age (years)	
Minimum	14
Maximum	19
Mean (St. Dev.)	16.1 (1.3)
BMI	
Minimum	15.6
Maximum	37.3
Mean (St. Dev.)	23.2 (3.3)

*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, 2018-19 School Year

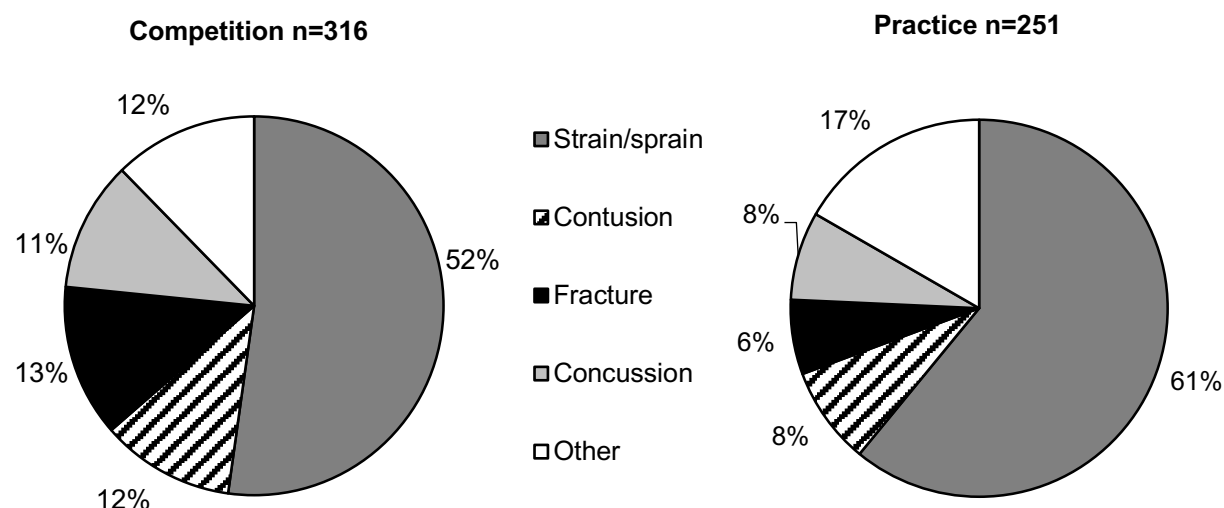


Table 7.3 Body Site of Boys' Basketball Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2018-19 School Year

	Competition		Practice		Overall	
	n	%	n	%	n	%
Body Site						
Ankle	121	38.3%	109	43.4%	230	40.6%
Head/face	68	21.5%	28	11.2%	96	16.9%
Hand/wrist	36	11.4%	22	8.8%	58	10.2%
Knee	26	8.2%	22	8.8%	48	8.5%
Hip/thigh/upper leg	18	5.7%	21	8.4%	39	6.9%
Trunk	15	4.7%	16	6.4%	31	5.5%
Lower leg	7	2.2%	13	5.2%	20	3.5%
Foot	10	3.2%	8	3.2%	18	3.2%
Shoulder	5	1.6%	5	2.0%	10	1.8%
Arm/elbow	7	2.2%	2	0.8%	9	1.6%
Neck	1	0.3%	2	0.8%	3	0.5%
Other	2	0.6%	3	1.2%	5	0.9%
Total	316	100.0%	251	100.0%	567	100.0%

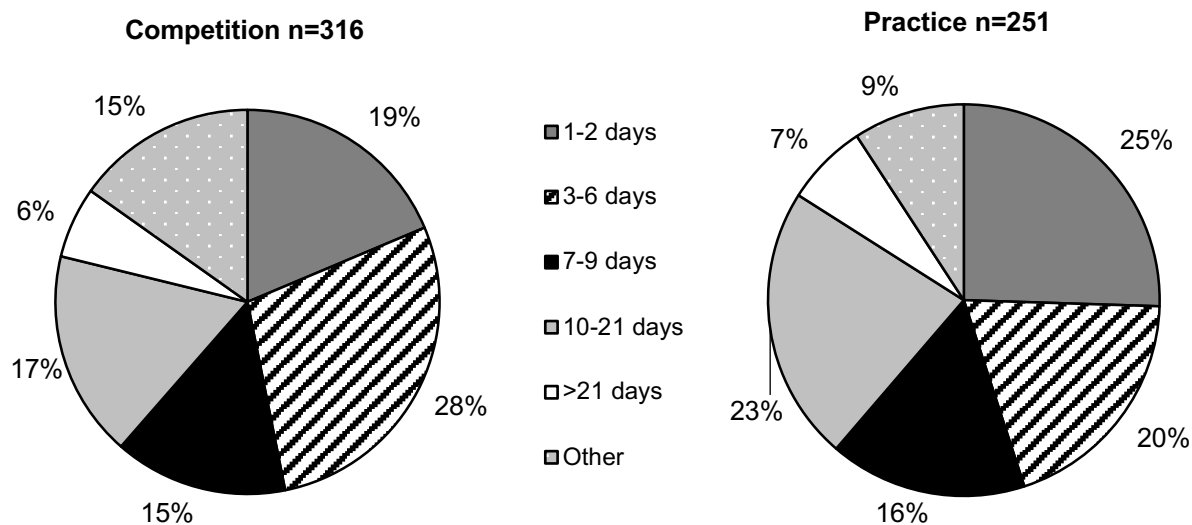
†Totals and n's are not always equal due to slight rounding or missing responses.

Table 7.4 Ten Most Common Boys' Basketball Injury Diagnoses by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2018-19 School Year

Diagnosis	Competition n=316		Practice n=251		Total n=567	
	n	%	n	%	n	%
Ankle strain/sprain	112	35.4%	103	41.0%	215	37.9%
Head/face Concussion	35	11.1%	19	7.6%	54	9.5%
Hand/wrist fracture	20	6.3%	7	2.8%	27	4.8%
Hip/thigh/upper leg strain/sprain	11	3.5%	13	5.2%	24	4.2%
Hand/wrist strain/sprain	11	3.5%	10	4.0%	21	3.7%
Head/face other	16	5.1%	4	1.6%	20	3.5%
Knee other	7	2.2%	12	4.8%	19	3.4%
Knee strain/sprain	10	3.2%	7	2.8%	17	3.0%
Trunk strain/sprain	7	2.2%	9	3.6%	16	2.8%
Head/face fracture	10	3.2%	4	1.6%	14	2.5%

†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, 2018-19 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, 2018-19 School Year

	Competition		Practice		Overall	
	n	%	n	%	n	%
Need for surgery						
Required surgery	14	4.5%	7	2.8%	21	3.8%
Did not require surgery	298	95.5%	241	97.2%	539	96.3%
Total	312	100.0%	248	100.0%	560	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, 2018-19 School Year

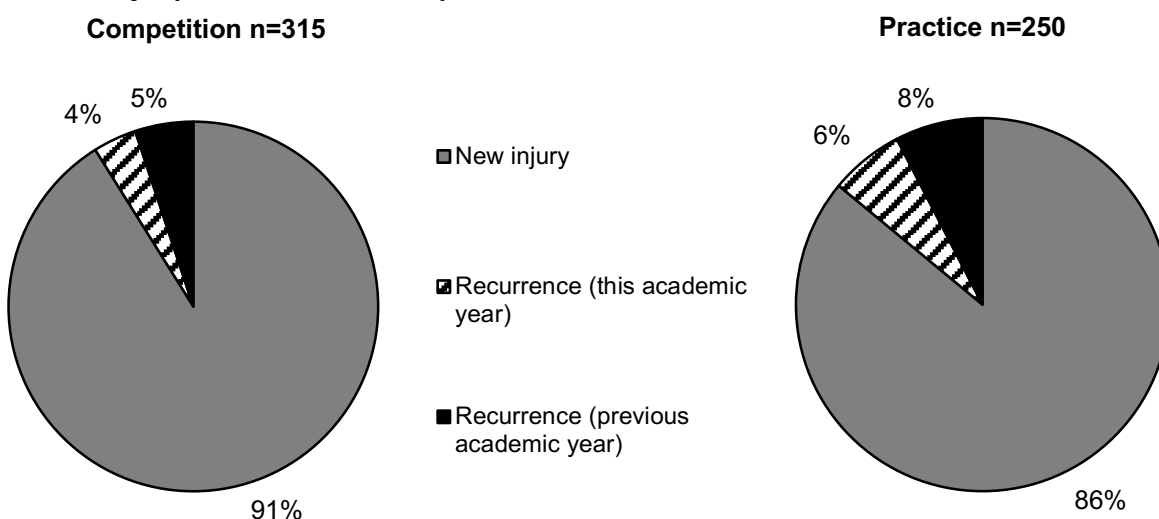


Table 7.6 Time during Season of Boys' Basketball Injuries, High School Sports-Related Injury Surveillance Study, US, 2018-19 School Year

	n	%
Time in Season		
Preseason	101	17.9%
Regular season	436	77.2%
Post season	28	5.0%
Total	565	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, 2018-19 School Year

	n	%
Time in Competition		
Pre-competition-warm-ups	8	2.7%
First quarter	25	8.5%
Second quarter	63	21.4%
Third quarter	73	24.7%
Fourth quarter	80	27.1%
Overtime	0	0.0%
Unknown	46	15.6%
Total	295	100.0%
Court Location		
Inside lane (offense)	63	21.3%
Inside lane (defense)	62	20.9%
Between 3 pt arc and lane (defense)	23	7.8%
Between 3 pt arc and lane (offense)	22	7.4%
Outside 3 point arc - offense	19	6.4%
Out of bounds	8	2.7%
Backcourt	7	2.4%
Outside 3 point arc - defense	6	2.0%
Off the court	1	0.3%
Unknown	85	28.7%
Total	296	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, 2018-19 School Year

	n	%
Time in Practice		
First 1/2 hour	27	10.9%
Second 1/2 hour	36	14.5%
1-2 hours into practice	141	56.9%
>2 hours into practice	9	3.6%
Unknown	35	14.1%
Total	248	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, 2018-19 School Year

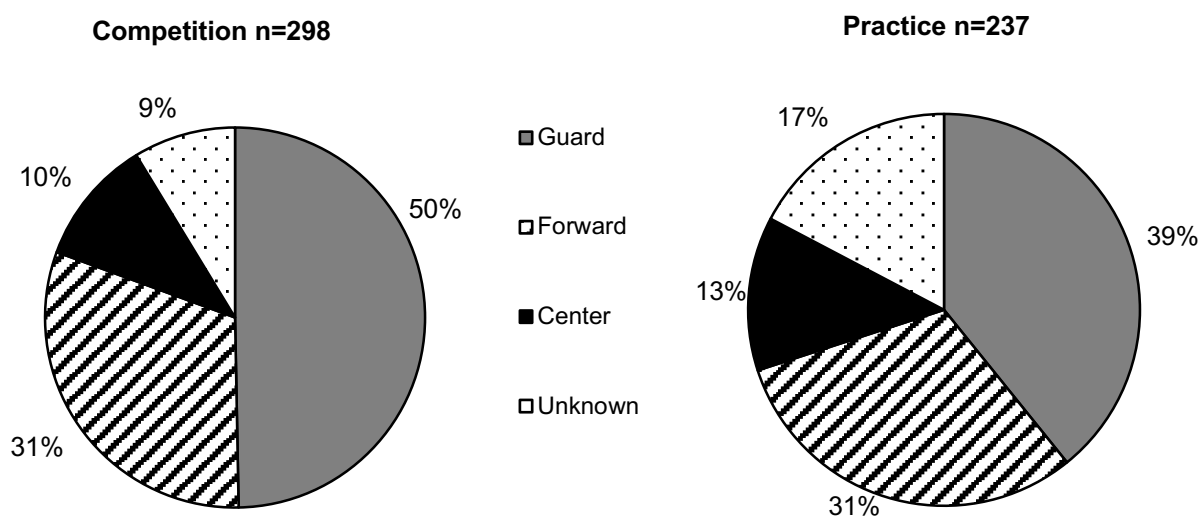


Table 7.9 Activities Leading to Boys' Basketball Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2018-19 School Year

	Competition		Practice		Overall	
	n	%	n	%	n	%
Activity						
Rebounding	71	23.7%	49	20.5%	120	22.3%
General play	27	9.0%	61	25.5%	88	16.4%
Defending	49	16.4%	27	11.3%	76	14.1%
Shooting	39	13.0%	25	10.5%	64	11.9%
Chasing loose ball	37	12.4%	8	3.3%	45	8.4%
Ball Handling/dribbling	23	7.7%	11	4.6%	34	6.3%
Receiving pass	7	2.3%	8	3.3%	15	2.8%
Conditioning	0	0.0%	11	4.6%	11	2.0%
Passing	7	2.3%	1	0.4%	8	1.5%
Screening	1	0.3%	0	0.0%	1	0.2%
Other	4	1.3%	2	0.8%	6	1.1%
Unknown	34	11.4%	36	15.1%	70	13.0%
Total	299	100.0%	239	100.0%	538	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, 2018-19 School Year

Activity	Diagnosis									
	Strain/Sprain		Contusion		Fracture		Concussion		Other	
	n	%	n	%	n	%	n	%	n	%
Rebounding	85	28.3%	9	15.8%	10	18.5%	8	15.7%	8	10.5%
General play	43	14.3%	7	12.3%	5	9.3%	6	11.8%	27	35.5%
Defending	35	11.7%	11	19.3%	12	22.2%	8	15.7%	10	13.2%
Shooting	35	11.7%	7	12.3%	15	27.8%	2	3.9%	5	6.6%
Chasing loose ball	13	4.3%	13	22.8%	3	5.6%	11	21.6%	5	6.6%
Ball handling/dribbling	25	8.3%	2	3.5%	1	1.9%	4	7.8%	2	2.6%
Receiving pass	11	3.7%	1	1.8%	1	1.9%	0	0.0%	2	2.6%
Conditioning	9	3.0%	0	0.0%	0	2.2%	0	0.0%	2	2.6%
Passing	6	2.0%	0	0.0%	1	1.9%	0	0.0%	1	1.3%
Screening	0	0.0%	0	0.0%	0	0.0%	0	1.9%	1	1.3%
Other	0	0.0%	2	3.5%	0	0.0%	3	5.9%	1	1.3%
Unknown	38	12.7%	5	8.8%	6	11.1%	9	17.6%	12	15.8%
Total	300	100.0%	57	100.0%	54	100.0%	51	100.0%	76	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, 2018-19 School Year

	# Injuries	# Exposures	Injury rate (per 1,000 athlete- exposures)
Total	442	230,514	1.92
Competition	255	69,942	3.65
Practice	187	160,572	1.16

Table 8.2 Demographic Characteristics of Injured Girls' Basketball Athletes, High School Sports-Related Injury Surveillance Study, US, 2018-19 School Year*

Year in School	n=429
Freshman	28.9%
Sophomore	22.8%
Junior	24.9%
Senior	23.3%
Total†	100.0%
Age (years)	
Minimum	12
Maximum	18
Mean (St. Dev.)	15.7 (1.3)
BMI	
Minimum	17.0
Maximum	37.4
Mean (St. Dev.)	22.3 (3.2)

*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, 2018-19 School Year

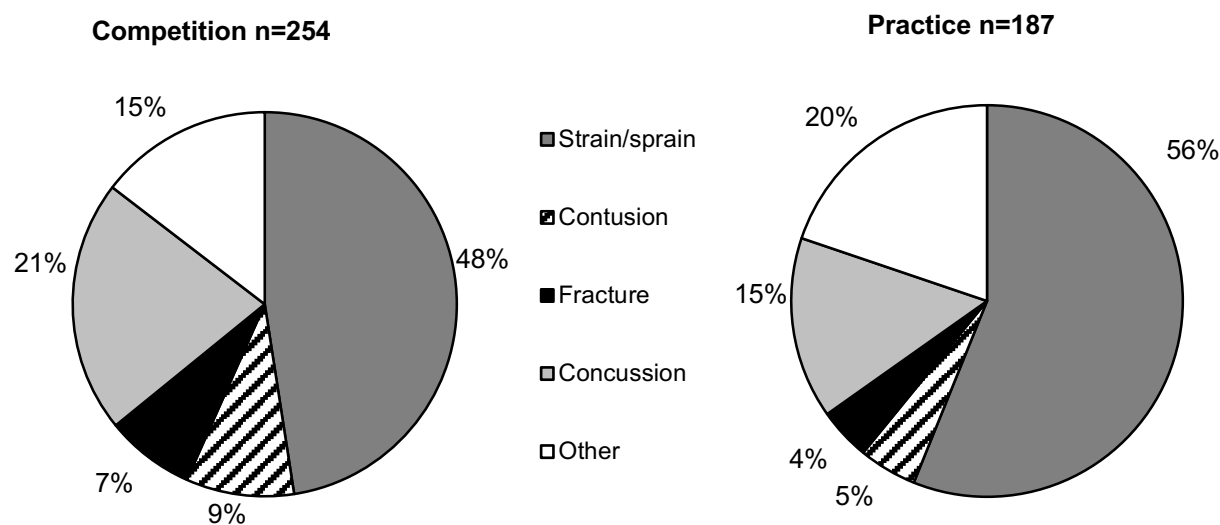


Table 8.3 Body Site of Girls' Basketball Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2018-19 School Year

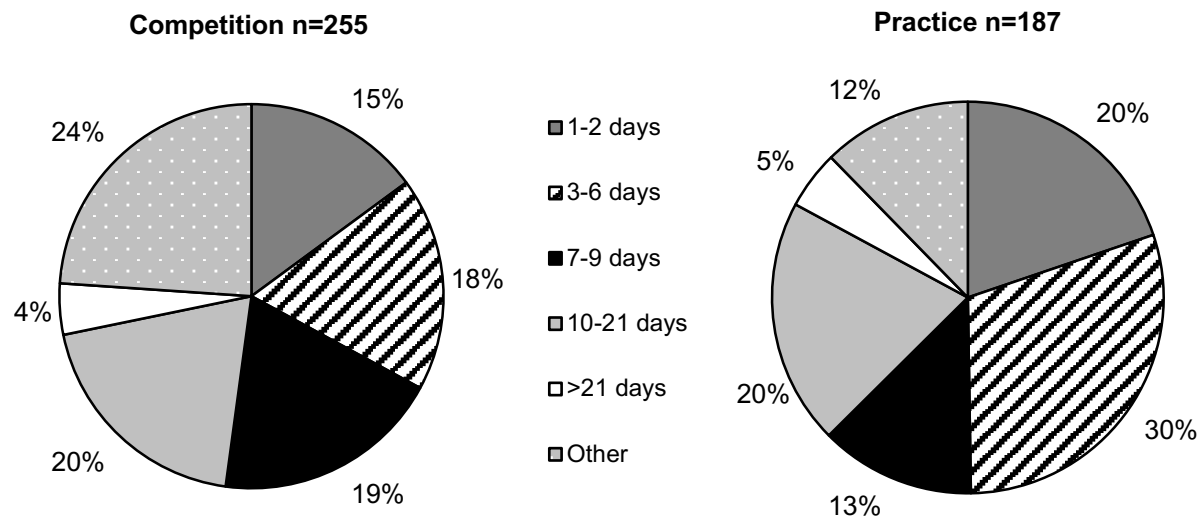
	Competition		Practice		Overall	
	n	%	n	%	n	%
Body Site						
Ankle	70	27.5%	66	35.3%	136	30.8%
Head/face	70	27.5%	33	17.6%	103	23.3%
Knee	43	16.9%	24	12.8%	67	15.2%
Hand/wrist	14	5.5%	14	7.5%	28	6.3%
Hip/thigh/upper leg	15	5.9%	12	6.4%	27	6.1%
Trunk	11	4.3%	11	5.9%	22	5.0%
Foot	6	2.4%	12	6.4%	18	4.1%
Shoulder	9	3.5%	3	1.6%	12	2.7%
Lower leg	4	1.6%	7	3.7%	11	2.5%
Arm/elbow	7	2.7%	2	1.1%	9	2.0%
Neck	3	1.2%	0	0.0%	3	0.7%
Other	3	1.2%	3	1.6%	6	1.4%
Total	255	100.0%	187	100.0%	442	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, 2018-19 School Year

Diagnosis	Competition n=255		Practice n=187		Total n=442	
	N	%	n	%	n	%
Ankle strain/sprain	66	25.9%	62	33.2%	128	29.0%
Head/face concussion	54	21.2%	28	15.0%	82	18.6%
Knee strain/sprain	27	10.6%	12	6.4%	39	8.8%
Knee other	12	4.7%	12	6.4%	24	5.4%
Hip/thigh/upper leg strain/sprain	10	3.9%	11	5.9%	21	4.8%
Hand/wrist fracture	8	3.1%	5	2.7%	13	2.9%
Hand/wrist strain/sprain	4	1.6%	7	3.7%	11	2.5%
Foot strain/sprain	3	1.2%	6	3.2%	9	2.0%
Head/face contusion	5	2.0%	4	2.1%	9	2.0%
Shoulder other	6	2.4%	3	1.6%	9	2.0%

Figure 8.2 Time Loss of Girls' Basketball Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2018-19 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, 2018-19 School Year

	Competition		Practice		Overall	
	n	%	n	%	N	%
Need for surgery						
Required surgery	27	10.7%	12	6.6%	39	8.9%
Did not require surgery	226	89.3%	171	93.4%	397	91.1%
Total	253	100.0%	183	100.0%	436	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, 2018-19 School Year

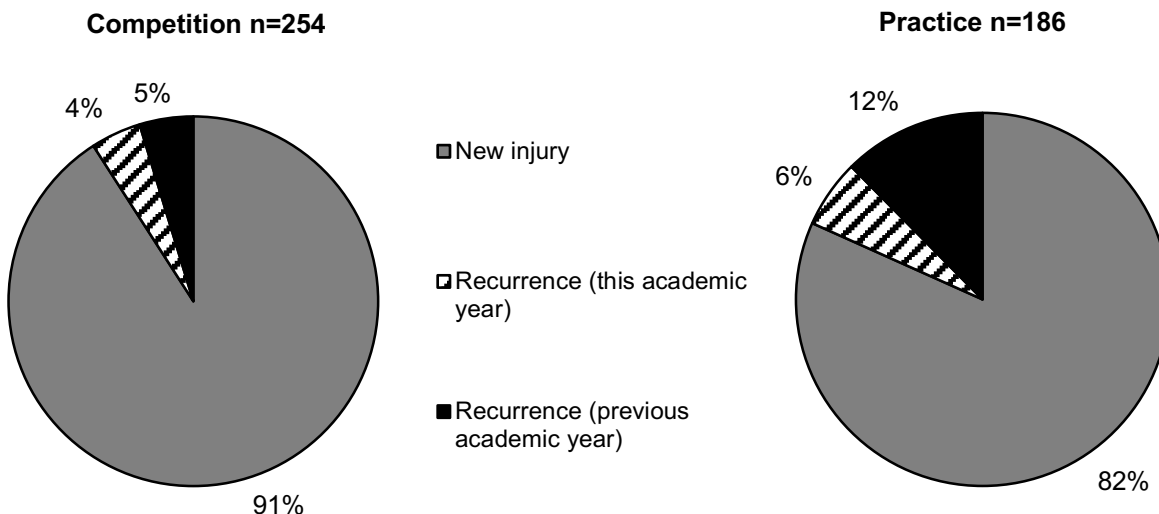


Table 8.6 Time during Season of Girls' Basketball Injuries, High School Sports-Related Injury Surveillance Study, US, 2018-19 School Year

	n	%
Time in Season		
Preseason	88	19.9%
Regular season	335	75.8%
Post season	19	4.3%
Total	442	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, 2018-19 School Year

	n	%
Time in Competition		
Pre-competition/Warm-ups	6	2.5%
First quarter	25	10.3%
Second quarter	53	21.8%
Third quarter	67	27.6%
Fourth quarter	48	19.8%
Overtime	2	0.8%
Unknown	42	17.3%
Total	243	100.0%
Court Location		
Inside lane (defense)	45	18.6%
Inside lane (offense)	30	12.4%
Between 3 pt arc and lane (defense)	22	9.1%
Between 3 pt arc and lane (offense)	18	7.4%
Outside 3 point arc - defense	14	5.8%
Outside 3 point arc - offense	14	5.8%
Backcourt	8	3.3%
Off the court	4	1.7%
Out of bounds	2	0.8%
Unknown	85	35.1%
Total	242	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, 2018-19 School Year

	n	%
Time in Practice		
First 1/2 hour	10	5.4%
Second 1/2 hour	28	15.2%
1-2 hours into practice	94	51.1%
>2 hours into practice	9	4.9%
Unknown	43	23.4%
Total	184	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, 2018-19 School Year

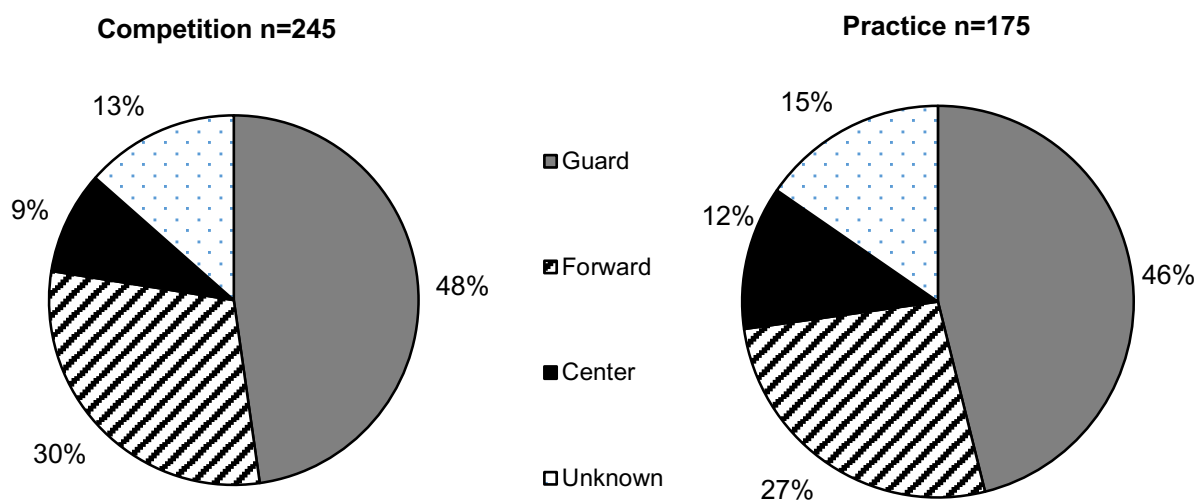


Table 8.9 Activities Leading to Girls' Basketball Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2018-19 School Year

	Competition		Practice		Overall	
	n	%	n	%	n	%
Activity						
General play	49	19.7%	40	23.3%	89	21.1%
Rebounding	41	16.5%	23	13.4%	64	15.2%
Defending	51	20.5%	15	8.7%	66	15.7%
Chasing loose ball	29	11.6%	13	7.6%	42	10.0%
Shooting	12	4.8%	7	4.1%	19	4.5%
Ball handling/dribbling	21	8.4%	9	5.2%	30	7.1%
Receiving pass	4	1.6%	12	7.0%	16	3.8%
Conditioning	1	0.4%	15	8.7%	16	3.8%
Passing	3	1.2%	4	2.3%	7	1.3%
Other	7	2.8%	7	4.1%	14	3.3%
Unknown	31	12.4%	27	15.7%	58	13.8%
Total	249	100.0%	172	100.0%	421	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, 2018-19 School Year

Activity	Diagnosis									
	Strain/Sprain		Contusion		Fracture		Concussion		Other	
	n	%	n	%	n	%	n	%	n	%
General play	47	21.8%	3	9.4%	4	15.4%	12	15.8%	22	31.4%
Rebounding	35	16.2%	9	28.1%	1	3.8%	15	19.7%	4	5.7%
Defending	30	13.9%	6	18.8%	4	15.4%	18	23.7%	8	11.4%
Chasing loose ball	16	7.4%	4	12.5%	5	19.2%	11	14.5%	6	8.6%
Shooting	11	5.1%	1	3.1%	3	11.5%	0	0.0%	4	5.7%
Ball handling/dribbling	18	8.3%	3	9.4%	2	7.7%	3	3.9%	4	5.7%
Receiving pass	6	2.8%	1	3.1%	3	11.5%	2	2.6%	4	5.7%
Conditioning	14	6.5%	0	0.0%	0	0.0%	1	1.3%	1	1.4%
Passing	5	2.3%	0	0.0%	1	3.8%	0	0.0%	1	1.4%
Other	4	1.9%	0	0.0%	0	0.0%	2	2.6%	8	11.4%
Unknown	30	13.9%	5	15.6%	3	11.5%	12	15.8%	8	11.4%
Total	216	100.0%	32	100.0%	26	100.0%	76	100.0%	70	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, 2018-19 School Year

	# Injuries	# Exposures	Injury rate (per 1,000 athlete- exposures)
Total	528	213,076	2.48
Competition	239	55,326	4.32
Practice	289	157,750	1.83

Table 9.2 Demographic Characteristics of Injured Wrestlers, High School Sports-Related Injury Surveillance Study, US, 2018-19 School Year*

Year in School	n=507
Freshman	24.7%
Sophomore	24.5%
Junior	27.2%
Senior	23.7%
Total†	100.0%
Age (years)	
Minimum	13
Maximum	19
Mean (St. Dev.)	15.9 (1.3)
BMI	
Minimum	16.6
Maximum	46.5
Mean (St. Dev.)	23.9 (4.9)

*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 9.1 Diagnosis of Wrestling Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2018-19 School Year

