



THE CENTER FOR INJURY RESEARCH AND POLICY HIGH SCHOOL RIO™

Each year, over 7 million children pursue their athletic dreams by participating in high school sports. Unfortunately, these children suffer an alarming 1.4 million injuries, many of which could be prevented. Dr. R. Dawn Comstock, an epidemiologist and Principal Investigator in the Center for Injury Research and Policy, has developed an innovative injury surveillance system to capture important injury data to protect children from sports injuries.



**REPORTING
INFORMATION
ONLINE**

This system is known as High School RIO™ (Reporting Information Online). It is one of

many studies under the RIO™ umbrella designed to track both injury rates and patterns of injury. By studying and understanding the “What, why, and how” of high school sports injuries, Dr. Comstock and her team recommend strategies to make participation in sports safer, ultimately preventing injuries from occurring.

High School RIO™ study findings encourages:

- Safe Play
- Increased Activity
- Physical Fitness
- Life Long Healthy Behaviors

How the System Works

Certified athletic trainers from across the country serve as study reporters submitting injury and participation data weekly through an easily navigated website. This essential data is analyzed and allows researchers to track trends over time. We can then provide data to the National Federation of State High School (NFHS) Associations’ Sports Medical Advisory and Rules Committees and other organizations to allow them to make evidence based decisions on injury prevention efforts and policies.

Potential injury prevention solutions include:

- Sport Specific Rule Changes
- Improved Protective Equipment
- Educational Programs

Sports Included

High School RIO™ is a completely adaptable program. It can be enhanced to include any number of sporting activities. Currently, the following popular high school sports are being tracked in the system:

Boys’ Sports

- Football
- Soccer
- Basketball
- Wrestling
- Baseball
- Cheerleading
- Ice Hockey

- Lacrosse
- Volleyball
- Swimming & Diving
- Track & Field

Girls’ Sports

- Soccer
- Volleyball
- Basketball
- Softball
- Field Hockey
- Cheerleading

- Gymnastics
- Lacrosse
- Swimming & Diving
- Track & Field

Sports Injuries Can Be Prevented

Healthy athletes are healthy children. As our country faces an increasing obesity crisis, it is crucial that we protect and encourage children’s ability to be active. Injuries are not a price you must pay to play sports. We can improve equipment, change rules, and provide education to reduce the risk of injury. Protection can happen through effective change that stems from accurate data collected over a period of time.

High School RIO™ is the only injury surveillance tool currently available that tracks high school sports-related injuries nationwide. We invite you to support the continuation of High School RIO™ research to help prevent unnecessary sports injuries in our youth. Your donation will make a lasting positive difference in the way high school sports are played.

SUMMARY REPORT

NATIONAL HIGH SCHOOL SPORTS-RELATED INJURY SURVEILLANCE STUDY

2007-2008 School Year

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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. We would also like to acknowledge the generous research funding contributions of DonJoy Orthotics, EyeBlack, the Nationwide Children's Hospital Foundation, and the Centers for Disease Control and Prevention.

Note

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

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I. Introduction & Methodology

1.1 Project Overview

To combat the epidemic of obesity among youth in the United States (US), adolescents must be encouraged to get up off the couch and participate in physically active sports, recreation, and leisure activities. Participation in high school sports, one of the most popular physical activities among adolescents, has grown rapidly from an estimated 4.0 million participants in 1971-72 to an estimated 7.0 million in 2007-08. While the health benefits of a physically active lifestyle including participating in sports are undeniable, high school athletes are at risk of sports-related injury because a certain endemic level of injury can be expected among participants of any physical activity. The challenge to injury epidemiologists is to reduce injury rates among high school athletes to the lowest possible level without discouraging adolescents from engaging in this important form of physical activity. This goal can best be accomplished by investigating the etiology of preventable injuries; by developing, implementing, and evaluating protective interventions using such science-based evidence; and by responsibly reporting epidemiologic findings while promoting a physically active lifestyle among adolescents.

1.2 Background and Significance

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

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

Since the 2005-06 school year, Dr. R. Dawn Comstock has conducted the National High School Sports-Related Injury Surveillance System to monitor injuries among US high school athletes participating in boys' football, boys' and girls' soccer, girls' volleyball, boys' and girls' basketball, boys' wrestling, boys' baseball, and girls' softball. This surveillance has been conducted using the time- and cost-efficient RIO™ (Reporting Information Online) surveillance system. 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 DonJoy Orthotics and EyeBlack, the National High School Sports-Related Injury Surveillance System was able to be continued during the 2007-08 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, and girls' softball athletes.
- B) To calculate the rate of injuries per 1,000 athlete-competitions, per 1,000 athlete-practices, and per 1,000 athlete-exposures for US high school athletes in the 9 sports of interest.

- C) To provide detailed information about the injuries sustained by US high school athletes including the type, site, severity, initial and subsequent treatment/care, outcome, etc.
- D) To provide detailed information about the injury events including athlete demographics, position played, phase of play/activity, etc.
- E) To identify potential risk or protective factors.
- F) To compare injury rates and patterns from the 2005-06 through the 2007-08 school years.

1.4 Project Design

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

- A) An injury that occurred as a result of participation in an organized high school competition or practice and
- B) Required medical attention by a team physician, certified athletic trainer, personal physician, or emergency department/urgent care facility and
- C) Resulted in restriction of the high school athlete's participation for one or more days beyond the day of injury and
- D) Any fracture, concussion, or dental injury regardless of whether or not it resulted in restriction of the student-athlete's participation.

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

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

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

1.5 Sample Recruitment

All eligible schools (i.e., all US high schools with a National Athletic Trainers' Association (NATA) affiliated certified athletic trainer (ATC) willing to serve as a reporter) were categorized into 8 sampling strata by geographic location (northeast, midwest, south, and west) and high school size (enrollment $\leq 1,000$ or $> 1,000$ students). Participant schools were then randomly selected from each substrata to obtain 100 study schools. To maintain a nationally representative sample, if a school dropped out of the study, another school from the same stratum was randomly selected for replacement. Participating ATCs were offered a \$300 honorarium along with individualized injury reports following the study's conclusion.

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 July 30, 2007 through June 8, 2008. 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 9.0 and SPSS, version 15.0. Although fractures, concussions, and dental injuries resulting in <1 day time loss were collected, unless otherwise noted, analyses in this report excluded these injuries. With the exception of injury rates, data were weighted for all analyses to produce national estimates. For each sport in each stratum, weights account for the total number of US schools offering the sport and the average number of participating study schools reporting each week for that sport. For example, following is the algorithm used to calculate football weights for the small (enrollment ≤ 1,000) west stratum:

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

Injury rates were calculated as the ratio of unweighted case counts per 1,000 athlete-exposures, and they were compared using rate ratios (RR) with 95% confidence intervals (CI).

Following is an example of the RR calculation comparing the rate of injury in boys' soccer to the rate of injury in girls' soccer:

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

Injury proportions were compared using injury proportion ratios (IPR) and corresponding confidence intervals calculated using the Complex Samples module of SPSS in order to account for the sampling weights and the complex sampling design. Following is an example of the IPR calculation comparing the proportion of male soccer concussions to the proportion of female soccer concussions:

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

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

II. Overall Injury Epidemiology

Table 2.1 Injury Rates by Sport and Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2007-08 School Year*

| | # Injuries | # Exposures | Injury rate (per 1,000 athlete- exposures) | Nationally Estimated # Injuries |
|-------------------------|--------------|------------------|--|---------------------------------------|
| Overall total | 4,799 | 2,077,780 | 2.31 | 1,419,723 |
| Competition | 2,501 | 562,558 | 4.45 | 763,034 |
| Practice | 2,298 | 1,515,222 | 1.52 | 656,689 |
| Boys' football total | 2,392 | 572,588 | 4.18 | 616,665 |
| Competition | 1,211 | 94,842 | 12.77 | 311,780 |
| Practice | 1,181 | 477,746 | 2.47 | 304,885 |
| Boys' soccer total | 355 | 202,650 | 1.75 | 159,351 |
| Competition | 219 | 60,258 | 3.63 | 99,785 |
| Practice | 136 | 142,392 | 0.96 | 59,566 |
| Girls' soccer total | 408 | 173,731 | 2.35 | 215,850 |
| Competition | 267 | 51,811 | 5.15 | 146,102 |
| Practice | 141 | 121,920 | 1.16 | 69,748 |
| Girls' volleyball total | 208 | 169,831 | 1.22 | 72,261 |
| Competition | 80 | 55,860 | 1.43 | 26,539 |
| Practice | 128 | 113,971 | 1.12 | 45,722 |
| Boys' basketball total | 348 | 249,849 | 1.39 | 82,612 |
| Competition | 166 | 74,446 | 2.23 | 36,766 |
| Practice | 182 | 175,403 | 1.04 | 45,846 |
| Girls' basketball total | 320 | 198,486 | 1.61 | 73,283 |
| Competition | 195 | 59,177 | 3.30 | 45,236 |
| Practice | 125 | 139,309 | 0.90 | 28,047 |
| Boys' wrestling total | 408 | 179,427 | 2.27 | 91,625 |
| Competition | 175 | 47,327 | 3.70 | 40,698 |
| Practice | 233 | 132,100 | 1.76 | 50,927 |
| Boys' baseball total | 173 | 186,264 | 0.93 | 44,760 |
| Competition | 92 | 67,167 | 1.37 | 22,803 |
| Practice | 81 | 119,097 | 0.68 | 21,957 |
| Girls' softball total | 187 | 144,954 | 1.29 | 63,316 |
| Competition | 96 | 51,670 | 1.86 | 33,325 |
| Practice | 91 | 93,284 | 0.98 | 29,991 |

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

Table 2.2 Proportion of Injuries Resulting in Time Loss, High School Sports-Related Injury Surveillance Study, US, 2007-08 School Year*

| | ≥1 days time loss | <1 day time loss | Total |
|-------------------|-------------------|------------------|-------------|
| Overall | 97.9% | 2.1% | 100% |
| Boys' football | 97.1% | 2.9% | 100% |
| Boys' soccer | 98.5% | 1.5% | 100% |
| Girls' soccer | 99.1% | 0.9% | 100% |
| Girls' volleyball | 99.3% | 0.7% | 100% |
| Boys' basketball | 98.0% | 2.0% | 100% |
| Girls' basketball | 97.9% | 2.1% | 100% |
| Boys' wrestling | 98.0% | 2.0% | 100% |
| Boys' baseball | 96.4% | 3.6% | 100% |
| Girls' softball | 99.5% | 0.5% | 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, 2007-08 School Year*

| | Male | Female |
|-----------------------|-----------------------|-----------------------|
| Year in School | | |
| Freshman | 191,186 (19.4%) | 93,256 (22.3%) |
| Sophomore | 237,801 (24.1%) | 110,440 (26.4%) |
| Junior | 276,377 (28.0%) | 112,030 (26.7%) |
| Senior | 282,218 (28.6%) | 103,246 (24.6%) |
| Total† | 987,582 (100%) | 418,972 (100%) |
| Age (years) | | |
| Minimum | 13 | 13 |
| Maximum | 19 | 19 |
| Mean (St. Dev.) | 16.0 (1.2) | 15.8 (1.2) |
| BMI | | |
| Minimum | 14.3 | 15.2 |
| Maximum | 48.7 | 46.2 |
| Mean (St. Dev.) | 25.2 (4.5) | 22.2 (3.3) |

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

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

Figure 2.1 Injury Diagnosis by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2007-08 School Year

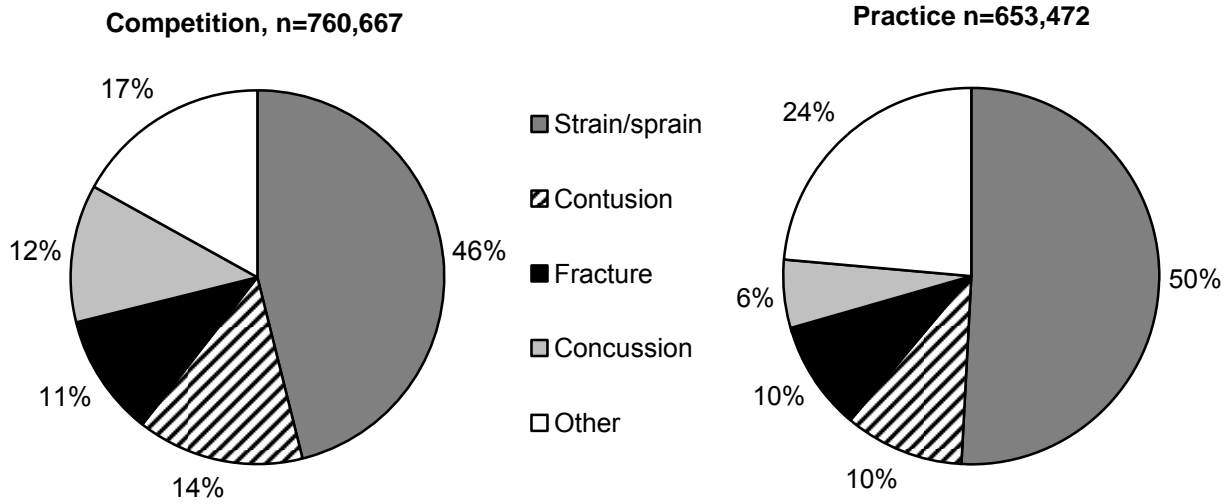


Table 2.4 Body Site of Injury by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2007-08 School Year

| Body Site | Competition | | Practice | | Overall | |
|---------------------|----------------|-------------|----------------|-------------|------------------|-------------|
| | n | % | n | % | n | % |
| Ankle | 142,807 | 18.8% | 117,836 | 18.0% | 260,643 | 18.5% |
| Knee | 123,796 | 16.3% | 82,416 | 12.6% | 206,212 | 14.6% |
| Head/face | 122,912 | 16.2% | 51,619 | 7.9% | 174,532 | 12.4% |
| Hip/thigh/upper leg | 61,674 | 8.1% | 82,376 | 12.6% | 144,050 | 10.2% |
| Hand/wrist | 66,188 | 8.7% | 76,160 | 11.7% | 142,348 | 10.1% |
| Shoulder | 64,828 | 8.6% | 64,150 | 9.8% | 128,978 | 9.1% |
| Trunk | 41,623 | 5.5% | 49,585 | 7.6% | 91,208 | 6.5% |
| Lower leg | 44,581 | 5.9% | 35,629 | 5.5% | 80,210 | 5.7% |
| Arm/elbow | 40,366 | 5.3% | 24,588 | 3.8% | 64,953 | 4.6% |
| Foot | 27,291 | 3.6% | 31,403 | 4.8% | 58,695 | 4.2% |
| Neck | 12,305 | 1.6% | 13,180 | 2.0% | 25,485 | 1.8% |
| Other | 10,203 | 1.4% | 24,104 | 3.7% | 34,307 | 2.4% |
| Total | 758,575 | 100% | 653,047 | 100% | 1,411,621 | 100% |

Table 2.5 Most Commonly Injured Ankle Structures, High School Sports-Related Injury Surveillance Study, US, 2007-08 School Year

| | Male | | Female | | Total | |
|---------------------------------|----------------|-------------|----------------|-------------|----------------|-------------|
| | n | % | n | % | n | % |
| Ankle Ligament | | | | | | |
| Anterior talofibular ligament | 121,959 | 78.1% | 87,581 | 83.8% | 209,540 | 80.4% |
| Calcaneofibular ligament | 45,626 | 29.2% | 38,371 | 36.7% | 83,996 | 32.2% |
| Anterior tibiofibular ligament | 47,468 | 30.4% | 27,768 | 26.6% | 75,236 | 28.9% |
| Posterior talofibular ligament | 17,414 | 11.2% | 18,820 | 18.0% | 36,234 | 13.9% |
| Posterior tibiofibular ligament | 7,295 | 4.7% | 4,436 | 4.2% | 11,730 | 4.5% |
| Total | 156,101 | 100% | 104,542 | 100% | 260,643 | 100% |

*Multiple responses allowed per injury report.

Table 2.6 Most Commonly Injured Knee Structures, High School Sports-Related Injury Surveillance Study, US, 2007-08 School Year

| | Male | | Female | | Total | |
|-----------------------------|----------------|-------------|---------------|-------------|----------------|-------------|
| | n | % | n | % | n | % |
| Knee Ligament | | | | | | |
| Medial collateral ligament | 45,892 | 33.8% | 18,646 | 26.4% | 64,538 | 31.3% |
| Patella/patellar tendon | 37,217 | 27.4% | 16,336 | 23.2% | 53,553 | 26.0% |
| Anterior cruciate ligament | 26,996 | 19.9% | 17,683 | 25.1% | 44,679 | 21.7% |
| Torn cartilage (meniscus) | 24,922 | 18.4% | 11,012 | 15.6% | 35,935 | 17.4% |
| Lateral collateral ligament | 7,787 | 5.7% | 5,042 | 7.1% | 12,829 | 6.2% |
| Posterior cruciate ligament | 2,606 | 1.9% | 1,057 | 1.5% | 3,663 | 1.8% |
| Total | 135,693 | 100% | 70,520 | 100% | 206,212 | 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, 2007-08 School Year

| Diagnosis | Competition n=758,120 | | Practice n=652,534 | | Overall n=1,410,654 | |
|-----------------------------------|--------------------------|-------|-----------------------|-------|------------------------|-------|
| | n | % | n | % | n | % |
| Ankle strain/sprain | 133,168 | 17.6% | 110,846 | 17.0% | 244,013 | 17.3% |
| Head/face concussion | 90,980 | 12.0% | 38,456 | 5.9% | 129,437 | 9.2% |
| Knee strain/sprain | 71,506 | 9.4% | 37,757 | 5.8% | 109,263 | 7.8% |
| Hip/thigh/upper leg strain/sprain | 39,542 | 5.2% | 63,240 | 9.7% | 102,783 | 7.3% |
| Knee other | 35,049 | 4.6% | 31,573 | 4.8% | 66,622 | 4.7% |
| Shoulder other | 33,114 | 4.4% | 25,224 | 3.9% | 58,338 | 4.1% |
| Hand/wrist fracture | 27,422 | 3.6% | 28,658 | 4.4% | 56,079 | 4.0% |
| Hand/wrist strain/sprain | 23,383 | 3.1% | 30,362 | 4.7% | 53,745 | 3.8% |
| Shoulder strain/sprain | 21,087 | 2.8% | 27,277 | 4.2% | 48,364 | 3.4% |
| Trunk strain/sprain | 18,696 | 2.5% | 26,291 | 4.0% | 44,988 | 3.2% |

Figure 2.2 Time Loss by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2007-08 School Year

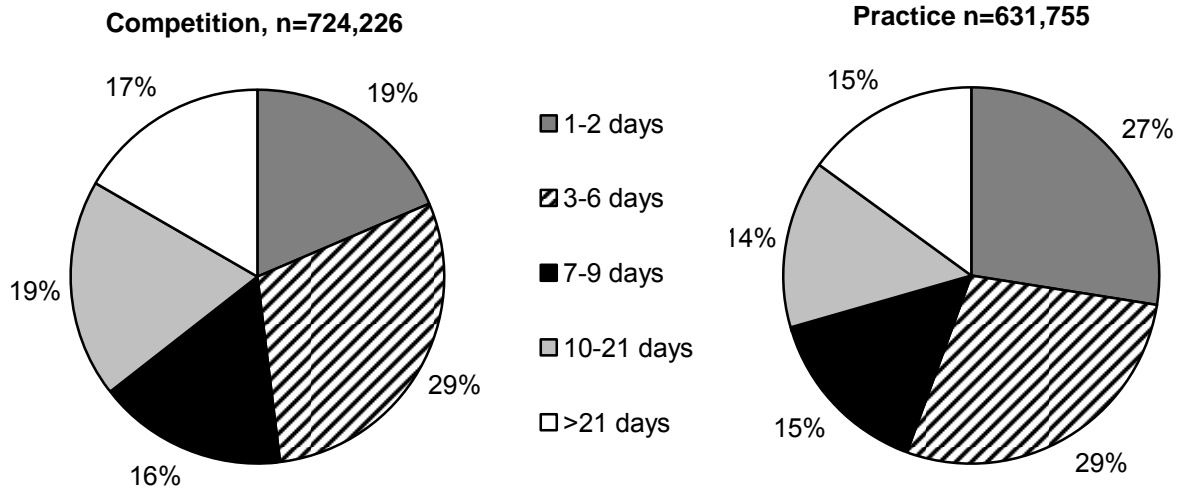


Table 2.8 Injuries Requiring Surgery by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2007-08 School Year

| | Competition | | Practice | | Overall | |
|-------------------------|----------------|-------------|----------------|-------------|------------------|-------------|
| | n | % | n | % | n | % |
| Need for surgery | | | | | | |
| Required surgery | 54,652 | 7.3% | 29,550 | 4.7% | 84,202 | 6.1% |
| Did not require surgery | 690,718 | 92.7% | 605,951 | 95.4% | 1,296,670 | 93.9% |
| Total | 745,371 | 100% | 635,502 | 100% | 1,380,872 | 100% |

Figure 2.3 New and Recurring Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2007-08 School Year

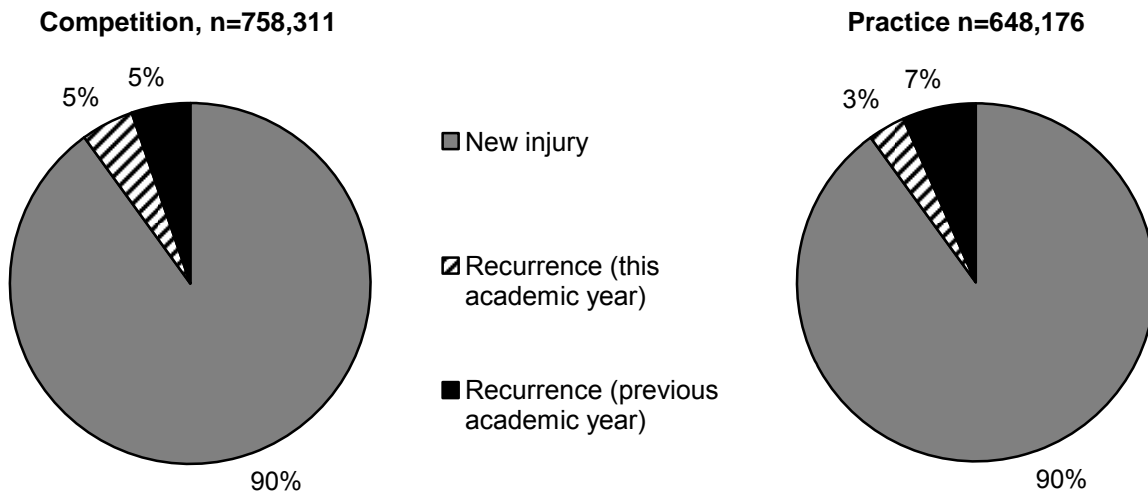


Table 2.9 Time during Season of Injury, High School Sports-Related Injury Surveillance Study, US, 2007-08 School Year

| | n | % |
|-----------------------|------------------|-------------|
| Time in Season | | |
| Preseason | 353,992 | 24.9% |
| Regular season | 1015875 | 71.6% |
| Post season | 49,353 | 3.5% |
| Total | 1,419,220 | 100% |

Table 2.10 Competition-Related Variables, High School Sports-Related Injury Surveillance Study, US, 2007-08 School Year

| | n | % |
|------------------------------------|----------------|-------------|
| Time in Competition | | |
| Warm-ups | 17,331 | 2.3% |
| Beginning | 115,230 | 15.2% |
| Middle | 413,587 | 54.7% |
| End | 207,443 | 27.4% |
| Overtime | 2,262 | 0.3% |
| Total | 755,852 | 100 |
| Competition Location | | |
| Home | 363,458 | 47.8% |
| Away | 368,658 | 48.5% |
| Neutral site | 28,299 | 3.7% |
| Total | 760,415 | 100% |
| Injury Related to Foul Play | | |
| No | 667,706 | 88.1% |
| Yes, and ruled foul play | 28,078 | 3.7% |
| Yes, but not ruled foul play | 37,867 | 5.0% |
| Unknown | 23,855 | 3.1% |
| Total | 757,507 | 100% |

Table 2.11 Practice-Related Variables, High School Sports-Related Injury Surveillance Study, US, 2007-08 School Year

| | n | % |
|---|----------------|-------------|
| Time in Practice | | |
| First 1/2 hour | 87,566 | 13.5% |
| Second 1/2 hour | 173,989 | 26.9% |
| Third 1/2 hour | 230,116 | 35.6% |
| Fourth 1/2 hour | 120,219 | 18.6% |
| >2 hours into practice | 34,565 | 5.3% |
| Total | 646,455 | 100% |
| Practice Type | | |
| Noncontact skills practice | 145,908 | 22.5% |
| Noncontact partial numbers scrimmage | 17,857 | 2.8% |
| Noncontact full scrimmage | 16,547 | 2.6% |
| Partial contact skills practice | 96,859 | 14.9% |
| Partial contact partial numbers scrimmage | 29,381 | 4.5% |
| Partial contact full scrimmage | 22,230 | 3.4% |
| Full contact skills practice | 160,941 | 24.8% |
| Full contact partial numbers scrimmage | 48,081 | 7.4% |
| Full contact full scrimmage | 81,216 | 12.5% |
| Other | 29,620 | 4.6% |
| Total | 648,640 | 100% |

Table 2.12 Methods for Injury Evaluation and Assessment, High School Sports-Related Injury Surveillance Study, US, 2007-08 School Year

| | n | % |
|-------------------------------------|------------------|-------------|
| % of Injuries Evaluated by:* | | |
| Certified athletic trainer | 1,303,508 | 91.8% |
| Physician | 790,104 | 55.7% |
| Dentist/oral surgeon | 1,959 | 0.1% |
| Nurse practitioner | 13,536 | 1.0% |
| Physician's assistant | 16,196 | 1.1% |
| Other | 44,920 | 3.2% |
| Total | 1,419,723 | 100% |
| % of Injuries Assessed by:* | | |
| Evaluation | 1,359,583 | 95.8% |
| X-ray | 587,317 | 41.4% |
| MRI | 155,204 | 10.9% |
| CT-scan | 48,581 | 3.4% |
| Surgery | 19,063 | 1.3% |
| Blood work/lab test | 17,720 | 1.2% |
| Other | 27,905 | 2.0% |
| Total | 1,419,723 | 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, 2007-08 School Year

| | # Injuries | # Exposures | Injury rate (per 1,000 athlete- exposures) | Nationally Estimated # Injuries |
|--------------|--------------|----------------|--|---------------------------------------|
| Total | 2,392 | 572,588 | 4.18 | 616,665 |
| Competition | 1,211 | 94,842 | 12.77 | 311,780 |
| Practice | 1,181 | 477,746 | 2.47 | 304,885 |

Table 3.2 Demographic Characteristics of Injured Football Athletes, High School Sports-Related Injury Surveillance Study, US, 2007-08 School Year*

| Year in School | |
|--------------------------|-----------------------|
| Freshman | 126,565 (20.6%) |
| Sophomore | 150,675 (24.6%) |
| Junior | 171,178 (27.9%) |
| Senior | 164,835 (26.9%) |
| Total[†] | 613,252 (100%) |
| Age (years) | |
| Minimum | 13 |
| Maximum | 19 |
| Mean (St. Dev.) | 15.9 (1.2) |
| BMI | |
| Minimum | 15.1 |
| Maximum | 48.7 |
| Mean (St. Dev.) | 26.2 (4.6) |

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

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

Figure 3.1 Diagnosis of Football Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2007-08 School Year

