CONVENIENCE SUMMARY REPORT

NATIONAL HIGH SCHOOL SPORTS-RELATED INJURY SURVEILLANCE STUDY

2008-2009 School Year

Compiled by:

R. Dawn Comstock, PhD

Ellen E. Yard, MPH

Christy L. Collins, MA

Natalie M. McIlvain, BS

Acknowledgements

We thank the certified athletic trainers (ATCs) for their hard work and dedication in providing us with complete and accurate data. Without their efforts, this study would not have been possible. We would like to thank the National Federation of State High School Associations (NFHS) for their support of this project. The content of this report was funded in part by the Centers for Disease Control and Prevention (CDC) grants #R49/CE000674-01 and #R49/CE001172-01. The content of this report is solely the responsibility of the authors and does not necessarily represent the official views of the CDC. We would also like to acknowledge the generous research funding contributions of the National Federation of State High School Associations (NFHS) and DonJoy Orthotics.

Note

The analyses presented here provide only a brief summary of collected data, with the feasibility of a more detailed presentation limited by the extensive breadth and detail contained in the dataset. The principal investigator, Dr. R. Dawn Comstock, is happy to provide further information or to discuss research partnership opportunities upon request.

For reprints/further information contact:
R. Dawn Comstock, PhD
Center for Injury Research and Policy
The Research Institute at Nationwide Children's Hospital
700 Children's Drive
Columbus, OH 43205
(614) 722-2400
Dawn.Comstock@NationwideChildrens.org

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I. Introduction & Methodology

1.1 Project Overview

To combat the epidemic of obesity among youth in the United States (US), adolescents must be encouraged to get up off the couch and participate in physically active sports, recreation, and leisure activities. Participation in high school sports, one of the most popular physical activities among adolescents, has grown rapidly from an estimated 4.0 million participants in 1971-72 to an estimated 7.0 million in 2008-09. While the health benefits of a physically active lifestyle including participating in sports are undeniable, high school athletes are at risk of sports-related injury because a certain endemic level of injury can be expected among participants of any physical activity. The challenge to injury epidemiologists is to reduce injury rates among high school athletes to the lowest possible level without discouraging adolescents from engaging in this important form of physical activity. This goal can best be accomplished by investigating the etiology of preventable injuries; by developing, implementing, and evaluating protective interventions using such science-based evidence; and by responsibly reporting epidemiologic findings while promoting a physically active lifestyle among adolescents.

1.2 Background and Significance

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

accurate national estimates of injury incidence, injury rate calculations, and risk and protective factor data. Previously, no injury surveillance system capable of providing researchers with the needed quality of injury and exposure data for high school sports-related injuries existed.

Since the 2005-06 school year, Dr. R. Dawn Comstock has conducted the National High School Sports-Related Injury Surveillance System to monitor injuries among US high school athletes participating in boys' football, boys' and girls' soccer, girls' volleyball, boys' and girls' basketball, boys' wrestling, boys' baseball, girls' softball, girls' field hockey, girls' gymnastics, boys' ice hockey, boys' and girls' lacrosse, boys' and girls' swimming, and boys' and girls' track. This surveillance has been conducted using the time- and cost-efficient RIO™ (Reporting Information Online) surveillance system. The first two study years were funded by the Centers for Disease Control, the Research Institute at Nationwide Children's Hospital, and The Ohio State University. Through the generous contributions of the Centers for Disease Control, the National Federation of State High School Associations (NFHS), and DonJoy Orthotics, the National High School Sports-Related Injury Surveillance System was able to be continued during the 2008-09 school year.

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, girls' gymnastics, boys' ice hockey boys' and girls' lacrosse, boys' and girls' swimming, and boys' and girls' track 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 18 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 or practice and

B) Required medical attention by a team physician, certified athletic trainer, personal physician, or emergency department/urgent care facility and

C) Resulted in restriction of the high school athlete's participation for one or more days beyond the day of injury and

D) Any fracture, concussion, or dental injury regardless of whether or not it resulted in restriction of the student-athlete's participation.

An athlete exposure was defined as one athlete participating in one practice or competition where he or she is exposed to the possibility of athletic injury. Exposure was expressed in two parts:

A) Number of athlete-practices = the sum of the number of athletes at each practice during the past week. For example, if 20 athletes practiced on Monday through Thursday and 18 practiced on Friday, the number of athlete-practices would equal 98.

B) Number of athlete-competitions = the sum of the number of athletes at each competition during the past week. For example, if 9 athletes played in a Freshman game, 12 in a JV game, and 14 in a Varsity game, the number of athlete-competitions would equal 35.

1.5 Sample Recruitment

The National Athletic Trainers' Association (NATA) membership list was used to identify eligible reporters - certified athletic trainers (ATC) 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 ATCs who expressed an interest in participating as reporters.

1) All schools were categorized into 8 sampling strata by geographic location (northeast, Midwest, south, and west) and high school size (enrollment <= 1,000 or > 1,000 students). Participant schools were then randomly selected from each substrata to obtain 100 study schools to report for each of the 9 sports included in the original National High School Sports-Related Injury Surveillance Study (boys' football, soccer, basketball, wrestling, and baseball and girls' soccer, volleyball, basketball, and softball). This subset of 100 study schools were the randomly selected, nationally representative sample.
2) All schools not selected in step 1 who offered any of the more rarely offered 9 sports included in the expansion of the National High School Sports-Related Injury Surveillance Study (girls' gymnastics, 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 of the 9 sports of interest in the expansion of the National High School Sports-Related

Injury Surveillance Study (boys' and girls' track & field and swimming & diving) were selected in an attempt to ensure at least 100 schools were reporting for each of the 18 sports of interest.

This three step sampling methodology resulted in a large, nationally disperse convenience sample of US high schools. Participating ATCs were offered a $300 honorarium for reporting for 9 sports (the honorarium for schools reporting for slightly more or fewer sports was adjusted according to the number of sports they reported for) 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, 2008-09 School Year.*

	# Schools in Random Sample	# Schools in Convenience Sample	# Schools Total
Original Sports			
Football	96	33	129
Boys' Soccer	97	37	134
Girls' Soccer	91	38	129
Volleyball	94	34	128
Boys' Basketball	100	37	137
Girls' Basketball	98	41	139
Wrestling	89	37	126
Baseball	90	33	123
Softball	92	35	127
New Sports			
Field Hockey	24	39	63
Gymnastics	7	19	26
Ice Hockey	14	21	35
Boys' Lacrosse	26	27	53
Girls' Lacrosse	27	25	52
Boys' Swimming and Diving	47	33	80
Girls' Swimming and Diving	47	37	84
Boys' Track and Field	63	52	115
Girls' Track and Field	62	55	117
Total	107	68	175

*Numbers only include schools who have actually reported data for the 2008-09 school year.

1.6 Data Collection

Each ATC 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 ATC was asked to complete 45 weekly exposure reports: one for each week from August 4, 2008 through June 7, 2009. 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 ATC 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 ATCs 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 9.1 and SPSS, version 17.0. Although fractures, concussions, and dental injuries resulting in <1 day time loss were collected, unless otherwise noted, analyses in this report excluded these injuries.

Injury rates were calculated as the ratio of unweighted case counts per 1,000 athlete-exposures, and they were compared using rate ratios (RR) with 95% confidence intervals (CI). Following is an example of the RR calculation comparing the rate of injury in boys' soccer to the rate of injury in girls' soccer:

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

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

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

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

II. Overall Injury Epidemiology

Table 2.1 Injury Rates by Sport and Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year*

	# Injuries	# Exposures	Injury rate (per 1,000 athlete-exposures)
Overall total	**7,249**	**3,928,477**	**1.85**
Competition	**3,753**	**1,012,087**	**3.71**
Practice	**3,496**	**2,916,390**	**1.20**
Boys' football total	2,796	766,995	3.65
Competition	1,490	132,122	11.28
Practice	1,306	634,873	2.06
Boys' soccer total	474	288,955	1.64
Competition	309	87,337	3.54
Practice	165	201,618	0.82
Girls' soccer total	555	246,111	2.26
Competition	353	74,312	4.75
Practice	202	171,799	1.18
Girls' volleyball total	243	240,858	1.01
Competition	88	81,617	1.08
Practice	155	159,241	0.97
Boys' basketball total	459	313,656	1.46
Competition	229	92,788	2.47
Practice	230	220,868	1.04
Girls' basketball total	420	256,603	1.64
Competition	259	76,915	3.37
Practice	161	179,688	0.90
Boys' wrestling total	544	247,553	2.20
Competition	210	64,616	3.25
Practice	334	182,937	1.83
Boys' baseball total	197	240,590	0.82
Competition	111	83,730	1.33
Practice	86	156,860	0.55
Girls' softball total	227	185,559	1.22
Competition	121	63,684	1.90
Practice	106	121,875	0.87

*Only includes injuries resulting in ≥1 day's time loss. Table continues to next page.

Table 2.1 (Continued) Injury Rates by Sport and Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year*

	# Injuries	# Exposures	Injury rate (per 1,000 athlete-exposures)
Girls' Field Hockey total	193	106,453	1.81
Competition	91	32,739	2.78
Practice	102	73,714	1.38
Girls' Gymnastics total	43	19,959	2.15
Competition	14	4,043	3.46
Practice	29	15,916	1.82
Boys' Ice Hockey total	145	64,877	2.23
Competition	123	20,237	6.08
Practice	22	44,640	0.49
Boys' Lacrosse total	246	111,792	2.20
Competition	146	33,755	4.33
Practice	100	78,037	1.28
Girls' Lacrosse total	148	86,205	1.72
Competition	70	26,187	2.67
Practice	78	60,018	1.30
Boys' Swimming total	23	117,422	0.20
Competition	3	21,920	0.14
Practice	20	95,502	0.21
Girls' Swimming total	44	130,099	0.34
Competition	8	24,789	0.32
Practice	36	105,310	0.34
Boys' Track total	255	280,291	0.91
Competition	76	50,514	1.50
Practice	179	229,777	0.78
Girls' Track total	237	224,499	1.06
Competition	52	40,782	1.28
Practice	185	183,717	1.01

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

Table 2.2 Proportion of Injuries Resulting in Time Loss, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year*

	≥1 days time loss	<1 day time loss	Total
Overall	**98.9%**	**1.1%**	**100%**
Boys' football	98.7%	1.3%	**100%**
Boys' soccer	98.5%	1.5%	**100%**
Girls' soccer	98.9%	1.1%	**100%**
Girls' volleyball	99.6%	0.4%	**100%**
Boys' basketball	97.6%	2.4%	**100%**
Girls' basketball	98.8%	1.2%	**100%**
Boys' wrestling	99.4%	0.6%	**100%**
Boys' baseball	98.5%	1.5%	**100%**
Girls' softball	99.1%	0.9%	**100%**
Girls' field hockey	99.5%	0.5%	**100%**
Girls' gymnastics	100.0%	0.0%	**100%**
Boys' ice hockey	99.3%	0.7%	**100%**
Boys' lacrosse	98.8%	1.2%	**100%**
Girls' lacrosse	100.0%	0.0%	**100%**
Boys' swimming	95.7%	4.3%	**100%**
Girls' swimming	100.0%	0.0%	**100%**
Boys' track	100.0%	0.0%	**100%**
Girls' track	100.0%	0.0%	**100%**

*By study definition, non-time loss injuries were fractures, concussions, and dental injuries. Because they accounted for less than 2% 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, 2008-09 School Year*

	Male	Female
Year in School		
Freshman	1036 (20.4%)	545 (26.3%)
Sophomore	1296 (25.5%)	576 (27.8%)
Junior	1331 (26.2%)	495 (23.9%)
Senior	1425 (28.0%)	458 (22.1%)
Total†	**5088 (100%)**	**2074 (100%)**
Age (years)		
Minimum	13	13
Maximum	19	18
Mean (St. Dev.)	16.0 (1.3)	15.7 (1.2)
BMI		
Minimum	9.6	14.0
Maximum	49.0	45.4
Mean (St. Dev.)	24.8 (4.3)	22.1 (3.5)

*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, 2008-09 School Year

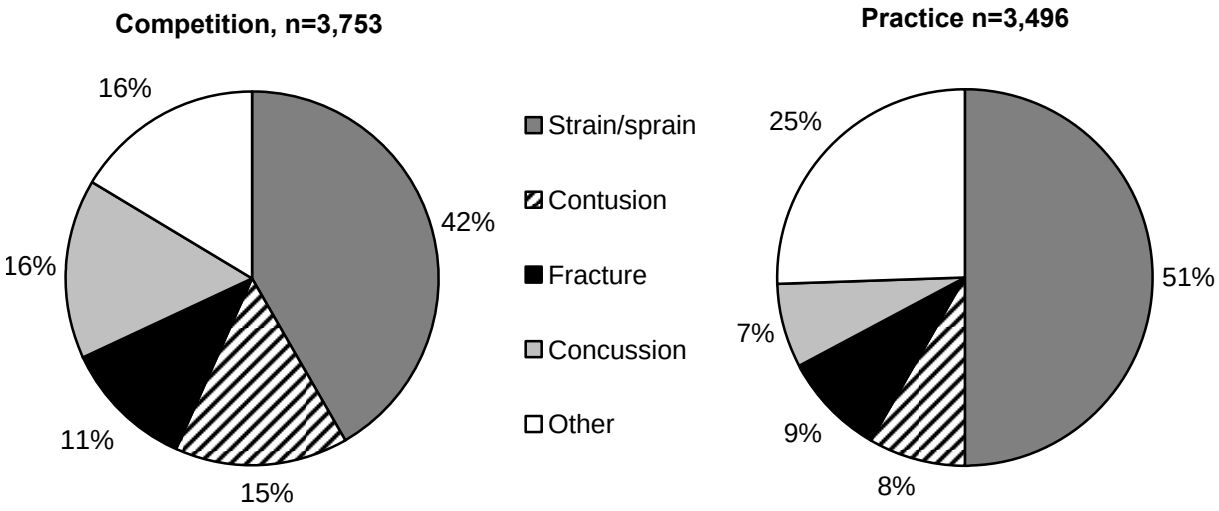


Table 2.4 Body Site of Injury by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

	Competition		Practice		Overall	
	n	%	n	%	n	%
Body Site						
Ankle	603	16.1%	576	16.5%	1,179	16.3%
Head/face	751	20.0%	367	10.5%	1,118	15.4%
Knee	578	15.4%	488	14.0%	1,066	14.7%
Hip/thigh/upper leg	355	9.5%	507	14.5%	862	11.9%
Hand/wrist	341	9.1%	321	9.2%	662	9.1%
Shoulder	319	8.5%	268	7.7%	587	8.1%
Trunk	228	6.1%	263	7.5%	491	6.8%
Lower leg	181	4.8%	250	7.2%	431	5.9%
Foot	135	3.6%	172	4.9%	307	4.2%
Arm/elbow	157	4.2%	133	3.8%	290	4.0%
Neck	59	1.6%	67	1.9%	126	1.7%
Other	46	1.2%	84	2.4%	130	1.8%
Total	**3,753**	**100%**	**3,496**	**100%**	**7,249**	**100%**

Table 2.5 Most Commonly Injured Ankle Structures, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

	Male		Female		Total	
	n	%	n	%	n	%
Ankle Ligament						
Anterior talofibular ligament	567	77.7%	372	82.9%	939	79.6%
Calcaneofibular ligament	265	36.3%	168	37.4%	433	36.7%
Anterior tibiofibular ligament	200	27.4%	103	22.9%	303	25.7%
Posterior talofibular ligament	76	10.4%	67	14.9%	143	12.1%
Posterior tibiofibular ligament	39	5.3%	24	5.3%	63	5.3%
Total	**730**	**100%**	**449**	**100%**	**1179**	**100%**

*Multiple responses allowed per injury report.

Table 2.6 Most Commonly Injured Knee Structures, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

	Male		Female		Total	
	n	%	n	%	n	%
Knee Ligament						
Medial collateral ligament	274	36.4%	62	19.8%	336	31.5%
Patella/patellar tendon	166	22.0%	96	30.7%	262	24.6%
Anterior cruciate ligament	125	16.6%	80	25.6%	205	19.2%
Torn cartilage (meniscus)	146	19.4%	65	20.8%	211	19.8%
Lateral collateral ligament	52	6.9%	22	7.0%	74	6.9%
Posterior cruciate ligament	8	1.1%	7	2.2%	15	1.4%
Total	**753**	**100%**	**313**	**100%**	**1066**	**100%**

*Multiple responses allowed per injury report.

Table 2.7 Ten Most Common Injury Diagnoses by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

	Competition n=3,753		Practice n=3,496		Overall n=7,249	
	n	%	n	%	n	%
Diagnosis						
Ankle strain/sprain	566	15.1%	523	15.0%	1,089	15.0%
Head/face concussion	583	15.5%	257	7.4%	840	11.6%
Hip/thigh/upper leg strain/sprain	241	6.4%	427	12.2%	668	9.2%
Knee strain/sprain	336	9.0%	207	5.9%	543	7.5%
Knee other	137	3.7%	216	6.2%	353	4.9%
Hand/wrist fracture	157	4.2%	137	3.9%	294	4.1%
Shoulder other	168	4.5%	129	3.7%	297	4.1%
Shoulder strain/sprain	116	3.1%	117	3.3%	233	3.2%
Hand/wrist strain/sprain	88	2.3%	111	3.2%	199	2.7%
Trunk strain/sprain	68	1.8%	131	3.7%	199	2.7%

Figure 2.2 Time Loss by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

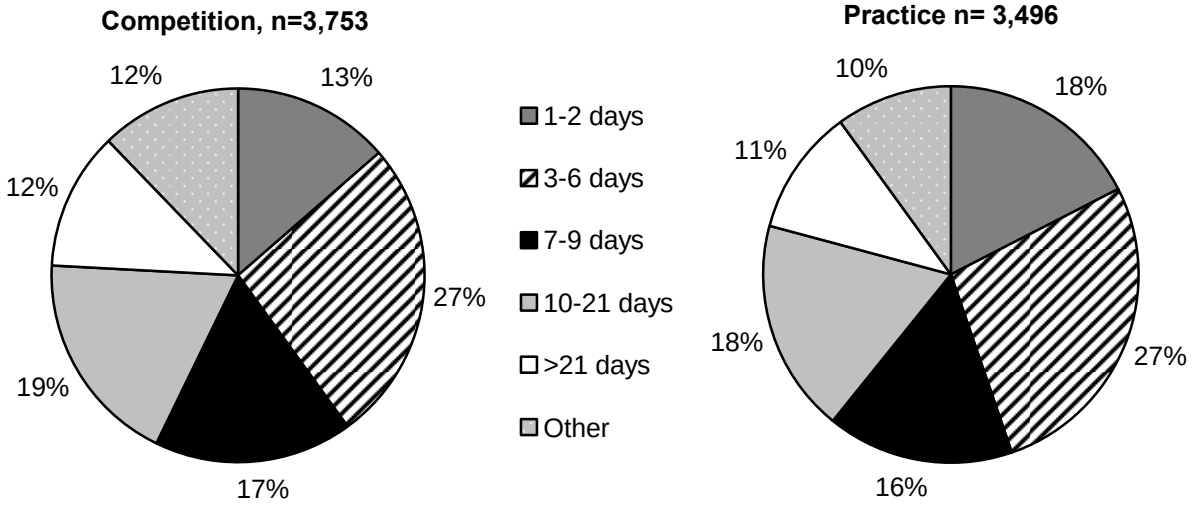


Table 2.8 Injuries Requiring Surgery by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

	Competition		Practice		Overall	
	n	%	n	%	n	%
Need for surgery						
Required surgery	285	7.8%	165	4.9%	450	6.4%
Did not require surgery	3,364	92.2%	3,231	95.1%	6,595	93.6%
Total	**3,649**	**100%**	**3,396**	**100%**	**7,045**	**100%**

Figure 2.3 New and Recurring Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

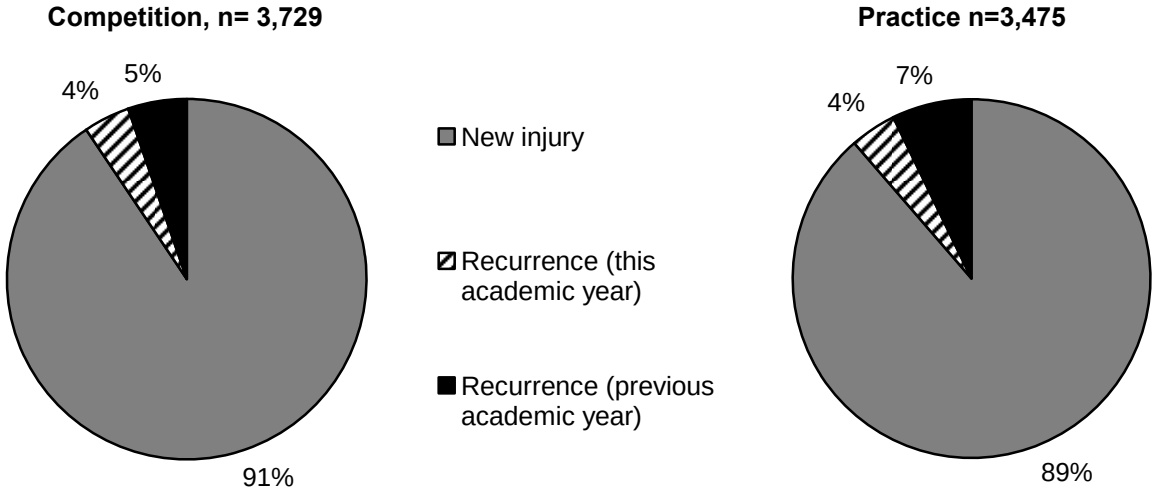


Table 2.9 Time during Season of Injury, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

	n	%
Time in Season		
Preseason	1,749	24.2%
Regular season	5,280	73.0%
Post season	201	2.8%
Total	**7,230**	**100%**

Table 2.10 Competition-Related Variables, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

	n	%
Injury Related to Foul Play		
No	2,985	86.2%
Yes, and ruled foul play	135	3.9%
Yes, but not ruled foul play	141	4.1%
Unknown	201	5.8%
Total	**3,462**	**100%**

Table 2.11 Practice-Related Variables, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

	n	%
Time in Practice		
First ½ hour	351	11.9%
Second ½ hour	706	23.8%
>2 hours into practice	325	11.0%
1-2 hours into practice	1,579	53.3%
Total	**2,961**	**100%**

Table 2.12 Methods for Injury Evaluation and Assessment, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

	n	%
% of Injuries Evaluated by:*		
Certified athletic trainer	6,856	94.6%
Physician	2,641	36.4%
Orthopedic physician	2,187	30.2%
Dentist/oral surgeon	27	0.4%
Nurse practitioner	66	0.9%
Physician's assistant	119	1.6%
Other	478	6.6%
Total	**7249**	**100%**
% of Injuries Assessed by:*		
Evaluation	7,097	97.9%
X-ray	2,976	41.1%
MRI	823	11.4%
CT-scan	311	4.3%
Surgery	109	1.5%
Blood work/lab test	97	1.3%
Other	123	1.7%
Total	**7,249**	**100%**

*Multiple responses allowed per injury report.

III. Boys' Football Injury Epidemiology

Table 3.1 Football Injury Rates by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

	# Injuries	# Exposures	Injury rate (per 1,000 athlete-exposures)
Total	**2,796**	**766,995**	**3.65**
Competition	1,490	132,122	11.28
Practice	1,306	634,873	2.06

Table 3.2 Demographic Characteristics of Injured Football Athletes, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year*

Year in School	
Freshman	571 (20.6%)
Sophomore	711 (25.6%)
Junior	728 (26.2%)
Senior	767 (27.6%)
Total†	**2,777 (100%)**
Age (years)	
Minimum	13
Maximum	19
Mean (St. Dev.)	15.9 (1.3)
BMI	
Minimum	9.63
Maximum	45.4
Mean (St. Dev.)	25.9 (4.6)

*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 3.1 Diagnosis of Football Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

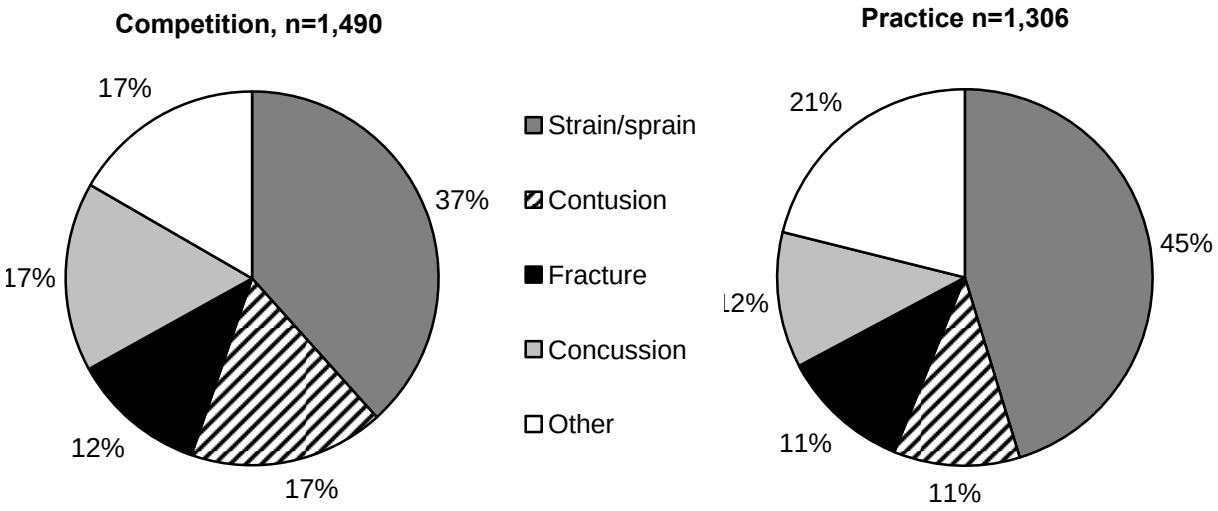


Table 3.3 Body Site of Football Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

	Competition		Practice		Overall	
	n	%	n	%	n	%
Body Site						
Knee	266	17.9%	212	16.2%	478	17.1%
Head/face	265	17.8%	169	12.9%	434	15.5%
Ankle	198	13.3%	166	12.7%	364	13.0%
Hand/wrist	158	10.6%	155	11.9%	313	11.2%
Shoulder	166	11.1%	117	9.0%	283	10.1%
Hip/thigh/upper leg	102	6.8%	147	11.3%	249	8.9%
Trunk	106	7.1%	116	8.9%	222	7.9%
Lower leg	74	5.0%	48	3.7%	122	4.4%
Arm/elbow	69	4.6%	54	4.1%	123	4.4%
Foot	39	2.6%	43	3.3%	82	2.9%
Neck	31	2.1%	43	3.3%	74	2.6%
Other	16	1.1%	36	2.8%	52	1.9%
Total	**1,490**	**100%**	**1,306**	**100%**	**2,796**	**100%**

Table 3.4 Ten Most Common Football Injury Diagnoses by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

	Competition n=1,490		Practice n=1,306		Total n=2,796	
	n	%	n	%	n	%
Diagnosis						
Head/face concussion	244	16.4%	151	11.6%	395	14.1%
Ankle strain/sprain	182	12.2%	144	11.0%	326	11.7%
Knee strain/sprain	169	11.3%	108	8.3%	277	9.9%
Hip/thigh/upper leg strain/sprain	50	3.4%	115	8.8%	165	5.9%
Shoulder other	94	6.3%	52	4.0%	146	5.2%
Hand/wrist fracture	71	4.8%	60	4.6%	131	4.7%
Knee other	49	3.3%	66	5.1%	115	4.1%
Shoulder strain/sprain	55	3.7%	49	3.8%	104	3.7%
Hand/wrist strain/sprain	36	2.4%	53	4.1%	89	3.2%
Knee contusion	46	3.1%	33	2.5%	79	2.8%

Figure 3.2 Time Loss of Football Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

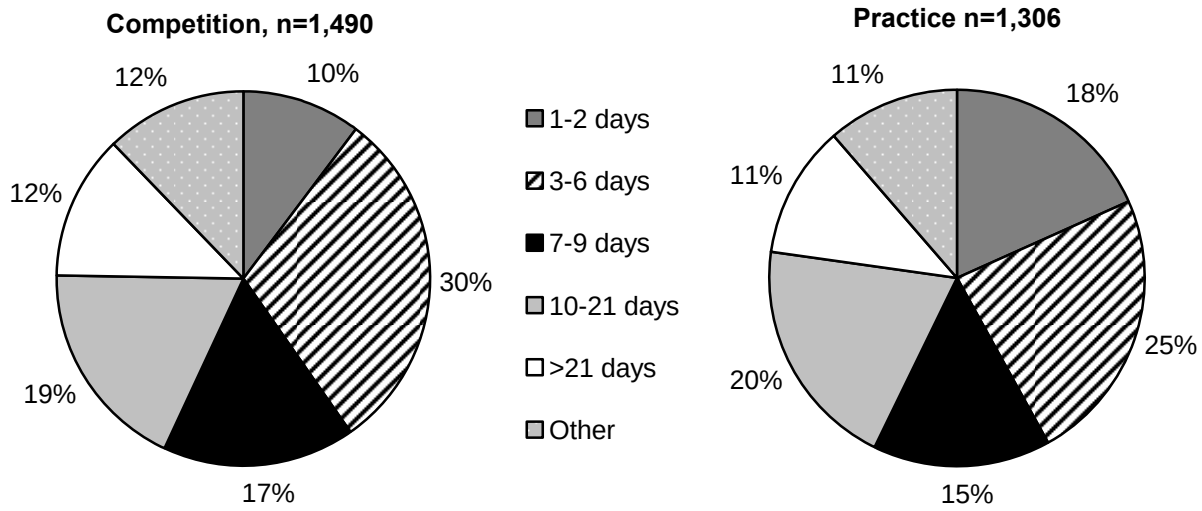


Table 3.5 Football Injuries Requiring Surgery by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

	Competition		Practice		Overall	
	n	%	n	%	n	%
Need for surgery						
Required surgery	110	7.6%	79	6.2%	189	7.0%
Did not require surgery	1,342	92.4%	1,187	93.8%	2,529	93.0%
Total	**1,452**	**100%**	**1,266**	**100%**	**2,718**	**100%**

Figure 3.3 History of Football Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

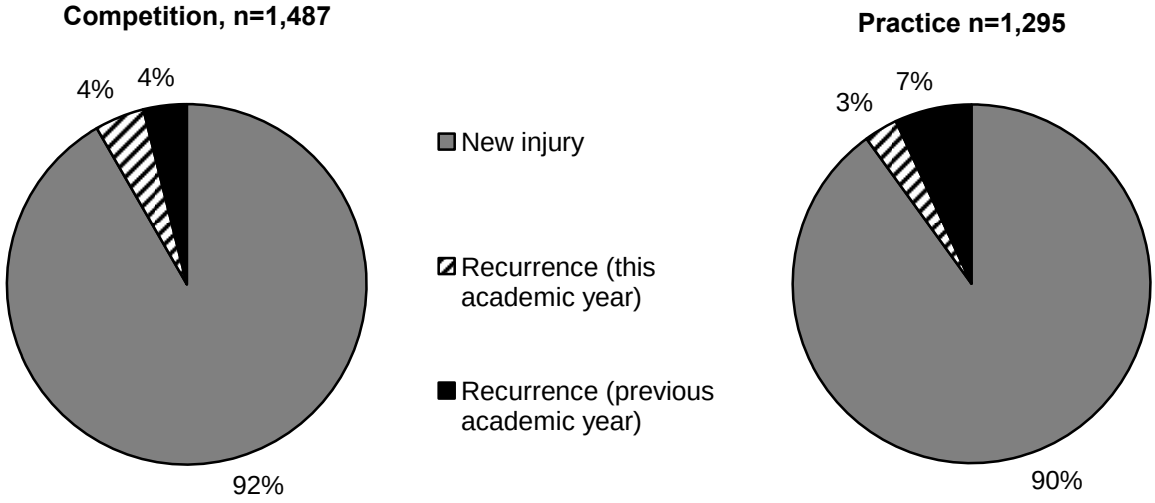


Table 3.6 Time during Season of Football Injuries, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

	n	%
Time in Season		
Preseason	790	28.3%
Regular season	1,931	69.3%
Post season	67	2.4%
Total	**2,788**	**100%**

Table 3.7 Competition-Related Variables for Football Injuries, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

	n	%
Time in Competition		
Pre-competition/warm-ups	21	1.5%
First quarter	178	12.7%
Second quarter	419	30.0%
Third quarter	469	33.5%
Fourth quarter	307	22.0%
Overtime	4	0.3%
Total	**1,398**	**100%**
Injury Related to Foul Play		
No	1,230	90.0%
Yes, and ruled foul play	19	1.4%
Yes, but not ruled foul play	38	2.8%
Unknown	79	5.8%
Total	**1,366**	**100%**
Field Location		
End zone	24	1.7%
Red zone	270	19.3%
Between the 20 yrd lines	1095	78.1%
Off the field	13	0.9%
Total	**1,402**	**100%**

Table 3.8 Practice-Related Variables for Football Injuries, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

	n	%
Time in Practice		
First 1/2 hour	102	9.2%
Second 1/2 hour	239	21.6%
1-2 hours into practice	619	56.1%
>2 hours into practice	144	13.0%
Total	**1,104**	**100%**

Figure 3.4 Player Position of Football Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

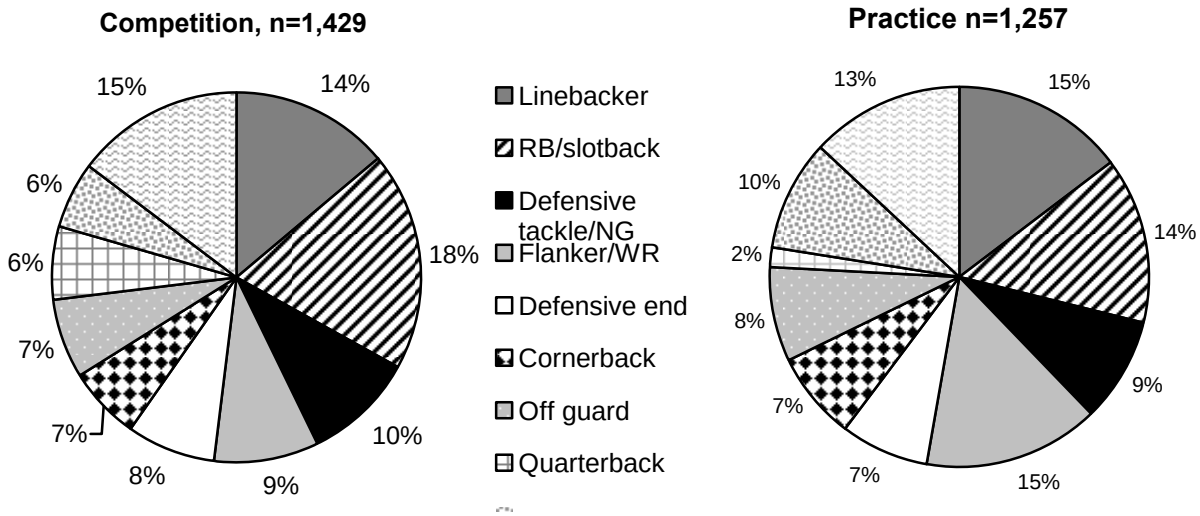
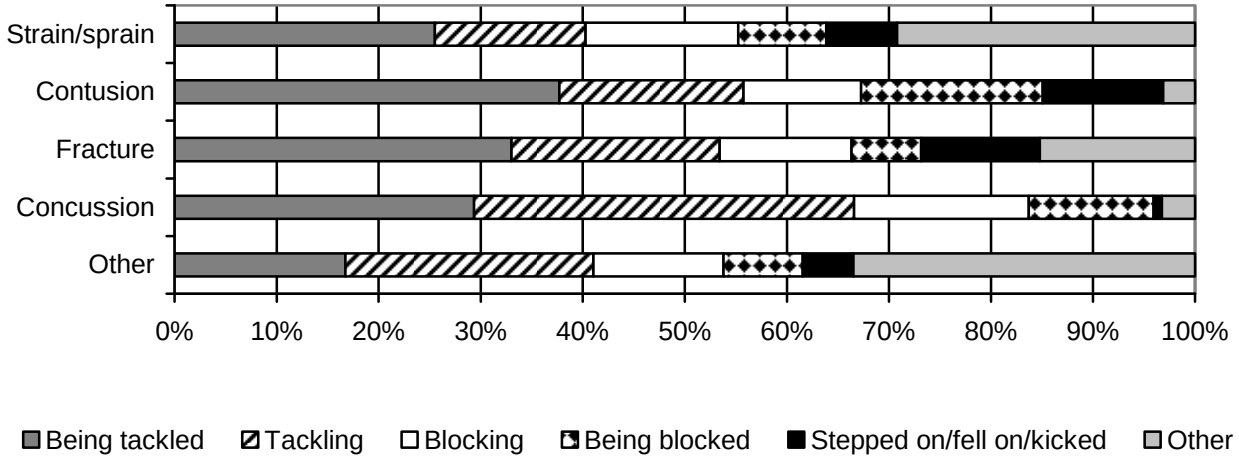


Table 3.9 Activities Leading to Football Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

	Competition		Practice		Overall	
	n	%	n	%	n	%
Activity						
Being tackled	474	33.1%	254	20.1%	728	27.0%
Tackling	328	22.9%	231	18.3%	559	20.7%
Blocking	202	14.1%	179	14.2%	381	14.1%
Being blocked	182	12.7%	89	7.0%	271	10.0%
N/A, chronic/overuse	29	2.0%	196	15.5%	225	8.3%
Stepped on/fell on/kicked	95	6.6%	93	7.4%	188	7.0%
Rotation around a planted foot	52	3.6%	79	6.3%	131	4.9%
Other	72	5.0%	143	11.3%	215	8.0%
Total	**1,434**	**100%**	**1,264**	**100%**	**2,698**	**100%**

Figure 3.5 Activity Resulting in Football Injuries by Injury Diagnosis, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year



IV. Boys' Soccer Injury Epidemiology

Table 4.1 Boys' Soccer Injury Rates by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

	# Injuries	# Exposures	Injury rate (per 1,000 athlete-exposures)
Total	474	288,955	1.64
Competition	309	87,337	3.54
Practice	165	201,618	0.82