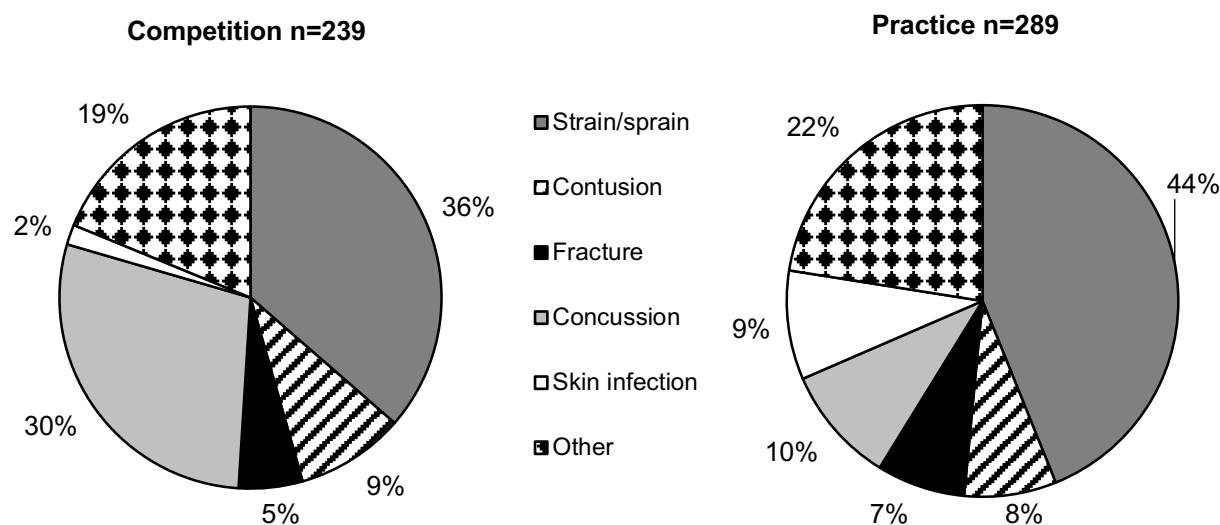


Table 9.3 Body Site of Wrestling Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2018-19 School Year

	Competition		Practice		Overall	
	n	%	n	%	n	%
Body Site						
Head/face	76	31.8%	45	15.6%	121	22.9%
Knee	37	15.5%	54	18.7%	91	17.2%
Shoulder	38	15.9%	43	14.9%	81	15.3%
Arm/elbow	20	8.4%	31	10.7%	51	9.7%
Trunk	12	5.0%	37	12.8%	49	9.3%
Ankle	17	7.1%	19	6.6%	36	6.8%
Hand/wrist	12	5.0%	23	8.0%	35	6.6%
Hip/thigh/upper leg	8	3.3%	8	2.8%	16	3.0%
Neck	8	3.3%	7	2.4%	15	2.8%
Foot	1	0.4%	13	4.5%	14	2.7%
Lower leg	4	1.7%	4	1.4%	8	1.5%
Other	6	2.5%	5	1.7%	11	2.1%
Total	239	100.0%	289	100.0%	528	100.0%

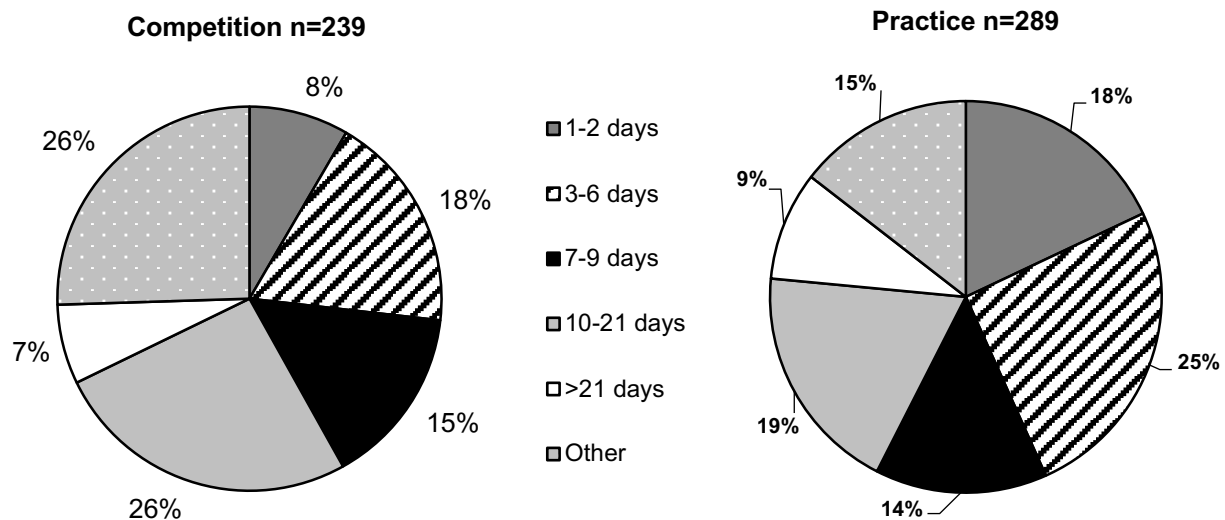
†Totals and n's are not always equal due to slight rounding or missing responses.

Table 9.4 Ten Most Common Wrestling Injury Diagnoses by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2018-19 School Year

	Competition n=239		Practice n=289		Total n=528	
	n	%	n	%	n	%
Diagnosis						
Head/face concussion	68	28.5%	28	9.7%	96	18.2%
Shoulder strain/sprain	19	7.9%	30	10.4%	49	9.3%
Knee other	15	6.3%	23	8.0%	38	7.2%
Knee strain/sprain	14	5.9%	22	7.6%	36	6.8%
Ankle strain/sprain	16	6.7%	18	6.2%	34	6.4%
Shoulder other	17	7.1%	10	3.5%	27	5.1%
Trunk strain/sprain	4	1.7%	15	5.2%	19	3.6%
Arm/elbow strain/sprain	10	4.2%	9	3.1%	19	3.6%
Knee contusion	8	3.3%	9	3.1%	17	3.2%
Arm/elbow other	7	2.9%	8	2.8%	15	2.8%
Hand/wrist strain/sprain	8	3.3%	7	2.4%	15	2.8%

†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, 2018-19 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, 2018-19 School Year

	Competition		Practice		Overall	
	n	%	n	%	n	%
Need for surgery						
Required surgery	20	8.4%	12	4.2%	32	6.1%
Did not require surgery	216	91.5%	275	95.8%	491	93.9%
Total	236	100.0%	287	100.0%	523	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, 2018-19 School Year

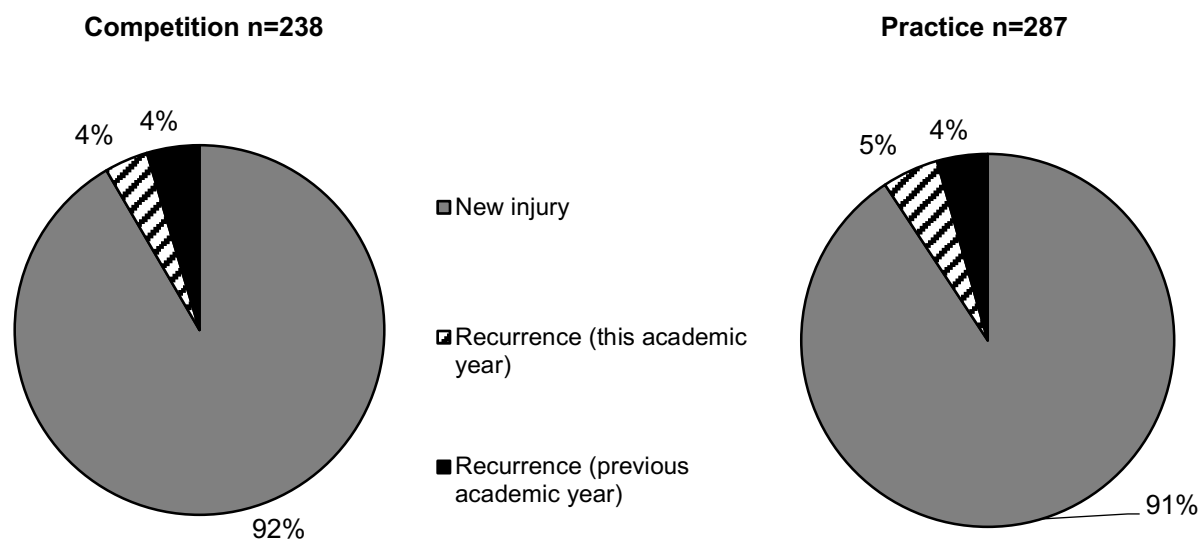


Table 9.6 Time during Season of Wrestling Injuries, High School Sports-Related Injury Surveillance Study, US, 2018-19 School Year

	n	%
Time in Season		
Preseason	89	16.9%
Regular season	400	75.8%
Post season	39	7.4%
Total	528	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, 2018-19 School Year

	n	%
Time in Competition		
Pre-competition/warm-ups	2	0.9%
First period	27	12.4%
Second period	57	26.3%
Third period	45	20.7%
Overtime	1	0.5%
Unknown	85	39.2%
Total	217	100.0%
Mat Location*		
Within 28 ft. circle	298	63.4%
Out of bounds	15	3.2%
Off the mat	10	2.1%
Unknown	147	31.3%
Total	470	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, 2018-19 School Year

	n	%
Time in Practice		
First 1/2 hour	27	9.8%
Second 1/2 hour	50	18.2%
1-2 hours into practice	126	45.8%
>2 hours into practice	8	2.9%
Unknown	64	23.3%
Total	275	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, 2018-19 School Year

	Competition		Practice		Overall	
	n	%	n	%	n	%
Activity						
Takedown	105	48.4%	85	33.3%	190	40.3%
Sparring	17	7.8%	52	20.4%	69	14.6%
Conditioning	0	0.0%	19	7.5%	19	4.0%
N/a (e.g., skin infection, overuse, heat illness, etc.)	2	0.9%	23	9.0%	25	5.3%
Fall	11	5.1%	6	2.4%	17	3.6%
Reversal	8	3.7%	8	3.1%	16	3.4%
Escape	8	3.7%	11	4.3%	19	4.0%
Near fall	7	3.2%	3	1.2%	10	2.1%
Riding	7	3.2%	3	1.2%	10	2.1%
Other	8	3.7%	10	3.9%	18	3.8%
Unknown	44	20.3%	35	13.7%	79	16.7%
Total	217	100.0%	255	100.0%	472	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, 2018-19 School Year

Activity	Diagnosis											
	Strain/Sprain		Contusion		Fracture		Concussion		Skin Infection		Other	
	n	%	n	%	n	%	n	%	n	%	n	%
Takedown	71	35.9%	22	56.4%	15	48.4%	48	57.1%	0	0.0%	34	34.7%
Sparring	29	14.6%	4	10.3%	7	22.6%	10	11.9%	0	0.0%	19	19.4%
Conditioning	14	7.1%	1	2.6%	1	3.2%	1	1.2%	0	0.0%	2	2.0%
N/A*	0	0.0%	0	0.0%	0	0.0%	0	0.0%	19	86.4%	6	6.1%
Fall	9	4.5%	1	2.6%	0	0.0%	2	2.4%	0	0.0%	5	5.1%
Reversal	13	6.6%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	3	3.1%
Escape	14	7.1%	2	5.1%	0	0.0%	0	0.0%	0	0.0%	3	3.1%
Near fall	9	4.5%	1	2.6%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Riding	4	2.0%	1	2.6%	1	3.2%	0	0.0%	0	0.0%	4	4.1%
Other	5	2.5%	0	0.0%	1	3.2%	8	9.5%	0	0.0%	4	4.1%
Unknown	30	15.2%	7	17.9%	6	19.4%	15	17.6%	3	13.6%	18	16.7%
Total	198	100.0%	39	100.0%	31	100.0%	84	100.0%	22	100.0%	98	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, 2018-19 School Year

	# Injuries	# Exposures	Injury rate (per 1,000 athlete- exposures)
Total	244	241,993	1.01
Competition	140	86,762	1.61
Practice	104	155,231	0.67

Table 10.2 Demographic Characteristics of Injured Baseball Athletes, High School Sports-Related Injury Surveillance Study, US, 2018-19 School Year*

Year in School	n=238
Freshman	22.3%
Sophomore	24.4%
Junior	25.2%
Senior	28.2%
Total[†]	100.0%
Age (years)	
Minimum	13
Maximum	18
Mean (St. Dev.)	16.2 (1.3)
BMI	
Minimum	17.6
Maximum	37.5
Mean (St. Dev.)	24.1 (3.6)

*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 10.1 Diagnosis of Baseball Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2018-19 School Year

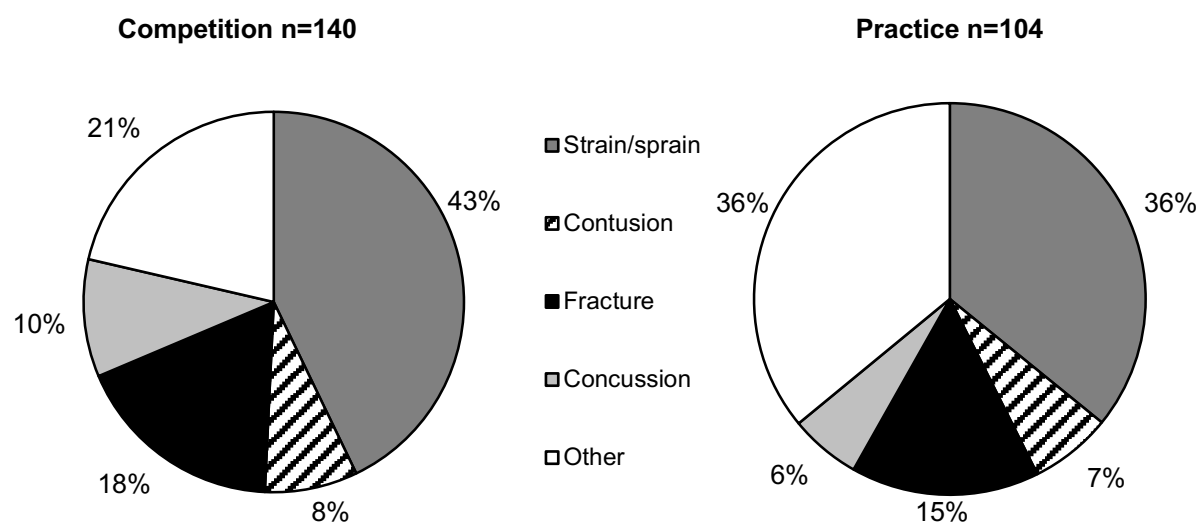


Table 10.3 Body Site of Baseball Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2018-19 School Year

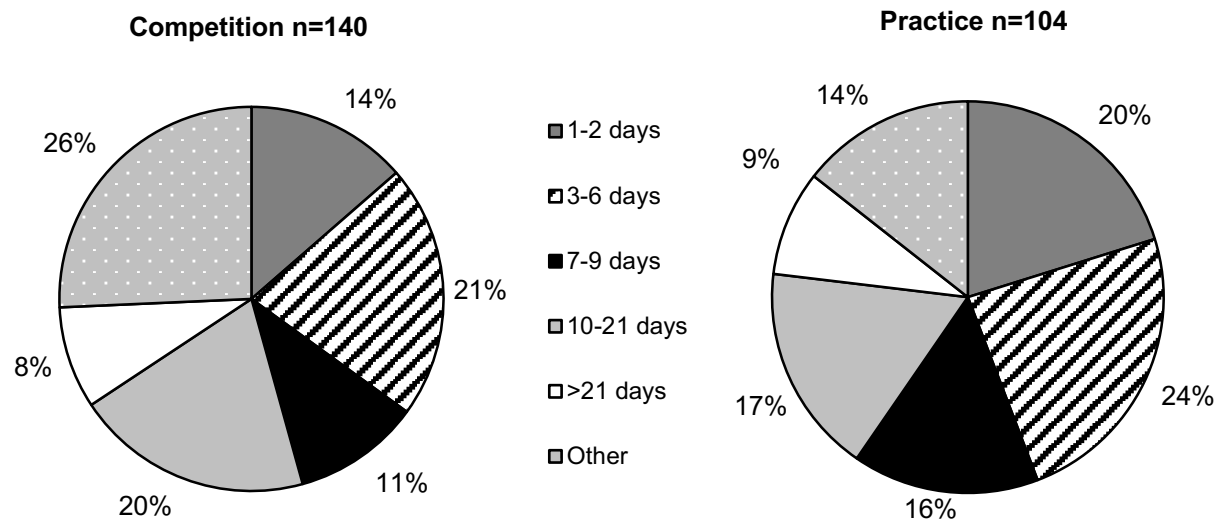
	Competition		Practice		Overall	
	n	%	n	%	n	%
Body Site						
Head/face	22	15.8%	19	18.3%	41	16.9%
Hand/wrist	24	17.3%	15	14.4%	39	16.0%
Shoulder	20	14.4%	16	15.4%	36	14.8%
Arm/elbow	23	16.5%	10	9.6%	33	13.6%
Hip/thigh/upper leg	15	10.8%	8	7.7%	23	9.5%
Ankle	12	8.6%	9	8.7%	21	8.6%
Knee	11	7.9%	8	7.7%	19	7.8%
Trunk	6	4.3%	11	10.6%	17	7.0%
Lower leg	3	2.2%	3	2.9%	6	2.5%
Foot	0	0.0%	3	2.9%	3	1.2%
Neck	1	0.7%	1	1.0%	1	0.8%
Other	2	1.4%	1	1.0%	3	1.2%
Total	139	100.0%	104	100.0%	243	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, 2018-19 School Year

Diagnosis	Competition n=140		Practice n=104		Total n=244	
	n	%	n	%	n	%
Arm/elbow strain/sprain	16	11.4%	6	5.8%	22	9.0%
Hand/wrist fracture	15	10.7%	7	6.7%	22	9.0%
Head/face concussion	14	10.0%	6	5.8%	20	8.2%
Shoulder other	10	7.1%	8	7.7%	18	7.4%
Ankle strain/sprain	11	7.9%	7	6.7%	18	7.4%
Shoulder strain/sprain	9	6.4%	8	7.7%	17	7.0%
Hip/thigh/upper leg strain/sprain	10	7.1%	5	4.8%	15	6.1%
Knee other	7	5.0%	5	4.8%	12	4.9%
Trunk strain/sprain	3	2.1%	7	6.7%	10	4.1%
Head/face other	3	2.1%	7	6.7%	10	4.1%

Figure 10.2 Time Loss of Baseball Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2018-19 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, 2018-19 School Year

	Competition		Practice		Overall	
	n	%	n	%	n	%
Need for surgery						
Required surgery	16	11.7%	5	4.9%	21	8.8%
Did not require surgery	121	88.3%	98	95.1%	219	91.3%
Total	137	100.0%	103	100.0%	240	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, 2018-19 School Year

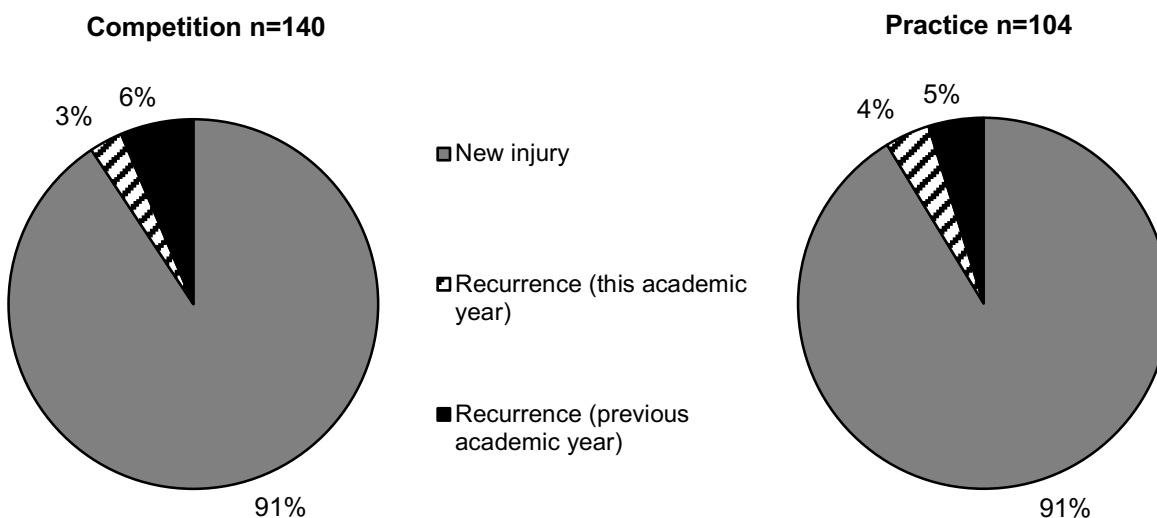


Table 10.6 Time during Season of Baseball Injuries, High School Sports-Related Injury Surveillance Study, US, 2018-19 School Year

	n	%
Time in Season		
Preseason	48	19.8%
Regular season	186	76.5%
Post season	9	3.7%
Total	243	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, 2018-19 School Year

	n	%
Time in Competition		
Pre-competition/warm-ups	8	6.1%
First inning	8	6.1%
Second inning	11	8.4%
Third inning	12	9.2%
Fourth inning	18	13.7%
Fifth inning	22	16.8%
Sixth inning	16	12.2%
Seventh inning	5	3.8%
Extra innings	0	0.0%
Unknown	31	23.7%
Total	131	100.0%
Field Location		
Home plate	41	30.6%
First base	18	13.4%
Second base	19	14.2%
Third base	4	3.0%
Infield	4	3.0%
Pitcher's mound	24	17.9%
Outfield	10	4.1%
Foul territory	0	0.0%
Other	4	3.0%
Unknown	10	7.5%
Total	134	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, 2018-19 School Year

	n	%
Time in Practice		
First 1/2 hour	8	8.0%
Second 1/2 hour	27	27.0%
1-2 hours into practice	34	34.0%
>2 hours into practice	4	4.0%
Unknown	27	27.0%
Total	100	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, 2018-19 School Year

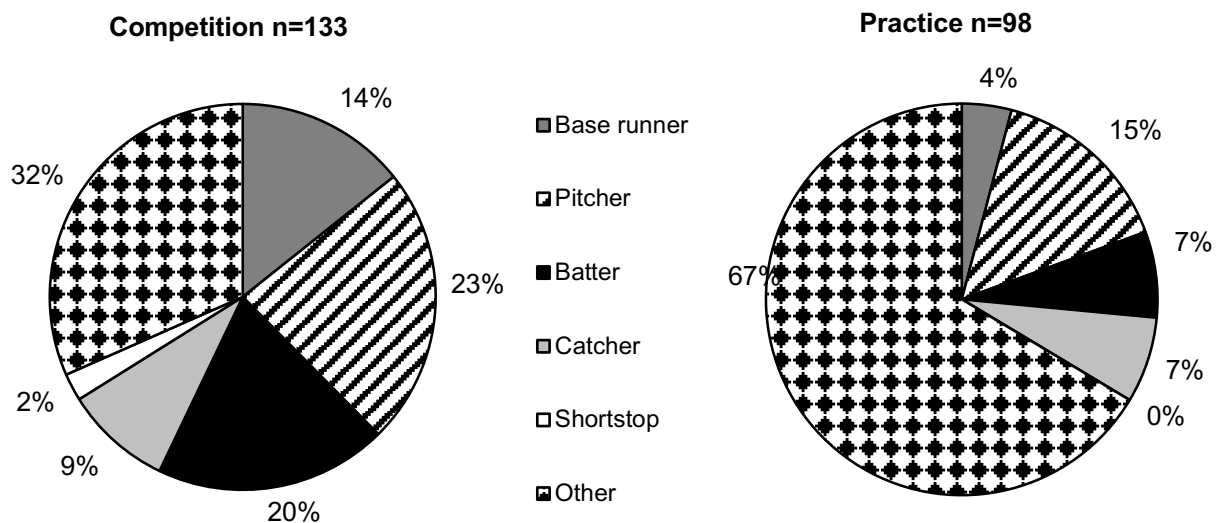


Table 10.9 Activities Leading to Baseball Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2018-19 School Year

	Competition		Practice		Overall	
	n	%	n	%	n	%
Activity						
Fielding a batted ball	16	11.9%	19	19.2%	35	15.0%
Running bases	24	17.9%	7	7.1%	31	13.3%
Throwing (not pitching)	6	4.5%	15	15.2%	21	9.0%
Batting	26	19.4%	13	13.1%	39	16.7%
Pitching	27	20.1%	9	9.1%	36	15.5%
Sliding	13	9.7%	2	2.0%	15	6.4%
Catching	9	6.7%	6	6.1%	15	6.4%
Fielding a thrown ball	5	3.7%	2	2.0%	7	3.0%
General play	3	2.2%	7	7.1%	10	4.3%
Conditioning	0	0.0%	3	3.0%	3	3.1%
Other	2	1.5%	8	8.1%	10	4.3%
Unknown	3	2.2%	8	8.1%	11	4.7%
Total	134	100.0%	99	100.0%	233	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, 2018-19 School Year

	Diagnosis									
	Strain/Sprain		Contusion		Fracture		Concussion		Other	
	n	%	n	%	n	%	n	%	n	%
Activity										
Fielding a batted ball	7	7.7%	5	27.8%	6	15.8%	9	47.4%	8	11.9%
Running bases	19	20.9%	0	0.0%	2	5.3%	0	0.0%	10	14.9%
Throwing (not pitching)	11	12.1%	0	0.0%	1	2.6%	1	5.3%	8	11.9%
Batting	5	5.5%	7	38.9%	12	31.6%	5	14.9%	10	14.9%
Pitching	28	30.8%	2	11.1%	1	2.6%	0	0.0%	5	7.5%
Sliding	6	6.6%	1	5.6%	4	10.5%	0	0.0%	4	6.0%
Catching	3	3.3%	1	5.6%	5	13.2%	1	5.3%	5	7.5%
Fielding a thrown ball	4	4.4%	2	11.1%	0	0.0%	0	0.0%	1	1.5%
General play	4	4.4%	0	0.0%	1	2.6%	0	0.0%	5	7.5%
Conditioning	0	0.0%	0	0.0%	2	5.3%	0	0.0%	1	1.5%
Other	2	2.2%	0	0.0%	3	7.9%	1	5.3%	4	6.0%
Unknown	2	2.2%	0	0.0%	1	2.6%	2	10.5%	6	9.0%
Total	91	100.0%	18	100.0%	38	100.0%	19	100.0%	67	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, 2018-19 School Year

	# Injuries	# Exposures	Injury rate (per 1,000 athlete- exposures)
Total	243	172,851	1.41
Competition	140	62,593	2.24
Practice	103	110,258	0.93

Table 11.2 Demographic Characteristics of Injured Softball Athletes, High School Sports-Related Injury Surveillance Study, US, 2018-19 School Year*

Year in School	n=238
Freshman	32.4%
Sophomore	26.9%
Junior	18.1%
Senior	22.7%
Total†	100.0%
Age (years)	
Minimum	13
Maximum	18
Mean (St. Dev.)	15.6 (1.3)
BMI	
Minimum	17.8
Maximum	39.1
Mean (St. Dev.)	23.3 (4.0)

*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, 2018-19 School Year

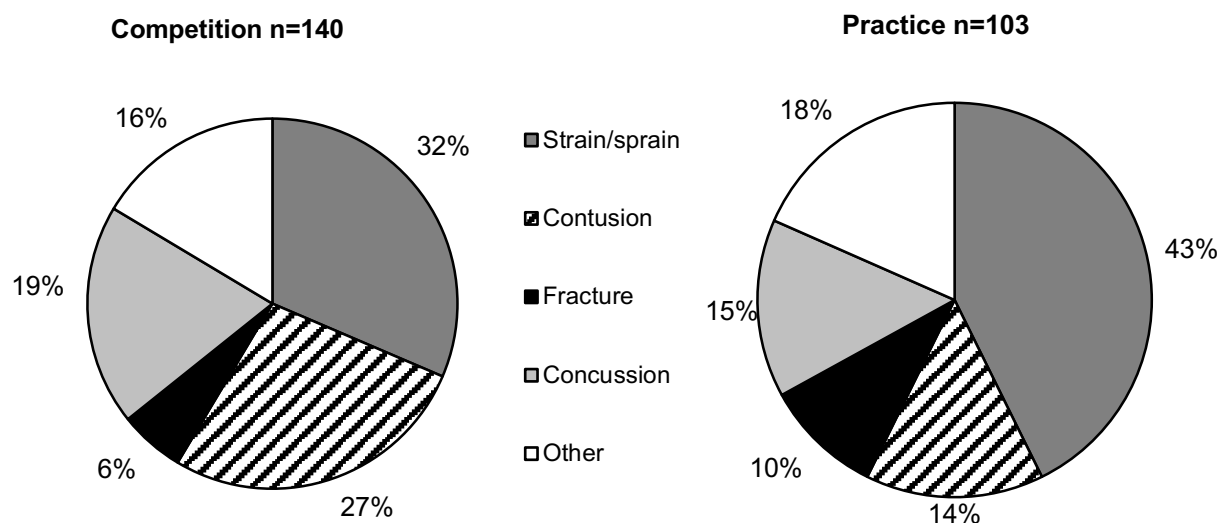


Table 11.3 Body Site of Softball Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2018-19 School Year