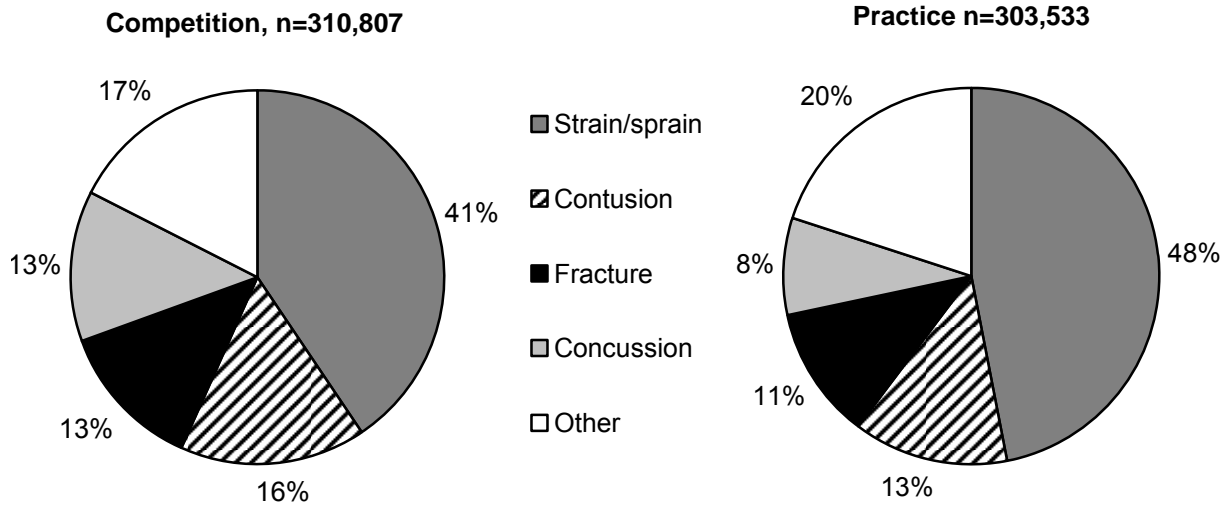


Table 3.3 Body Site of Football Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2007-08 School Year

| Body Site | Competition | | Practice | | Overall | |
|---------------------|----------------|-------------|----------------|-------------|----------------|-------------|
| | n | % | n | % | n | % |
| Ankle | 42,178 | 13.6% | 42,059 | 13.9% | 84,236 | 13.8% |
| Knee | 47,320 | 15.3% | 33,933 | 11.2% | 81,253 | 13.3% |
| Head/face | 44,407 | 14.4% | 27,133 | 9.0% | 71,540 | 11.7% |
| Hip/thigh/upper leg | 20,264 | 6.6% | 33,391 | 11.0% | 53,655 | 8.8% |
| Hand/wrist | 32,626 | 10.6% | 44,509 | 14.7% | 77,136 | 12.6% |
| Shoulder | 39,566 | 12.8% | 36,377 | 12.0% | 75,944 | 12.4% |
| Trunk | 21,380 | 6.9% | 28,876 | 9.5% | 50,256 | 8.2% |
| Lower leg | 18,251 | 5.9% | 12,843 | 4.2% | 31,094 | 5.1% |
| Arm/elbow | 20,111 | 6.5% | 11,180 | 3.7% | 31,291 | 5.1% |
| Foot | 9,338 | 3.0% | 10,180 | 3.4% | 19,518 | 3.2% |
| Neck | 8,007 | 2.6% | 8,309 | 2.7% | 16,316 | 2.7% |
| Other | 5,922 | 1.9% | 14,404 | 4.8% | 20,327 | 3.3% |
| Total | 309,370 | 100% | 303,194 | 100% | 612,564 | 100% |

Table 3.4 Ten Most Common Football Injury Diagnoses by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2007-08 School Year

| Diagnosis | Competition n=309,293 | | Practice n=302,681 | | Total n=611,974 | |
|-----------------------------------|--------------------------|-------|-----------------------|-------|--------------------|-------|
| | n | % | n | % | n | % |
| Ankle strain/sprain | 39,362 | 12.7% | 38,403 | 12.7% | 77,765 | 12.7% |
| Head/face concussion | 40,645 | 13.1% | 24,760 | 8.2% | 65,405 | 10.7% |
| Knee strain/sprain | 31,023 | 10.0% | 16,342 | 5.4% | 47,364 | 7.7% |
| Hand/wrist fracture | 16,717 | 5.4% | 18,171 | 6.0% | 34,888 | 5.7% |
| Hip/thigh/upper leg strain/sprain | 10,784 | 3.5% | 23,611 | 7.8% | 34,394 | 5.6% |
| Shoulder other | 21,828 | 7.1% | 12,039 | 4.0% | 33,867 | 5.5% |
| Shoulder strain/sprain | 9,995 | 3.2% | 16,212 | 5.4% | 26,207 | 4.3% |
| Trunk strain/sprain | 8,690 | 2.8% | 15,630 | 5.2% | 24,319 | 4.0% |
| Hand/wrist strain/sprain | 7,093 | 2.3% | 16,448 | 5.4% | 23,541 | 3.9% |
| Knee other | 10,211 | 3.3% | 10,857 | 3.6% | 21,068 | 3.4% |

Figure 3.2 Time Loss of Football Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2007-08 School Year

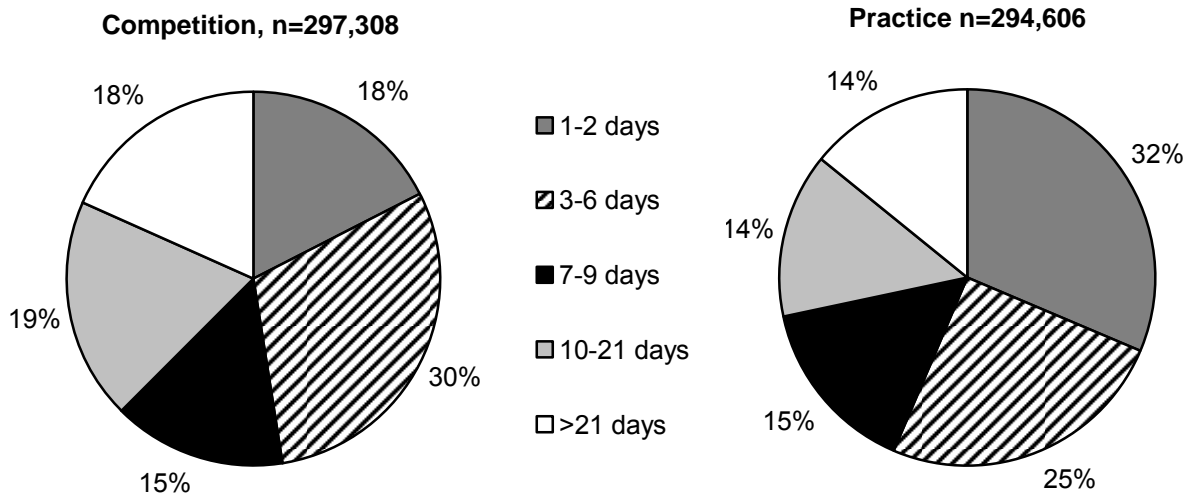


Table 3.5 Football Injuries Requiring Surgery by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2007-08 School Year

| | Competition | | Practice | | Overall | |
|-------------------------|----------------|-------------|----------------|-------------|----------------|-------------|
| | n | % | n | % | n | % |
| Need for surgery | | | | | | |
| Required surgery | 20,452 | 6.8% | 14,085 | 4.8% | 34,537 | 5.8% |
| Did not require surgery | 281,673 | 93.2% | 281,107 | 95.2% | 562,780 | 94.2% |
| Total | 302,125 | 100% | 295,192 | 100% | 597,317 | 100% |

Figure 3.3 History of Football Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2007-08 School Year

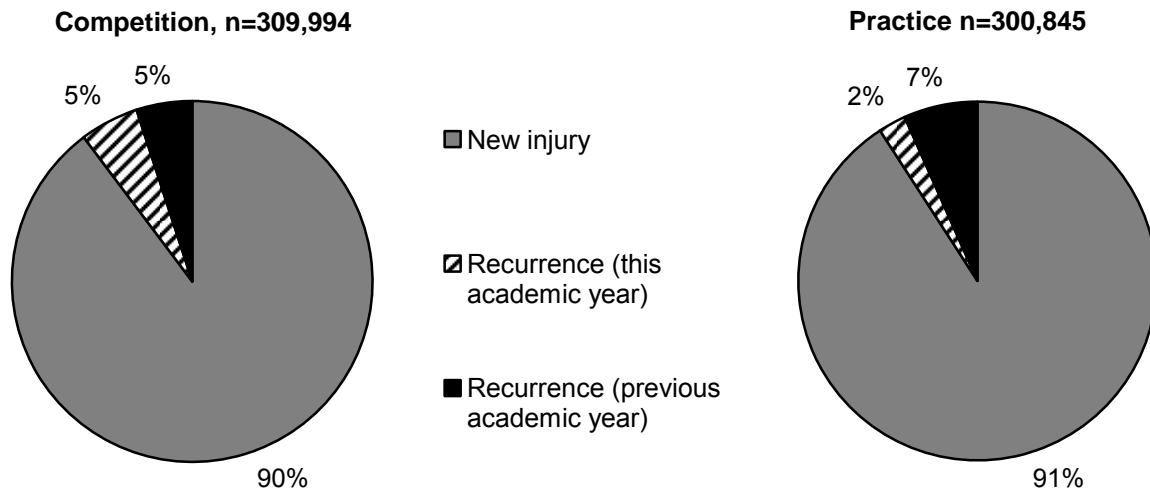


Table 3.6 Time during Season of Football Injuries, High School Sports-Related Injury Surveillance Study, US, 2007-08 School Year

| | n | % |
|-----------------------|----------------|-------------|
| Time in Season | | |
| Preseason | 176,789 | 28.7% |
| Regular season | 423,894 | 68.7% |
| Post season | 15,904 | 2.6% |
| Total | 616,587 | 100% |

Table 3.7 Competition-Related Variables for Football Injuries, High School Sports-Related Injury Surveillance Study, US, 2007-08 School Year

| | n | % |
|------------------------------------|----------------|-------------|
| Time in Competition | | |
| Warm-ups | 6,355 | 2.1% |
| Beginning | 50,158 | 16.2% |
| Middle | 170,435 | 55.2% |
| End | 81,737 | 26.5% |
| Overtime | 77 | 0.0% |
| Total | 308,762 | 100% |
| Competition Location | | |
| Home | 144,184 | 46.4% |
| Away | 162,147 | 52.2% |
| Neutral site | 4,554 | 1.5% |
| Total | 310,885 | 100% |
| Injury Related to Foul Play | | |
| No | 290,569 | 93.8% |
| Yes, and ruled foul play | 2,814 | 0.9% |
| Yes, but not ruled foul play | 9,498 | 3.1% |
| Unknown | 6,790 | 2.2% |
| Total | 309,670 | 100% |
| Field Location | | |
| Between the 20 yrd lines | 243,180 | 80.2% |
| Red zone | 50,874 | 16.8% |
| End zone | 5,079 | 1.7% |
| Off the field | 4,011 | 1.3% |
| Total | 303,144 | 100% |

Table 3.8 Practice-Related Variables for Football Injuries, High School Sports-Related Injury Surveillance Study, US, 2007-08 School Year

| | n | % |
|---|----------------|-------------|
| Time in Practice | | |
| First 1/2 hour | 31,525 | 10.4% |
| Second 1/2 hour | 80,045 | 26.5% |
| Third 1/2 hour | 110,655 | 36.6% |
| Fourth 1/2 hour | 61,084 | 20.2% |
| >2 hours into practice | 19,060 | 6.3% |
| Total | 302,369 | 100% |
| Practice Type | | |
| Noncontact skills practice | 40,382 | 13.3% |
| Noncontact partial numbers scrimmage | 4,367 | 1.4% |
| Noncontact full scrimmage | 1,737 | 0.6% |
| Partial contact skills practice | 47,821 | 15.8% |
| Partial contact partial numbers scrimmage | 9,506 | 3.1% |
| Partial contact full scrimmage | 10,231 | 3.4% |
| Full contact skills practice | 96,383 | 31.8% |
| Full contact partial numbers scrimmage | 32,272 | 10.7% |
| Full contact full scrimmage | 48,860 | 16.1% |
| Other | 11,088 | 3.7% |
| Total | 302,648 | 100% |

Figure 3.4 Player Position of Football Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2007-08 School Year

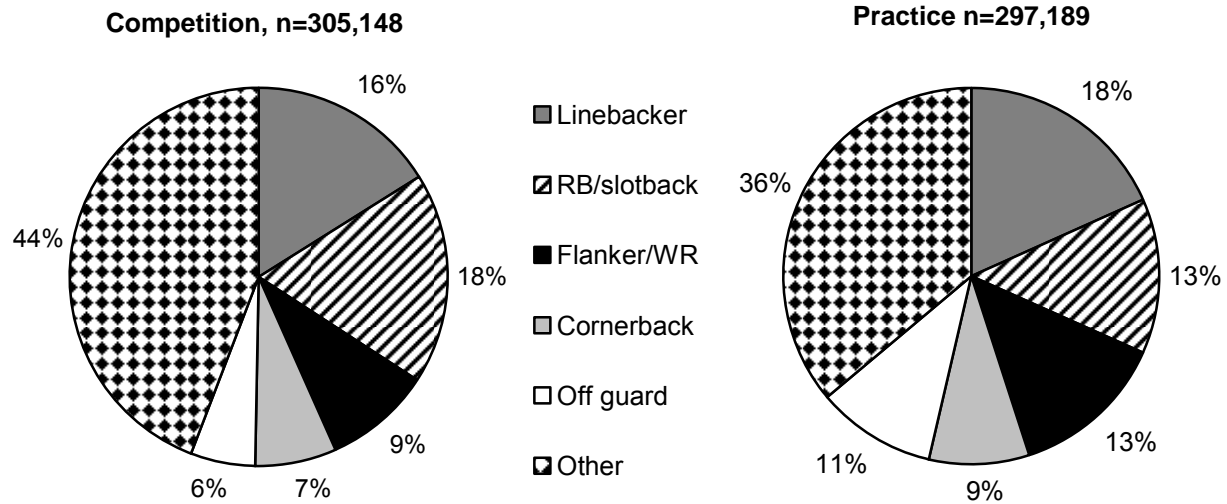
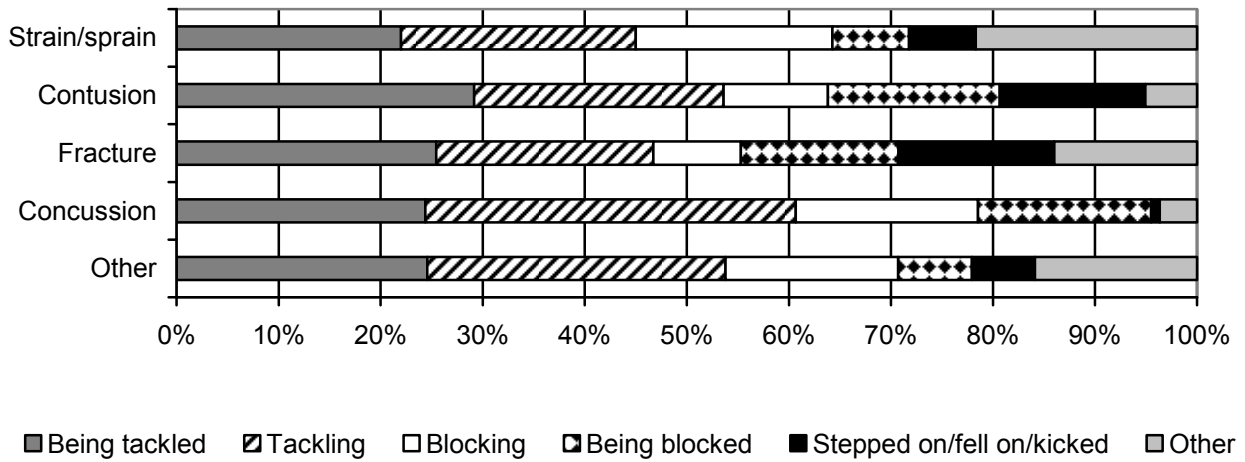


Table 3.9 Activities Leading to Football Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2007-08 School Year

| Activity | Competition | | Practice | | Overall | |
|--------------------------------|----------------|-------------|----------------|-------------|----------------|-------------|
| | n | % | n | % | n | % |
| Tackling | 79,233 | 25.9% | 62,647 | 20.9% | 141,880 | 23.4% |
| Being tackled | 84,592 | 27.7% | 50,270 | 16.7% | 134,862 | 22.3% |
| Blocking | 40,863 | 13.4% | 47,706 | 15.9% | 88,569 | 14.6% |
| Being blocked | 40,476 | 13.3% | 21,105 | 7.0% | 61,580 | 10.2% |
| N/A, chronic/overuse | 7,960 | 2.6% | 41,681 | 13.9% | 49,641 | 8.2% |
| Stepped on/fell on/kicked | 26,968 | 8.8% | 18,559 | 6.2% | 45,527 | 7.5% |
| Rotation around a planted foot | 13,136 | 4.3% | 20,263 | 6.7% | 33,399 | 5.5% |
| Other | 12,142 | 4.0% | 38,133 | 12.7% | 50,276 | 8.3% |
| Total | 309,370 | 100% | 303,194 | 100% | 612,564 | 100% |

Figure 3.5 Activity Resulting in Football Injuries by Injury Diagnosis, High School Sports-Related Injury Surveillance Study, US, 2007-08 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, 2007-08 School Year

| | # Injuries | # Exposures | Injury rate (per 1,000 athlete- exposures) | Nationally Estimated # Injuries |
|--------------|------------|----------------|--|---------------------------------------|
| Total | 355 | 202,650 | 1.75 | 159,351 |
| Competition | 219 | 60,258 | 3.63 | 99,785 |
| Practice | 136 | 142,392 | 0.96 | 59,566 |

Table 4.2 Demographic Characteristics of Injured Boys' Soccer Athletes, High School Sports-Related Injury Surveillance Study, US, 2007-08 School Year*

| Year in School | |
|-----------------------|-----------------------|
| Freshman | 23,026 (14.6%) |
| Sophomore | 33,707 (21.4%) |
| Junior | 45,741 (29.0%) |
| Senior | 55,076 (35.0%) |
| Total† | 157,550 (100%) |
| Age (years) | |
| Minimum | 13 |
| Maximum | 18 |
| Mean (St. Dev.) | 16.2 (1.2) |
| BMI | |
| Minimum | 17.5 |
| Maximum | 34.3 |
| Mean (St. Dev.) | 22.7 (2.8) |

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

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

Figure 4.1 Diagnosis of Boys' Soccer Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2007-08 School Year

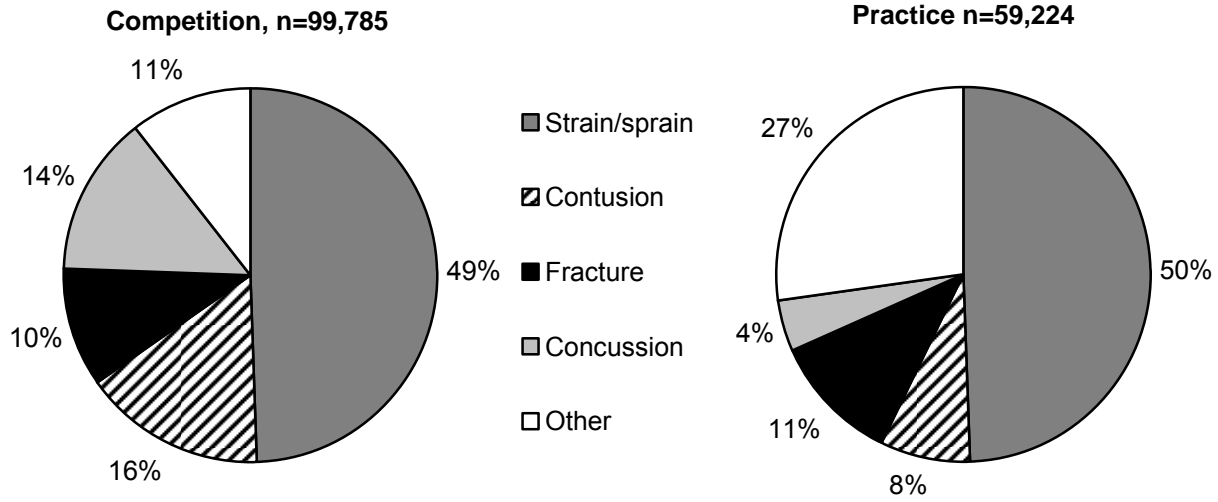


Table 4.3 Body Site of Boys' Soccer Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2007-08 School Year

| | Competition | | Practice | | Overall | |
|---------------------|---------------|-------------|---------------|-------------|----------------|-------------|
| | n | % | n | % | n | % |
| Body Site | | | | | | |
| Ankle | 20,997 | 21.3% | 12,353 | 20.9% | 33,350 | 21.1% |
| Knee | 12,156 | 12.3% | 9,188 | 15.5% | 21,344 | 13.5% |
| Head/face | 22,399 | 22.7% | 3,464 | 5.8% | 25,863 | 16.4% |
| Hip/thigh/upper leg | 13,379 | 13.5% | 9,909 | 16.7% | 23,288 | 14.7% |
| Hand/wrist | 3,795 | 3.8% | 1,260 | 2.1% | 5,054 | 3.2% |
| Shoulder | 3,408 | 3.5% | 3,425 | 5.8% | 6,833 | 4.3% |
| Trunk | 6,492 | 6.6% | 3,886 | 6.6% | 10,378 | 6.6% |
| Lower leg | 8,058 | 8.2% | 4,929 | 8.3% | 12,987 | 8.2% |
| Arm/elbow | 1,784 | 1.8% | 1,071 | 1.8% | 2,855 | 1.8% |
| Foot | 4,746 | 4.8% | 6,591 | 11.1% | 11,336 | 7.2% |
| Neck | 84 | 0.1% | 1,078 | 1.8% | 1,162 | 0.7% |
| Other | 1,455 | 1.5% | 2,073 | 3.5% | 3,528 | 2.2% |
| Total | 98,753 | 100% | 59,224 | 100% | 157,978 | 100% |

Table 4.4 Ten Most Common Boys' Soccer Injury Diagnoses by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2007-08 School Year

| Diagnosis | Competition n=98,754 | | Practice n=59,224 | | Total n=157,978 | |
|-----------------------------------|-------------------------|-------|----------------------|-------|--------------------|-------|
| | n | % | n | % | n | % |
| Ankle strain/sprain | 19,570 | 19.8% | 12,353 | 20.9% | 31,923 | 20.2% |
| Hip/thigh/upper leg strain/sprain | 9,977 | 10.1% | 6,758 | 11.4% | 16,735 | 10.6% |
| Head/face concussion | 13,847 | 14.0% | 2,529 | 4.3% | 16,376 | 10.4% |
| Knee strain/sprain | 9,422 | 9.5% | 2,862 | 4.8% | 12,285 | 7.8% |
| Knee other | 1,455 | 1.5% | 5,256 | 8.9% | 6,712 | 4.2% |
| Head/face other | 5,603 | 5.7% | 229 | 0.4% | 5,832 | 3.7% |
| Trunk strain/sprain | 2,795 | 2.8% | 2,369 | 4.0% | 5,165 | 3.3% |
| Shoulder other | 2,733 | 2.8% | 2,431 | 4.1% | 5,163 | 3.3% |
| Lower leg strain/sprain | 3,098 | 3.1% | 2,027 | 3.4% | 5,125 | 3.2% |
| Trunk contusion | 3,697 | 3.7% | 707 | 1.2% | 4,403 | 2.8% |

Figure 4.2 Time Loss of Boys' Soccer Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2007-08 School Year

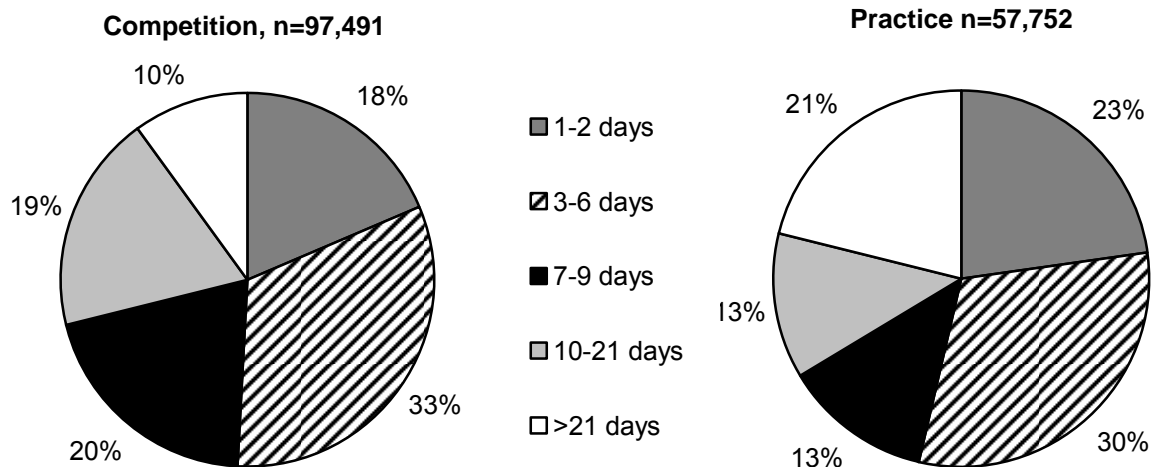


Table 4.5 Boys' Soccer Injuries Requiring Surgery by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2007-08 School Year

| | Competition | | Practice | | Overall | |
|-------------------------|---------------|-------------|---------------|-------------|----------------|-------------|
| | n | % | n | % | n | % |
| Need for surgery | | | | | | |
| Required surgery | 10,152 | 10.4% | 821 | 1.4% | 10,973 | 7.0% |
| Did not require surgery | 87,141 | 89.6% | 58,039 | 98.6% | 145,181 | 93.0% |
| Total | 97,294 | 100% | 58,860 | 100% | 156,153 | 100% |

Figure 4.3 History of Boys' Soccer Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2007-08 School Year

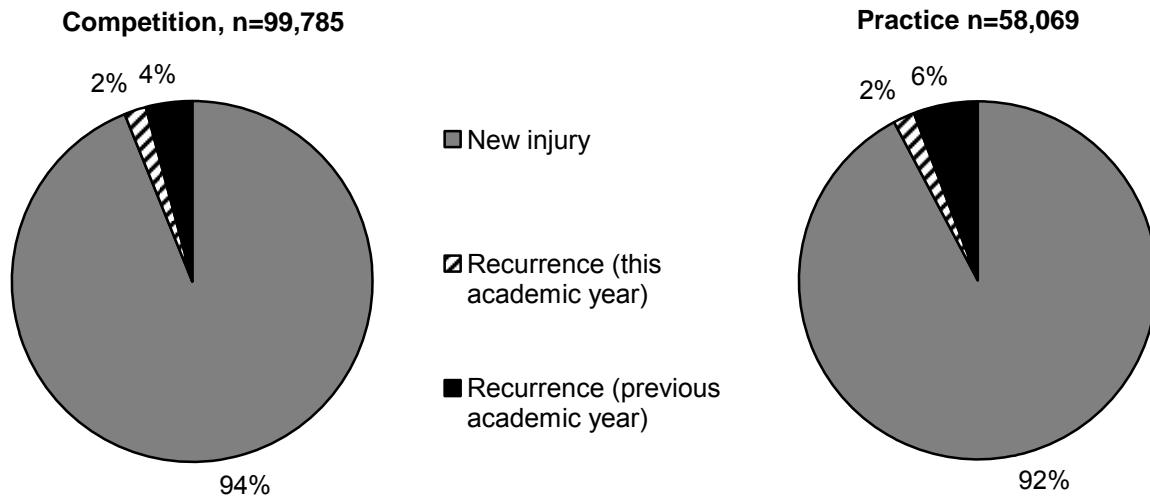


Table 4.6 Time during Season of Boys' Soccer Injuries, High School Sports-Related Injury Surveillance Study, US, 2007-08 School Year

| | n | % |
|-----------------------|----------------|-------------|
| Time in Season | | |
| Preseason | 38,128 | 24.0% |
| Regular season | 111,399 | 70.1% |
| Post season | 9,399 | 5.9% |
| Total | 158,926 | 100% |