Table 4.2 Demographic Characteristics of Injured Boys' Soccer Athletes, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year*

Year in School	
Freshman	74 (15.8%)
Sophomore	100 (21.3%)
Junior	124 (26.4%)
Senior	171 (36.5%)
Total†	**469 (100%)**
Age (years)	
Minimum	13
Maximum	18
Mean (St. Dev.)	16.1 (1.2)
BMI	
Minimum	15.2
Maximum	33.7
Mean (St. Dev.)	22.7 (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, 2008-09 School Year

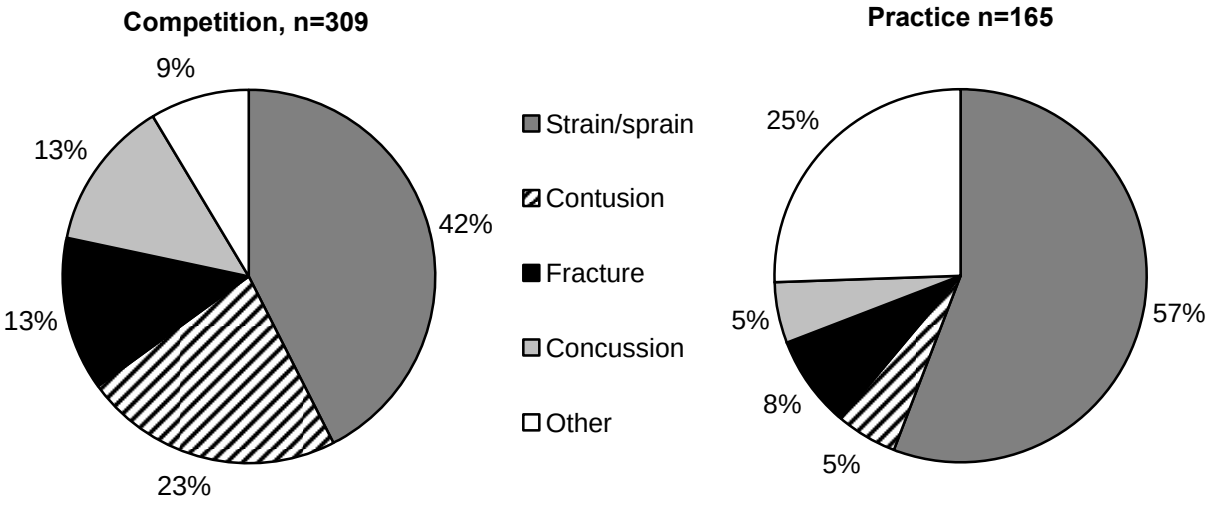


Table 4.3 Body Site of Boys' Soccer Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

	Competition		Practice		Overall	
	n	%	n	%	n	%
Body Site						
Hip/thigh/upper leg	45	14.6%	46	27.9%	91	19.2%
Ankle	58	18.8%	32	19.4%	90	19.0%
Head/face	58	18.8%	11	6.7%	69	14.6%
Knee	42	13.6%	20	12.1%	62	13.1%
Lower leg	32	10.4%	16	9.7%	48	10.1%
Foot	22	7.1%	15	9.1%	37	7.8%
Trunk	18	5.8%	9	5.5%	27	5.7%
Hand/wrist	15	4.9%	7	4.2%	22	4.6%
Shoulder	11	3.6%	7	4.2%	18	3.8%
Arm/elbow	5	1.6%	1	0.6%	6	1.3%
Neck	2	0.6%	0	0.0%	2	0.4%
Other	1	0.3%	1	0.6%	2	0.4%
Total	**309**	**100%**	**165**	**100%**	**474**	**100%**

Table 4.4 Ten Most Common Boys' Soccer Injury Diagnoses by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

	Competition n=309		Practice n=165		Total n=474	
	n	%	n	%	n	%
Diagnosis						
Ankle strain/sprain	53	17.2%	27	16.4%	80	16.9%
Hip/thigh/upper leg strain/sprain	35	11.3%	41	24.8%	76	16.0%
Head/face concussion	40	12.9%	9	5.5%	49	10.3%
Knee strain/sprain	20	6.5%	9	5.5%	29	6.1%
Lower leg contusion	18	5.8%	3	1.8%	21	4.4%
Knee contusion	16	5.2%	2	1.2%	18	3.8%
Hand/wrist fracture	13	4.2%	5	3.0%	18	3.8%
Head/face other	12	3.9%	1	0.6%	13	2.7%
Knee other	3	1.0%	9	5.5%	12	2.5%
Trunk strain/sprain	6	1.9%	6	3.6%	12	2.5%
Foot contusion	9	2.9%	3	1.8%	12	2.5%

Figure 4.2 Time Loss of Boys' Soccer Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

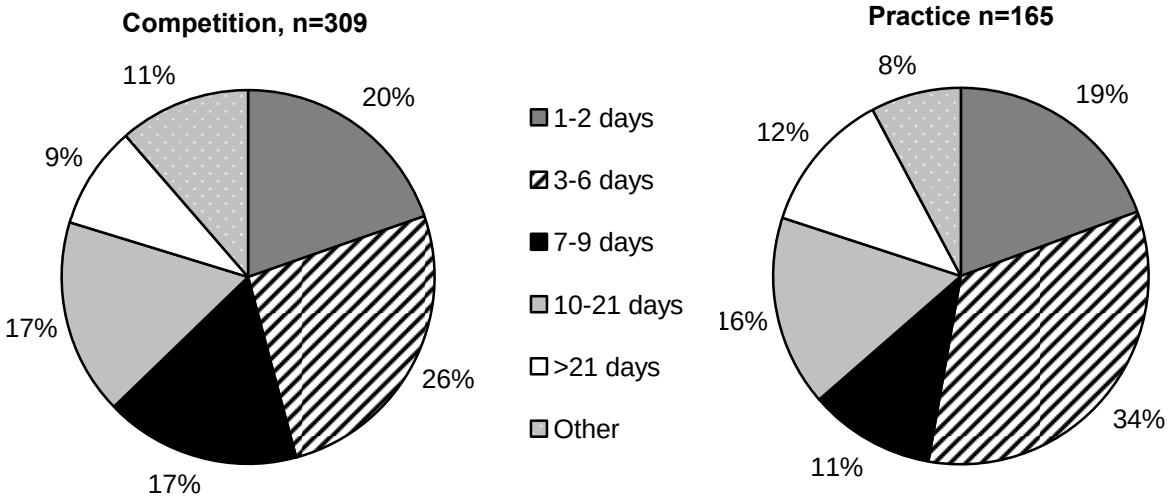


Table 4.5 Boys' Soccer Injuries Requiring Surgery by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

	Competition		Practice		Overall	
	n	%	n	%	n	%
Need for surgery						
Required surgery	18	5.9%	4	2.5%	22	4.7%
Did not require surgery	285	94.1%	157	97.5%	442	95.3%
Total	**303**	**100%**	**161**	**100%**	**464**	**100%**

Figure 4.3 History of Boys' Soccer Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

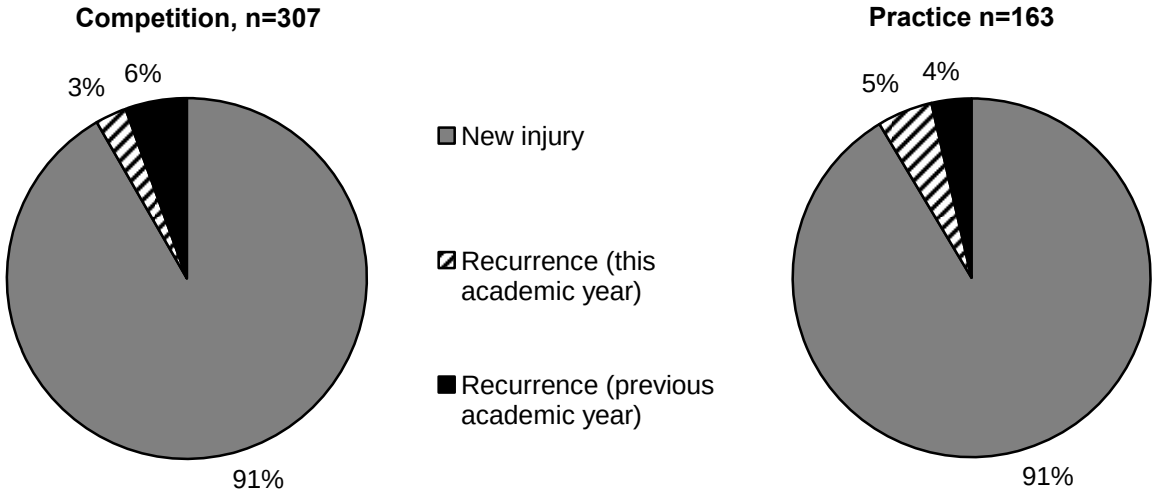


Table 4.6 Time during Season of Boys' Soccer Injuries, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

	n	%
Time in Season		
Preseason	115	24.3%
Regular season	346	73.2%
Post season	12	2.5%
Total	**473**	**100%**

Table 4.7 Competition-Related Variables for Boys' Soccer Injuries, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

	n	%
Time in Competition		
Pre-competition/warm-ups	7	2.4%
First half	94	32.1%
Second half	190	64.8%
Overtime	2	0.7%
Total	**293**	**100%**
Injury Related to Foul Play		
No	216	76.3%
Yes, and ruled foul play	21	7.4%
Yes, but not ruled foul play	23	8.1%
Unknown	23	8.1%
Total	**283**	**100%**
Field Location		
Top of goal box extended to center line (offense)	99	33.6%
Top of goal box extended to center line (defense)	54	18.3%
Goal box (defense)	49	16.6%
Side of goal box (defense)	25	8.5%
Side of goal box (offense)	29	9.8%
Goal box (offense)	36	12.2%
Off the field	3	1.0%
Total	**295**	**100%**

Table 4.8 Practice-Related Variables for Boys' Soccer Injuries, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

	n	%
Time in Practice		
First 1/2 hour	12	8.5%
Second 1/2 hour	34	23.9%
1-2 hours into practice	78	54.9%
>2 hours into practice	18	12.7%
Total	**142**	**100%**

Figure 4.4 Player Position of Boys' Soccer Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

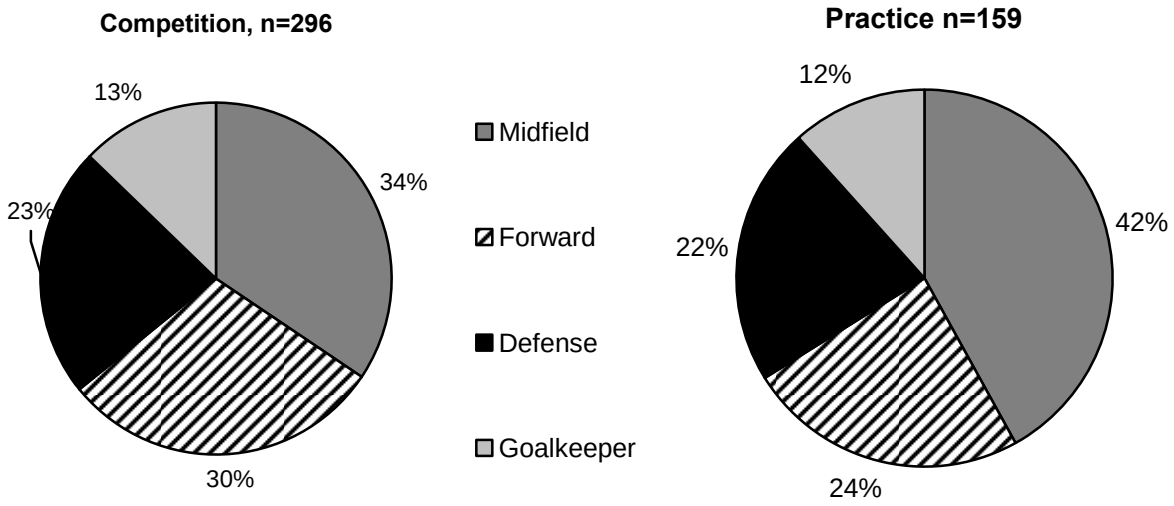
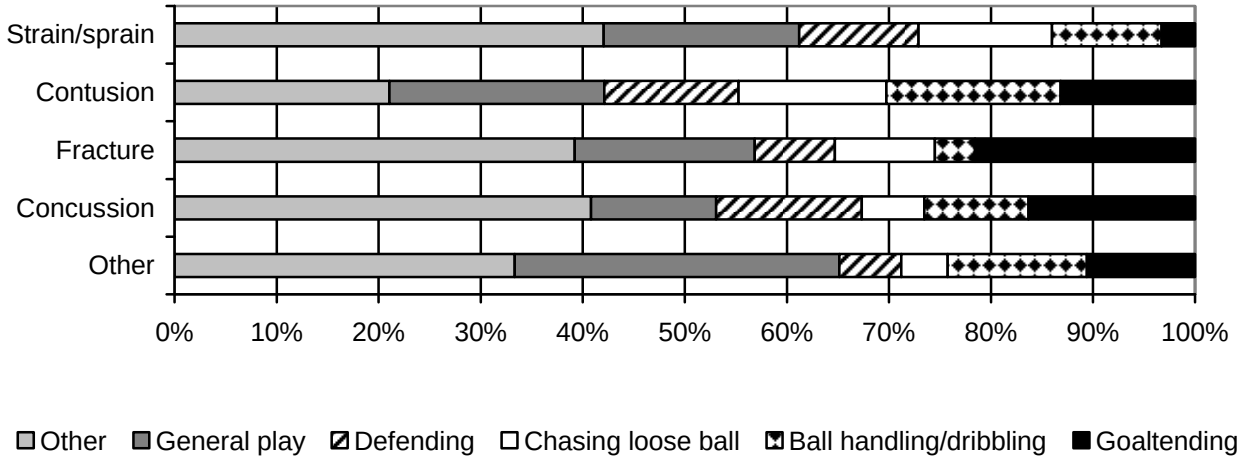


Table 4.9 Activities Leading to Boys' Soccer Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

	Competition		Practice		Overall	
	n	%	n	%	n	%
Activity						
General play	46	15.5%	47	29.4%	93	20.4%
Ball handling/dribbling	40	13.5%	12	7.5%	52	11.4%
Defending	39	13.2%	11	6.9%	50	11.0%
Chasing loose ball	39	13.2%	11	6.9%	50	11.0%
Goaltending	28	9.5%	15	9.4%	43	9.4%
Shooting (foot)	19	6.4%	13	8.1%	32	7.0%
Passing (foot)	21	7.1%	10	6.3%	31	6.8%
Heading ball	24	8.1%	4	2.5%	28	6.1%
Receiving pass	17	5.7%	4	2.5%	21	4.6%
Other	23	7.8%	33	20.6%	56	12.3%
Total	**296**	**100%**	**160**	**100%**	**456**	**100%**

Figure 4.5 Activity Resulting in Boys' Soccer Injuries by Injury Diagnosis, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year



V. Girls' Soccer Injury Epidemiology

Table 5.1 Girls' Soccer Injury Rates by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

	# Injuries	# Exposures	Injury rate (per 1,000 athlete-exposures)
Total	**555**	**246,111**	**2.26**
Competition	353	74,312	4.75
Practice	202	171,799	1.18

Table 5.2 Demographic Characteristics of Injured Girls' Soccer Athletes, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year*

Year in School	
Freshman	121 (22.1%)
Sophomore	158 (28.8%)
Junior	140 (25.5%)
Senior	129 (23.5%)
Total†	**548 (100%)**
Age (years)	
Minimum	13
Maximum	18
Mean (St. Dev.)	15.8 (1.2)
BMI	
Minimum	15.4
Maximum	45.4
Mean (St. Dev.)	21.9 (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, 2008-09 School Year

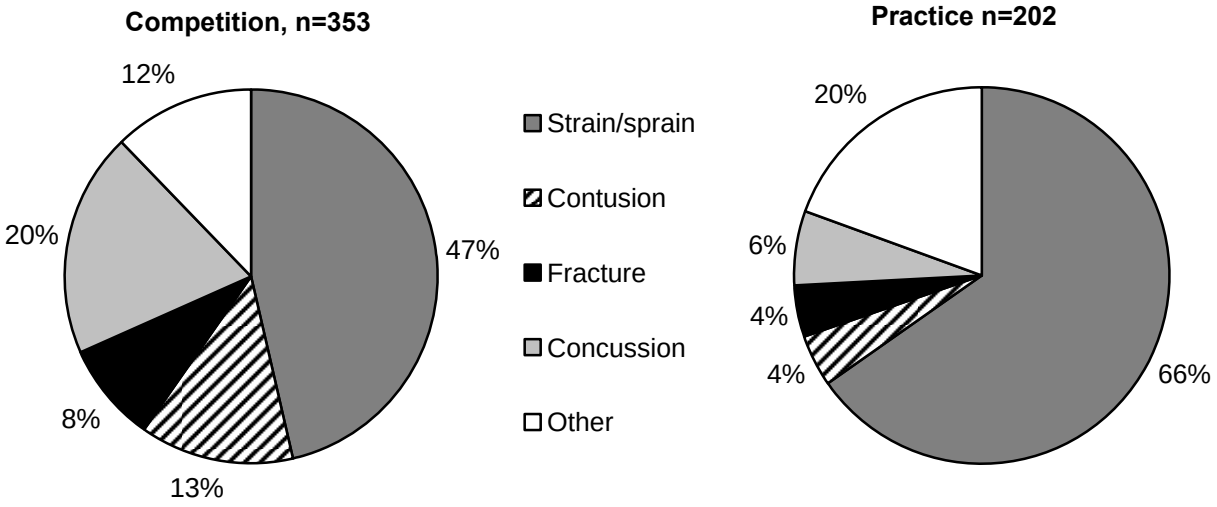


Table 5.3 Body Site of Girls' Soccer Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

	Competition		Practice		Overall	
	n	%	n	%	n	%
Body Site						
Ankle	56	15.9%	51	25.2%	107	19.3%
Knee	73	20.7%	27	13.4%	100	18.0%
Head/face	78	22.1%	15	7.4%	93	16.8%
Hip/thigh/upper leg	43	12.2%	52	25.7%	95	17.1%
Hand/wrist	11	3.1%	4	2.0%	15	2.7%
Shoulder	9	2.5%	4	2.0%	13	2.3%
Trunk	15	4.2%	8	4.0%	23	4.1%
Lower leg	22	6.2%	22	10.9%	44	7.9%
Arm/elbow	8	2.3%	4	2.0%	12	2.2%
Foot	26	7.4%	12	5.9%	38	6.8%
Neck	6	1.7%	1	0.5%	7	1.3%
Other	6	1.7%	2	1.0%	8	1.4%
Total	**353**	**100%**	**202**	**100%**	**555**	**100%**

Table 5.4 Ten Most Common Girls' Soccer Injury Diagnoses by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

	Competition n=353		Practice n=202		Total n=555	
	n	%	n	%	n	%
Diagnosis						
Ankle strain/sprain	52	14.7%	49	24.3%	101	18.2%
Hip/thigh/upper leg strain/sprain	39	11.0%	49	24.3%	88	15.9%
Head/face concussion	69	19.5%	13	6.4%	82	14.8%
Knee strain/sprain	38	10.8%	12	5.9%	50	9.0%
Knee other	25	7.1%	13	6.4%	38	6.8%
Lower leg other	1	0.3%	15	7.4%	16	2.9%
Foot strain/sprain	10	2.8%	5	2.5%	15	2.7%
Foot contusion	10	2.8%	3	1.5%	13	2.3%
Trunk strain/sprain	9	2.5%	4	2.0%	13	2.3%
Lower leg fracture	9	2.5%	3	1.5%	12	2.2%

Figure 5.2 Time Loss of Girls' Soccer Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

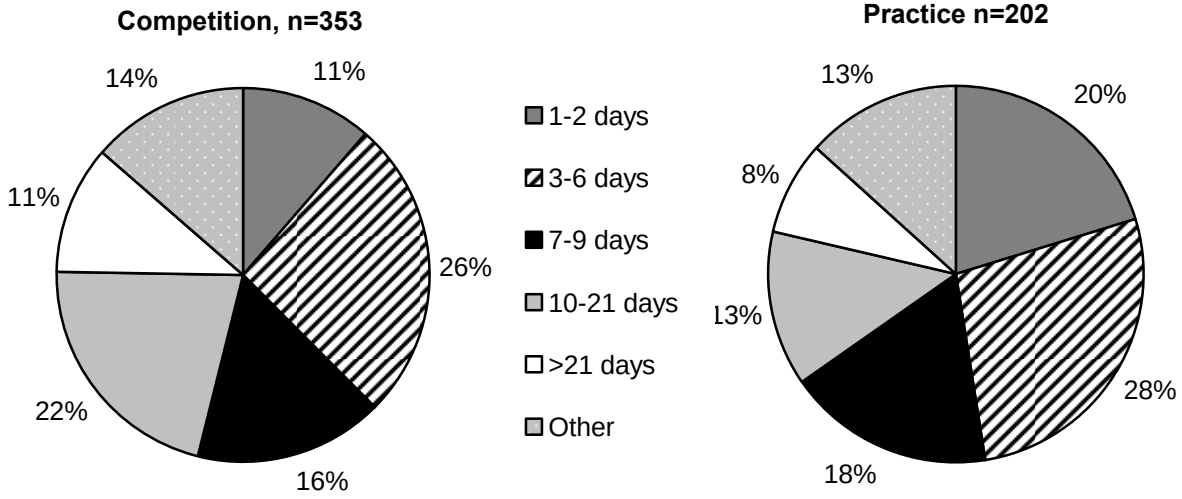


Table 5.5 Girls' Soccer Injuries Requiring Surgery by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

	Competition		Practice		Overall	
	n	%	n	%	n	%
Need for surgery						
Required surgery	30	8.8%	7	3.5%	37	6.9%
Did not require surgery	312	91.2%	191	96.5%	503	93.1%
Total	**342**	**100%**	**198**	**100%**	**540**	**100%**

Figure 5.3 History of Girls' Soccer Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

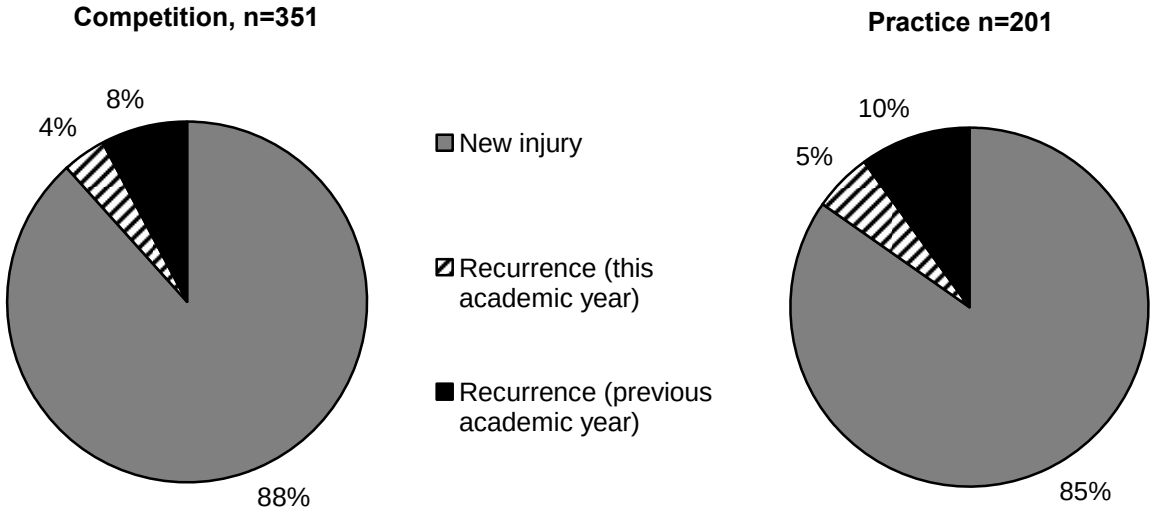


Table 5.6 Time during Season of Girls' Soccer Injuries, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

	n	%
Time in Season		
Preseason	119	21.4%
Regular season	411	74.1%
Post season	25	4.5%
Total	**555**	**100%**

Table 5.7 Competition-Related Variables for Girls' Soccer Injuries, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

	n	%
Time in Competition		
Pre-competition/warm-ups	10	3.0%
First half	120	35.5%
Second half	206	60.9%
Overtime	2	0.6%
Total	**338**	**100%**
Injury Related to Foul Play		
No	252	76.1%
Yes, and ruled foul play	20	6.0%
Yes, but not ruled foul play	25	7.6%
Unknown	34	10.3%
Total	**331**	**100%**
Field Location		
Goal box (defense)	46	14.1%
Side of goal box (defense)	30	9.2%
Goal box (offense)	31	9.5%
Side of goal box (offense)	26	8.0%
Top of goal box extended to center line (offense)	107	32.7%
Top of goal box extended to center line (defense)	76	23.2%
Off the field	11	3.4%
Total	**327**	**100%**

Table 5.8 Practice-Related Variables for Girls' Soccer Injuries, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

	n	%
Time in Practice		
First 1/2 hour	23	14.2%
Second 1/2 hour	30	18.5%
>2 hours into practice	15	9.3%
1-2 hours into practice	94	58.0%
Total	**162**	**100%**

Figure 5.4 Player Position of Girls' Soccer Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

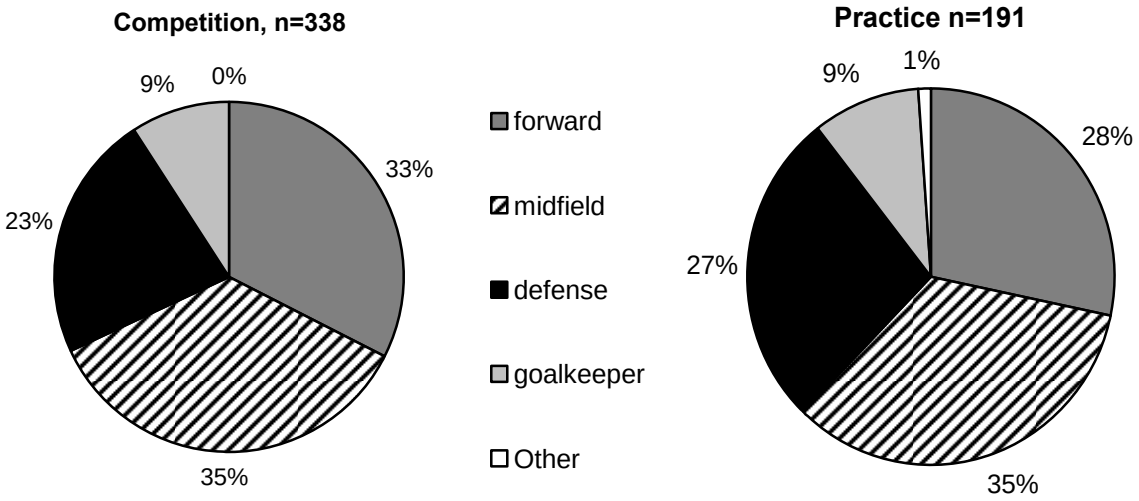
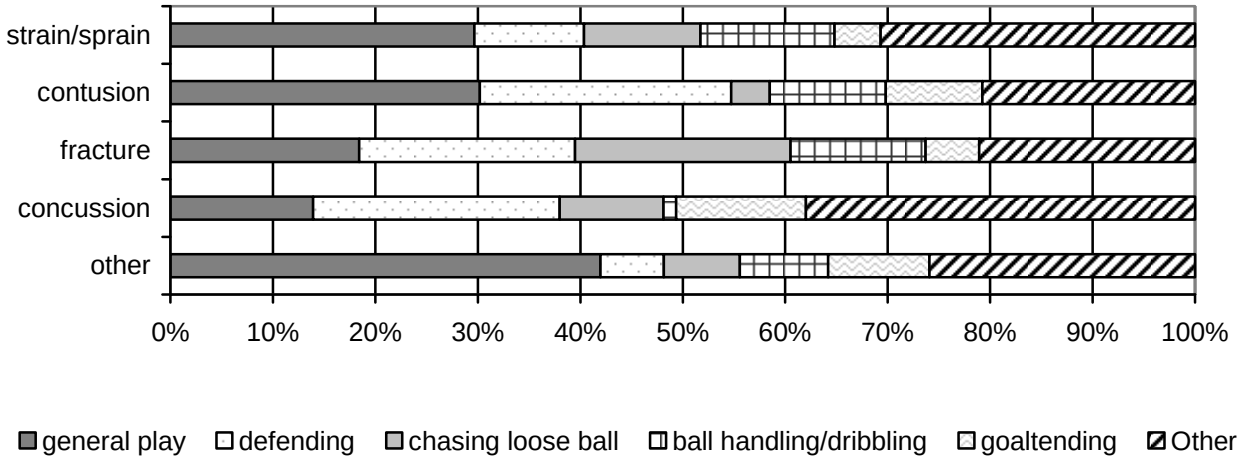


Table 5.9 Activities Leading to Girls' Soccer Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

	Competition		Practice		Overall	
	n	%	n	%	n	%
Activity						
General play	81	23.5%	73	37.2%	154	28.5%
Defending	62	18.0%	14	7.1%	76	14.0%
Chasing loose ball	46	13.3%	11	5.6%	57	10.5%
Ball handling/dribbling	38	11.0%	19	9.7%	57	10.5%
Goaltending	26	7.5%	12	6.1%	38	7.0%
Shooting (foot)	18	5.2%	14	7.1%	32	5.9%
Conditioning	0	0.0%	28	14.3%	28	5.2%
Receiving pass	21	6.1%	6	3.1%	27	5.0%
Heading ball	19	5.5%	4	2.0%	23	4.3%
Passing (foot)	13	3.8%	5	2.6%	18	3.3%
Other	21	6.1%	10	5.1%	31	5.7%
Total	**345**	**100%**	**196**	**100%**	**541**	**100%**

Figure 5.5 Activity Resulting in Girls' Soccer Injuries by Injury Diagnosis, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year



VI. Volleyball Injury Epidemiology

Table 6.1 Volleyball Injury Rates by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

	# Injuries	# Exposures	Injury rate (per 1,000 athlete-exposures)
Total	**243**	**240,858**	**1.01**
Competition	88	81,617	1.08
Practice	155	159,241	0.97

Table 6.2 Demographic Characteristics of Injured Volleyball Athletes, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year*

Year in School	
Freshman	74 (30.7%)
Sophomore	59 (24.5%)
Junior	50 (20.7%)
Senior	58 (24.1%)
Total†	**241 (100%)**
Age (years)	
Minimum	13
Maximum	18
Mean (St. Dev.)	15.5 (1.2)
BMI	
Minimum	15.3
Maximum	41.9
Mean (St. Dev.)	21.8 (3.5)

*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 Volleyball Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

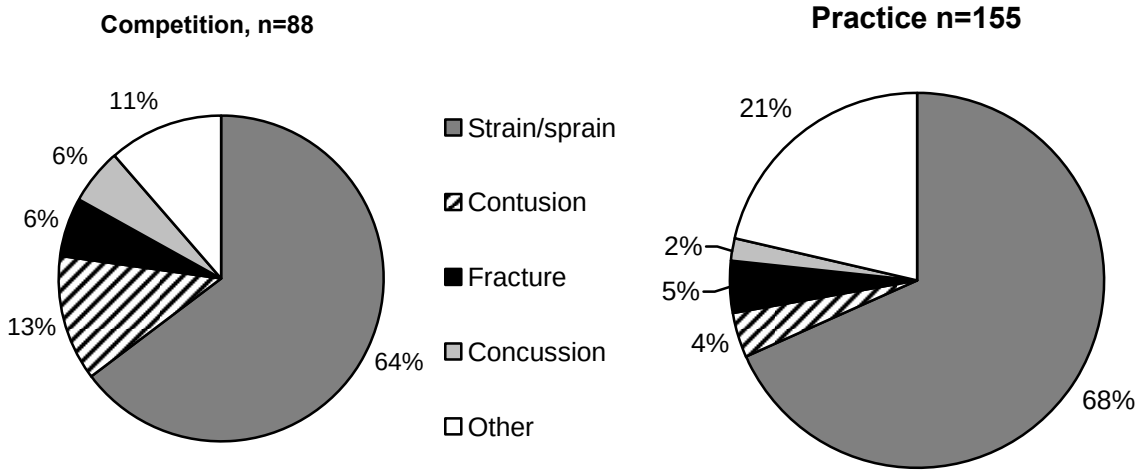


Table 6.3 Body Site of Volleyball Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

	Competition		Practice		Overall	
	n	%	n	%	n	%
Body Site						
Ankle	32	36.4%	63	40.6%	95	39.1%
Hand/wrist	18	20.5%	15	9.7%	33	13.6%
Knee	11	12.5%	18	11.6%	29	11.9%
Shoulder	4	4.5%	16	10.3%	20	8.2%
Hip/thigh/upper leg	6	6.8%	9	5.8%	15	6.2%
Head/face	5	5.7%	5	3.2%	10	4.1%
Trunk	4	4.5%	6	3.9%	10	4.1%
Lower leg	2	2.3%	6	3.9%	8	3.3%
Arm/elbow	3	3.4%	4	2.6%	7	2.9%
Foot	1	1.1%	6	3.9%	7	2.9%
Neck	2	2.3%	1	0.6%	3	1.2%
Other	0	0.0%	6	3.9%	6	2.5%
Total	**88**	**100%**	**155**	**100%**	**243**	**100**

Table 6.4 Ten Most Common Volleyball Injury Diagnoses by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

	Competition n=88		Practice n=155		Total n=243	
	n	%	n	%	n	%
Diagnosis						
Ankle strain/sprain	31	35.2%	61	39.4%	92	37.9%
Hand/wrist strain/sprain	13	14.8%	11	7.1%	24	9.9%
Knee other	3	3.4%	12	7.7%	15	6.2%
Shoulder other	3	3.4%	10	6.5%	13	5.3%
Knee strain/sprain	5	5.7%	5	3.2%	10	4.1%
Head/face concussion	5	5.7%	3	1.9%	8	3.3%
Hip/thigh/upper leg strain/sprain	2	2.3%	6	3.9%	8	3.3%
Shoulder strain/sprain	1	1.1%	6	3.9%	7	2.9%
Trunk strain/sprain	2	2.3%	5	3.2%	7	2.9%
Knee contusion	3	3.4%	1	0.6%	4	1.6%
Lower leg strain/sprain	1	1.1%	3	1.9%	4	1.6%
Foot strain/sprain	0	0.0%	4	2.6%	4	1.6%

Figure 6.2 Time Loss of Volleyball Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

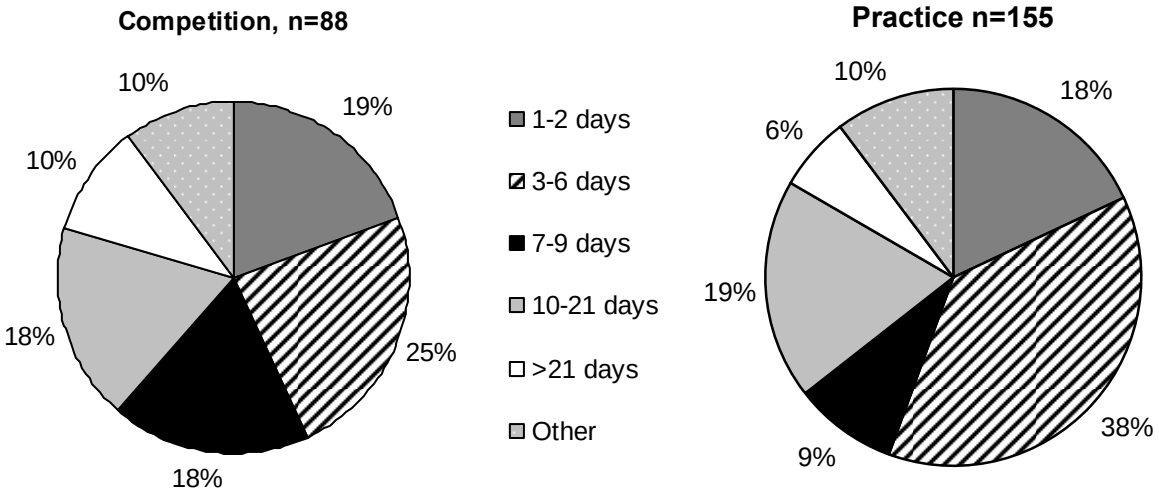


Table 6.5 Volleyball Injuries Requiring Surgery by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

	Competition		Practice		Overall	
	n	%	n	%	n	%
Need for surgery						
Required surgery	4	4.6%	2	1.4%	6	2.6%
Did not require surgery	83	95.4%	146	98.6%	229	97.4%
Total	**87**	**100%**	**148**	**100%**	**235**	**100%**

Figure 6.3 History of Volleyball Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

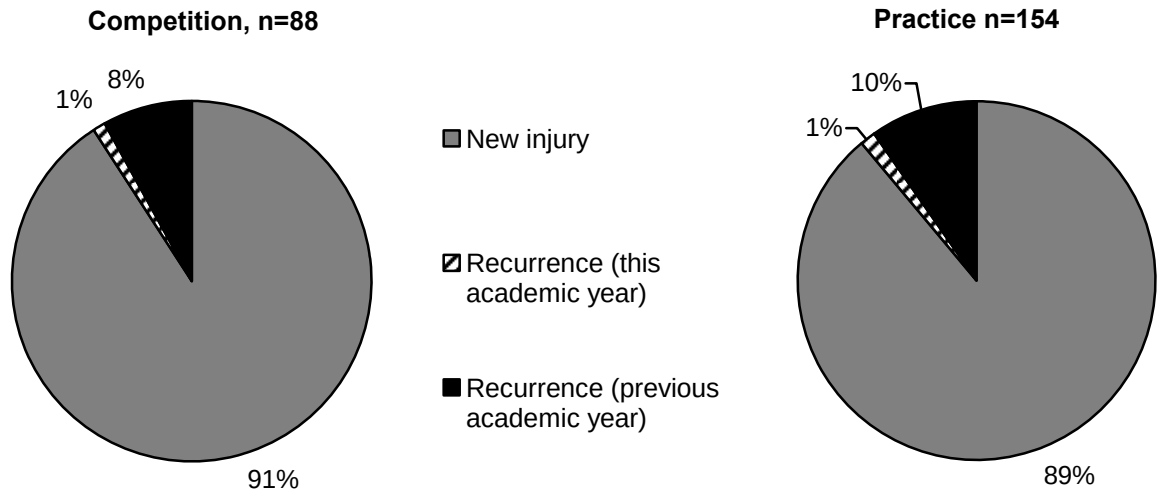


Table 6.6 Time during Season of Volleyball Injuries, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

	n	%
Time in Season		
Preseason	60	24.8%
Regular season	176	72.7%
Post season	6	2.5%
Total	**242**	**100%**