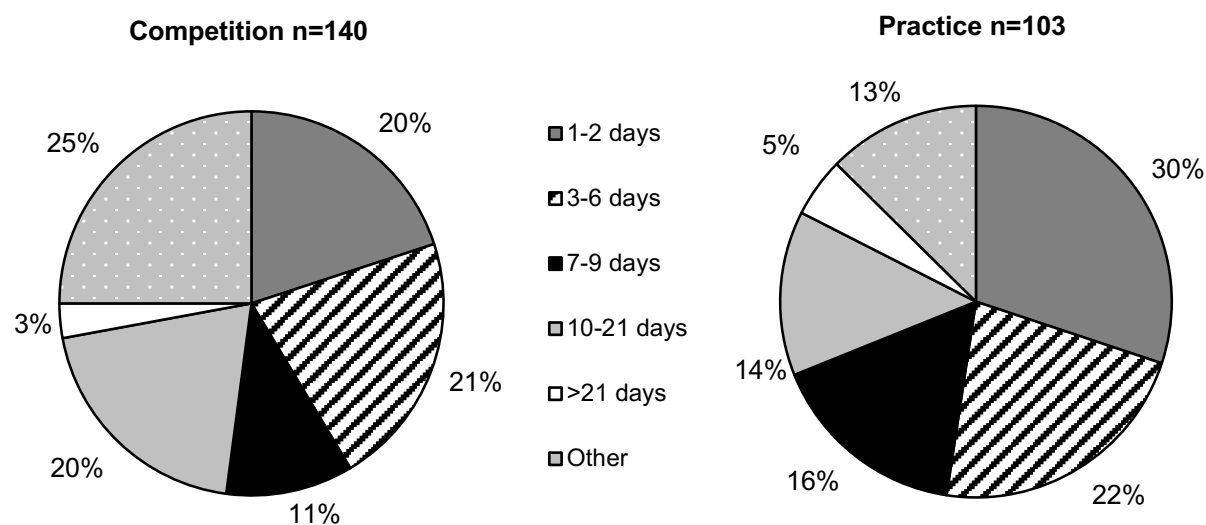
	Competition		Practice		Overall	
	n	%	n	%	n	%
Body Site						
Head/face	37	26.4%	22	21.4%	59	24.3%
Knee	24	17.1%	12	11.7%	36	14.8%
Hand/wrist	19	13.6%	12	11.7%	31	12.8%
Ankle	16	11.4%	14	13.6%	30	12.3%
Arm/elbow	7	5.0%	13	12.6%	20	8.2%
Shoulder	12	8.6%	6	5.8%	18	7.4%
Hip/thigh/upper leg	9	6.4%	9	8.7%	18	7.4%
Trunk	7	5.0%	8	7.8%	15	6.2%
Lower leg	7	5.0%	1	1.0%	8	3.3%
Neck	1	0.7%	3	2.9%	4	1.6%
Foot	1	0.7%	2	1.9%	3	1.2%
Other	0	0.0%	1	1.0%	1	0.4%
Total	140	100.0%	103	100.0%	243	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, 2018-19 School Year

Diagnosis	Competition n=140		Practice n=103		Total n=243	
	n	%	n	%	n	%
Head/face concussion	27	19.3%	15	14.6%	42	17.3%
Ankle strain/sprain	13	9.3%	13	12.6%	26	10.7%
Hip/thigh/upper leg strain/sprain	8	5.7%	8	7.8%	16	6.6%
Head/face contusion	9	6.4%	7	6.8%	16	6.6%
Knee other	6	4.3%	8	7.8%	14	5.8%
Knee contusion	9	6.4%	3	2.9%	12	4.9%
Knee strain/sprain	9	6.4%	1	1.0%	10	4.1%
Hand/wrist fracture	5	3.6%	5	4.9%	10	4.1%
Hand/wrist contusion	9	6.4%	1	1.0%	10	4.1%
Arm/elbow other	5	3.6%	5	4.9%	10	4.1%

Figure 11.2 Time Loss of Softball Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2018-19 School Year



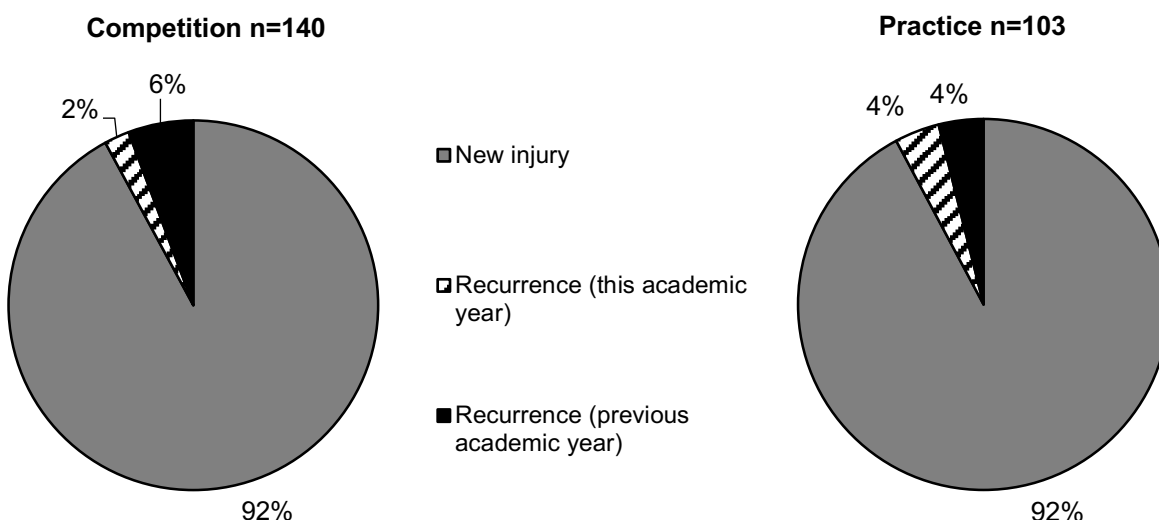
*Other category is made up of medical disqualification for season, medical disqualification for career, athlete chooses not to continue, and season ended before athlete returned to play

Table 11.5 Softball Injuries Requiring Surgery by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2018-19 School Year

	Competition		Practice		Overall	
	n	%	n	%	n	%
Need for surgery						
Required surgery	9	6.4%	4	4.0%	13	5.4%
Did not require surgery	130	93.5%	97	96.0%	227	94.6%
Total	139	100.0%	101	100.0%	240	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, 2018-19 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, 2018-19 School Year

	n	%
Time in Season		
Preseason	36	14.8%
Regular season	197	81.1%
Post season	10	4.1%
Unknown	0	0.0%
Total	243	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, 2018-19 School Year

	n	%
Time in Competition		
Pre-competition/warm-ups	11	8.3%
First inning	9	6.8%
Second inning	5	3.8%
Third inning	10	7.5%
Fourth inning	20	15.0%
Fifth inning	20	15.0%
Sixth inning	12	9.0%
Seventh inning	7	5.3%
Extra innings	0	0.0%
Unknown	39	29.3%
Total	133	100.0%
Field Location		
Home plate	27	20.0%
Second base	24	17.8%
First base	17	12.6%
Outfield	16	11.9%
Pitcher's mound	16	11.9%
Third base	10	7.4%
Foul territory	7	5.2%
Infield	6	4.4%
Other	2	1.5%
Unknown	10	7.4%
Total	135	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, 2018-19 School Year

	n	%
Time in Practice		
First 1/2 hour	14	14.4%
Second 1/2 hour	11	11.3%
1-2 hours into practice	41	42.3%
>2 hours into practice	5	5.2%
Unknown	26	26.8%
Total	97	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, 2018-19 School Year

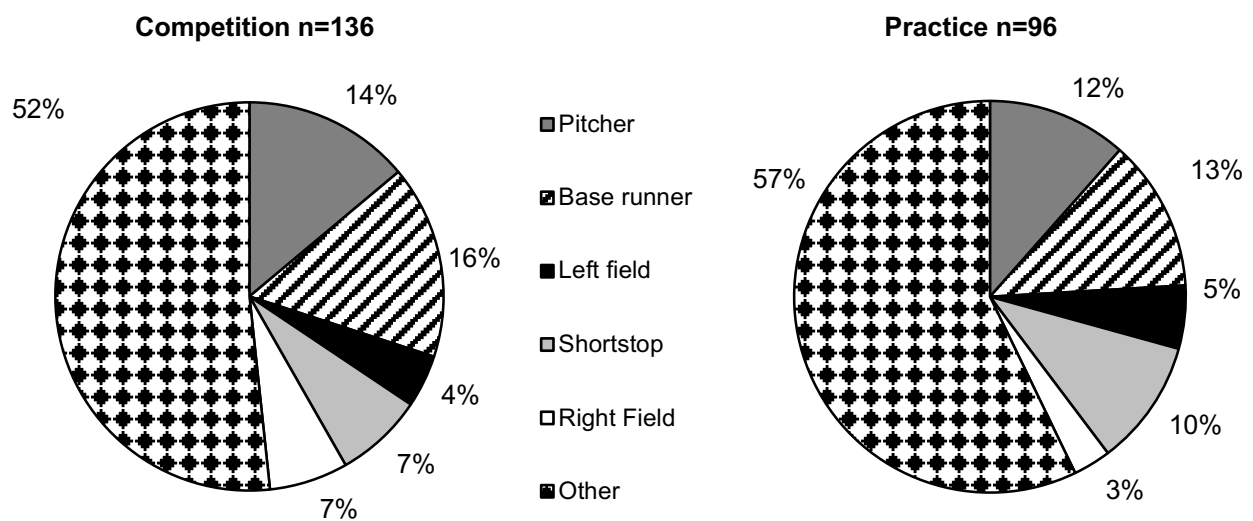


Table 11.9 Activities Leading to Softball Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2018-19 School Year

	Competition		Practice		Overall	
	n	%	n	%	n	%
Activity						
Fielding a batted ball	28	20.6%	13	13.1%	41	17.4%
Running bases	23	16.9%	13	13.1%	36	15.3%
Catching	18	13.2%	5	5.1%	23	9.8%
Pitching	16	11.8%	7	7.1%	23	9.8%
Sliding	16	11.8%	7	7.1%	23	9.8%
Throwing (not pitching)	4	2.9%	16	16.2%	20	8.5%
Batting	12	8.8%	7	7.1%	19	8.1%
Fielding a thrown ball	9	6.6%	10	10.1%	19	8.1%
General play	0	0.0%	10	10.1%	10	4.3%
Conditioning	0	0.0%	3	3.0%	3	1.3%
Other	6	4.4%	2	2.0%	8	3.4%
Unknown	4	2.9%	6	6.1%	10	4.3%
Total	136	100.0%	99	100.0%	235	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, 2018-19 School Year

	Diagnosis									
	Strain/Sprain		Contusion		Fracture		Concussion		Other	
	n	%	n	%	n	%	n	%	n	%
Activity										
Fielding a batted ball	10	11.9%	17	32.7%	3	17.6%	8	19.5%	3	7.3%
Running bases	21	25.0%	4	7.7%	4	23.5%	3	7.3%	4	9.8%
Throwing (not pitching)	9	10.7%	1	1.9%	1	5.9%	3	7.3%	6	14.6%
Batting	3	3.6%	10	19.2%	1	5.9%	3	7.3%	2	4.9%
Catching	7	8.3%	5	9.6%	2	11.8%	5	12.2%	4	9.8%
Pitching	11	13.1%	1	1.9%	1	5.9%	0	0.0%	10	24.4%
General play	1	1.2%	1	1.9%	0	0.0%	3	7.3%	5	12.2%
Sliding	8	9.5%	5	9.6%	2	11.8%	4	9.8%	4	9.8%
Fielding a thrown ball	5	6.0%	7	13.5%	0	0.0%	5	12.2%	2	4.9%
Conditioning	1	1.2%	0	0.0%	2	11.8%	0	0.0%	0	0.0%
Other	1	1.2%	1	1.9%	1	5.9%	4	9.8%	1	2.4%
Unknown	7	8.3%	0	0.0%	0	0.0%	3	7.3%	0	0.0%
Total	84	100.0%	52	100.0%	17	100.0%	41	100.0%	41	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, 2018-19 School Year

	# Injuries	# Exposures	Injury rate (per 1,000 athlete-exposures)
Total	120	71,442	1.68
Competition	61	23,496	2.60
Practice	59	47,946	1.23

Table 12.2 Demographic Characteristics of Injured Girls' Field Hockey Athletes, High School Sports-Related Injury Surveillance Study, US, 2018-19 School Year*

Year in School	n=112
Freshman	20.5%
Sophomore	30.4%
Junior	23.2%
Senior	25.9%
Total†	100.0%
Age (years)	
Minimum	14
Maximum	17
Mean (St. Dev.)	15.5 (1.1)
BMI	
Minimum	17.2
Maximum	35.3
Mean (St. Dev.)	22.7 (3.9)

*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 12.1 Diagnosis of Girls' Field Hockey Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2018-19 School Year

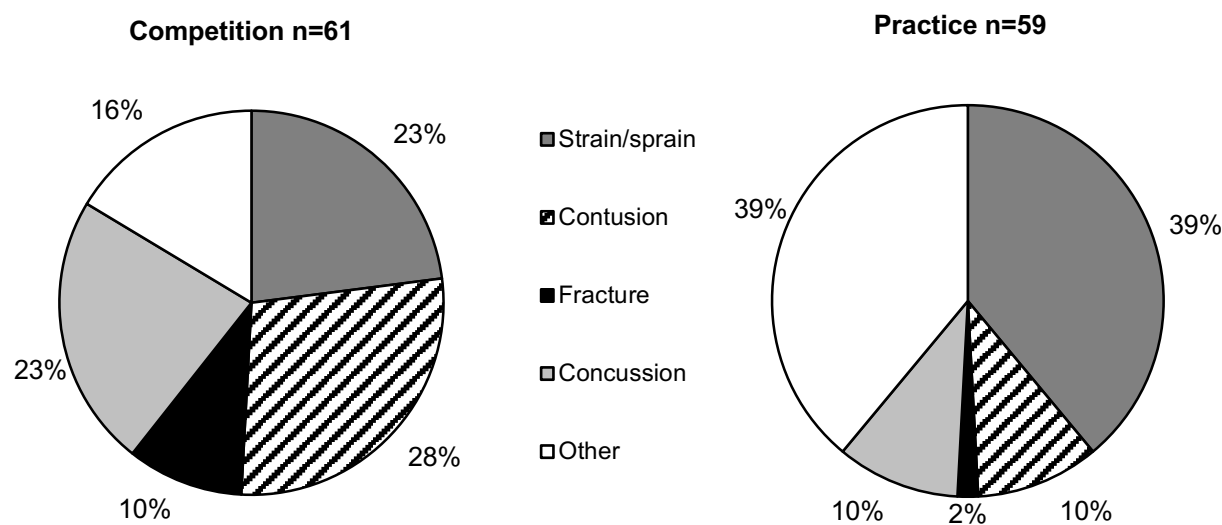


Table 12.3 Body Site of Girls' Field Hockey Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2018-19 School Year

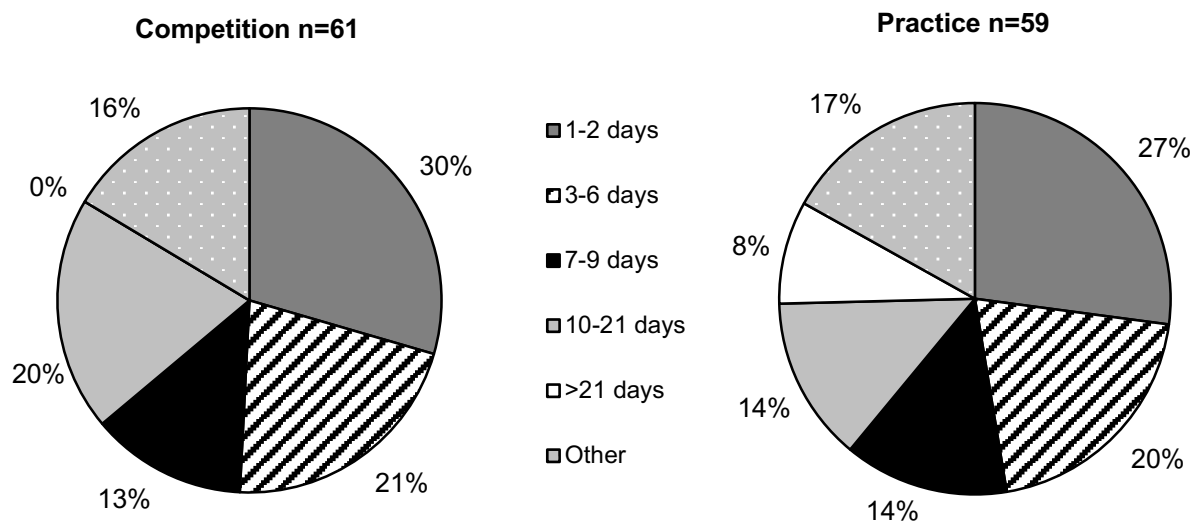
	Competition		Practice		Overall	
	n	%	n	%	n	%
Body Site						
Head/face	20	32.8%	9	15.3%	29	24.2%
Hand/wrist	13	21.3%	5	8.5%	18	15.0%
Hip/thigh/upper leg	6	9.8%	9	15.3%	15	12.5%
Ankle	5	8.2%	10	16.9%	15	12.5%
Lower leg	2	3.3%	10	16.9%	12	10.0%
Trunk	3	4.9%	7	11.9%	10	8.3%
Knee	5	8.2%	3	5.1%	8	6.7%
Arm/elbow	2	3.3%	2	3.4%	4	3.3%
Foot	2	3.3%	2	3.4%	4	3.3%
Neck	2	3.3%	0	0.0%	2	1.4%
Shoulder	0	0.0%	0	0.0%	0	0.0%
Other	1	1.6%	2	3.4%	3	2.4%
Total	61	100.0%	59	100.0%	120	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, 2018-19 School Year

Diagnosis	Competition n=61		Practice n=59		Total n=120	
	n	%	n	%	n	%
Head/face concussion	14	22.5%	6	10.2%	20	16.7%
Ankle strain/sprain	4	6.6%	9	15.3%	13	10.8%
Hip/thigh/upper leg strain/sprain	5	8.2%	7	11.9%	12	10.0%
Lower leg other	1	1.6%	9	15.3%	10	8.3%
Trunk other	1	1.6%	5	8.5%	6	5.0%
Hand/wrist fracture	6	9.8%	0	0.0%	6	5.0%
Head/face contusion	5	8.2%	1	1.7%	6	5.0%
Hand/wrist contusion	4	6.6%	2	3.4%	6	5.0%
Hand/wrist strain/sprain	2	3.3%	3	5.1%	5	4.2%
Knee other	3	4.9%	2	3.4%	5	4.2%

Figure 12.2 Time Loss of Girls' Field Hockey Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2018-19 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, 2018-19 School Year

	Competition		Practice		Overall	
	n	%	n	%	n	%
Need for surgery						
Required surgery	2	3.4%	0	0.0%	2	1.8%
Did not require surgery	57	96.6%	58	100.0%	115	98.3%
Total	59	100.0%	58	100.0%	117	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, 2018-19 School Year

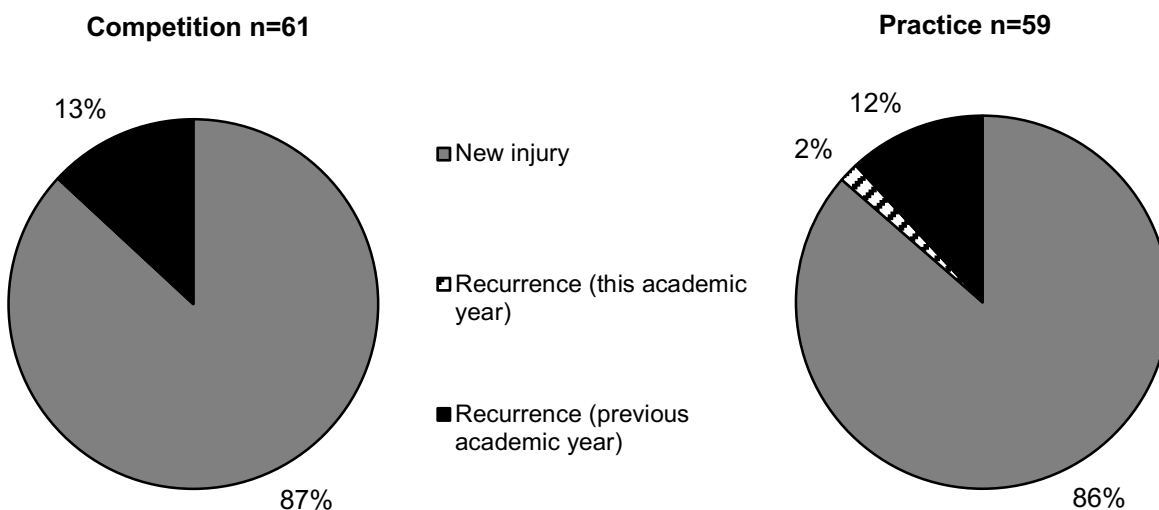


Table 12.6 Time during Season of Girls' Field Hockey Injuries, High School Sports-Related Injury Surveillance Study, US, 2018-19 School Year

	n	%
Time in Season		
Preseason	28	23.3%
Regular season	90	75.0%
Post season	2	1.7%
Total	120	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, 2018-19 School Year

	n	%
Time in Competition		
Pre-competition/warm-ups	3	5.8%
First half	11	21.2%
Second half	35	67.3%
Overtime	0	0.0%
Unknown	3	5.8%
Total	52	100.0%
Field Location		
Between 25-yard line and center line	17	32.7%
Within 25-yard line	8	15.4%
Within 16-yard arc	2	3.8%
Goal area/circle	5	9.6%
Sideline	2	3.8%
Unknown	18	34.6%
Total	52	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, 2018-19 School Year

	n	%
Time in Practice		
First 1/2 hour	4	7.1%
Second 1/2 hour	10	17.9%
1-2 hours into practice	27	48.2%
>2 hours into practice	1	1.8%
Unknown	14	25.0%
Total	56	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, 2018-19 School Year

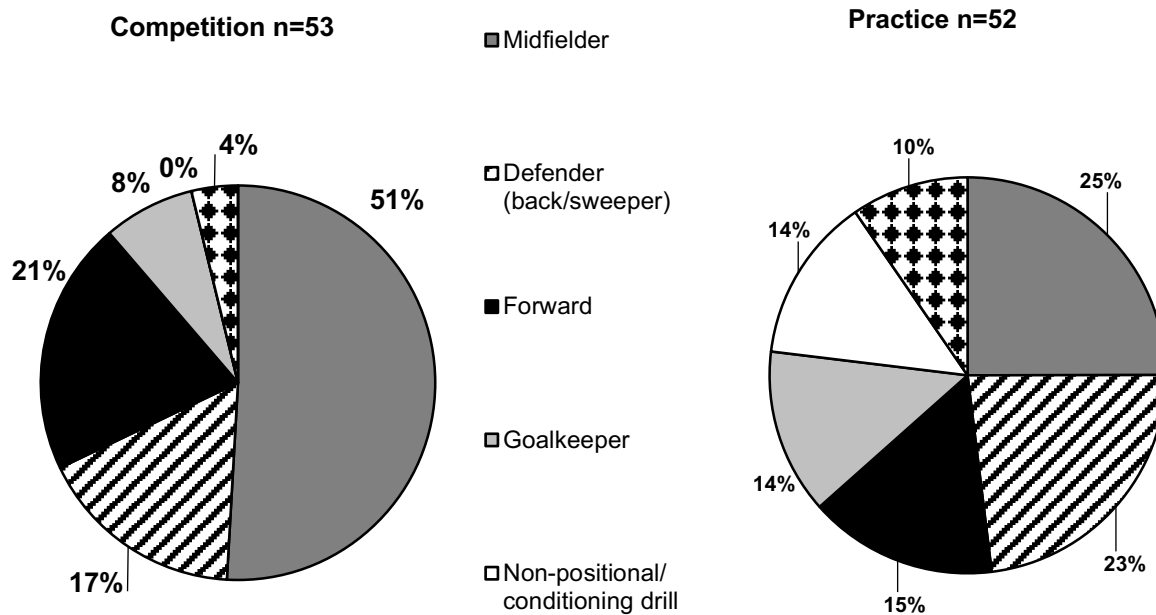


Table 12.9 Activities Leading to Girls' Field Hockey Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2018-19 School Year

	Competition		Practice		Overall	
	n	%	n	%	n	%
Activity						
General play	10	18.9%	18	34.0%	28	26.4%
Defending	11	20.8%	3	5.7%	14	13.2%
Conditioning	0	0.0%	12	22.6%	12	11.3%
Ball handling/dribbling	7	13.2%	2	3.8%	9	8.5%
Goaltending	3	5.7%	6	11.3%	9	8.5%
Chasing a loose ball	6	11.3%	1	1.9%	7	6.6%
Receiving pass	4	7.5%	1	1.9%	5	4.7%
Shooting	0	0.0%	2	3.8%	2	1.9%
Blocking shot	1	1.9%	1	1.9%	2	1.9%
Passing	0	0.0%	1	1.9%	1	0.9%
Other	1	1.9%	0	0.0%	1	0.9%
Unknown	10	18.9%	6	11.3%	16	15.1%
Total	53	100.0%	53	100.0%	106	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, 2018-19 School Year

Activity	Diagnosis									
	Strain/Sprain		Contusion		Fracture		Concussion		Other	
	n	%	n	%	n	%	n	%	n	%
General play	8	26.7%	2	10.0%	0	0.0%	4	22.2%	14	26.4%
Defending	2	6.7%	8	40.0%	1	14.3%	2	11.1%	1	3.2%
Conditioning	5	16.7%	0	0.0%	0	0.0%	0	0.0%	7	22.6%
Goaltending	3	10.0%	1	5.0%	0	0.0%	4	22.2%	1	3.2%
Ball handling/dribbling	2	6.7%	4	20.0%	0	0.0%	3	16.7%	0	0.0%
Shooting	1	3.3%	0	0.0%	1	14.3%	0	0.0%	0	0.0%
Chasing a loose ball	3	10.0%	0	0.0%	0	0.0%	1	5.6%	3	9.7%
Passing	1	3.3%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Receiving pass	0	0.0%	2	10.0%	1	14.3%	1	5.6%	1	3.2%
Other	1	3.3%	1	5.0%	0	0.0%	1	5.6%	0	0.0%
Unknown	4	13.3%	2	10.0%	4	57.1%	2	11.1%	4	12.9%
Total	30	100.0%	20	100.0%	7	100.0%	18	100.0%	31	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, 2018-19 School Year

	# Injuries	# Exposures	Injury rate (per 1,000 athlete-exposures)
Total	126	52,032	2.42
Competition	105	17,745	5.92
Practice	21	34,287	0.61

Table 13.2 Demographic Characteristics of Injured Boys' Ice Hockey Athletes, High School Sports-Related Injury Surveillance Study, US, 2018-19 School Year*

Year in School	n=122
Freshman	6.6%
Sophomore	27.9%
Junior	40.2%
Senior	25.4%
Total†	100.0%
Age (years)	
Minimum	14
Maximum	18
Mean (St. Dev.)	16.3 (1.0)
BMI	
Minimum	18.1
Maximum	30.1
Mean (St. Dev.)	22.7 (2.5)

*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 13.1 Diagnosis of Boys' Ice Hockey Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2018-19 School Year

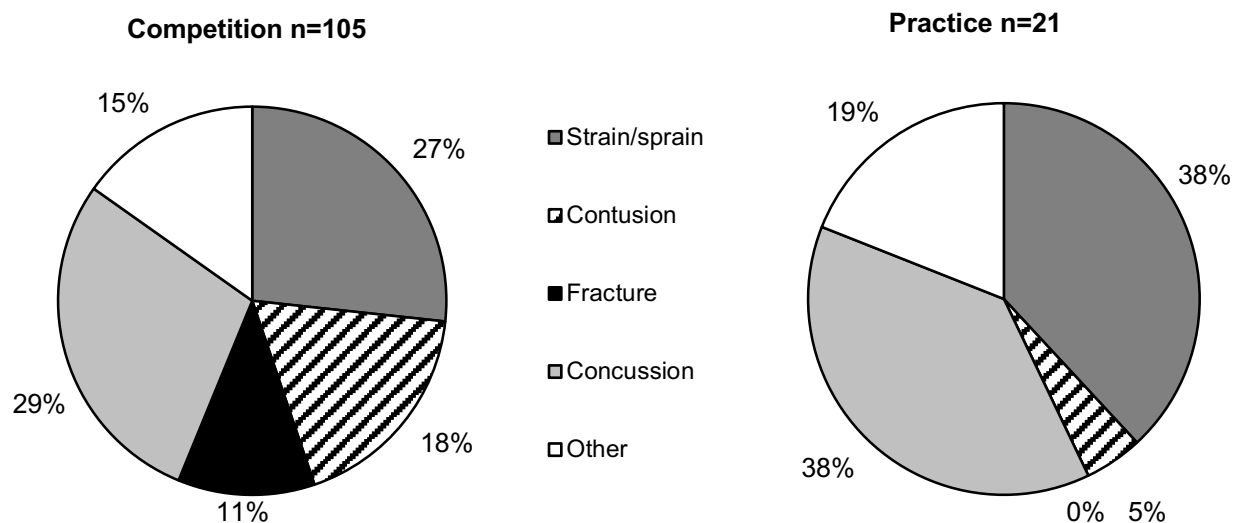


Table 13.3 Body Site of Boys' Ice Hockey Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2018-19 School Year

	Competition		Practice		Overall	
	n	%	n	%	n	%
Body Site						
Head/face	32	30.5%	9	42.9%	41	32.5%
Shoulder	23	21.9%	1	4.8%	24	19.0%
Hip/thigh/upper leg	11	10.5%	4	19.0%	15	11.9%
Ankle	8	7.6%	2	9.5%	10	7.9%
Hand/wrist	9	8.6%	1	4.8%	10	7.9%
Arm/elbow	4	3.8%	2	9.5%	6	4.8%
Knee	5	4.8%	0	0.0%	5	4.0%
Trunk	3	2.9%	1	4.8%	4	3.2%
Lower leg	1	1.0%	0	0.0%	1	0.8%
Foot	0	0.0%	1	4.8%	1	0.8%
Neck	1	1.0%	0	0.0%	1	0.8%
Other	8	7.6%	0	0.0%	8	6.3%
Total	105	100.0%	21	100.0%	126	100.0%

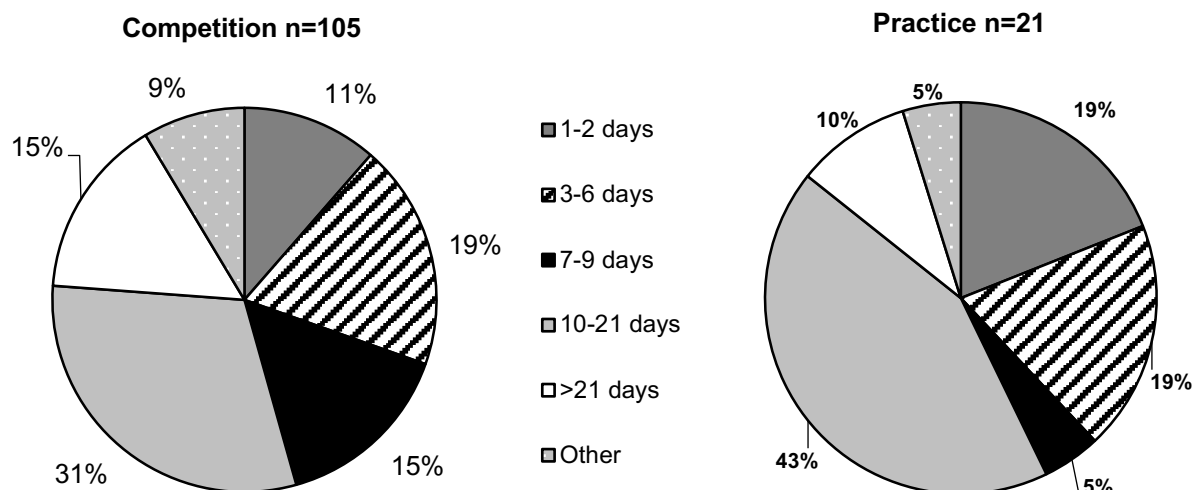
†Totals and n's are not always equal due to slight rounding or missing responses.