Table 4.7 Competition-Related Variables for Boys' Soccer Injuries, High School Sports-Related Injury Surveillance Study, US, 2007-08 School Year

| | n | % |
|---|---------------|-------------|
| Time in Competition | | |
| Warm-ups | 1,432 | 1.5% |
| Beginning | 16,689 | 17.0% |
| Middle | 55,337 | 56.5% |
| End | 23,117 | 23.6% |
| Overtime | 1,358 | 1.4% |
| Total | 97,933 | 100% |
| Competition Location | | |
| Home | 47,079 | 47.5% |
| Away | 45,089 | 45.5% |
| Neutral site | 6,910 | 7.0% |
| Total | 99,079 | 100% |
| Injury Related to Foul Play | | |
| No | 76,020 | 76.2% |
| Yes, and ruled foul play | 6,655 | 6.7% |
| Yes, but not ruled foul play | 12,123 | 12.1% |
| Unknown | 4,988 | 5.0% |
| Total | 99,785 | 100% |
| Field Location | | |
| Top of goal box extended to center line (offense) | 33,212 | 35.3% |
| Top of goal box extended to center line (defense) | 17,624 | 18.7% |
| Goal box (defense) | 16,509 | 17.5% |
| Side of goal box (defense) | 9,801 | 10.4% |
| Side of goal box (offense) | 9,518 | 10.1% |
| Goal box (offense) | 6,463 | 6.9% |
| Off the field | 1,069 | 1.1% |
| Total | 94,196 | 100% |

Table 4.8 Practice-Related Variables for Boys' Soccer Injuries, High School Sports-Related Injury Surveillance Study, US, 2007-08 School Year

| | n | % |
|---|---------------|-------------|
| Time in Practice | | |
| First 1/2 hour | 9,748 | 16.8% |
| Second 1/2 hour | 16,208 | 27.9% |
| Third 1/2 hour | 21,739 | 37.4% |
| Fourth 1/2 hour | 9,356 | 16.1% |
| >2 hours into practice | 1,042 | 1.8% |
| Total | 58,093 | 100% |
| Practice Type | | |
| Noncontact skills practice | 14,820 | 25.5% |
| Noncontact partial numbers scrimmage | 1,701 | 2.9% |
| Noncontact full scrimmage | 4,053 | 7.0% |
| Partial contact skills practice | 11,060 | 19.0% |
| Partial contact partial numbers scrimmage | 4,452 | 7.6% |
| Partial contact full scrimmage | 2,308 | 4.0% |
| Full contact skills practice | 7,038 | 12.1% |
| Full contact partial numbers scrimmage | 5,949 | 10.2% |
| Full contact full scrimmage | 5,695 | 9.8% |
| Other | 1,155 | 2.0% |
| Total | 58,230 | 100% |

Figure 4.4 Player Position of Boys' Soccer Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2007-08 School Year

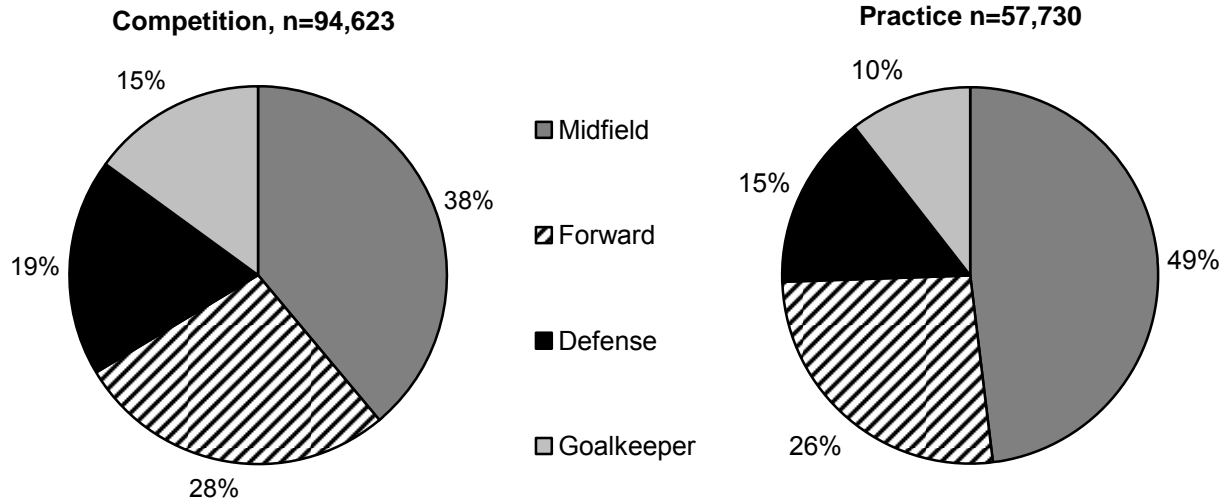
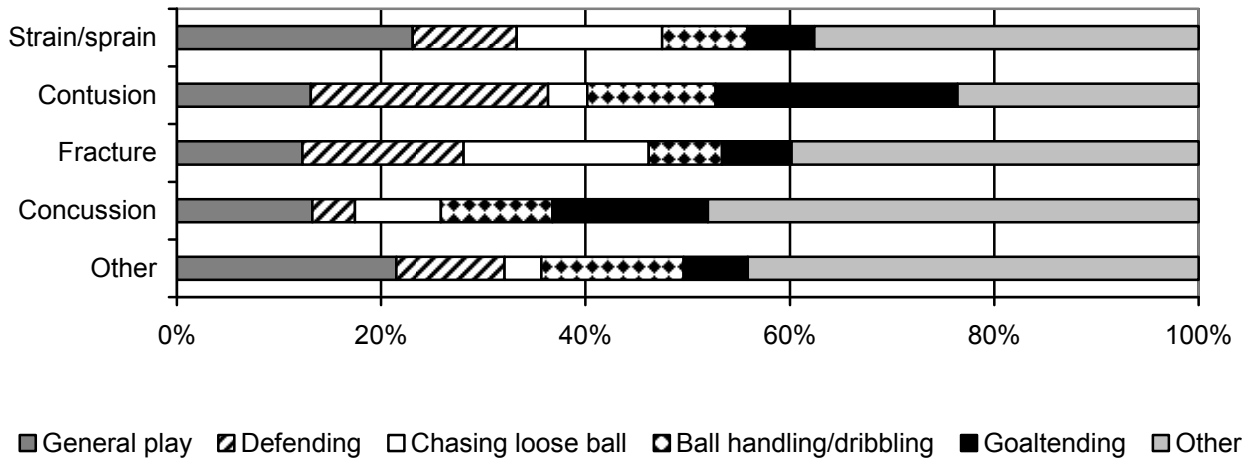


Table 4.9 Activities Leading to Boys' Soccer Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2007-08 School Year

| Activity | Competition | | Practice | | Overall | |
|-------------------------|---------------|-------------|---------------|-------------|----------------|-------------|
| | n | % | n | % | n | % |
| General play | 16,425 | 16.8% | 13,877 | 23.9% | 30,302 | 19.4% |
| Defending | 13,591 | 13.9% | 4,777 | 8.2% | 18,368 | 11.8% |
| Chasing loose ball | 11,292 | 11.6% | 5,762 | 9.9% | 17,054 | 10.9% |
| Ball handling/dribbling | 9,735 | 10.0% | 5,798 | 10.0% | 15,533 | 10.0% |
| Goaltending | 12,342 | 12.6% | 2,491 | 4.3% | 14,833 | 9.5% |
| Shooting (foot) | 5,225 | 5.3% | 7,075 | 12.2% | 12,300 | 7.9% |
| Heading ball | 11,480 | 11.7% | 790 | 1.4% | 12,270 | 7.9% |
| Passing (foot) | 6,045 | 6.2% | 4,328 | 7.5% | 10,373 | 6.7% |
| Receiving pass | 6,065 | 6.2% | 4,199 | 7.2% | 10,264 | 6.6% |
| Other | 5,558 | 5.7% | 8,975 | 15.5% | 14,532 | 9.3% |
| Total | 97,757 | 100% | 58,071 | 100% | 155,828 | 100% |

Figure 4.5 Activity Resulting in Boys' Soccer Injuries by Injury Diagnosis, High School Sports-Related Injury Surveillance Study, US, 2007-08 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, 2007-08 School Year

| | # Injuries | # Exposures | Injury rate (per 1,000 athlete- exposures) | Nationally Estimated # Injuries |
|--------------|------------|----------------|--|---------------------------------------|
| Total | 408 | 173,731 | 2.35 | 215,850 |
| Competition | 267 | 51,811 | 5.15 | 146,102 |
| Practice | 141 | 121,920 | 1.16 | 69,748 |

Table 5.2 Demographic Characteristics of Injured Girls' Soccer Athletes, High School Sports-Related Injury Surveillance Study, US, 2007-08 School Year*

| Year in School | |
|-----------------------|-----------------------|
| Freshman | 38,152 (17.9%) |
| Sophomore | 58,120 (27.2%) |
| Junior | 50,840 (23.8%) |
| Senior | 66,417 (31.1%) |
| Total† | 213,528 (100%) |
| Age (years) | |
| Minimum | 13 |
| Maximum | 19 |
| Mean (St. Dev.) | 15.9 (1.2) |
| BMI | |
| Minimum | 15.7 |
| Maximum | 34.4 |
| Mean (St. Dev.) | 21.9 (3.0) |

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

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

Figure 5.1 Diagnosis of Girls' Soccer Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2007-08 School Year

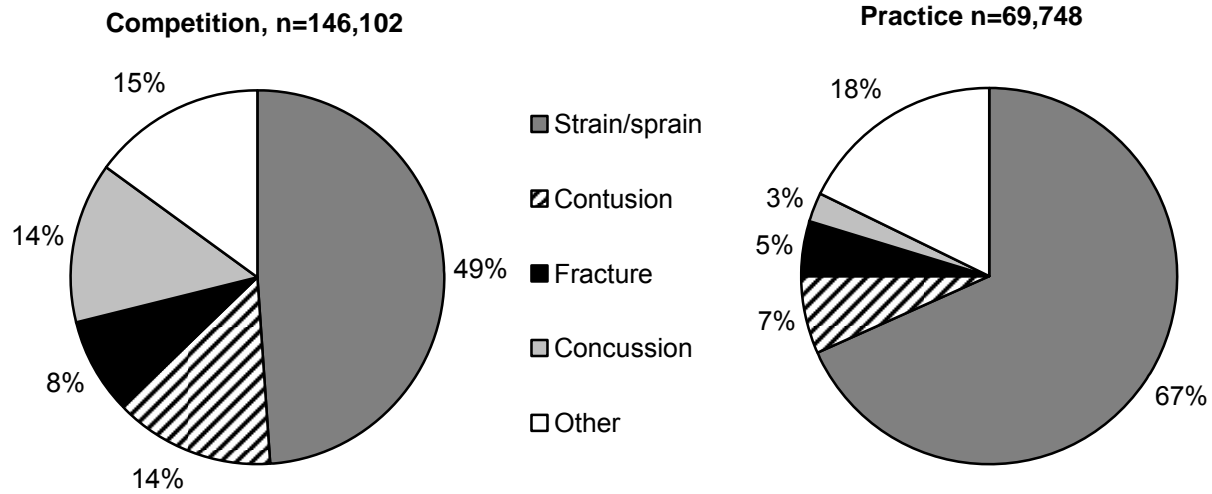


Table 5.3 Body Site of Girls' Soccer Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2007-08 School Year

| Body Site | Competition | | Practice | | Overall | |
|---------------------|----------------|-------------|---------------|-------------|----------------|-------------|
| | n | % | n | % | n | % |
| Ankle | 32,605 | 22.3% | 17,697 | 25.4% | 50,302 | 23.3% |
| Knee | 35,768 | 24.5% | 9,570 | 13.7% | 45,338 | 21.0% |
| Head/face | 25,003 | 17.1% | 2,360 | 3.4% | 27,363 | 12.7% |
| Hip/thigh/upper leg | 14,925 | 10.2% | 18,544 | 26.6% | 33,470 | 15.5% |
| Hand/wrist | 9,526 | 6.5% | 4,864 | 7.0% | 14,390 | 6.7% |
| Shoulder | 1,640 | 1.1% | 1,232 | 1.8% | 2,871 | 1.3% |
| Trunk | 1,801 | 1.2% | 719 | 1.0% | 2,520 | 1.2% |
| Lower leg | 10,743 | 7.4% | 5,947 | 8.5% | 16,690 | 7.7% |
| Arm/elbow | 3,692 | 2.5% | 2,373 | 3.4% | 6,064 | 2.8% |
| Foot | 8,597 | 5.9% | 3,291 | 4.7% | 11,888 | 5.5% |
| Neck | 1,803 | 1.2% | 0 | 0.0% | 1,803 | 0.8% |
| Other | 0 | 0.0% | 3,152 | 4.5% | 3,152 | 1.5% |
| Total | 146,102 | 100% | 69,748 | 100% | 215,849 | 100% |

Table 5.4 Ten Most Common Girls' Soccer Injury Diagnoses by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2007-08 School Year

| Diagnosis | Competition n=146,102 | | Practice n=69,748 | | Total n=215,849 | |
|-----------------------------------|--------------------------|-------|----------------------|-------|--------------------|-------|
| | n | % | n | % | n | % |
| Ankle strain/sprain | 31,802 | 21.8% | 16,570 | 23.8% | 48,372 | 22.4% |
| Hip/thigh/upper leg strain/sprain | 8,815 | 6.0% | 16,938 | 24.3% | 25,752 | 11.9% |
| Knee strain/sprain | 18,434 | 12.6% | 6,762 | 9.7% | 25,196 | 11.7% |
| Head/face concussion | 20,319 | 13.9% | 1,847 | 2.6% | 22,166 | 10.3% |
| Knee other | 12,782 | 8.7% | 1,621 | 2.3% | 14,403 | 6.7% |
| Hand/wrist strain/sprain | 5,304 | 3.6% | 4,505 | 6.5% | 9,808 | 4.5% |
| Lower leg other | 3,694 | 2.5% | 4,235 | 6.1% | 7,929 | 3.7% |
| Hip/thigh/upper leg contusion | 5,752 | 3.9% | 719 | 1.0% | 6,470 | 3.0% |
| Knee contusion | 3,833 | 2.6% | 1,186 | 1.7% | 5,020 | 2.3% |
| Foot contusion | 4,618 | 3.2% | 0 | 0.0% | 4,618 | 2.1% |

Figure 5.2 Time Loss of Girls' Soccer Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2007-08 School Year

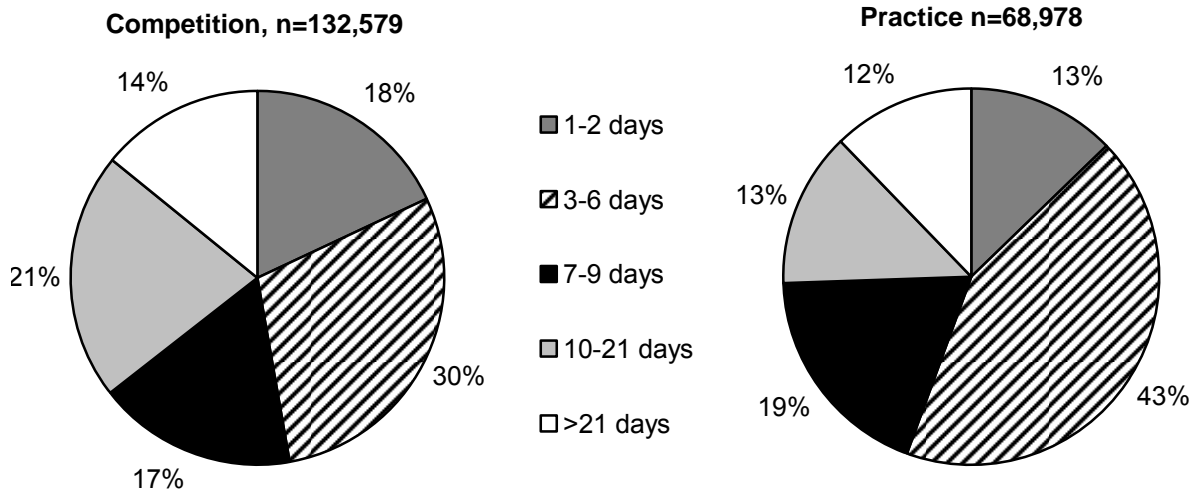


Table 5.5 Girls' Soccer Injuries Requiring Surgery by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2007-08 School Year

| | Competition | | Practice | | Overall | |
|-------------------------|----------------|-------------|---------------|-------------|----------------|-------------|
| | n | % | n | % | n | % |
| Need for surgery | | | | | | |
| Required surgery | 8,721 | 6.0% | 2,058 | 3.1% | 10,779 | 5.1% |
| Did not require surgery | 135,769 | 94.0% | 63,875 | 96.9% | 199,645 | 94.9% |
| Total | 144,491 | 100% | 65,933 | 100% | 210,424 | 100% |

Figure 5.3 History of Girls' Soccer Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2007-08 School Year

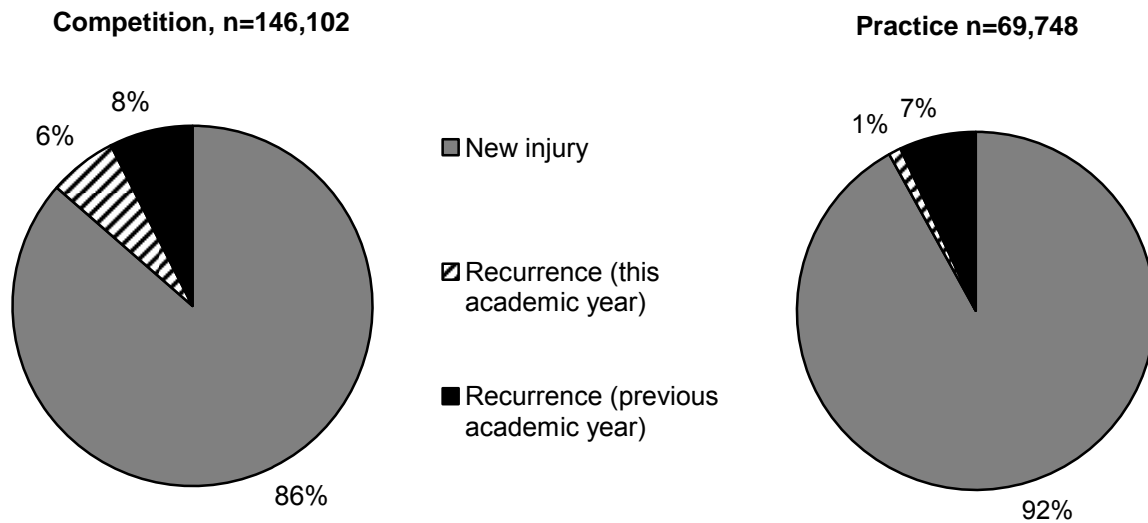


Table 5.6 Time during Season of Girls' Soccer Injuries, High School Sports-Related Injury Surveillance Study, US, 2007-08 School Year

| | n | % |
|-----------------------|----------------|-------------|
| Time in Season | | |
| Preseason | 38,733 | 17.9% |
| Regular season | 165,826 | 76.8% |
| Post season | 11,291 | 5.2% |
| Total | 215,849 | 100% |

Table 5.7 Competition-Related Variables for Girls' Soccer Injuries, High School Sports-Related Injury Surveillance Study, US, 2007-08 School Year

| | n | % |
|---|----------------|-------------|
| Time in Competition | | |
| Warm-ups | 3,332 | 2.3% |
| Beginning | 20,275 | 13.9% |
| Middle | 68,944 | 47.4% |
| End | 52,885 | 36.4% |
| Total | 145,436 | 100% |
| Competition Location | | |
| Home | 78,458 | 53.7% |
| Away | 61,226 | 41.9% |
| Neutral site | 6,418 | 4.4% |
| Total | 146,102 | 100% |
| Injury Related to Foul Play | | |
| No | 117,502 | 81.2% |
| Yes, and ruled foul play | 9,173 | 6.3% |
| Yes, but not ruled foul play | 9,573 | 6.6% |
| Unknown | 8,424 | 5.8% |
| Total | 144,672 | 100% |
| Field Location | | |
| Top of goal box extended to center line (offense) | 38,337 | 27.1% |
| Goal box (defense) | 34,058 | 24.0% |
| Top of goal box extended to center line (defense) | 31,347 | 22.1% |
| Goal box (offense) | 14,638 | 10.3% |
| Side of goal box (defense) | 12,821 | 9.1% |
| Side of goal box (offense) | 7,789 | 5.5% |
| Off the field | 2,669 | 1.9% |
| Total | 141,659 | 100% |

Table 5.8 Practice-Related Variables for Girls' Soccer Injuries, High School Sports-Related Injury Surveillance Study, US, 2007-08 School Year

| | n | % |
|---|---------------|-------------|
| Time in Practice | | |
| First 1/2 hour | 10,030 | 15.0% |
| Second 1/2 hour | 18,013 | 26.9% |
| Third 1/2 hour | 26,126 | 39.0% |
| Fourth 1/2 hour | 11,520 | 17.2% |
| >2 hours into practice | 1,384 | 2.1% |
| Total | 67,073 | 100% |
| Practice Type | | |
| Noncontact skills practice | 17,091 | 24.7% |
| Noncontact partial numbers scrimmage | 3,679 | 5.3% |
| Partial contact skills practice | 16,398 | 23.7% |
| Partial contact partial numbers scrimmage | 6,267 | 9.1% |
| Full contact skills practice | 13,825 | 20.0% |
| Full contact partial numbers scrimmage | 2,168 | 3.1% |
| Full contact full scrimmage | 4,145 | 6.0% |
| Other | 5,678 | 8.2% |
| Total | 69,251 | 100% |

Figure 5.4 Player Position of Girls' Soccer Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2007-08 School Year

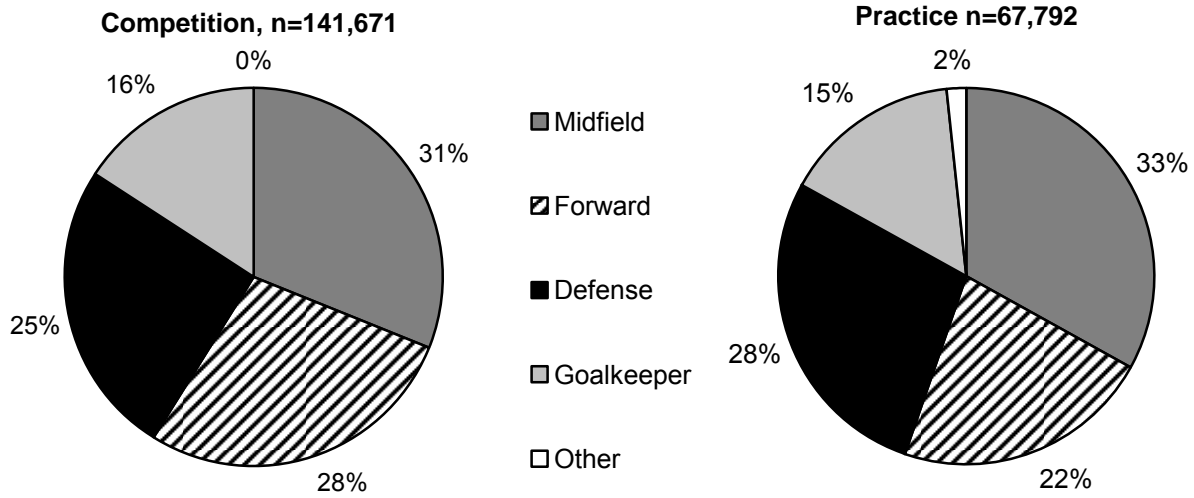
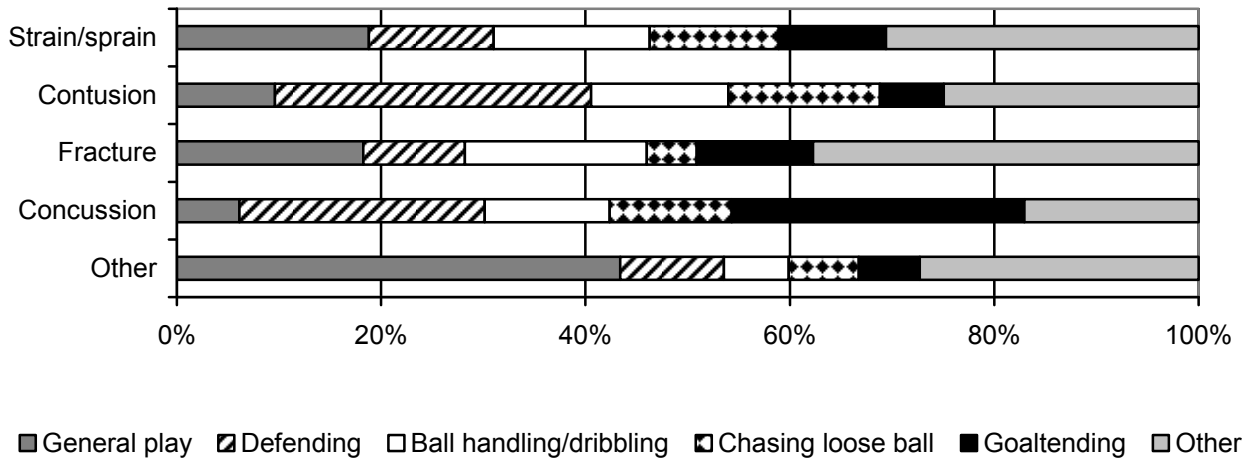


Table 5.9 Activities Leading to Girls' Soccer Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2007-08 School Year

| Activity | Competition | | Practice | | Overall | |
|-------------------------|----------------|-------------|---------------|-------------|----------------|-------------|
| | n | % | n | % | n | % |
| General play | 22,332 | 15.7% | 20,953 | 30.1% | 43,285 | 20.5% |
| Defending | 25,561 | 18.0% | 6,295 | 9.0% | 31,856 | 15.1% |
| Ball handling/dribbling | 19,854 | 14.0% | 8,681 | 12.5% | 28,535 | 13.5% |
| Chasing loose ball | 22,616 | 15.9% | 1,438 | 2.1% | 24,054 | 11.4% |
| Goaltending | 17,935 | 12.6% | 5,541 | 8.0% | 23,477 | 11.1% |
| Passing (foot) | 7,181 | 5.1% | 4,137 | 5.9% | 11,319 | 5.3% |
| Blocking shot | 5,972 | 4.2% | 2,983 | 4.3% | 8,955 | 4.2% |
| Receiving pass | 6,350 | 4.5% | 2,533 | 3.6% | 8,883 | 4.2% |
| Conditioning | 153 | 0.1% | 7,296 | 10.5% | 7,449 | 3.5% |
| Shooting (foot) | 3,910 | 2.8% | 3,491 | 5.0% | 7,401 | 3.5% |
| Other | 5601.9 | 3.9% | 512.41 | 0.7% | 6114.3 | 2.9% |
| Total | 142,030 | 100% | 69,595 | 100% | 211,625 | 100% |

Figure 5.5 Activity Resulting in Girls' Soccer Injuries by Injury Diagnosis, High School Sports-Related Injury Surveillance Study, US, 2007-08 School Year



VI. Volleyball Injury Epidemiology

Table 6.1 Volleyball Injury Rates by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2007-08 School Year

| | # Injuries | # Exposures | Injury rate (per 1,000 athlete- exposures) | Nationally Estimated # Injuries |
|--------------|------------|----------------|--|---------------------------------------|
| Total | 208 | 169,831 | 1.22 | 72,261 |
| Competition | 80 | 55,860 | 1.43 | 26,539 |
| Practice | 128 | 113,971 | 1.12 | 45,722 |

Table 6.2 Demographic Characteristics of Injured Volleyball Athletes, High School Sports-Related Injury Surveillance Study, US, 2007-08 School Year*

| Year in School | |
|--------------------------|----------------------|
| Freshman | 18,674 (26.2%) |
| Sophomore | 18,897 (26.5%) |
| Junior | 17,790 (25.0%) |
| Senior | 15,956 (22.4%) |
| Total[†] | 71,317 (100%) |
| Age (years) | |
| Minimum | 14 |
| Maximum | 18 |
| Mean (St. Dev.) | 15.6 (1.2) |
| BMI | |
| Minimum | 15.2 |
| Maximum | 46.2 |
| Mean (St. Dev.) | 21.7 (3.2) |