Table 6.7 Competition-Related Variables for Volleyball Injuries, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

	n	%
Time in Competition		
Pre-competition/warm-ups	9	10.8%
First game	17	20.5%
Second game	34	41.0%
Third game	23	27.7%
Total	**83**	**100%**
Injury Related to Foul Play		
No	81	96.4%
Yes, and ruled foul play	1	1.2%
Yes, but not ruled foul play	0	0.0%
Unknown	2	2.4%
Total	**84**	**100%**
Court Location		
Middle forward	28	35.0%
Right forward	20	25.0%
Left back	11	13.8%
Left forward	9	11.3%
Right back (server)	3	3.8%
Off the court	1	1.3%
Outside court (your side)	8	10.0%
Outside court (opponent's side)	0	0.0%
Total	**80**	**100%**

Table 6.8 Practice-Related Variables for Volleyball Injuries, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

	n	%
Time in Practice		
First 1/2 hour	15	10.7%
Second 1/2 hour	40	28.6%
1-2 hours into practice	66	47.1%
>2 hours into practice	19	13.6%
Total	**140**	**100%**

Figure 6.4 Player Position of Volleyball Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

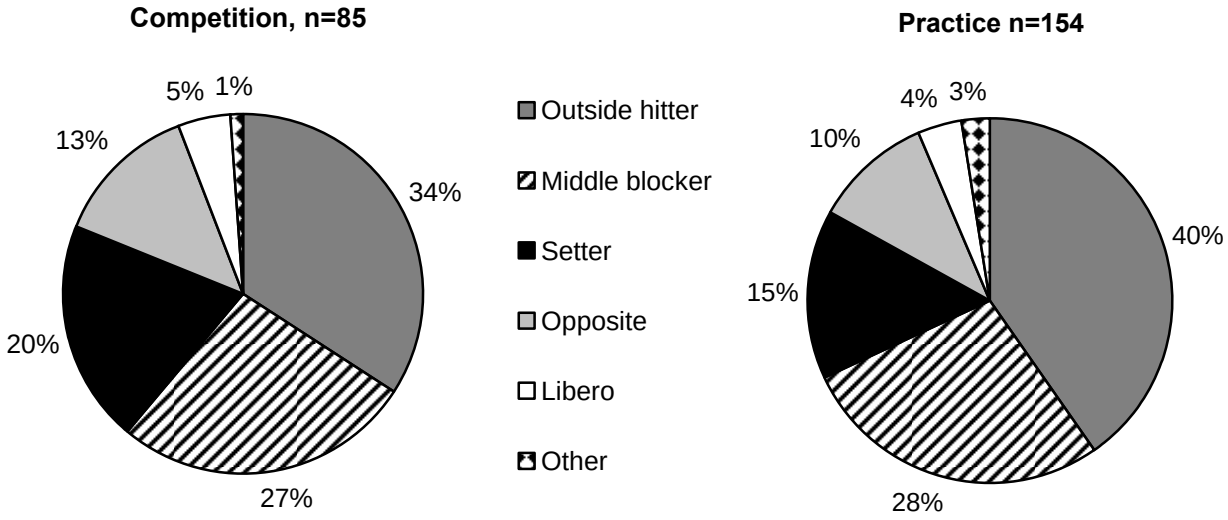
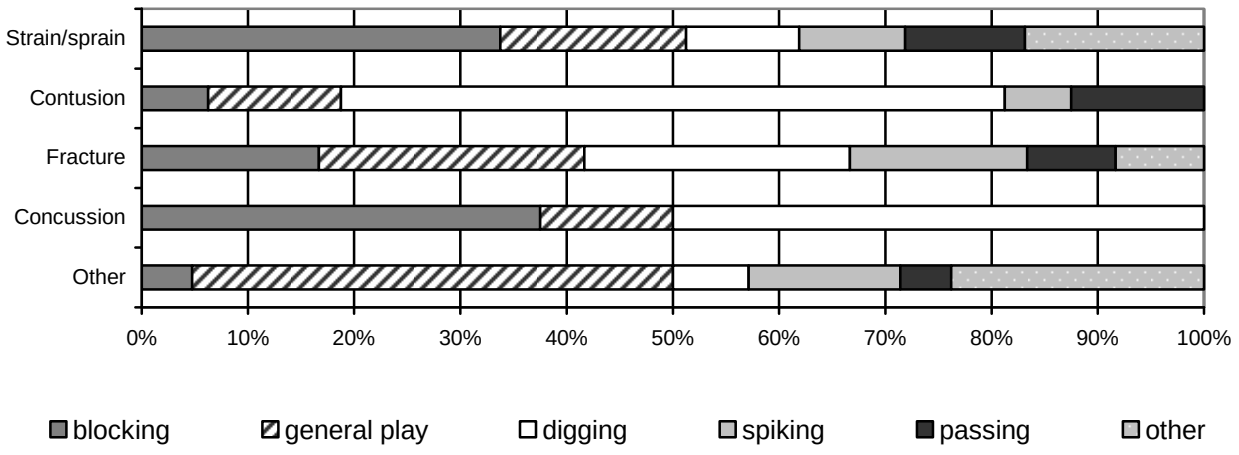


Table 6.9 Activities Leading to Volleyball Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

	Competition		Practice		Overall	
	n	%	n	%	n	%
Activity						
Blocking	22	25.9%	40	26.1%	62	26.1%
General play	15	17.6%	38	24.8%	53	22.3%
Digging	22	25.9%	15	9.8%	37	15.5%
Spiking	8	9.4%	17	11.1%	25	10.5%
Passing	7	8.2%	16	10.5%	23	9.7%
Conditioning	0	0.0%	12	7.8%	12	5.0%
Serving	1	1.2%	9	5.9%	10	4.2%
Setting	7	8.2%	2	1.3%	9	3.8%
Other	3	3.5%	4	2.6%	7	2.9%
Total	**85**	**100%**	**153**	**100%**	**238**	**100%**

Figure 6.5 Activity Resulting in Volleyball Injuries by Injury Diagnosis, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year



VII. Boys' Basketball Injury Epidemiology

Table 7.1 Boys' Basketball Injury Rates by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

	# Injuries	# Exposures	Injury rate (per 1,000 athlete-exposures)
Total	**459**	**313,656**	**1.46**
Competition	229	92,788	2.47
Practice	230	220,868	1.04

Table 7.2 Demographic Characteristics of Injured Boys' Basketball Athletes, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year*

Year in School	
Freshman	84 (18.6%)
Sophomore	124 (27.4%)
Junior	118 (26.1%)
Senior	126 (27.9%)
Total†	**452 (100%)**
Age (years)	
Minimum	13
Maximum	19
Mean (St. Dev.)	16.2 (1.2)
BMI	
Minimum	13.3
Maximum	42.3
Mean (St. Dev.)	23.0 (3.0)

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

Figure 7.1 Diagnosis of Boys' Basketball Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

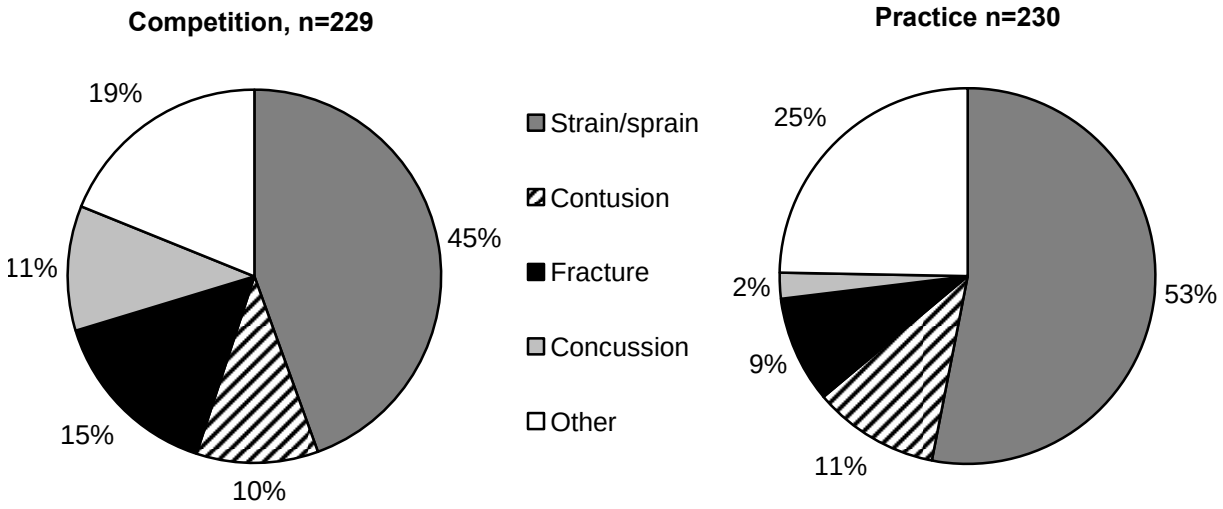


Table 7.3 Body Site of Boys' Basketball Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

	Competition		Practice		Overall	
	n	%	n	%	n	%
Body Site						
Ankle	75	32.8%	87	37.8%	162	35.3%
Head/face	52	22.7%	23	10.0%	75	16.3%
Knee	24	10.5%	21	9.1%	45	9.8%
Hand/wrist	20	8.7%	24	10.4%	44	9.6%
Hip/thigh/upper leg	12	5.2%	21	9.1%	33	7.2%
Foot	11	4.8%	15	6.5%	26	5.7%
Trunk	6	2.6%	14	6.1%	20	4.4%
Shoulder	12	5.2%	5	2.2%	17	3.7%
Arm/elbow	10	4.4%	6	2.6%	16	3.5%
Lower leg	5	2.2%	8	3.5%	13	2.8%
Neck	0	0.0%	1	0.4%	1	0.2%
Other	2	0.9%	5	2.2%	7	1.5%
Total	**229**	**100%**	**230**	**100%**	**459**	**100%**

Table 7.4 Ten Most Common Boys' Basketball Injury Diagnoses by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

	Competition n=229		Practice n=230		Total n=459	
	n	%	n	%	n	%
Diagnosis						
Ankle strain/sprain	73	31.9%	82	35.7%	155	33.8%
Head/face concussion	25	10.9%	5	2.2%	30	6.5%
Head/face other	14	6.1%	11	4.8%	25	5.4%
Knee other	12	5.2%	11	4.8%	23	5.0%
Hand/wrist fracture	10	4.4%	11	4.8%	21	4.6%
Hip/thigh/upper leg strain/sprain	5	2.2%	13	5.7%	18	3.9%
Head/face fracture	11	4.8%	5	2.2%	16	3.5%
Hip/thigh/upper leg contusion	5	2.2%	8	3.5%	15	3.3%
Knee strain/sprain	8	3.5%	6	2.6%	14	3.1%
Hand/wrist strain/sprain	6	2.6%	5	2.2%	11	2.4%
Foot other	0	0.0%	11	4.8%	11	2.4%

Figure 7.2 Time Loss of Boys' Basketball Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

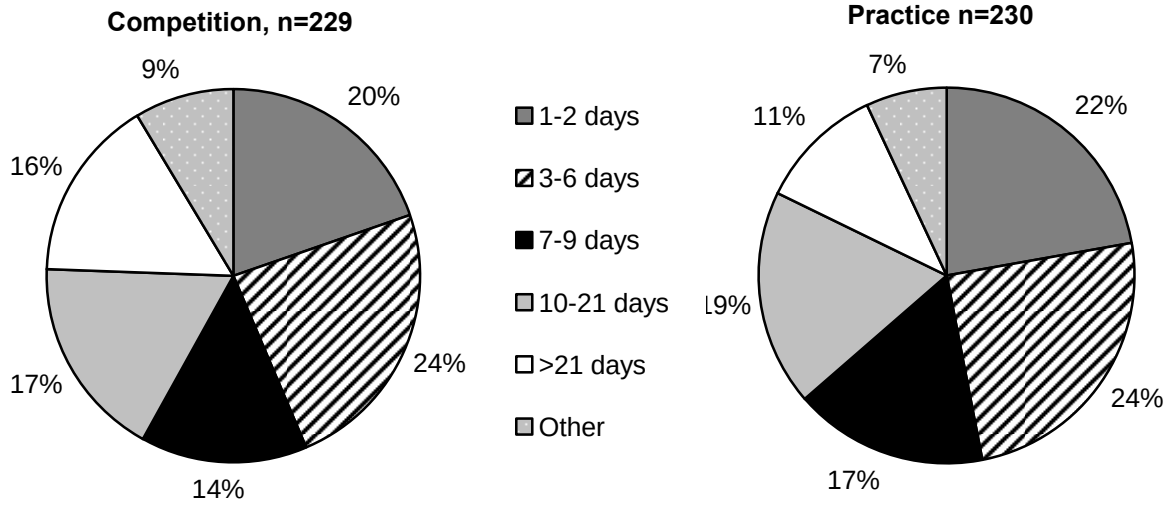


Table 7.5 Boys' Basketball Injuries Requiring Surgery by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

	Competition		Practice		Overall	
	n	%	n	%	n	%
Need for surgery						
Required surgery	17	7.7%	14	6.3%	31	7.0%
Did not require surgery	204	92.3%	209	93.7%	413	93.0%
Total	**221**	**100%**	**223**	**100%**	**444**	**100%**

Figure 7.3 History of Boys' Basketball Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

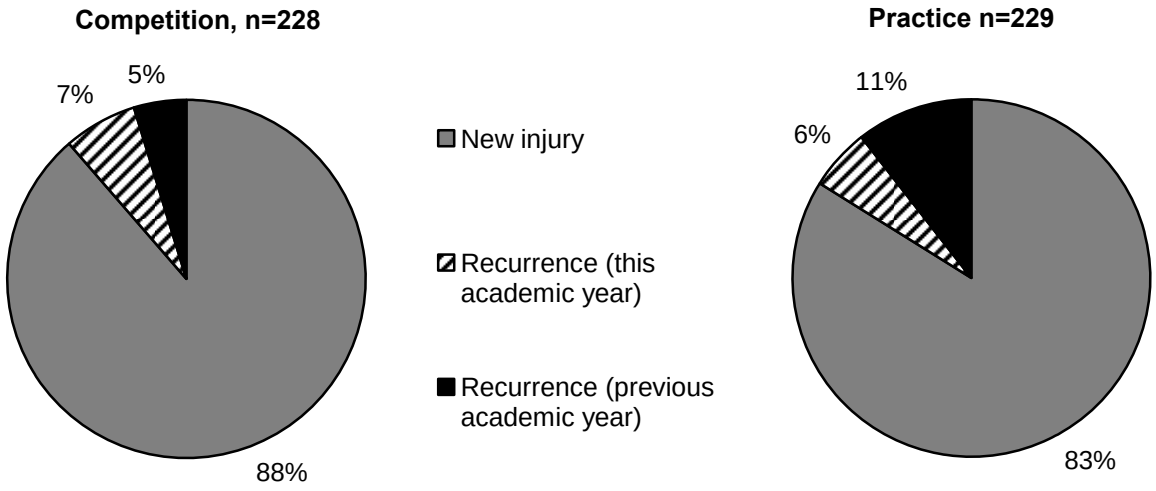


Table 7.6 Time during Season of Boys' Basketball Injuries, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

	n	%
Time in Season		
Preseason	98	21.4%
Regular season	353	76.9%
Post season	8	1.7%
Total	**459**	**100%**

Table 7.7 Competition-Related Variables for Boys' Basketball Injuries, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

	n	%
Time in Competition		
Pre-competition-warm-ups	3	1.3%
First quarter	28	12.3%
Second quarter	62	27.3%
Third quarter	73	32.2%
Fourth quarter	59	26.0%
Overtime	2	0.9%
Total	**227**	**100%**
Injury Related to Foul Play		
No	176	83.0%
Yes, and ruled foul play	20	9.4%
Yes, but not ruled foul play	7	3.3%
Unknown	9	4.2%
Total	**212**	**100%**
Court Location		
Inside lane (offense)	67	30.0%
Inside lane (defense)	51	22.9%
Between 3 pt arc and lane (offense)	28	12.6%
Between 3 pt arc and lane (defense)	22	9.9%
Outside 3 point arc (offense)	20	9.0%
Outside 3 point arc (defense)	14	6.3%
Backcourt	14	6.3%
Out of bounds	7	3.1%
Off the court	0	0.0%
Total	**223**	**100%**

Table 7.8 Practice-Related Variables for Boys' Basketball Injuries, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

	n	%
Time in Practice		
First 1/2 hour	26	12.7%
Second 1/2 hour	45	22.0%
1-2 hours into practice	111	54.1%
>2 hours into practice	23	11.2%
Total	**205**	**100%**

Figure 7.4 Player Position of Boys' Basketball Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

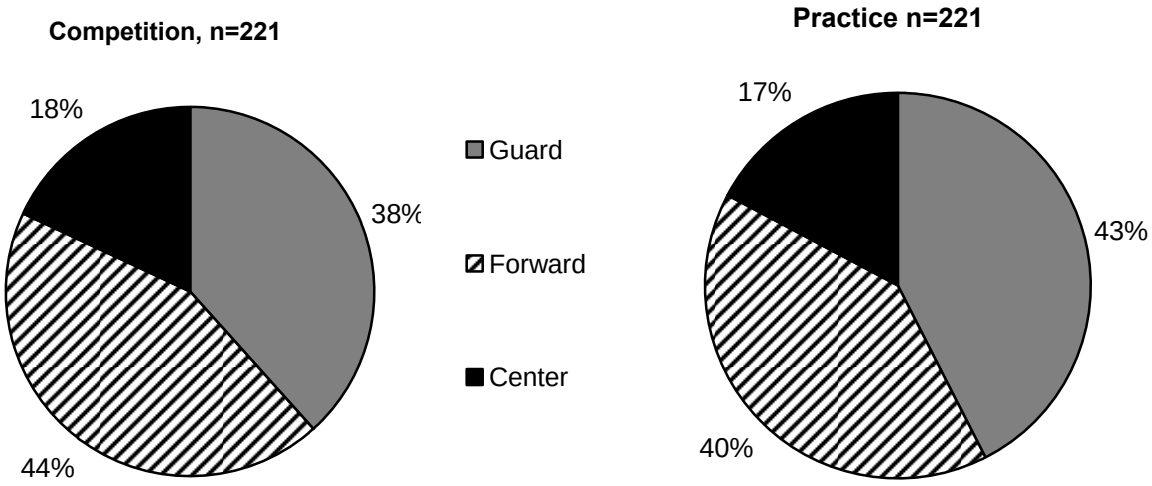
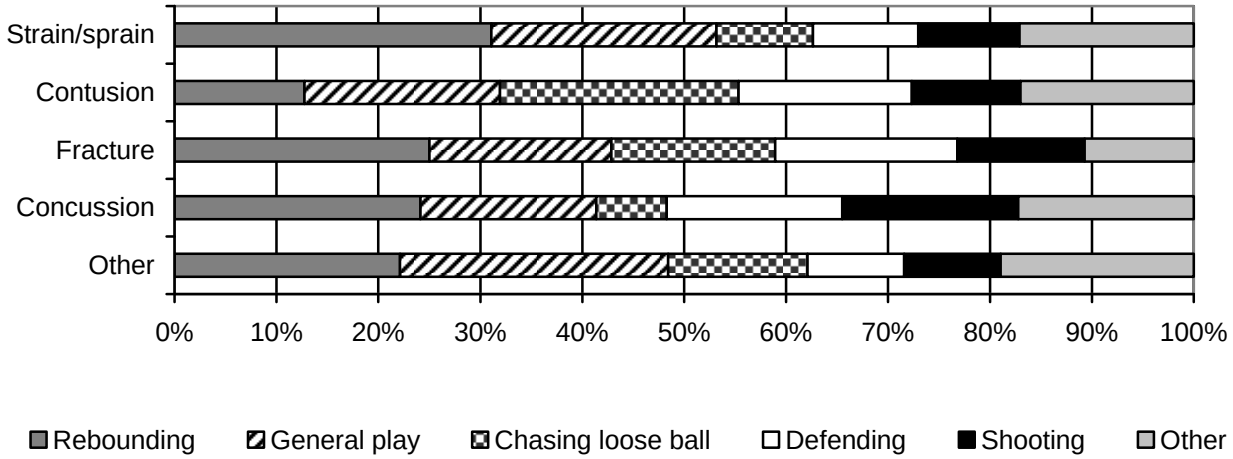


Table 7.9 Activities Leading to Boys' Basketball Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

	Competition		Practice		Overall	
	n	%	n	%	n	%
Activity						
Rebounding	68	30.0%	49	22.1%	117	26.1%
General play	31	13.7%	67	30.2%	98	21.8%
Chasing loose ball	35	15.4%	21	9.5%	56	12.5%
Defending	33	14.5%	22	9.9%	55	12.2%
Shooting	25	11.0%	23	10.4%	48	10.7%
Ball handling/dribbling	20	8.8%	11	5.0%	31	6.9%
Receiving pass	3	1.3%	9	4.1%	12	2.7%
Conditioning	1	0.4%	10	4.5%	11	2.4%
Other	11	4.8%	10	4.5%	21	4.7%
Total	**227**	**100%**	**222**	**100%**	**449**	**100%**

Figure 7.5 Activity Resulting in Boys' Basketball Injuries by Injury Diagnosis, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year



VIII. Girls' Basketball Injury Epidemiology

Table 8.1 Girls' Basketball Injury Rates by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

	# Injuries	# Exposures	Injury rate (per 1,000 athlete-exposures)
Total	**420**	**256,603**	**1.64**
Competition	259	76,915	3.37
Practice	161	179,688	0.90

Table 8.2 Demographic Characteristics of Injured Girls' Basketball Athletes, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year*

Year in School	
Freshman	117 (28.2%)
Sophomore	107 (25.8%)
Junior	98 (23.6%)
Senior	93 (22.4%)
Total†	**415 (100%)**
Age (years)	
Minimum	13
Maximum	18
Mean (St. Dev.)	15.8 (1.3)
BMI	
Minimum	16.9
Maximum	40.4
Mean (St. Dev.)	22.5 (3.4)

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

Figure 8.1 Diagnosis of Girls' Basketball Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

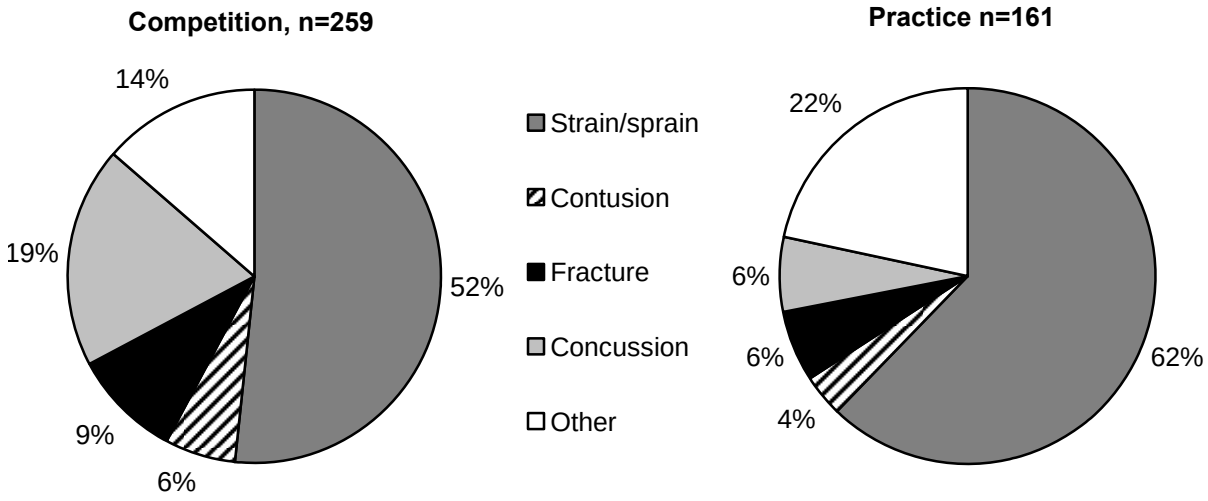


Table 8.3 Body Site of Girls' Basketball Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

	Competition		Practice		Overall	
	n	%	n	%	n	%
Body Site						
Ankle	84	32.4%	47	29.2%	131	31.2%
Head/face	70	27.0%	11	6.8%	81	19.3%
Knee	46	17.8%	32	19.9%	78	18.6%
Hand/wrist	19	7.3%	15	9.3%	34	8.1%
Hip/thigh/upper leg	4	1.5%	17	10.6%	21	5.0%
Lower leg	7	2.7%	12	7.5%	19	4.5%
Trunk	6	2.3%	10	6.2%	16	3.8%
Foot	5	1.9%	10	6.2%	15	3.6%
Shoulder	10	3.9%	4	2.5%	14	3.3%
Arm/elbow	3	1.2%	0	0.0%	3	0.7%
Neck	2	0.8%	1	0.6%	3	0.7%
Other	3	1.2%	2	1.2%	5	1.2%
Total	**259**	**100%**	**161**	**100%**	**420**	**100%**

Table 8.4 Ten Most Common Girls' Basketball Injury Diagnoses by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

	Competition n=259		Practice n=161		Total n=420	
	n	%	n	%	n	%
Diagnosis						
Ankle strain/sprain	81	31.3%	44	27.3%	125	29.8%
Head/face concussion	50	19.3%	10	6.2%	60	14.3%
Knee strain/sprain	30	11.6%	17	10.6%	47	11.2%
Knee other	8	3.1%	12	7.5%	20	4.8%
Hip/thigh/upper leg strain/sprain	3	1.2%	16	9.9%	19	4.5%
Hand/wrist strain/sprain	6	2.3%	9	5.6%	15	3.6%
Hand/wrist fracture	9	3.5%	5	3.1%	14	3.3%
Head/face other	13	5.0%	0	0.0%	13	3.1%
Knee contusion	7	2.7%	3	1.9%	10	2.4%
Shoulder other	6	2.3%	3	1.9%	9	2.1%

Figure 8.2 Time Loss of Girls' Basketball Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

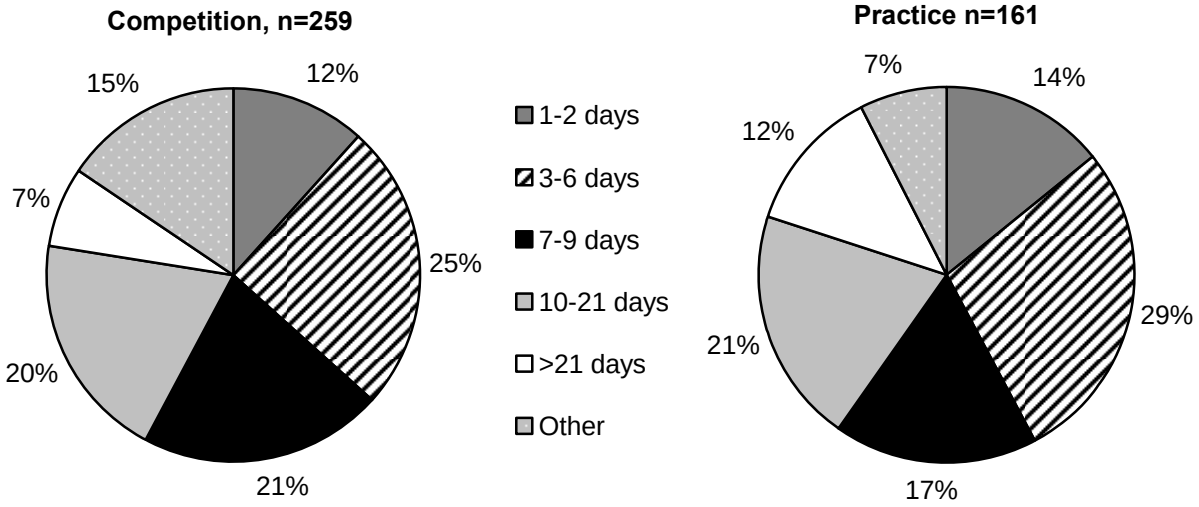


Table 8.5 Girls' Basketball Injuries Requiring Surgery by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

	Competition		Practice		Overall	
	n	%	n	%	n	%
Need for surgery						
Required surgery	25	10.0%	10	6.4%	35	8.6%
Did not require surgery	226	90.0%	147	93.6%	373	91.4%
Total	**251**	**100%**	**157**	**100%**	**408**	**100%**

Figure 8.3 History of Girls' Basketball Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

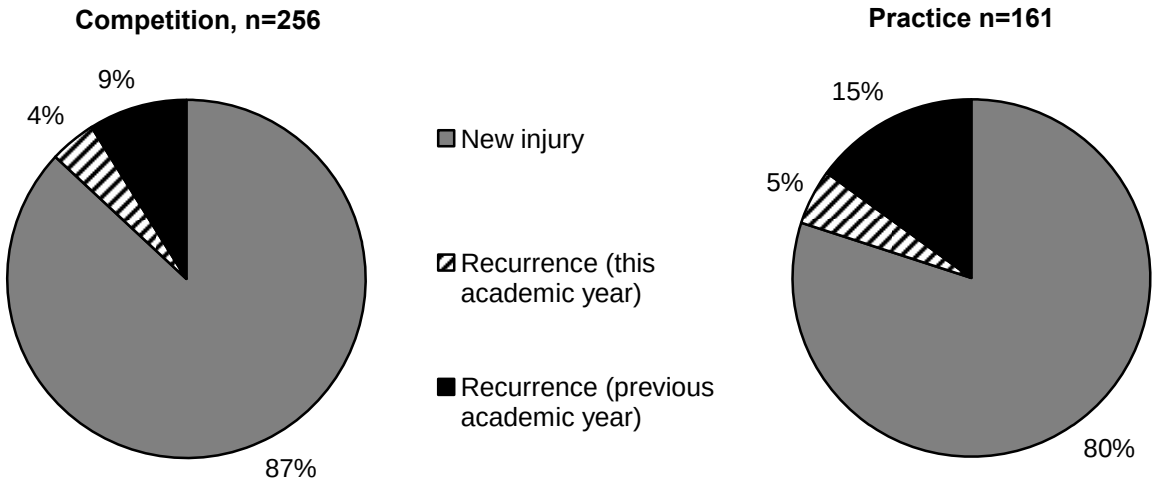


Table 8.6 Time during Season of Girls' Basketball Injuries, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

	n	%
Time in Season		
Preseason	83	19.8%
Regular season	326	77.6%
Post season	11	2.6%
Total	**420**	**100%**

Table 8.7 Competition-Related Variables for Girls' Basketball Injuries, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

	n	%
Time in Competition		
Pre-competition/Warm-ups	4	1.6%
First quarter	27	10.8%
Second quarter	76	30.4%
Third quarter	82	32.8%
Fourth quarter	61	24.4%
Overtime	0	0.0%
Total	**250**	**100%**
Injury Related to Foul Play		
No	205	87.2%
Yes, and ruled foul play	8	3.4%
Yes, but not ruled foul play	13	5.5%
Unknown	9	3.8%
Total	**235**	**100%**
Court Location		
Inside lane (offense)	53	21.7%
Inside lane (defense)	58	23.8%
Between 3 pt arc and lane (offense)	34	13.9%
Between 3 pt arc and lane (defense)	20	8.2%
Outside 3 point arc (offense)	29	11.9%
Outside 3 point arc (defense)	31	12.7%
Backcourt	12	4.9%
Out of bounds	7	2.9%
Off the court	0	0.0%
Total	**244**	**100%**

Table 8.8 Practice-Related Variables for Girls' Basketball Injuries, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

	n	%
Time in Practice		
First 1/2 hour	23	16.3%
Second 1/2 hour	36	25.5%
1-2 hours into practice	67	47.5%
>2 hours into practice	15	10.6%
Total	**141**	**100%**

Figure 8.4 Player Position of Girls' Basketball Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

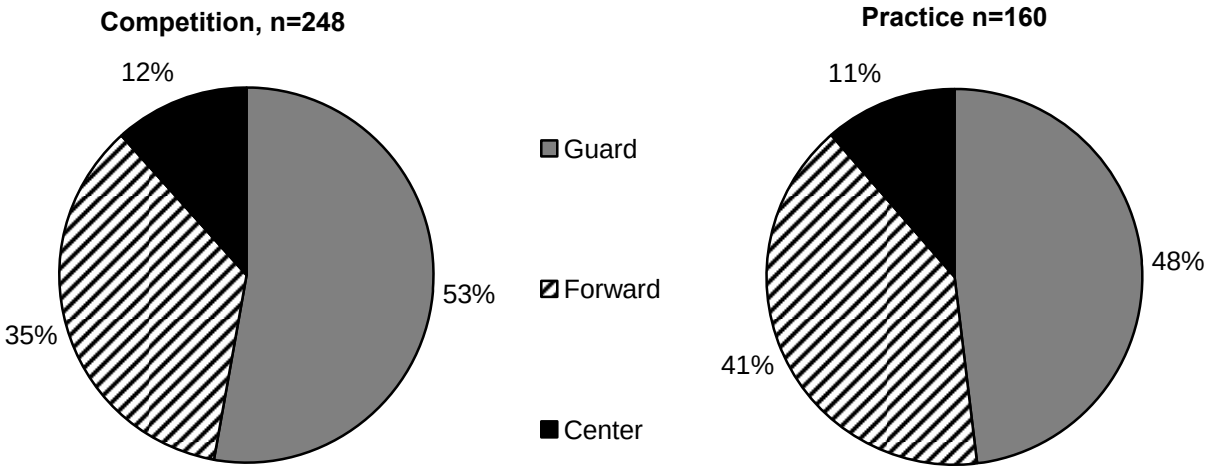
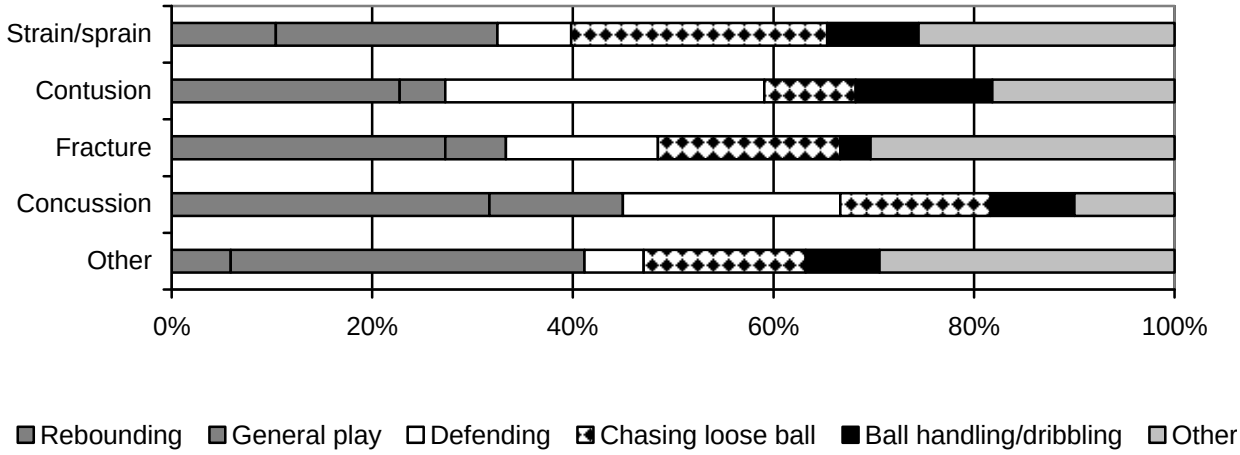


Table 8.9 Activities Leading to Girls' Basketball Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

	Competition		Practice		Overall	
	n	%	n	%	n	%
Activity						
Rebounding	57	22.4%	30	18.9%	87	21.0%
General play	37	14.5%	49	30.8%	86	20.8%
Defending	41	16.1%	20	12.6%	61	14.7%
Chasing loose ball	38	14.9%	8	5.0%	46	11.1%
Ball handling/dribbling	29	11.4%	6	3.8%	35	8.5%
Shooting	24	9.4%	8	5.0%	32	7.7%
Receiving pass	18	7.1%	10	6.3%	28	6.8%
Conditioning	0	0.0%	18	11.3%	18	4.3%
Passing	5	2.0%	3	1.9%	8	1.9%
Other	6	2.4%	7	4.4%	13	3.1%
Total	**255**	**100%**	**159**	**100%**	**414**	**100%**

Figure 8.5 Activity Resulting in Girls' Basketball Injuries by Injury Diagnosis, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year



IX. Wrestling Injury Epidemiology

Table 9.1 Wrestling Injury Rates by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

	# Injuries	# Exposures	Injury rate (per 1,000 athlete-exposures)
Total	**544**	**247,553**	**2.20**
Competition	210	64,616	3.25
Practice	334	182,937	1.83

Table 9.2 Demographic Characteristics of Injured Wrestlers, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year*

Year in School	
Freshman	146 (27.1%)
Sophomore	148 (27.5%)
Junior	122 (22.7%)
Senior	122 (22.7%)
Total†	**538 (100%)**
Age (years)	
Minimum	13
Maximum	19
Mean (St. Dev.)	15.9 (1.3)
BMI	
Minimum	17.2
Maximum	49.0
Mean (St. Dev.)	24.0 (4.8)

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

Figure 9.1 Diagnosis of Wrestling Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