Table 13.4 Eight Most Common Boys' Ice Hockey Injury Diagnoses by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2018-19 School Year

Diagnosis	Competition n=105		Practice n=21		Total n=126	
	n	%	n	%	n	%
Head/face concussion	30	28.6%	8	38.1%	38	30.2%
Shoulder strain/sprain	11	10.5%	0	0.0%	11	8.7%
Hip/thigh/upper leg strain/sprain	6	5.7%	4	19.5%	10	7.9%
Shoulder other	7	6.7%	1	4.8	8	6.3%
Ankle strain/sprain	5	4.8%	2	9.5%	7	5.6%
Hand/wrist fracture	6	5.7%	0	0.0%	6	4.8%
Shoulder contusion	4	3.8%	0	0.0%	4	3.2%
Other fracture	4	3.8%	0	0.0%	4	3.2%

†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, 2018-19 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, 2018-19 School Year

	Competition		Practice		Overall	
	n	%	n	%	n	%
Need for surgery						
Required surgery	3	2.9%	0	0.0%	3	2.4%
Did not require surgery	101	97.1%	21	100.0%	122	97.6%
Total	104	100.0%	21	100.0%	125	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, 2018-19 School Year

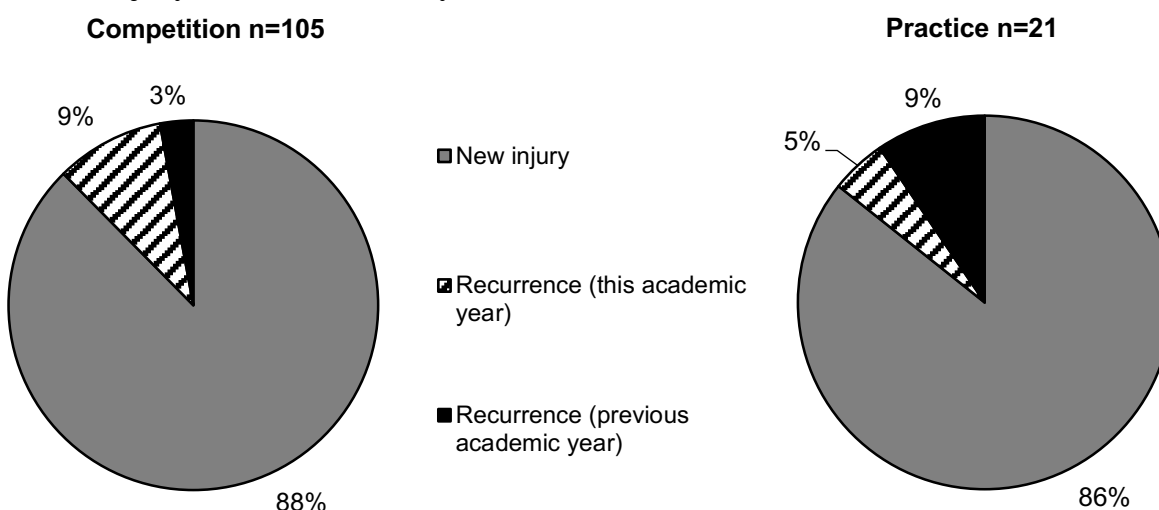


Table 13.6 Time during Season of Boys' Ice Hockey Injuries, High School Sports-Related Injury Surveillance Study, US, 2018-19 School Year

	n	%
Time in Season		
Preseason	6	4.8%
Regular season	116	92.8%
Post season	3	2.4%
Total	125	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, 2018-19 School Year

	n	%
Time in Competition		
Warm-ups	0	0.0%
First period	17	17.9%
Second period	32	33.7%
Third period	31	32.6%
Overtime	0	0.0%
Unknown	15	15.8%
Total	95	100.0%
Rink Location		
Between goal line and blue line	22	23.2%
Corner	13	13.7%
Neutral zone	9	9.5%
Goal area	7	7.4%
Behind goal	5	5.3%
Face-off circle	4	4.2%
Bench	0	0.0%
Unknown	35	36.8%
Total	95	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, 2018-19 School Year

	n	%
Time in Practice		
First 1/2 hour	2	9.5%
Second 1/2 hour	3	14.3%
1-2 hours into practice	10	47.6%
>2 hours into practice	1	4.8%
Unknown	5	23.8%
Total	21	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, 2018-19 School Year

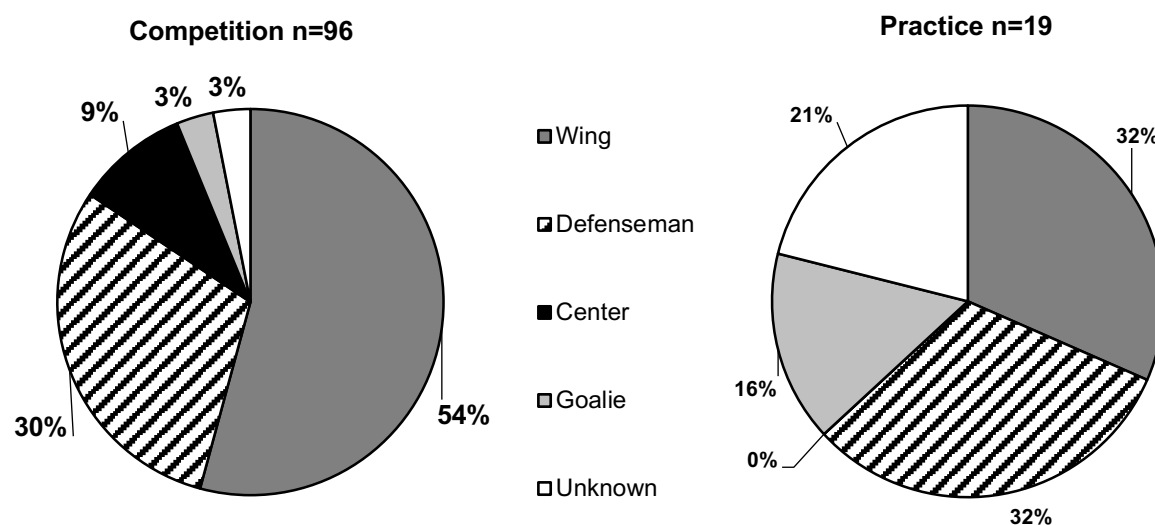


Table 13.9 Activities Leading to Boys' Ice Hockey Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2018-19 School Year

	Competition		Practice		Overall	
	n	%	n	%	n	%
Activity						
Being checked	31	32.3%	1	5.3%	32	27.8%
Skating	22	22.9%	9	47.4%	31	27.0%
Chasing loose puck	8	8.3%	1	5.3%	9	7.8%
Checking	9	9.4%	0	0.0%	9	7.8%
Receiving pass	5	5.2%	0	0.0%	5	4.3%
Goaltending	3	3.1%	1	5.3%	4	3.2%
Passing	3	3.1%	0	0.0%	3	2.6%
Shooting	0	0.0%	1	5.3%	1	0.9%
Other	7	7.3%	2	10.5%	9	7.8%
Unknown	8	8.3%	4	21.5%	12	10.4%
Total	96	100.0%	19	100.0%	115	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, 2018-19 School Year

	Diagnosis									
	Strain/Sprain		Contusion		Fracture		Concussion		Other	
	n	%	n	%	n	%	n	%	n	%
Activity										
Being checked	7	20.0%	10	52.6%	3	30.0%	9	27.3%	3	16.7%
Skating	13	37.1%	3	15.8%	1	10.0%	11	33.3%	3	16.7%
Chasing loose puck	4	11.4%	1	5.3%	1	10.0%	3	9.1%	0	0.0%
Checking	3	8.6%	0	0.0%	3	30.0%	2	6.1%	1	5.6%
Receiving pass	1	2.9%	0	0.0%	0	0.0%	2	6.1%	3	11.1%
Passing	1	2.9%	0	0.0%	0	0.0%	1	3.0%	1	5.6%
Goaltending	2	5.7%	0	0.0%	0	0.0%	1	3.0%	1	5.6%
Shooting	0	0.0%	0	0.0%	0	0.0%	1	3.0%	0	0.0%
Other	2	5.7%	3	15.8%	1	10.0%	2	6.1%	3	16.7%
Unknown	2	5.7%	2	10.5%	1	10.0%	1	3.0%	3	16.7%
Total	35	100.0%	19	100.0%	10	100.0%	33	100.0%	18	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, 2018-19 School Year

	# Injuries	# Exposures	Injury rate (per 1,000 athlete- exposures)
Total	275	132,645	2.07
Competition	167	38,333	4.36
Practice	108	94,312	1.15

Table 14.2 Demographic Characteristics of Injured Boys' Lacrosse Athletes, High School Sports-Related Injury Surveillance Study, US, 2018-19 School Year*

Year in School	n=266
Freshman	23.3%
Sophomore	18.8%
Junior	32.0%
Senior	25.9%
Total†	100.0%
Age (years)	
Minimum	12
Maximum	19
Mean (St. Dev.)	16.1 (1.3)
BMI	
Minimum	16.5
Maximum	40.7
Mean (St. Dev.)	24.4 (4.2)

*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, 2018-19 School Year

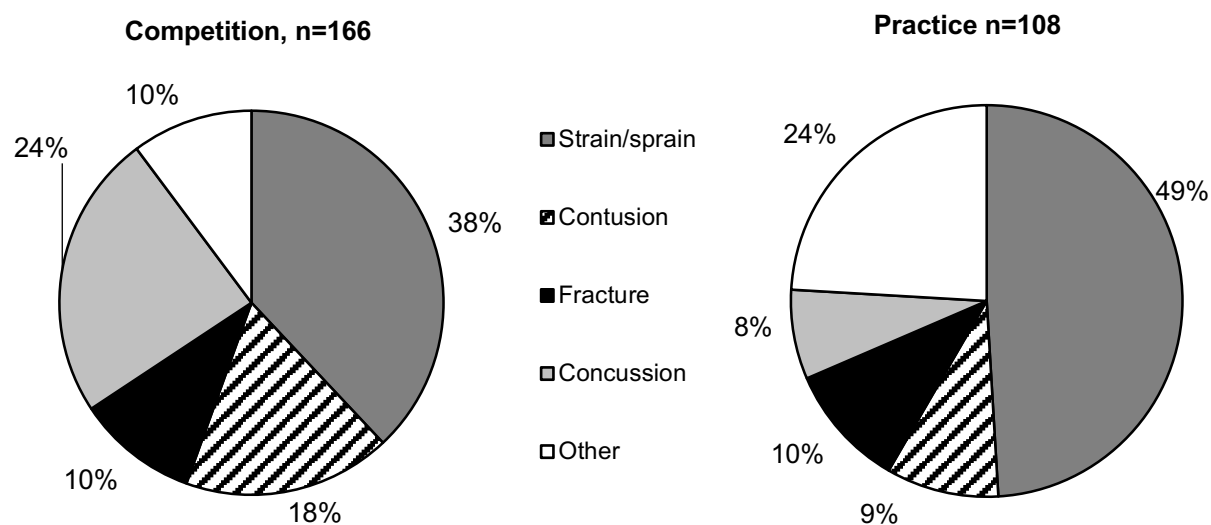


Table 14.3 Body Site of Boys' Lacrosse Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2018-19 School Year

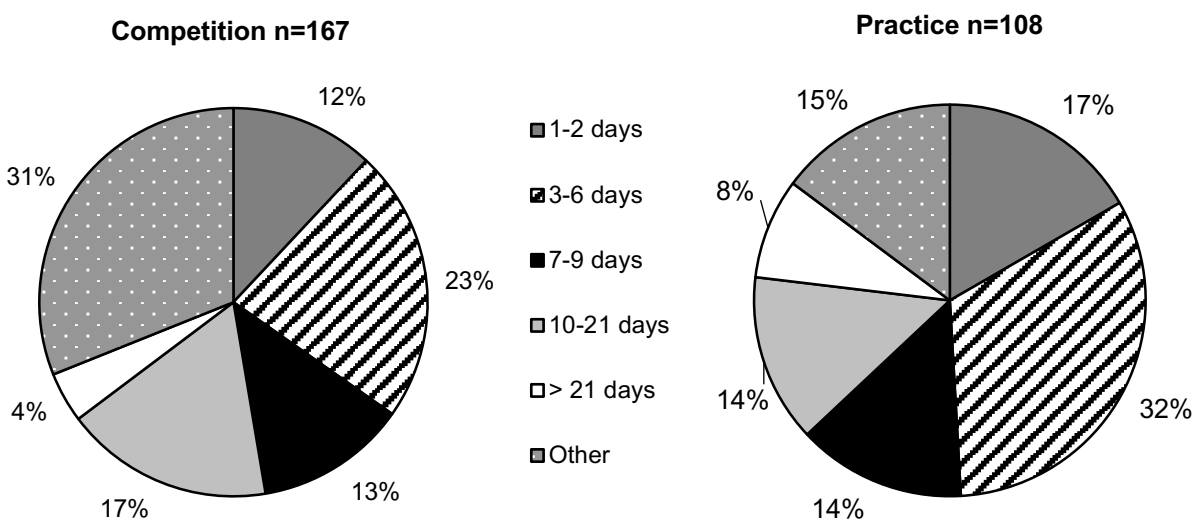
	Competition		Practice		Overall	
	n	%	n	%	n	%
Body Site						
Head/face	44	26.3%	8	7.4%	52	18.9%
Hip/thigh/upper leg	12	7.2%	20	18.5%	32	11.6%
Knee	31	18.6%	24	22.2%	55	20.0%
Hand/wrist	15	9.0%	12	11.2%	27	9.8%
Ankle	17	10.2%	14	13.0%	31	11.3%
Shoulder	13	7.8%	6	5.6%	19	6.9%
Trunk	9	5.4%	5	4.6%	14	5.1%
Arm/elbow	5	3.0%	4	3.7%	9	3.3%
Lower leg	5	3.0%	9	8.3%	14	5.1%
Foot	2	1.2%	3	2.8%	5	1.8%
Neck	4	2.4%	0	0.0%	4	1.5%
Other	10	6.0%	3	2.8%	13	4.7%
Total	167	100.0%	108	100.0%	275	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, 2018-19 School Year

Diagnosis	Competition n=167		Practice n=108		Total n=275	
	n	%	n	%	n	%
Head/face concussion	40	24.0%	8	7.4%	48	17.5%
Ankle strain/sprain	17	10.2%	13	12.0%	30	10.9%
Knee strain/sprain	20	12.0%	9	8.3%	29	10.5%
Hip/thigh/upper leg strain/sprain	8	4.8%	18	16.7%	26	9.5%
Knee other	7	4.2%	15	13.9%	22	8.0%
Hand/wrist fracture	7	4.2%	6	5.6%	13	4.7%
Other fracture	6	3.6%	2	1.9%	8	2.9%
Shoulder other	6	3.6%	1	0.9%	7	2.5%
Shoulder strain/sprain	4	2.4%	2	1.9%	6	2.2%
Hand/wrist strain/sprain	3	1.8%	3	2.8%	6	2.2%

Figure 14.2 Time Loss of Boys' Lacrosse Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2018-19 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, 2018-19 School Year

	Competition		Practice		Overall	
	n	%	n	%	n	%
Need for surgery						
Required surgery	19	11.7%	8	7.5%	27	10.0%
Did not require surgery	143	88.3%	99	92.5%	242	90.0%
Total	162	100.0%	107	100.0%	269	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, 2018-19 School Year

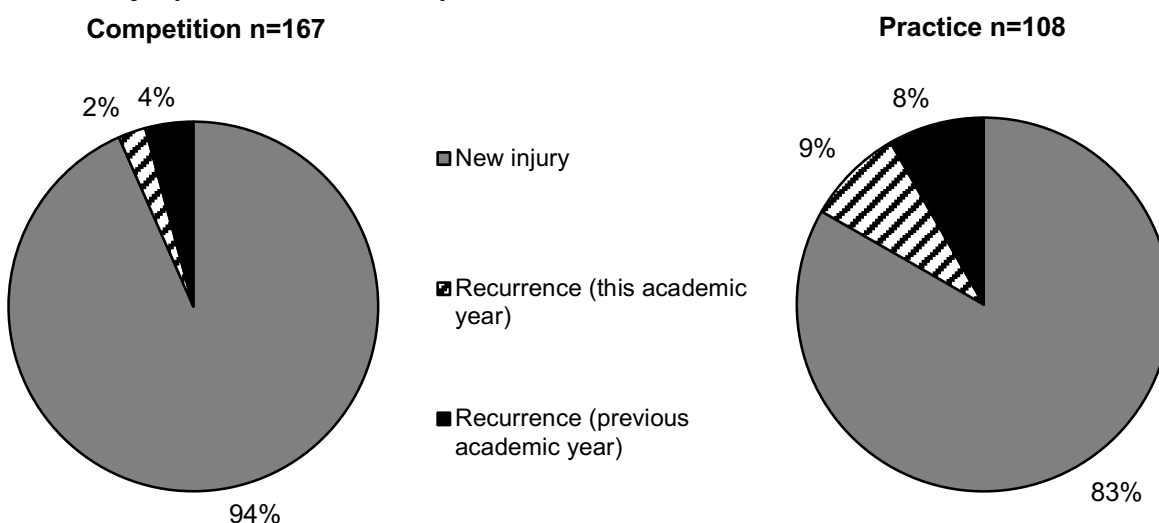


Table 14.6 Time during Season of Boys' Lacrosse Injuries, High School Sports-Related Injury Surveillance Study, US, 2017-18 School Year

	n	%
Time in Season		
Preseason	46	16.7%
Regular season	220	80.0%
Post season	9	3.3%
Total	275	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, 2018-19 School Year

	n	%
Time in Competition		
Pre-competition/warm-ups	5	3.2%
First quarter	14	9.0%
Second quarter	25	16.0%
Third quarter	48	30.8%
Fourth quarter	33	21.2%
Unknown	31	11.3%
Total	156	100.0%
Field Location		
Goal area	42	27.3%
Midfield	31	20.1%
Defensive area	23	14.9%
Wing area	9	5.8%
Sideline	4	2.6%
Crease area	4	2.6%
Unknown	41	26.6%
Total	154	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, 2018-19 School Year

	n	%
Time in Practice		
First ½ hour	11	10.4%
Second ½ hour	21	19.8%
1-2 hours into practice	52	49.1%
> 2 hours into practice	1	0.9%
Unknown	21	19.8%
Total	106	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, 2018-19 School Year

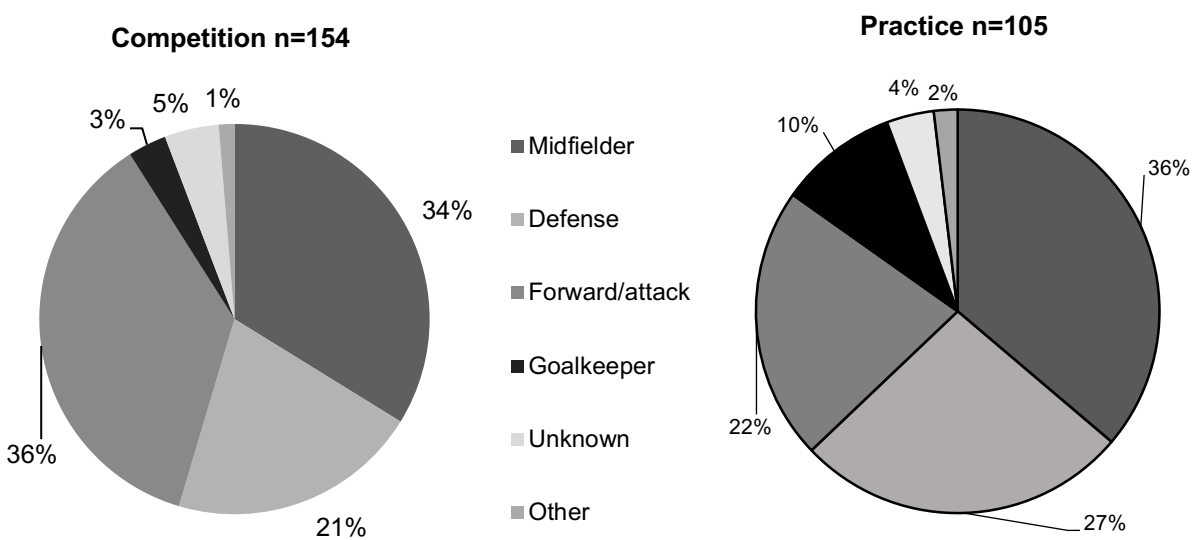


Table 14.9 Activities Leading to Boys' Lacrosse Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2018-19 School Year

	Competition		Practice		Overall	
	n	%	n	%	n	%
Activity						
General play	23	14.9%	28	26.9%	51	19.8%
Defending	18	11.7%	14	13.5%	32	12.4%
Being body checked	17	11.0%	6	5.8%	23	8.9%
Shooting	16	10.4%	6	5.8%	22	8.5%
Chasing loose ball	14	9.1%	8	7.7%	22	8.5%
Being crosse/stick checked	13	8.4%	3	2.9%	16	6.2%
Ball handling/cradling	10	6.5%	2	1.9%	12	4.7%
Goaltending	2	1.3%	8	7.7%	10	3.9%
Receiving pass	4	2.6%	3	2.9%	7	2.7%
Body checking	3	1.9%	4	3.8%	7	2.7%
Conditioning	0	0.0%	6	5.8%	6	2.3%
Blocking shot	4	2.6%	2	1.9%	6	2.3%
Crosse/stick checking	5	3.2%	0	0.0%	5	1.9%
Face-off	4	2.6%	0	0.0%	4	1.6%
Passing	1	0.6%	1	1.0%	2	0.8%
Other	1	0.6%	1	1.0%	2	0.8%
Unknown	19	12.3%	12	11.5%	31	12.0%
Total	154	100.0%	104	100.0%	258	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, 2018-19 School Year

Activity	Diagnosis									
	Strain/Sprain		Contusion		Fracture		Concussion		Other	
	n	%	n	%	n	%	n	%	n	%
General Play	27	24.8%	6	15.8%	2	7.7%	5	11.6%	11	26.8%
Defending	15	13.8%	5	13.2%	2	7.7%	2	4.7%	7	17.1%
Being Body Checked	8	7.3%	2	5.3%	3	11.5%	7	16.3%	3	7.3%
Shooting	11	10.1%	3	7.9%	4	15.4%	4	9.3%	0	0.0%
Being Crosse/Stick Checked	2	1.8%	5	13.2%	4	15.4%	1	2.3%	4	9.8%
Chasing Loose Ball	13	11.9%	3	7.9%	1	3.8%	5	11.6%	0	0.0%
Goaltending	2	1.8%	4	10.5%	3	11.5%	0	0.0%	1	2.4%
Other	20	18.3%	9	23.7%	4	15.4%	11	25.6%	7	17.1%
Unknown	11	10.1%	1	2.6%	3	11.5%	8	18.6%	8	19.5%
Total	109	100.0%	38	100.0%	26	100.0%	43	100.0%	41	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, 2018-19 School Year

	# Injuries	# Exposures	Injury rate (per 1,000 athlete- exposures)
Total	177	105,532	1.68
Competition	101	32,319	3.13
Practice	76	73,213	1.04

Table 15.2 Demographic Characteristics of Injured Girls' Lacrosse Athletes, High School Sports-Related Injury Surveillance Study, US, 2018-19 School Year*

Year in School	n=170
Freshman	27.6%
Sophomore	22.4%
Junior	25.3%
Senior	24.7%
Total	100.0%
Age (years)	
Minimum	13
Maximum	18
Mean (St. Dev.)	15.9 (1.3)
BMI	
Minimum	15.8
Maximum	36.2
Mean (St. Dev.)	22.0 (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 15.1 Diagnosis of Girls' Lacrosse Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2018-19 School Year

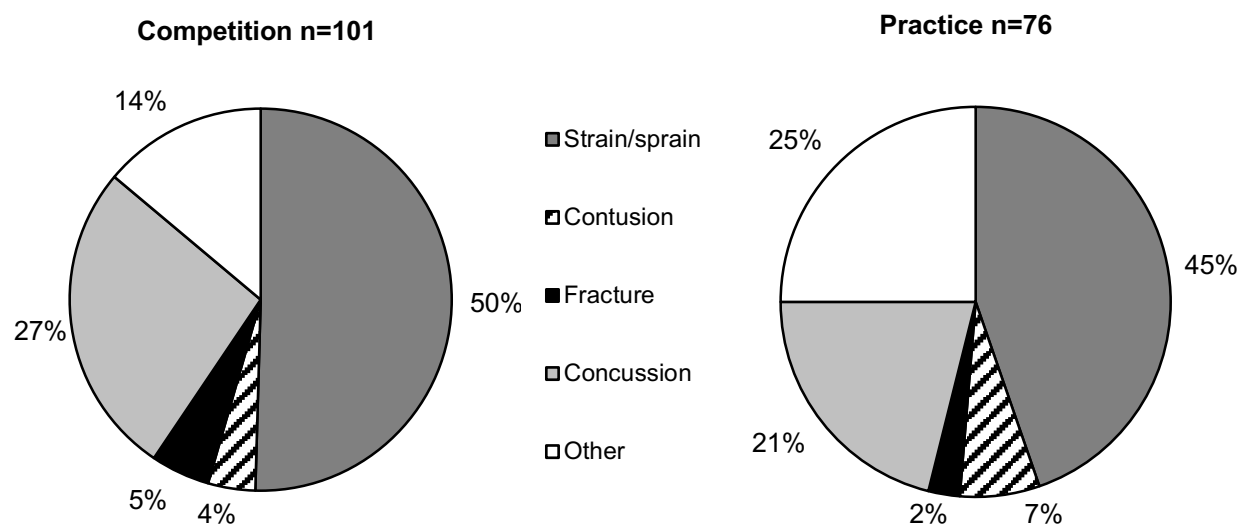


Table 15.3 Body Site of Girls' Lacrosse Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2018-19 School Year

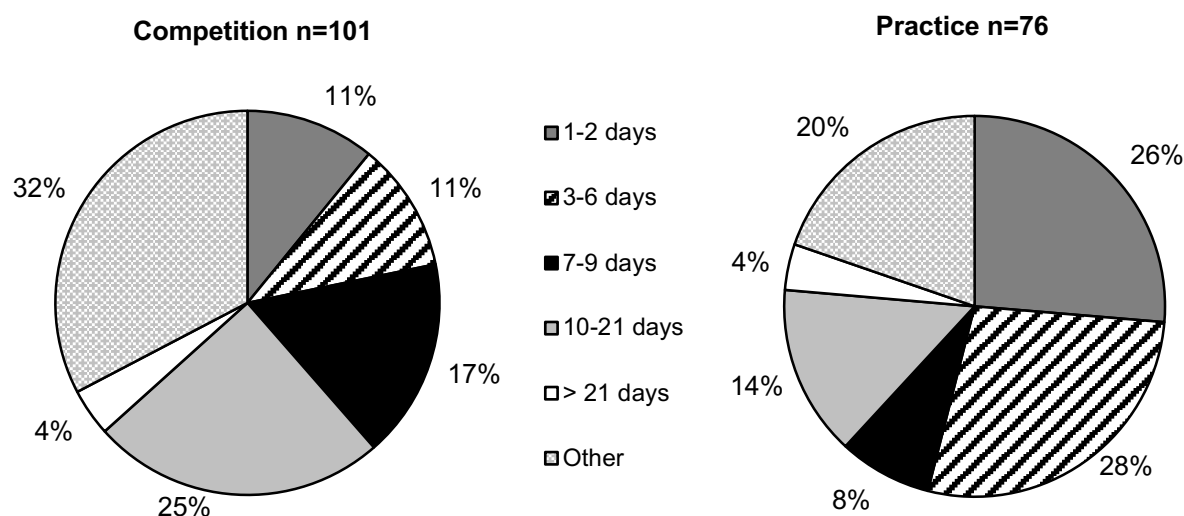
	Competition		Practice		Overall	
	n	%	n	%	n	%
Body Site						
Head/face	28	27.7%	19	25.0%	47	26.6%
Ankle	23	22.8%	15	19.7%	38	21.5%
Knee	27	26.7%	13	17.1%	40	22.6%
Lower leg	3	3.0%	6	7.9%	9	5.1%
Hip/thigh/upper leg	10	9.9%	6	7.6%	16	9.0%
Trunk	1	1.0%	5	6.6%	6	3.4%
Hand/wrist	3	3.0%	3	3.9%	6	3.4%
Foot	2	2.0%	6	7.9%	8	4.5%
Shoulder	2	2.0%	0	0.0%	2	1.1%
Neck	1	1.0%	1	1.3%	2	1.1%
Other	1	0.0%	2	2.6%	3	1.7%
Total	101	100.0%	76	100.0%	177	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, 2018-19 School Year