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

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

Figure 6.1 Diagnosis of Volleyball Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2007-08 School Year

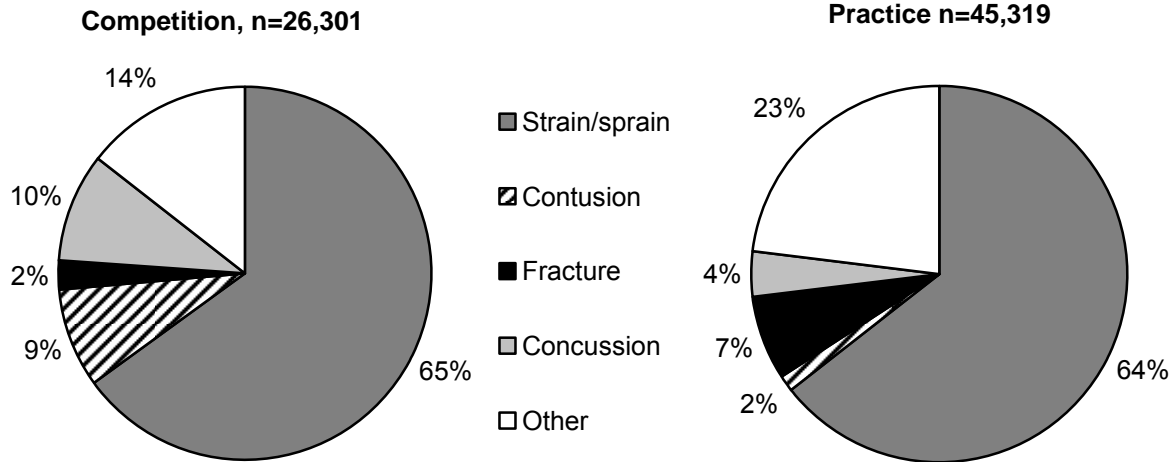


Table 6.3 Body Site of Volleyball Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2007-08 School Year

| Body Site | Competition | | Practice | | Overall | |
|---------------------|---------------|-------------|---------------|-------------|---------------|-------------|
| | n | % | n | % | n | % |
| Ankle | 8,926 | 33.8% | 14,531 | 32.1% | 23,456 | 32.7% |
| Knee | 3,119 | 11.8% | 2,763 | 6.1% | 5,882 | 8.2% |
| Head/face | 2,924 | 11.1% | 2,247 | 5.0% | 5,171 | 7.2% |
| Hip/thigh/upper leg | 1,544 | 5.8% | 5,345 | 11.8% | 6,890 | 9.6% |
| Hand/wrist | 3,157 | 12.0% | 3,741 | 8.3% | 6,898 | 9.6% |
| Shoulder | 2,298 | 8.7% | 4,713 | 10.4% | 7,011 | 9.8% |
| Trunk | 2,386 | 9.0% | 3,555 | 7.8% | 5,940 | 8.3% |
| Lower leg | 93 | 0.4% | 3,753 | 8.3% | 3,846 | 5.4% |
| Arm/elbow | 1,048 | 4.0% | 135 | 0.3% | 1,182 | 1.6% |
| Foot | 0 | 0.0% | 2,922 | 6.4% | 2,922 | 4.1% |
| Neck | 0 | 0.0% | 403 | 0.9% | 403 | 0.6% |
| Other | 910 | 3.4% | 1,213 | 2.7% | 2,123 | 3.0% |
| Total | 26,405 | 100% | 45,319 | 100% | 71,723 | 100% |

Table 6.4 Ten Most Common Volleyball Injury Diagnoses by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2007-08 School Year

| Diagnosis | Competition n=26,301 | | Practice n=45,319 | | Total n=71,620 | |
|-----------------------------------|-------------------------|-------|----------------------|-------|-------------------|-------|
| | n | % | n | % | n | % |
| Ankle strain/sprain | 8,523 | 32.4% | 14,531 | 32.1% | 23,053 | 32.2% |
| Hand/wrist strain/sprain | 2,413 | 9.2% | 1,887 | 4.2% | 4,300 | 6.0% |
| Head/face concussion | 2,521 | 9.6% | 1,705 | 3.8% | 4,227 | 5.9% |
| Shoulder strain/sprain | 1,353 | 5.1% | 2,791 | 6.2% | 4,145 | 5.8% |
| Hip/thigh/upper leg strain/sprain | 403 | 1.5% | 3,433 | 7.6% | 3,836 | 5.4% |
| Trunk strain/sprain | 1,141 | 4.3% | 2,046 | 4.5% | 3,187 | 4.4% |
| Knee strain/sprain | 1,937 | 7.4% | 1,147 | 2.5% | 3,084 | 4.3% |
| Shoulder other | 944 | 3.6% | 1,922 | 4.2% | 2,866 | 4.0% |
| Trunk other | 1,141 | 4.3% | 1,509 | 3.3% | 2,650 | 3.7% |
| Lower leg other | 0 | 0.0% | 2,151 | 4.7% | 2,151 | 3.0% |

Figure 6.2 Time Loss of Volleyball Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2007-08 School Year

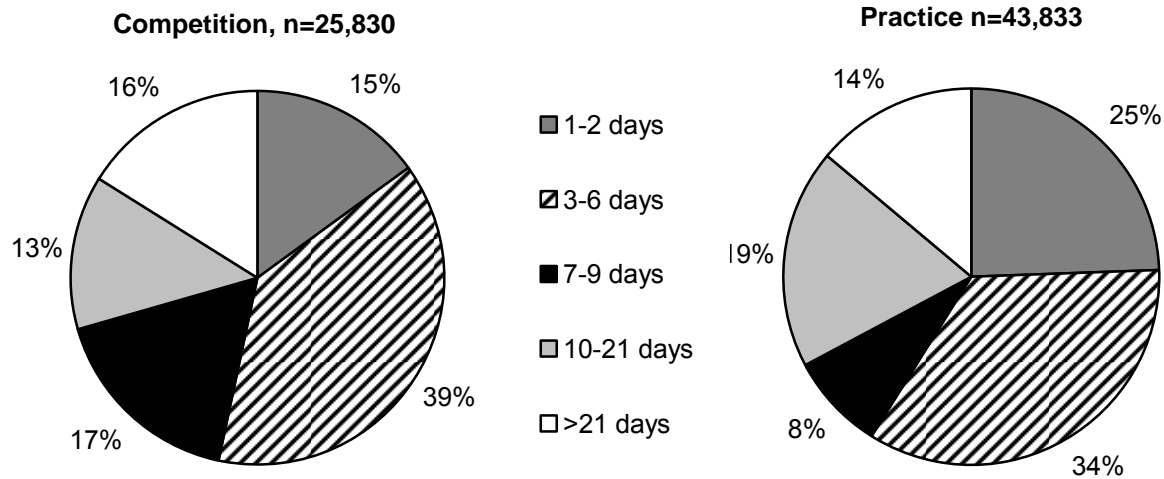


Table 6.5 Volleyball Injuries Requiring Surgery by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2007-08 School Year

| | Competition | | Practice | | Overall | |
|-------------------------|---------------|-------------|---------------|-------------|---------------|-------------|
| | n | % | n | % | n | % |
| Need for surgery | | | | | | |
| Required surgery | 590 | 2.2% | 238 | 0.5% | 828 | 1.2% |
| Did not require surgery | 25,577 | 97.8% | 44,043 | 99.5% | 69,620 | 98.8% |
| Total | 26,167 | 100% | 44,281 | 100% | 70,448 | 100% |

Figure 6.3 History of Volleyball Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2007-08 School Year

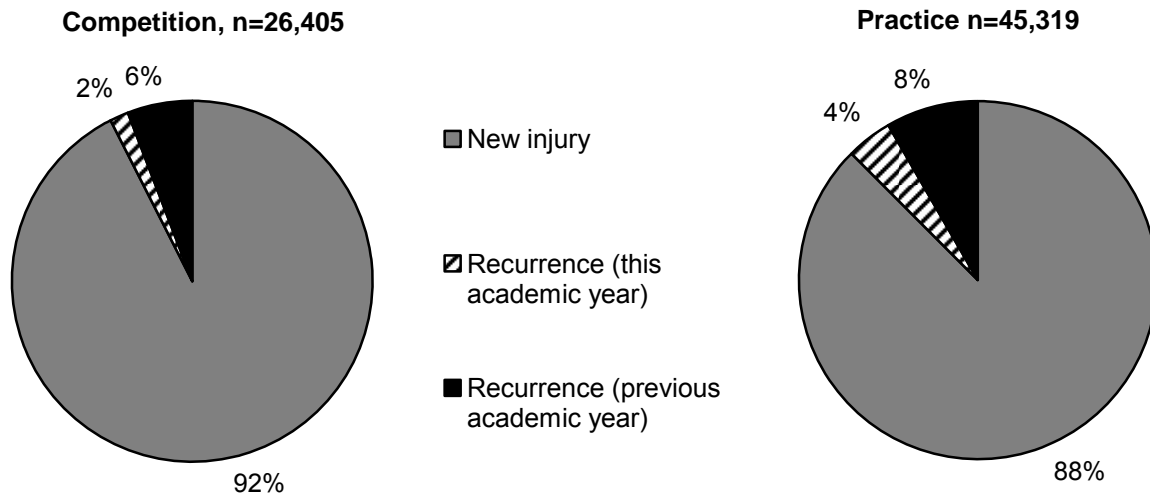


Table 6.6 Time during Season of Volleyball Injuries, High School Sports-Related Injury Surveillance Study, US, 2007-08 School Year

| | n | % |
|-----------------------|---------------|-------------|
| Time in Season | | |
| Preseason | 20,644 | 28.6% |
| Regular season | 51,513 | 71.3% |
| Post season | 103 | 0.1% |
| Total | 72,261 | 100% |

Table 6.7 Competition-Related Variables for Volleyball Injuries, High School Sports-Related Injury Surveillance Study, US, 2007-08 School Year

| | n | % |
|------------------------------------|---------------|-------------|
| Time in Competition | | |
| Warm-ups | 2,230 | 8.4% |
| Beginning | 1,514 | 5.7% |
| Middle | 16,980 | 64.3% |
| End | 5,680 | 21.5% |
| Total | 26,405 | 100% |
| Competition Location | | |
| Home | 11,992 | 45.4% |
| Away | 13,330 | 50.5% |
| Neutral site | 1,083 | 4.1% |
| Total | 26,405 | 100% |
| Injury Related to Foul Play | | |
| No | 25,598 | 98.4% |
| Yes, and ruled foul play | 0 | 0.0% |
| Yes, but not ruled foul play | 403 | 1.6% |
| Unknown | 0 | 0.0% |
| Total | 26,002 | 100% |
| Court Location | | |
| Middle forward | 8,441 | 34.3% |
| Right forward | 4,919 | 20.0% |
| Left back | 4,273 | 17.3% |
| Left forward | 2,786 | 11.3% |
| Right back (server) | 2,591 | 10.5% |
| Off the court | 641 | 2.6% |
| Outside court (your side) | 589 | 2.4% |
| Outside court (opponent's side) | 403 | 1.6% |
| Total | 24,644 | 100% |

Table 6.8 Practice-Related Variables for Volleyball Injuries, High School Sports-Related Injury Surveillance Study, US, 2007-08 School Year

| | n | % |
|---|---------------|-------------|
| Time in Practice | | |
| First 1/2 hour | 6,210 | 13.7% |
| Second 1/2 hour | 19,147 | 42.3% |
| Third 1/2 hour | 8,911 | 19.7% |
| Fourth 1/2 hour | 7,664 | 16.9% |
| >2 hours into practice | 3,385 | 7.5% |
| Total | 45,319 | 100% |
| Practice Type | | |
| Noncontact skills practice | 23,986 | 52.9% |
| Noncontact partial numbers scrimmage | 4,368 | 9.6% |
| Noncontact full scrimmage | 5,150 | 11.4% |
| Partial contact skills practice | 3,126 | 6.9% |
| Partial contact partial numbers scrimmage | 1,750 | 3.9% |
| Partial contact full scrimmage | 93 | 0.2% |
| Full contact skills practice | 2,900 | 6.4% |
| Full contact full scrimmage | 2,494 | 5.5% |
| Other | 1,451 | 3.2% |
| Total | 45,319 | 100% |

Figure 6.4 Player Position of Volleyball Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2007-08 School Year

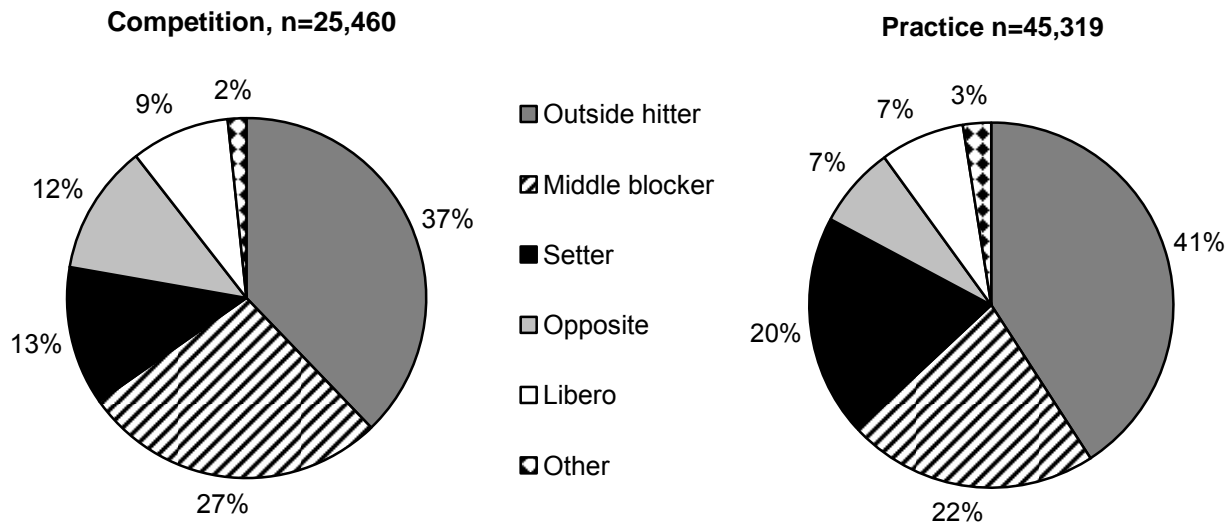
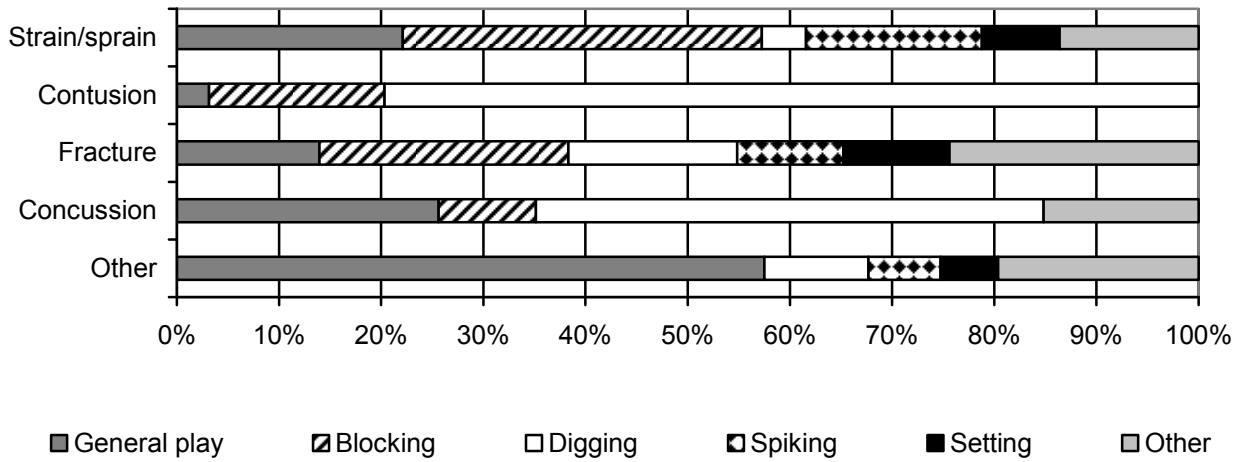


Table 6.9 Activities Leading to Volleyball Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2007-08 School Year

| Activity | Competition | | Practice | | Overall | |
|--------------|---------------|-------------|---------------|-------------|---------------|-------------|
| | n | % | n | % | n | % |
| General play | 8,452 | 32.0% | 11,663 | 25.9% | 20,115 | 28.1% |
| Blocking | 6,962 | 26.4% | 11,177 | 24.8% | 18,140 | 25.4% |
| Spiking | 3,181 | 12.0% | 6,159 | 13.7% | 9,339 | 13.1% |
| Digging | 5,259 | 19.9% | 3,273 | 7.3% | 8,531 | 11.9% |
| Conditioning | 0 | 0.0% | 5,077 | 11.3% | 5,077 | 7.1% |
| Setting | 541 | 2.1% | 4,168 | 9.2% | 4,709 | 6.6% |
| Serving | 1,244 | 4.7% | 1,747 | 3.9% | 2,991 | 4.2% |
| Passing | 362 | 1.4% | 1,048 | 2.3% | 1,411 | 2.0% |
| Other | 403 | 1.5% | 779 | 1.7% | 1,182 | 1.7% |
| Total | 26,405 | 100% | 45,091 | 100% | 71,496 | 100% |

Figure 6.5 Activity Resulting in Volleyball Injuries by Injury Diagnosis, High School Sports-Related Injury Surveillance Study, US, 2007-08 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, 2007-08 School Year

| | # Injuries | # Exposures | Injury rate (per 1,000 athlete- exposures) | Nationally Estimated # Injuries |
|--------------|------------|----------------|--|---------------------------------------|
| Total | 348 | 249,849 | 1.39 | 82,612 |
| Competition | 166 | 74,446 | 2.23 | 36,766 |
| Practice | 182 | 175,403 | 1.04 | 45,846 |

Table 7.2 Demographic Characteristics of Injured Boys' Basketball Athletes, High School Sports-Related Injury Surveillance Study, US, 2007-08 School Year*

| Year in School | |
|-----------------------|----------------------|
| Freshman | 15,876 (19.3%) |
| Sophomore | 20,692 (25.2%) |
| Junior | 21,378 (26.0%) |
| Senior | 24,154 (29.4%) |
| Total† | 82,099 (100%) |
| Age (years) | |
| Minimum | 14 |
| Maximum | 19 |
| Mean (St. Dev.) | 16.2 (1.2) |
| BMI | |
| Minimum | 16.3 |
| Maximum | 33.7 |
| Mean (St. Dev.) | 23.0 (2.9) |

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

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

Figure 7.1 Diagnosis of Boys' Basketball Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2007-08 School Year

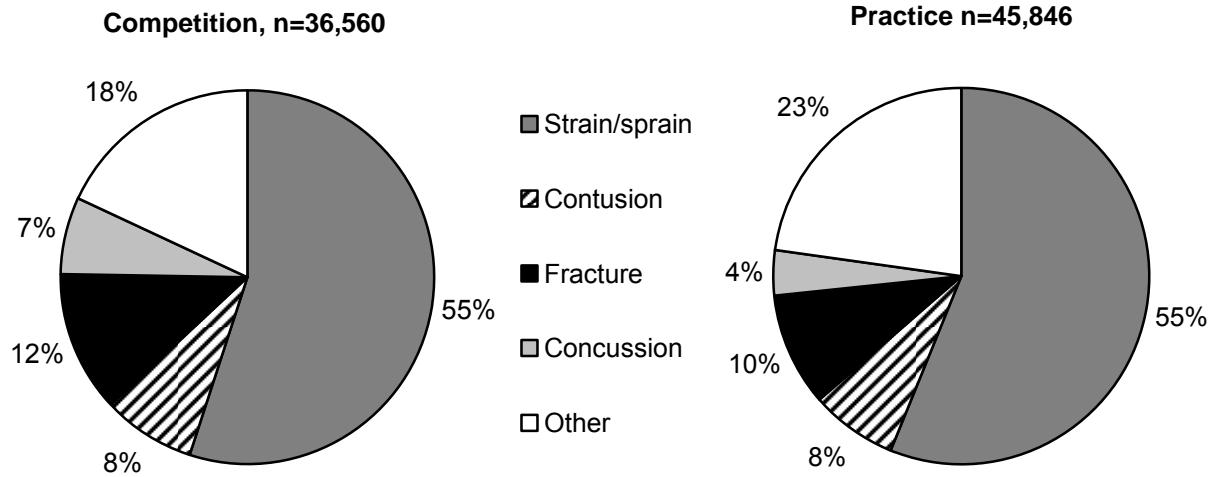


Table 7.3 Body Site of Boys' Basketball Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2007-08 School Year

| Body Site | Competition | | Practice | | Overall | |
|---------------------|---------------|-------------|---------------|-------------|---------------|-------------|
| | n | % | n | % | n | % |
| Ankle | 12,570 | 34.3% | 14,801 | 32.3% | 27,371 | 33.2% |
| Knee | 5,672 | 15.5% | 6,548 | 14.3% | 12,220 | 14.8% |
| Head/face | 4,651 | 12.7% | 3,848 | 8.4% | 8,499 | 10.3% |
| Hip/thigh/upper leg | 1,430 | 3.9% | 2,090 | 4.6% | 3,520 | 4.3% |
| Hand/wrist | 3,680 | 10.0% | 6,652 | 14.5% | 10,332 | 12.5% |
| Shoulder | 1,099 | 3.0% | 2,807 | 6.1% | 3,906 | 4.7% |
| Trunk | 1,534 | 4.2% | 2,422 | 5.3% | 3,955 | 4.8% |
| Lower leg | 506 | 1.4% | 505 | 1.1% | 1,011 | 1.2% |
| Arm/elbow | 2,211 | 6.0% | 946 | 2.1% | 3,157 | 3.8% |
| Foot | 2,504 | 6.8% | 3,841 | 8.4% | 6,345 | 7.7% |
| Neck | 85 | 0.2% | 85 | 0.2% | 169 | 0.2% |
| Other | 703 | 1.9% | 1,302 | 2.8% | 2,005 | 2.4% |
| Total | 36,645 | 100% | 45,846 | 100% | 82,490 | 100% |

Table 7.4 Ten Most Common Boys' Basketball Injury Diagnoses by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2007-08 School Year

| Diagnosis | Competition n=36,560 | | Practice n=45,846 | | Total n=82,406 | |
|--------------------------|-------------------------|-------|----------------------|-------|-------------------|-------|
| | n | % | n | % | n | % |
| Ankle strain/sprain | 12,279 | 33.6% | 14,197 | 31.0% | 26,477 | 32.1% |
| Knee strain/sprain | 1,884 | 5.2% | 3,123 | 6.8% | 5,006 | 6.1% |
| Knee other | 2,433 | 6.7% | 2,451 | 5.3% | 4,884 | 5.9% |
| Hand/wrist fracture | 1,670 | 4.6% | 2,810 | 6.1% | 4,481 | 5.4% |
| Head/face concussion | 2,418 | 6.6% | 1,761 | 3.8% | 4,179 | 5.1% |
| Hand/wrist strain/sprain | 1,562 | 4.3% | 2,252 | 4.9% | 3,814 | 4.6% |
| Foot strain/sprain | 1,961 | 5.4% | 1,015 | 2.2% | 2,976 | 3.6% |
| Head/face other | 1,803 | 4.9% | 1,097 | 2.4% | 2,900 | 3.5% |
| Foot other | 0 | 0.0% | 2,395 | 5.2% | 2,395 | 2.9% |
| Shoulder strain/sprain | 683 | 1.9% | 1,704 | 3.7% | 2,386 | 2.9% |

Figure 7.2 Time Loss of Boys' Basketball Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2007-08 School Year

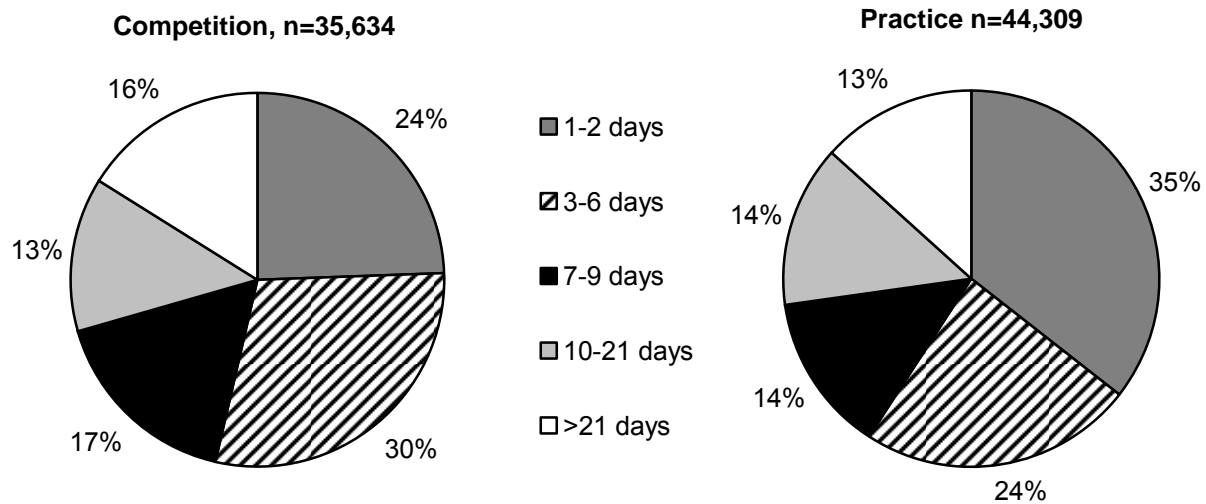


Table 7.5 Boys' Basketball Injuries Requiring Surgery by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2007-08 School Year

| | Competition | | Practice | | Overall | |
|-------------------------|---------------|-------------|---------------|-------------|---------------|-------------|
| | n | % | n | % | n | % |
| Need for surgery | | | | | | |
| Required surgery | 1,563 | 4.3% | 3,729 | 8.3% | 5,292 | 6.5% |
| Did not require surgery | 34,745 | 95.7% | 41,156 | 91.7% | 75,900 | 93.5% |
| Total | 36,308 | 100% | 44,884 | 100% | 81,192 | 100% |

Figure 7.3 History of Boys' Basketball Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2007-08 School Year

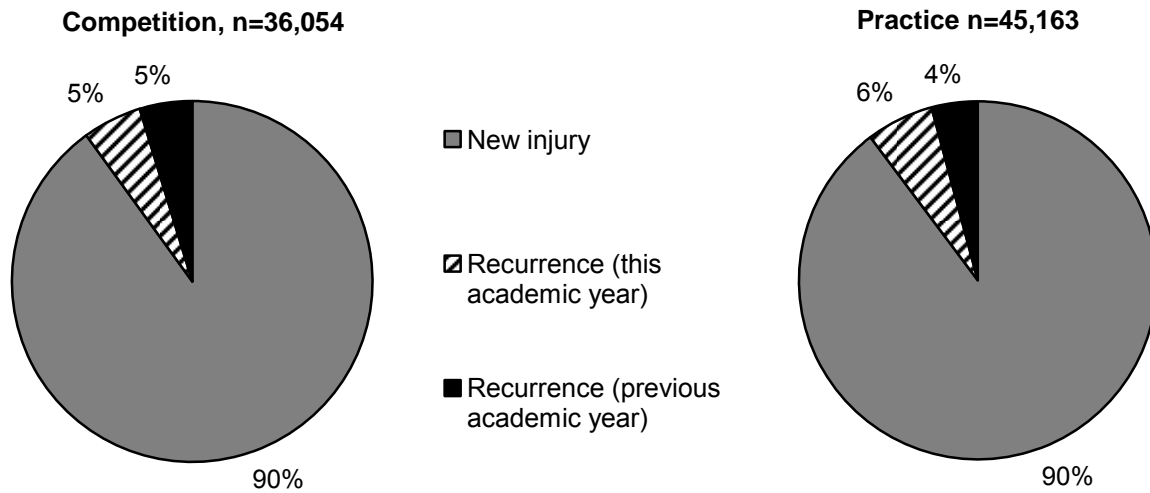


Table 7.6 Time during Season of Boys' Basketball Injuries, High School Sports-Related Injury Surveillance Study, US, 2007-08 School Year

| | n | % |
|-----------------------|---------------|-------------|
| Time in Season | | |
| Preseason | 16,039 | 19.4% |
| Regular season | 62,042 | 75.1% |
| Post season | 4,530 | 5.5% |
| Total | 82,612 | 100% |