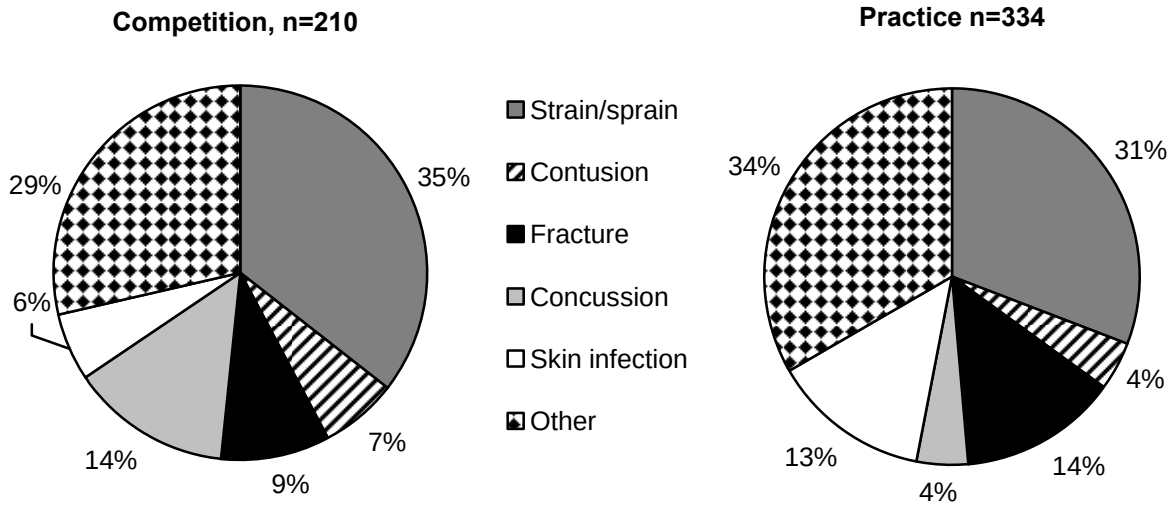


Table 9.3 Body Site of Wrestling Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

	Competition		Practice		Overall	
	n	%	n	%	n	%
Body Site						
Shoulder	40	19.0%	48	14.4%	88	16.2%
Knee	33	15.7%	52	15.6%	85	15.6%
Head/face	41	19.5%	40	12.0%	81	14.9%
Hand/wrist	10	4.8%	50	15.0%	60	11.0%
Trunk	25	11.9%	34	10.2%	59	10.8%
Arm/elbow	17	8.1%	30	9.0%	47	8.6%
Ankle	16	7.6%	25	7.5%	41	7.5%
Neck	5	2.4%	11	3.3%	16	2.9%
Hip/thigh/upper leg	5	2.4%	10	3.0%	15	2.8%
Foot	6	2.9%	9	2.7%	15	2.8%
Lower leg	1	0.5%	11	3.3%	12	2.2%
Other	11	5.2%	14	4.2%	25	4.6%
Total	**210**	**100%**	**334**	**100%**	**544**	**100%**

Table 9.4 Ten Most Common Wrestling Injury Diagnoses by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

	Competition n=210		Practice n=334		Total n=544	
	n	%	n	%	n	%
Diagnosis						
Head/face concussion	31	14.8%	17	5.1%	48	8.8%
Shoulder strain/sprain	21	10.0%	24	7.2%	45	8.3%
Knee strain/sprain	18	8.6%	23	6.9%	41	7.5%
Shoulder other	19	9.0%	22	6.6%	41	7.5%
Ankle strain/sprain	15	7.1%	23	6.9%	38	7.0%
Knee other	11	5.2%	23	6.9%	34	6.3%
Hand/wrist fracture	1	0.5%	30	9.0%	31	5.7%
Head/face other	8	3.8%	19	5.7%	27	5.0%
Arm/elbow other	7	3.3%	20	6.0%	27	5.0%
Trunk strain/sprain	8	3.8%	12	3.6%	20	3.7%

Figure 9.2 Time Loss of Wrestling Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

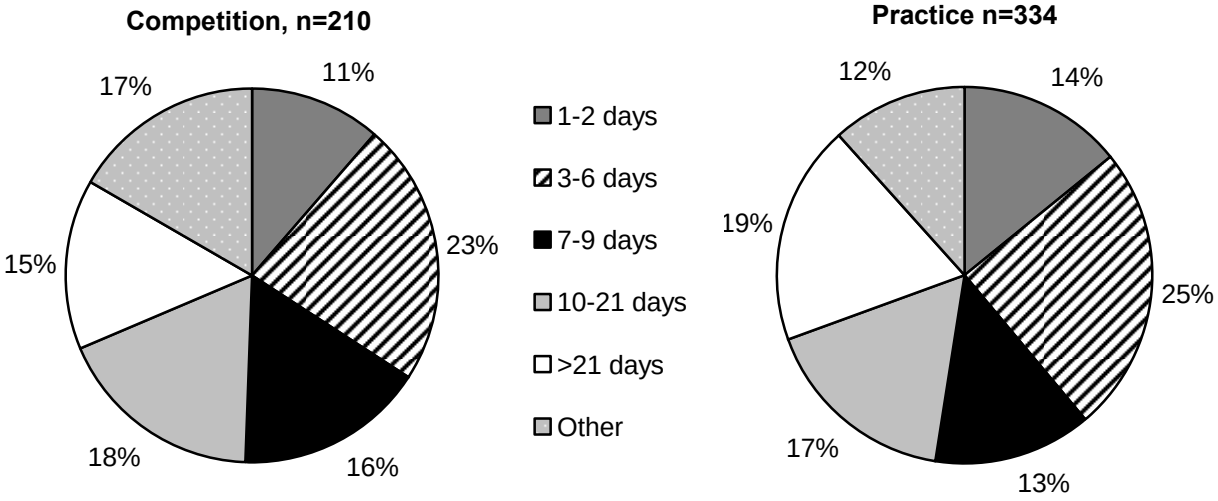


Table 9.5 Wrestling Injuries Requiring Surgery by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

	Competition		Practice		Overall	
	n	%	n	%	n	%
Need for surgery						
Required surgery	16	8.1%	20	6.2%	36	6.9%
Did not require surgery	182	91.9%	305	93.8%	487	93.1%
Total	**198**	**100%**	**325**	**100%**	**523**	**100%**

Figure 9.3 History of Wrestling Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

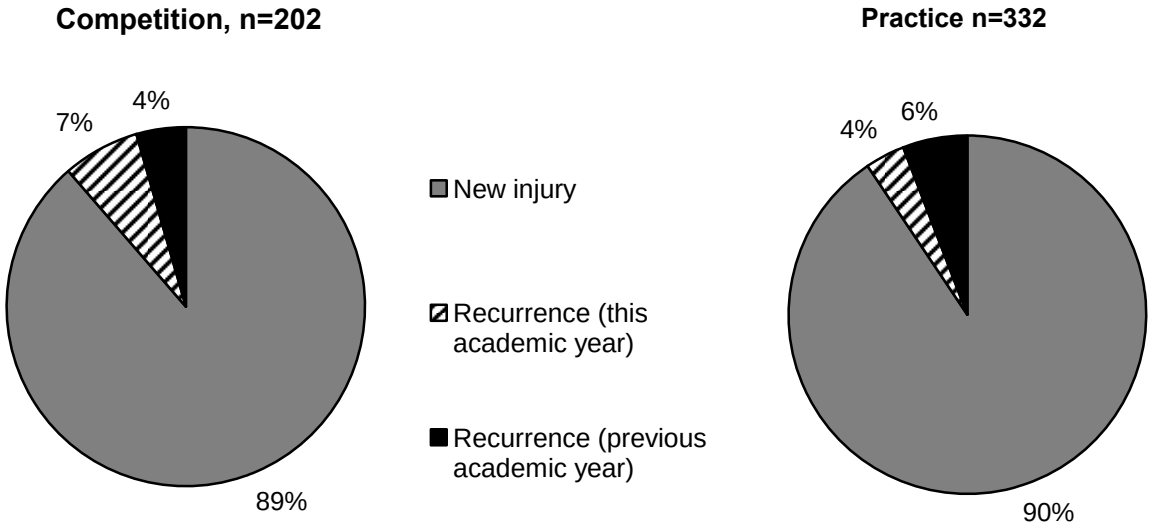


Table 9.6 Time during Season of Wrestling Injuries, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

	n	%
Time in Season		
Preseason	94	17.4%
Regular season	420	77.9%
Post season	25	4.6%
Total	**539**	**100%**

Table 9.7 Competition-Related Variables for Wrestling Injuries, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

	n	%
Time in Competition		
Pre-competition/warm-ups	6	3.1%
First period	35	17.9%
Second period	107	54.6%
Third period	47	24.0%
Overtime	1	0.5%
Total	**196**	**100%**
Injury Related to Foul Play		
No	165	90.2%
Yes, and ruled foul play	0	0.0%
Yes, but not ruled foul play	11	6.0%
Unknown	7	3.8%
Total	**183**	**100%**
Mat Location*		
Within circle	451	87.2%
Out of bounds	28	5.4%
Off mat	38	7.4%
Total	**517**	**100%**

*ATCs were asked to provide the mat location for both competition- and practice-related wrestling injuries.

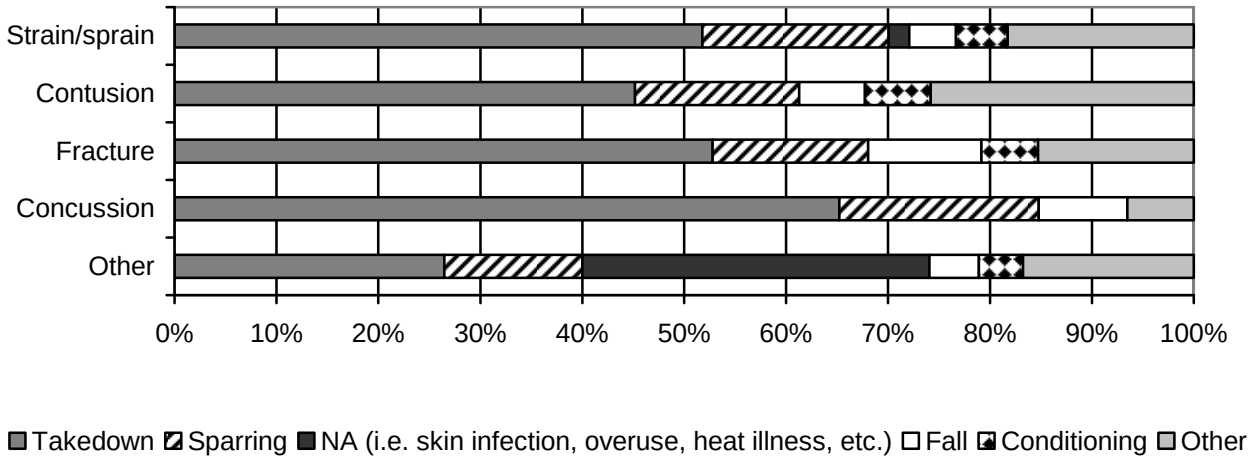
Table 9.8 Practice-Related Variables for Wrestling Injuries, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

	n	%
Time in Practice		
First 1/2 hour	38	12.9%
Second 1/2 hour	62	21.1%
1-2 hours into practice	164	55.8%
>2 hours into practice	30	10.2%
Total	**294**	**100%**

Table 9.9 Activities Leading to Wrestling Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

	Competition		Practice		Overall	
	n	%	n	%	n	%
Activity						
Takedown	108	54.0%	125	37.8%	233	43.9%
Sparring	15	7.5%	71	21.5%	86	16.2%
NA (i.e. skin infection, overuse, heat illness, etc.)	10	5.0%	57	17.2%	67	12.6%
Fall	18	9.0%	14	4.2%	32	6.0%
Escape	13	6.5%	12	3.6%	25	4.7%
Conditioning	2	1.0%	22	6.6%	24	4.5%
Near fall	16	8.0%	3	0.9%	19	3.6%
Riding	9	4.5%	10	3.0%	19	3.6%
Reversal	4	2.0%	9	2.7%	13	2.4%
Other	5	2.5%	8	2.4%	13	2.4%
Total	**200**	**100%**	**331**	**100%**	**531**	**100%**

Figure 9.4 Activities Resulting in Wrestling Injuries by Injury Diagnosis, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year



X. Baseball Injury Epidemiology

Table 10.1 Baseball Injury Rates by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

	# Injuries	# Exposures	Injury rate (per 1,000 athlete-exposures)
Total	**197**	**240,590**	**0.82**
Competition	111	83,730	1.33
Practice	86	156,860	0.55

Table 10.2 Demographic Characteristics of Injured Baseball Athletes, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year*

Year in School	
Freshman	36 (18.5%)
Sophomore	59 (30.3%)
Junior	49 (25.1%)
Senior	51 (26.2%)
Total†	**195 (100%)**
Age (years)	
Minimum	14
Maximum	19
Mean (St. Dev.)	16.3 (1.2)
BMI	
Minimum	18.7
Maximum	38.1
Mean (St. Dev.)	24.4 (3.4)

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

Figure 10.1 Diagnosis of Baseball Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

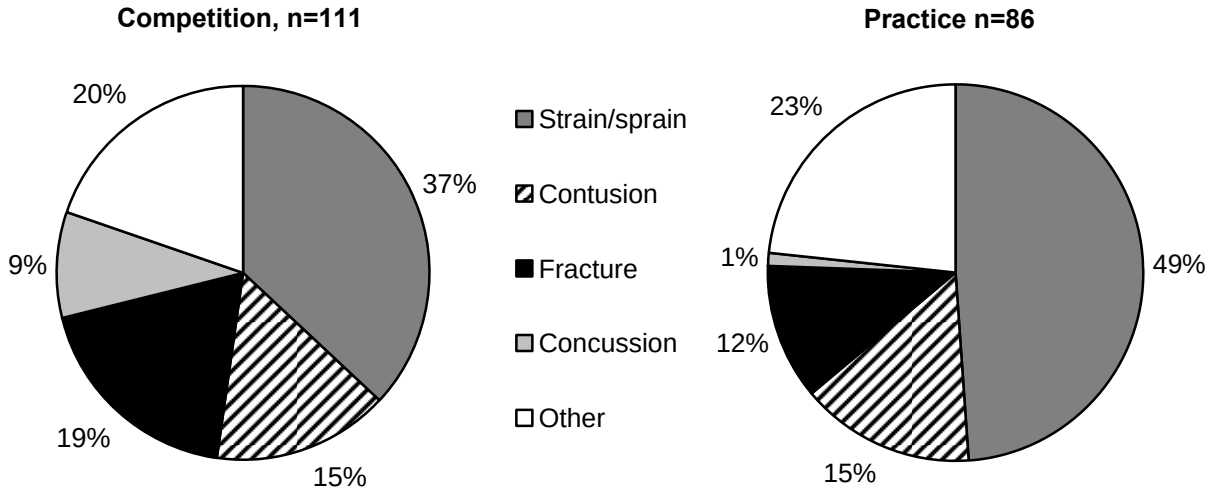


Table 10.3 Body Site of Baseball Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

	Competition		Practice		Overall	
	n	%	n	%	n	%
Body Site						
Head/face	26	23.4%	15	17.4%	41	20.8%
Shoulder	17	15.3%	17	19.8%	34	17.3%
Hand/wrist	16	14.4%	12	14.0%	28	14.2%
Arm/elbow	15	13.5%	6	7.0%	21	10.7%
Hip/thigh/upper leg	9	8.1%	11	12.8%	20	10.2%
Ankle	9	8.1%	7	8.1%	16	8.1%
Lower leg	7	6.3%	3	3.5%	10	5.1%
Trunk	3	2.7%	6	7.0%	9	4.6%
Knee	5	4.5%	2	2.3%	7	3.6%
Foot	3	2.7%	4	4.7%	7	3.6%
Neck	0	0.0%	2	2.3%	2	1.0%
Other	1	0.9%	1	1.2%	2	1.0%
Total	**111**	**100%**	**86**	**100%**	**197**	**100%**

Table 10.4 Ten Most Common Baseball Injury Diagnoses by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

	Competition n=111		Practice n=86		Total n=197	
	n	%	n	%	n	%
Diagnosis						
Shoulder strain/sprain	10	9.0%	9	10.5%	19	9.6%
Hip/thigh/upper leg strain/sprain	7	6.3%	9	10.5%	16	8.1%
Ankle strain/sprain	9	8.1%	6	7.0%	15	7.6%
Hand/wrist fracture	9	8.1%	4	4.7%	13	6.6%
Head/face contusion	7	6.3%	5	5.8%	12	6.1%
Shoulder other	5	4.5%	7	8.1%	12	6.1%
Arm/elbow strain/sprain	8	7.2%	4	4.7%	12	6.1%
Head/face concussion	10	9.0%	1	1.2%	11	5.6%
Head/face fracture	4	3.6%	5	5.8%	9	4.6%
Head/face other	5	4.5%	4	4.7%	9	4.6%
Hand/wrist strain/sprain	3	2.7%	6	7.0%	9	4.6%

Figure 10.2 Time Loss of Baseball Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

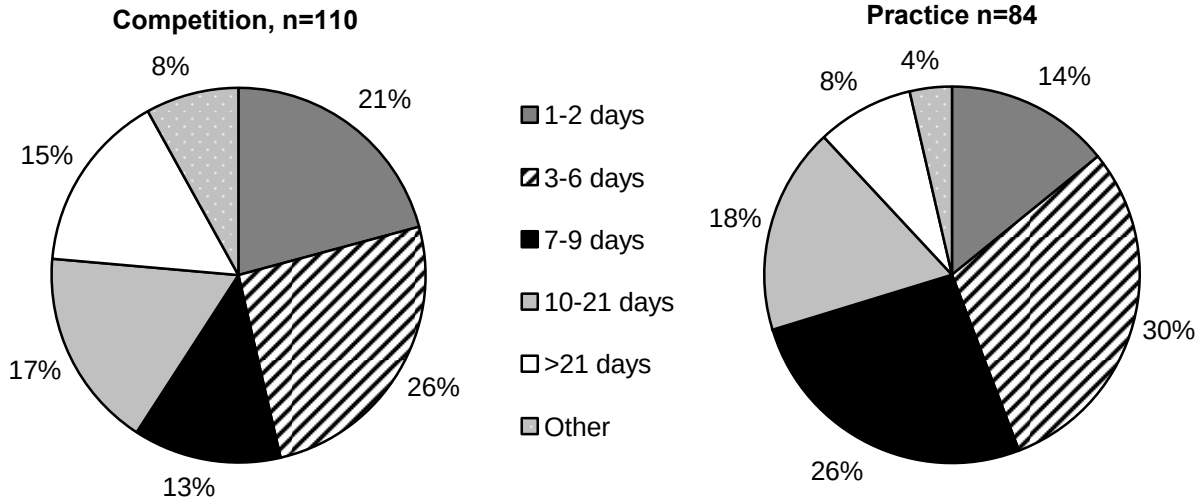


Table 10.5 Baseball Injuries Requiring Surgery by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

	Competition		Practice		Overall	
	n	%	n	%	n	%
Need for surgery						
Required surgery	9	8.3%	5	5.9%	14	7.3%
Did not require surgery	99	91.7%	80	94.1%	179	92.7%
Total	**108**	**100%**	**85**	**100%**	**193**	**100%**

Figure 10.3 History of Baseball Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

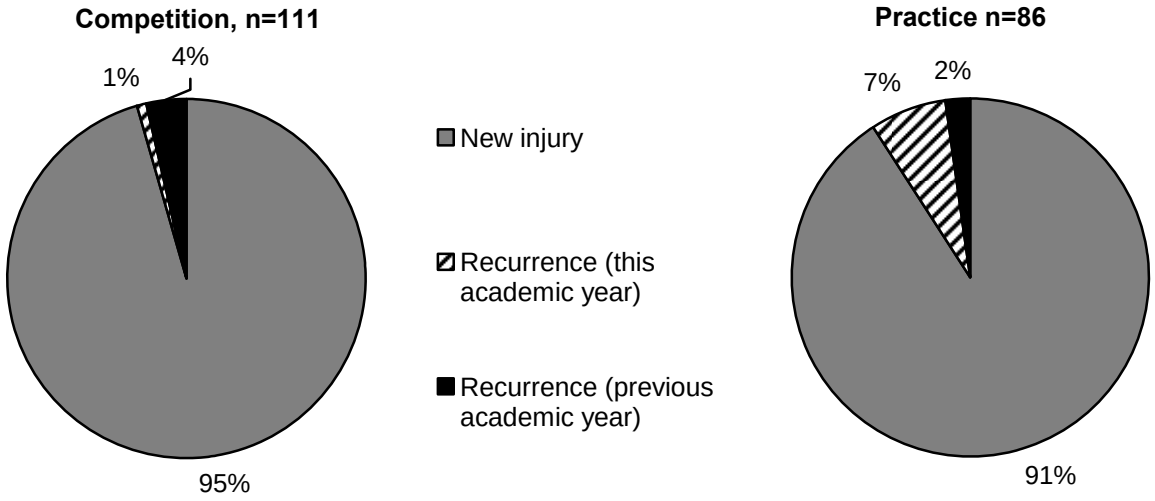


Table 10.6 Time during Season of Baseball Injuries, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

	n	%
Time in Season		
Preseason	41	20.8%
Regular season	148	75.1%
Post season	8	4.1%
Total	**197**	**100%**

Table 10.7 Competition-Related Variables for Baseball Injuries, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

	n	%
Time in Competition		
Pre-competition/warm-ups	3	2.8%
First inning	9	8.4%
Second inning	9	8.4%
Third inning	18	16.8%
Fourth inning	27	25.2%
Fifth inning	22	20.6%
Sixth inning	13	12.1%
Seventh inning	6	5.6%
Total	**107**	**100%**
Injury Related to Foul Play		
No	101	96.2%
Yes, and ruled foul play	2	1.9%
Yes, but not ruled foul play	2	1.9%
Unknown	0	0.0%
Total	**105**	**100%**
Field Location		
Home plate	18	16.4%
First base	17	15.5%
Second base	17	15.5%
Third base	17	15.5%
Infield	6	5.5%
Pitcher's mound	17	15.5%
Outfield	14	12.7%
Foul territory	0	0.0%
Other	4	3.6%
Total	**110**	**100%**

Table 10.8 Practice-Related Variables for Baseball Injuries, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

	n	%
Time in Practice		
First 1/2 hour	7	9.5%
Second 1/2 hour	13	17.6%
1-2 hours into practice	46	62.2%
>2 hours into practice	8	10.8%
Total	**74**	**100%**

Figure 10.4 Player Position of Baseball Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

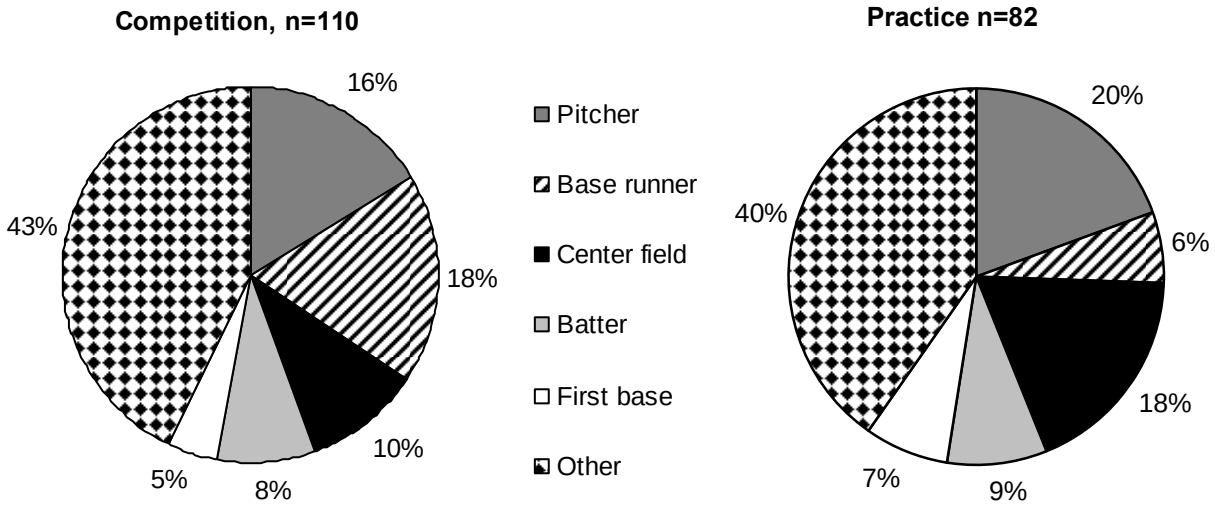
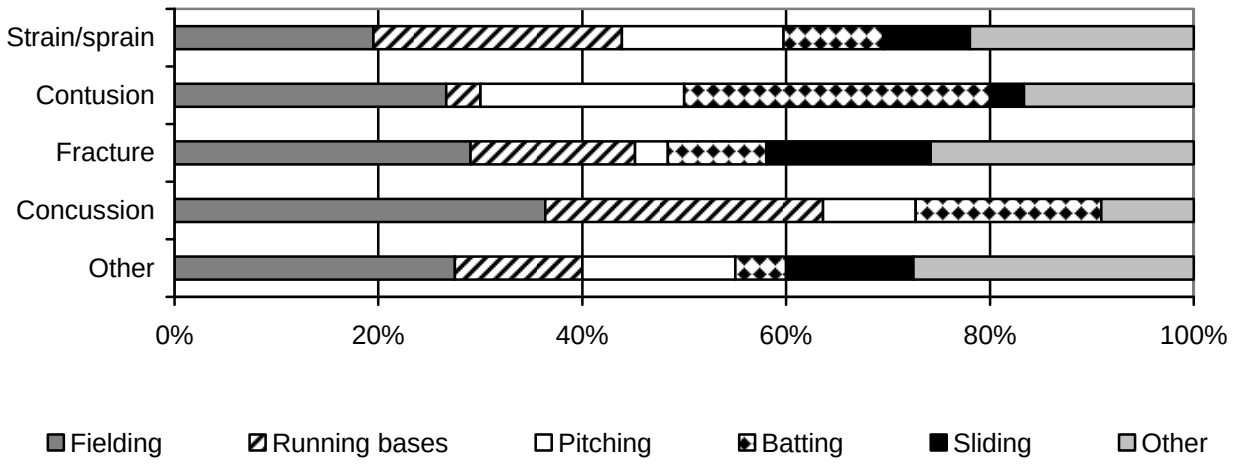


Table 10.9 Activities Leading to Baseball Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

	Competition		Practice		Overall	
	n	%	n	%	n	%
Activity						
Fielding	25	22.5%	23	27.7%	48	24.8%
Running bases	22	19.8%	12	14.5%	34	17.5%
Pitching	15	13.5%	12	14.5%	27	13.9%
Batting	17	15.3%	7	8.4%	24	12.4%
Sliding	15	13.5%	3	3.6%	18	9.3%
General play	6	5.4%	9	10.8%	15	7.7%
Throwing (not pitching)	5	4.5%	8	9.6%	13	6.7%
Catching	0	0.0%	4	4.8%	4	2.1%
Conditioning	0	0.0%	2	2.4%	2	1.0%
Other	6	5.4%	3	3.6%	9	4.6%
Total	**111**	**100%**	**83**	**100%**	**194**	**100%**

Figure 10.5 Activity Resulting in Baseball Injuries by Injury Diagnosis, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year



XI. Softball Injury Epidemiology

Table 11.1 Softball Injury Rates by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

	# Injuries	# Exposures	Injury rate (per 1,000 athlete-exposures)
Total	**227**	**185,559**	**1.22**
Competition	121	63,684	1.90
Practice	106	121,875	0.87

Table 11.2 Demographic Characteristics of Injured Softball Athletes, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year*

Year in School	
Freshman	60 (27.3%)
Sophomore	58 (26.4%)
Junior	54 (24.5%)
Senior	48 (21.8%)
Total†	**220 (100%)**
Age (years)	
Minimum	14
Maximum	18
Mean (St. Dev.)	15.9 (1.2)
BMI	
Minimum	16.6
Maximum	38.8
Mean (St. Dev.)	23.5 (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 11.1 Diagnosis of Softball Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

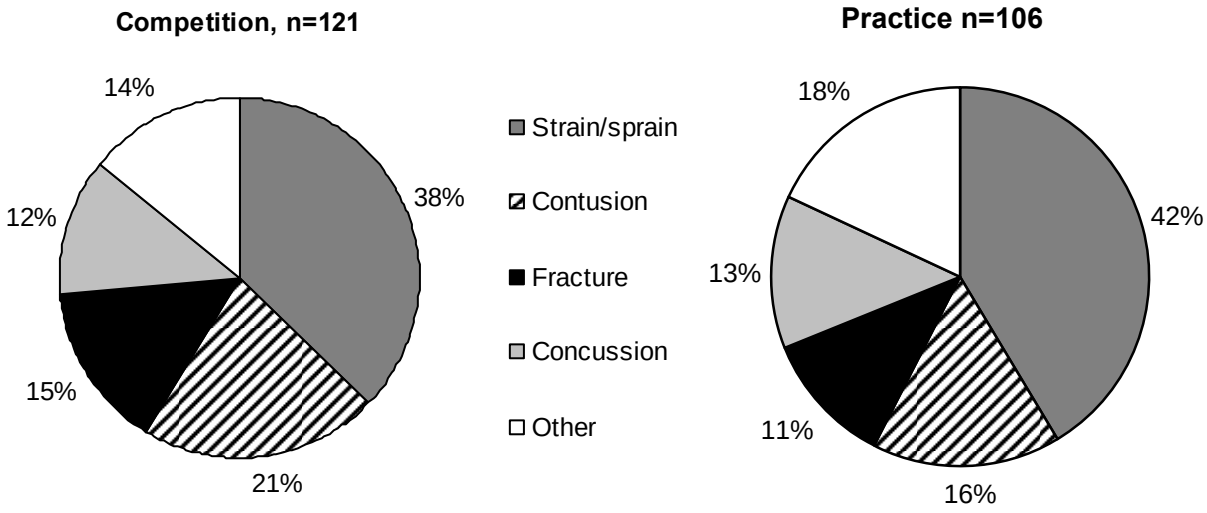


Table 11.3 Body Site of Softball Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

	Competition		Practice		Overall	
	n	%	n	%	n	%
Body Site						
Ankle	16	13.2%	16	15.1%	32	14.1%
Knee	17	14.0%	10	9.4%	27	11.9%
Head/face	21	17.4%	22	20.8%	43	18.9%
Hip/thigh/upper leg	7	5.8%	12	11.3%	19	8.4%
Hand/wrist	29	24.0%	20	18.9%	49	21.6%
Shoulder	10	8.3%	6	5.7%	16	7.0%
Trunk	6	5.0%	3	2.8%	9	4.0%
Lower leg	5	4.1%	4	3.8%	9	4.0%
Arm/elbow	6	5.0%	10	9.4%	16	7.0%
Foot	2	1.7%	3	2.8%	5	2.2%
Neck	2	1.7%	0	0.0%	2	0.9%
Other	0	0.0%	0	0.0%	0	0.0%
Total	**121**	**100%**	**106**	**100%**	**227**	**100%**

Table 11.4 Ten Most Common Softball Injury Diagnoses by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

	Competition n=121		Practice n=106		Total n=227	
	n	%	n	%	n	%
Diagnosis						
Head/face concussion	15	12.4%	14	13.2%	29	12.8%
Ankle strain/sprain	15	12.4%	13	12.3%	28	12.3%
Hand/wrist fracture	14	11.6%	8	7.5%	22	9.7%
Hip/thigh/upper leg strain/sprain	5	4.1%	9	8.5%	14	6.2%
Hand/wrist strain/sprain	6	5.0%	8	7.5%	14	6.2%
Knee strain/sprain	10	8.3%	3	2.8%	13	5.7%
Head/face contusion	4	3.3%	8	7.5%	12	5.3%
Hand/wrist contusion	8	6.6%	4	3.8%	12	5.3%
Shoulder other	8	6.6%	4	3.8%	12	5.3%
Knee other	4	3.3%	6	5.7%	10	4.4%

Figure 11.2 Time Loss of Softball Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

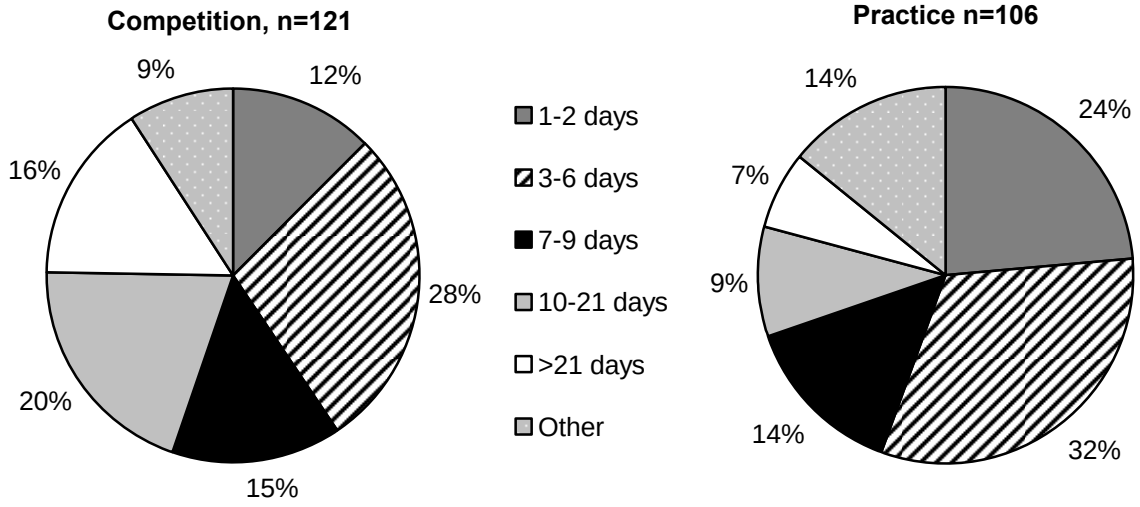


Table 11.5 Softball Injuries Requiring Surgery by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

	Competition		Practice		Overall	
	n	%	n	%	n	%
Need for surgery						
Required surgery	11	9.2%	3	2.9%	14	6.3%
Did not require surgery	108	90.8%	101	97.1%	209	93.7%
Total	**119**	**100%**	**104**	**100%**	**223**	**100%**

Figure 11.3 History of Softball Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

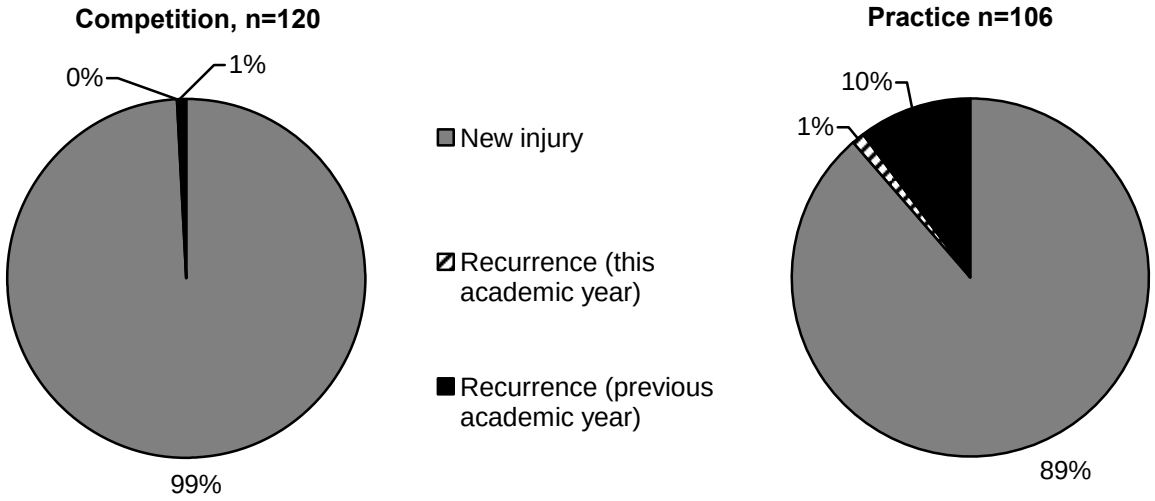


Table 11.6 Time during Season of Softball Injuries, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

	n	%
Time in Season		
Preseason	51	22.5%
Regular season	169	74.4%
Post season	7	3.1%
Total	**227**	**100%**

Table 11.7 Competition-Related Variables for Softball Injuries, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

	n	%
Time in Competition		
Pre-competition/warm-ups	5	4.4%
First inning	6	5.3%
Second inning	9	8.0%
Third inning	27	23.9%
Fourth inning	29	25.7%
Fifth inning	17	15.0%
Sixth inning	13	11.5%
Seventh inning	6	5.3%
Extra innings	1	0.9%
Total	**113**	**100%**
Injury Related to Foul Play		
No	112	95.7%
Yes, and ruled foul play	2	1.7%
Yes, but not ruled foul play	0	0.0%
Unknown	3	2.6%
Total	**117**	**100%**
Field Location		
Home plate	41	36.3%
First base	11	9.7%
Second base	17	15.0%
Third base	12	10.6%
Infield	6	5.3%
Pitchers mound	10	8.8%
Outfield	16	14.2%
Foul territory	0	0.0%
Other	0	0.0%
Total	**113**	**100%**

Table 11.8 Practice-Related Variables for Softball Injuries, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

	n	%
Time in Practice		
First 1/2 hour	18	20.9%
Second 1/2 hour	25	29.1%
1-2 hours into practice	37	43.0%
>2 hours into practice	6	7.0%
Total	**86**	**100%**

Figure 11.4 Player Position of Softball Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