Diagnosis	Competition n=101		Practice n=76		Total n=177	
	n	%	n	%	n	%
Head/face concussion	27	26.7%	16	21.1%	43	24.3%
Ankle strain/sprain	20	19.8%	14	18.4%	34	19.2%
Knee strain/sprain	19	18.8%	6	7.9%	25	14.1%
Knee other	8	7.9%	7	9.2%	15	8.5%
Hip/thigh/upper leg strain/sprain	8	7.9%	4	5.3%	12	6.8%
Lower leg other	1	1.0%	3	3.9%	4	2.3%
Head/face contusion	1	1.0%	3	3.9%	4	2.3%
Trunk strain/sprain	1	1.0%	3	3.9%	4	2.3%
Hand wrist fracture	2	2.0%	1	1.3%	3	1.7%
Foot strain/sprain	1	1.0%	2	2.6%	3	1.7%

Figure 15.2 Time Loss of Girls' Lacrosse Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2018-19 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, 2018-19 School Year

	Competition		Practice		Overall	
	n	%	n	%	n	%
Need for surgery						
Required surgery	18	18.0%	3	3.9%	21	11.9%
Did not require surgery	82	82.0%	73	96.1%	155	88.1%
Total	100	100.0%	76	100.0%	176	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, 2018-19 School Year

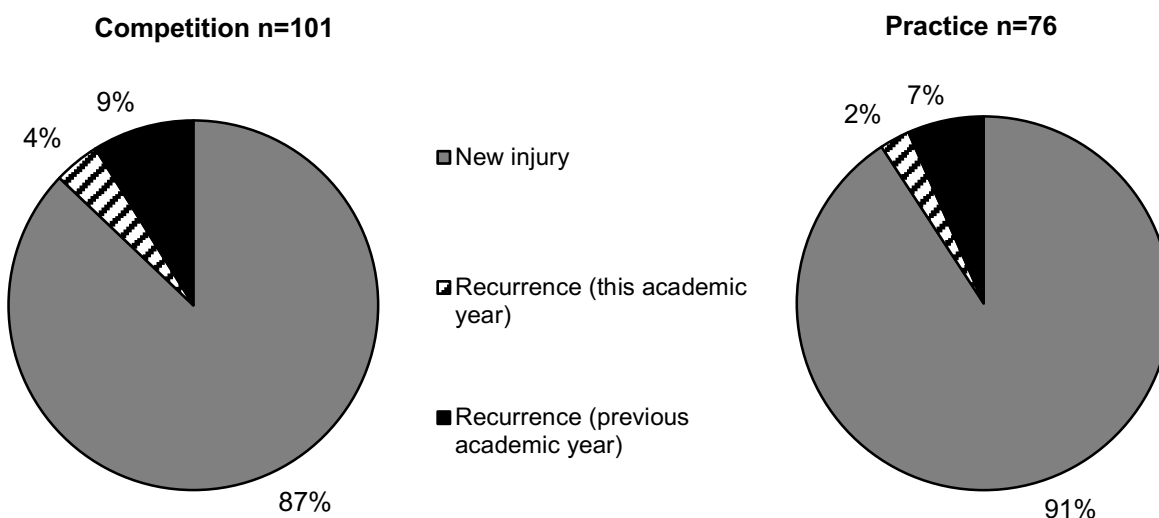


Table 15.6 Time during Season of Girls' Lacrosse Injuries, High School Sports-Related Injury Surveillance Study, US, 2018-19 School Year

	n	%
Time in Season		
Preseason	23	13.0%
Regular season	147	83.1%
Post season	7	4.0%
Total	177	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, 2018-19 School Year

	n	%
Time in Competition		
Pre-Competition-Warm-ups	2	2.1%
First half	31	32.6%
Second half	45	47.4%
Overtime	0	0.0%
Unknown	17	17.9%
Total	95	100.0%
Field Location		
Midfield (between restraining lines)	25	26.0%
Critical scoring area (including the fan and arc)	22	22.9%
Goal circle	14	14.6%
Sideline	5	5.2%
Center circle	1	1.0%
Endline	1	1.0%
Unknown	28	29.2%
Total	96	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, 2018-19 School Year

	n	%
Time in Practice		
First 1/2 hour	9	12.2%
Second 1/2 hour	12	16.2%
1-2 hours into practice	33	44.6%
>2 hours into practice	4	5.4%
Unknown	16	21.6%
Total	74	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, 2018-19 School Year

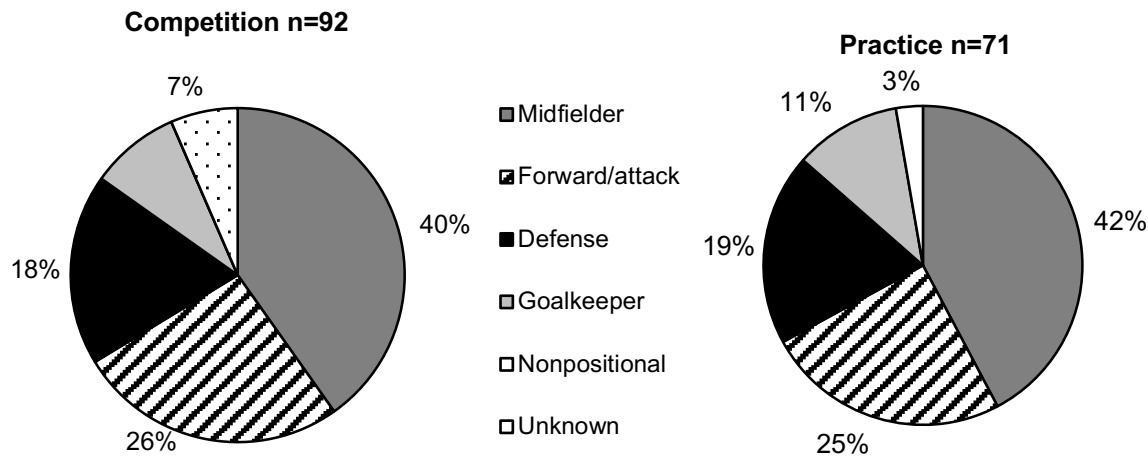


Table 15.9 Activities Leading to Girls' Lacrosse Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2018-19 School Year

Activity	Competition		Practice		Overall	
	n	%	n	%	n	%
General play	13	13.5%	22	31.0%	35	21.0%
Ball handling/cradling	8	8.3%	1	1.4%	9	5.4%
Receiving pass	4	4.2%	8	11.3%	12	7.2%
Defending	16	16.7%	6	8.5%	22	13.2%
Chasing loose ball	15	15.6%	3	4.2%	18	10.8%
Conditioning	0	0.0%	9	12.7%	9	5.4%
Shooting	5	5.2%	2	2.8%	7	4.2%
Being crosse/stick checked	6	6.3%	0	0.0%	6	3.6%
Passing	1	1.0%	1	1.4%	2	1.2%
Blocking shot	1	1.0%	0	0.0%	1	0.6%
Crosse/stick checking	0	0.0%	1	1.4%	1	0.6%
Goaltending	7	7.3%	6	8.5%	13	7.8%
Being body checked	2	2.1%	0	0.0%	2	1.2%
Face off	1	1.0%	0	0.0%	1	0.6%
Other	0	0.0%	2	2.8%	2	1.2%
Unknown	17	17.7%	9	12.7%	26	15.6%
Total	96	100.0%	71	100.0%	167	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, 2018-19 School Year

	Diagnosis									
	Strain/Sprain		Contusion		Fracture		Concussion		Other	
	n	%	n	%	n	%	n	%	n	%
Activity										
General play	15	19.0%	1	11.1%	2	33.3%	4	9.8%	13	40.6%
Ball handling/cradling	7	8.9%	0	0.0%	0	0.0%	1	2.4%	1	3.1%
Receiving pass	4	5.1%	3	33.3%	0	0.0%	5	12.2%	0	0.0%
Defending	13	16.5%	2	22.2%	0	0.0%	6	14.6%	1	3.1%
Chasing loose ball	11	13.9%	1	11.1%	1	16.7%	3	7.3%	2	6.3%
Conditioning	3	3.8%	1	11.1%	0	0.0%	0	0.0%	5	15.6%
Shooting	4	5.1%	0	0.0%	0	0.0%	0	0.0%	3	9.4%
Being crosse/stick checked	1	1.3%	1	11.1%	0	0.0%	3	7.3%	1	3.1%
Passing	1	1.3%	0	0.0%	0	0.0%	1	2.4%	0	0.0%
Blocking shot	0	0.0%	0	0.0%	0	0.0%	1	2.4%	0	0.0%
Crosse/stick checking	1	1.3%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Goaltending	2	2.5%	0	0.0%	0	0.0%	11	26.8%	0	0.0%
Being body checked	2	2.5%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Face off	0	0.0%	0	0.0%	1	16.7%	0	0.0%	0	0.0%
Unknown	15	19.0%	0	0.0%	1	16.7%	6	14.6%	4	12.5%
Total	79	100.0%	9	100.0%	6	100.0%	41	100.0%	32	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, 2018-19 School Year

	# Injuries	# Exposures	Injury rate (per 1,000 athlete-exposures)
Total	14	85,434	0.16
Competition	4	15,444	0.26
Practice	10	69,990	0.14

Table 16.2 Demographic Characteristics of Injured Boys' Swimming and Diving Athletes, High School Sports-Related Injury Surveillance Study, US, 2018-19 School Year*

Year in School	n=13
Freshman	15.4%
Sophomore	23.1%
Junior	23.1%
Senior	38.5%
Total†	100.0%
Age (years)	
Minimum	15
Maximum	18
Mean (St. Dev.)	16.5 (1.0)
BMI	
Minimum	19.1
Maximum	25.8
Mean (St. Dev.)	21.7 (2.1)

*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 16.1 Diagnosis of Boys' Swimming and Diving Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2018-19 School Year

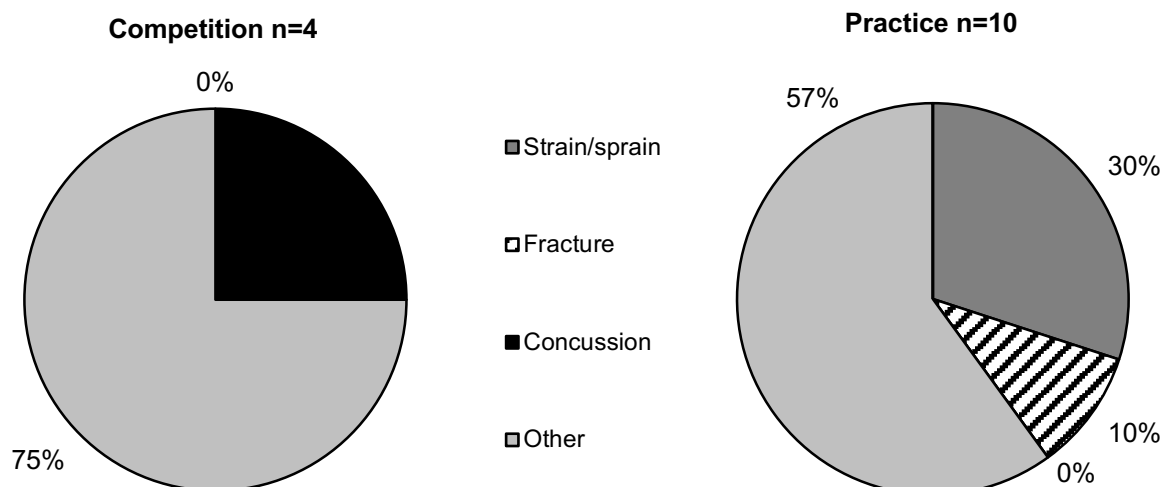


Table 16.3 Body Site of Boys' Swimming and Diving Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2018-19 School Year

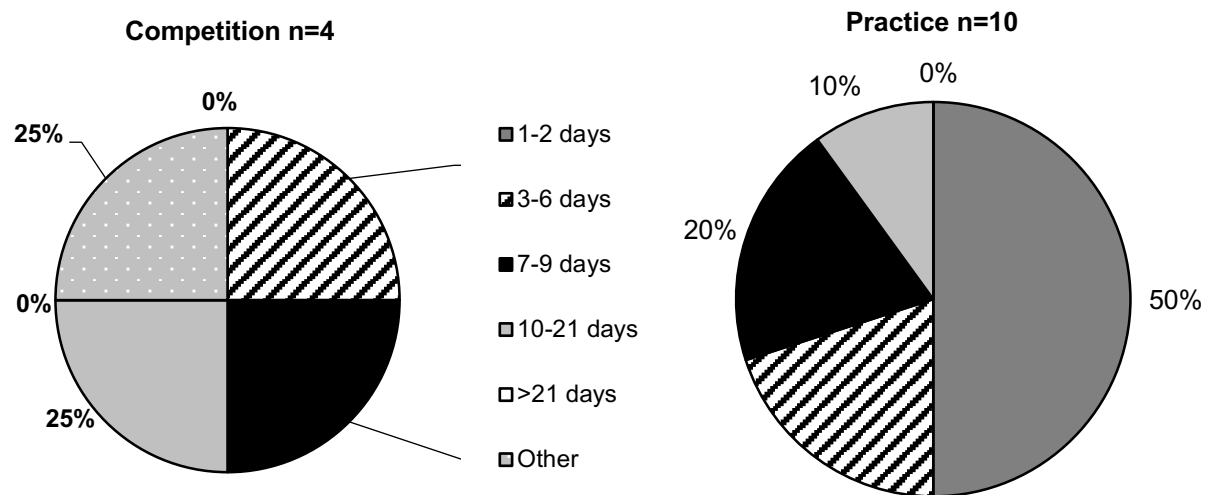
	Competition		Practice		Overall	
	n	%	n	%	n	%
Body Site						
Shoulder	1	25.0%	7	70.0%	8	57.1%
Head/face	1	25.0%	1	10.0%	2	14.3%
Foot	0	0.0%	0	0.0%	0	0.0%
Arm/elbow	2	50.0%	0	0.0%	2	14.3%
Hip/thigh/upper leg	0	0.0%	1	10.0%	1	7.1%
Trunk	0	0.0%	1	10.0%	1	7.1%
Total	4	100.0%	10	100.0%	14	100.0%

†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, 2018-19 School Year

Diagnosis	Competition n=4		Practice n=10		Total n=14	
	n	%	n	%	n	%
Shoulder other	1	25.0%	5	50.0%	6	42.8%
Head/face concussion	1	25.0%	1	10.0%	2	14.3%
Shoulder strain/sprain	0	0.0%	2	20.0%	2	14.3%
Arm/elbow other	2	50.0%	0	0.0%	2	14.3%
Hip/thigh/upper leg other	0	0.0%	1	10.0%	1	7.1%
Trunk strain/sprain	0	0.0%	1	10.0%	1	7.1%

Figure 16.2 Time Loss of Boys' Swimming and Diving Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2018-19 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, 2018-19 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%	10	100.0%	14	100.0%
Total	4	100.0%	10	100.0%	14	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, 2018-19 School Year

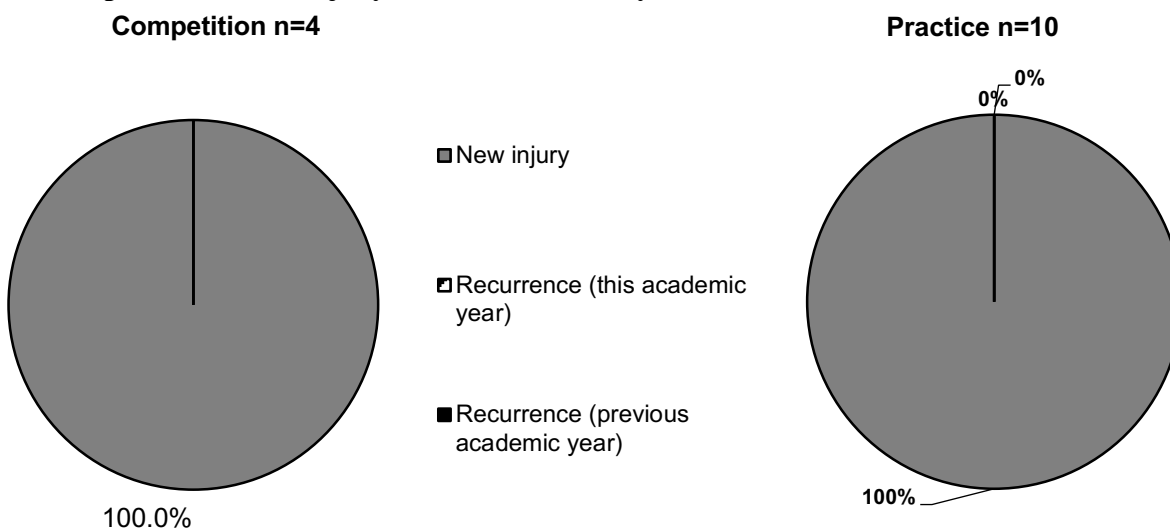


Table 16.6 Time during Season of Boys' Swimming and Diving Injuries, High School Sports-Related Injury Surveillance Study, US, 2018-19 School Year

	n	%
Time in Season		
Preseason	0	0.0%
Regular season	12	92.3%
Post season	1	7.7%
Total	13	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, 2018-19 School Year

	n	%
Pool Location		
In pool	12	100.0%
Poolside	0	0.0%
Unknown	0	0.0%
Total	12	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, 2018-19 School Year

	n	%
Time in Practice		
First 1/2 hour	0	0.0%
Second 1/2 hour	2	20.0%
1-2 hours into practice	2	20.0%
>2 hours into practice	0	0.0%
Unknown	6	60.0%
Total	10	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, 2018-19 School Year

	Competition		Practice		Overall	
	n	%	n	%	n	%
Activity						
Swimming	1	33.3%	8	88.9%	9	75.0%
Flip turn off wall	0	0.0%	0	0.0%	0	0.0%
Conditioning	0	0.0%	1	11.1%	1	8.3%
Diving off board/platform/block	1	33.3%	0	0.0%	1	8.3%
Other	1	33.3%	0	0.0%	1	8.3%
Unknown	0	0.0%	0	0.0%	0	0.0%
Total	3	100.0%	9	100.0%	12	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, 2018-19 School Year

	Diagnosis									
	Strain/Sprain		Contusion		Fracture		Concussion		Other	
	n	%	n	%	n	%	n	%	n	%
Activity										
Swimming	1	50.0%	0	0.0%	0	0.0%	1	50.0%	7	87.5%
Flip turn off wall	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Conditioning	1	50.0%	0	0.0%	0	0.0%	0	0.0%	0	40.0%
Diving off board/platform/block	0	0.0%	0	0.0%	0	0.0%	1	50.0%	0	0.0%
Other	0	0.0%	0	0.0%	0	0.0%	0	0.0%	1	12.5%
Unknown	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Total	2	100.0%	0	100.0%	0	0.0%	2	100.0%	8	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, 2018-19 School Year

	# Injuries	# Exposures	Injury rate (per 1,000 athlete- exposures)
Total	28	106,201	0.26
Competition	2	20,500	0.10
Practice	26	85,701	0.30

Table 17.2 Demographic Characteristics of Injured Girls' Swimming and Diving Athletes, High School Sports-Related Injury Surveillance Study, US, 2018-19 School Year*

Year in School	n=26
Freshman	19.2%
Sophomore	34.6%
Junior	34.6%
Senior	11.5%
Total[†]	100.0%
Age (years)	
Minimum	13
Maximum	18
Mean (St. Dev.)	15.4 (1.4)
BMI	
Minimum	17.8
Maximum	31.3
Mean (St. Dev.)	22.4 (3.6)

*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 17.1 Diagnosis of Girls' Swimming and Diving Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2018-19 School Year

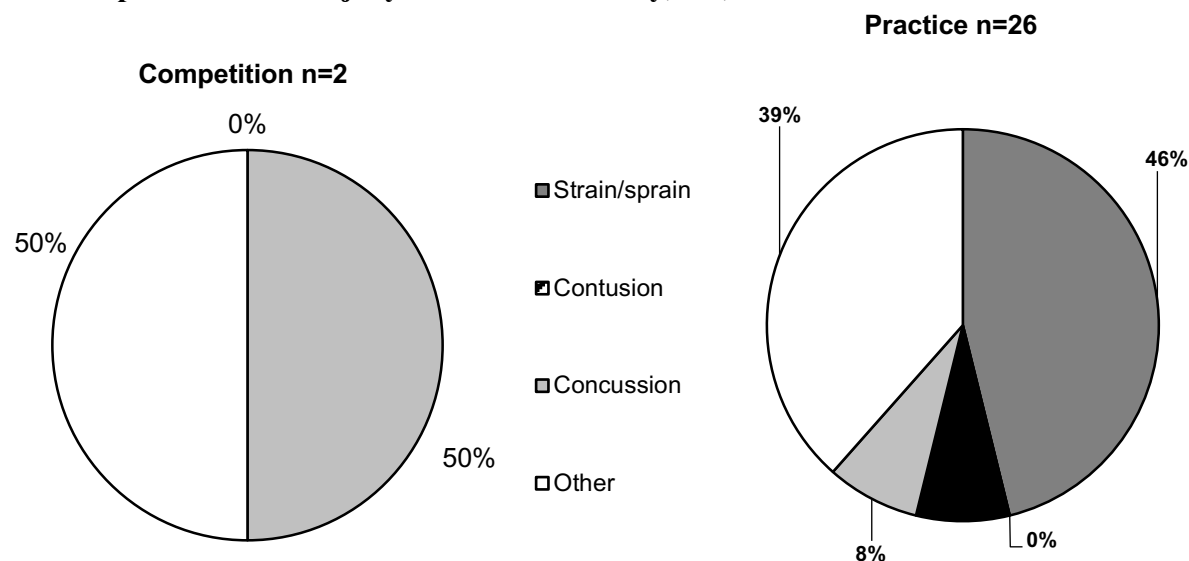


Table 17.3 Body Site of Girls' Swimming and Diving Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2018-19 School Year

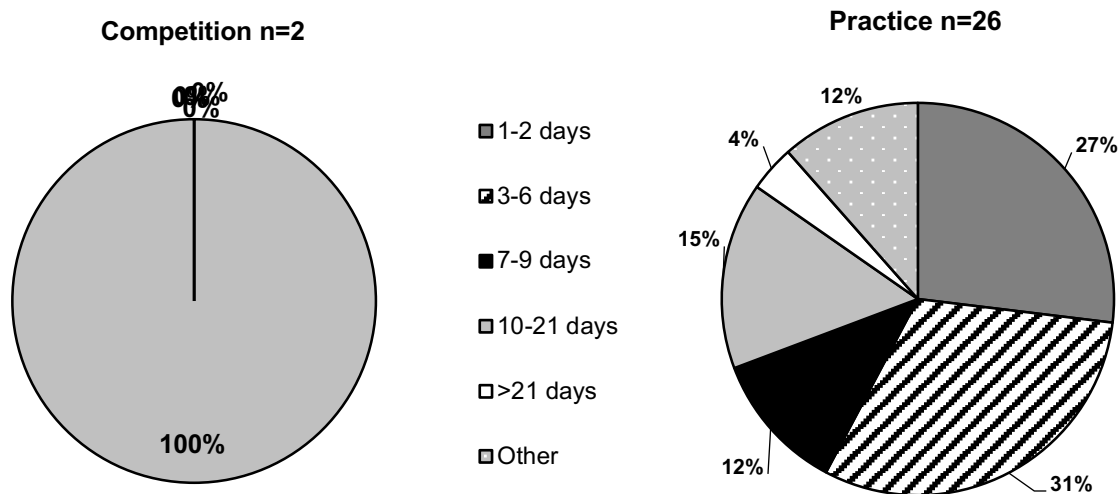
	Competition		Practice		Overall	
	n	%	n	%	n	%
Body Site						
Shoulder	0	0.0%	14	53.8%	14	50.0%
Head/face	1	50.0%	3	11.5%	4	14.3%
Arm/elbow	1	50.0%	2	7.7%	3	10.7%
Ankle	0	0.0%	2	7.7%	2	7.1%
Lower leg	0	0.0%	1	3.8%	1	3.6%
Trunk	0	0.0%	1	3.8%	1	3.6%
Hip/thigh/upper leg	0	0.0%	1	3.8%	1	3.6%
Hand/wrist	0	0.0%	1	3.8%	1	3.6%
Foot	0	0.0%	1	3.8%	1	3.6%
Knee	0	0.0%	0	0.0%	0	0.0%
Other	0	0.0%	0	0.0%	0	0.0%
Total	2	100.0%	26	100.0%	28	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, 2018-19 School Year

Diagnosis	Competition n=2		Practice n=26		Total n=28	
	n	%	n	%	n	%
Shoulder strain/sprain	0	0.0%	7	26.9%	7	25.0%
Shoulder other	0	0.0%	7	26.9%	7	25.0%
Head/face concussion	1	50.0%	2	7.7%	3	10.7%
Foot strain/sprain	0	0.0%	1	3.8%	1	3.6%
Arm/elbow other	1	50.0%	0	0.0%	1	3.6%
Trunk strain/sprain	0	0.0%	1	3.8%	1	3.6%
Arm/elbow strain/sprain	0	0.0%	1	3.8%	1	3.6%
Hip/thigh/upper leg strain/sprain	0	0.0%	1	3.8%	1	3.6%
Foot strain/sprain	0	0.0%	1	3.8%	1	3.6%
Hand/wrist fracture	0	0.0%	1	3.8%	1	3.6%
Ankle strain/sprain	0	0.0%	1	3.8%	1	3.6%

Figure 17.2 Time Loss of Girls' Swimming and Diving Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2018-19 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, 2018-19 School Year

	Competition		Practice		Overall	
	n	%	n	%	n	%
Need for surgery						
Required surgery	0	0.0%	1	3.8%	1	3.6%
Did not require surgery	2	100.0%	25	96.2%	27	96.4%
Total	2	100.0%	26	100.0%	28	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, 2018-19 School Year

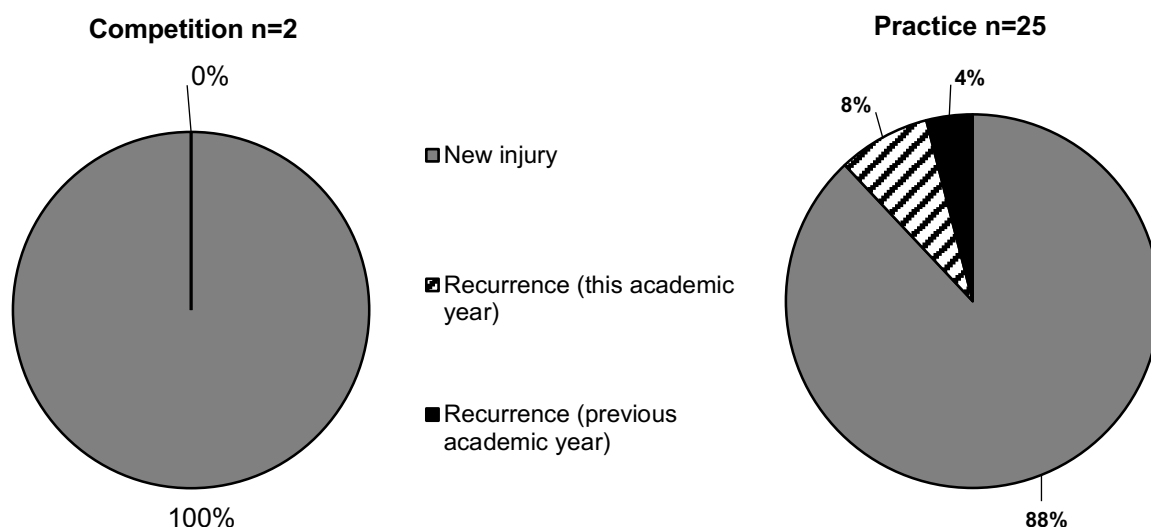


Table 17.6 Time during Season of Girls' Swimming and Diving Injuries, High School Sports-Related Injury Surveillance Study, US, 2018-19 School Year

	n	%
Time in Season		
Preseason	5	17.9%
Regular season	22	78.6%
Post season	1	3.6%
Total	28	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, 2018-19 School Year

	n	%
Pool Location		
In pool	23	85.2%
Poolside	2	7.4%
Starting platform/board/block	1	3.7%
Other	1	3.7%
Total	27	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, 2018-19 School Year

	n	%
Time in Practice		
First 1/2 hour	2	7.7%
Second 1/2 hour	4	15.4%
1-2 hours into practice	5	19.2%
>2 hours into practice	2	7.7%
Unknown	13	50.0%
Total	26	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, 2018-19 School Year

	Competition		Practice		Overall	
	n	%	n	%	n	%
Activity						
Swimming	1	50.0%	16	64.0%	17	63.0%
Conditioning	0	0.0%	5	20.0%	5	18.5%
Flip turn off wall	0	0.0%	1	4.0%	1	3.7%
Start	0	0.0%	1	4.0%	1	3.7%
Other	1	50.0%	2	8.0%	3	11.1%
Total	2	100.0%	25	100.0%	27	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, 2018-19 School Year

	Diagnosis									
	Strain/Sprain		Contusion		Fracture		Concussion		Other	
	n	%	n	%	n	%	n	%	n	%
Activity										
Swimming	5	41.7%	0	0.0%	1	50.0%	2	66.7%	9	90.0%
Conditioning	4	33.3%	0	0.0%	0	0.0%	0	0.0%	1	10.0%
Flip turn off wall	1	8.3%	0	0.0%	0	0.0%	0	28.6%	0	0.0%
Start	1	8.3%	0	0.0%	0	0.0%	0	14.3%	0	0.0%
Other	1	8.3%	0	0.0%	1	50.0%	1	33.3%	0	0.0%
Total	12	100.0%	0	0.0%	2	100.0%	3	100.0%	10	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, 2018-19 School Year

	# Injuries	# Exposures	Injury rate (per 1,000 athlete-exposures)
Total	164	260,689	0.63
Competition	53	46,570	1.14
Practice	111	214,119	0.52

Table 18.2 Demographic Characteristics of Injured Boys' Track and Field Athletes, High School Sports-Related Injury Surveillance Study, US, 2018-19 School Year*

Year in School	n=162
Freshman	17.9%
Sophomore	24.7%
Junior	27.2%
Senior	30.2%
Total†	100.0%
Age (years)	
Minimum	13
Maximum	18
Mean (St. Dev.)	16.2 (1.2)
BMI	
Minimum	17.6
Maximum	40.9
Mean (St. Dev.)	23.1 (4.4)