Table 7.7 Competition-Related Variables for Boys' Basketball Injuries, High School Sports-Related Injury Surveillance Study, US, 2007-08 School Year

| | n | % |
|-------------------------------------|---------------|-------------|
| Time in Competition | | |
| Warm-ups | 252 | 0.7% |
| Beginning | 5,098 | 13.9% |
| Middle | 19,200 | 52.4% |
| End | 12,095 | 33.0% |
| Total | 36,645 | 100% |
| Competition Location | | |
| Home | 18,902 | 51.6% |
| Away | 16,305 | 44.5% |
| Neutral site | 1,438 | 3.9% |
| Total | 36,645 | 100% |
| Injury Related to Foul Play | | |
| No | 29,701 | 81.1% |
| Yes, and ruled foul play | 3,958 | 10.8% |
| Yes, but not ruled foul play | 1,363 | 3.7% |
| Unknown | 1,623 | 4.4% |
| Total | 36,645 | 100% |
| Court Location | | |
| Inside lane (offense) | 8,563 | 23.7% |
| Inside lane (defense) | 7,103 | 19.7% |
| Outside 3 point arc (offense) | 5,546 | 15.3% |
| Outside 3 point arc (defense) | 5,349 | 14.8% |
| Between 3 pt arc and lane (defense) | 4,324 | 12.0% |
| Between 3 pt arc and lane (offense) | 4,091 | 11.3% |
| Out of bounds | 795 | 2.2% |
| Off the court | 373 | 1.0% |
| Total | 36,144 | 100% |

Table 7.8 Practice-Related Variables for Boys' Basketball Injuries, High School Sports-Related Injury Surveillance Study, US, 2007-08 School Year

| | n | % |
|---|---------------|-------------|
| Time in Practice | | |
| First 1/2 hour | 6,118 | 13.5% |
| Second 1/2 hour | 11,937 | 26.3% |
| Third 1/2 hour | 16,723 | 36.9% |
| Fourth 1/2 hour | 7,305 | 16.1% |
| >2 hours into practice | 3,273 | 7.2% |
| Total | 45,356 | 100% |
| Practice Type | | |
| Noncontact skills practice | 7,823 | 17.2% |
| Noncontact partial numbers scrimmage | 206 | 0.5% |
| Noncontact full scrimmage | 2,046 | 4.5% |
| Partial contact skills practice | 5,105 | 11.2% |
| Partial contact partial numbers scrimmage | 4,247 | 9.3% |
| Partial contact full scrimmage | 4,959 | 10.9% |
| Full contact skills practice | 6,308 | 13.9% |
| Full contact partial numbers scrimmage | 5,235 | 11.5% |
| Full contact full scrimmage | 8,059 | 17.7% |
| Other | 1,526 | 3.4% |
| Total | 45,515 | 100% |

Figure 7.4 Player Position of Boys' Basketball Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2007-08 School Year

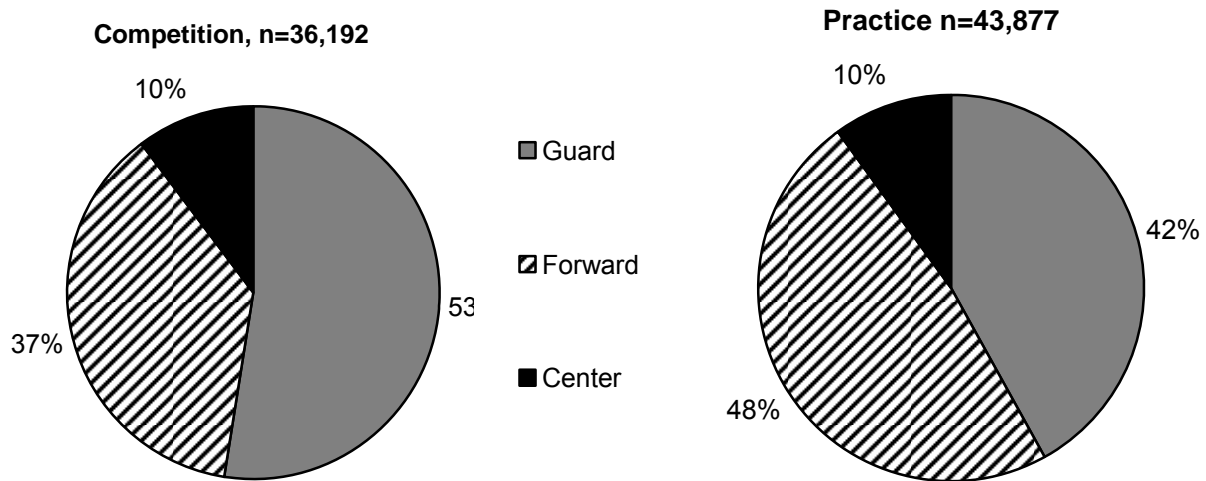
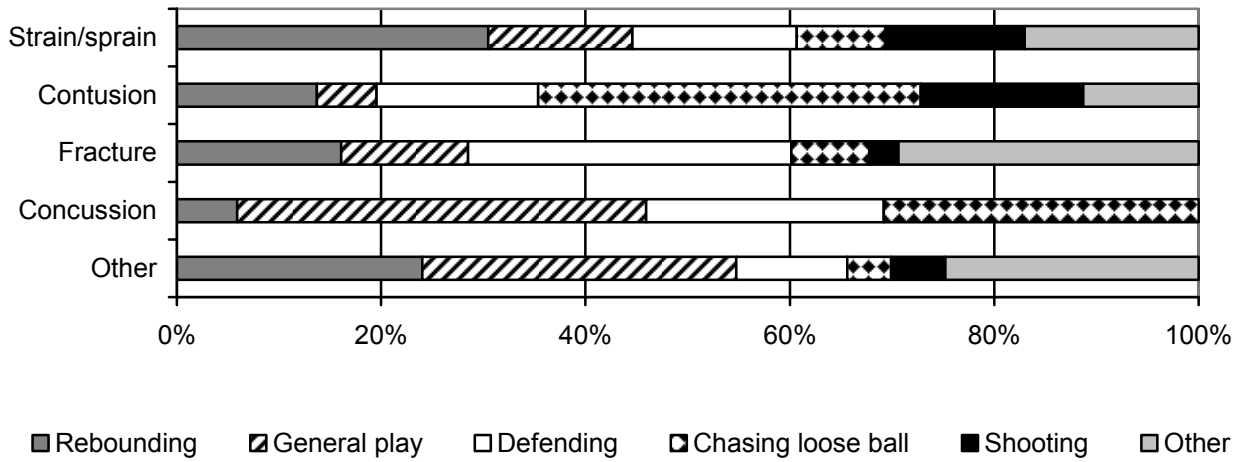


Table 7.9 Activities Leading to Boys' Basketball Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2007-08 School Year

| Activity | Competition | | Practice | | Overall | |
|-------------------------|---------------|-------------|---------------|-------------|---------------|-------------|
| | n | % | n | % | n | % |
| Rebounding | 8,875 | 24.4% | 11,517 | 25.4% | 20,392 | 25.0% |
| General play | 5,382 | 14.8% | 9,348 | 20.7% | 14,731 | 18.1% |
| Defending | 7,196 | 19.8% | 6,706 | 14.8% | 13,903 | 17.0% |
| Chasing loose ball | 5,685 | 15.7% | 3,331 | 7.4% | 9,016 | 11.1% |
| Shooting | 4,296 | 11.8% | 4,038 | 8.9% | 8,334 | 10.2% |
| Conditioning | 434 | 1.2% | 3,352 | 7.4% | 3,786 | 4.6% |
| Ball handling/dribbling | 2,058 | 5.7% | 1,627 | 3.6% | 3,685 | 4.5% |
| Receiving pass | 885 | 2.4% | 2,569 | 5.7% | 3,454 | 4.2% |
| Other | 1,502 | 4.1% | 2,768 | 6.1% | 4,270 | 5.2% |
| Total | 36,313 | 100% | 45,258 | 100% | 81,571 | 100% |

Figure 7.5 Activity Resulting in Boys' Basketball Injuries by Injury Diagnosis, High School Sports-Related Injury Surveillance Study, US, 2007-08 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, 2007-08 School Year

| | # Injuries | # Exposures | Injury rate (per 1,000 athlete- exposures) | Nationally Estimated # Injuries |
|--------------|------------|----------------|--|---------------------------------------|
| Total | 320 | 198,486 | 1.61 | 73,283 |
| Competition | 195 | 59,177 | 3.30 | 45,236 |
| Practice | 125 | 139,309 | 0.90 | 28,047 |

Table 8.2 Demographic Characteristics of Injured Girls' Basketball Athletes, High School Sports-Related Injury Surveillance Study, US, 2007-08 School Year*

| Year in School | |
|--------------------------|----------------------|
| Freshman | 20,320 (28.6%) |
| Sophomore | 18,614 (26.2%) |
| Junior | 21,369 (30.0%) |
| Senior | 10,827 (15.2%) |
| Total[†] | 71,129 (100%) |
| Age (years) | |
| Minimum | 13 |
| Maximum | 19 |
| Mean (St. Dev.) | 15.7 (1.2) |
| BMI | |
| Minimum | 15.6 |
| Maximum | 36.1 |
| Mean (St. Dev.) | 22.0 (3.2) |

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

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

Figure 8.1 Diagnosis of Girls' Basketball Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2007-08 School Year

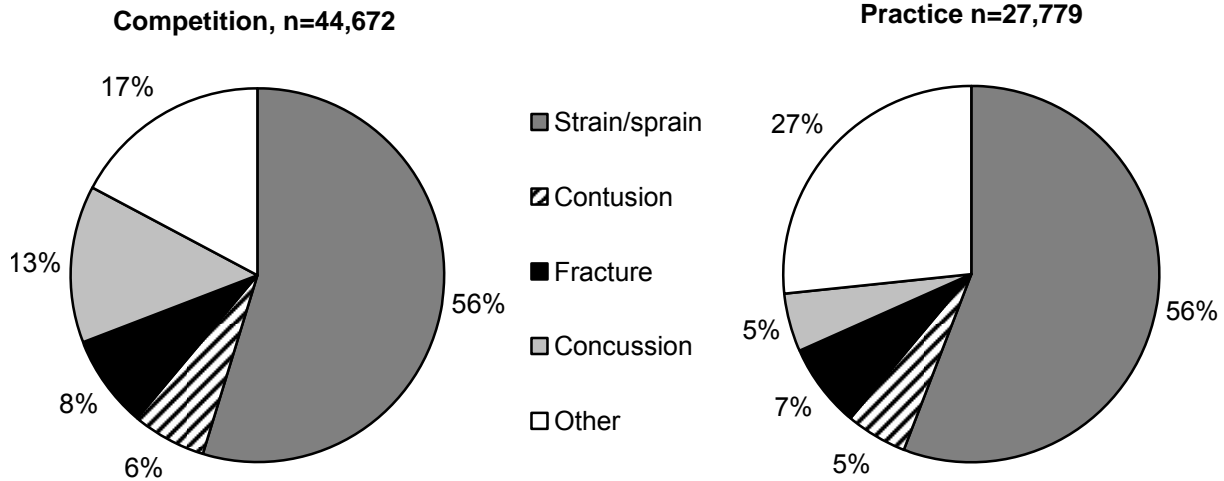


Table 8.3 Body Site of Girls' Basketball Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2007-08 School Year

| | Competition | | Practice | | Overall | |
|---------------------|---------------|-------------|---------------|-------------|---------------|-------------|
| | n | % | n | % | n | % |
| Body Site | | | | | | |
| Ankle | 14,176 | 31.7% | 7,553 | 27.2% | 21,729 | 30.0% |
| Knee | 8,204 | 18.4% | 5,060 | 18.2% | 13,263 | 18.3% |
| Head/face | 9,003 | 20.2% | 1,368 | 4.9% | 10,370 | 14.3% |
| Hip/thigh/upper leg | 1,208 | 2.7% | 4,798 | 17.3% | 6,006 | 8.3% |
| Hand/wrist | 4,138 | 9.3% | 2,774 | 10.0% | 6,913 | 9.5% |
| Shoulder | 1,758 | 3.9% | 1,770 | 6.4% | 3,528 | 4.9% |
| Trunk | 1,811 | 4.1% | 208 | 0.7% | 2,019 | 2.8% |
| Lower leg | 2,203 | 4.9% | 1,230 | 4.4% | 3,433 | 4.7% |
| Arm/elbow | 379 | 0.8% | 0 | 0.0% | 379 | 0.5% |
| Foot | 1,030 | 2.3% | 2,614 | 9.4% | 3,644 | 5.0% |
| Neck | 321 | 0.7% | 73 | 0.3% | 395 | 0.5% |
| Other | 442 | 1.0% | 331 | 1.2% | 773 | 1.1% |
| Total | 44,673 | 100% | 27,779 | 100% | 72,451 | 100% |

Table 8.4 Ten Most Common Girls' Basketball Injury Diagnoses by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2007-08 School Year

| Diagnosis | Competition n=44,672 | | Practice n=27,779 | | Total n=72,451 | |
|-----------------------------------|-------------------------|-------|----------------------|-------|-------------------|-------|
| | n | % | n | % | n | % |
| Ankle strain/sprain | 12,813 | 28.7% | 7,111 | 25.6% | 19,923 | 27.5% |
| Head/face concussion | 6,021 | 13.5% | 1,368 | 4.9% | 7,389 | 10.2% |
| Knee strain/sprain | 5,254 | 11.8% | 1,705 | 6.1% | 6,959 | 9.6% |
| Hip/thigh/upper leg strain/sprain | 784 | 1.8% | 4,356 | 15.7% | 5,140 | 7.1% |
| Knee other | 1,640 | 3.7% | 2,595 | 9.3% | 4,235 | 5.8% |
| Hand/wrist strain/sprain | 2,178 | 4.9% | 1,026 | 3.7% | 3,204 | 4.4% |
| Foot other | 822 | 1.8% | 1,908 | 6.9% | 2,730 | 3.8% |
| Hand/wrist fracture | 1,289 | 2.9% | 1,393 | 5.0% | 2,682 | 3.7% |
| Shoulder other | 1,048 | 2.3% | 997 | 3.6% | 2,045 | 2.8% |
| Lower leg other | 746 | 1.7% | 1,144 | 4.1% | 1,889 | 2.6% |

Figure 8.2 Time Loss of Girls' Basketball Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2007-08 School Year

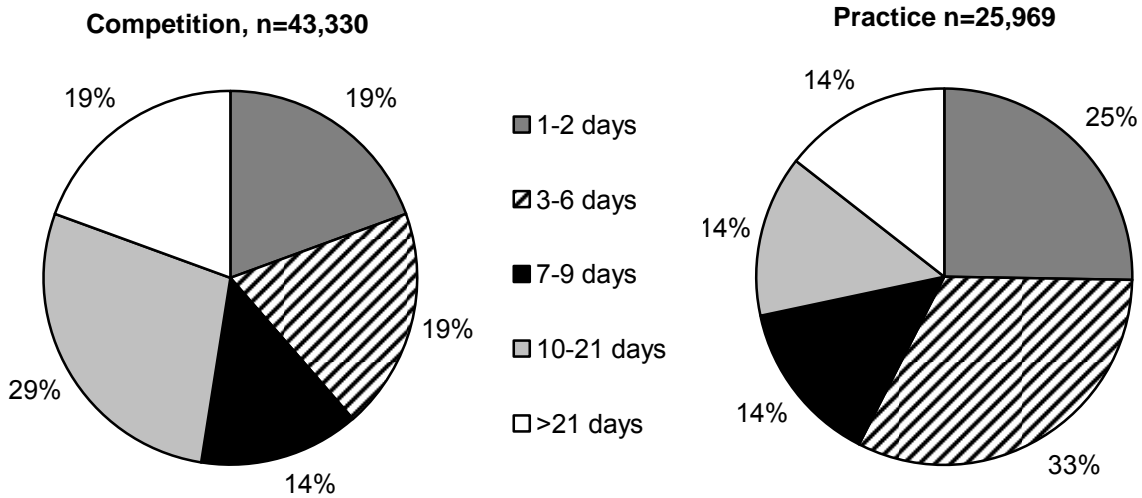


Table 8.5 Girls' Basketball Injuries Requiring Surgery by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2007-08 School Year

| | Competition | | Practice | | Overall | |
|-------------------------|---------------|-------------|---------------|-------------|---------------|-------------|
| | n | % | n | % | n | % |
| Need for surgery | | | | | | |
| Required surgery | 4,042 | 9.3% | 1,081 | 4.0% | 5,123 | 7.2% |
| Did not require surgery | 39,424 | 90.7% | 26,318 | 96.0% | 65,743 | 92.8% |
| Total | 43,466 | 100% | 27,400 | 100% | 70,866 | 100% |

Figure 8.3 History of Girls' Basketball Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2007-08 School Year

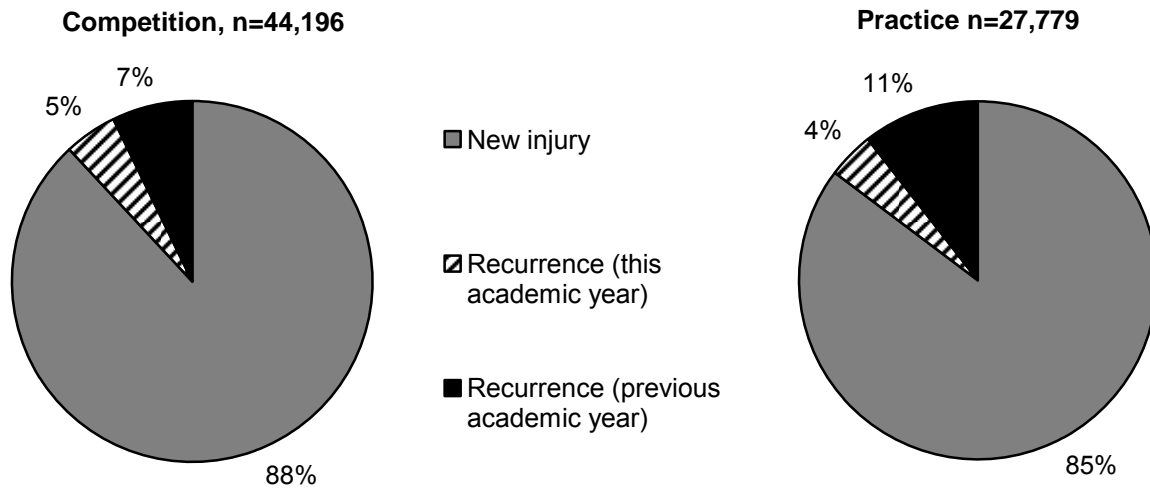


Table 8.6 Time during Season of Girls' Basketball Injuries, High School Sports-Related Injury Surveillance Study, US, 2007-08 School Year

| | n | % |
|-----------------------|---------------|-------------|
| Time in Season | | |
| Preseason | 15,919 | 21.7% |
| Regular season | 55,198 | 75.3% |
| Post season | 2,166 | 3.0% |
| Total | 73,283 | 100% |

Table 8.7 Competition-Related Variables for Girls' Basketball Injuries, High School Sports-Related Injury Surveillance Study, US, 2007-08 School Year

| | n | % |
|-------------------------------------|---------------|-------------|
| Time in Competition | | |
| Warm-ups | 1,630 | 3.7% |
| Beginning | 7,679 | 17.2% |
| Middle | 21,607 | 48.5% |
| End | 13,610 | 30.6% |
| Total | 44,526 | 100% |
| Competition Location | | |
| Home | 20,064 | 44.9% |
| Away | 23,411 | 52.4% |
| Neutral site | 1,197 | 2.7% |
| Total | 44,672 | 100% |
| Injury Related to Foul Play | | |
| No | 38,665 | 86.6% |
| Yes, and ruled foul play | 3,075 | 6.9% |
| Yes, but not ruled foul play | 1,967 | 4.4% |
| Unknown | 966 | 2.2% |
| Total | 44,672 | 100% |
| Court Location | | |
| Inside lane (offense) | 8,812 | 20.2% |
| Inside lane (defense) | 9,645 | 22.1% |
| Between 3 pt arc and lane (offense) | 6,624 | 15.2% |
| Between 3 pt arc and lane (defense) | 7,012 | 16.1% |
| Outside 3 point arc (offense) | 5,324 | 12.2% |
| Outside 3 point arc (defense) | 4,278 | 9.8% |
| Out of bounds | 1,117 | 2.6% |
| Off the court | 847 | 1.9% |
| Total | 43,660 | 100% |

Table 8.8 Practice-Related Variables for Girls' Basketball Injuries, High School Sports-Related Injury Surveillance Study, US, 2007-08 School Year

| | n | % |
|---|---------------|-------------|
| Time in Practice | | |
| First 1/2 hour | 4,745 | 17.2% |
| Second 1/2 hour | 5,914 | 21.4% |
| Third 1/2 hour | 9,100 | 33.0% |
| Fourth 1/2 hour | 5,866 | 21.3% |
| >2 hours into practice | 1,959 | 7.1% |
| Total | 27,584 | 100% |
| Practice Type | | |
| Noncontact skills practice | 7,656 | 27.6% |
| Noncontact partial numbers scrimmage | 408 | 1.5% |
| Noncontact full scrimmage | 1,847 | 6.7% |
| Partial contact skills practice | 4,370 | 15.7% |
| Partial contact partial numbers scrimmage | 1,371 | 4.9% |
| Partial contact full scrimmage | 2,290 | 8.2% |
| Full contact skills practice | 4,007 | 14.4% |
| Full contact partial numbers scrimmage | 1,124 | 4.0% |
| Full contact full scrimmage | 2,713 | 9.8% |
| Other | 1,992 | 7.2% |
| Total | 27,779 | 100% |

Figure 8.4 Player Position of Girls' Basketball Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2007-08 School Year

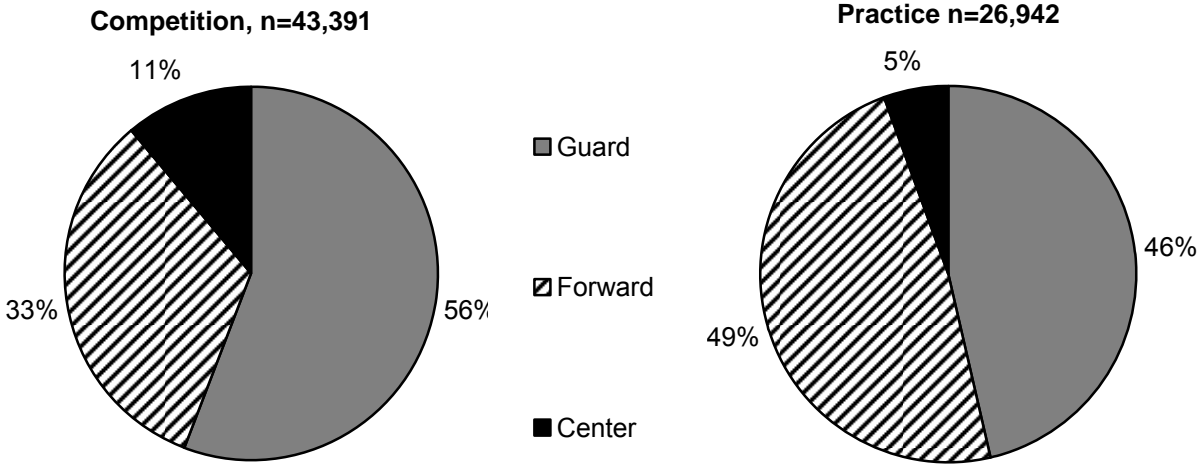
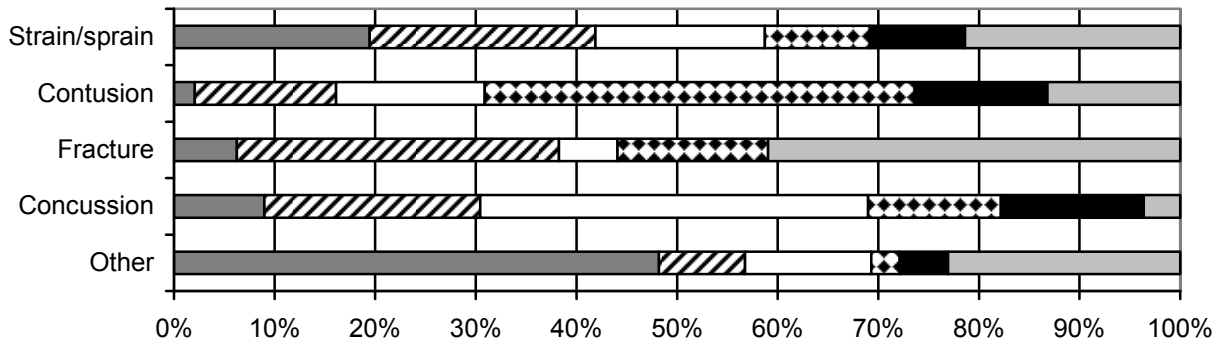


Table 8.9 Activities Leading to Girls' Basketball Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2007-08 School Year

| Activity | Competition | | Practice | | Overall | |
|-------------------------|---------------|-------------|---------------|-------------|---------------|-------------|
| | n | % | n | % | n | % |
| General play | 6,232 | 14.5% | 9,475 | 34.6% | 15,707 | 22.3% |
| Rebounding | 10,115 | 23.5% | 3,761 | 13.7% | 13,877 | 19.7% |
| Defending | 10,576 | 24.6% | 1,486 | 5.4% | 12,061 | 17.1% |
| Chasing loose ball | 4,664 | 10.8% | 3,380 | 12.3% | 8,044 | 11.4% |
| Shooting | 3,608 | 8.4% | 2,952 | 10.8% | 6,561 | 9.3% |
| Ball handling/dribbling | 4,173 | 9.7% | 1,759 | 6.4% | 5,932 | 8.4% |
| Receiving pass | 947 | 2.2% | 1,606 | 5.9% | 2,553 | 3.6% |
| Other | 2,733 | 6.3% | 2,965 | 10.8% | 5,698 | 8.1% |
| Total | 43,050 | 100% | 27,384 | 100% | 70,434 | 100% |

Figure 8.5 Activity Resulting in Girls' Basketball Injuries by Injury Diagnosis, High School Sports-Related Injury Surveillance Study, US, 2007-08 School Year



General play
 Rebounding
 Defending
 Chasing loose ball
 Ball handling/dribbling
 Other

IX. Wrestling Injury Epidemiology

Table 9.1 Wrestling Injury Rates by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2007-08 School Year

| | # Injuries | # Exposures | Injury rate (per 1,000 athlete- exposures) | Nationally Estimated # Injuries |
|--------------|------------|----------------|--|---------------------------------------|
| Total | 408 | 179,427 | 2.27 | 91,625 |
| Competition | 175 | 47,327 | 3.70 | 40,698 |
| Practice | 233 | 132,100 | 1.76 | 50,927 |

Table 9.2 Demographic Characteristics of Injured Wrestlers, High School Sports-Related Injury Surveillance Study, US, 2007-08 School Year*

| Year in School | |
|--------------------------|----------------------|
| Freshman | 18,453 (20.3%) |
| Sophomore | 22,602 (24.9%) |
| Junior | 26,127 (28.8%) |
| Senior | 23,673 (26.1%) |
| Total[†] | 90,856 (100%) |
| Age (years) | |
| Minimum | 13 |
| Maximum | 18 |
| Mean (St. Dev.) | 16.0 (1.2) |
| BMI | |
| Minimum | 14.3 |
| Maximum | 47.9 |
| Mean (St. Dev.) | 23.7 (4.8) |

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

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

Figure 9.1 Diagnosis of Wrestling Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2007-08 School Year