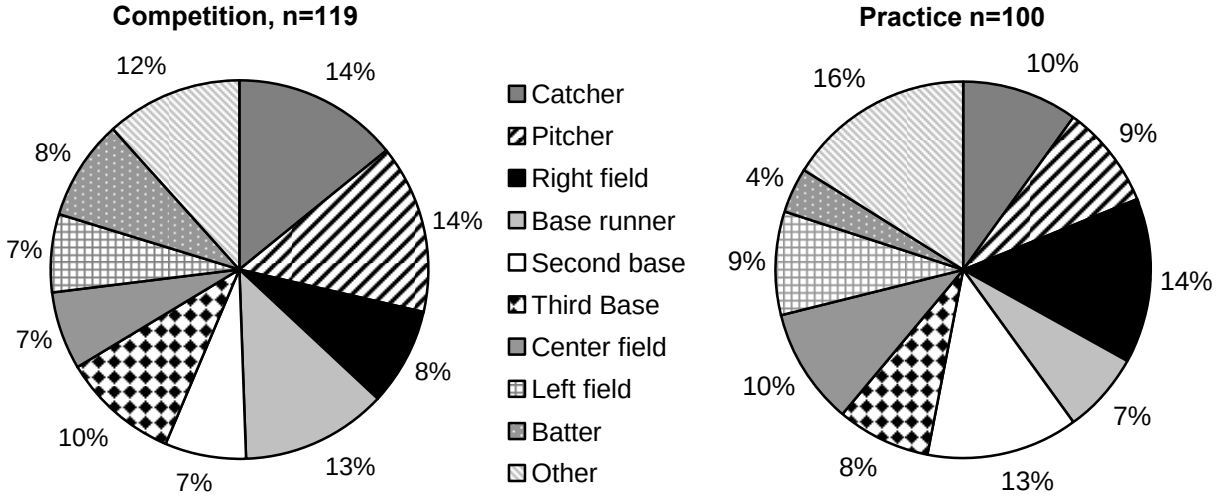
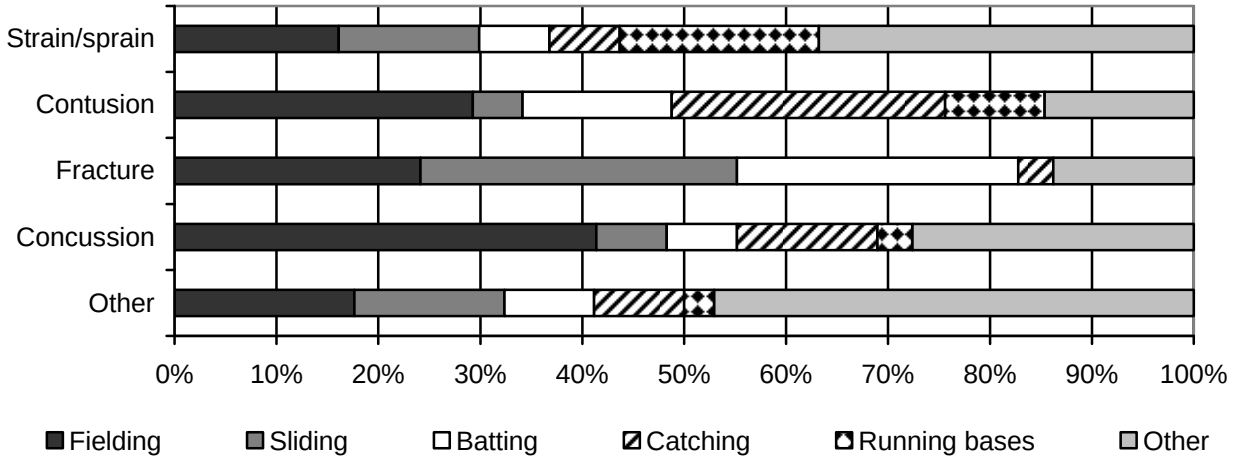


Table 11.9 Activities Leading to Softball Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

	Competition		Practice		Overall	
	n	%	n	%	n	%
Activity						
Fielding	29	24.4%	22	21.8%	51	23.2%
Sliding	23	19.3%	7	6.9%	30	13.6%
Batting	19	16%	6	5.9%	25	11.4%
Catching	14	11.8%	11	10.9%	25	11.4%
Running bases	13	10.9%	10	9.9%	23	10.5%
General play	3	2.5%	13	12.9%	16	7.3%
Pitching	10	8.4%	4	4.0%	14	6.4%
Throwing	4	3.4%	10	9.9%	14	6.4%
Conditioning	0	0.0%	7	6.9%	7	3.2%
Other	4	3.4%	11	10.9%	15	6.8%
Total	**119**	**100%**	**101**	**100%**	**220**	**100%**

Figure 11.5 Activity Resulting in Softball Injuries by Injury Diagnosis, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year



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, 2008-09 School Year

	# Injuries	# Exposures	Injury rate (per 1,000 athlete-exposures)
Total	**193**	**106,453**	**1.81**
Competition	91	32,739	2.78
Practice	102	73,714	1.38

Table 12.2 Demographic Characteristics of Injured Girls' Field Hockey Athletes, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year*

Year in School	
Freshman	40 (21.3%)
Sophomore	52 (27.7%)
Junior	46 (24.5%)
Senior	50 (26.6%)
Total†	**188 (100%)**
Age (years)	
Minimum	13
Maximum	18
Mean (St. Dev.)	15.7 (1.2)
BMI	
Minimum	15.4
Maximum	33.8
Mean (St. Dev.)	22.1 (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 12.1 Diagnosis of Girls' Field Hockey Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

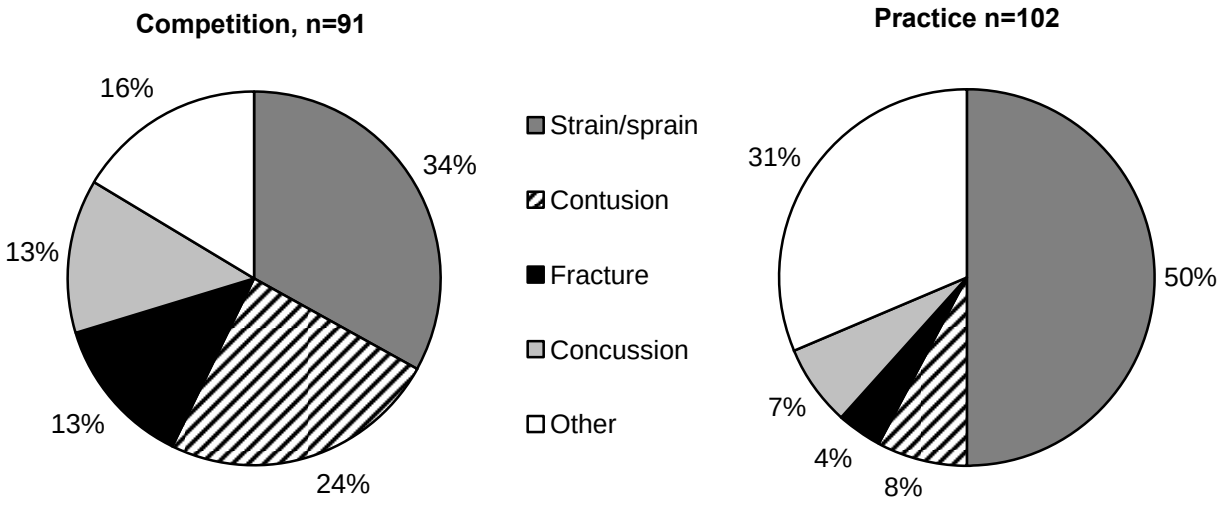


Table 12.3 Body Site of Girls' Field Hockey Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

	Competition		Practice		Overall	
	n	%	n	%	n	%
Body Site						
Head/face	32	35.2%	16	15.7%	48	24.9%
Hip/thigh/upper leg	10	11.0%	20	19.6%	30	15.5%
Ankle	16	17.6%	11	10.8%	27	14.0%
Knee	5	5.5%	13	12.7%	18	9.3%
Hand/wrist	13	14.3%	3	2.9%	16	8.3%
Lower leg	5	5.5%	10	9.8%	15	7.8%
Trunk	1	1.1%	12	11.8%	13	6.7%
Foot	4	4.4%	9	8.8%	13	6.7%
Shoulder	2	2.2%	2	2.0%	4	2.1%
Arm/elbow	1	1.1%	1	1.0%	2	1.0%
Neck	0	0.0%	0	0.0%	0	0.0%
Other	2	2.2%	5	4.9%	7	3.6%
Total	**91**	**100%**	**102**	**100%**	**193**	**100%**

Table 12.4 Ten Most Common Girls' Field Hockey Injury Diagnoses by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

	Competition n=91		Practice n=102		Total n=193	
	n	%	n	%	n	%
Diagnosis						
Ankle strain/sprain	15	16.5%	10	9.8%	25	13.0%
Hip/thigh/upper leg strain/sprain	5	5.5%	18	17.6%	23	11.9%
Head/face concussion	12	13.2%	7	6.9%	19	9.8%
Head/face other	10	11.0%	5	4.9%	15	7.8%
Trunk strain/sprain	0	0.0%	11	10.8%	11	5.7%
Knee other	1	1.1%	9	8.8%	10	5.2%
Hand/wrist fracture	6	6.6%	3	2.9%	9	4.7%
Head/face contusion	5	5.5%	3	2.9%	8	4.1%
Lower leg strain/sprain	3	3.3%	4	3.9%	7	3.6%
Head/face fracture	5	5.5%	1	1.0%	6	3.1%
Hip/thigh/upper leg contusion	5	5.5%	1	1.0%	6	3.1%
Hand/wrist contusion	6	6.6%	0	0.0%	6	3.1%
Lower leg other	0	0.0%	6	5.9%	6	3.1%

Figure 12.2 Time Loss of Girls' Field Hockey Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

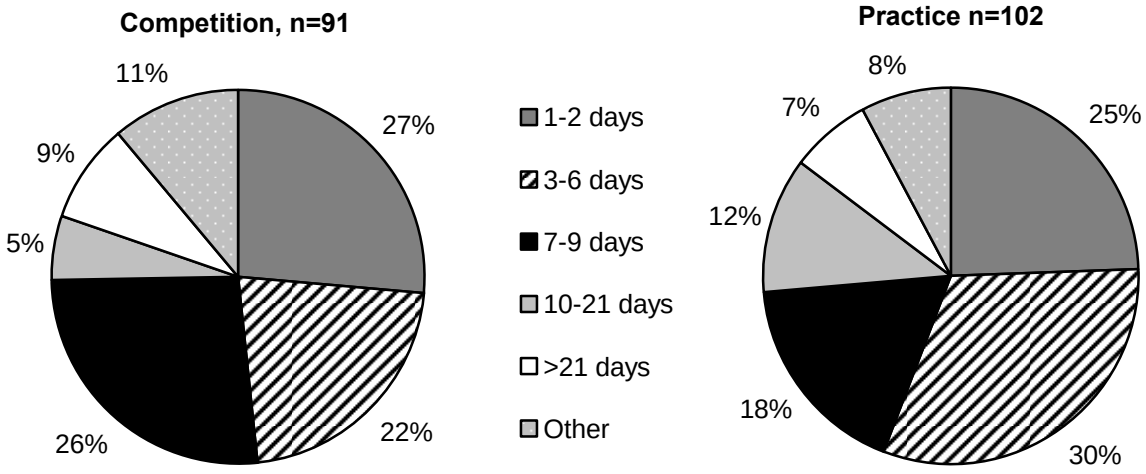


Table 12.5 Girls' Field Hockey Injuries Requiring Surgery by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

	Competition		Practice		Overall	
	n	%	n	%	n	%
Need for surgery						
Required surgery	7	7.9%	3	3.0%	10	5.3%
Did not require surgery	82	92.1%	96	97.0%	178	94.7%
Total	**89**	**100%**	**99**	**100%**	**188**	**100%**

Figure 12.3 History of Girls' Field Hockey Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

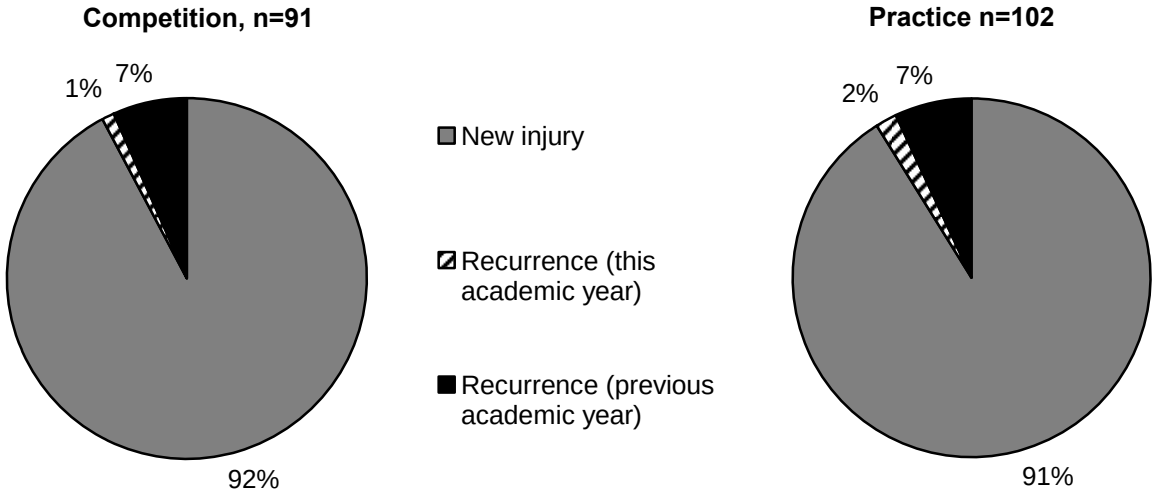


Table 12.6 Time during Season of Girls' Field Hockey Injuries, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

	n	%
Time in Season		
Preseason	48	24.9%
Regular season	137	71.0%
Post season	8	4.1%
Total	**193**	**100%**

Table 12.7 Competition-Related Variables for Girls' Field Hockey Injuries, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

	n	%
Time in Competition		
Pre-competition/warm-ups	2	2.2%
First half	28	31.5%
Second half	56	62.9%
Overtime	3	3.4%
Total	**89**	**100%**
Injury Related to Foul Play		
No	64	78.0%
Yes, and ruled foul play	11	13.4%
Yes, but not ruled foul play	4	4.9%
Unknown	3	3.7%
Total	**82**	**100%**
Field Location		
Goal area/circle	15	16.7%
Within 16-yard arc	12	13.3%
Within 25-yard line	20	22.2%
Between 25-yard line and center line	36	40.0%
Sideline	6	6.7%
Other	1	1.1%
Total	**90**	**100%**

Table 12.8 Practice-Related Variables for Girls' Field Hockey Injuries, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

	n	%
Time in Practice		
First 1/2 hour	14	17.1%
Second 1/2 hour	19	23.2%
1-2 hours into practice	45	54.9%
>2 hours into practice	4	4.9%
Total	**82**	**100%**

Figure 12.4 Player Position of Girls' Field Hockey Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

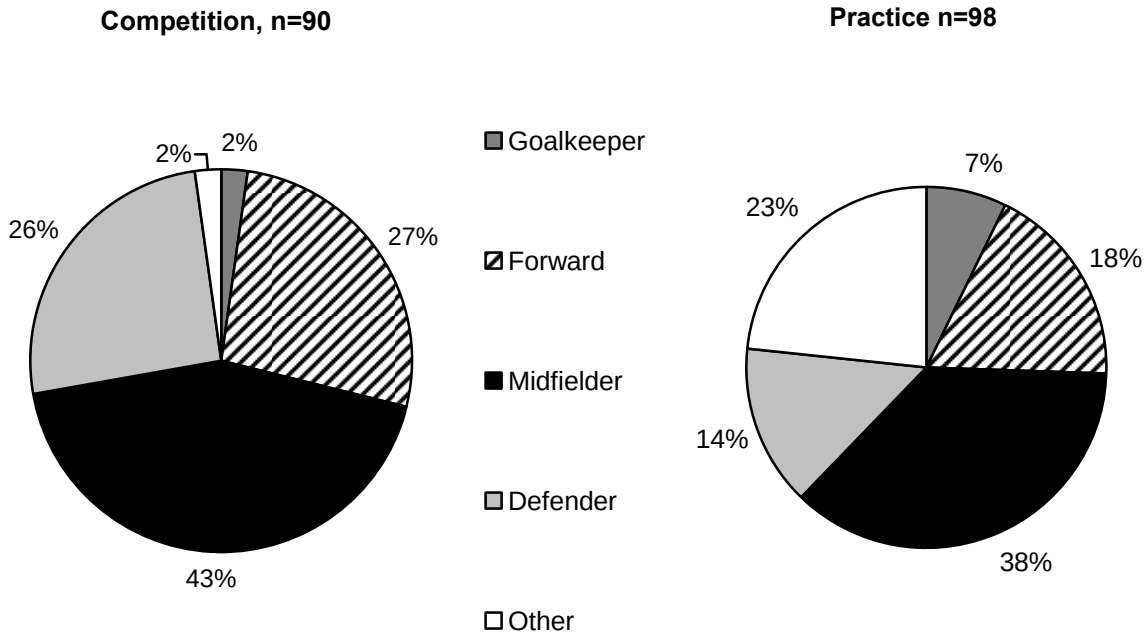
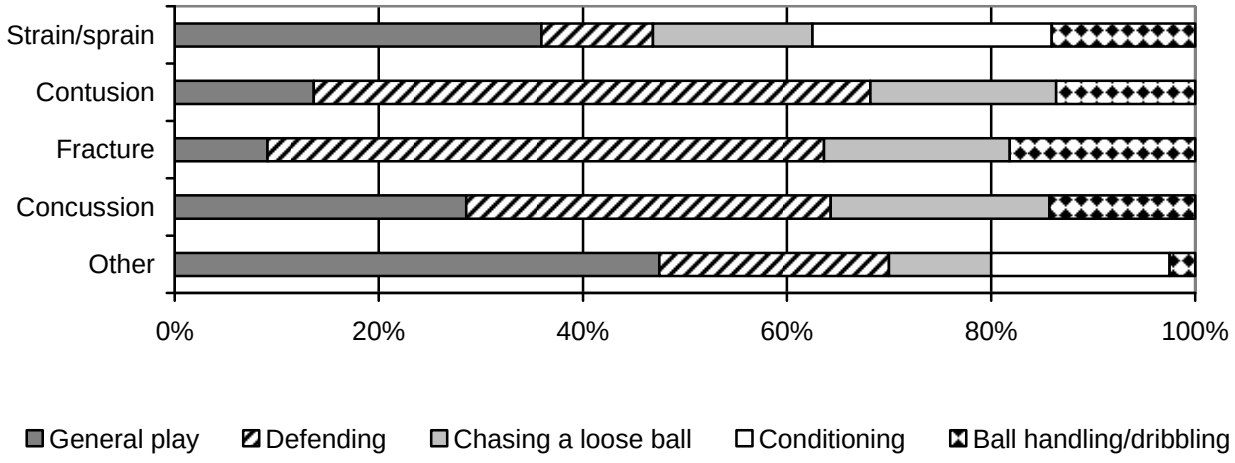


Table 12.9 Activities Leading to Girls' Field Hockey Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

	Competition		Practice		Overall	
	n	%	n	%	n	%
Activity						
General play	13	14.6%	37	37.4%	50	26.6%
Defending	34	38.2%	5	5.1%	39	20.7%
Chasing a loose ball	16	18.0%	7	7.1%	23	12.2%
Conditioning	0	0.0%	22	22.2%	22	11.7%
Ball handling/dribbling	10	11.2%	7	7.1%	17	9.0%
Blocking shot	8	9.0%	2	2.0%	10	5.3%
Receiving pass	3	3.4%	4	4.0%	7	3.7%
Shooting	2	2.2%	2	2.0%	4	2.1%
Goaltending	0	0.0%	4	4.0%	4	2.1%
Other	3	3.4%	9	9.1%	12	6.4%
Total	**89**	**100%**	**99**	**100%**	**188**	**100%**

Figure 12.5 Activity Resulting in Girls' Field Hockey Injuries by Injury Diagnosis, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year



XIII. Girls' Gymnastics Injury Epidemiology

Table 13.1 Girls' Gymnastics Injury Rates by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

	# Injuries	# Exposures	Injury rate (per 1,000 athlete-exposures)
Total	**43**	**19,959**	**2.15**
Competition	14	4,043	3.46
Practice	29	15,916	1.82

Table 13.2 Demographic Characteristics of Injured Girls' Gymnastics Athletes, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year*

Year in School	
Freshman	12 (29.3%)
Sophomore	14 (34.1%)
Junior	8 (19.5%)
Senior	7 (17.1%)
Total†	**41 (100%)**
Age (years)	
Minimum	13
Maximum	18
Mean (St. Dev.)	15.4 (1.3)
BMI	
Minimum	15.5
Maximum	28.4
Mean (St. Dev.)	20.4 (2.6)

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

Figure 13.1 Diagnosis of Girls' Gymnastics Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

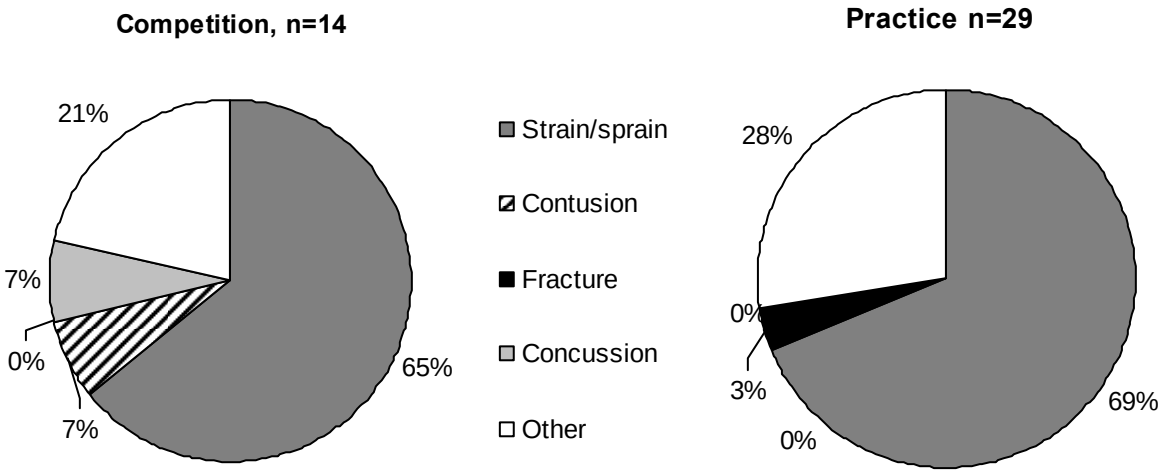


Table 13.3 Body Site of Girls' Gymnastics Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

	Competition		Practice		Overall	
	n	%	n	%	n	%
Body Site						
Ankle	4	28.6%	6	20.7%	10	23.3%
Knee	5	35.7%	4	13.8%	9	20.9%
Head/face	1	7.1%	0	0.0%	1	2.3%
Hip/thigh/upper leg	1	7.1%	2	6.9%	3	7.0%
Hand/wrist	0	0.0%	4	13.8%	4	9.3%
Shoulder	0	0.0%	1	3.4%	1	2.3%
Trunk	0	0.0%	1	3.4%	1	2.3%
Lower leg	0	0.0%	3	10.3%	3	7.0%
Arm/elbow	0	0.0%	6	20.7%	6	14.0%
Foot	3	21.4%	1	3.4%	4	9.3%
Neck	0	0.0%	1	3.4%	1	2.3%
Other	0	0.0%	0	0.0%	0	0.0%
Total	**14**	**100%**	**29**	**100%**	**43**	**100%**

Table 13.4 Nine Most Common Girls' Gymnastics Injury Diagnoses by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

	Competition n=14		Practice n=29		Total n=43	
	n	%	n	%	n	%
Diagnosis						
Ankle strain/sprain	4	28.6%	6	20.7%	10	23.3%
Knee other	3	21.4%	3	10.3%	6	14.0%
Hand/wrist strain/sprain	0	0.0%	4	13.8%	4	9.3%
Arm/elbow strain/sprain	0	0.0%	4	13.8%	4	9.3%
Knee strain/sprain	2	14.3%	1	3.4%	3	7.0%
Hip/thigh/upper leg strain/sprain	1	7.1%	2	6.9%	3	7.0%
Lower leg other	0	0.0%	2	6.9%	2	4.7%
Arm/elbow other	0	0.0%	2	6.9%	2	4.7%
Foot strain/sprain	2	14.3%	0	0.0%	2	4.7%

Figure 13.2 Time Loss of Girls' Gymnastics Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

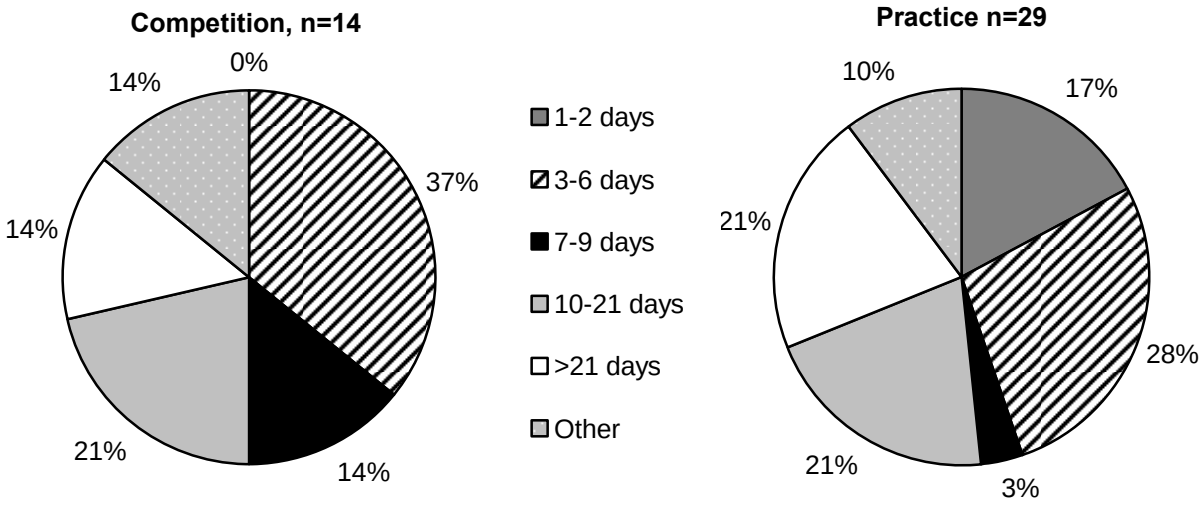


Table 13.5 Girls' Gymnastics Injuries Requiring Surgery by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

	Competition		Practice		Overall	
	n	%	n	%	n	%
Need for surgery						
Required surgery	3	21.4%	2	7.1%	5	11.9%
Did not require surgery	11	78.6%	26	92.9%	37	88.1%
Total	**14**	**100%**	**28**	**100%**	**42**	**100%**

Figure 13.3 History of Girls' Gymnastics Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

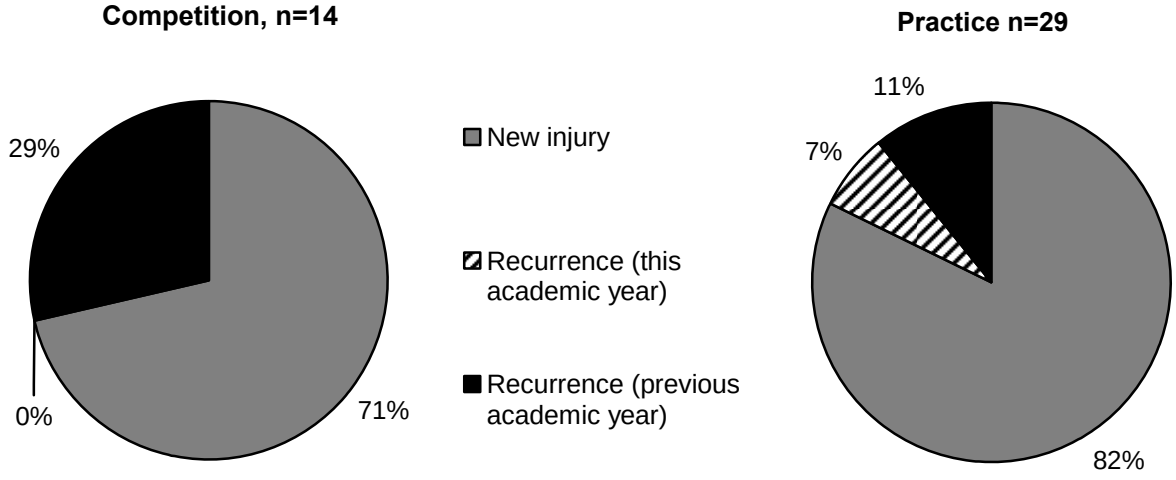


Table 13.6 Time during Season of Girls' Gymnastics Injuries, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

	n	%
Time in Season		
Preseason	4	9.3%
Regular season	38	88.4%
Post season	1	2.3%
Total	**43**	**100%**

Table 13.7 Competition-Related Variables for Girls' Gymnastics Injuries, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

	n	%
Gymnast event/apparatus		
Floor exercise	17	39.5%
Balance beam	8	18.6%
Vault	7	16.3%
Uneven parallel bars	6	14.0%
Warm-up/stretching/conditioning	2	4.7%
Other	3	7.0%
Total	**43**	**100%**

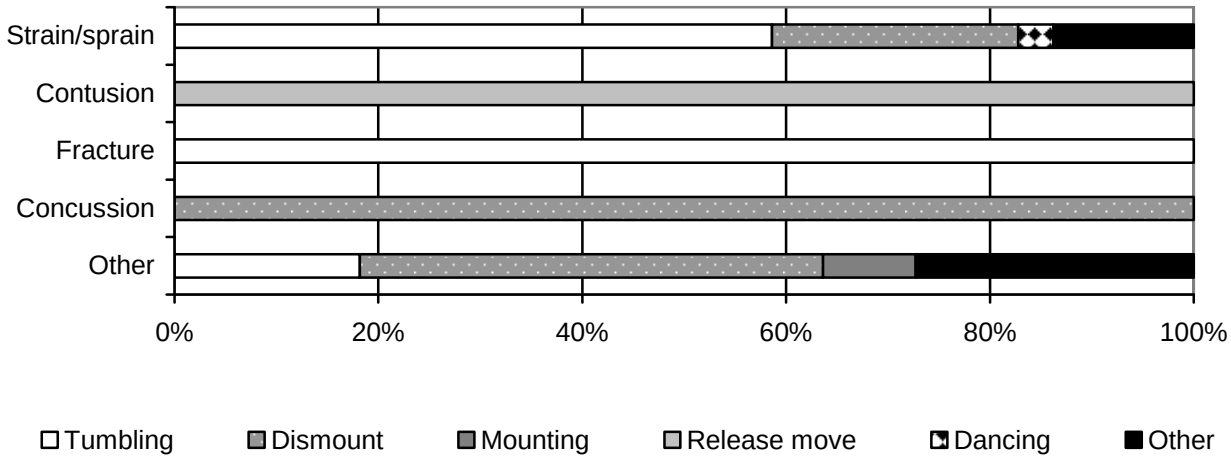
Table 13.8 Practice-Related Variables for Girls' Gymnastics Injuries, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

	n	%
Time in Practice		
First 1/2 hour	0	0.0%
Second 1/2 hour	6	25.0%
1-2 hours into practice	14	58.3%
>2 hours into practice	4	16.7%
Total	**24**	**100%**

Table 13.9 Activities Leading to Girls' Gymnastics Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

	Competition		Practice		Overall	
	n	%	n	%	n	%
Activity						
Tumbling	5	35.7%	15	51.7%	20	46.5%
Dismount	6	42.9%	7	24.1%	13	30.2%
Mounting	0	0.0%	1	3.4%	1	2.3%
Release move	1	7.1%	0	0.0%	1	2.3%
Dancing	0	0.0%	1	3.4%	1	2.3%
Other	2	14.3%	5	17.2%	7	16.3%
Total	**14**	**100%**	**29**	**100%**	**43**	**100%**

Figure 13.4 Activity Resulting in Girls' Gymnastics Injuries by Injury Diagnosis, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year



XIV. Boys' Ice Hockey Injury Epidemiology

Table 14.1Boys' Ice Hockey Injury Rates by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

	# Injuries	# Exposures	Injury rate (per 1,000 athlete-exposures)
Total	**145**	**64,877**	**2.23**
Competition	123	20,237	6.08
Practice	22	44,640	0.49

Table 14.2 Demographic Characteristics of Injured Boys' Ice Hockey Athletes, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year*

Year in School	
Freshman	23 (16.7%)
Sophomore	28 (20.3%)
Junior	48 (34.8%)
Senior	39 (28.3%)
Total†	**138 (100%)**
Age (years)	
Minimum	14
Maximum	19
Mean (St. Dev.)	16.4 (1.3)
BMI	
Minimum	18.0
Maximum	34.9
Mean (St. Dev.)	23.7 (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 14.1 Diagnosis of Boys' Ice Hockey Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

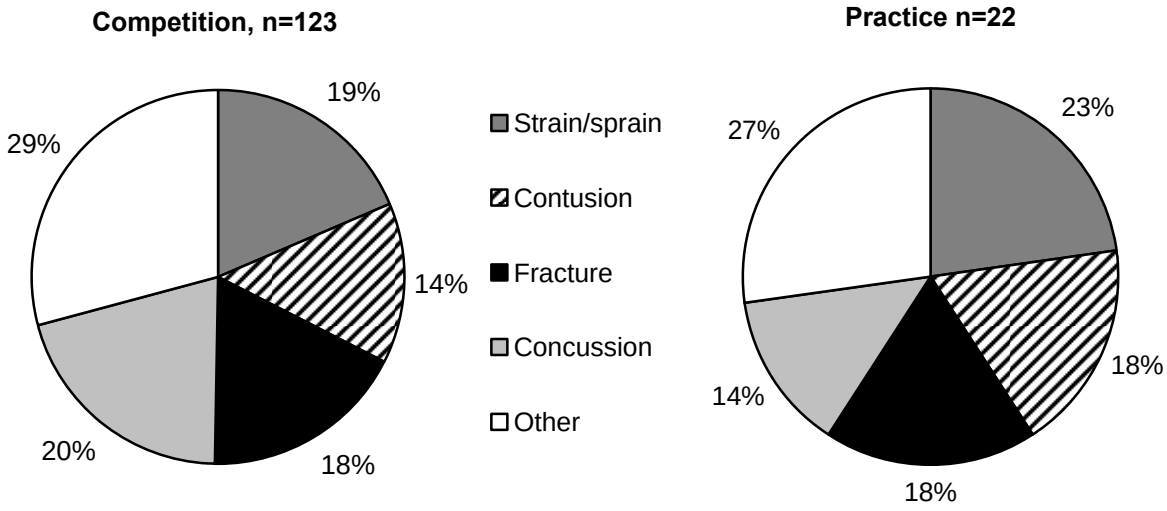


Table 14.3 Body Site of Boys' Ice Hockey Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

	Competition		Practice		Overall	
	n	%	n	%	n	%
Body Site						
Head/face	38	30.9%	4	18.2%	42	29.0%
Hand/wrist	13	10.6%	4	18.2%	17	11.7%
Shoulder	15	12.2%	1	4.5%	16	11.0%
Knee	12	9.8%	2	9.1%	14	9.7%
Hip/thigh/upper leg	12	9.8%	1	4.5%	13	9.0%
Arm/elbow	10	8.1%	1	4.5%	11	7.6%
Trunk	9	7.3%	1	4.5%	10	6.9%
Ankle	4	3.3%	4	18.2%	8	5.5%
Lower leg	6	4.9%	1	4.5%	7	4.8%
Foot	2	1.6%	1	4.5%	3	2.1%
Neck	2	1.6%	1	4.5%	3	2.1%
Other	0	0.0%	1	4.5%	1	0.7%
Total	**123**	**100%**	**22**	**100%**	**145**	**100%**

Table 14.4 Ten Most Common Boys' Ice Hockey Injury Diagnoses by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

	Competition n=123		Practice n=22		Total n=145	
	n	%	n	%	n	%
Diagnosis						
Head/face concussion	25	20.3%	3	13.6%	28	19.3%
Head/face other	12	9.8%	1	4.5%	13	9.0%
Hand/wrist fracture	10	8.1%	2	9.1%	12	8.3%
Shoulder other	11	8.9%	0	0.0%	11	7.6%
Knee other	5	4.1%	2	9.1%	7	4.8%
Ankle strain/sprain	3	2.4%	3	13.6%	6	4.1%
Hip/thigh/upper leg contusion	5	4.1%	1	4.5%	6	4.1%
Hip/thigh/upper leg strain/sprain	5	4.1%	0	0.0%	5	3.4%
Arm/elbow fracture	4	3.3%	1	4.5%	5	3.4%
Shoulder strain/sprain	3	2.4%	1	4.5%	4	2.8%

Figure 14.2 Time Loss of Boys' Ice Hockey Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

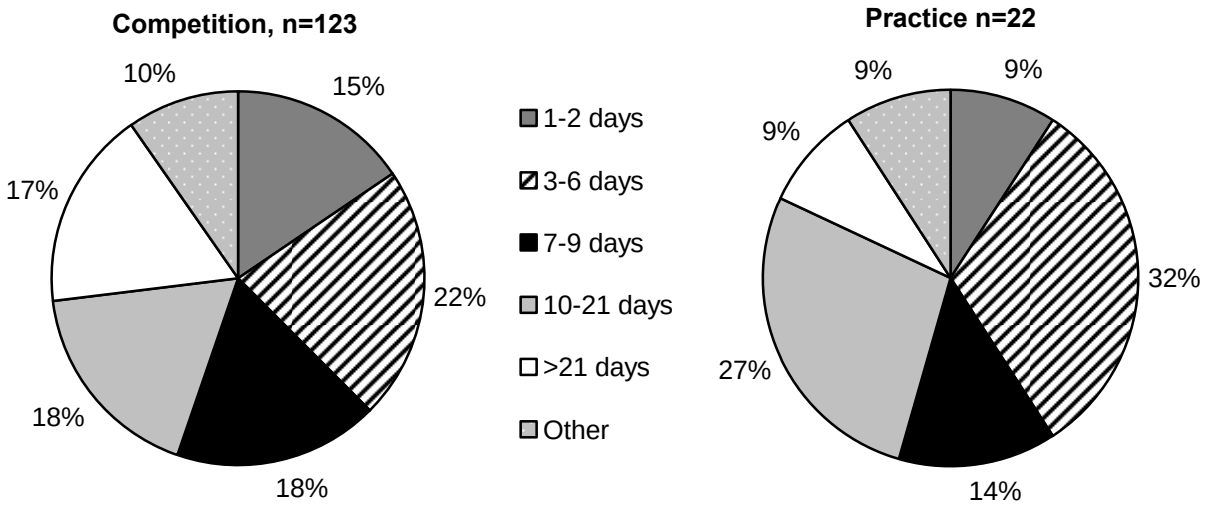


Table 14.5 Boys' Ice Hockey Injuries Requiring Surgery by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

	Competition		Practice		Overall	
	n	%	n	%	n	%
Need for surgery						
Required surgery	11	9.2%	1	4.5%	12	8.5%
Did not require surgery	108	90.8%	21	95.5%	129	91.5%
Total	**119**	**100%**	**22**	**100%**	**141**	**100%**

Figure 14.3 History of Boys' Ice Hockey Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