*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 18.1 Diagnosis of Boys' Track and Field Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2018-19 School Year

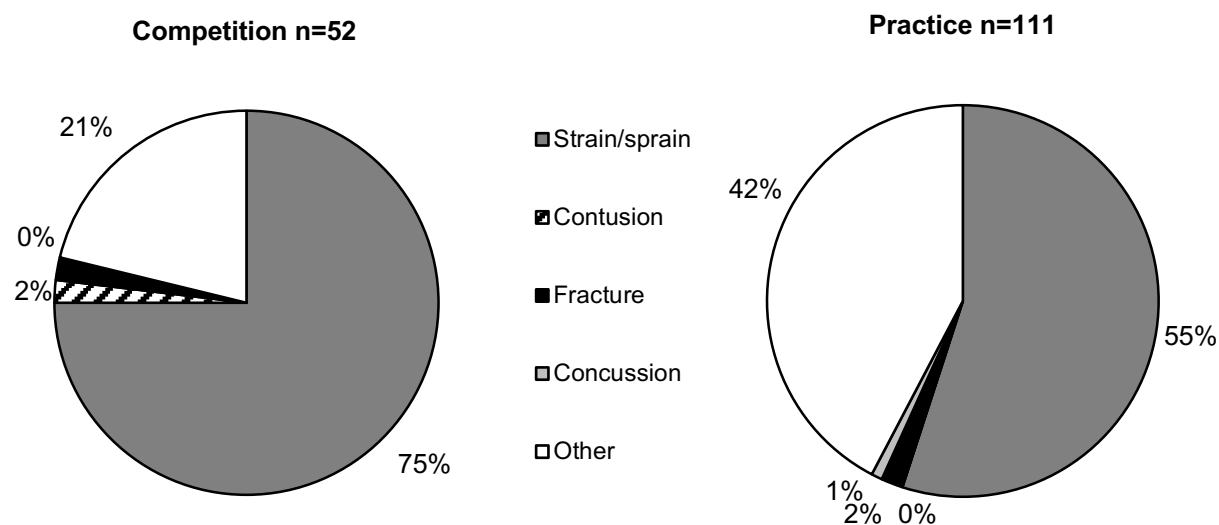


Table 18.3 Body Site of Boys' Track and Field Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2018-19 School Year

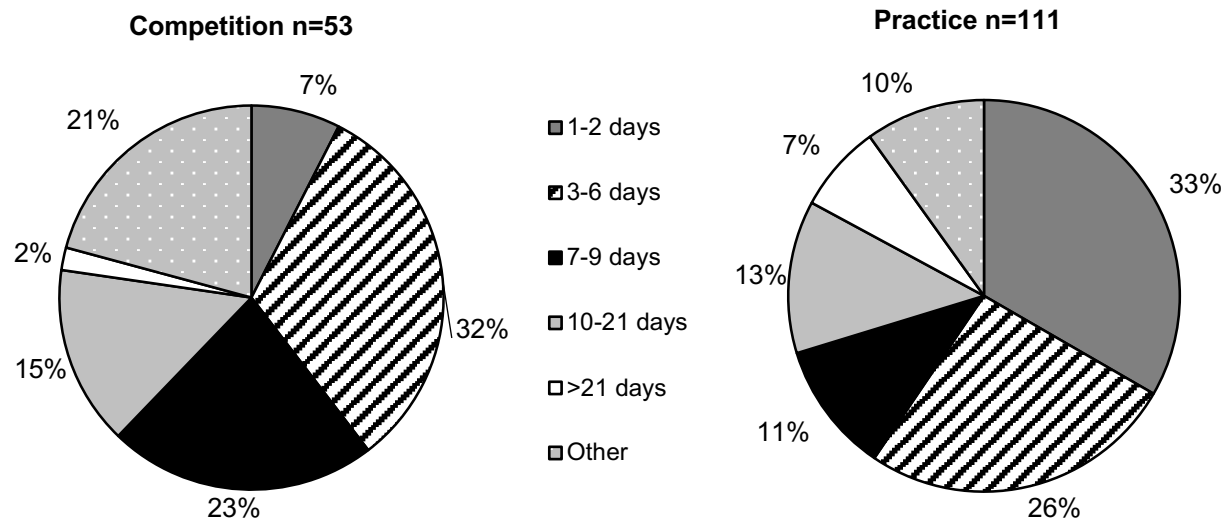
	Competition		Practice		Overall	
	n	%	n	%	n	%
Body Site						
Hip/thigh/upper leg	31	58.5%	43	38.7%	74	45.1%
Lower leg	2	3.8%	26	23.4%	28	17.1%
Knee	4	7.5%	15	13.5%	19	11.6%
Ankle	6	11.3%	7	6.3%	13	7.9%
Trunk	2	3.8%	7	6.3%	9	5.5%
Foot	4	7.5%	5	4.5%	9	5.5%
Shoulder	1	1.9%	1	0.9%	2	1.2%
Arm/elbow	1	1.9%	1	0.9%	2	1.2%
Hand/wrist	1	1.9%	1	0.9%	2	1.2%
Head/face	0	0.0%	1	0.9%	1	0.6%
Other	1	1.9%	4	3.6%	5	3.0%
Total	53	100.0%	111	100.0%	164	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, 2018-19 School Year

Diagnosis	Competition n=53		Practice n=111		Total N=164	
	n	%	n	%	n	%
Hip/thigh/upper leg strain/sprain	27	50.9%	38	34.2%	65	39.6%
Lower leg other	2	3.8%	20	18.0%	22	13.4%
Ankle strain/sprain	6	11.3%	7	6.3%	13	7.9%
Knee other	1	1.9%	11	9.9%	12	7.3%
Hip/thigh/upper leg other	4	7.5%	5	4.5%	9	5.5%
Knee strain/sprain	2	3.8%	4	3.6%	6	3.7%
Lower leg strain/sprain	0	0.0%	6	5.4%	6	3.7%
Foot other	2	3.8%	3	2.7%	5	3.0%
Trunk strain/sprain	2	3.8%	3	2.7%	5	3.0%
Trunk other	0	0.0%	4	3.6%	4	2.4%

Figure 18.2 Time Loss of Boys' Track and Field Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2018-19 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, 2018-19 School Year

	Competition		Practice		Overall	
	n	%	n	%	n	%
Need for surgery						
Required surgery	2	3.8%	1	0.9%	3	1.9%
Did not require surgery	50	96.2%	109	99.1%	159	98.1%
Total	52	100.0%	110	100.0%	162	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, 2018-19 School Year

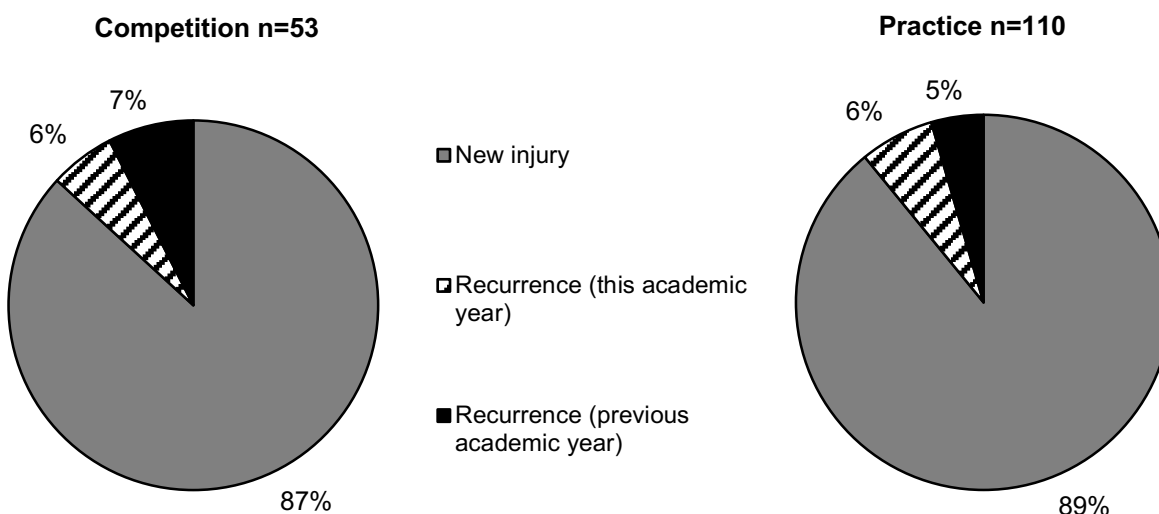


Table 18.6 Time during Season of Boys' Track and Field Injuries, High School Sports-Related Injury Surveillance Study, US, 2018-19 School Year

	n	%
Time in Season		
Preseason	38	23.2%
Regular season	122	74.4%
Post season	4	2.4%
Total	164	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, 2018-19 School Year

	n	%
Time in Practice		
First 1/2 hour	6	5.5%
Second 1/2 hour	17	15.6%
1-2 hours into practice	39	35.8%
>2 hours into practice	2	1.8%
Unknown	45	41.3%
Total	109	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, 2018-19 School Year

	Competition		Practice		Overall	
	n	%	n	%	n	%
Activity						
Running	38	74.5%	61	61.6%	99	66.0%
Jumping/landing	8	15.7%	8	8.1%	16	10.7%
Running hurdles	3	3.9%	3	3.0%	6	3.3%
Throwing	1	2.0%	2	2.0%	3	2.0%
Warming up	1	2.0%	2	2.0%	3	2.0%
Conditioning	0	0.0%	3	3.0%	3	2.0%
Leaving block	0	0.0%	3	3.0%	3	2.0%
Baton hand off	1	2.0%	1	1.0%	2	1.3%
Other	0	0.0%	3	3.0%	3	2.0%
Unknown	0	0.0%	13	13.1%	13	8.7%
Total	51	100.0%	99	100.0%	150	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, 2018-19 School Year

Activity	Diagnosis									
	Strain/Sprain		Contusion		Fracture		Concussion		Other	
	n	%	n	%	n	%	n	%	n	%
Running	62	63.9%	0	0.0%	2	66.7%	0	0.0%	35	72.9%
Jumping/landing	14	14.4%	0	0.0%	0	0.0%	0	0.0%	2	4.2%
Running hurdles	2	2.1%	0	0.0%	1	33.3%	0	0.0%	2	4.2%
Throwing	2	2.1%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Warming up	1	1.0%	0	0.0%	0	0.0%	0	0.0%	2	4.2%
Conditioning	1	1.0%	0	0.0%	0	0.0%	0	0.0%	2	4.2%
Leaving block	3	3.1%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Baton hand off	2	2.1%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Other	0	0.0%	0	0.0%	0	0.0%	1	100.0%	2	4.2%
Unknown	10	10.3%	0	0.0%	0	0.0%	0	0.0%	3	6.3%
Total	97	100.0%	0	0.0%	3	100.0%	1	100.0%	48	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, 2018-19 School Year

	# Injuries	# Exposures	Injury rate (per 1,000 athlete-exposures)
Total	230	220,562	1.04
Competition	57	39,358	1.45
Practice	173	181,204	0.95

Table 19.2 Demographic Characteristics of Injured Girls' Track and Field Athletes, High School Sports-Related Injury Surveillance Study, US, 2018-19 School Year*

Year in School	n=226
Freshman	28.3%
Sophomore	29.2%
Junior	25.2%
Senior	17.3%
Total†	100.0%
Age (years)	
Minimum	13
Maximum	18
Mean (St. Dev.)	15.8 (1.2)
BMI	
Minimum	15.6
Maximum	32.9
Mean (St. Dev.)	21.4 (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, 2018-19 School Year

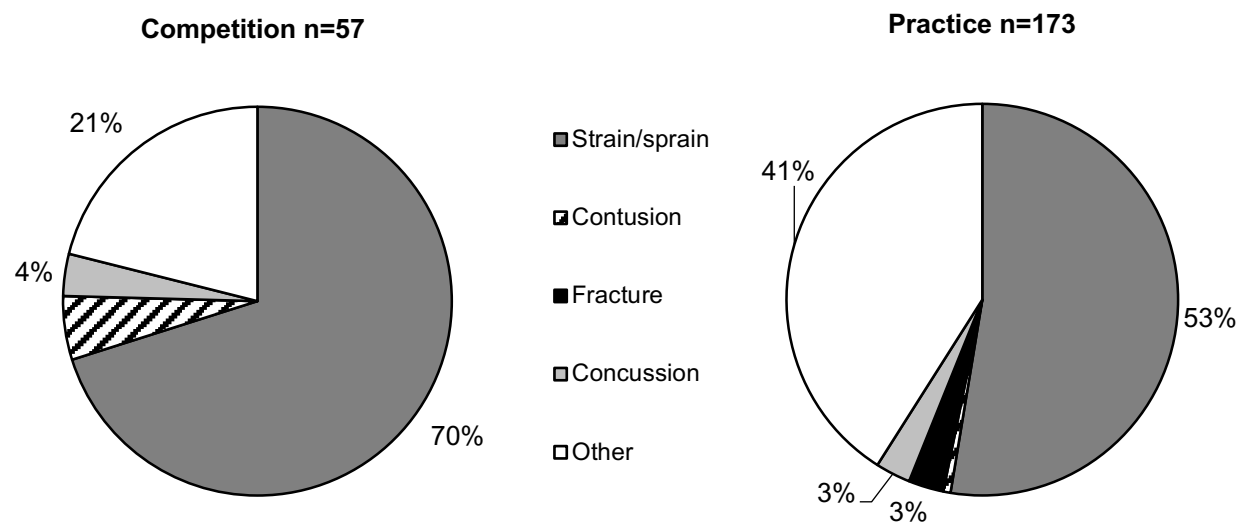


Table 19.3 Body Site of Girls' Track and Field Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2018-19 School Year

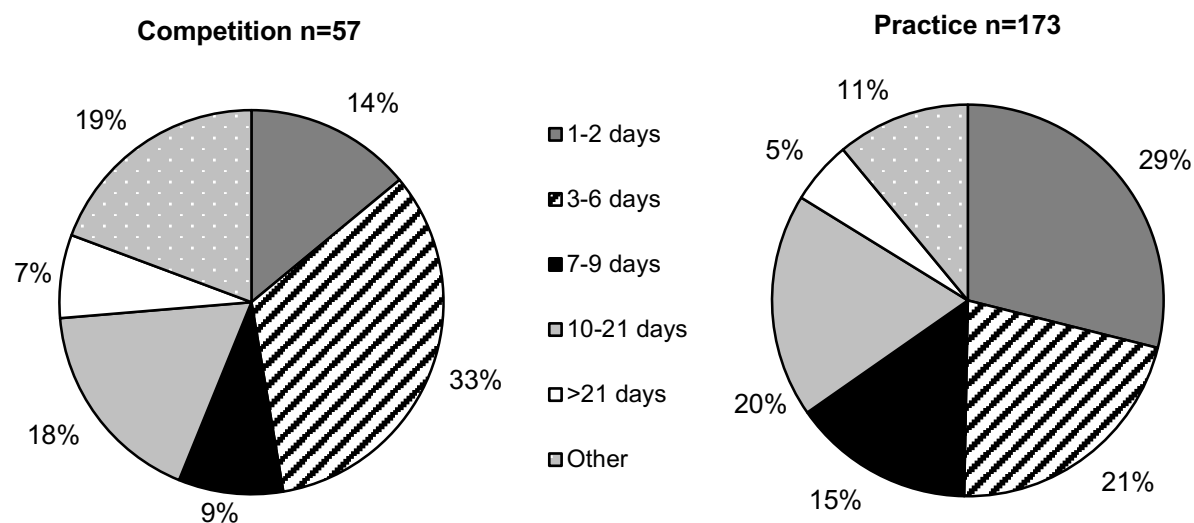
	Competition		Practice		Overall	
	n	%	n	%	n	%
Body Site						
Lower leg	8	14.0%	54	31.2%	62	27.0%
Hip/thigh/upper leg	15	26.3%	46	26.6%	61	26.5%
Ankle	11	19.3%	18	10.4%	29	12.6%
Knee	10	17.5%	12	6.9%	22	9.6%
Trunk	6	10.5%	10	5.8%	16	7.0%
Foot	1	1.8%	14	8.1%	15	6.5%
Head/face	2	3.5%	8	4.6%	10	4.3%
Shoulder	1	1.8%	3	1.7%	4	1.7%
Hand/wrist	0	0.0%	3	1.7%	3	1.3%
Arm/elbow	1	1.8%	2	1.2%	3	1.3%
Neck	0	0.0%	1	0.6%	1	0.4%
Other	2	3.5%	2	1.2%	4	1.7%
Total	57	100.0%	173	100.0%	230	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, 2018-19 School Year

	Competition n=57		Practice n=173		Total n=230	
	n	%	n	%	n	%
Diagnosis						
Hip/thigh/upper leg strain/sprain	14	24.6%	42	24.2%	56	24.3%
Lower leg other	3	5.2%	44	25.4%	47	20.4%
Ankle strain/sprain	10	17.5%	18	10.4%	28	12.2%
Knee other	3	5.2%	11	6.4%	14	6.1%
Lower leg strain/sprain	4	7.0%	10	5.8%	14	6.1%
Trunk strain/sprain	5	8.8%	7	4.0%	12	5.2%
Foot strain/sprain	1	0.2%	10	5.8%	11	4.8%
Head/face concussion	2	3.5%	5	2.9%	7	3.0%
Knee strain/sprain	6	10.5%	1	0.6	7	3.0%
Hip/thigh/upper leg other	1	1.8%	4	2.3%	5	2.2%

Figure 19.2 Time Loss of Girls' Track and Field Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2018-19 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, 2018-19 School Year

	Competition		Practice		Overall	
	n	%	n	%	n	%
Need for surgery						
Required surgery	1	1.8%	1	0.6%	2	0.9%
Did not require surgery	55	98.3%	172	99.4%	227	99.1%
Total	56	100.0%	173	100.0%	229	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, 2018-19 School Year

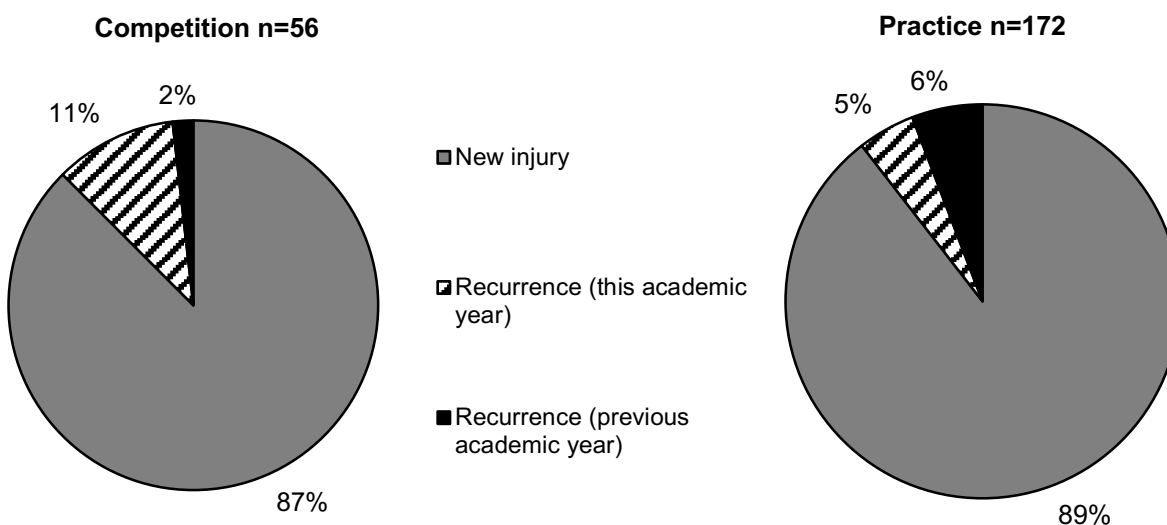


Table 19.6 Time during Season of Girls' Track and Field Injuries, High School Sports-Related Injury Surveillance Study, US, 2018-19 School Year

	n	%
Time in Season		
Preseason	53	23.1%
Regular season	170	74.2%
Post season	6	2.6%
Total	229	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, 2018-19 School Year

	n	%
Time in Practice		
First 1/2 hour	21	13.6%
Second 1/2 hour	22	14.3%
1-2 hours into practice	56	36.4%
>2 hours into practice	2	1.3%
Unknown	53	34.4%
Total	154	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, 2018-19 School Year

	Competition		Practice		Overall	
	n	%	n	%	n	%
Activity						
Running	21	40.4%	91	61.1%	112	55.7%
Jumping/landing	16	30.8%	21	14.1%	37	18.4%
Running hurdles	5	9.6%	6	4.0%	11	5.5%
Throwing	3	5.8%	7	4.7%	10	5.0%
Conditioning	0	0.0%	8	5.4%	8	4.0%
Warming up	1	1.9%	1	0.7%	2	1.0%
Leaving block	2	3.8%	0	0.0%	2	1.0%
Baton hand off	1	1.9%	0	0.0%	1	0.5%
Hit by shot put/javelin/discus	0	0.0%	1	0.7%	1	0.5%
Other	2	3.8%	5	3.4%	7	3.5%
Unknown	1	1.9%	9	6.0%	10	5.0%
Total	52	100.0%	149	100.0%	201	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, 2018-19 School Year

Activity	Diagnosis									
	Strain/Sprain		Contusion		Fracture		Concussion		Other	
	n	%	n	%	n	%	n	%	n	%
Running	71	58.2%	1	25.0%	2	40.0%	2	33.3%	36	56.3%
Jumping/landing	22	18.0%	0	0.0%	2	40.0%	2	33.3%	11	17.2%
Throwing	5	4.1%	0	0.0%	0	0.0%	0	0.0%	5	7.8%
Conditioning	3	2.5%	0	0.0%	0	0.0%	0	0.0%	4	6.3%
Running hurdles	6	4.9%	2	50.0%	1	20.0%	1	16.7%	2	3.1%
Warming up	2	1.6%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Leaving block	2	1.6%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Baton hand off	1	0.8%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Hit by shot put/javelin/discus	0	0.0%	1	25.0%	0	0.0%	0	0.0%	0	0.0%
Other	3	2.5%	0	0.0%	0	0.0%	1	16.7%	3	4.7%
Unknown	7	5.7%	0	0.0%	0	0.0%	0	0.0%	3	4.7%
Total	122	100.0%	4	100.0%	5	100.0%	6	100.0%	64	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, 2018-19 School Year

	# Injuries	# Exposures	Injury rate (per 1,000 athlete- exposures)
Total	101	126,692	0.80
Competition	19	20,394	0.93
Practice	82	106,298	0.77

Table 20.2 Demographic Characteristics of Injured Boys' Cross Country Athletes, High School Sports-Related Injury Surveillance Study, US, 2018-19 School Year*

Year in School	n=93
Freshman	28.0%
Sophomore	15.1%
Junior	26.9%
Senior	30.1%
Total†	100.0%
Age (years)	
Minimum	13
Maximum	18
Mean (St. Dev.)	15.8 (1.2)
BMI	
Minimum	16.3
Maximum	26.6
Mean (St. Dev.)	20.3 (2.3)

*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 20.1 Diagnosis of Boys' Cross Country Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2018-19 School Year

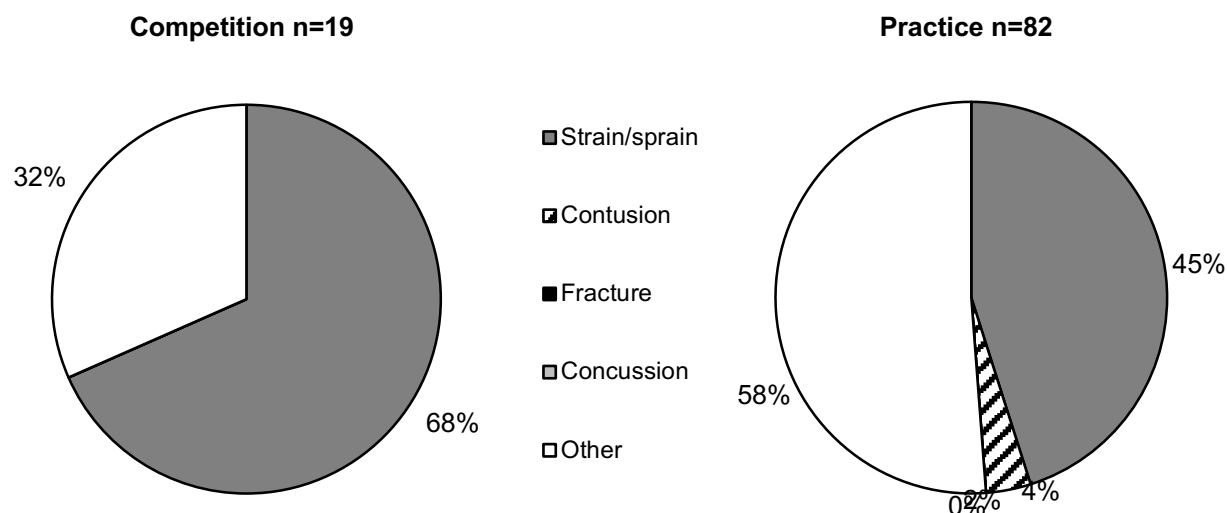


Table 20.3 Body Site of Boys' Cross Country Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2017-18 School Year

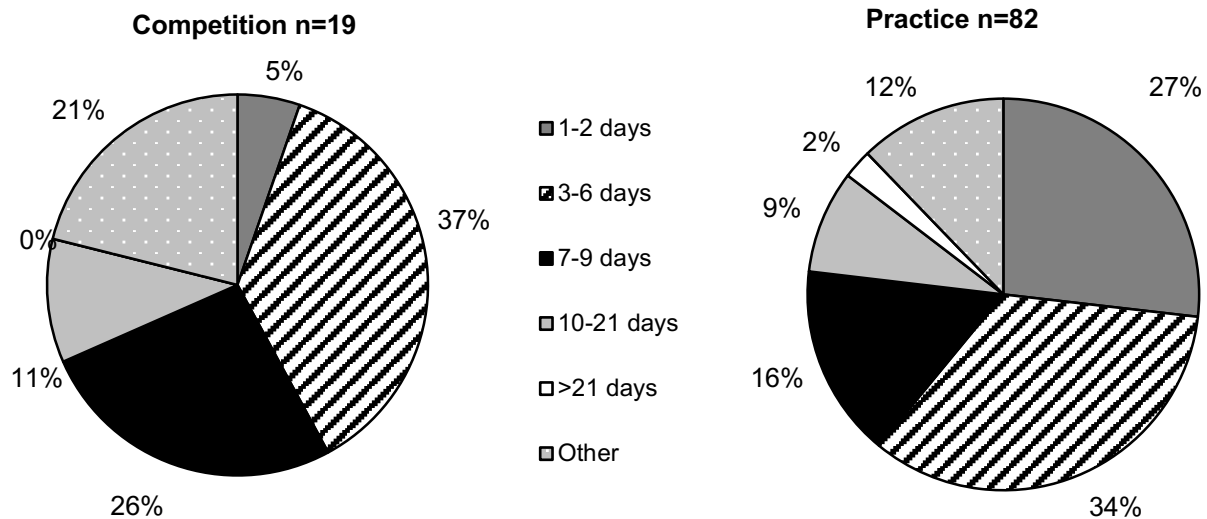
	Competition		Practice		Overall	
	n	%	n	%	n	%
Body Site						
Knee	4	21.1%	14	17.3%	18	18.0%
Ankle	8	42.1%	10	12.3%	18	18.0%
Lower leg	2	10.5%	24	29.6%	26	26.0%
Foot	0	0.0%	12	14.8%	12	12.0%
Hip/thigh/upper leg	3	15.8%	18	22.2%	21	21.0%
Trunk	1	5.3%	1	1.2%	2	2.0%
Hand/wrist	0	0.0%	1	1.2%	1	1.0%
Other	1	5.3%	1	1.2%	2	2.0%
Total	19	100.0%	81	100.0%	100	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, 2018-19 School Year

Diagnosis	Competition n=19		Practice n=82		Total n=101	
	n	%	n	%	n	%
Lower leg other	1	5.3%	18	22.0%	19	18.8%
Ankle strain/sprain	8	42.1%	7	8.5%	15	14.9%
Hip/thigh/upper leg strain/sprain	3	15.8%	11	13.4%	14	13.9%
Knee other	3	15.8%	8	9.8%	11	10.9%
Lower leg strain/sprain	1	5.3%	6	7.3%	7	6.9%
Knee strain/sprain	1	5.3%	6	7.3%	7	6.9%
Hip/thigh/upper leg other	0	0.0%	7	8.5%	7	6.9%
Foot other	0	0.0%	6	7.3%	6	5.9%
Foot strain/sprain	0	0.0%	5	6.1%	5	5.0%
Ankle contusion	0	0.0%	2	2.4%	2	2.0%

Figure 20.2 Time Loss of Boys' Cross Country Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2018-19 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, 2018-19 School Year

	Competition		Practice		Overall	
	n	%	n	%	n	%
Need for surgery						
Required surgery	2	10.5%	0	0.0%	2	2.0%
Did not require surgery	17	89.5%	82	100.0%	99	98.0%
Total	19	100.0%	82	100.0%	101	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, 2018-19 School Year