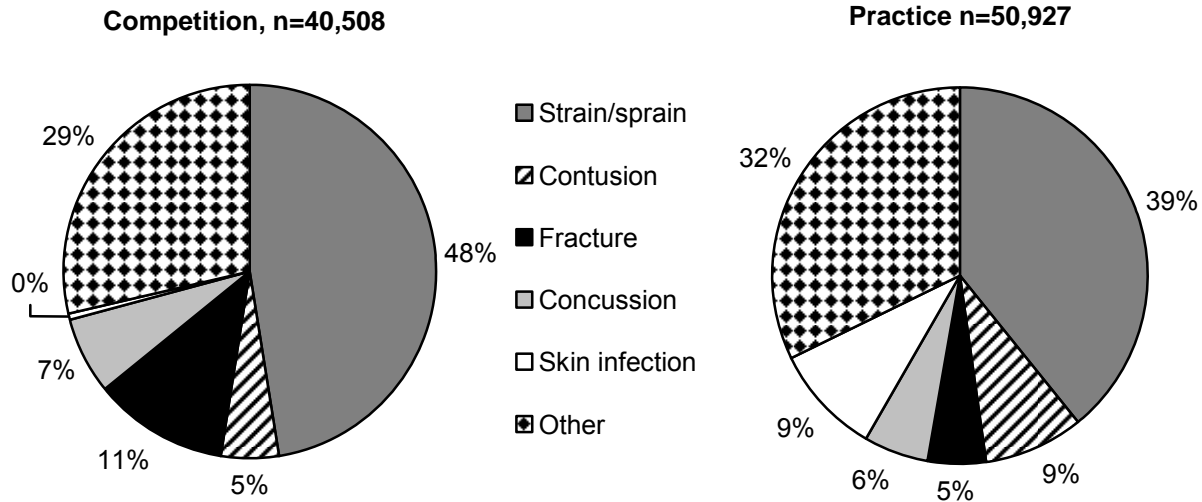


Table 9.3 Body Site of Wrestling Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2007-08 School Year

| Body Site | Competition | | Practice | | Overall | |
|---------------------|---------------|-------------|---------------|-------------|---------------|-------------|
| | n | % | n | % | n | % |
| Ankle | 2,368 | 5.8% | 2,631 | 5.2% | 4,999 | 5.5% |
| Knee | 7,120 | 17.5% | 9,753 | 19.2% | 16,872 | 18.4% |
| Head/face | 5,476 | 13.5% | 6,263 | 12.3% | 11,739 | 12.8% |
| Hip/thigh/upper leg | 984 | 2.4% | 1,507 | 3.0% | 2,491 | 2.7% |
| Hand/wrist | 1,456 | 3.6% | 4,749 | 9.3% | 6,204 | 6.8% |
| Shoulder | 9,742 | 23.9% | 8,468 | 16.7% | 18,211 | 19.9% |
| Trunk | 5,402 | 13.3% | 7,594 | 14.9% | 12,996 | 14.2% |
| Lower leg | 379 | 0.9% | 879 | 1.7% | 1,258 | 1.4% |
| Arm/elbow | 4,899 | 12.0% | 3,900 | 7.7% | 8,798 | 9.6% |
| Foot | 793 | 1.9% | 742 | 1.5% | 1,535 | 1.7% |
| Neck | 1,941 | 4.8% | 3,232 | 6.4% | 5,174 | 5.7% |
| Other | 138 | 0.3% | 1,124 | 2.2% | 1,262 | 1.4% |
| Total | 40,698 | 100% | 50,841 | 100% | 91,539 | 100% |

Table 9.4 Ten Most Common Wrestling Injury Diagnoses by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2007-08 School Year

| Diagnosis | Competition n=40,508 | | Practice n=50,841 | | Total n=91,349 | |
|-------------------------|-------------------------|-------|----------------------|------|-------------------|-------|
| | n | % | n | % | n | % |
| Shoulder strain/sprain | 5,642 | 13.9% | 3,895 | 7.7% | 9,538 | 10.4% |
| Knee other | 3,737 | 9.2% | 4,093 | 8.1% | 7,830 | 8.6% |
| Knee strain/sprain | 2,713 | 6.7% | 4,487 | 8.8% | 7,200 | 7.9% |
| Shoulder other | 2,718 | 6.7% | 3,487 | 6.9% | 6,204 | 6.8% |
| Head/face concussion | 2,784 | 6.9% | 3,113 | 6.1% | 5,896 | 6.5% |
| Trunk strain/sprain | 2,604 | 6.4% | 2,851 | 5.6% | 5,455 | 6.0% |
| Trunk other | 1,772 | 4.4% | 2,749 | 5.4% | 4,521 | 4.9% |
| Head/face other | 1,744 | 4.3% | 2,703 | 5.3% | 4,447 | 4.9% |
| Ankle strain/sprain | 1,921 | 4.7% | 2,232 | 4.4% | 4,154 | 4.5% |
| Arm/elbow strain/sprain | 1,842 | 4.5% | 2,073 | 4.1% | 3,914 | 4.3% |

Figure 9.2 Time Loss of Wrestling Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2007-08 School Year

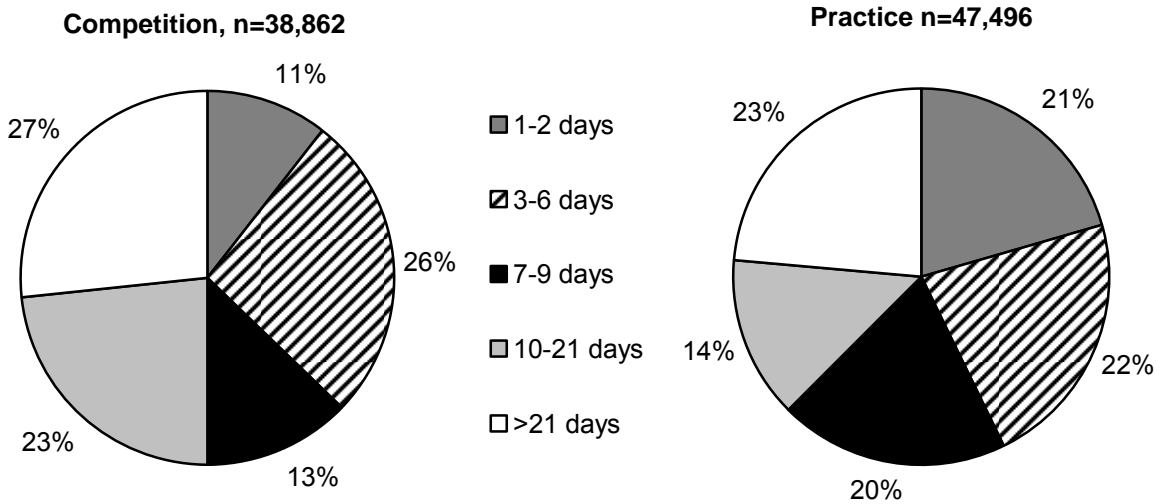


Table 9.5 Wrestling Injuries Requiring Surgery by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2007-08 School Year

| | Competition | | Practice | | Overall | |
|-------------------------|---------------|-------------|---------------|-------------|---------------|-------------|
| | n | % | n | % | n | % |
| Need for surgery | | | | | | |
| Required surgery | 4,864 | 12.0% | 3,716 | 7.7% | 8,579 | 9.7% |
| Did not require surgery | 35,696 | 88.0% | 44,463 | 92.3% | 80,159 | 90.3% |
| Total | 40,560 | 100% | 48,179 | 100% | 88,739 | 100% |

Figure 9.3 History of Wrestling Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2007-08 School Year

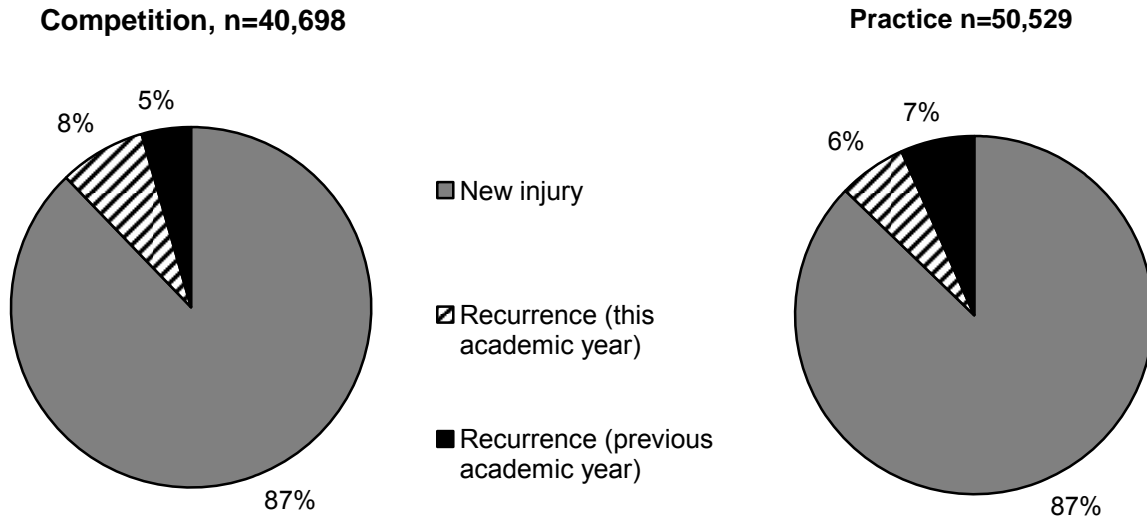


Table 9.6 Time during Season of Wrestling Injuries, High School Sports-Related Injury Surveillance Study, US, 2007-08 School Year

| | n | % |
|-----------------------|---------------|-------------|
| Time in Season | | |
| Preseason | 14,324 | 15.6% |
| Regular season | 73,573 | 80.3% |
| Post season | 3,728 | 4.1% |
| Total | 91,625 | 100% |

Table 9.7 Competition-Related Variables for Wrestling Injuries, High School Sports-Related Injury Surveillance Study, US, 2007-08 School Year

| | n | % |
|------------------------------------|---------------|-------------|
| Time in Competition | | |
| Warm-ups | 876 | 2.2% |
| Beginning | 5,889 | 14.5% |
| Middle | 22,864 | 56.3% |
| End | 10,983 | 27.0% |
| Total | 40,612 | 100% |
| Competition Location | | |
| Home | 13,858 | 34.1% |
| Away | 24,179 | 59.4% |
| Neutral site | 2,660 | 6.5% |
| Total | 40,698 | 100% |
| Injury Related to Foul Play | | |
| No | 35,521 | 87.3% |
| Yes, and ruled foul play | 2,208 | 5.4% |
| Yes, but not ruled foul play | 2,089 | 5.1% |
| Unknown | 881 | 2.2% |
| Total | 40,698 | 100% |
| Mat Location* | | |
| Within circle | 77,871 | 88.8% |
| Out of bounds | 3,982 | 4.5% |
| Off mat | 5,836 | 6.7% |
| Total | 87,689 | 100% |

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

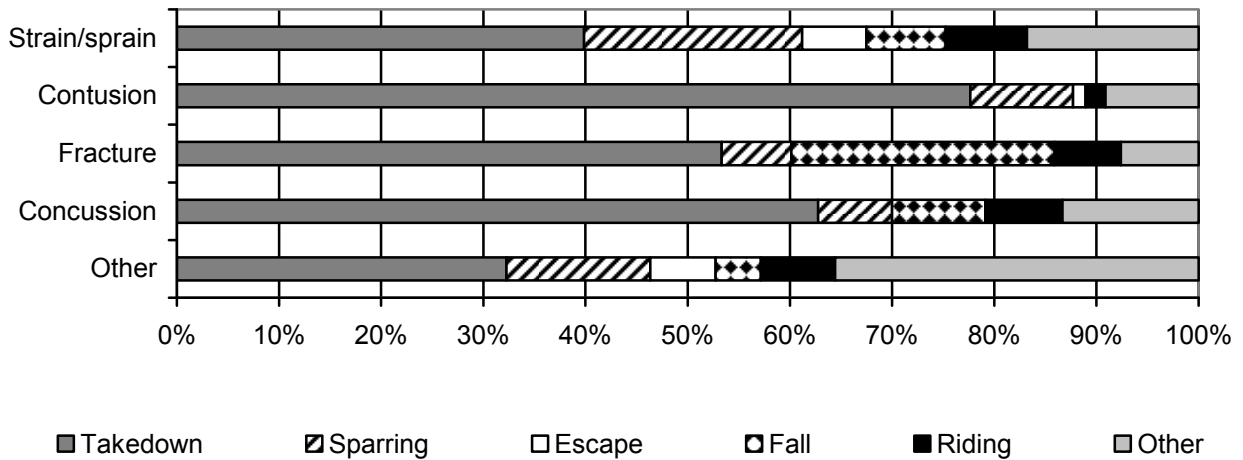
Table 9.8 Practice-Related Variables for Wrestling Injuries, High School Sports-Related Injury Surveillance Study, US, 2007-08 School Year

| | n | % |
|--|---------------|-------------|
| Time in Practice | | |
| First 1/2 hour | 8,004 | 16.0% |
| Second 1/2 hour | 11,313 | 22.6% |
| Third 1/2 hour | 19,596 | 39.2% |
| Fourth 1/2 hour | 8,917 | 17.9% |
| >2 hours into practice | 2,121 | 4.2% |
| Total | 49,951 | 100% |
| Practice Type | | |
| Noncontact skills practice | 2,051 | 4.1% |
| Partial contact skills practice | 6,688 | 13.3% |
| Partial contact full scrimmage | 1,105 | 2.2% |
| Full contact skills practice | 26,727 | 53.2% |
| Full contact partial numbers scrimmage | 568 | 1.1% |
| Full contact full scrimmage | 8,279 | 16.5% |
| Other | 4,811 | 9.6% |
| Total | 50,230 | 100% |

Table 9.9 Activities Leading to Wrestling Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2007-08 School Year

| Activity | Competition | | Practice | | Overall | |
|--------------|---------------|-------------|---------------|-------------|---------------|-------------|
| | n | % | n | % | n | % |
| Takedown | 18,045 | 45.7% | 20,157 | 40.6% | 38,203 | 42.9% |
| Sparring | 4,668 | 11.8% | 9,643 | 19.4% | 14,311 | 16.1% |
| Fall | 4,063 | 10.3% | 2,866 | 5.8% | 6,929 | 7.8% |
| N/A, | 756 | 1.9% | 5,990 | 12.1% | 6,746 | 7.6% |
| Riding | 4,413 | 11.2% | 1,920 | 3.9% | 6,334 | 7.1% |
| Conditioning | 438 | 1.1% | 4,576 | 9.2% | 5,014 | 5.6% |
| Escape | 2,032 | 5.2% | 2,420 | 4.9% | 4,452 | 5.0% |
| Reversal | 2,187 | 5.5% | 1,897 | 3.8% | 4,084 | 4.6% |
| Other | 2,853 | 7.2% | 209 | 0.4% | 3,062 | 3.4% |
| Total | 39,457 | 100% | 49,677 | 100% | 89,134 | 100% |

Figure 9.5 Activity Resulting in Wrestling Injuries by Injury Diagnosis, High School Sports-Related Injury Surveillance Study, US, 2007-08 School Year



X. Baseball Injury Epidemiology

Table 10.1 Baseball Injury Rates by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2007-08 School Year

| | # Injuries | # Exposures | Injury rate (per 1,000 athlete- exposures) | Nationally Estimated # Injuries |
|--------------|------------|----------------|--|---------------------------------------|
| Total | 173 | 186,264 | 0.93 | 44,760 |
| Competition | 92 | 67,167 | 1.37 | 22,803 |
| Practice | 81 | 119,097 | 0.68 | 21,957 |

Table 10.2 Demographic Characteristics of Injured Baseball Athletes, High School Sports-Related Injury Surveillance Study, US, 2007-08 School Year*

| Year in School | |
|--------------------------|----------------------|
| Freshman | 7,266 (16.6%) |
| Sophomore | 10,125 (23.1%) |
| Junior | 11,953 (27.3%) |
| Senior | 14,480 (33.0%) |
| Total[†] | 43,824 (100%) |
| Age (years) | |
| Minimum | 13 |
| Maximum | 19 |
| Mean (St. Dev.) | 16.3 (1.3) |
| BMI | |
| Minimum | 17.9 |
| Maximum | 38.7 |
| Mean (St. Dev.) | 24.2 (3.7) |

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

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

Figure 10.1 Diagnosis of Baseball Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2007-08 School Year

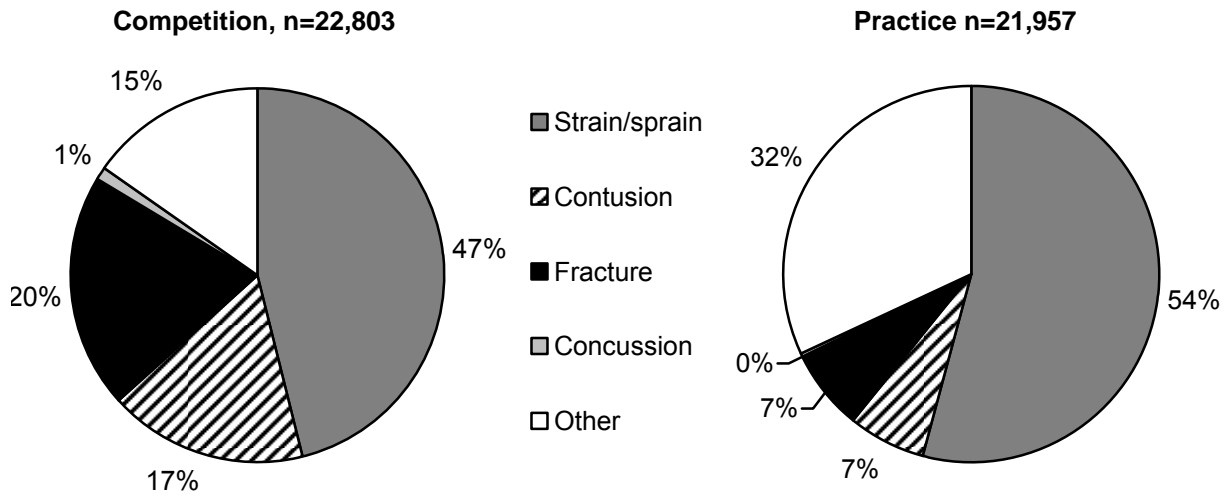


Table 10.3 Body Site of Baseball Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2007-08 School Year

| Body Site | Competition | | Practice | | Overall | |
|---------------------|---------------|-------------|---------------|-------------|---------------|-------------|
| | n | % | n | % | n | % |
| Ankle | 2,810 | 12.3% | 3,335 | 15.2% | 6,145 | 13.7% |
| Knee | 1,403 | 6.2% | 2,601 | 11.8% | 4,004 | 8.9% |
| Head/face | 2,374 | 10.4% | 1,392 | 6.3% | 3,766 | 8.4% |
| Hip/thigh/upper leg | 2,367 | 10.4% | 2,630 | 12.0% | 4,997 | 11.2% |
| Hand/wrist | 4,500 | 19.7% | 3,392 | 15.4% | 7,891 | 17.6% |
| Shoulder | 4,007 | 17.6% | 3,134 | 14.3% | 7,141 | 16.0% |
| Trunk | 402 | 1.8% | 1,315 | 6.0% | 1,717 | 3.8% |
| Lower leg | 1,307 | 5.7% | 1,739 | 7.9% | 3,046 | 6.8% |
| Arm/elbow | 2,938 | 12.9% | 2,113 | 9.6% | 5,051 | 11.3% |
| Foot | 0 | 0.0% | 0 | 0.0% | 0 | 0.0% |
| Neck | 64 | 0.3% | 0 | 0.0% | 64 | 0.1% |
| Other | 633 | 2.8% | 306 | 1.4% | 938 | 2.1% |
| Total | 22,803 | 100% | 21,957 | 100% | 44,760 | 100% |

Table 10.4 Ten Most Common Baseball Injury Diagnoses by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2007-08 School Year

| Diagnosis | Competition n=22,803 | | Practice n=21,957 | | Total n=44,760 | |
|-----------------------------------|-------------------------|-------|----------------------|-------|-------------------|-------|
| | n | % | n | % | n | % |
| Ankle strain/sprain | 2,375 | 10.4% | 2,766 | 12.6% | 5,142 | 11.5% |
| Hip/thigh/upper leg strain/sprain | 2,366 | 10.4% | 2,630 | 12.0% | 4,997 | 11.2% |
| Shoulder other | 2,460 | 10.8% | 1,207 | 5.5% | 3,667 | 8.2% |
| Hand/wrist strain/sprain | 2,283 | 10.0% | 644 | 2.9% | 2,927 | 6.5% |
| Shoulder strain/sprain | 915 | 4.0% | 1,927 | 8.8% | 2,842 | 6.3% |
| Hand/wrist fracture | 1,648 | 7.2% | 939 | 4.3% | 2,587 | 5.8% |
| Arm/elbow strain/sprain | 1,241 | 5.4% | 644 | 2.9% | 1,884 | 4.2% |
| Arm/elbow other | 686 | 3.0% | 1,102 | 5.0% | 1,788 | 4.0% |
| Knee other | 0 | 0.0% | 1,664 | 7.6% | 1,664 | 3.7% |
| Trunk strain/sprain | 249 | 1.1% | 1,315 | 6.0% | 1,564 | 3.5% |

Figure 10.2 Time Loss of Baseball Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2007-08 School Year

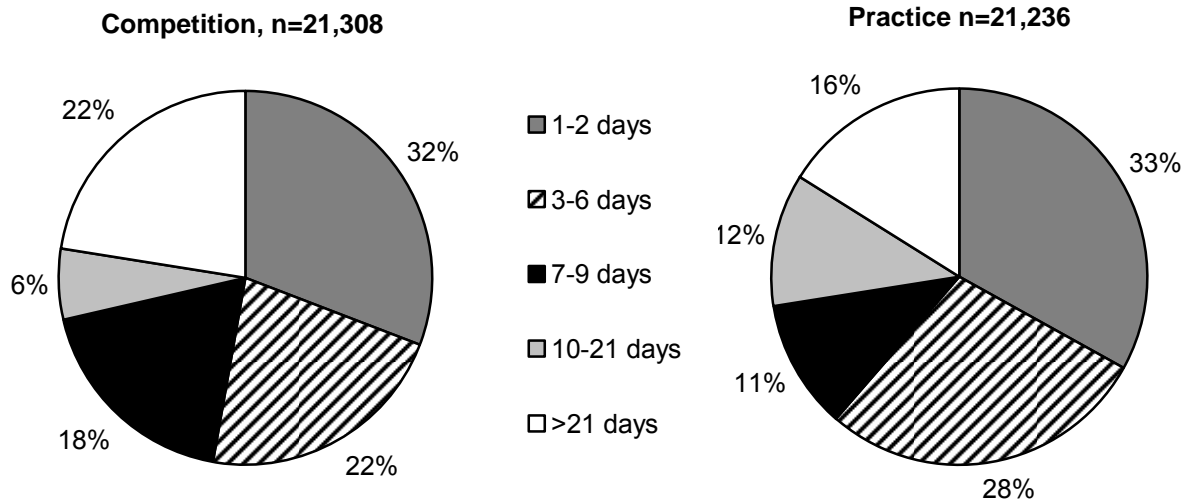


Table 10.5 Baseball Injuries Requiring Surgery by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2007-08 School Year

| | Competition | | Practice | | Overall | |
|-------------------------|---------------|-------------|---------------|-------------|---------------|-------------|
| | n | % | n | % | n | % |
| Need for surgery | | | | | | |
| Required surgery | 2,363 | 10.6% | 2,187 | 10.0% | 4,550 | 10.3% |
| Did not require surgery | 19,907 | 89.4% | 19,643 | 90.0% | 39,549 | 89.7% |
| Total | 22,270 | 100% | 21,829 | 100% | 44,099 | 100% |

Figure 10.3 History of Baseball Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2007-08 School Year

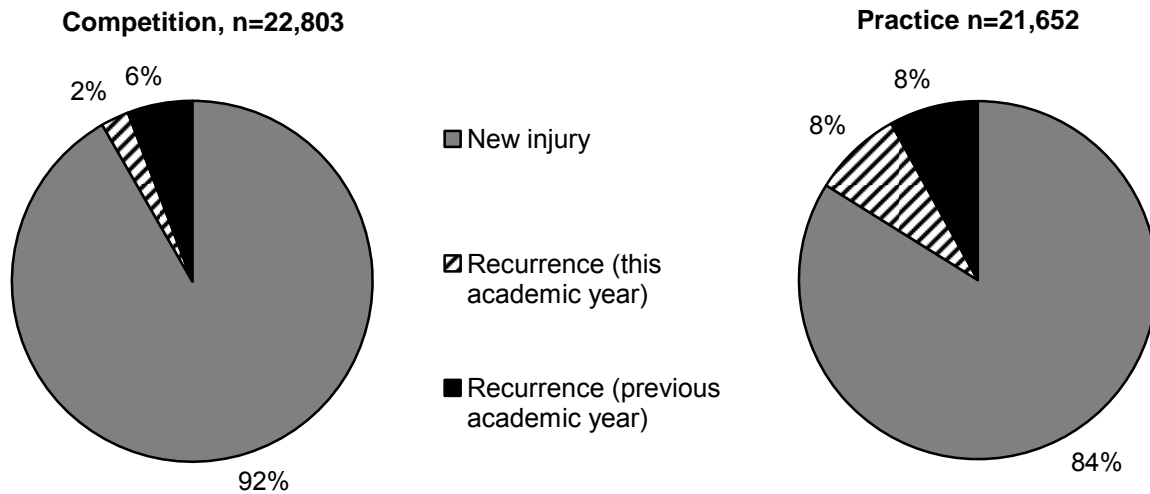


Table 10.6 Time during Season of Baseball Injuries, High School Sports-Related Injury Surveillance Study, US, 2007-08 School Year

| | n | % |
|-----------------------|---------------|-------------|
| Time in Season | | |
| Preseason | 13,055 | 29.2% |
| Regular season | 30,324 | 67.7% |
| Post season | 1,381 | 3.1% |
| Total | 44,760 | 100% |

Table 10.7 Competition-Related Variables for Baseball Injuries, High School Sports-Related Injury Surveillance Study, US, 2007-08 School Year

| | n | % |
|------------------------------------|---------------|-------------|
| Time in Competition | | |
| Warm-ups | 250 | 1.1% |
| Beginning | 1,911 | 8.4% |
| Middle | 16,212 | 71.1% |
| End | 4,429 | 19.4% |
| Total | 22,803 | 100% |
| Competition Location | | |
| Home | 10,646 | 46.7% |
| Away | 10,690 | 46.9% |
| Neutral site | 1,467 | 6.4% |
| Total | 22,803 | 100% |
| Injury Related to Foul Play | | |
| Yes, and ruled foul play | 0 | 100% |
| Yes, but not ruled foul play | 0 | 100% |
| No | 22,050 | 99.2% |
| Unknown | 185 | 0.8% |
| Total | 22,234 | 100% |
| Field Location | | |
| Home plate | 6,555 | 29.5% |
| Pitchers mound | 3,185 | 14.3% |
| Second base | 3,046 | 13.7% |
| First base | 2,912 | 13.1% |
| Outfield | 2,823 | 12.7% |
| Infield | 1,459 | 6.6% |
| Third base | 1,435 | 6.5% |
| Foul territory | 633 | 2.8% |
| Other | 186 | 0.8% |
| Total | 22,234 | 100% |

Table 10.8 Practice-Related Variables for Baseball Injuries, High School Sports-Related Injury Surveillance Study, US, 2007-08 School Year

| | n | % |
|---|---------------|-------------|
| Time in Practice | | |
| First 1/2 hour | 4,728 | 21.9% |
| Second 1/2 hour | 6,160 | 28.5% |
| Third 1/2 hour | 7,719 | 35.7% |
| Fourth 1/2 hour | 2,717 | 12.6% |
| >2 hours into practice | 313 | 1.4% |
| Total | 21,637 | 100% |
| Practice Type | | |
| Noncontact skills practice | 14,687 | 67.5% |
| Noncontact partial numbers scrimmage | 1,492 | 6.9% |
| Noncontact full scrimmage | 1,322 | 6.1% |
| Partial contact skills practice | 619 | 2.8% |
| Partial contact partial numbers scrimmage | 569 | 2.6% |
| Full contact skills practice | 1,393 | 6.4% |
| Full contact partial numbers scrimmage | 569 | 2.6% |
| Full contact full scrimmage | 185 | 0.8% |
| Other | 938 | 4.3% |
| Total | 21,773 | 100% |