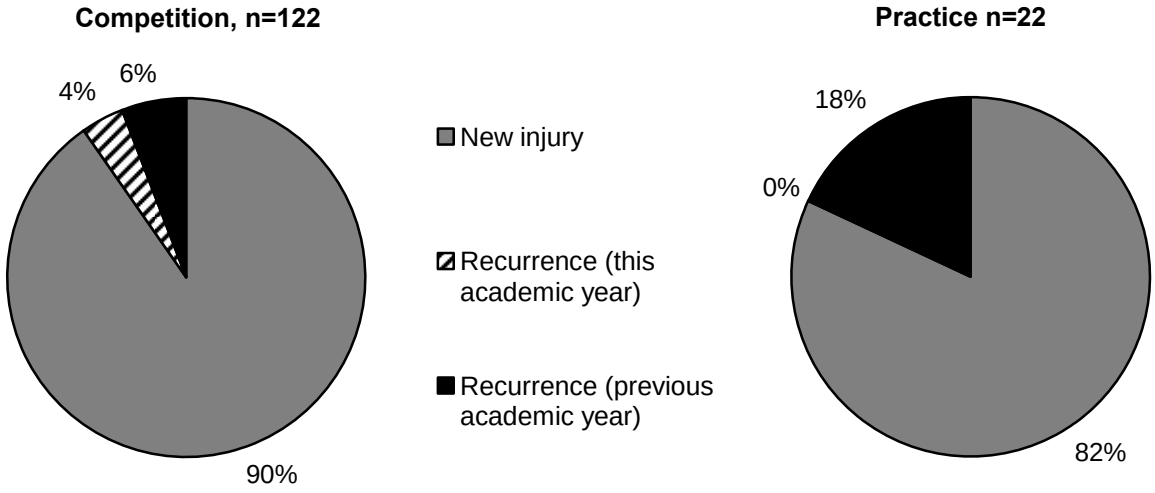


Table 14.6 Time during Season of Boys' Ice Hockey Injuries, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

	n	%
Time in Season		
Preseason	6	4.1%
Regular season	130	89.7%
Post season	9	6.2%
Total	**145**	**100%**

Table 14.7 Competition-Related Variables for Boys' Ice Hockey Injuries, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

	n	%
Time in Competition		
Warm-ups	0	0.0%
First period	26	22.6%
Second period	57	49.6%
Third period	31	27.0%
Overtime	1	0.9%
Total	**115**	**100%**
Injury Related to Foul Play		
No	84	74.3%
Yes, and ruled foul play	10	8.8%
Yes, but not ruled foul play	8	7.1%
Unknown	11	9.7%
Total	**113**	**100%**
Rink Location		
Corner	21	17.8%
Behind goal	11	9.3%
Goal area	9	7.6%
Face-off circle	3	2.5%
Between goal line/blue line	44	37.3%
Neutral zone	25	21.2%
Bench	1	0.8%
Other	4	3.4%
Total	**118**	**100%**

Table 14.8 Practice-Related Variables for Boys' Ice Hockey Injuries, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

	n	%
Time in Practice		
First 1/2 hour	4	22.2%
Second 1/2 hour	3	16.7%
1-2 hours into practice	11	61.1%
>2 hours into practice	0	0.0%
Total	**18**	**100%**

Figure 14.4 Player Position of Boys' Ice Hockey Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

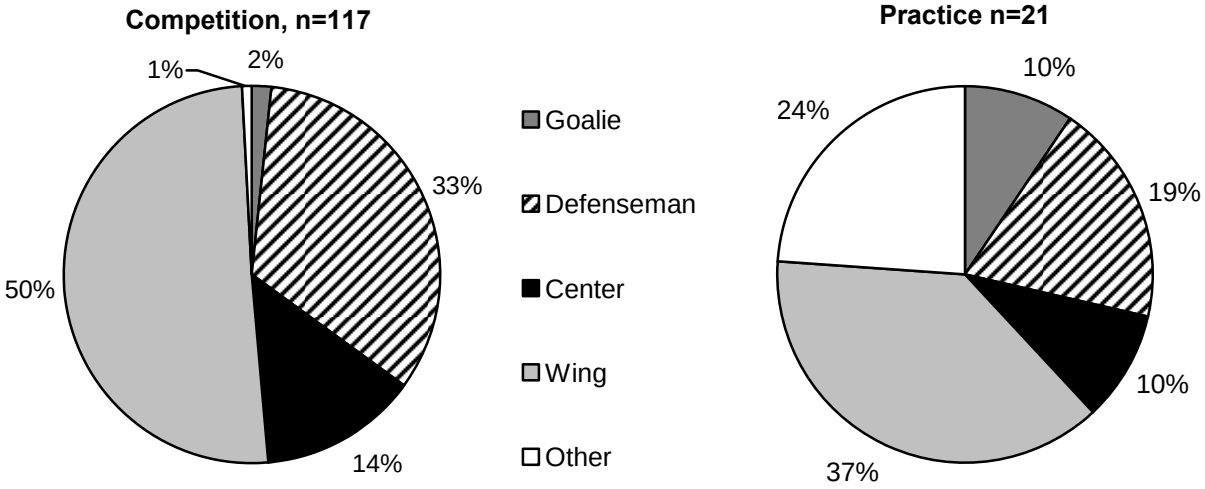
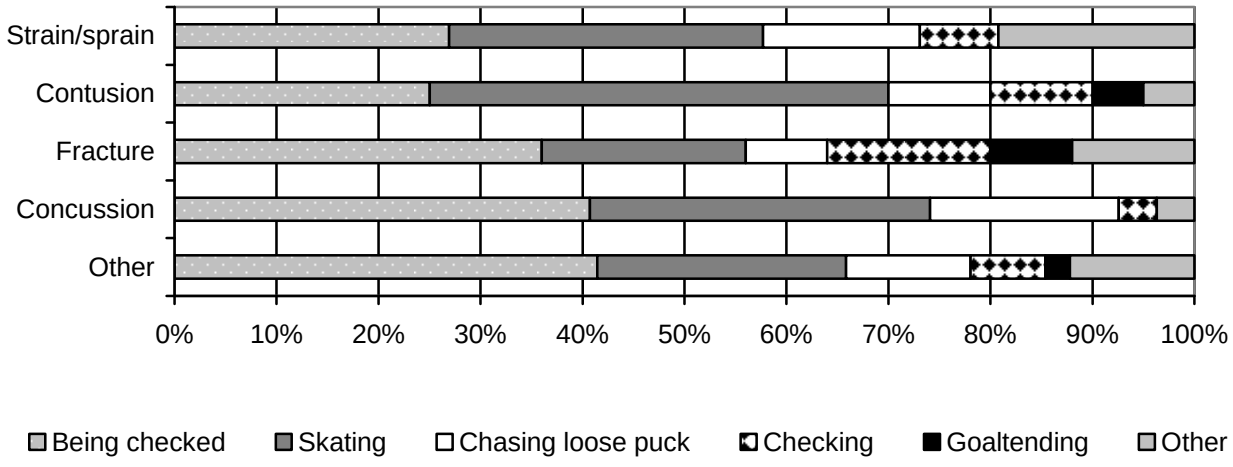


Table 14.9 Activities Leading to Boys' Ice Hockey Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

	Competition		Practice		Overall	
	n	%	n	%	n	%
Activity						
Being checked	47	39.8%	2	9.5%	49	35.3%
Skating	33	28.0%	8	38.1%	41	29.5%
Chasing loose puck	15	12.7%	3	14.3%	18	12.9%
Checking	11	9.3%	1	4.8%	12	8.6%
Goaltending	2	1.7%	2	9.5%	4	2.9%
Shooting	3	2.5%	0	0.0%	3	2.2%
Passing	2	1.7%	1	4.8%	3	2.2%
Receiving pass	1	0.8%	1	4.8%	2	1.4%
Line change	1	0.8%	0	0.0%	1	0.7%
Face-off	0	0.0%	0	0.0%	0	0.0%
Other	3	2.5%	3	14.3%	6	4.3%
Total	**118**	**100%**	**21**	**100%**	**139**	**100%**

Figure 14.5 Activity Resulting in Boys' Ice Hockey Injuries by Injury Diagnosis, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year



XV. Boys' Lacrosse Injury Epidemiology

Table 15.1 Boys' Lacrosse Injury Rates by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

	# Injuries	# Exposures	Injury rate (per 1,000 athlete-exposures)
Total	**246**	**111,792**	**2.20**
Competition	146	33,755	4.33
Practice	100	78,037	1.28

Table 15.2 Demographic Characteristics of Injured Boys' Lacrosse Athletes, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year*

Year in School	
Freshman	54 (22.1%)
Sophomore	55 (22.5%)
Junior	75 (30.7%)
Senior	60 (24.6%)
Total†	**244 (100%)**
Age (years)	
Minimum	14
Maximum	19
Mean (St. Dev.)	16.3 (1.3)
BMI	
Minimum	17.5
Maximum	41.0
Mean (St. Dev.)	23.8 (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 15.1 Diagnosis of Boys' Lacrosse Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

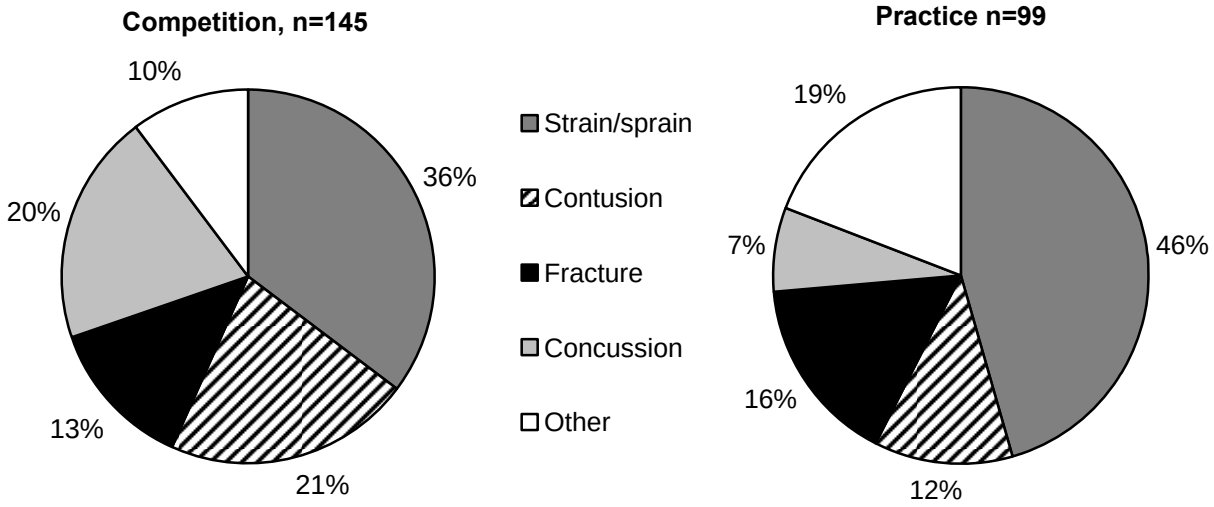


Table 15.3 Body Site of Boys' Lacrosse Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

	Competition		Practice		Overall	
	n	%	n	%	n	%
Body Site						
Head/face	34	23.3%	12	12.2%	46	19.0%
Trunk	23	15.8%	10	10.2%	33	13.6%
Ankle	15	10.3%	14	14.3%	29	12.0%
Knee	14	9.6%	13	13.3%	27	11.2%
Hip/thigh/upper leg	13	8.9%	13	13.3%	26	10.7%
Shoulder	12	8.2%	5	5.1%	17	7.0%
Hand/wrist	11	7.5%	5	5.1%	16	6.6%
Lower leg	7	4.8%	9	9.2%	16	6.6%
Foot	4	2.7%	12	12.2%	16	6.6%
Arm/elbow	5	3.4%	3	3.1%	8	3.3%
Neck	6	4.1%	2	2.0%	8	3.3%
Other	2	1.4%	2	2.0%	4	1.7%
Total	**144**	**100%**	**98**	**100%**	**242**	**100%**

Table 15.4 Ten Most Common Boys' Lacrosse Injury Diagnoses by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

	Competition n=146		Practice n=100		Total n=246	
	n	%	n	%	n	%
Diagnosis						
Head/face concussion	28	19.2%	7	7.0%	35	14.2%
Ankle strain/sprain	14	9.6%	13	13.0%	27	11.0%
Knee strain/sprain	11	7.5%	7	7.0%	18	7.3%
Hip/thigh/upper leg strain/sprain	6	4.1%	10	10.0%	16	6.5%
Trunk fracture	9	6.2%	5	5.0%	14	5.7%
Trunk strain/sprain	7	4.8%	4	4.0%	11	4.5%
Hand/wrist fracture	4	2.7%	5	5.0%	9	3.7%
Head/face other	5	3.4%	2	2.0%	7	2.8%
Hip/thigh/upper leg contusion	6	4.1%	1	1.0%	7	2.8%
Shoulder contusion	5	3.4%	2	2.0%	7	2.8%

Figure 15.2 Time Loss of Boys' Lacrosse Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

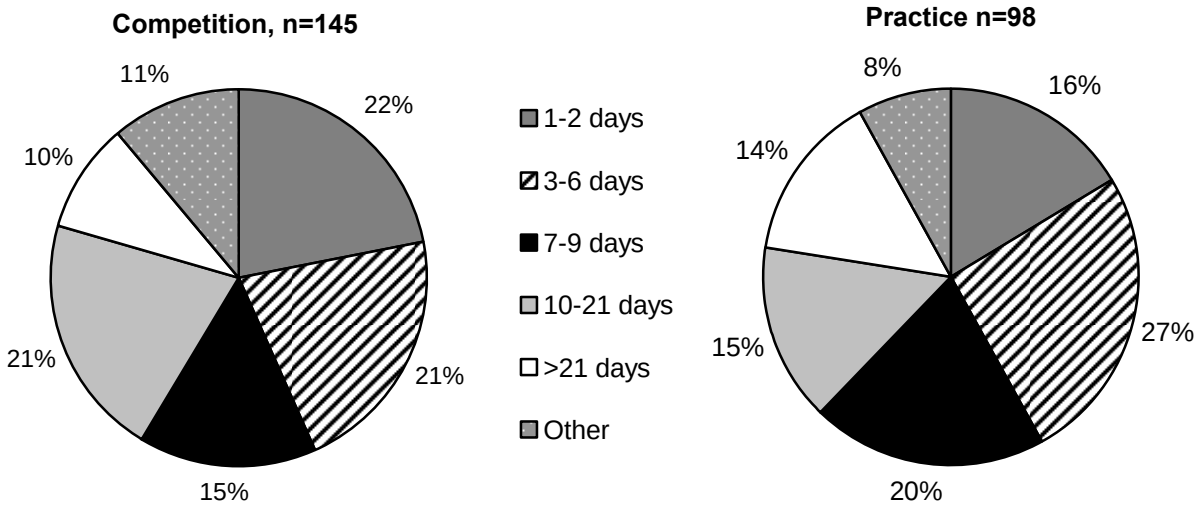


Table 15.5 Boys' Lacrosse Injuries Requiring Surgery by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

	Competition		Practice		Overall	
	n	%	n	%	n	%
Need for surgery						
Required surgery	10	7.0%	7	7.2%	17	7.1%
Did not require surgery	132	93.0%	90	92.8%	222	92.9%
Total	**142**	**100%**	**97**	**100%**	**239**	**100%**

Figure 15.3 History of Boys' Lacrosse Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

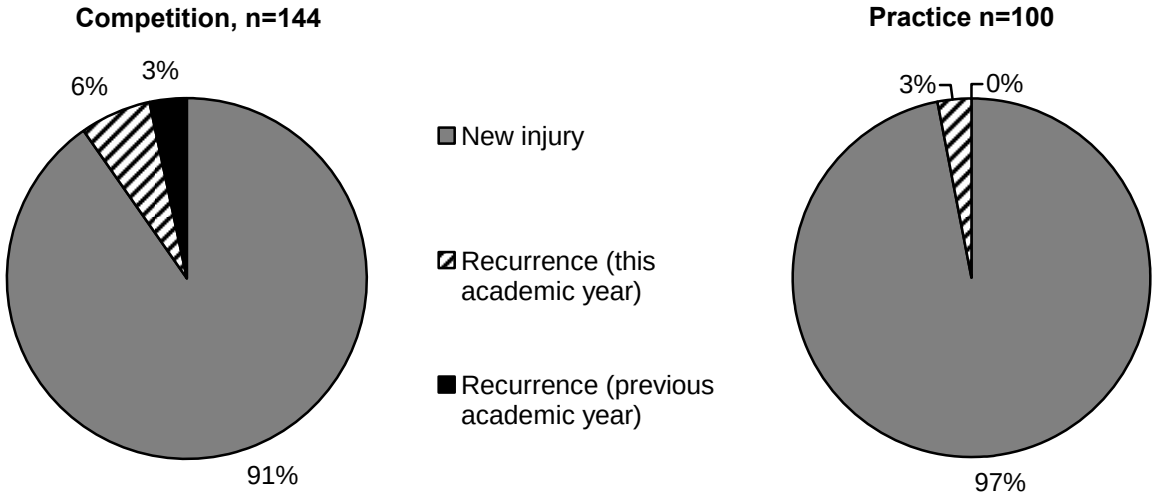


Table 15.6 Time during Season of Boys' Lacrosse Injuries, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

	n	%
Time in Season		
Preseason	49	20.0%
Regular season	194	79.2%
Post season	2	0.8%
Total	**245**	**100%**

Table 15.7 Competition-Related Variables for Boys' Lacrosse Injuries, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

	n	%
Time in Competition		
Pre-competition/warm-ups	1	0.7%
First quarter	14	10.0%
Second quarter	51	36.4%
Third quarter	41	29.3%
Fourth quarter	33	23.6%
Total	**140**	**100%**
Injury Related to Foul Play		
No	114	78.6%
Yes, and ruled foul play	13	9.0%
Yes, but not ruled foul play	5	3.4%
Unknown	13	9.0%
Total	**145**	**100%**
Field Location		
Midfield	52	38.2%
Wing area	15	11.0%
Defensive area	23	16.9%
Goal area	41	30.1%
Sideline	5	3.7%
Total	**136**	**100%**

Table 15.8 Practice-Related Variables for Boys' Lacrosse Injuries, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

	n	%
Time in Practice		
First 1/2 hour	20	24.1%
Second 1/2 hour	20	24.1%
1-2 hours into practice	34	41.0%
>2 hours into practice	9	10.8%
Total	**83**	**100%**

Figure 15.4 Player Position of Boys' Lacrosse Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

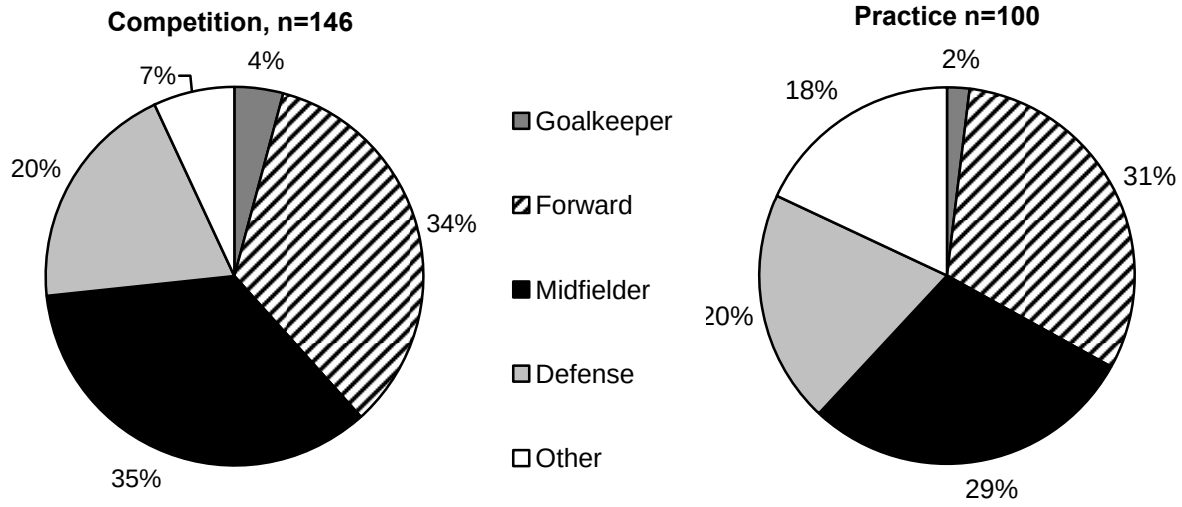
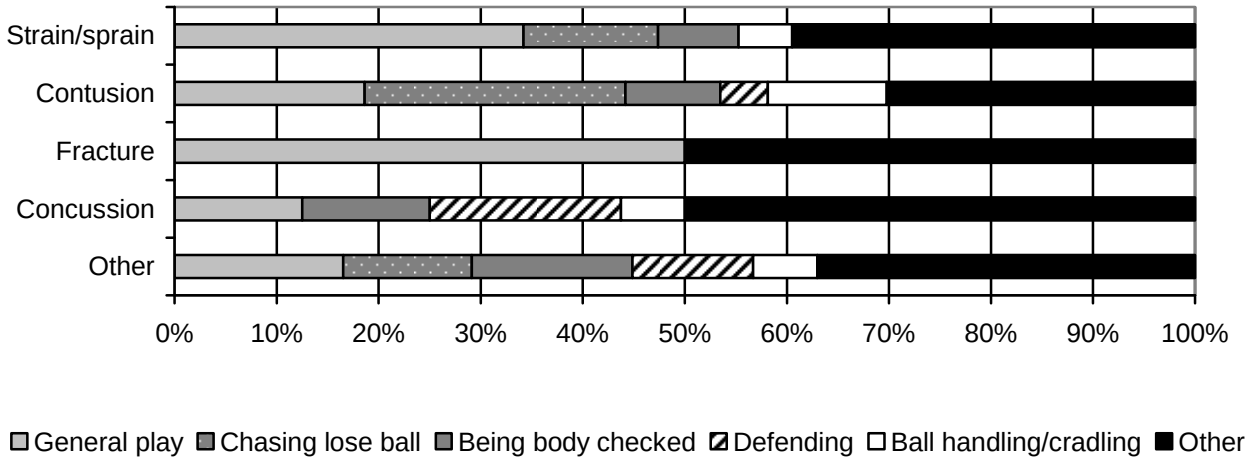


Table 15.9 Activities Leading to Boys' Lacrosse Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

	Competition		Practice		Overall	
	n	%	n	%	n	%
Activity						
General play	20	14.8%	25	27.2%	45	19.8%
Chasing lose ball	17	12.6%	15	16.3%	32	14.1%
Being body checked	24	17.8%	5	5.4%	29	12.8%
Defending	12	8.9%	8	8.7%	20	8.8%
Ball handling/cradling	12	8.9%	4	4.3%	16	7.0%
Being crosse/stick checked	9	6.7%	4	4.3%	13	5.7%
Shooting	10	7.4%	1	1.1%	11	4.8%
Body checking	7	5.2%	4	4.3%	11	4.8%
Passing	6	4.4%	4	4.3%	10	4.4%
Receiving pass	6	4.4%	4	4.3%	10	4.4%
Other	12	8.9%	18	19.6%	30	13.2%
Total	**135**	**100%**	**92**	**100%**	**227**	**100%**

Figure 15.5 Activity Resulting in Boys' Lacrosse Injuries by Injury Diagnosis, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year



XVI. Girls' Lacrosse Injury Epidemiology

Table 16.1 Girls' Lacrosse Injury Rates by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

	# Injuries	# Exposures	Injury rate (per 1,000 athlete-exposures)
Total	**148**	**86,205**	**1.72**
Competition	70	26,187	2.67
Practice	78	60,018	1.30

Table 16.2 Demographic Characteristics of Injured Girls' Lacrosse Athletes, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year*

Year in School	
Freshman	33 (22.9%)
Sophomore	45 (31.3%)
Junior	44 (30.6%)
Senior	22 (15.3%)
Total	**144 (100%)**
Age (years)	
Minimum	14
Maximum	18
Mean (St. Dev.)	15.7 (1.1)
BMI	
Minimum	16.9
Maximum	33.8
Mean (St. Dev.)	22.4 (3.4)

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

Figure 16.1 Diagnosis of Girls' Lacrosse Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

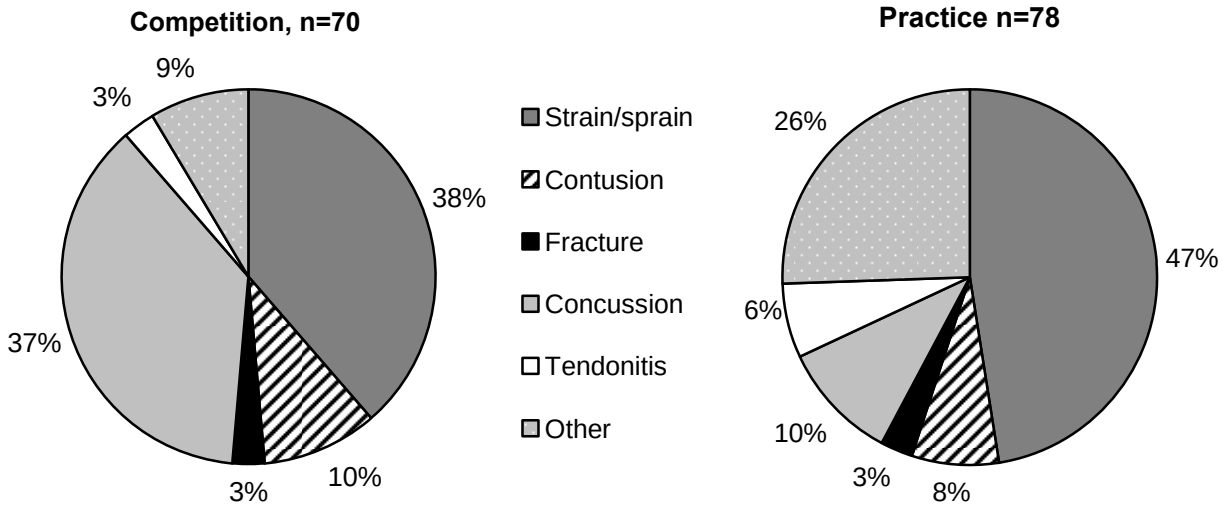


Table 16.3 Body Site of Girls' Lacrosse Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

	Competition		Practice		Overall	
	n	%	n	%	n	%
Body Site						
Head/face	27	38.6%	12	15.4%	39	26.4%
Ankle	9	12.9%	17	21.8%	26	17.6%
Hip/thigh/upper leg	6	8.6%	16	20.5%	22	14.9%
Knee	14	20.0%	5	6.4%	19	12.8%
Lower leg	2	2.9%	15	19.2%	17	11.5%
Foot	1	1.4%	6	7.7%	7	4.7%
Hand/wrist	5	7.1%	1	1.3%	6	4.1%
Trunk	2	2.9%	2	2.6%	4	2.7%
Arm/elbow	2	2.9%	2	2.6%	4	2.7%
Shoulder	2	2.9%	0	0.0%	2	1.4%
Neck	0	0.0%	1	1.3%	1	0.7%
Other	0	0.0%	1	1.3%	1	0.7%
Total	**70**	**100%**	**78**	**100%**	**148**	**100%**

Table 16.4 Nine Most Common Girls' Lacrosse Injury Diagnoses by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

	Competition n=70		Practice n=78		Total n=148	
	n	%	n	%	n	%
Diagnosis						
Head/face concussion	26	37.1%	8	10.3%	34	23.0%
Ankle strain/sprain	9	12.9%	15	19.2%	24	16.2%
Hip/thigh/upper leg strain/sprain	5	7.1%	14	17.9%	19	12.8%
Lower leg other	0	0.0%	12	15.4%	12	8.1%
Knee other	6	8.6%	4	5.1%	10	6.8%
Knee strain/sprain	8	11.4%	0	0.0%	8	5.4%
Foot other	1	1.4%	4	5.1%	5	3.4%
Hand/wrist contusion	4	5.7%	0	0.0%	4	2.7%
Lower leg strain/sprain	1	1.4%	3	3.8%	4	2.7%

Figure 16.2 Time Loss of Girls' Lacrosse Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

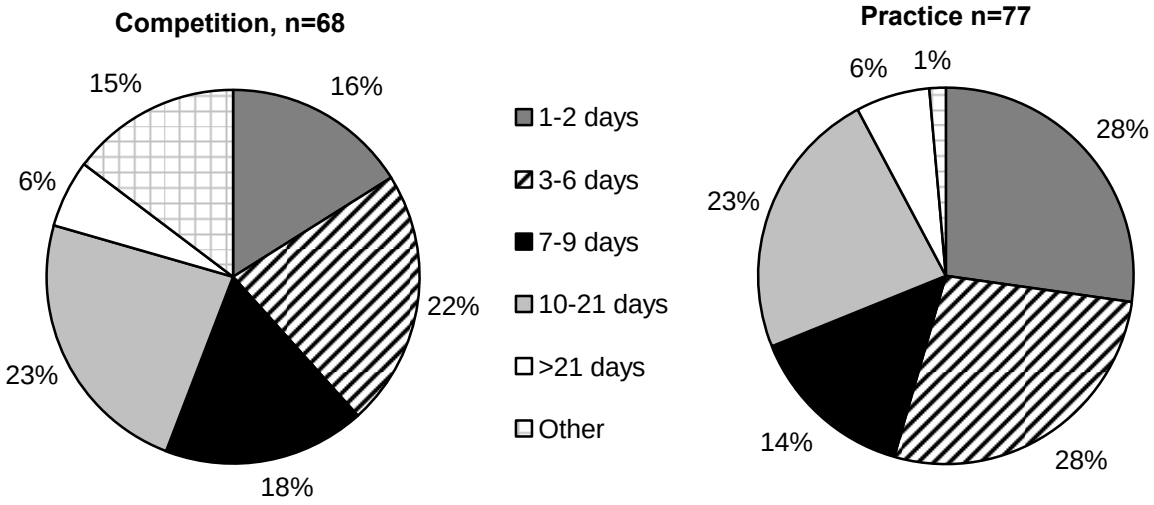


Table 16.5 Girls' Lacrosse Injuries Requiring Surgery by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

	Competition		Practice		Overall	
	n	%	n	%	n	%
Need for surgery						
Required surgery	8	11.6%	2	2.7%	10	7.0%
Did not require surgery	61	88.4%	71	97.3%	132	93.0%
Total	**69**	**100%**	**73**	**100%**	**142**	**100%**

Figure 16.3 History of Girls' Lacrosse Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

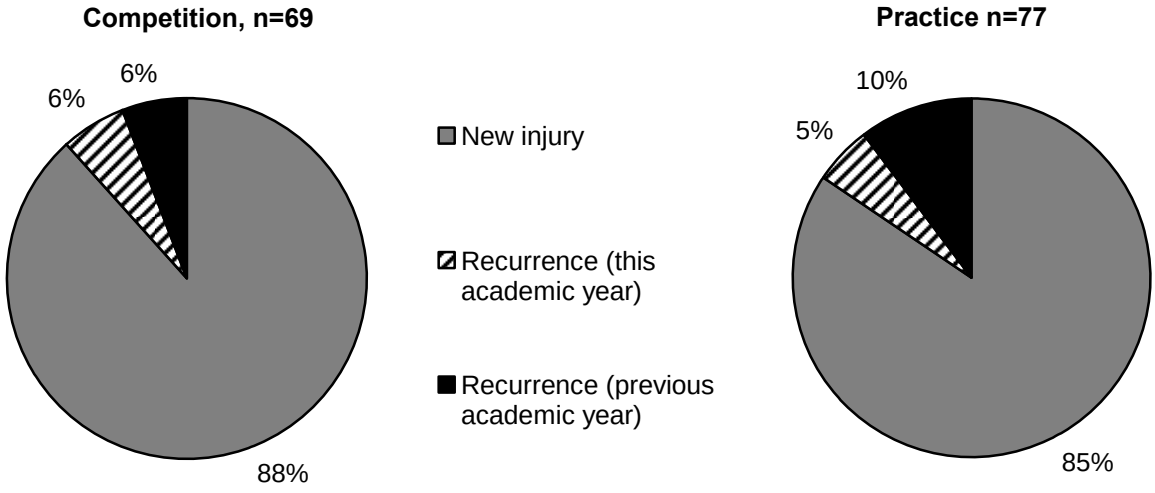


Table 16.6 Time during Season of Girls' Lacrosse Injuries, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

	n	%
Time in Season		
Preseason	36	24.5%
Regular season	107	72.8%
Post season	4	2.7%
Total	**147**	**100%**

Table 16.7 Competition-Related Variables for Girls' Lacrosse Injuries, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

	n	%
Time in Competition		
Pre-Competition-Warm-ups	1	1.5%
First half	33	50.0%
Second half	32	48.5%
Overtime	0	0.0%
Total	**66**	**100%**
Injury Related to Foul Play		
No	43	69.4%
Yes, and ruled foul play	8	12.9%
Yes, but not ruled foul play	4	6.5%
Unknown	7	11.3%
Total	**62**	**100%**
Field Location		
Center circle	1	1.6%
Midfield (between restraining lines)	37	59.7%
Critical scoring area (including the fan and arc)	12	19.4%
Goal circle	11	17.7%
Endline	0	0.0%
Sideline	1	1.6%
Total	**62**	**100%**

Table 16.8 Practice-Related Variables for Girls' Lacrosse Injuries, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

	n	%
Time in Practice		
First 1/2 hour	5	8.6%
Second 1/2 hour	12	20.7%
1-2 hours into practice	38	65.5%
>2 hours into practice	3	5.2%
Total	**58**	**100%**

Figure 16.4 Player Position of Girls' Lacrosse Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

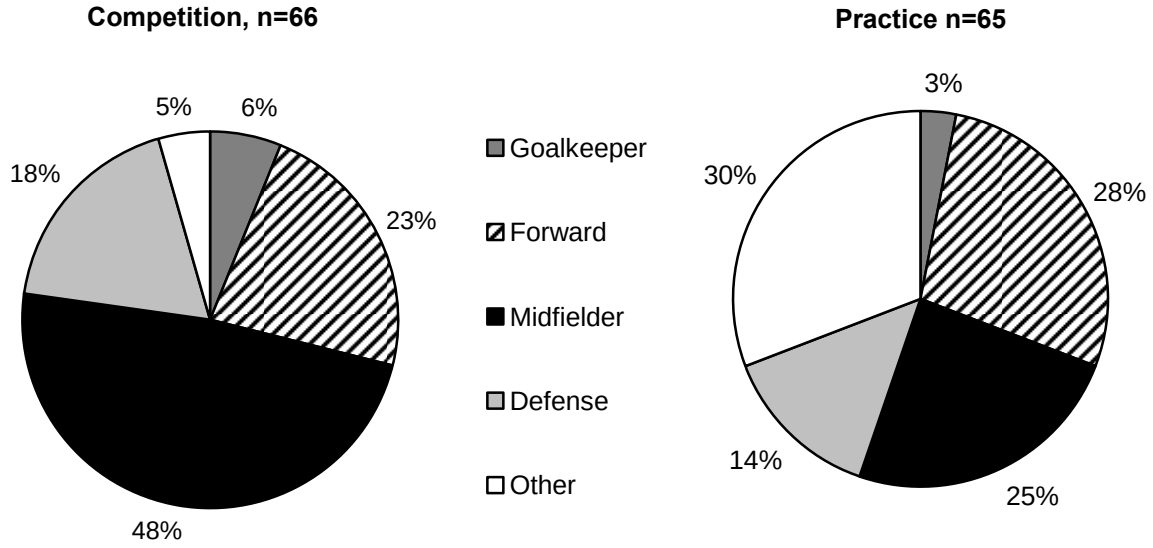
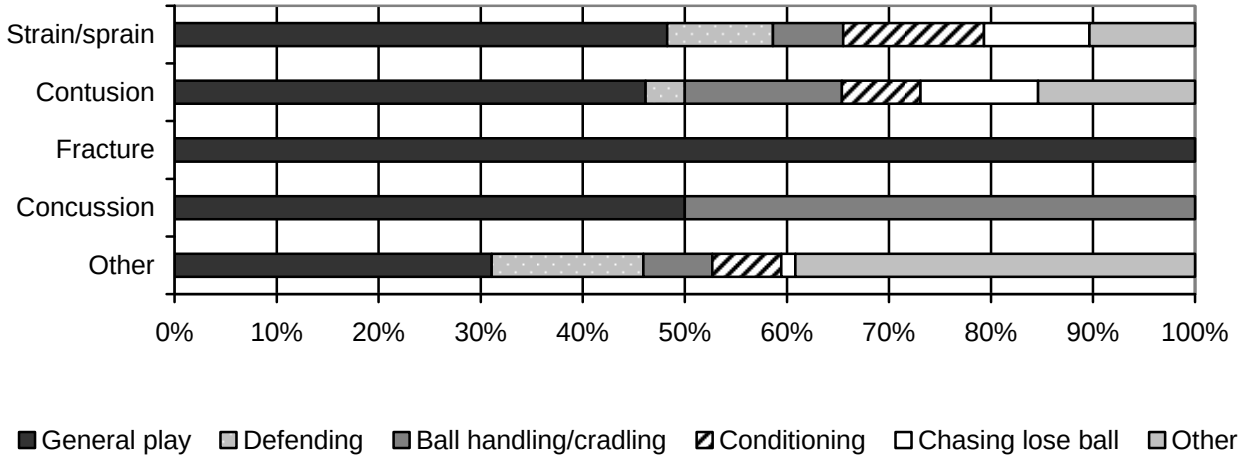


Table 16.9 Activities Leading to Girls' Lacrosse Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

	Competition		Practice		Overall	
	n	%	n	%	n	%
Activity						
General play	18	27.3%	37	51.4%	55	39.9%
Defending	9	13.6%	6	8.3%	15	10.9%
Ball handling/cradling	11	16.7%	3	4.2%	14	10.1%
Conditioning	0	0.0%	11	15.3%	11	8.0%
Receiving pass	3	4.5%	5	6.9%	8	5.8%
Chasing lose ball	7	10.6%	0	0.0%	7	5.1%
Being crosse/stick checked	5	7.6%	0	0.0%	5	3.6%
Passing	3	4.5%	2	2.8%	5	3.6%
Shooting	1	1.5%	1	1.4%	2	1.4%
Body checking	0	0.0%	0	0.0%	0	0.0%
Other	9	13.6%	7	9.7%	16	11.6%
Total	**66**	**100%**	**72**	**100%**	**138**	**100%**

Figure 16.5 Activity Resulting in Girls' Lacrosse Injuries by Injury Diagnosis, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year



XVII. Boys' Swimming and Diving Injury Epidemiology

Table 17.1 Boys' Swimming and Diving Injury Rates by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