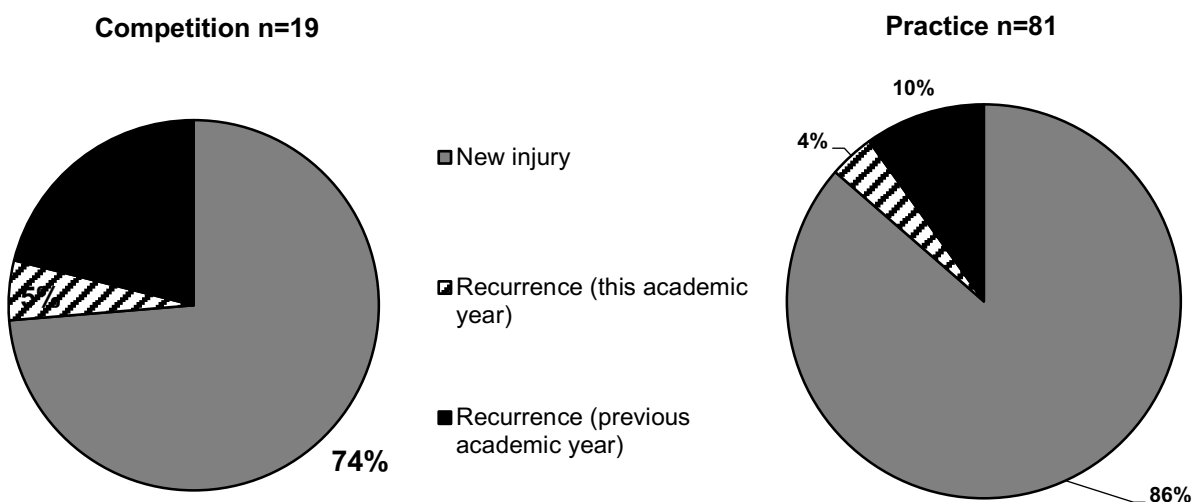


Table 20.6 Time during Season of Boys' Cross Country Injuries, High School Sports-Related Injury Surveillance Study, US, 2018-19 School Year

	n	%
Time in Season		
Preseason	22	22.0%
Regular season	74	74.0%
Unknown	4	4.0%
Total	100	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, 2018-19 School Year

	n	%
Time in Practice		
First 1/2 hour	11	13.4%
Second 1/2 hour	14	17.1%
1-2 hours into practice	25	30.5%
>2 hours into practice	3	3.7%
Unknown	29	35.4%
Total	82	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, 2018-19 School Year

	Competition		Practice		Overall	
	n	%	n	%	n	%
Activity						
Running	15	88.2%	61	83.6%	76	84.4%
Conditioning	0	0.0%	3	4.1%	3	3.3%
Cooling down	0	0.0%	1	1.4%	1	1.1%
Warming up	0	0.0%	1	1.4%	1	1.1%
Other	0	0.0%	0	0.0%	0	0.0%
Unknown	2	11.8%	7	9.6%	9	10.0%
Total	17	100.0%	73	100.0%	90	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, 2018-19 School Year

	Diagnosis									
	Strain/Sprain		Contusion		Fracture		Concussion		Other	
	n	%	n	%	n	%	n	%	n	%
Activity										
Running	38	88.4%	2	66.7%	0	0.0%	0	0.0%	36	81.8%
Conditioning	1	2.3%	1	33.3%	0	0.0%	0	0.0%	1	2.3%
Cooling down	0	0.0%	0	0.0%	0	0.0%	0	0.0%	1	2.3%
Warming up	1	2.3%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Other	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Unknown	3	7.0%	0	0.0%	0	0.0%	0	0.0%	6	13.6%
Total	43	100.0%	3	100.0%	0	0.0%	0	0.0%	44	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, 2018-19 School Year

	# Injuries	# Exposures	Injury rate (per 1,000 athlete-exposures)
Total	114	106,069	1.07
Competition	19	16,603	1.14
Practice	95	89,466	1.06

Table 21.2 Demographic Characteristics of Injured Girls' Cross Country Athletes, High School Sports-Related Injury Surveillance Study, US, 2018-19 School Year*

Year in School	n=110
Freshman	34.5%
Sophomore	28.2%
Junior	29.1%
Senior	8.2%
Total[†]	100.0%
Age (years)	
Minimum	14
Maximum	18
Mean (St. Dev.)	15.3 (1.1)
BMI	
Minimum	14.4
Maximum	28.3
Mean (St. Dev.)	20.0 (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 21.1 Diagnosis of Girls' Cross Country Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2018-19 School Year

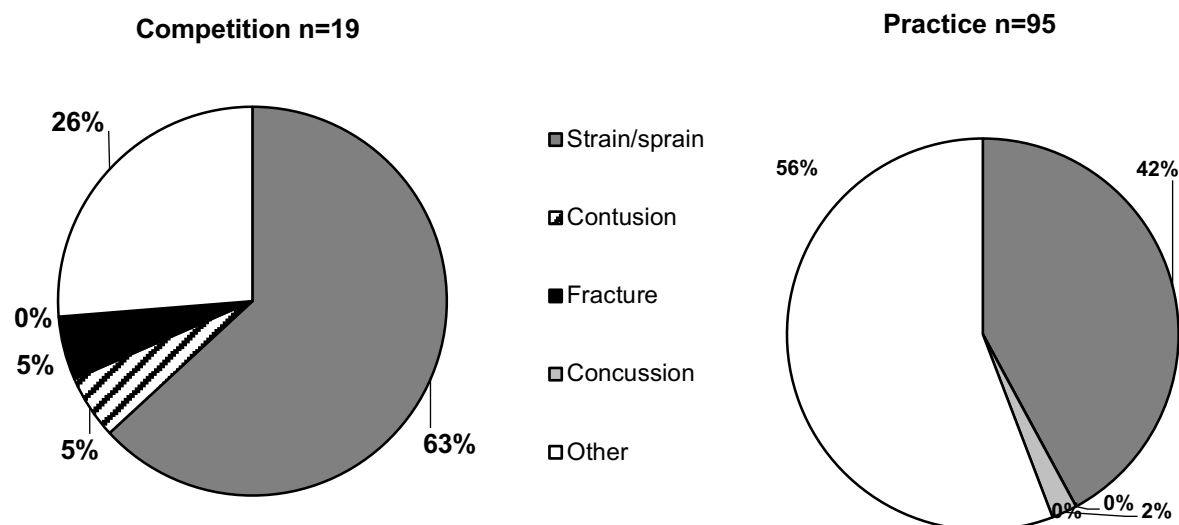


Table 21.3 Body Site of Girls' Cross Country Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2018-19 School Year

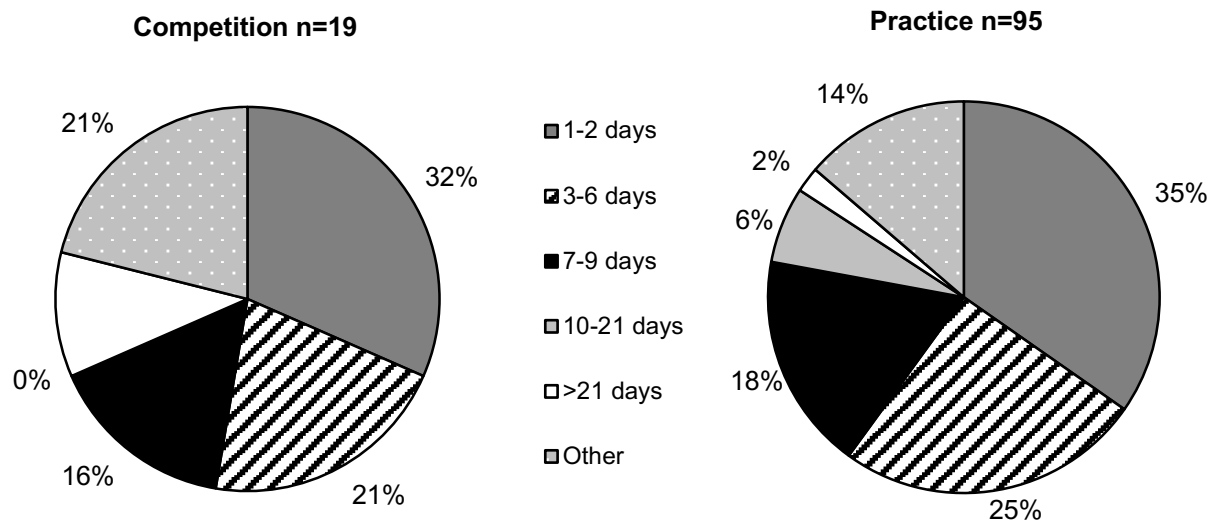
	Competition		Practice		Overall	
	n	%	n	%	n	%
Body Site						
Lower leg	5	26.3%	32	33.7%	37	32.5%
Hip/thigh/upper leg	6	31.6%	16	16.8%	22	19.3%
Ankle	4	21.1%	13	13.7%	17	14.9%
Knee	0	0.0%	12	12.6%	12	10.5%
Foot	0	0.0%	11	11.6%	11	9.6%
Trunk	2	10.5%	5	5.3%	7	6.1%
Head/face	0	0.0%	3	3.2%	3	2.6%
Neck	0	0.0%	1	1.1%	1	0.9%
Shoulder	0	0.0%	1	1.1%	1	0.9%
Other	2	10.5%	1	1.1%	3	2.6%
Total	19	100.0%	95	100.0%	114	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, 2018-19 School Year

Diagnosis	Competition n=19		Practice n=95		Total n=114	
	n	%	n	%	n	%
Lower leg other	1	5.3%	25	26.3%	26	22.8%
Hip/thigh/upper leg strain/sprain	5	26.3%	11	11.6%	16	14.0%
Ankle strain/sprain	4	21.1%	11	11.6%	15	13.2%
Knee other	0	0.0%	10	10.5%	10	8.8%
Lower leg strain/sprain	3	15.8%	7	7.4%	10	8.8%
Hip/thigh/upper leg other	1	5.3%	5	5.3%	6	5.3%
Foot strain/sprain	0	0.0%	6	6.3%	6	5.3%
Trunk other	1	5.3%	4	4.2%	5	4.4%
Foot other	0	0.0%	5	5.3%	5	4.4%
Head/face concussion	0	0.0%	2	2.1%	2	1.8%

Figure 21.2 Time Loss of Girls' Cross Country Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2018-19 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, 2018-19 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	19	100.0%	95	100.0%	114	100.0%
Total	19	100.0%	95	100.0%	114	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, 2018-19 School Year

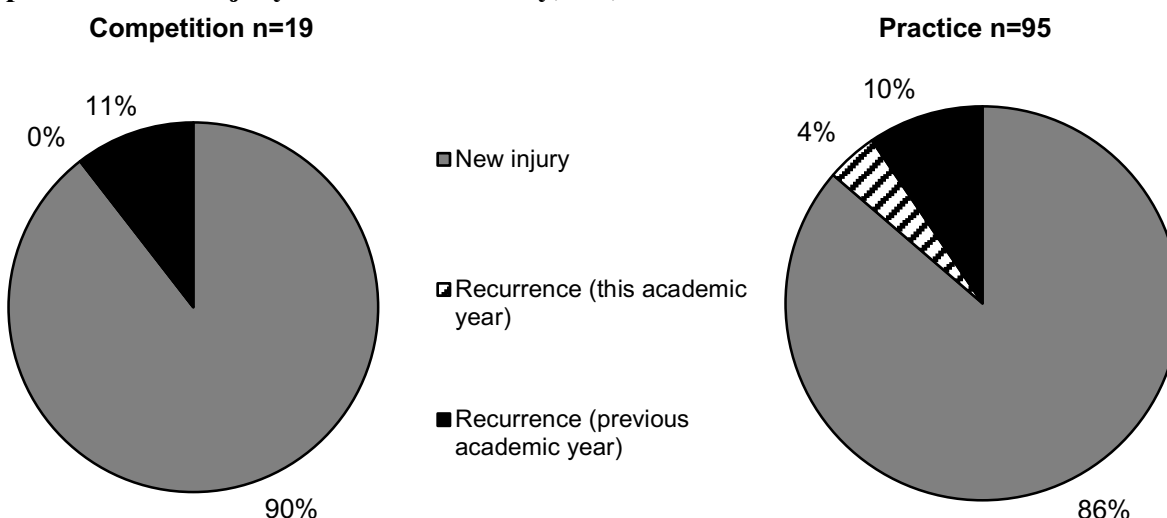


Table 21.6 Time during Season of Girls' Cross Country Injuries, High School Sports-Related Injury Surveillance Study, US, 2018-19 School Year

	n	%
Time in Season		
Preseason	14	12.4%
Regular season	96	85.0%
Post season	3	2.7%
Total	113	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, 2018-19 School Year

	n	%
Time in Practice		
First 1/2 hour	5	8.7%
Second 1/2 hour	16	17.4%
1-2 hours into practice	38	41.3%
>2 hours into practice	2	2.2%
Unknown	28	30.4%
Total	92	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, 2018-19 School Year

	Competition		Practice		Overall	
	n	%	n	%	n	%
Activity						
Running	16	84.2%	69	77.5%	85	78.7%
Conditioning	0	0.0%	5	5.6%	5	4.6%
Warming up	0	0.0%	2	2.2%	2	1.9%
Cooling down	2	10.5%	1	1.1%	3	2.8%
Other	1	5.3%	1	1.1%	2	1.9%
Unknown	0	0.0%	11	12.4%	11	10.2%
Total	19	100.0%	89	100.0%	108	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, 2018-19 School Year

	Diagnosis									
	Strain/Sprain		Contusion		Fracture		Concussion		Other	
	n	%	n	%	n	%	n	%	n	%
Activity										
Running	41	83.7%	1	100.0%	1	100.0%	0	0.0%	42	76.4%
Conditioning	2	4.1%	0	0.0%	0	0.0%	1	50.0%	2	3.6%
Warming up	1	2.0%	0	0.0%	0	0.0%	1	50.0%	0	0.0%
Cooling down	2	4.1%	0	0.0%	0	0.0%	0	0.0%	1	1.8%
Other	0	0.0%	0	0.0%	0	0.0%	0	0.0%	2	3.6%
Unknown	3	6.1%	0	0.0%	0	0.0%	0	0.0%	8	14.5%
Total	49	100.0%	1	100.0%	1	100.0%	2	100.0%	55	100.0%

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

XXII. Cheerleading Injury Epidemiology

Table 22.1 Cheerleading Injury Rates by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2018-19 School Year

	# Injuries	# Exposures	Injury rate (per 1,000 athlete- exposures)
Total	119	178,077	0.67
Competition	4	8,689	0.46
Practice	97	130,592	0.74
Performance	18	38,796	0.46

Table 22.2 Demographic Characteristics of Injured Cheerleading Athletes, High School Sports-Related Injury Surveillance Study, US, 2018-19 School Year*

Year in School	n=114
Freshman	28.1%
Sophomore	24.6%
Junior	30.7%
Senior	16.7%
Total[†]	100.0%
Age (years)	
Minimum	13
Maximum	18
Mean (St. Dev.)	15.5 (1.2)
BMI	
Minimum	17.1
Maximum	34.4
Mean (St. Dev.)	21.4 (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 22.1 Diagnosis of Cheerleading Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2018-19 School Year

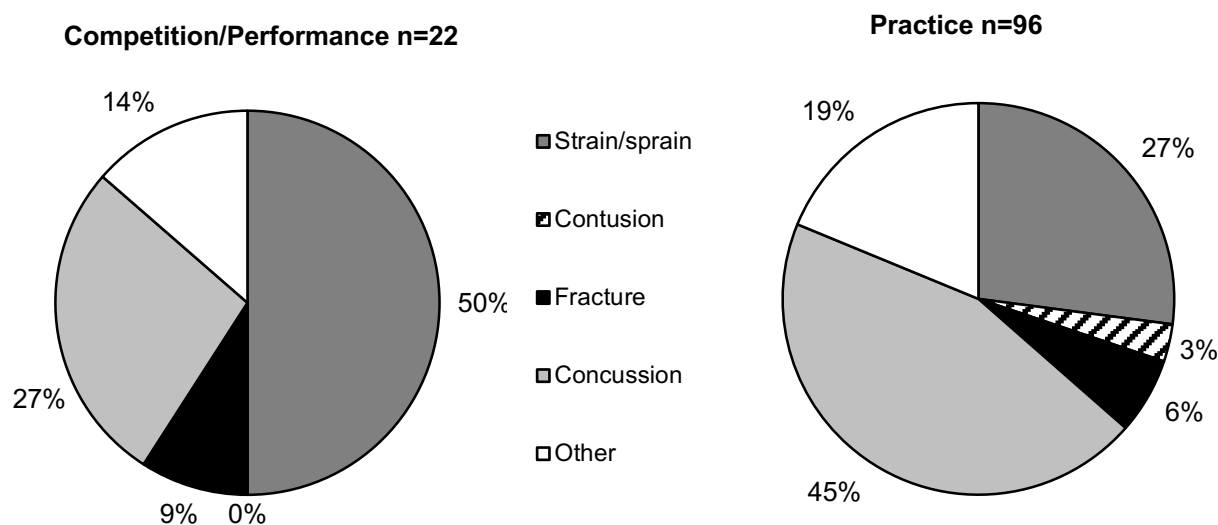


Table 22.3 Body Site of Cheerleading Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2018-19 School Year

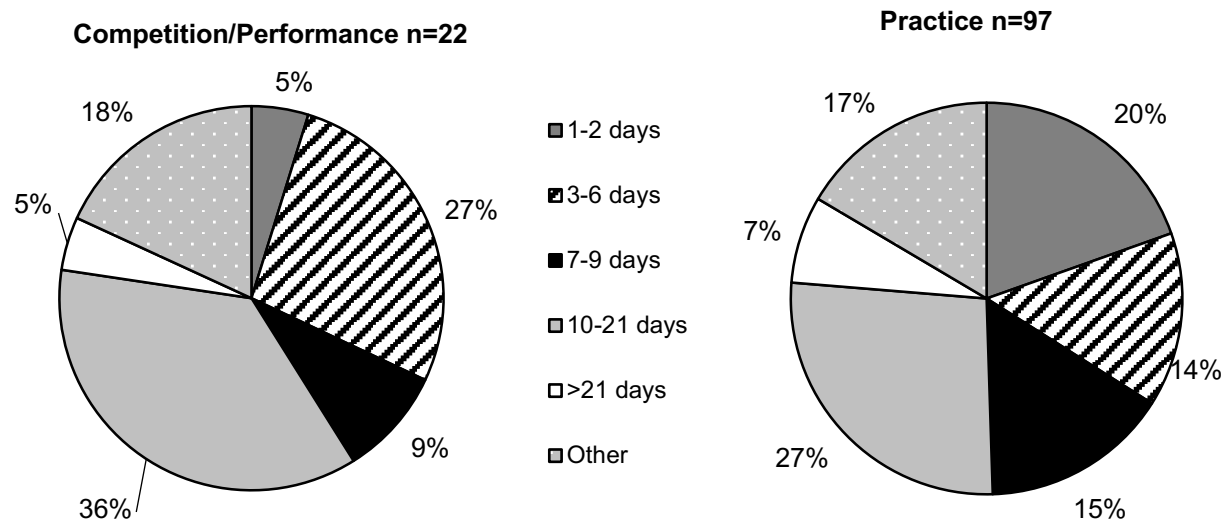
	Competition		Practice		Performance		Overall	
	n	%	n	%	n	%	n	%
Body Site								
Head/face	2	50.0%	44	45.4%	5	27.8%	51	42.9%
Hand/wrist	0	0.0%	6	6.2%	4	22.2%	10	8.4%
Ankle	1	25.0%	14	14.4%	2	11.1%	17	14.3%
Knee	0	0.0%	5	5.2%	2	11.1%	7	5.9%
Trunk	0	0.0%	9	9.3%	1	5.6%	10	8.4%
Shoulder	0	0.0%	4	4.1%	2	11.1%	6	5.0%
Arm/elbow	0	0.0%	3	3.1%	1	5.6%	4	3.4%
Hip/thigh/upper leg	0	0.0%	4	4.1%	0	0.0%	4	3.4%
Neck	0	0.0%	3	3.1%	0	0.0%	3	2.5%
Lower leg	0	0.0%	3	3.1%	0	0.0%	3	2.5%
Foot	1	25.0%	2	2.1%	0	0.0%	3	2.5%
Other	0	0.0%	0	0.0%	1	5.6%	1	0.8%
Total	4	100.0%	97	100.0%	18	100.0%	119	100.0%

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

Table 22.4 Ten Most Common Cheerleading Injury Diagnoses by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2018-19 School Year

Diagnosis	Competition n=4		Practice n=97		Performance n=18		Total n=119	
	n	%	n	%	n	%	n	%
Head/face concussion	2	50.0%	43	44.3%	4	22.2%	49	74.5%
Ankle strain/sprain	1	25.0%	12	12.4%	2	33.3%	15	12.6%
Hand/wrist strain/sprain	0	0.0%	2	2.1%	4	22.2%	6	5.0%
Trunk other	0	0.0%	5	5.2%	0	0.0%	5	4.2%
Knee other	0	0.0%	3	3.1%	2	33.3%	5	4.2%
Shoulder strain/sprain	0	0.0%	3	3.1%	2	33.3%	5	4.2%
Hand/wrist fracture	0	0.0%	2	2.1%	0	0.0%	2	1.7%
Hip/thigh/upper leg strain/sprain	0	0.0%	2	2.1%	0	0.0%	2	1.7%
Knee strain/sprain	0	0.0%	2	2.1%	0	0.0%	2	1.7%
Trunk contusion	0	0.0%	2	2.1%	0	0.0%	2	1.7%

Figure 22.2 Time Loss of Cheerleading Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2018-19 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 Cheerleading Injuries Requiring Surgery by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2018-19 School Year

	Competition		Practice		Performance		Overall	
	n	%	n	%	n	%	n	%
Need for surgery								
Required surgery	0	0.0%	4	4.2%	1	5.6%	5	4.2%
Did not require surgery	4	100.0%	92	95.8%	17	94.4%	113	95.8%
Total	4	100.0%	96	100.0%	18	100.0%	118	100.0%

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

Figure 22.3 History of Cheerleading Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2018-19 School Year

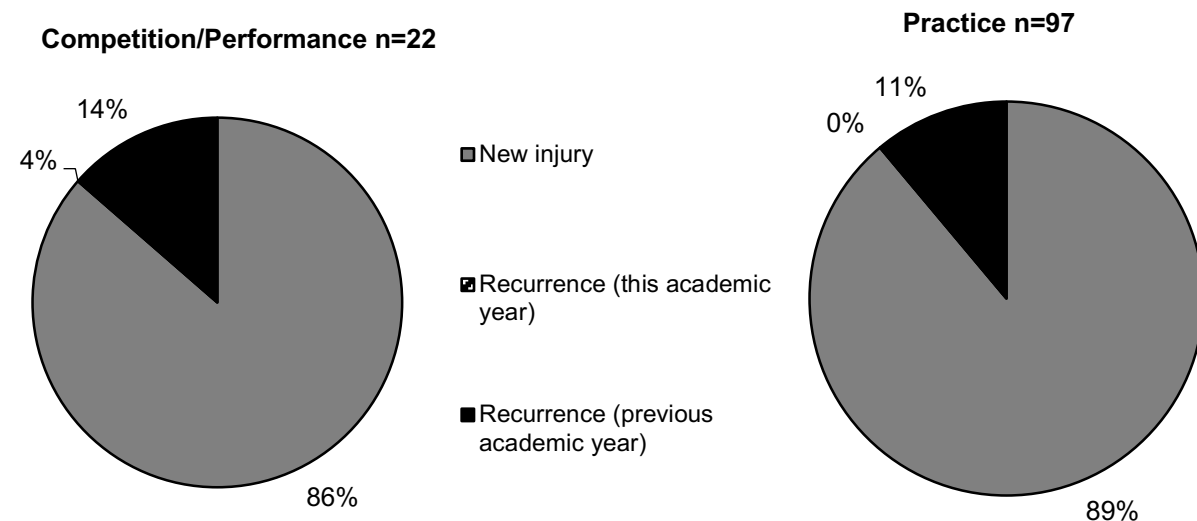


Table 22.6 Time during Season of Cheerleading Injuries, High School Sports-Related Injury Surveillance Study, US, 2018-19 School Year

	n	%
Time in Season		
Preseason	18	15.1%
Regular season	94	79.0%
Post season	4	3.4%
Other	3	2.5%
Total	119	100.0%

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

Table 22.7 Practice-Related Variables for Cheerleading Injuries, High School Sports-Related Injury Surveillance Study, US, 2018-19 School Year

	n	%
Time in Practice		
First 1/2 hour	5	5.2%
Second 1/2 hour	13	13.5%
1-2 hours into practice	48	50.0%
>2 hours into practice	5	5.2%
Unknown	25	26.0%
Total	96	100.0%

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

Table 22.8 Activities Leading to Cheerleading Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2018-19 School Year

	Competition		Practice		Performance		Overall	
	n	%	n	%	n	%	n	%
Activity								
Partner stunt	1	33.3%	28	29.8%	3	16.7%	32	27.8%
Toss	0	0.0%	28	29.8%	2	11.1%	30	26.1%
Pyramid	0	0.0%	16	17.0%	4	22.2%	20	17.4%
Moving tumbling	1	33.3%	2	2.1%	3	16.7%	6	5.2%
Jump	0	0.0%	4	4.3%	1	5.6%	5	4.3%
Warm-up	0	0.0%	2	2.1%	1	5.6%	3	2.6%
Standing tumbling	0	0.0%	2	2.1%	0	0.0%	2	1.7%
Other	1	33.3%	3	3.2%	1	5.6%	5	4.3%
Unknown	0	0.0%	9	9.6%	3	16.7%	12	10.4%
Total	3	100.0%	94	100.0%	18	100.0%	115	100.0%

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

Table 22.10 Activity Resulting in Cheerleading Injuries by Injury Diagnosis, High School Sports-Related Injury Surveillance Study, US, 2018-19 School Year

	Diagnosis									
	Strain/Sprain		Contusion		Fracture		Concussion		Other	
	n	%	n	%	n	%	n	%	n	%
Activity										
Toss	6	17.1%	3	100.0%	2	25.0%	18	36.7%	1	5.0%
Partner stunt	10	28.6%	0	0.0%	3	37.5%	16	32.7%	3	15.0%
Moving tumbling	4	11.4%	0	0.0%	1	12.5%	0	0.0%	1	5.0%
Pyramid	4	11.4%	0	0.0%	1	12.5%	11	22.4%	4	20.0%
Standing tumbling	0	0.0%	0	0.0%	0	0.0%	2	4.1%	0	0.0%
Warm-up	1	2.9%	0	0.0%	0	0.0%	0	0.0%	2	10.0%
Jump	3	8.6%	0	0.0%	0	0.0%	0	0.0%	2	10.0%
Other	1	2.9%	0	0.0%	0	0.0%	1	2.0%	3	15.0%
Unknown	6	17.1%	0	0.0%	1	12.5%	1	2.0%	4	20.0%
Total	35	100.0%	3	100.0%	8	100.0%	49	100.0%	20	100.0%

XXIII. Gender Differences within Sports

23.1 Boys' and Girls' Soccer

Table 23.1 Comparison of Boys' and Girls' Soccer Injury Rates, High School Sports-Related Injury Surveillance Study, US, 2018-19 School Year

	Boys' soccer	Girls' soccer*	RR (95% CI)†
Total	1.86	2.51	1.35 (1.20, 1.51)
Competition	3.92	5.47	1.40 (1.21, 1.61)
Practice	0.95	1.18	1.23 (1.01, 1.51)

*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 23.10 Comparison of Body Sites of Boys' and Girls' Soccer Injuries, High School Sports-Related Injury Surveillance Study, US, 2018-19 School Year

	Boys' soccer	Girls' soccer	IPR (95% CI)
Body Site			
Head/face	21.2%	27.4%	1.29 (1.05, 1.60)
Hip/thigh/upper leg	16.4%	14.0%	1.17 (0.88, 1.54)
Ankle	15.0%	22.7%	1.51 (1.17, 1.94)
Knee	12.7%	18.4%	1.45 (1.09, 1.92)
Foot	7.7%	3.7%	2.07 (1.25, 3.44)
Lower leg	7.5%	4.9%	1.53 (0.96, 2.44)
Hand/wrist	5.8%	2.2%	2.63 (1.39, 4.98)
Trunk	6.9%	2.0%	3.41 (1.80, 6.50)
Shoulder	2.1%	1.0%	2.01 (0.78, 5.61)
Arm/elbow	1.3%	1.7%	1.25 (0.48, 3.27)
Neck	1.0%	1.2%	1.23 (0.39, 3.85)
Other	2.3%	0.7%	3.42 (1.11, 10.53)
Total	100.0%	100.0%	--

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

Table 23.11 Comparison of Diagnoses of Boys' and Girls' Soccer Injuries, High School Sports-Related Injury Surveillance Study, US, 2018-19 School Year

	Boys' soccer	Girls' soccer	IPR (95% CI)
Diagnosis			
Strain/sprain	44.3%	47.5%	1.07 (0.94, 1.22)
Concussion	17.9%	24.4%	1.36 (1.08, 1.72)
Contusion	15.4%	9.1%	1.69 (1.22, 2.33)
Fracture	9.1%	3.2%	2.82 (1.68, 4.74)
Other	13.3%	15.7%	1.18 (0.89, 1.58)
Total	100.0%	100.0%	---

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

Table 23.12 Most Common Boys' and Girls' Soccer Injury Diagnoses*, High School Sports-Related Injury Surveillance Study, US, 2018-19 School Year

	Boys' soccer	Girls' soccer	IPR (95% CI)
Diagnosis			
Head/face concussion	17.9%	24.4%	1.36 (1.08, 1.72)
Hip/thigh/upper leg strain/sprain	13.9%	11.7%	1.12 (0.87, 1.62)
Ankle strain/sprain	13.3%	20.5%	1.54 (1.17, 2.02)
Knee strain/sprain	6.0%	9.6%	1.62 (1.06, 2.46)
Knee other	4.0%	6.8%	1.63 (1.00, 2.80)

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

Table 23.13 Comparison of Time Loss of Boys' and Girls' Soccer Injuries, High School Sports-Related Injury Surveillance Study, US, 2018-19 School Year

	Boys' soccer	Girls' soccer	IPR (95% CI)
Time Loss			
1-2 days	22.5%	16.9%	1.33 (1.04, 1.69)
3-6 days	23.7%	18.3%	1.30 (1.03, 1.63)
7-9 days	13.9%	14.9%	1.07 (0.81, 1.43)
10-21 days	18.9%	25.7%	1.36 (1.09, 1.71)
22 days or more	4.8%	4.7%	1.02 (0.60, 1.72)
Other	16.2%	19.5%	1.20 (0.93, 1.55)
Total	100.0%	100.0%	--