Figure 10.4 Player Position of Baseball Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2007-08 School Year

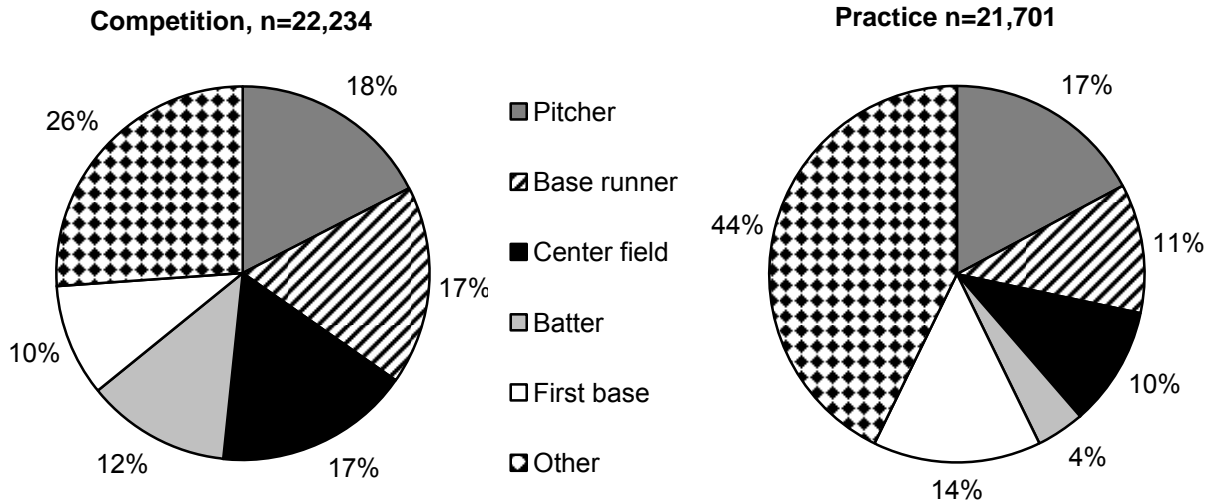
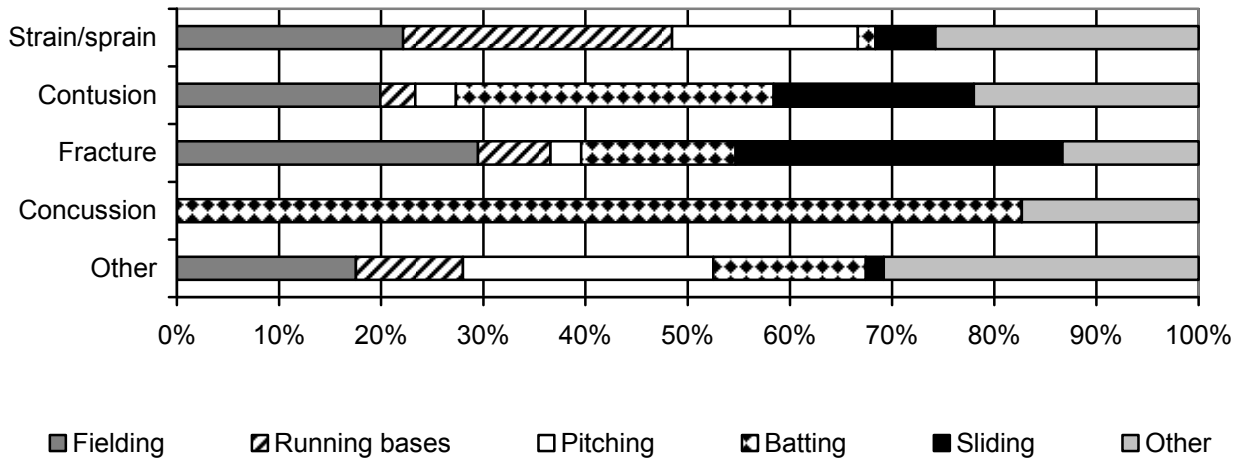


Table 10.9 Activities Leading to Baseball Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2007-08 School Year

| Activity | Competition | | Practice | | Overall | |
|-------------------------|---------------|-------------|---------------|-------------|---------------|-------------|
| | n | % | n | % | n | % |
| Fielding | 4,855 | 21.8% | 4,652 | 21.4% | 9,507 | 21.6% |
| Running bases | 2,738 | 12.3% | 4,667 | 21.4% | 7,404 | 16.8% |
| Pitching | 3,754 | 16.9% | 3,137 | 14.4% | 6,891 | 15.7% |
| Batting | 3,595 | 16.2% | 1,255 | 5.8% | 4,850 | 11.0% |
| Sliding | 3,581 | 16.1% | 906 | 4.2% | 4,487 | 10.2% |
| Throwing (not pitching) | 1,426 | 6.4% | 1,851 | 8.5% | 3,277 | 7.4% |
| General play | 881 | 4.0% | 1,578 | 7.2% | 2,459 | 5.6% |
| Conditioning | 186 | 0.8% | 2,196 | 10.1% | 2,382 | 5.4% |
| Catching | 847 | 3.8% | 1,218 | 5.6% | 2,065 | 4.7% |
| Other | 372 | 1.7% | 306 | 1.4% | 678 | 1.5% |
| Total | 22,234 | 100% | 21,765 | 100% | 44,000 | 100% |

Figure 10.5 Activity Resulting in Baseball Injuries by Injury Diagnosis, High School Sports-Related Injury Surveillance Study, US, 2007-08 School Year



XI. Softball Injury Epidemiology

Table 11.1 Softball Injury Rates by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2007-08 School Year

| | # Injuries | # Exposures | Injury rate (per 1,000 athlete- exposures) | Nationally Estimated # Injuries |
|--------------|------------|----------------|--|---------------------------------------|
| Total | 187 | 144,954 | 1.29 | 63,316 |
| Competition | 96 | 51,670 | 1.86 | 33,325 |
| Practice | 91 | 93,284 | 0.98 | 29,991 |

Table 11.2 Demographic Characteristics of Injured Softball Athletes, High School Sports-Related Injury Surveillance Study, US, 2007-08 School Year*

| Year in School | |
|-----------------------|----------------------|
| Freshman | 16,111 (25.6%) |
| Sophomore | 14,809 (23.5%) |
| Junior | 22,031 (35.0%) |
| Senior | 10,048 (16.0%) |
| Total† | 62,998 (100%) |
| Age (years) | |
| Minimum | 13 |
| Maximum | 18 |
| Mean (St. Dev.) | 15.8 (1.2) |
| BMI | |
| Minimum | 16.7 |
| Maximum | 42.2 |
| Mean (St. Dev.) | 23.6 (4.1) |

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

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

Figure 11.1 Diagnosis of Softball Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2007-08 School Year

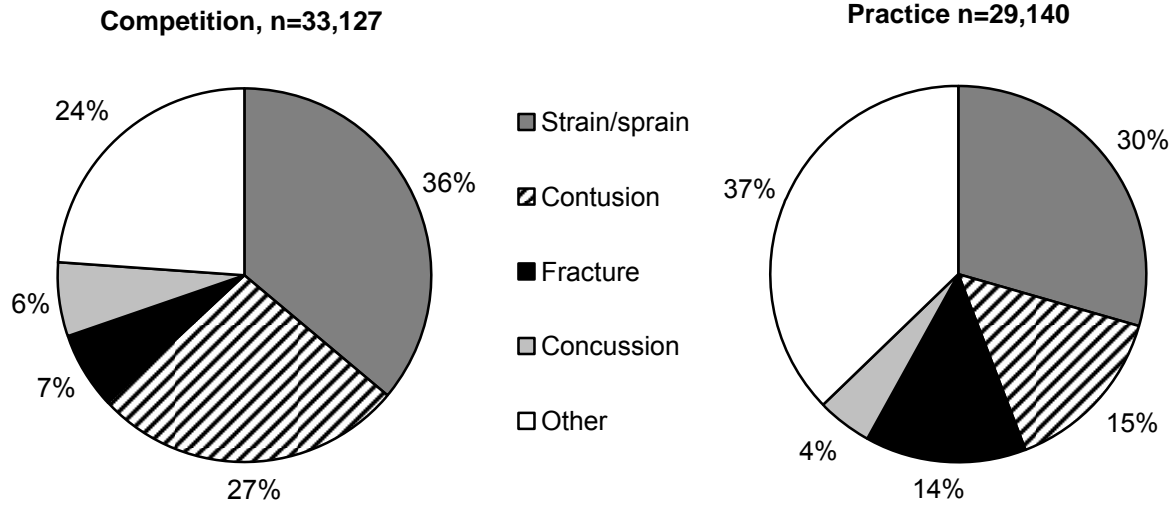


Table 11.3 Body Site of Softball Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2007-08 School Year

| Body Site | Competition | | Practice | | Overall | |
|---------------------|---------------|-------------|---------------|-------------|---------------|-------------|
| | n | % | n | % | n | % |
| Ankle | 6,177 | 18.6% | 2,877 | 9.9% | 9,055 | 14.5% |
| Knee | 3,035 | 9.2% | 3,001 | 10.3% | 6,037 | 9.7% |
| Head/face | 6,676 | 20.2% | 3,546 | 12.2% | 10,221 | 16.4% |
| Hip/thigh/upper leg | 5,574 | 16.8% | 4,162 | 14.3% | 9,735 | 15.6% |
| Hand/wrist | 3,310 | 10.0% | 4,221 | 14.5% | 7,531 | 12.1% |
| Shoulder | 1,310 | 4.0% | 2,224 | 7.6% | 3,534 | 5.7% |
| Trunk | 416 | 1.3% | 1,012 | 3.5% | 1,428 | 2.3% |
| Lower leg | 3,041 | 9.2% | 3,804 | 13.1% | 6,845 | 11.0% |
| Arm/elbow | 3,304 | 10.0% | 2,871 | 9.9% | 6,175 | 9.9% |
| Foot | 285 | 0.9% | 1,223 | 4.2% | 1,508 | 2.4% |
| Neck | 0 | 0.0% | 0 | 0.0% | 0 | 0.0% |
| Other | 0 | 0.0% | 199 | 0.7% | 199 | 0.3% |
| Total | 33,128 | 100% | 29,140 | 100% | 62,267 | 100% |

Table 11.4 Ten Most Common Softball Injury Diagnoses by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2007-08 School Year

| Diagnosis | Competition n=33,127 | | Practice n=29,140 | | Total n=62,267 | |
|-----------------------------------|-------------------------|-------|----------------------|-------|-------------------|-------|
| | n | % | n | % | n | % |
| Hip/thigh/upper leg strain/sprain | 4,723 | 14.3% | 3,138 | 10.8% | 7,861 | 12.6% |
| Ankle strain/sprain | 4,523 | 13.7% | 2,681 | 9.2% | 7,204 | 11.6% |
| Arm/elbow other | 2,553 | 7.7% | 2,479 | 8.5% | 5,032 | 8.1% |
| Lower leg contusion | 2,494 | 7.5% | 1,678 | 5.8% | 4,172 | 6.7% |
| Knee other | 2,114 | 6.4% | 1,822 | 6.3% | 3,937 | 6.3% |
| Head/face concussion | 2,119 | 6.4% | 1,309 | 4.5% | 3,428 | 5.5% |
| Head/face other | 2,071 | 6.3% | 784 | 2.7% | 2,854 | 4.6% |
| Shoulder other | 1,046 | 3.2% | 1,765 | 6.1% | 2,810 | 4.5% |
| Hand/wrist fracture | 947 | 2.9% | 1,850 | 6.4% | 2,798 | 4.5% |
| Hand/wrist contusion | 1,586 | 4.8% | 787 | 2.7% | 2,373 | 3.8% |

Figure 11.2 Time Loss of Softball Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2007-08 School Year

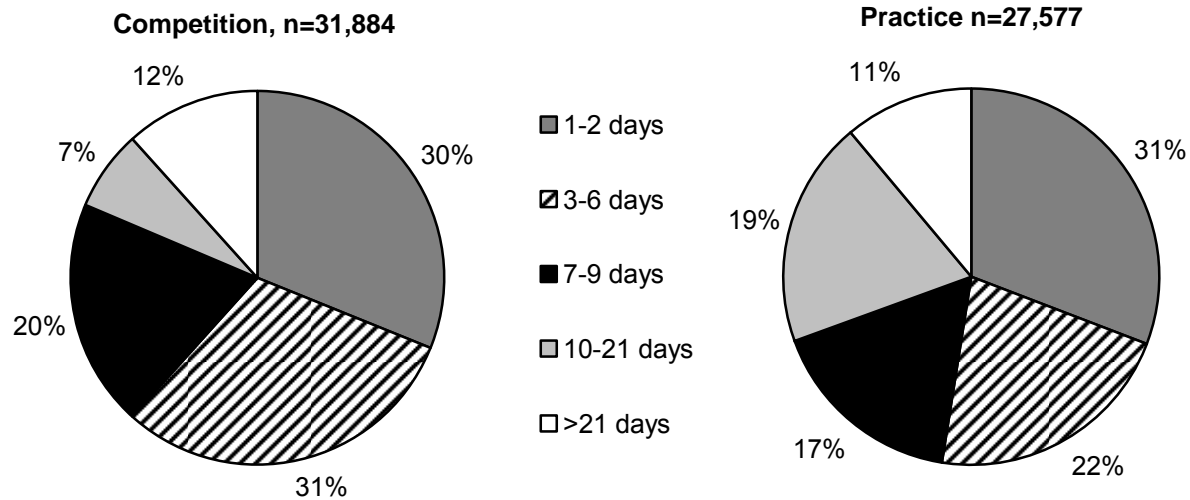


Table 11.5 Softball Injuries Requiring Surgery by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2007-08 School Year

| | Competition | | Practice | | Overall | |
|-------------------------|---------------|-------------|---------------|-------------|---------------|-------------|
| | n | % | n | % | n | % |
| Need for surgery | | | | | | |
| Required surgery | 1,905 | 5.8% | 1,636 | 5.6% | 3,541 | 5.7% |
| Did not require surgery | 30,785 | 94.2% | 27,307 | 94.4% | 58,093 | 94.3% |
| Total | 32,690 | 100% | 28,944 | 100% | 61,634 | 100% |

Figure 11.3 History of Softball Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2007-08 School Year

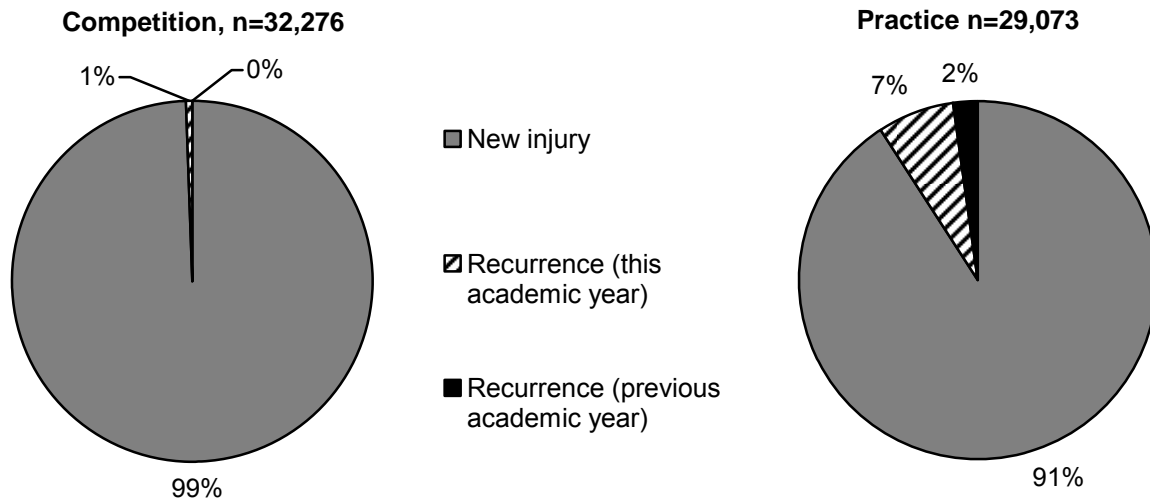


Table 11.6 Time during Season of Softball Injuries, High School Sports-Related Injury Surveillance Study, US, 2007-08 School Year

| | n | % |
|-----------------------|---------------|-------------|
| Time in Season | | |
| Preseason | 20,359 | 32.2% |
| Regular season | 42,105 | 66.5% |
| Post season | 851 | 1.3% |
| Total | 63,316 | 100% |

Table 11.7 Competition-Related Variables for Softball Injuries, High School Sports-Related Injury Surveillance Study, US, 2007-08 School Year

| | n | % |
|------------------------------------|---------------|-------------|
| Time in Competition | | |
| Warm-ups | 973 | 3.0% |
| Beginning | 6,015 | 18.4% |
| Middle | 22,007 | 67.2% |
| End | 2,908 | 8.9% |
| Overtime | 827 | 2.5% |
| Total | 32,731 | 100% |
| Competition Location | | |
| Home | 18,274 | 55.2% |
| Away | 12,281 | 37.1% |
| Neutral site | 2,573 | 7.8% |
| Total | 33,127 | 100% |
| Injury Related to Foul Play | | |
| No | 32,081 | 96.8% |
| Yes, and ruled foul play | 196 | 0.6% |
| Yes, but not ruled foul play | 851 | 2.6% |
| Unknown | 0 | 0% |
| Total | 33,127 | 100% |
| Field Location | | |
| Home plate | 6,555 | 29.5 |
| First base | 2,912 | 13.1 |
| Second base | 3,046 | 13.7 |
| Third base | 1,435 | 6.5 |
| Infield | 1,459 | 6.6 |
| Pitchers mound | 3,185 | 14.3 |
| Outfield | 2,823 | 12.7 |
| Foul territory | 633 | 2.8 |
| Other | 186 | 0.8 |
| Total | 22,234 | 100 |

Table 11.8 Practice-Related Variables for Softball Injuries, High School Sports-Related Injury Surveillance Study, US, 2007-08 School Year

| | n | % |
|---|---------------|-------------|
| Time in Practice | | |
| First 1/2 hour | 6,458 | 22.2% |
| Second 1/2 hour | 5,252 | 18.1% |
| Third 1/2 hour | 9,546 | 32.8% |
| Fourth 1/2 hour | 5,790 | 19.9% |
| >2 hours into practice | 2,028 | 7.0% |
| Total | 29,073 | 100% |
| Practice Type | | |
| Noncontact skills practice | 17,411 | 62.4% |
| Noncontact partial numbers scrimmage | 1,636 | 5.9% |
| Noncontact full scrimmage | 392 | 1.4% |
| Partial contact skills practice | 1,673 | 6.0% |
| Partial contact partial numbers scrimmage | 1,219 | 4.4% |
| Partial contact full scrimmage | 1,244 | 4.5% |
| Full contact skills practice | 2,360 | 8.5% |
| Full contact partial numbers scrimmage | 196 | 0.7% |
| Full contact full scrimmage | 785 | 2.8% |
| Other | 979 | 3.5% |
| Total | 27,895 | 100% |

Figure 11.4 Player Position of Softball Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2007-08 School Year

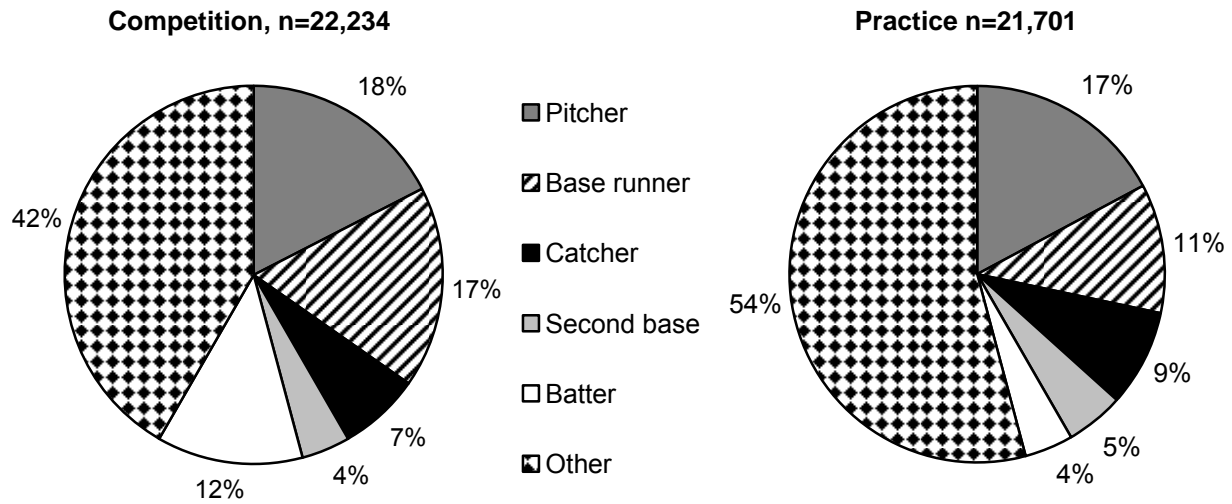
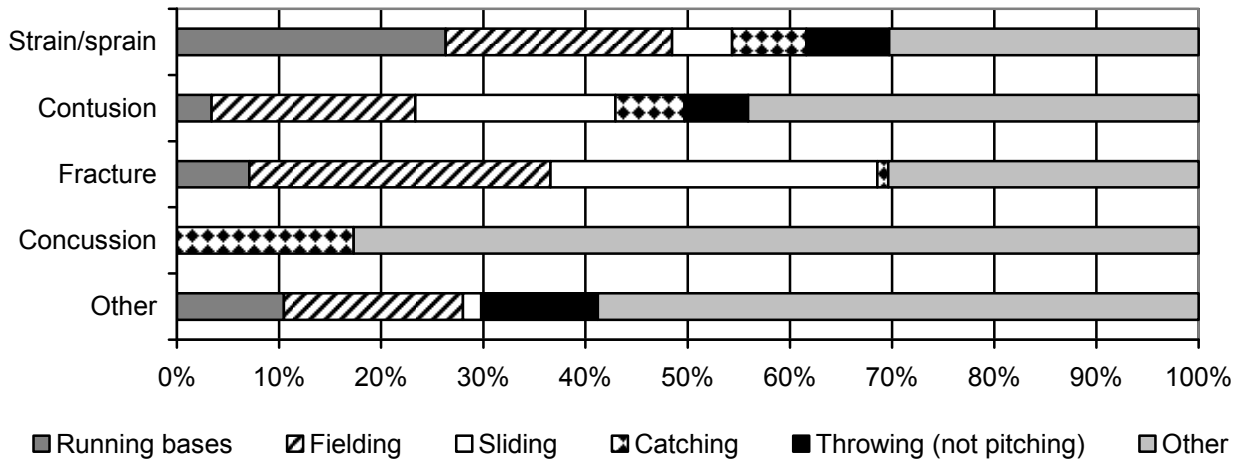


Table 11.9 Activities Leading to Softball Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2007-08 School Year

| Activity | Competition | | Practice | | Overall | |
|-------------------------|---------------|-------------|---------------|-------------|---------------|-------------|
| | n | % | n | % | n | % |
| Running bases | 7,831 | 23.6% | 4,153 | 14.3% | 11,984 | 19.3% |
| Throwing (not pitching) | 4,909 | 14.8% | 4,558 | 15.7% | 9,467 | 15.3% |
| Catching | 4,066 | 12.3% | 4,787 | 16.5% | 8,853 | 14.3% |
| Fielding | 3,145 | 9.5% | 3,796 | 13.1% | 6,941 | 11.2% |
| Sliding | 3,910 | 11.8% | 2,487 | 8.6% | 6,398 | 10.3% |
| Pitching | 4,089 | 12.3% | 908 | 3.1% | 4,997 | 8.1% |
| Batting | 3,221 | 9.7% | 1,442 | 5.0% | 4,663 | 7.5% |
| Conditioning | 0 | 0.0% | 4,010 | 13.9% | 4,010 | 6.5% |
| General play | 1,561 | 4.7% | 1,582 | 5.5% | 3,143 | 5.1% |
| Other | 396 | 1.2% | 1,219 | 4.2% | 1,616 | 2.6% |
| Total | 33,128 | 100% | 28,944 | 100% | 62,071 | 100% |

Figure 11.5 Activity Resulting in Softball Injuries by Injury Diagnosis, High School Sports-Related Injury Surveillance Study, US, 2007-08 School Year



XII. Gender Differences within Sports

12.1 Boys' and Girls' Soccer

Table 12.1 Comparison of Boys' and Girls' Soccer Injury Rates, High School Sports-Related Injury Surveillance Study, US, 2007-08 School Year

| | Boys' soccer | Girls' soccer* | RR (95% CI) [†] |
|--------------|--------------|----------------|--------------------------|
| Total | 1.75 | 2.35 | 1.34 (1.16-1.55) |
| Competition | 3.63 | 5.15 | 1.42 (1.19-1.69) |
| Practice | 0.96 | 1.16 | 1.21 (0.96-1.53) |

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

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

Table 12.2 Comparison of Body Sites of Boys' and Girls' Soccer Injuries, High School Sports-Related Injury Surveillance Study, US, 2007-08 School Year

| Body Site | Boys' soccer | Girls' soccer | IPR (95% CI) |
|---------------------|--------------|---------------|-------------------------|
| Ankle | 21.1% | 23.3% | 1.10 (0.80-1.52) |
| Knee | 13.5% | 21.0% | 1.56 (0.84-0.99) |
| Head/face | 16.4% | 12.7% | 1.29 (0.86-1.94) |
| Hip/thigh/upper leg | 14.7% | 15.5% | 1.05 (0.70-1.59) |
| Hand/wrist | 3.2% | 6.7% | 2.08 (0.90-4.80) |
| Shoulder | 4.3% | 1.3% | 3.25 (1.15-9.17) |
| Trunk | 6.6% | 1.2% | 5.63 (1.76-18.0) |
| Lower leg | 8.2% | 7.7% | 1.06 (0.58-1.94) |
| Arm/elbow | 1.8% | 2.8% | 1.56 (0.48-5.06) |
| Foot | 7.2% | 5.5% | 1.30 (0.65-2.63) |
| Neck | 0.7% | 0.8% | 1.14 (0.12-10.5) |
| Other | 2.2% | 1.5% | 1.53 (0.41-5.68) |
| Total | 100% | 100% | --- |

Table 12.3 Comparison of Diagnoses of Boys' and Girls' Soccer Injuries, High School Sports-Related Injury Surveillance Study, US, 2007-08 School Year

| | Boys' soccer | Girls' soccer | IPR (95% CI) |
|------------------|--------------|---------------|------------------|
| Diagnosis | | | |
| Strain/sprain | 49.5% | 55.3% | 1.12 (0.94-1.32) |
| Contusion | 12.7% | 11.5% | 1.11 (0.69-1.77) |
| Fracture | 10.7% | 7.1% | 1.51 (0.87-2.64) |
| Concussion | 10.3% | 10.3% | 1.00 (0.60-1.65) |
| Other | 16.8% | 15.9% | 1.06 (0.70-1.59) |
| Total | 100% | 100% | --- |

Table 12.4 Most Common Boys' and Girls' Soccer Injury Diagnoses*, High School Sports-Related Injury Surveillance Study, US, 2007-08 School Year

| | Boys' soccer | Girls' soccer | IPR (95% CI) |
|-----------------------------------|--------------|---------------|------------------|
| Diagnosis | | | |
| Ankle strain/sprain | 20.2% | 22.4% | 1.11 (0.80-1.54) |
| Hip/thigh/upper leg strain/sprain | 10.6% | 11.9% | 1.13 (0.70-1.81) |
| Head/face concussion | 10.4% | 10.3% | 1.01 (0.61-1.67) |
| Knee strain/sprain | 7.8% | 11.7% | 1.50 (0.85-2.64) |
| Knee other | 4.2% | 6.7% | 1.57 (0.75-3.29) |