	# Injuries	# Exposures	Injury rate (per 1,000 athlete-exposures)
Total	**23**	**117,422**	**0.20**
Competition	3	21,920	0.14
Practice	20	95,502	0.21

Table 17.2 Demographic Characteristics of Injured Boys' Swimming and Diving Athletes, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year*

Year in School	
Freshman	5 (21.7%)
Sophomore	7 (30.4%)
Junior	7 (30.4%)
Senior	4 (17.4%)
Total†	**23 (100%)**
Age (years)	
Minimum	14
Maximum	18
Mean (St. Dev.)	15.9 (1.2)
BMI	
Minimum	17.9
Maximum	48.7
Mean (St. Dev.)	29.2 (3.5)

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

Figure 17.1 Diagnosis of Boys' Swimming and Diving Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

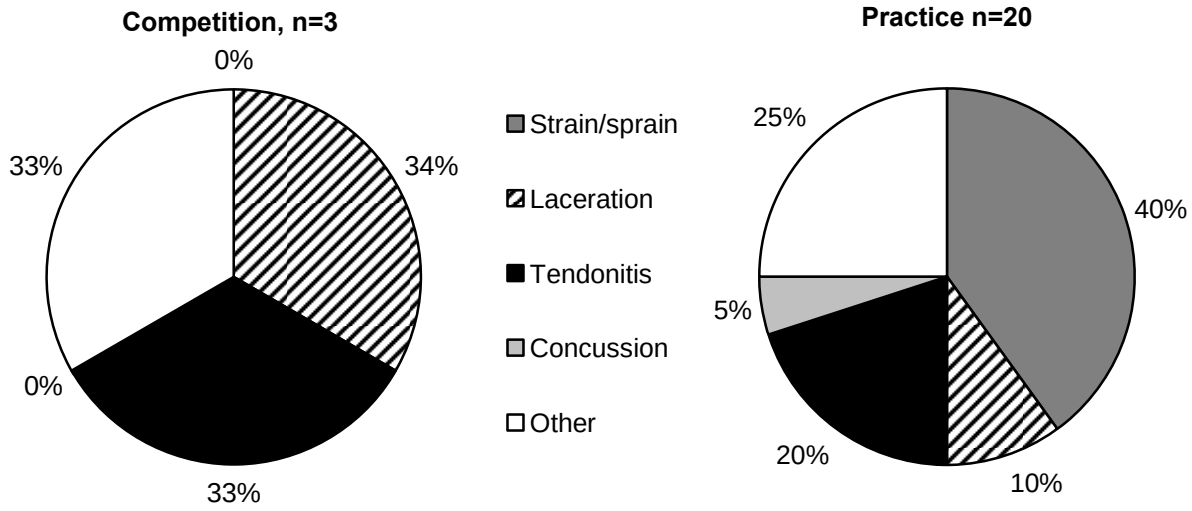


Table 17.3 Body Site of Boys' Swimming and Diving Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

	Competition		Practice		Overall	
	n	%	n	%	n	%
Body Site						
Shoulder	1	33.3%	8	40.0%	9	39.1%
Trunk	1	33.3%	3	15.0%	4	17.4%
Knee	0	0.0%	3	15.0%	3	13.0%
Head/face	1	33.3%	2	10.0%	3	13.0%
Lower leg	0	0.0%	2	10.0%	2	8.7%
Arm/elbow	0	0.0%	1	5.0%	1	4.3%
Foot	0	0.0%	1	5.0%	1	4.3%
Ankle	0	0.0%	0	0.0%	0	0.0%
Hip/thigh/upper leg	0	0.0%	0	0.0%	0	0.0%
Hand/wrist	0	0.0%	0	0.0%	0	0.0%
Neck	0	0.0%	0	0.0%	0	0.0%
Other	0	0.0%	0	0.0%	0	0.0%
Total	**3**	**100%**	**20**	**100%**	**23**	**100%**

Table 17.4 Ten Most Common Boys' Swimming and Diving Injury Diagnoses by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

	Competition n=3		Practice n=20		Total n=23	
	n	%	n	%	n	%
Diagnosis						
Shoulder other	1	33.3%	4	20.0%	5	21.7%
Shoulder strain/sprain	0	0.0%	4	20.0%	4	17.4%
Knee other	0	0.0%	3	15.0%	3	13.0%
Trunk strain/sprain	0	0.0%	3	15.0%	3	13.0%
Lower leg other	0	0.0%	2	10.0%	2	8.7%
Head/face other	1	33.3%	1	5.0%	2	8.7%
Head/face concussion	0	0.0%	1	5.0%	1	4.3%
Trunk other	1	33.3%	3	15.0%	1	4.3%
Arm/elbow strain/sprain	0	0.0%	1	5.0%	1	4.3%
Foot other	0	0.0%	1	5.0%	1	4.3%

Figure 17.2 Time Loss of Boys' Swimming and Diving Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

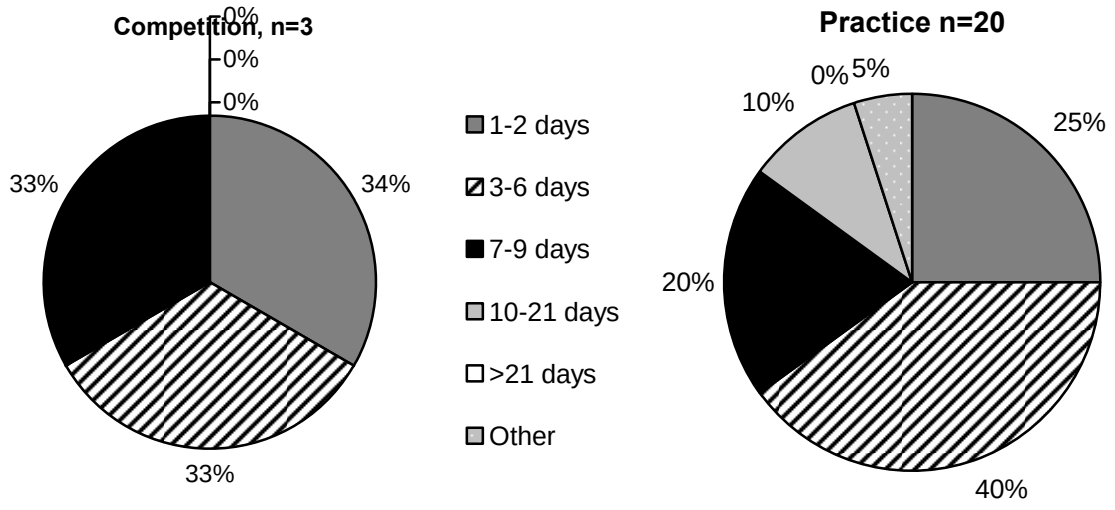


Table 17.5 Boys' Swimming and Diving Injuries Requiring Surgery by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

	Competition		Practice		Overall	
	n	%	n	%	n	%
Need for surgery						
Required surgery	0	0.0%	0	0.0%	0	0.0%
Did not require surgery	3	100%	19	100%	22	100%
Total	**3**	**100%**	**19**	**100%**	**22**	**100%**

Figure 17.3 History of Boys' Swimming and Diving Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

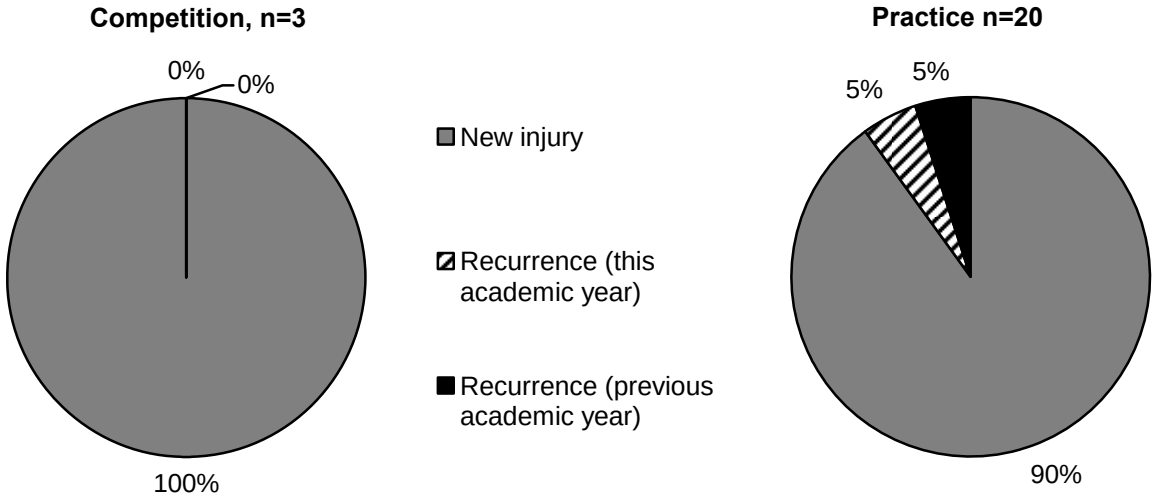


Table 17.6 Time during Season of Boys' Swimming and Diving Injuries, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

	n	%
Time in Season		
Preseason	5	21.7%
Regular season	17	73.9%
Post season	1	4.3%
Total	**23**	**100%**

Table 17.7 Competition-Related Variables for Boys' Swimming and Diving Injuries, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

	n	%
Pool Location		
Starting platform	3	13.0%
In pool	19	82.6%
Poolside	0	0.0%
Other	1	4.3%
Total	**23**	**100%**

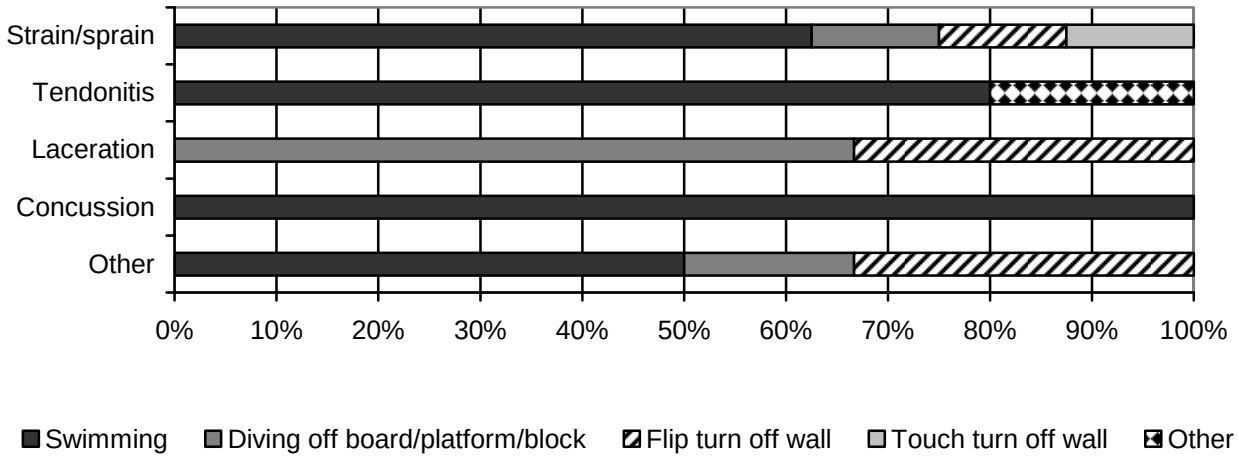
Table 17.8 Practice-Related Variables for Boys' Swimming and Diving Injuries, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

	n	%
Time in Practice		
First 1/2 hour	6	33.3%
Second 1/2 hour	4	22.2%
1-2 hours into practice	6	33.3%
>2 hours into practice	2	11.1%
Total	**18**	**100%**

Table 17.9 Activities Leading to Boys' Swimming and Diving Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

	Competition		Practice		Overall	
	n	%	n	%	n	%
Activity						
Swimming	2	66.7%	11	55.0%	13	56.5%
Diving off board/platform/block	1	33.3%	3	15.0%	4	17.4%
Flip turn off wall	0	0.0%	4	20.0%	4	17.4%
Touch turn off wall	0	0.0%	1	5.0%	1	4.3%
Start	0	0.0%	0	0.0%	0	0.0%
Using kickboard	0	0.0%	0	0.0%	0	0.0%
Other	0	0.0%	1	5.0%	1	4.3%
Total	**3**	**100%**	**20**	**100%**	**23**	**100%**

Figure 17.4 Activity Resulting in Boys' Swimming and Diving Injuries by Injury Diagnosis, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year



XVIII. Girls' Swimming and Diving Injury Epidemiology

Table 18.1 Girls' Swimming and Diving Injury Rates by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

	# Injuries	# Exposures	Injury rate (per 1,000 athlete-exposures)
Total	**44**	**130,099**	**0.34**
Competition	8	24,789	0.32
Practice	36	105,310	0.34

Table 18.2 Demographic Characteristics of Injured Girls' Swimming and Diving Athletes, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year*

Year in School	
Freshman	12 (27.9%)
Sophomore	12 (27.9%)
Junior	11 (25.6%)
Senior	8 (18.6%)
Total†	**43 (100%)**
Age (years)	
Minimum	14
Maximum	18
Mean (St. Dev.)	15.6 (1.0)
BMI	
Minimum	16.3
Maximum	32.8
Mean (St. Dev.)	21.8 (3.5)

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

Figure 18.1 Diagnosis of Girls' Swimming and Diving Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

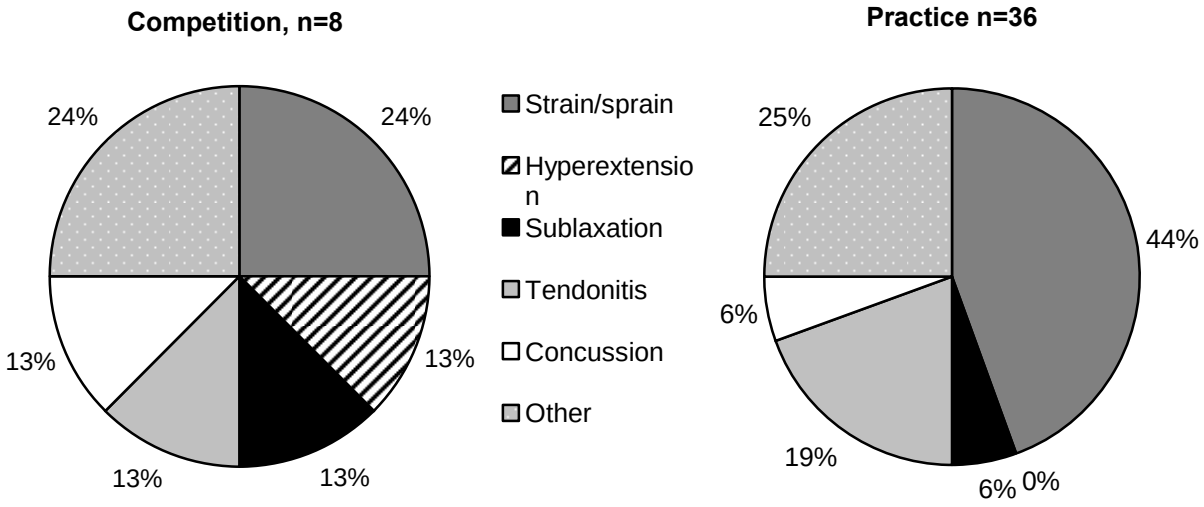


Table 18.3 Body Site of Girls' Swimming and Diving Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

	Competition		Practice		Overall	
	n	%	n	%	n	%
Body Site						
Shoulder	2	25.0%	22	61.1%	24	54.5%
Head/face	1	12.5%	3	8.3%	4	9.1%
Trunk	1	12.5%	3	8.3%	4	9.1%
Hip/thigh/upper leg	1	12.5%	2	5.6%	3	6.8%
Arm/elbow	2	25.0%	1	2.8%	3	6.8%
Knee	0	0.0%	2	5.6%	2	4.5%
Neck	0	0.0%	1	2.8%	1	2.3%
Ankle	0	0.0%	0	0.0%	0	0.0%
Hand/wrist	0	0.0%	0	0.0%	0	0.0%
Lower leg	0	0.0%	0	0.0%	0	0.0%
Foot	0	0.00%	0	0.0%	0	0.0%
Other	1	12.5%	2	5.6%	3	6.8%
Total	**8**	**100%**	**36**	**100%**	**44**	**100%**

Table 18.4 Ten Most Common Girls' Swimming and Diving Injury Diagnoses by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

	Competition n=8		Practice n=36		Total n=44	
	n	%	n	%	n	%
Diagnosis						
Shoulder strain/sprain	0	0.0%	12	33.3%	12	27.3%
Shoulder other	2	25.0%	10	27.8%	12	27.3%
Head/face concussion	1	12.5%	2	5.6%	3	6.8%
Hip/thigh/upper leg strain/sprain	1	12.5%	1	2.8%	2	4.5%
Trunk strain/sprain	0	0.0%	2	5.6%	2	4.5%
Trunk other	1	12.5%	1	2.8%	2	4.5%
Arm/elbow strain/sprain	1	12.5%	1	2.8%	2	4.5%
Knee contusion	0	0.0%	1	2.8%	1	2.3%
Knee other	0	0.0%	1	2.8%	1	2.3%
Head/face other	0	0.0%	1	2.8%	1	2.3%
Hip/thigh/upper leg other	0	0.0%	1	2.8%	1	2.3%
Arm/elbow other	1	12.5%	0	0.0%	1	2.3%
Neck other	0	0.0%	1	2.8%	1	2.3%

Figure 18.2 Time Loss of Girls' Swimming and Diving Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

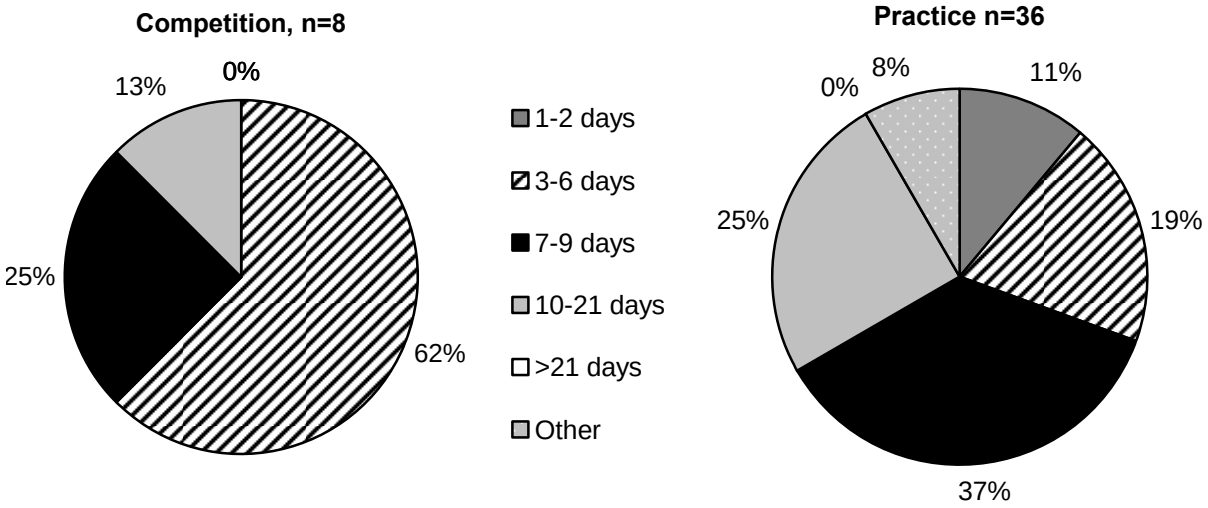


Table 18.5 Girls' Swimming and Diving Injuries Requiring Surgery by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

	Competition		Practice		Overall	
	n	%	n	%	n	%
Need for surgery						
Required surgery	0	0.0%	0	0.0%	0	0.0%
Did not require surgery	8	100%	36	100%	44	100%
Total	**8**	**100%**	**36**	**100%**	**44**	**100%**

Figure 18.3 History of Girls' Swimming and Diving Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

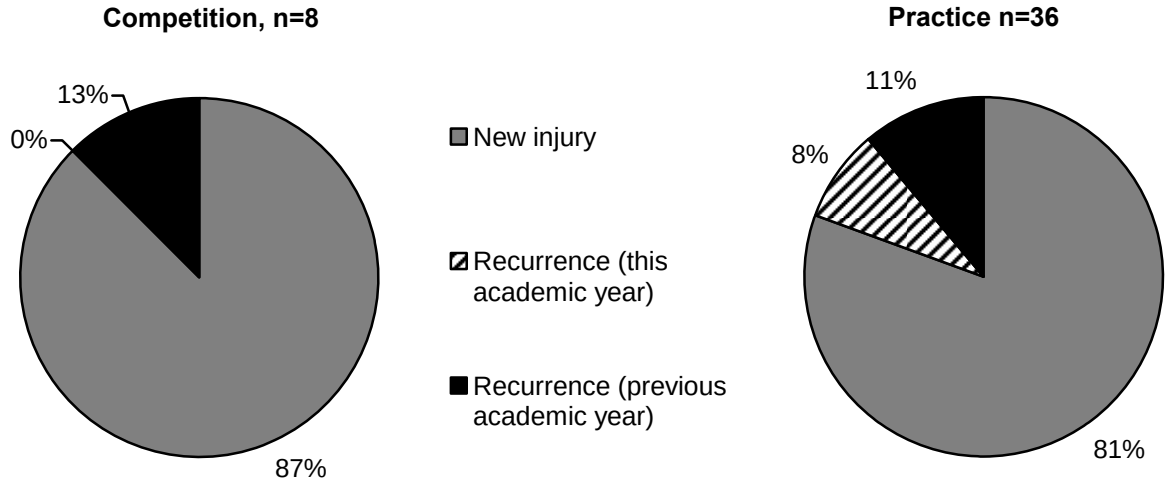


Table 18.6 Time during Season of Girls' Swimming and Diving Injuries, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

	n	%
Time in Season		
Preseason	5	11.4%
Regular season	39	88.6%
Post season	0	0.0%
Total	**44**	**100%**

Table 18.7 Competition-Related Variables for Girls' Swimming and Diving Injuries, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

	n	%
Pool Location		
In pool	39	92.9%
Poolside	2	4.8%
Starting platform/board/blocks	0	0.0%
Other	1	2.4%
Total	**42**	**100%**

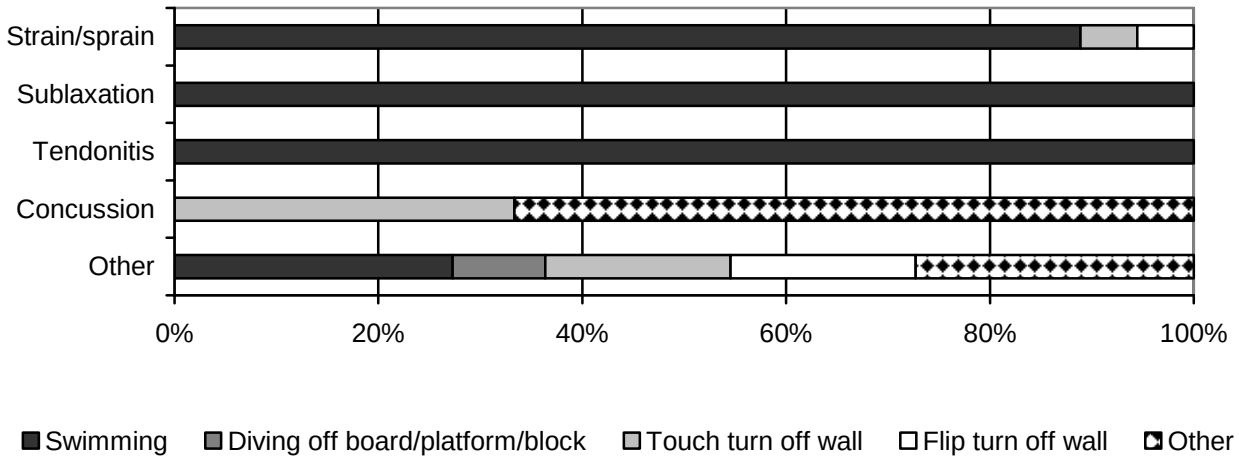
Table 18.8 Practice-Related Variables for Girls' Swimming and Diving Injuries, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

	n	%
Time in Practice		
First 1/2 hour	4	13.8%
Second 1/2 hour	6	20.7%
1-2 hours into practice	14	48.3%
>2 hours into practice	5	17.2%
Total	**29**	**100%**

Table 18.9 Activities Leading to Girls' Swimming and Diving Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

	Competition		Practice		Overall	
	n	%	n	%	n	%
Activity						
Swimming	4	57.1%	26	72.2%	30	69.8%
Diving off board/platform/block	0	0.0%	1	2.8%	1	2.3%
Touch turn off wall	1	14.3%	3	8.3%	4	9.3%
Flip turn off wall	0	0.0%	3	8.3%	3	7.0%
Using kickboard	0	0.0%	0	0.0%	0	0.0%
Other	2	28.6%	3	8.3%	5	11.6%
Total	**7**	**100%**	**36**	**100%**	**43**	**100%**

Figure 18.4 Activity Resulting in Girls' Swimming and Diving Injuries by Injury Diagnosis, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year



XIX. Boys' Track and Field Injury Epidemiology

Table 19.1 Boys' Track and Field Injury Rates by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

	# Injuries	# Exposures	Injury rate (per 1,000 athlete-exposures)
Total	**255**	**280,291**	**0.91**
Competition	76	50,514	1.50
Practice	179	229,777	0.78

Table 19.2 Demographic Characteristics of Injured Boys' Track and Field Athletes, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year*

Year in School	
Freshman	43 (17.1%)
Sophomore	64 (25.4%)
Junior	60 (23.8%)
Senior	85 (33.7%)
Total†	**252 (100%)**
Age (years)	
Minimum	14
Maximum	19
Mean (St. Dev.)	16.4 (1.3)
BMI	
Minimum	16.7
Maximum	36.9
Mean (St. Dev.)	23.1 (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 19.1 Diagnosis of Boys' Track and Field Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

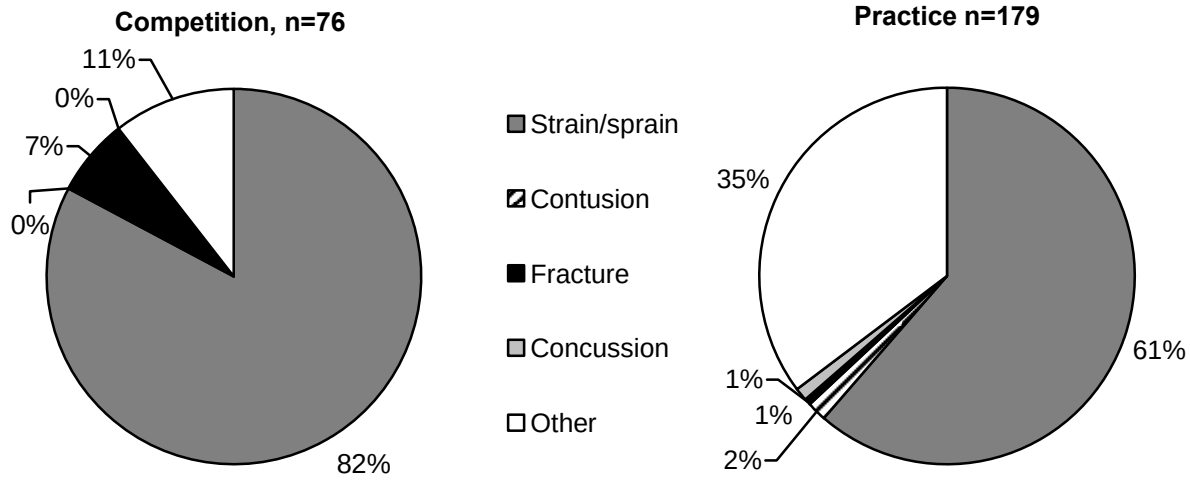


Table 19.3 Body Site of Boys' Track and Field Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

	Competition		Practice		Overall	
	n	%	n	%	n	%
Body Site						
Hip/thigh/upper leg	56	73.7%	68	38.0%	124	48.6%
Lower leg	3	3.9%	31	17.3%	34	13.3%
Knee	2	2.6%	30	16.8%	32	12.5%
Ankle	4	5.3%	16	8.9%	20	7.8%
Foot	2	2.6%	11	6.1%	13	5.1%
Trunk	2	2.6%	10	5.6%	12	4.7%
Shoulder	4	5.3%	3	1.7%	7	2.7%
Hand/wrist	3	3.9%	2	1.1%	5	2.0%
Head/face	0	0.0%	2	1.1%	2	0.8%
Arm/elbow	0	0.0%	1	0.6%	1	0.4%
Neck	0	0.0%	0	0.0%	0	0.0%
Other	0	0.0%	5	2.8%	5	2.0%
Total	**76**	**100%**	**179**	**100%**	**255**	**100%**

Table 19.4 Ten Most Common Boys' Track and Field Injury Diagnoses by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

	Competition n=76		Practice n=179		Total n=255	
	n	%	n	%	n	%
Diagnosis						
Hip/thigh/upper leg strain/sprain	51	67.1%	60	33.5%	111	43.5%
Knee other	1	1.3%	23	12.8%	24	9.4%
Ankle strain/sprain	4	5.3%	15	8.4%	19	7.5%
Lower leg strain/sprain	2	2.6%	15	8.4%	17	6.7%
Lower leg other	1	1.3%	15	8.4%	16	6.3%
Hip/thigh/upper leg other	3	3.9%	8	4.5%	11	4.3%
Knee strain/sprain	1	1.3%	7	3.9%	8	3.1%
Trunk strain/sprain	1	1.3%	6	3.4%	7	2.7%
Foot other	1	1.3%	5	2.8%	6	2.4%
Trunk other	1	1.3%	4	2.2%	5	2.0%
Foot strain/sprain	1	1.3%	4	2.2%	5	2.0%

Figure 19.2 Time Loss of Boys' Track and Field Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

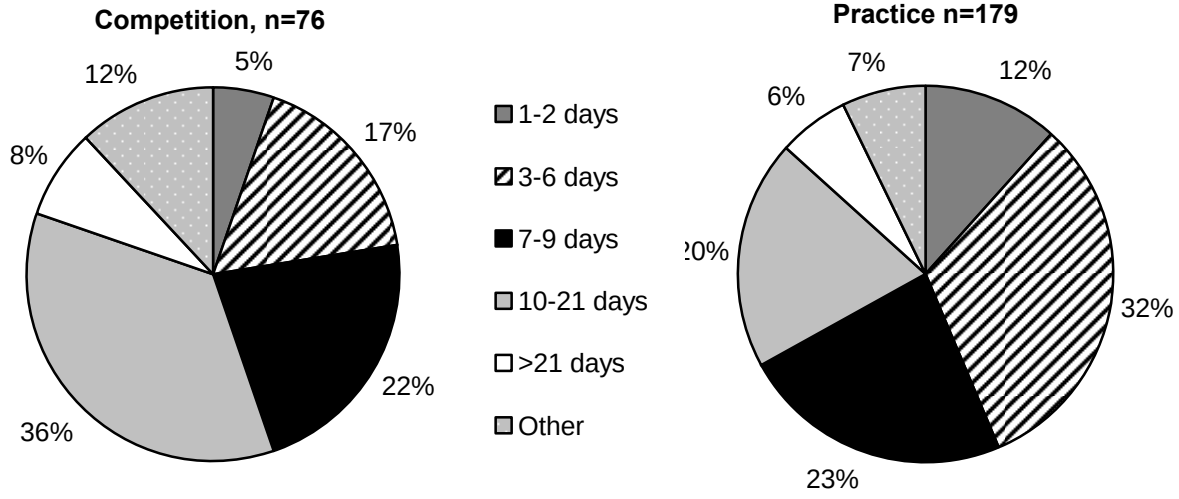


Table 19.5 Boys' Track and Field Injuries Requiring Surgery by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

	Competition		Practice		Overall	
	n	%	n	%	n	%
Need for surgery						
Required surgery	3	4.0%	3	1.7%	6	2.4%
Did not require surgery	72	96.0%	170	98.3%	242	97.6%
Total	**75**	**100%**	**173**	**100%**	**248**	**100%**

Figure 19.3 History of Boys' Track and Field Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

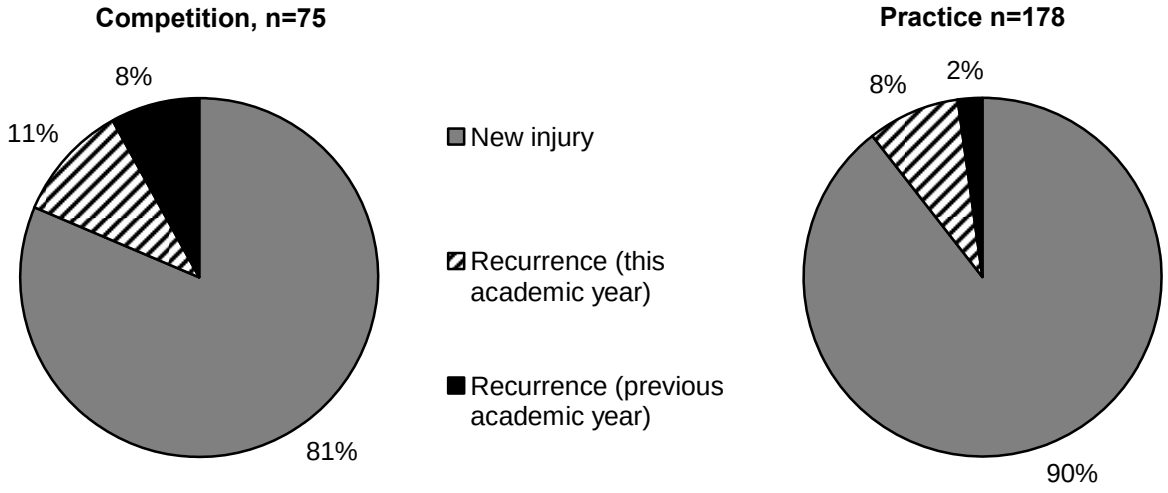


Table 19.6 Time during Season of Boys' Track and Field Injuries, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

	n	%
Time in Season		
Preseason	69	27.2%
Regular season	180	70.9%
Post season	5	2%
Total	**254**	**100%**

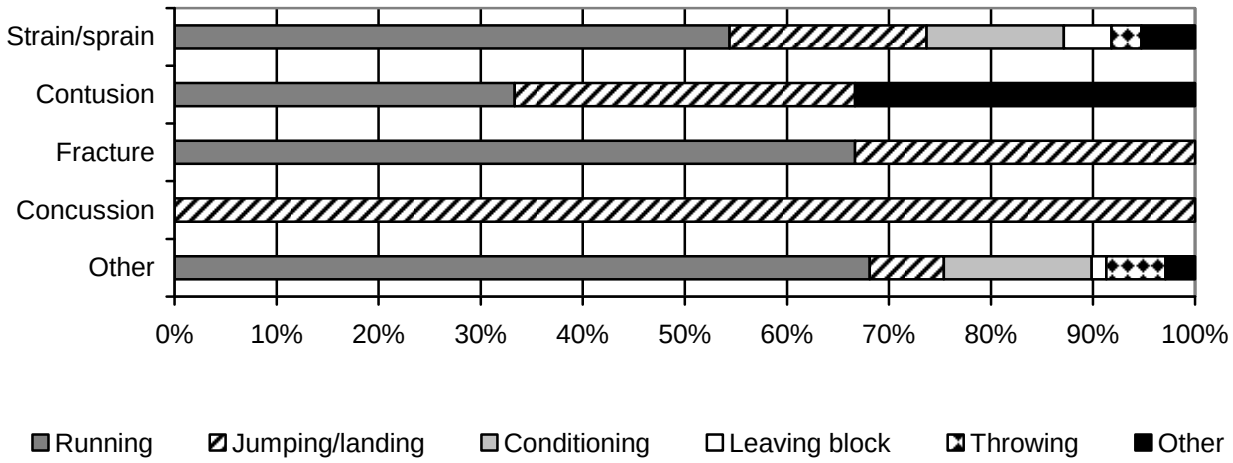
Table 19.7 Practice-Related Variables for Boys' Track and Field Injuries, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

	n	%
Time in Practice		
First 1/2 hour	17	11.6%
Second 1/2 hour	59	40.1%
1-2 hours into practice	62	42.2%
>2 hours into practice	9	6.1%
Total	**147**	**100%**

Table 19.8 Activities Leading to Boys' Track and Field Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

	Competition		Practice		Overall	
	n	%	n	%	n	%
Activity						
Running	54	72.0%	91	51.7%	145	57.8%
Jumping/landing	12	16.0%	31	17.6%	43	17.1%
Conditioning	0	0.0%	33	18.8%	33	13.1%
Leaving block	3	4.0%	6	3.4%	9	3.6%
Throwing	2	2.7%	7	4.0%	9	3.6%
Baton hand off	2	2.7%	0	0.0%	2	0.8%
Warming up	1	1.3%	0	0.0%	1	0.4%
Other	1	1.3%	8	4.5%	9	3.6%
Total	**75**	**100%**	**176**	**100%**	**251**	**100%**

Figure 19.4 Activity Resulting in Boys' Track and Field Injuries by Injury Diagnosis, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year



XX. Girls' Track and Field Injury Epidemiology

Table 20.1 Girls' Track and Field Injury Rates by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

	# Injuries	# Exposures	Injury rate (per 1,000 athlete-exposures)
Total	**237**	**224,499**	**1.06**
Competition	52	40,782	1.28
Practice	185	183,717	1.01

Table 20.2 Demographic Characteristics of Injured Girls' Track and Field Athletes, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year*

Year in School	
Freshman	76 (32.5%)
Sophomore	71 (30.3%0
Junior	44 (18.8%)
Senior	43 (18.4%)
Total†	**234 (100%)**
Age (years)	
Minimum	13
Maximum	18
Mean (St. Dev.)	15.7 (1.3)
BMI	
Minimum	14.0
Maximum	36.8
Mean (St. Dev.)	21.4 (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 20.1 Diagnosis of Girls' Track and Field Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