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

Table 23.14 Comparison of Mechanisms of Boys' and Girls' Soccer Injuries, High School Sports-Related Injury Surveillance Study, US, 2018-19 School Year

Soccer Mechanism	Boys' soccer	Girls' soccer	IPR (95% CI)
Contact with another player	27.4%	24.2%	1.17 (0.91, 1.38)
N/A (overuse, heat illness, conditioning, etc.)	12.1%	14.5%	1.20 (0.88, 1.65)
Stepped on/fell on/kicked	15.2%	11.6%	1.31 (0.96, 1.80)
Contact with ball	11.4%	17.2%	1.51 (1.12, 2.06)
Rotation around planted foot/inversion	10.1%	13.2%	1.30 (0.92, 1.84)
Slide tackle	4.9%	4.6%	2.05 (1.10, 3.82)
Uneven playing surface	2.5%	2.0%	1.25 (0.56, 2.82)
Other	10.6%	7.9%	1.34 (0.91, 1.98)
Total	100.0%	100.0%	--

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

Table 23.15 Comparison of Activities of Boys' and Girls' Soccer Injuries, High School Sports-Related Injury Surveillance Study, US, 2018-19 School Year

Soccer Activity	Boys' soccer	Girls' soccer	IPR (95% CI)
General play	25.5%	24.9%	1.03 (0.83, 1.27)
Defending	13.2%	16.0%	1.22 (0.90, 1.65)
Heading ball	7.0%	4.6%	1.52 (0.92, 2.52)
Chasing loose ball	7.6%	5.5%	0.73 (0.45, 1.16)
Ball handling/dribbling	10.0%	7.4%	1.36 (0.90, 2.03)
Goaltending	6.4%	7.7%	1.22 (0.77, 1.91)
Shooting (foot)	5.1%	4.8%	1.06 (0.62, 1.83)
Passing (foot)	3.0%	3.7%	1.24 (0.63, 2.43)
Conditioning	3.4%	3.9%	1.14 (0.60, 2.16)
Receiving pass	2.8%	3.7%	1.33 (0.67, 2.65)
Blocking shot	2.1%	1.5%	1.44 (0.57, 3.62)
Attempting slide tackle	0.8%	0.7%	1.15 (0.29, 4.59)
Receiving slide tackle	0.8%	0.6%	1.54 (0.35, 6.83)
Other	0.8%	2.4%	2.82 (0.93, 8.62)
Total	100.0%	100.0%	--

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

23.2 Boys' and Girls' Basketball

Table 23.2 Comparison of Boys' and Girls' Basketball Injury Rates, High School Sports-Related Injury Surveillance Study, US, 2018-19 School Year

	Boys' basketball	Girls' basketball	RR (95% CI)
Total	1.82	1.92	1.06 (0.93, 1.20)
Competition	3.37	3.65	1.08 (0.92, 1.28)
Practice	1.15	1.16	1.01 (0.84, 1.23)

Table 23.20 Comparison of Body Sites of Boys' and Girls' Basketball Injuries, High School Sports-Related Injury Surveillance Study, US, 2018-19 School Year

	Boys' basketball	Girls' basketball	IPR (95% CI)
Body Site			
Ankle	40.6%	30.8%	1.32 (1.11, 1.57)
Head/face	16.9%	23.3%	1.38 (1.07, 1.77)
Knee	8.5%	15.2%	1.79 (1.26, 2.54)
Hand/wrist	10.2%	6.3%	1.62 (1.05, 2.49)
Hip/thigh/upper leg	6.9%	6.1%	1.13 (0.70, 1.81)
Trunk	5.5%	5.0%	1.10 (0.65, 1.87)
Lower leg	3.5%	2.5%	1.42 (0.69, 2.93)
Foot	3.2%	4.1%	1.28 (0.68, 2.44)
Shoulder	1.8%	2.7%	1.54 (0.67, 3.53)
Arm/elbow	1.6%	2.0%	1.28 (0.51, 3.21)
Neck	0.5%	0.7%	1.28 (0.26, 6.33)
Other	0.9%	1.4%	1.54 (0.47, 5.01)
Total	100.0%	100.0%	--

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

Table 23.21 Comparison of Diagnoses of Boys' and Girls' Basketball Injuries, High School Sports-Related Injury Surveillance Study, US, 2018-19 School Year

	Boys' basketball	Girls' basketball	IPR (95% CI)
Diagnosis			
Strain/sprain	56.1%	51.2%	1.09 (0.97, 1.23)
Concussion	9.5%	18.6%	1.95 (1.42, 2.69)
Fracture	10.1%	6.1%	1.64 (1.06, 2.55)
Contusion	10.1%	7.3%	1.39 (0.92, 2.10)
Other	14.3%	16.8%	1.18 (0.88, 1.57)
Total	100.0%	100.0%	--

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

Table 23.22 Most Common Boys' and Girls' Basketball Injury Diagnoses*, High School Sports-Related Injury Surveillance Study, US, 2018-19 School Year

	Boys' basketball	Girls' basketball	IPR (95% CI)
Diagnosis			
Ankle strain/sprain	37.9%	29.0%	1.31 (1.09, 1.57)
Head/face concussion	9.5%	18.6%	1.95 (1.41, 2.68)
Knee strain/sprain	3.0%	8.8%	2.94 (1.69, 5.13)
Knee other	3.4%	5.4%	1.62 (0.90, 2.92)

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

Table 23.23 Comparison of Time Loss of Boys' and Girls' Basketball Injuries, High School Sports-Related Injury Surveillance Study, US, 2018-19 School Year

	Boys' basketball	Girls' basketball	IPR (95% CI)
Time Loss			
1-2 days	21.7%	17.0%	1.28 (0.99, 1.66)
3-6 days	24.3%	23.1%	1.05 (0.84, 1.32)
7-9 days	15.3%	16.5%	0.93 (0.70, 1.24)
10-21 days	19.8%	19.9%	1.01 (0.79, 1.29)
22 days or more	6.3%	4.5%	1.40 (0.82, 2.39)
Other	12.5%	19.0%	1.52 (0.88, 2.03)
Total	100.0%	100.0%	--

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

Table 23.24 Comparison of Mechanisms of Boys' and Girls' Basketball Injuries, High School Sports-Related Injury Surveillance Study, US, 2018-19 School Year

	Boys' basketball	Girls' basketball	IPR (95% CI)
Basketball Mechanism			
Collision with another player	26.7%	24.2%	1.10 (0.89, 1.37)
Jumping/landing	26.7%	17.3%	1.54 (1.20, 1.98)
Stepped on/fell on/kicked	8.5%	5.5%	1.56 (0.96, 2.54)
Rotation around a planted foot/inversion	14.6%	19.0%	1.30 (0.98, 1.72)
N/A (e.g., overuse, heat illness, etc.)	6.1%	9.2%	1.51 (0.97, 2.36)
Contact with ball	4.1%	7.1%	1.75 (1.02, 2.98)
Other	10.0%	11.1%	1.11 (0.77, 1.61)
Total	100.0%	100.0%	--

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

Table 23.35 Comparison of Activities of Boys' and Girls' Basketball Injuries, High School Sports-Related Injury Surveillance Study, US, 2018-19 School Year

	Boys' basketball	Girls' basketball	IPR (95% CI)
Basketball Activity			
Rebounding	22.3%	15.2%	1.47 (1.11, 1.93)
General play	16.4%	21.1%	1.29 (0.99, 1.69)
Defending	14.1%	15.7%	1.11 (0.82, 1.50)
Shooting	11.9%	4.5%	2.64 (1.61, 4.33)
Chasing loose ball	8.4%	10.0%	1.19 (0.80, 1.78)
Ball handling/dribbling	6.3%	7.1%	1.13 (0.70, 1.81)
Receiving pass	2.8%	3.8%	1.36 (0.68, 2.73)
Conditioning	2.0%	3.8%	1.86 (0.87, 3.96)
Other	2.8%	5.0%	1.79 (0.93, 3.43)
Total	100.0%	100.0%	--

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

23.3 Boys' Baseball and Girls' Softball

Table 23.3 Comparison of Baseball and Softball Injury Rates, High School Sports-Related Injury Surveillance Study, US, 2018-19 School Year

	Baseball	Softball	RR (95% CI)
Total	1.01	1.41	1.39 (1.17, 1.67)
Competition	1.61	2.24	1.39 (1.10, 1.75)
Practice	0.67	0.93	1.39 (1.06, 1.83)

Table 23.30 Comparison of Body Sites of Baseball and Softball Injuries, High School Sports-Related Injury Surveillance Study, US, 2018-19 School Year

	Baseball	Softball	IPR (95% CI)
Body Site			
Head/face	16.9%	24.3%	1.44 (1.01, 2.06)
Shoulder	14.8%	7.4%	2.00 (1.17, 3.42)
Arm/elbow	13.6%	8.2%	1.65 (0.98, 2.79)
Hand/wrist	16.0%	12.8%	1.26 (0.81, 1.95)
Hip/thigh/upper leg	9.5%	7.4%	1.28 (0.71, 2.31)
Ankle	8.6%	12.3%	1.43 (0.84, 2.42)
Knee	7.8%	14.8%	1.90 (1.12, 3.21)
Trunk	7.0%	6.2%	1.13 (0.58, 2.22)
Lower leg	2.5%	3.3%	1.33 (0.47, 3.79)
Foot	1.2%	1.2%	1.00 (0.20, 4.91)
Neck	0.8%	1.6%	2.00 (0.37, 10.82)
Other	1.2%	0.4%	3.00 (0.31, 28.57)
Total	100.0%	100.0%	--

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

Table 23.31 Comparison of Diagnoses of Baseball and Softball Injuries, High School Sports-Related Injury Surveillance Study, US, 2018-19 School Year

	Baseball	Softball	IPR (95% CI)
Diagnosis			
Strain/sprain	40.2%	36.2%	1.11 (0.88, 1.39)
Contusion	7.4%	21.8%	2.96 (1.79, 4.90)
Concussion	8.2%	17.3%	2.11 (1.28, 3.48)
Fracture	16.8%	7.4%	2.27 (1.34, 3.83)
Other	27.5%	17.3%	1.59 (1.13, 2.24)
Total	100.0%	100.0%	--

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

Table 23.32 Most Common Baseball and Softball Injury Diagnoses*, High School Sports-Related Injury Surveillance Study, US, 2018-19 School Year

	Baseball	Softball	IPR (95% CI)
Diagnosis			
Head/face concussion	8.2%	17.3%	2.11 (1.28, 3.48)
Hip/thigh/upper leg strain/sprain	6.1%	6.6%	1.07 (0.54, 2.12)
Ankle strain/sprain	7.4%	10.7%	1.45 (0.82, 2.58)
Shoulder other	7.4%	3.3%	2.24 (0.99, 5.06)
Hand/wrist fracture	9.0%	4.1%	2.19 (1.06, 4.53)

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

Table 23.33 Comparison of Time Loss of Baseball and Softball Injuries, High School Sports-Related Injury Surveillance Study, US, 2018-19 School Year

	Baseball	Softball	IPR (95% CI)
Time Loss			
1-2 days	16.4%	24.3%	1.48 (1.03, 2.12)
3-6 days	22.5%	21.8%	1.03 (0.74, 1.44)
7-9 days	12.7%	13.2%	0.97 (0.61, 1.53)
10-21 days	18.9%	17.3%	1.09 (0.75, 1.59)
22 days or more	8.6%	3.7%	2.32 (1.09, 4.97)
Other	20.9%	19.8%	1.06 (0.74, 1.50)
Total	100.0%	100.0%	--

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

Table 23.34 Comparison of Mechanisms of Baseball and Softball Injuries, High School Sports-Related Injury Surveillance Study, US, 2018-19 School Year

	Baseball	Softball	IPR (95% CI)
Baseball/Softball Mechanism			
Contact with another player	9.8%	9.8%	1.00 (0.58, 1.83)
Throwing - pitching	10.2%	6.8%	1.50 (0.82, 2.75)
N/A (overuse, heat illness, conditioning, etc.)	11.1%	9.4%	1.18 (0.69, 2.02)
Hit by batted ball	10.2%	10.2%	1.00 (0.59, 1.71)
Hit by pitch	8.5%	4.7%	1.82 (0.89, 3.70)
Contact with bases	10.2%	9.8%	1.04 (0.61, 1.80)
Contact with thrown ball (non-pitch)	4.7%	11.5%	2.46 (1.25, 4.83)
Throwing - not pitching	7.7%	4.7%	1.64 (0.79, 3.39)
Rotation around a planted foot/inversion	3.8%	7.7%	2.00 (0.92, 4.36)
Other	18.7%	21.7%	1.15 (0.81, 1.66)
Unknown	1.9%	2.5%	--
Total*	100.0%	100.0%	--

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

Table 23.35 Comparison of Activities of Baseball and Softball Injuries, High School Sports-Related Injury Surveillance Study, US, 2018-19 School Year

	Baseball	Softball	IPR (95% CI)
Baseball/Softball Activity			
Pitching	15.5%	9.8%	1.58 (0.97, 2.58)
Fielding a batted ball	15.0%	17.4%	1.16 (0.77, 1.76)
Running bases	13.3%	15.3%	1.15 (0.74, 1.80)
Batting	16.7%	8.1%	2.07 (1.23, 3.47)
Throwing (not pitching)	9.0%	8.5%	1.06 (0.59, 1.90)
Fielding a thrown ball	3.0%	8.1%	2.69 (1.15, 6.28)
General play	4.3%	4.3%	1.01 (0.43, 2.38)
Sliding	6.4%	9.8%	1.52 (0.81, 2.84)
Catching	6.4%	9.8%	1.52 (0.81, 2.84)
Conditioning	1.3%	1.3%	1.01 (0.21, 4.95)
Other	4.3%	3.4%	1.26 (0.51, 3.14)
Unknown	4.5%	7.6%	--
Total*	100.0%	100.0%	--

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

23.4 Boys' and Girls' Swimming

Table 23.4 Comparison of Boys' and Girls' Swimming Injury Rates, High School Sports-Related Injury Surveillance Study, US, 2018-19 School Year

	Boys' swimming	Girls' swimming	RR (95% CI)
Total	0.16	0.26	1.61 (0.85, 3.06)
Competition	0.26	0.10	2.66 (0.49, 14.49)
Practice	0.14	0.30	2.12 (1.02, 4.40)

Table 23.40 Comparison of Body Sites of Boys' and Girls' Swimming and Diving Injuries, High School Sports-Related Injury Surveillance Study, US, 2018-19 School Year

	Boys' swimming	Girls' swimming	IPR (95% CI)
Body Site			
Ankle	0.0%	7.1%	--
Knee	0.0%	0.0%	--
Head/face	14.3%	14.3%	1.00 (0.28, 4.81)
Hand/wrist	0.0%	3.6%	--
Shoulder	57.1%	50.0%	1.14 (0.64, 2.05)
Trunk	7.1%	3.6%	2.00 (0.14, 29.66)
Lower leg	0.0%	0.0%	--
Arm/elbow	14.3%	10.7%	1.33 (0.25, 7.08)
Foot	0.0%	3.6%	--
Hip/thigh/upper leg	7.1%	3.6%	2.00 (0.14, 29.66)
Neck	0.0%	0.0%	--
Other	0.0%	5.0%	--
Total	100.0%	100.0%	--

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

Table 23.41 Comparison of Diagnoses of Boys' and Girls' Swimming Injuries, High School Sports-Related Injury Surveillance Study, US, 2018-19 School Year

	Boys' swimming	Girls' swimming	IPR (95% CI)
Diagnosis			
Strain/sprain	21.4%	42.9%	2.00 (0.67, 5.95)
Concussion	14.3%	10.7%	1.33 (0.25, 7.08)
Fracture	0.0%	7.1%	--
Contusion	0.0%	0.0%	--
Other	64.3%	39.3%	1.64 (0.89, 2.99)
Total	100.0%	100.0%	--

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

Table 23.42 Most Common Boys' and Girls' Swimming Injury Diagnoses, High School Sports-Related Injury Surveillance Study, US, 2018-19 School Year

	Boys' swimming	Girls' swimming	IPR (95% CI)
Diagnosis			
Shoulder other	42.9%	25.0%	1.72 (0.71, 4.13)
Head/face concussion	14.3%	10.7%	1.33 (0.25, 7.08)
Trunk strain/sprain	7.1%	3.6%	2.00 (0.14, 29.66)
Shoulder strain/sprain	14.3%	25.0%	1.75 (0.42, 7.35)

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

Table 23.43 Comparison of Time Loss of Boys' and Girls' Swimming Injuries, High School Sports-Related Injury Surveillance Study, US, 2018-19 School Year

	Boys' swimming	Girls' swimming	IPR (95% CI)
Time Loss			
1-2 days	35.7%	25.0%	1.43 (0.55, 3.70)
3-6 days	21.4%	28.6%	1.33 (0.42, 4.26)
7-9 days	21.4%	10.7%	2.00 (0.46, 8.66)
10-21 days	14.3%	21.4%	1.50 (0.35, 6.49)
22 days or more	0.0%	3.6%	--
Other	7.1%	10.7%	1.50 (0.17, 13.14)
Total	100.0%	100.0%	--

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

Table 23.44 Comparison of Mechanisms of Boys' and Girls' Swimming and Diving Injuries, High School Sports-Related Injury Surveillance Study, US, 2018-19 School Year

	Boys' swimming	Girls' swimming	IPR (95% CI)
Swimming Mechanism			
N/A (overuse, heat illness, conditioning, etc.)	75.0%	67.9%	1.10 (0.73, 1.67)
Contact with wall	8.3%	3.6%	2.33 (0.16, 34.48)
Contact with another person	8.3%	7.1%	1.17 (0.12, 11.67)
Other	8.3%	17.9%	2.14 (0.28, 16.39)
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 23.45 Comparison of Activities of Boys' and Girls' Swimming and Diving Injuries, High School Sports-Related Injury Surveillance Study, US, 2018-19 School Year

	Boys' swimming	Girls' swimming	IPR (95% CI)
Swimming Activity			
Swimming	75.0%	63.0%	1.19 (0.77, 1.84)
Flip turn off wall	0.0%	3.7%	--
Diving off board/platform/starting platform	8.3%	0.0%	--
Other	8.3%	14.8%	1.78 (0.22, 14.29)
Total	100.0%	100.0%	--

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

23.5 Boys' and Girls' Track and Field

Table 23.5 Comparison of Boys' and Girls' Track and Field Injury Rates, High School Sports-Related Injury Surveillance Study, US, 2018-19 School Year

	Boys' track	Girls' track	RR (95% CI)
Total	0.63	1.04	1.66 (1.36, 2.03)
Competition	1.14	1.45	1.27 (0.88, 1.85)
Practice	0.52	0.95	1.84 (1.45, 2.34)

Table 23.50 Comparison of Body Sites of Boys' and Girls' Track and Field Injuries, High School Sports-Related Injury Surveillance Study, US, 2018-19 School Year

	Boys' track	Girls' track	IPR (95% CI)
Body Site			
Hip/thigh/upper leg	45.1%	26.5%	1.70 (1.29, 2.24)
Lower leg	17.1%	27.0%	1.58 (1.06, 2.35)
Knee	11.6%	9.6%	1.21 (0.68, 2.16)
Ankle	7.9%	12.6%	1.59 (0.85, 2.97)
Trunk	5.5%	7.0%	1.27 (0.57, 2.80)
Foot	5.5%	6.5%	1.19 (0.53, 2.65)
Head/face	0.6%	4.3%	7.13 (0.92, 55.16)
Shoulder	1.2%	1.7%	1.43 (0.26, 7.69)
Arm/elbow	1.2%	1.3%	1.07 (0.18, 6.33)
Other	3.0%	1.7%	1.75 (0.48, 6.43)
Hand/wrist	1.2%	1.3%	1.07 (0.18, 6.33)
Neck	0.0%	0.4%	--
Total	100.0%	100.0%	--

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

Table 23.51 Comparison of Diagnoses of Boys' and Girls' Track and Field Injuries, High School Sports-Related Injury Surveillance Study, US, 2018-19 School Year

	Boys' track	Girls' track	IPR (95% CI)
Diagnosis			
Strain/sprain	61.3%	57.0%	1.08 (0.91, 1.27)
Contusion	0.6%	1.7%	2.83 (0.32, 25.00)
Fracture	1.8%	2.2%	1.18 (0.29, 4.88)
Concussion	0.6%	3.0%	4.96 (0.62, 39.93)
Other	35.6%	36.1%	1.01 (0.78, 1.33)
Total	100.0%	100.0%	--

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

Table 23.52 Most Common Boys' and Girls' Track and Field Injury Diagnoses, High School Sports-Related Injury Surveillance Study, US, 2018-19 School Year

	Boys' track	Girls' track	IPR (95% CI)
Diagnosis			
Hip/thigh/upper leg strain/sprain	39.6%	24.3%	1.63 (1.21, 2.29)
Lower leg other	13.4%	20.4%	1.52 (0.96, 2.43)
Hip/thigh/upper leg other	5.5%	2.2%	2.52 (0.86, 7.41)
Ankle strain/sprain	7.9%	12.2%	1.54 (0.82, 2.87)
Knee other	7.3%	6.1%	1.20 (0.57, 2.53)

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

Table 23.53 Comparison of Time Loss of Boys' and Girls' Track and Field Injuries, High School Sports-Related Injury Surveillance Study, US, 2018-19 School Year

	Boys' track	Girls' track	IPR (95% CI)
Time Loss			
1-2 days	25.0%	25.2%	1.01 (0.71, 1.43)
3-6 days	28.0%	24.3%	1.15 (0.82, 1.61)
7-9 days	14.6%	13.5%	1.09 (0.66, 1.78)
10-21 days	13.4%	18.3%	1.36 (0.85, 2.19)
22 days or more	5.5%	5.7%	1.03 (0.45, 2.35)
Other	13.4%	13.0%	1.03 (0.62, 1.72)
Total	100.0%	100.0%	--

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

Table 23.54 Comparison of Mechanisms of Boys' and Girls' Track and Field Injuries, High School Sports-Related Injury Surveillance Study, US, 2018-19 School Year

	Boys' track	Girls' track	IPR (95% CI)
Track Mechanism			
N/A (e.g., overuse, heat illness, conditioning, etc.)	53.0%	55.0%	1.04 (0.85, 1.26)
Contact with ground/track/surface	10.6%	8.4%	1.26 (0.67, 2.41)
Fall/trip	4.0%	7.4%	1.87 (0.74, 4.70)
Rotation around planted foot/inversion	6.0%	5.9%	1.00 (0.43, 2.32)
Contact with field equipment	4.0%	5.0%	1.25 (0.46, 3.35)
Uneven playing surface	0.0%	1.0%	--
Stepped on/kicked	0.0%	0.0%	--
Contact with another person	0.7%	0.5%	1.33 (0.08, 21.28)
Other	11.3%	9.9%	1.14 (0.62, 2.10)
Total	100.0%	100.0%	--

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

Table 23.55 Comparison of Activities of Boys' and Girls' Track and Field Injuries, High School Sports-Related Injury Surveillance Study, US, 2018-19 School Year

	Boys' track	Girls' track	IPR (95% CI)
Track Activity			
Running	66.0%	55.7%	1.18 (1.00, 1.40)
Jumping/landing	10.7%	18.4%	1.73 (0.99, 2.99)
Conditioning	2.0%	4.0%	1.99 (0.54, 7.38)
Throwing	2.0%	5.0%	2.49 (0.70, 8.88)
Running hurdles	3.3%	5.5%	1.64 (0.58, 4.63)
Warming up	2.0%	1.0%	2.00 (0.34, 23.81)
Leaving block	2.0%	1.0%	2.01 (0.34, 11.88)
Hit by shot put/discus/javelin/hammer	0.0%	0.5%	--
Other	3.3%	4.0%	1.19 (0.40, 3.58)
Total	100.0%	100.0%	--

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

23.6 Boys' and Girls' Cross Country

Table 23.6 Comparison of Boys' and Girls' Cross Country Injury Rates, High School Sports-Related Injury Surveillance Study, US, 2018-19 School Year

	Boys' cross country	Girls' cross country	RR (95% CI)
Total	0.80	1.07	1.35 (1.03, 1.76)
Competition	0.93	1.14	1.23 (0.65, 2.32)
Practice	0.77	1.06	1.38 (1.02, 1.85)

Table 23.60 Comparison of Body Sites of Boys' and Girls' Cross Country Injuries, High School Sports-Related Injury Surveillance Study, US, 2018-19 School Year

	Boys' cross country	Girls' cross country	IPR (95% CI)
Body Site			
Knee	18.0%	10.5%	1.71 (0.87, 3.37)
Ankle	18.0%	14.9%	1.21 (0.66, 2.21)
Lower leg	26.0%	32.5%	1.25 (0.82, 1.91)
Foot	12.0%	9.6%	1.24 (0.57, 2.69)
Hip/thigh/upper leg	21.0%	19.3%	1.09 (0.64, 1.86)
Shoulder	0.0%	0.9%	--
Trunk	2.0%	6.1%	3.07 (0.65, 14.44)
Head/face	0.0%	2.6%	--
Hand/wrist	1.0%	0.0%	--
Arm/elbow	0.0%	0.0%	--
Neck	--	0.9%	--
Other	2.0%	2.6%	1.32 (0.22, 7.72)
Total	100.0%	100.0%	--

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

Table 23.61 Comparison of Diagnoses of Boys' and Girls' Cross Country Injuries, High School Sports-Related Injury Surveillance Study, US, 2018-19 School Year

	Boys' cross country	Girls' cross country	IPR (95% CI)
Diagnosis			
Strain/sprain	49.5%	45.6%	1.19 (0.82, 1.44)
Contusion	3.0%	0.9%	3.39 (0.36, 32.26)
Fracture	0.0%	0.9%	--
Concussion	0.0%	1.8%	--
Other	47.5%	50.9%	1.07 (0.82, 1.41)
Total	100.0%	100.0%	--

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

Table 23.62 Most Common Boys' and Girls' Cross Country Injury Diagnoses, High School Sports-Related Injury Surveillance Study, US, 2018-19 School Year

	Boys' cross country	Girls' cross country	IPR (95% CI)
Diagnosis			
Lower leg other	18.8%	22.8%	1.21 (0.72, 2.05)
Ankle strain/sprain	14.9%	13.2%	1.13 (0.58, 2.19)
Hip/thigh/upper leg strain/sprain	13.9%	14.0%	1.01 (0.52, 1.97)
Lower leg strain/sprain	6.9%	8.8%	1.27 (0.50, 3.21)
Hip/thigh/upper leg other	6.9%	5.3%	1.32 (0.46, 3.79)
Knee other	10.9%	8.8%	1.24 (0.89, 1.07)

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

Table 23.63 Comparison of Time Loss of Boys' and Girls' Cross Country Injuries, High School Sports-Related Injury Surveillance Study, US, 2018-19 School Year

	Boys' cross country	Girls' cross country	IPR (95% CI)
Time Loss			
1-2 days	22.8%	34.2%	1.50 (0.97, 2.33)
3-6 days	34.7%	24.6%	1.41 (0.93, 2.15)
7-9 days	17.8%	17.5%	1.02 (0.57, 1.81)
10-21 days	8.9%	5.3%	1.69 (0.62, 4.59)
22 days or more	2.0%	3.5%	1.77 (0.33, 9.43)
Other	13.9%	14.9%	1.08 (0.56, 2.07)
Total	100.0%	100.0%	--

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

Table 23.64 Comparison of Mechanisms of Boys' and Girls' Cross Country Injuries, High School Sports-Related Injury Surveillance Study, US, 2018-19 School Year

	Boys' cross country	Girls' cross country	IPR (95% CI)
Track Mechanism			
Overuse	50.5%	57.4%	1.14 (0.88, 1.47)
Contact with ground/track/surface	3.3%	4.6%	1.40 (0.34, 5.71)
Fall/trip	8.8%	9.3%	1.05 (0.43, 2.56)
Rotation around planted foot/inversion	7.7%	1.9%	4.15 (0.89, 19.50)
Contact with obstacle	1.1%	0.0%	--
Uneven surface	11.0%	6.5%	1.69 (0.67, 4.27)
N/A (e.g., heat illness, conditioning, etc.)	6.6%	7.4%	1.12 (0.41, 3.12)
Contact with another person	0.0%	0.9%	--
Other	4.4%	4.6%	1.05 (0.29, 3.80)
Total	100.0%	100.0%	--

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

Table 23.65 Comparison of Activities of Boys' and Girls' Cross Country Injuries, High School Sports-Related Injury Surveillance Study, US, 2018-19 School Year

	Boys' cross country	Girls' cross country	IPR (95% CI)
Track Activity			
Running	84.4%	78.7%	1.07 (0.94, 1.23)
Conditioning	3.3%	4.6%	1.39 (0.34, 5.65)
Warming up	1.1%	1.9%	1.67 (0.15, 18.18)
Cooldown	1.1%	2.8%	2.50 (0.27, 23.62)
Total	100.0%	100.0%	--

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

XXIV. Reporter Demographics & Compliance

During the 2018-19 School Year, 215 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, 175 enrolled ATs reported an average of 38 study weeks. The majority of ATs (91.0%) 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 of a 5% randomly selected sample of the 175 schools participating in the convenience sample during the 2018-19 academic year yielded 76.7% sensitivity, 96.4% specificity, a positive predictive value of 74.2%, and a negative predictive value of 96.9%. Internal validity checks are completed every other year, so the next will occur using data from the 2020-21 academic year.

Prior to the start of the 2018-19 High School RIO™ study, participating ATs were asked to complete a short demographics survey. Over three-quarters (79.4%) of participating high schools were public schools, with the remainder being private. All ATs except for 5 provided services to athletes of their high school on 5 or more days each week. Over 60% of ATs participating during the 2018-19 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 101 ATs (47.0%). Average reporting time burdens were 37 minutes for the weekly

exposure report and 17 minutes for the injury report form. Using a 5 point Likert scale, RIO™ was overwhelmingly reported to be either very easy (54.5%) or somewhat easy (36.6%) to use (5 and 4 on the Likert scale, respectively), with ATs being either very satisfied (67.3%) or somewhat satisfied (24.8%) 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 2019-20 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.