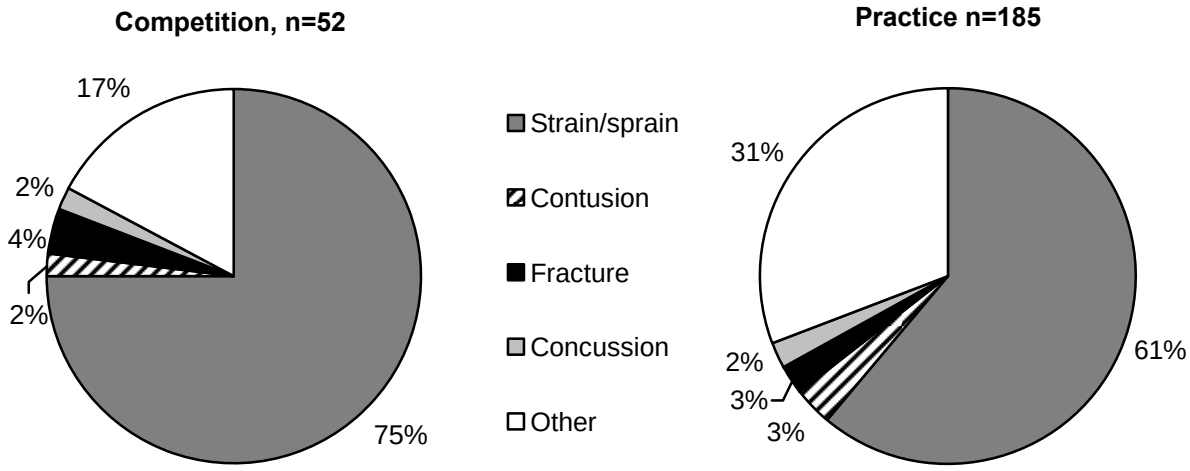


Table 20.3 Body Site of Girls' Track and Field Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

	Competition		Practice		Overall	
	n	%	n	%	n	%
Body Site						
Hip/thigh/upper leg	23	44.2%	60	32.4%	83	35.0%
Lower leg	3	5.8%	49	26.5%	52	21.9%
Knee	9	17.3%	22	11.9%	31	13.1%
Ankle	7	13.5%	14	7.6%	21	8.9%
Foot	4	7.7%	14	7.6%	18	7.6%
Trunk	0	0.0%	15	8.1%	15	6.3%
Head/face	1	1.9%	5	2.7%	6	2.5%
Shoulder	2	3.8%	2	1.1%	4	1.7%
Arm/elbow	1	1.9%	2	1.1%	3	1.3%
Neck	1	1.9%	1	0.5%	2	0.8%
Hand/wrist	0	0.0%	0	0.0%	0	0.0%
Other	1	1.9%	1	0.5%	2	0.8%
Total	**52**	**100%**	**185**	**100%**	**237**	**100%**

Table 20.4 Ten Most Common Girls' Track and Field Injury Diagnoses by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

	Competition n=52		Practice n=185		Total n=237	
	n	%	n	%	n	%
Diagnosis						
Hip/thigh/upper leg strain/sprain	19	36.5%	57	30.8%	76	32.1%
Lower leg other	0	0.0%	28	15.1%	28	11.8%
Lower leg strain/sprain	2	3.8%	19	10.3%	21	8.9%
Ankle strain/sprain	6	11.5%	12	6.5%	18	7.6%
Knee strain/sprain	7	13.5%	8	4.3%	15	6.3%
Knee other	2	3.8%	13	7.0%	15	6.3%
Trunk strain/sprain	0	0.0%	9	4.9%	9	3.8%
Foot strain/sprain	2	3.8%	6	3.2%	8	3.4%
Foot other	1	1.9%	6	3.2%	7	3.0%
Head/face concussion	1	1.9%	4	2.2%	5	2.1%
Hip/thigh/upper leg other	3	5.8%	2	1.1%	5	2.1%

Figure 20.2 Time Loss of Girls' Track and Field Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

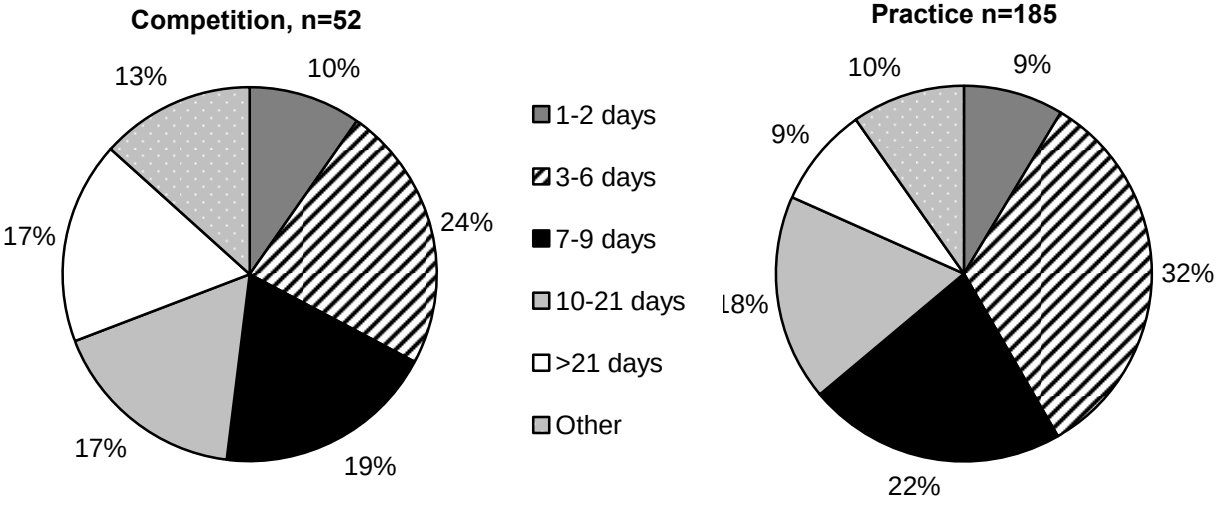


Table 20.5 Girls' Track and Field Injuries Requiring Surgery by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

	Competition		Practice		Overall	
	n	%	n	%	n	%
Need for surgery						
Required surgery	3	6.1%	3	1.6%	6	2.6%
Did not require surgery	46	93.9%	179	98.4%	225	97.4%
Total	**49**	**100%**	**182**	**100%**	**231**	**100%**

Figure 20.3 History of Girls' Track and Field Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

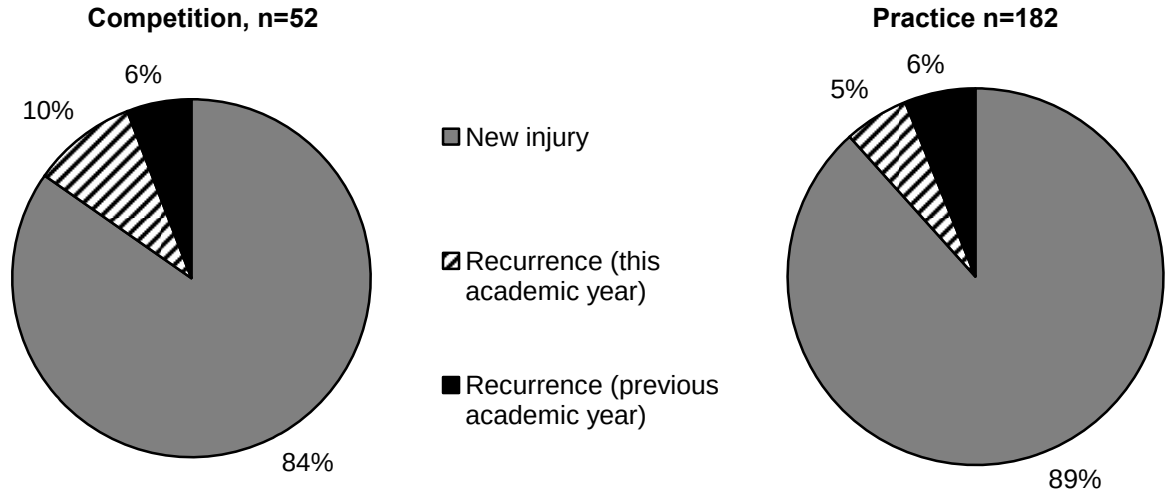


Table 20.6 Time during Season of Girls' Track and Field Injuries, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

	n	%
Time in Season		
Preseason	76	32.2%
Regular season	158	66.9%
Post season	2	0.8%
Total	**236**	**100%**

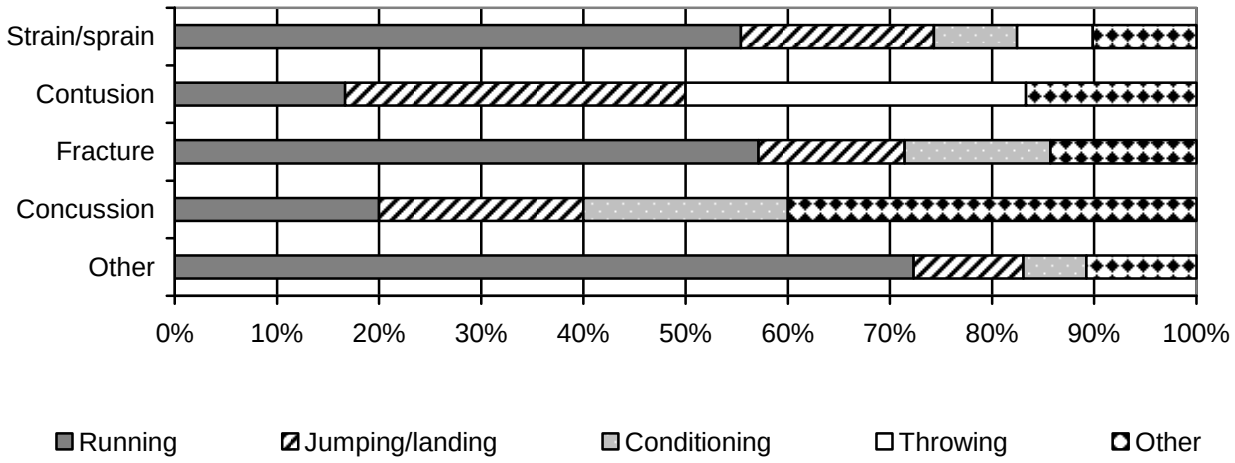
Table 20.7 Practice-Related Variables for Girls' Track and Field Injuries, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

	n	%
Time in Practice		
First 1/2 hour	17	11.0%
Second 1/2 hour	53	34.4%
1-2 hours into practice	73	47.4%
>2 hours into practice	11	7.1%
Total	**154**	**100%**

Table 20.8 Activities Leading to Girls' Track and Field Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

	Competition		Practice		Overall	
	n	%	n	%	n	%
Activity						
Running	24	46.2%	111	62.0%	135	58.4%
Jumping/landing	16	30.8%	23	12.8%	39	16.9%
Conditioning	0	0.0%	18	10.1%	18	7.8%
Throwing	6	11.5%	7	3.9%	13	5.6%
Leaving block	2	3.8%	4	2.2%	6	2.6%
Warming up	3	5.8%	2	1.1%	5	2.2%
Baton hand off	0	0.0%	1	0.6%	1	0.4%
Other	1	1.9%	13	7.3%	14	6.1%
Total	**52**	**100%**	**179**	**100%**	**231**	**100%**

Figure 20.4 Activity Resulting in Girls' Track and Field Injuries by Injury Diagnosis, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year



XXI. Gender Differences within Sports

21.1 Boys' and Girls' Soccer

Table 21.1 Comparison of Boys' and Girls' Soccer Injury Rates, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

	Boys' soccer	Girls' soccer*	RR (95% CI)†
Total	1.64	2.26	**1.38 (1.22-1.55)**
Competition	3.54	4.75	**1.34 (1.15-1.56)**
Practice	0.82	1.18	**1.44 (1.17-1.77)**

*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 21.10 Comparison of Body Sites of Boys' and Girls' Soccer Injuries, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

	Boys' soccer	Girls' soccer	IPR (95% CI)
Body Site			
Ankle	19.0%	**19.3%**	1.02 (0.79-1.39)
Knee	13.1%	**18.0%**	1.39 (1.03-1.85)
Head/face	14.6%	**16.8%**	1.15 (0.87-1.53)
Hip/thigh/upper leg	**19.2%**	17.1%	1.12 (0.87-1.46)
Hand/wrist	**4.6%**	2.7%	1.72 (0.90-3.27)
Shoulder	**3.8%**	2.3%	**1.62 (0.80-3.27)**
Trunk	**5.7%**	4.1%	1.38 (0.80-2.37)
Lower leg	**10.1%**	7.9%	1.28 (0.87-1.89)
Arm/elbow	1.3%	**2.2%**	1.71 (0.65-4.52)
Foot	**7.8%**	6.8%	1.14 (0.74-1.76)
Neck	0.4%	**1.3%**	**2.99 (0.62-14.32)**
Other	0.4%	**1.4%**	3.42 (0.73-16.00)
Total	**100%**	**100%**	---

Table 21.11 Comparison of Diagnoses of Boys' and Girls' Soccer Injuries, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

	Boys' soccer	Girls' soccer	IPR (95% CI)
Diagnosis			
Strain/sprain	47.0%	**53.3%**	1.13 (1.00-1.28)
Contusion	**16.7%**	10.1%	1.65 (1.20-2.27)
Fracture	**11.4%**	7.0%	**1.62 (1.09-2.40)**
Concussion	10.3%	**14.8%**	1.43 (1.03-1.99)
Other	14.6%	**14.8%**	1.02 (0.76-1.36)
Total	**100%**	**100%**	---

Table 21.12 Most Common Boys' and Girls' Soccer Injury Diagnoses*, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

	Boys' soccer	Girls' soccer	IPR (95% CI)
Diagnosis			
Ankle strain/sprain	16.9%	**18.2%**	1.08 (0.83-1.41)
Hip/thigh/upper leg strain/sprain	**16.0%**	15.9%	1.01 (0.76-1.34)
Head/face concussion	10.3%	**14.8%**	**1.43 (1.03-1.99)**
Knee strain/sprain	6.1%	**9.0%**	**1.48 (0.95-2.30)**
Knee other	2.5%	**6.8%**	**2.71 (1.43-5.12)**

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

Table 21.13 Comparison of Time Loss of Boys' and Girls' Soccer Injuries, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

	Boys' soccer	Girls' soccer	IPR (95% CI)
Time Loss			
1-2 days	**19.6%**	14.6%	**1.34 (1.03-1.98)**
3-6 days	**28.7%**	26.5%	1.08 (0.89-1.32)
7-9 days	14.8%	**16.9%**	1.15 (0.86-1.52)
10-21 days	16.7%	**18.6%**	1.11 (0.85-1.45)
22 days or more	**10.1%**	9.9%	1.02 (0.71-1.48)
Other	10.1%	**13.5%**	1.33 (0.95-1.88)
Total	**100%**	**100%**	---

Table 21.14 Comparison of Mechanisms of Boys' and Girls' Soccer Injuries, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

	Boys' soccer	Girls' soccer	IPR (95% CI)
Soccer Mechanism			
Contact with another player	**31.9%**	28.7%	1.11 (0.92-1.34)
Overuse, heat illness, conditioning, etc.	14.6%	**18.3%**	1.25 (0.94-1.66)
Stepped on/fell on/kicked	11.8%	**12.6%**	1.07 (0.76-1.49)
Rotation around a planted foot/inversion	10.0%	**12.8%**	1.27 (0.89-1.81)
Contact with ball	**11.8%**	11.3%	1.05 (0.74-1.48)
Uneven playing surface	**6.8%**	4.8%	1.12 (0.59-2.11)
Slide tackle	**3.9%**	3.5%	1.41 (0.85-2.34)
Contact with goal	**0.9%**	0.0%	---
Other	**8.3%**	8.1%	1.02 (0.67-1.55)
Total	**100%**	**100%**	---

Table 21.15 Comparison of Activities of Boys' and Girls' Soccer Injuries, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

	Boys' soccer	Girls' soccer	IPR (95% CI)
Soccer Activity			
General play	20.4%	**28.5%**	1.40 (1.11-1.75)
Defending	11.0%	**14.0%**	1.28 (0.92-1.79)
Chasing loose ball	**11.0%**	10.5%	1.04 (0.73-1.49)
Ball handling/dribbling	**11.4%**	10.5%	1.08 (0.76-1.54)
Goaltending	**9.4%**	7.0%	1.34 (0.88-2.04)
Shooting (foot)	**7.0%**	5.9%	1.19 (0.74-1.91)
Heading ball	**6.1%**	4.3%	1.44 (0.84-2.47)
Passing (foot)	**6.8%**	3.3%	**2.04 (1.16-3.60)**
Receiving pass	4.6%	**5.0%**	1.08 (0.62-1.89)
Other	**12.3%**	5.7%	0.89 (0.63-1.25)
Total	**100%**	**100%**	---

21.2 Boys' and Girls' Basketball

Table 21.2 Comparison of Boys' and Girls' Basketball Injury Rates, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

	Boys' basketball	Girls' basketball	RR (95% CI)*
Total	1.46	**1.64**	0.89 (0.78-1.02)
Competition	2.47	**3.37**	**1.36 (1.14-1.63)**
Practice	**1.04**	0.90	1.16 (0.95-1.42)

Table 21.20 Comparison of Body Sites of Boys' and Girls' Basketball Injuries, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

	Boys' basketball	Girls' basketball	IPR (95% CI)
Body Site			
Ankle	**35.3%**	31.2%	1.13 (0.94-1.37)
Knee	9.8%	**18.6%**	1.89 (1.35-2.67)
Head/face	16.3%	**19.3%**	1.18 (0.89-1.57)
Hip/thigh/upper leg	**7.2%**	5.0%	1.44 (0.85-2.45)
Hand/wrist	**9.6%**	8.1%	1.18 (0.77-1.82)
Shoulder	**3.7%**	3.3%	1.11 (0.56-2.23)
Trunk	**4.4%**	3.8%	1.14 (0.60-2.18)
Lower leg	2.8%	**4.5%**	**1.60 (0.80-3.19)**
Arm/elbow	**3.5%**	0.7%	**4.88 (1.43-16.63)**
Foot	**5.7%**	3.6%	1.59 (0.85-2.95)
Neck	0.2%	**0.7%**	3.28 (0.34-31.40)
Other	**1.5%**	1.2%	1.28 (0.41-4.01)
Total	**100%**	**100%**	---

Table 21.21 Comparison of Diagnoses of Boys' and Girls' Basketball Injuries, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

	Boys' basketball	Girls' basketball	IPR (95% CI)
Diagnosis			
Strain/sprain	48.8%	**55.7%**	1.14 (1.01-1.30)
Contusion	**10.7%**	5.2%	2.04 (1.25-3.31)
Fracture	**12.2%**	8.1%	1.51 (1.01-2.26)
Concussion	6.5%	**14.3%**	**2.19 (1.44-3.32)**
Other	**21.8%**	16.7%	1.31 (0.99-1.72)
Total	**100%**	**100%**	---

Table 21.22 Most Common Boys' and Girls' Basketball Injury Diagnoses*, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

	Boys' basketball	Girls' basketball	IPR (95% CI)
Diagnosis			
Ankle strain/sprain	**33.8%**	29.8%	1.14 (0.93-1.38)
Head/face concussion	6.5%	**14.3%**	**2.19 (1.44-3.32)**
Knee strain/sprain	3.1%	**11.2%**	**3.67 (2.05-6.57)**
Head/face other	**5.4%**	3.1%	1.76 (0.91-3.39)
Knee other	**5.0%**	4.8%	1.05 (0.59-1.89)

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

Table 21.23 Comparison of Time Loss of Boys' and Girls' Basketball Injuries, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

	Boys' basketball	Girls' basketball	IPR (95% CI)
Time Loss			
1-2 days	**20.9%**	12.6%	**1.66 (1.22-2.26)**
3-6 days	24.4%	**26.2%**	1.07 (0.86-1.35)
7-9 days	15.5%	**19.8%**	1.28 (0.96-1.70)
10-21 days	18.1%	**20.0%**	1.11 (0.84-1.45)
22 days or more	**13.3%**	9.0%	**1.47 (1.00-2.15)**
Other	7.8%	**12.4%**	1.58 (1.05-2.36)
Total	**100%**	**100%**	---

Table 21.24 Comparison of Mechanisms of Boys' and Girls' Basketball Injuries, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

	Boys' basketball	Girls' basketball	IPR (95% CI)
Basketball Mechanism			
Collision with another player	**30.0%**	25.5%	1.18 (0.95-1.46)
Jumping/landing	**25.7%**	19.0%	1.35 (1.05-1.74)
Overuse, heat illness, conditioning, etc.	7.7%	**10.3%**	1.35 (0.88-2.06)
Rotation around a planted foot/inversion	10.5%	**16.6%**	1.58 (1.12-2.22)
Stepped on/fell on/kicked	**9.2%**	8.9%	1.04 (0.68-1.58)
Contact with ball	3.5%	**6.0%**	**1.71 (0.93-3.16)**
Other	13.4%	**13.7%**	1.02 (0.73-1.43)
Total	**100%**	**100%**	---

Table 21.25 Comparison of Activities of Boys' and Girls' Basketball Injuries, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

	Boys' basketball	Girls' basketball	IPR (95% CI)
Basketball Activity			
Rebounding	**26.1%**	21.0%	1.24 (0.97-1.82)
General play	**21.8%**	20.8%	1.05 (0.81-1.36)
Chasing loose ball	**12.5%**	11.1%	1.12 (0.78-1.62)
Defending	12.2%	**14.7%**	1.20 (0.86-1.69)
Shooting	**10.7%**	7.7%	1.38 (0.90-2.12)
Ball handling/dribbling	6.9%	**8.5%**	1.22 (0.77-1.95)
Receiving pass	2.7%	**6.8%**	**2.53 (1.30-4.91)**
Conditioning	2.4%	**4.3%**	**1.78 (0.85-3.71)**
Other	4.7%	**5.1%**	1.09 (0.60-1.96)
Total	**100%**	**100%**	---

21.3 Boys' Baseball and Girls' Softball

Table 21.3 Comparison of Baseball and Softball Injury Rates, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

	Baseball	Softball	RR (95% CI)
Total	0.82	**1.22**	**1.49 (1.24-1.81)**
Competition	1.33	**1.90**	**1.43 (1.11-1.85)**
Practice	0.55	**0.87**	**1.59 (1.19-2.11)**

Table 21.30 Comparison of Body Sites of Baseball and Softball Injuries, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

	Baseball	Softball	IPR (95% CI)
Body Site			
Ankle	8.1%	**14.1%**	**1.74 (0.98-3.07)**
Knee	3.6%	**11.9%**	**3.35 (1.49-7.52)**
Head/face	**20.8%**	18.9%	1.10 (0.75-1.61)
Hip/thigh/upper leg	**10.2%**	8.4%	1.21 (0.67-2.21)
Hand/wrist	14.2%	**21.6%**	1.52 (1.00-2.32)
Shoulder	**17.3%**	7.0%	**2.45 (1.40-4.30)**
Trunk	**4.6%**	4.0%	1.15 (0.47-2.85)
Lower leg	**5.1%**	4.0%	1.28 (0.53-3.09)
Arm/elbow	**10.7%**	7.0%	1.51 (0.81-2.82)
Foot	**3.6%**	2.2%	1.61 (0.52-5.00)
Neck	**1.0%**	0.9%	1.15 (0.16-8.10)
Other	**1.0%**	0.0%	**---**
Total	**100%**	**100%**	---

Table 21.31 Comparison of Diagnoses of Baseball and Softball Injuries, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

	Baseball	Softball	IPR (95% CI)
Diagnosis			
Strain/sprain	**42.1%**	39.2%	1.08 (0.85-1.35)
Contusion	15.2%	**18.9%**	1.24 (0.81-1.90)
Fracture	**15.7%**	13.2%	1.19 (0.75-1.89)
Concussion	5.6%	**12.8%**	**2.29 (1.17-4.46)**
Other	**21.3%**	15.9%	1.34 (0.90-2.01)
Total	**100%**	**100%**	---

Table 21.32 Most Common Baseball and Softball Injury Diagnoses*, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

	Baseball	Softball	IPR (95% CI)
Diagnosis			
Head/face concussion	5.6%	**12.8%**	**2.29 (1.17-4.46)**
Ankle strain/sprain	7.6%	**12.3%**	1.62 (0.89-2.94)
Hand/wrist fracture	6.6%	**9.7%**	1.47 (0.76-2.84)
Shoulder strain/sprain	**9.6%**	0.0%	**---**
Hip/thigh/upper leg strain/sprain	**8.1%**	6.2%	1.32 (0.66-2.63)

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

Table 21.33 Comparison of Time Loss of Baseball and Softball Injuries, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

	Baseball	Softball	IPR (95% CI)
Time Loss			
1-2 days	**18.0%**	17.6%	1.01 (0.61-1.67)
3-6 days	27.3%	**30.0%**	1.11 (0.82-1.51)
7-9 days	**18.6%**	14.5%	**1.26 (0.82-1.94)**
10-21 days	**17.5%**	15.0%	1.15 (0.75-1.78)
22 days or more	**12.4%**	11.5%	1.06 (0.63-1.79)
Other	6.2%	**11.5%**	**1.50 (0.82-2.76)**
Total	**100%**	**100%**	---

Table 21.34 Comparison of Mechanisms of Baseball and Softball Injuries, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

	Baseball	Softball	IPR (95% CI)
Baseball/Softball Mechanism			
Overuse, heat illness, conditioning, etc.	**11.7%**	10.9%	1.08 (0.63-1.85)
Contact with another player	11.7%	**14.5%**	1.23 (0.75-2.04)
Contact with bases	10.2%	**10.9%**	1.06 (0.61-1.87)
Throwing - not pitching	**5.6%**	3.6%	1.55 (0.64-3.78)
Throwing - pitching	**8.2%**	4.1%	**2.01 (0.91-4.43)**
Contact with thrown ball (non-pitch)	8.2%	**12.7%**	**1.55 (0.87-2.78)**
Rotation around a planted foot/inversion	4.6%	**7.2%**	**1.58 (0.71-3.49)**
Hit by batted ball (line drive)	**15.3%**	8.1%	1.88 (1.08-3.26)
Hit by pitch	4.1%	**7.7%**	1.89 (0.83-4.27)
Other	**20.4%**	20.3%	1.00 (0.69-1.47)
Total	**100%**	**100%**	---

Table 21.35 Comparison of Activities of Baseball and Softball Injuries, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

	Baseball	Softball	IPR (95% CI)
Baseball/Softball Activity			
Running bases	**17.5%**	10.5%	1.68 (1.02-2.74)
Fielding	**24.8%**	23.2%	1.07 (0.76-1.51)
Throwing (not pitching)	**6.7%**	6.4%	1.05 (0.51-2.19)
Pitching	**13.9%**	6.4%	2.19 (1.18-4.05)
Catching	2.1%	**11.4%**	**5.51 (1.95-15.56)**
Sliding	9.3%	**13.6%**	1.47 (0.85-2.55)
Batting	**12.4%**	11.4%	1.09 (0.64-1.84)
Conditioning	1.0%	**3.2%**	**3.09 (0.65-14.68)**
General play	**7.7%**	7.3%	1.06 (0.54-2.09)
Other	4.6%	**6.6%**	1.47 (0.66-3.28)
Total	**100%**	**100%**	---

21.4 Boys' and Girls' Swimming

Table 21.4 Comparison of Boys' and Girls' Swimming Injury Rates, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

	Boys' swimming	Girls' swimming*	RR (95% CI)†
Total	0.20	**0.34**	**1.73 (1.04-2.86)**
Competition	0.14	**0.32**	**2.36 (0.63-8.89)**
Practice	0.21	**0.34**	**1.63 (0.95-2.82)**

*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 21.40 Comparison of Body Sites of Boys' and Girls' Swimming and Diving Injuries, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

	Boys' swimming	Girls' swimming	IPR (95% CI)
Body Site			
Shoulder	39.1%	**54.5%**	1.39 (0.78-2.48)
Head/face	**13.0%**	9.1%	1.44 (0.35-5.87)
Trunk	**17.4%**	9.1%	1.91 (0.53-6.96)
Hip/thigh/upper leg	0.0%	**6.8%**	---
Arm/elbow	4.3%	**6.8%**	1.57 (0.17-14.24)
Knee	**13.0%**	4.5%	**2.87 (0.52-15.97)**
Neck	0.0%	**2.3%**	---
Lower leg	**8.7%**	0.0%	---
Foot	**4.3%**	0.0%	---
Ankle	0.0%	0.0%	---
Hand/wrist	0.0%	0.0%	---
Other	0.0%	**6.8%**	---
Total	**100%**	**100%**	**---**

Table 21.41 Comparison of Diagnoses of Boys' and Girls' Swimming Injuries, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

	Boys' swimming	Girls' swimming	IPR (95% CI)
Diagnosis			
Strain/sprain	34.8%	**40.9%**	1.18 (0.61-2.28)
Concussion	4.3%	**6.8%**	**1.57 (0.17-14.24)**
Contusion	0.0%	**2.3%**	---
Fracture	0.0%	0.0%	---
Other	**60.9%**	50.0%	0.82 (0.53-1.28)
Total	**100%**	**100%**	---

Table 21.42 Most Common Boys' and Girls' Swimming Injury Diagnoses*, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

	Boys' swimming	Girls' swimming	IPR (95% CI)
Diagnosis			
Shoulder strain/sprain	17.4%	**27.3%**	1.57 (0.57-4.32)
Shoulder other	21.7%	**27.3%**	1.26 (0.50-3.13)
Knee other	**13.0%**	2.3%	**5.74 (0.63-52.12)**
Trunk strain/sprain	**13.0%**	4.5%	**2.87 (0.52-15.97)**
Lower leg other	**8.7%**	0.0%	---

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

Table 21.43 Comparison of Time Loss of Boys' and Girls' Swimming Injuries, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

	Boys' swimming	Girls' swimming	IPR (95% CI)
Time Loss			
1-2 days	**26.1%**	9.1%	**2.87 (0.90-9.16)**
3-6 days	**39.1%**	27.3%	1.44 (0.71-2.90)
7-9 days	21.7%	**34.1%**	1.57 (0.65-3.77)
10-21 days	8.7%	**22.7%**	**2.61 (0.62-10.94)**
22 days or more	0.0%	0.0%	---
Other	4.3%	**6.8%**	1.50 (0.82-2.76)
Total	**100%**	**100%**	---

Table 21.44 Comparison of Mechanisms of Boys' and Girls' Swimming and Diving Injuries, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

	Boys' swimming	Girls' swimming	IPR (95% CI)
Swimming Mechanism			
Overuse, heat illness, hypothermia, conditioning, etc.	**68.2%**	**68.2%**	1.00 (0.71-1.42)
Contact with another person	**9.1%**	2.3%	**4.00 (0.38-41.74)**
Contact with deck	**4.5%**	2.3%	2.00 (0.13-30.49)
Contact with board	**13.6%**	0.0%	---
Contact with wall	0.0%	**11.4%**	---
Other	4.5%	**15.9%**	3.50 (0.47-27.36)
Total	**100%**	**100%**	**---**

Table 21.45 Comparison of Activities of Boys' and Girls' Swimming and Diving Injuries, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

	Boys' swimming	Girls' swimming	IPR (95% CI)
Swimming Activity			
Swimming	56.5%	**69.8%**	1.23 (0.82-1.86)
Flip turn off wall	**17.4%**	7.0%	**2.49 (0.61-10.20)**
Diving off board/platform/block	**17.4%**	2.3%	**7.48 (0.89-63.06)**
Touch turn off wall	4.3%	**9.3%**	**2.14 (0.25-18.04)**
Start	0.0%	0.0%	---
Using kickboard	0.0%	0.0%	---
Other	4.3%	**11.6%**	0.37 (0.05-3.01)
Total	**100%**	**100%**	---

21.5 Boys' and Girls' Track and Field

Table 21.5 Comparison of Boys' and Girls' Track and Field Injury Rates, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

	Boys' track	Girls' track*	RR (95% CI)†
Total	0.91	**1.06**	**0.86 (0.72-1.03)**
Competition	**1.50**	1.28	**1.18 (0.83-1.68)**
Practice	0.78	**1.01**	**1.29 (1.05-1.59)**

*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 21.50 Comparison of Body Sites of Boys' and Girls' Track and Field Injuries, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

	Boys' track	Girls' track	IPR (95% CI)
Body Site			
Ankle	7.8%	**8.9%**	1.13 (0.63-20.3)
Knee	12.5%	**13.1%**	1.04 (0.66-1.65)
Head/face	0.8%	**2.5%**	**3.23 (0.66-15.84)**
Hip/thigh/upper leg	**48.6%**	35.0%	1.39 (1.12-1.72)
Shoulder	**2.7%**	1.7%	1.63 (0.48-5.49)
Trunk	4.7%	**6.3%**	1.35 (0.64-2.81)
Lower leg	13.3%	**21.9%**	1.65 (1.11-2.44)
Arm/elbow	0.4%	**1.3%**	**3.23 (0.34-30.82)**
Foot	5.1%	**7.6%**	1.49 (0.75-2.97)
Hand/wrist	**2.0%**	0.0%	---
Neck	0.0%	**0.8%**	---
Other	**2.0%**	0.8%	2.32 (0.46-11.86)
Total	**100%**	**100%**	---

Table 21.51 Comparison of Diagnoses of Boys' and Girls' Track and Field Injuries, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

	Boys' track	Girls' track	IPR (95% CI)
Diagnosis			
Strain/sprain	**67.8%**	64.1%	1.06 (0.93-1.20)
Contusion	1.2%	**3.0%**	2.51 (0.66-9.60)
Fracture	2.4%	**3.0%**	1.26 (0.43-3.68)
Concussion	0.8%	**2.1%**	**2.69 (0.53-13.73)**
Other	27.8%	27.8%	---
Total	**100%**	**100%**	---

Table 21.52 Most Common Boys' and Girls' Track and Field Injury Diagnoses*, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

	Boys' track	Girls' track	IPR (95% CI)
Diagnosis			
Hip/thigh/upper leg strain/sprain	**43.5%**	32.1%	1.36 (1.08-1.71)
Lower leg other	6.3%	**11.8%**	**1.88 (1.05-3.39)**
Knee other	**9.4%**	6.3%	1.49 (0.80-2.77)
Lower leg strain/sprain	6.7%	**8.9%**	1.33 (0.72-2.46)
Ankle strain/sprain	7.5%	**7.6%**	1.02 (0.55-1.90)

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

Table 21.53 Comparison of Time Loss of Boys' and Girls' Track and Field Injuries, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

	Boys' track	Girls' track	IPR (95% CI)
Time Loss			
1-2 days	**9.8%**	8.9%	1.06 (0.61-1.86)
3-6 days	27.5%	**30.8%**	1.12 (0.85-1.48)
7-9 days	**23.1%**	21.5%	1.08 (0.77-1.50)
10-21 days	**24.3%**	17.7%	1.37 (0.97-1.95)
22 days or more	6.7%	**10.5%**	1.58 (0.88-2.86)
Other	8.6%	**10.5%**	1.22 (0.71-2.11)
Total	**100%**	**100%**	---

Table 21.54 Comparison of Mechanisms of Boys' and Girls' Track and Field Injuries, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

	Boys' track	Girls' track	IPR (95% CI)
Track Mechanism			
Overuse, heat illness, conditioning, etc.	**56.0%**	51.5%	1.09 (0.92-1.28)
Contact with ground	**11.9%**	10.5%	1.14 (0.69-1.88)
Contact with field equipment (e.g. hurdle, shot put, crossbar, etc.)	4.0%	**4.8%**	1.21 (0.52-2.80)
Rotation around planted foot/inversion	5.2%	**8.3%**	**1.61 (0.81-3.18)**
Fall/trip	3.6%	**3.9%**	1.10 (0.45-2.72)
Uneven playing surface	0.8%	**0.9%**	1.10 (0.16-7.75)
Other	18.7%	**20.1%**	1.08 (0.75-1.55)
Total	**100%**	**100%**	---

Table 21.55 Comparison of Activities of Boys' and Girls' Track and Field Injuries, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

	Boys' track	Girls' track	IPR (95% CI)
Track Activity			
Running	57.8%	**58.4%**	1.01 (0.87-1.18)
Jumping/landing	**17.1%**	16.9%	1.02 (0.68-1.51)
Conditioning	**13.1%**	7.8%	**1.69 (0.98-2.91)**
Throwing	3.6%	**5.6%**	1.57 (0.68-3.60)
Leaving block	**3.6%**	2.6%	1.38 (0.50-3.82)
Warming up	0.4%	**2.2%**	**5.43 (0.64-46.16)**
Baton hand off	**0.8%**	0.4%	1.84 (0.17-20.16)
Other	3.6%	**6.1%**	1.57 (0.68-3.60)
Total	**100%**	**100%**	---

XXII. Reporter Demographics & Compliance

During the 2008-09 school year, 100 ATCs were invited to participate in the study at the beginning of the school year. In addition, 21 ATCs were invited to participate during the school year to replace a previously enrolled ATC who was no longer able to participate. ATCs were expected to report for every week in which they were enrolled. For example, an ATC who joined the study as a replacement school in week 10 was not expected to report for weeks 1-9. Overall, 71 ATCs were enrolled in the study. Sixty-eight ATCs, who actually reported data, reported an average of 39 study weeks. The majority of ATCs (73%) reported all the weeks during which they were enrolled, with only 11 ATCs (15%) missing over 10 weeks. Internal validity checks yielded 100% sensitivity, 99.6% specificity, a positive predictive value of 96.7%, and a negative predictive value of 100%.

Prior to the start of the 2008-09 High School RIO™ study, participating ATCs were asked to complete a short demographics survey. Three-quarters (83%) of participating high schools were public schools, with the remainder being private. All but 1 participating ATC provided services to athletes of their high school on 5 or more days each week.

An online "End of Season" survey gave all participating ATCs (both in the original study as well as in the expanded study) the opportunity to provide feedback on their experiences with High School RIO™. This survey was completed by 110 ATCs (64%). Average reporting time burdens were 17 minutes for the weekly exposure report and 7 minutes for the injury report form. Using a 5 point Likert scale, RIO™ was overwhelmingly reported to be either very easy (62.7%) or somewhat easy (30.9%) to use (5 and 4 on the Likert scale, respectively), with ATCs being either very satisfied (64.5%) or somewhat satisfied (31.8%) with the study (5 and 4 on the Likert scale, respectively). Suggestions provided by ATCs, such as the addition or clarification

of questions or answer choices, will used to improve the National High School Sports-Related Injury Surveillance Study for the 2009-10 school year.

XXIII. 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.