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

Table 12.5 Comparison of Time Loss of Boys' and Girls' Soccer Injuries, High School Sports-Related Injury Surveillance Study, US, 2007-08 School Year

| | Boys' soccer | Girls' soccer | IPR (95% CI) |
|------------------|---------------|---------------|------------------|
| Time Loss | | | |
| 1-2 days | 20.1% | 16.2% | 1.24 (0.85-1.81) |
| 3-6 days | 31.8% | 33.9% | 1.07 (0.83-1.38) |
| 7-9 days | 17.6% | 17.9% | 1.01 (0.70-1.48) |
| 10-21 days | 16.5% | 18.5% | 1.12 (0.76-1.65) |
| 22 days or more | 14.1% | 13.6% | 1.04 (0.67-1.61) |
| Total | 100.0% | 100.0% | --- |

Table 12.6 Comparison of Mechanisms of Boys' and Girls' Soccer Injuries, High School Sports-Related Injury Surveillance Study, US, 2007-08 School Year

| | Boys' soccer | Girls' soccer | IPR (95% CI) |
|---|--------------|---------------|-------------------------|
| Soccer Mechanism | | | |
| Contact with another player | 28.8% | 31.3% | 1.09 (0.83-1.42) |
| Stepped on/fell on/kicked | 14.8% | 13.4% | 1.10 (0.73-1.68) |
| Rotation around a planted foot/inversion | 12.3% | 13.0% | 1.06 (0.66-1.70) |
| Overuse, heat illness, conditioning, etc. | 12.6% | 12.8% | 1.01 (0.63-1.62) |
| Contact with ball | 12.0% | 11.3% | 1.06 (0.65-1.71) |
| Uneven playing surface | 4.1% | 3.4% | 1.20 (0.55-2.61) |
| Slide tackle | 6.7% | 3.2% | 2.11 (1.04-4.31) |
| Contact with goal | 0.0% | 0.6% | --- |
| Other | 8.8% | 11.0% | 1.26 (0.73-2.18) |
| Total | 100% | 100% | --- |

Table 12.7 Comparison of Activities of Boys' and Girls' Soccer Injuries, High School Sports-Related Injury Surveillance Study, US, 2007-08 School Year

| | Boys' soccer | Girls' soccer | IPR (95% CI) |
|-------------------------|--------------|---------------|-------------------------|
| Soccer Activity | | | |
| General play | 19.4% | 20.5% | 1.05 (0.74-1.49) |
| Defending | 11.8% | 15.1% | 1.28 (0.81-2.01) |
| Ball handling/dribbling | 10.0% | 13.5% | 1.35 (0.86-2.12) |
| Chasing loose ball | 10.9% | 11.4% | 1.04 (0.64-1.70) |
| Goaltending | 9.5% | 11.1% | 1.17 (0.66-2.06) |
| Passing (foot) | 6.7% | 5.3% | 1.24 (0.60-2.60) |
| Shooting (foot) | 7.9% | 3.5% | 2.26 (1.09-4.67) |
| Receiving pass | 6.6% | 4.2% | 1.57 (0.79-3.11) |
| Heading ball | 7.9% | 2.9% | 2.73 (1.36-5.47) |
| Other | 9.3% | 12.6% | 1.35 (0.82-2.24) |
| Total | 100% | 100% | --- |

12.2 Boys' and Girls' Basketball

Table 12.8 Comparison of Boys' and Girls' Basketball Injury Rates, High School Sports-Related Injury Surveillance Study, US, 2007-08 School Year

| | Boys' basketball | Girls' basketball | RR (95% CI)* |
|--------------|------------------|-------------------|-------------------------|
| Total | 1.39 | 1.61 | 1.16 (0.99-1.35) |
| Competition | 2.23 | 3.30 | 1.48 (1.20-1.82) |
| Practice | 1.04 | 0.90 | 1.16 (0.92-1.45) |

Table 12.9 Comparison of Body Sites of Boys' and Girls' Basketball Injuries, High School Sports-Related Injury Surveillance Study, US, 2007-08 School Year

| Body Site | Boys' basketball | Girls' basketball | IPR (95% CI) |
|---------------------|------------------|-------------------|-------------------------|
| Ankle | 33.2% | 30.0% | 1.11 (0.85-1.44) |
| Knee | 14.8% | 18.3% | 1.24 (0.83-1.83) |
| Head/face | 10.3% | 14.3% | 1.39 (0.87-2.21) |
| Hip/thigh/upper leg | 4.3% | 8.3% | 1.94 (0.98-3.84) |
| Hand/wrist | 12.5% | 9.5% | 1.31 (0.80-2.16) |
| Shoulder | 4.7% | 4.9% | 1.03 (0.47-2.24) |
| Trunk | 4.8% | 2.8% | 1.72 (0.73-4.07) |
| Lower leg | 1.2% | 4.7% | 3.87 (1.23-12.2) |
| Arm/elbow | 3.8% | 0.5% | 7.31 (1.47-36.4) |
| Foot | 7.7% | 5.0% | 1.53 (0.76-3.07) |
| Neck | 0.2% | 0.5% | 2.65 (0.31-22.8) |
| Other | 2.4% | 1.1% | 2.28 (0.52-10.0) |
| Total | 100% | 100% | --- |

Table 12.10 Comparison of Diagnoses of Boys' and Girls' Basketball Injuries, High School Sports-Related Injury Surveillance Study, US, 2007-08 School Year

| | Boys' basketball | Girls' basketball | IPR (95% CI) |
|------------------|------------------|-------------------|-------------------------|
| Diagnosis | | | |
| Strain/sprain | 55.6% | 55.2% | 1.01 (0.86-1.18) |
| Contusion | 7.8% | 5.9% | 1.32 (0.70-2.50) |
| Fracture | 10.8% | 7.8% | 1.38 (0.78-2.46) |
| Concussion | 5.1% | 10.2% | 2.01 (1.09-3.70) |
| Other | 20.7% | 20.9% | 1.01 (0.71-1.42) |
| Total | 100% | 100% | --- |

Table 12.11 Most Common Boys' and Girls' Basketball Injury Diagnoses*, High School Sports-Related Injury Surveillance Study, US, 2007-08 School Year

| | Boys' basketball | Girls' basketball | IPR (95% CI) |
|----------------------|------------------|-------------------|-------------------------|
| Diagnosis | | | |
| Ankle strain/sprain | 32.1% | 27.5% | 1.17 (0.89-1.53) |
| Knee strain/sprain | 6.1% | 9.6% | 1.58 (0.85-2.94) |
| Head/face concussion | 5.1% | 10.2% | 2.01 (1.09-3.70) |
| Knee other | 5.9% | 5.8% | 1.01 (0.51-2.03) |
| Hand/wrist fracture | 5.4% | 3.7% | 1.47 (0.65-3.33) |

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

Table 12.12 Comparison of Time Loss of Boys' and Girls' Basketball Injuries, High School Sports-Related Injury Surveillance Study, US, 2007-08 School Year

| | Boys' basketball | Girls' basketball | IPR (95% CI) |
|------------------|------------------|-------------------|-------------------------|
| Time Loss | | | |
| 1-2 days | 30.6% | 21.7% | 1.42 (1.03-1.94) |
| 3-6 days | 26.1% | 24.0% | 1.09 (0.80-1.48) |
| 7-9 days | 15.0% | 14.1% | 1.07 (0.70-1.64) |
| 10-21 days | 13.6% | 22.8% | 1.67 (1.14-2.45) |
| 22 days or more | 14.6% | 17.5% | 1.20 (0.80-1.80) |
| Total | 100% | 100% | --- |

Table 12.13 Comparison of Mechanisms of Boys' and Girls' Basketball Injuries, High School Sports-Related Injury Surveillance Study, US, 2007-08 School Year

| | Boys' basketball | Girls' basketball | IPR (95% CI) |
|---|------------------|-------------------|-------------------------|
| Basketball Mechanism | | | |
| Collision with another player | 28.8% | 23.8% | 1.21 (0.90-1.63) |
| Jumping/landing | 22.6% | 21.6% | 1.05 (0.75-1.46) |
| Overuse, heat illness, conditioning, etc. | 9.1% | 15.2% | 1.67 (1.03-2.71) |
| Rotation around a planted foot/inversion | 11.0% | 11.2% | 1.02 (0.62-1.68) |
| Stepped on/fell on/kicked | 11.8% | 9.3% | 1.26 (0.76-2.11) |
| Contact with ball | 5.7% | 6.6% | 1.15 (0.57-2.33) |
| Other | 11.0% | 12.3% | 1.12 (0.69-1.82) |
| Total | 100% | 100% | --- |

Table 12.14 Comparison of Activities of Boys' and Girls' Basketball Injuries, High School Sports-Related Injury Surveillance Study, US, 2007-08 School Year

| | Boys' basketball | Girls' basketball | IPR (95% CI) |
|----------------------------|------------------|-------------------|------------------|
| Basketball Activity | | | |
| Rebounding | 25.0% | 19.7% | 1.27 (0.91-1.78) |
| General play | 18.1% | 22.3% | 1.24 (0.87-1.76) |
| Defending | 17.0% | 17.1% | 1.01 (0.68-1.49) |
| Chasing loose ball | 11.1% | 11.4% | 1.03 (0.64-1.68) |
| Shooting | 10.2% | 9.3% | 1.10 (0.63-1.90) |
| Ball handling/dribbling | 4.5% | 8.4% | 1.86 (0.94-3.72) |
| Receiving pass | 4.2% | 3.6% | 1.17 (0.50-2.75) |
| Other | 9.9% | 8.1% | 1.22 (0.70-2.14) |
| Total | 100% | 100% | --- |

12.3 Boys' Baseball and Girls' Softball

Table 12.15 Comparison of Baseball and Softball Injury Rates, High School Sports-Related Injury Surveillance Study, US, 2007-08 School Year

| | Baseball | Softball | RR (95% CI) |
|--------------|----------|-------------|-------------------------|
| Total | 0.93 | 1.29 | 1.39 (1.13-1.71) |
| Competition | 1.37 | 1.86 | 1.36 (1.02-1.81) |
| Practice | 0.68 | 0.98 | 1.43 (1.06-1.93) |

Table 12.16 Comparison of Body Sites of Baseball and Softball Injuries, High School Sports-Related Injury Surveillance Study, US, 2007-08 School Year

| Body Site | Baseball | Softball | IPR (95% CI) |
|---------------------|--------------|--------------|-------------------------|
| Ankle | 13.7% | 14.5% | 1.06 (0.56-2.01) |
| Knee | 8.9% | 9.7% | 1.08 (0.50-2.34) |
| Head/face | 8.4% | 16.4% | 1.95 (0.99-3.83) |
| Hip/thigh/upper leg | 11.2% | 15.6% | 1.40 (0.69-2.84) |
| Hand/wrist | 17.6% | 12.1% | 1.46 (0.78-2.74) |
| Shoulder | 16.0% | 5.7% | 2.81 (1.18-6.72) |
| Trunk | 3.8% | 2.3% | 1.67 (0.52-5.42) |
| Lower leg | 6.8% | 11.0% | 1.62 (0.69-3.77) |
| Arm/elbow | 11.3% | 9.9% | 1.14 (0.52-2.51) |
| Foot | 0.0% | 2.4% | --- |
| Neck | 0.1% | 0.0% | --- |
| Other | 2.1% | 0.3% | 6.57 (1.12-38.5) |
| Total | 100% | 100% | --- |

Table 12.17 Comparison of Diagnoses of Baseball and Softball Injuries, High School Sports-Related Injury Surveillance Study, US, 2007-08 School Year

| | Baseball | Softball | IPR (95% CI) |
|------------------|-----------------|-----------------|-------------------------|
| Diagnosis | | | |
| Strain/sprain | 50.0% | 33.0% | 1.51 (1.10-2.07) |
| Contusion | 12.1% | 21.3% | 1.76 (0.98-3.15) |
| Fracture | 13.7% | 10.0% | 1.38 (0.65-2.92) |
| Concussion | 0.8% | 5.5% | 6.66 (1.60-27.7) |
| Other | 23.4% | 30.2% | 1.29 (0.83-2.03) |
| Total | 100% | 100% | --- |

Table 12.18 Most Common Baseball and Softball Injury Diagnoses*, High School Sports-Related Injury Surveillance Study, US, 2007-08 School Year

| | Baseball | Softball | IPR (95% CI) |
|-----------------------------------|-----------------|-----------------|-------------------------|
| Diagnosis | | | |
| Ankle strain/sprain | 11.5% | 11.6% | 1.01 (0.50-2.03) |
| Hip/thigh/upper leg strain/sprain | 11.2% | 12.6% | 1.13 (0.54-2.37) |
| Shoulder other | 8.2% | 4.5% | 1.82 (0.59-5.59) |
| Hand/wrist strain/sprain | 6.5% | 2.1% | 3.15 (1.04-9.59) |
| Arm/elbow other | 4.0% | 8.1% | 2.02 (0.58-7.11) |
| Lower leg contusion | 1.4% | 6.7% | 4.85 (1.30-18.1) |

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

Table 12.19 Comparison of Time Loss of Baseball and Softball Injuries, High School Sports-Related Injury Surveillance Study, US, 2007-08 School Year

| | Baseball | Softball | IPR (95% CI) |
|------------------|-----------------|-----------------|---------------------|
| Time Loss | | | |
| 1-2 days | 32.0% | 30.9% | 1.03 (0.69-1.54) |
| 3-6 days | 25.2% | 26.4% | 1.05 (0.67-1.64) |
| 7-9 days | 14.7% | 18.5% | 1.26 (0.67-2.35) |
| 10-21 days | 8.9% | 12.8% | 1.44 (0.68-3.05) |
| 22 days or more | 19.3% | 11.4% | 1.69 (0.89-3.24) |
| Total | 100% | 100% | --- |

Table 12.20 Comparison of Mechanisms of Baseball and Softball Injuries, High School Sports-Related Injury Surveillance Study, US, 2007-08 School Year

| | Baseball | Softball | IPR (95% CI) |
|---|--------------|--------------|-------------------------|
| Baseball/Softball Mechanism | | | |
| Overuse, heat illness, conditioning, etc. | 10.6% | 20.0% | 1.88 (0.98-3.63) |
| Contact with another player | 12.7% | 12.3% | 1.03 (0.50-2.12) |
| Contact with bases | 11.9% | 9.8% | 1.21 (0.60-2.47) |
| Throwing - not pitching | 5.5% | 9.0% | 1.63 (0.61-4.37) |
| Throwing - pitching | 10.8% | 4.0% | 2.71 (1.03-7.10) |
| Contact with thrown ball (non-pitch) | 1.9% | 8.3% | 4.40 (1.52-12.8) |
| Rotation around a planted foot/inversion | 10.9% | 1.4% | 7.92 (2.67-23.5) |
| Hit by batted ball (line drive) | 3.2% | 6.1% | 1.92 (0.59-6.24) |
| Hit by pitch | 5.4% | 3.4% | 1.57 (0.48-5.17) |
| Other | 27.1% | 25.6% | 1.06 (0.69-1.63) |
| Total | 100% | 100% | --- |

Table 12.21 Comparison of Activities of Baseball and Softball Injuries, High School Sports-Related Injury Surveillance Study, US, 2007-08 School Year

| | Baseball | Softball | IPR (95% CI) |
|-----------------------------------|--------------|--------------|-------------------------|
| Baseball/Softball Activity | | | |
| Running bases | 16.8% | 19.3% | 1.15 (0.65-2.02) |
| Fielding | 21.6% | 11.2% | 1.94 (1.08-3.48) |
| Throwing (not pitching) | 7.4% | 15.3% | 2.04 (0.96-4.35) |
| Pitching | 15.7% | 8.1% | 2.71 (1.03-7.10) |
| Catching | 4.7% | 14.3% | 3.03 (1.17-7.85) |
| Sliding | 10.2% | 10.3% | 1.01 (0.47-2.14) |
| Batting | 11.0% | 7.5% | 1.47 (0.63-3.46) |
| Conditioning | 5.4% | 6.5% | 1.19 (0.37-3.85) |
| General play | 5.6% | 5.1% | 1.11 (0.40-3.03) |
| Other | 1.5% | 2.6% | 1.66 (0.34-8.31) |
| Total | 100% | 100% | --- |

XIII. Trends over Time

Table 13.1 Injury Rates by Sport, Type of Exposure, and Year, High School Sports-Related Injury Surveillance Study, US, 2005-08 School Years

| | 2005-06 | 2006-07 | 2007-08 | p-value for trend* |
|-------------------------|-------------|-------------|-------------|--------------------|
| Overall total | 2.51 | 2.59 | 2.31 | 0.512 |
| Competition | 4.63 | 4.88 | 4.45 | 0.726 |
| Practice | 1.69 | 1.75 | 1.52 | 0.495 |
| Boys' football total | 4.36 | 4.45 | 4.18 | 0.546 |
| Competition | 12.09 | 13.5 | 12.8 | 0.680 |
| Practice | 2.54 | 2.68 | 2.47 | 0.788 |
| Boys' soccer total | 2.43 | 2.27 | 1.75 | 0.189 |
| Competition | 4.22 | 4.31 | 3.63 | 0.411 |
| Practice | 1.58 | 1.45 | 0.96 | 0.206 |
| Girls' soccer total | 2.36 | 2.51 | 2.35 | 0.964 |
| Competition | 5.21 | 5.43 | 5.15 | 0.870 |
| Practice | 1.10 | 1.31 | 1.16 | 0.821 |
| Girls' volleyball total | 1.64 | 1.37 | 1.22 | 0.104 |
| Competition | 1.92 | 1.40 | 1.43 | 0.366 |
| Practice | 1.48 | 1.36 | 1.12 | 0.121 |
| Boys' basketball total | 1.89 | 1.75 | 1.39 | 0.158 |
| Competition | 2.98 | 2.87 | 2.23 | 0.247 |
| Practice | 1.46 | 1.28 | 1.04 | 0.052 |
| Girls' basketball total | 2.01 | 2.09 | 1.61 | 0.433 |
| Competition | 3.60 | 3.60 | 3.30 | 0.333 |
| Practice | 1.37 | 1.44 | 0.90 | 0.409 |
| Boys' wrestling total | 2.50 | 2.51 | 2.27 | 0.357 |
| Competition | 3.93 | 3.80 | 3.70 | 0.048 |
| Practice | 2.04 | 2.06 | 1.76 | 0.371 |
| Boys' baseball total | 1.19 | 1.25 | 0.93 | 0.446 |
| Competition | 1.77 | 2.01 | 1.37 | 0.575 |
| Practice | 0.87 | 0.82 | 0.68 | 0.170 |
| Girls' softball total | 1.13 | 1.11 | 1.29 | 0.398 |
| Competition | 1.78 | 1.96 | 1.86 | 0.707 |
| Practice | 0.79 | 0.65 | 0.98 | 0.611 |

*Statistically significant tests for trend are bolded.

Table 13.2 Nationally Estimated Number of Injuries by Sport, Type of Exposure, and Year, High School Sports-Related Injury Surveillance Study, US, 2005-08 School Years

| | 2005-06 | 2006-07 | 2007-08 |
|-------------------------|------------------|------------------|------------------|
| Overall total | 1,442,533 | 1,472,849 | 1,419,723 |
| Competition | 759,334 | 766,512 | 763,034 |
| Practice | 683,199 | 706,337 | 656,689 |
| Boys' football total | 516,150 | 574,367 | 616,665 |
| Competition | 280,919 | 292,316 | 311,780 |
| Practice | 235,231 | 282,051 | 304,885 |
| Boys' soccer total | 218,760 | 171,874 | 159,351 |
| Competition | 119,703 | 93,295 | 99,785 |
| Practice | 99,058 | 78,579 | 59,566 |
| Girls' soccer total | 185,770 | 230,769 | 215,850 |
| Competition | 122,803 | 149,231 | 146,102 |
| Practice | 62,967 | 81,538 | 69,748 |
| Girls' volleyball total | 81,813 | 80,493 | 72,261 |
| Competition | 32,677 | 27,423 | 26,539 |
| Practice | 49,136 | 53,069 | 45,722 |
| Boys' basketball total | 100,058 | 96,670 | 82,612 |
| Competition | 44,826 | 46,109 | 36,766 |
| Practice | 55,232 | 50,561 | 45,846 |
| Girls' basketball total | 103,566 | 102,831 | 73,283 |
| Competition | 53,812 | 53,703 | 45,236 |
| Practice | 49,753 | 49,128 | 28,047 |
| Boys' wrestling total | 105,542 | 101,139 | 91,625 |
| Competition | 36,259 | 38,750 | 40,698 |
| Practice | 69,283 | 62,389 | 50,927 |
| Boys' baseball total | 67,560 | 60,296 | 44,760 |
| Competition | 33,639 | 33,494 | 22,803 |
| Practice | 33,922 | 26,802 | 21,957 |
| Girls' softball total | 63,313 | 54,411 | 63,316 |
| Competition | 34,696 | 32,191 | 33,325 |
| Practice | 28,618 | 22,220 | 29,991 |

Table 13.3 Body Site of Injury by Year, High School Sports-Related Injury Surveillance Study, US, 2005-08 School Years

| | 2005-06 n=1,480,557 | 2006-07 n=1,464,926 | 2007-08 n=1,411,621 |
|---------------------|--------------------------------------|--------------------------------------|--------------------------------------|
| Body Site | | | |
| Ankle | 22.7% | 19.8% | 18.5% |
| Knee | 14.2% | 16.6% | 14.6% |
| Head/face | 12.3% | 12.4% | 12.4% |
| Hip/thigh/upper leg | 10.8% | 10.5% | 10.2% |
| Shoulder | 7.9% | 8.0% | 10.1% |
| Hand/wrist | 8.0% | 7.5% | 9.1% |
| Trunk | 6.2% | 6.7% | 6.5% |
| Lower leg | 4.6% | 5.2% | 5.7% |
| Arm/elbow | 4.1% | 3.9% | 4.6% |
| Foot | 4.0% | 4.0% | 4.2% |
| Neck | 2.2% | 1.9% | 1.8% |
| Other | 3.2% | 3.6% | 2.4% |
| Total | 100% | 100% | 100% |

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

Table 13.4 Injury Diagnosis by Year, High School Sports-Related Injury Surveillance Study, US, 2005-08 School Years

| | 2005-06, n=1,444,172 | 2006-07, n=1,466,398 | 2007-08 n=1,414,139 |
|------------------|---------------------------------------|---------------------------------------|--------------------------------------|
| Diagnosis | | | |
| Strain/sprain | 52.0% | 48.2% | 48.3% |
| Contusion | 12.2% | 13.7% | 12.4% |
| Fracture | 9.8% | 8.9% | 10.2% |
| Concussion | 9.1% | 8.4% | 9.2% |
| Other | 16.8% | 20.9% | 19.9% |
| Total | 100% | 100% | 100% |

Table 13.5 Most Common Injury Diagnoses by Year, High School Sports-Related Injury Surveillance Study, US, 2005-08 School Years

| | 2005-06 n=1,435,954 | 2006-07 n=1,463,273 | 2007-08 n=1,410,654 |
|-----------------------------------|--------------------------------------|--------------------------------------|--------------------------------------|
| Diagnosis | | | |
| Ankle strain/sprain | 20.6% | 17.8% | 17.3% |
| Head/face concussion | 9.0% | 8.4% | 9.2% |
| Knee strain/sprain | 7.6% | 8.8% | 7.8% |
| Hip/thigh/upper leg strain/sprain | 7.9% | 7.7% | 7.3% |
| Knee other | 4.3% | 4.9% | 4.7% |
| Shoulder other | 3.1% | 3.7% | 4.1% |
| Hand/wrist fracture | 3.2% | 3.3% | 4.0% |
| Shoulder strain/sprain | 3.4% | 2.9% | 3.4% |
| Trunk strain/sprain | 2.8% | 2.7% | 3.2% |
| Hand/wrist strain/sprain | 3.1% | 2.5% | 3.8% |

Table 13.6 Time Loss of Injuries by Year, High School Sports-Related Injury Surveillance Study, US, 2005-07 School Years

| | 2005-06 n=1,378,145 | 2006-07 n=1,423,183 | 2007-08 n=1,355,981 |
|------------------|--------------------------------------|--------------------------------------|--------------------------------------|
| Time Loss | | | |
| 1-2 days | 22.5% | 26.6% | 22.8% |
| 3-6 days | 30.0% | 28.5% | 28.8% |
| 7-9 days | 15.3% | 14.7% | 15.8% |
| 10-21 days | 14.9% | 14.1% | 16.7% |
| 22 days or more | 17.2% | 16.1% | 15.9% |
| Total | 100% | 100% | 100% |

Table 13.7 Injuries Requiring Surgery by Year, High School Sports-Related Injury Surveillance Study, US, 2005-08 School Years

| | 2005-06 n=1,429,072 | 2006-07 n=1,428,960 | 2007-08 n=1,380,872 |
|-------------------------|--------------------------------------|--------------------------------------|--------------------------------------|
| Need for surgery | | | |
| Required surgery | 5.3% | 6.4% | 6.1% |
| Did not require surgery | 94.7% | 93.6% | 93.9% |
| Total | 100% | 100% | 100% |

IX. Reporter Demographics & Compliance

During the 2007-08 school year, 100 ATCs were invited to participate in the study at the beginning of the school year. In addition, 20 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, 113 enrolled ATCs reported an average of 42 study weeks. The majority of ATCs (87%) reported all the weeks during which they were enrolled, with only 6 ATCs (5%) missing over 10 weeks. Internal validity checks yielded 96.7% sensitivity, 100% specificity, a positive predictive value of 100%, and a negative predictive value of 99.4%.

Prior to the start of the 2007-08 High School RIO™ study, participating ATCs were asked to complete a short demographics survey. Three-quarters (79%) of participating high schools were public schools, with the remainder being private. All participating ATCs provided services to athletes of their high school on 5 or more days each week. Over half (62%) of ATCs participating during the 2007-08 study year had participated during the 2005-06 school year.

An online “End of Season” survey gave all participating ATCs the opportunity to provide feedback on their experiences with High School RIO™. This survey was completed by 73 ATCs (63%). Average reporting time burdens were 15 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 (70.0%) or somewhat easy (24.7%) to use (5 and 4 on the Likert scale, respectively), with ATCs being either very satisfied (70.0%) or somewhat satisfied (26.0%) 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 be used to improve the National High School Sports-Related Injury Surveillance Study for the 2008-09 school year.

X. Summary

High school sports play an important role in the adoption and maintenance of a physically active lifestyle among millions of US adolescents. Too often injury prevention in this population is overlooked as sports-related injuries are thought to be unavoidable. In reality, sports-related injuries are largely preventable through the application of evidence-based preventive interventions. Such preventive interventions can include educational campaigns, introduction of new/improved protective equipment, rule changes, other policy changes, etc. The morbidity, mortality, and disability caused by high school sports-related injuries can be reduced through the development and implementation of improved injury diagnosis and treatment modalities as well as through effective prevention strategies. However, surveillance of exposure based injury rates in a nationally representative sample of high school athletes and subsequent epidemiologic analysis of patterns of injury are needed to drive evidence-based prevention practices.

Prior to the implementation of the High School Sports-Related Injury Surveillance Study by Dr. Comstock, the study of high school sports-related injuries had largely been limited by an inability to calculate injury rates due to a lack of exposure data (i.e., frequency of participation in athletic activities including training, practice, and competition), an inability to compare findings across groups (i.e., sports/activities, genders, schools, and levels of competition), or an inability to generalize findings from small non-representative samples. The value of national injury surveillance studies that collect injury, exposure, and risk factor data from representative samples has been well demonstrated by the National Collegiate Athletic Association's Injury Surveillance System (NCAA ISS). Data collected by the NCAA ISS since 1982 has been used to develop preventive interventions including changes in coaching habits, increased use of protective equipment, and rule changes which have had proven success in reducing injuries among collegiate athletes. For example, NCAA ISS data has been used to develop several interventions

intended to reduce the number of preseason heat-related football injuries including the elimination of consecutive days of multiple practices, daily hour limitations, and a gradual increase in equipment for conditioning and heat acclimation. Additionally, several committees have considered NCAA ISS data when making recommendations including the NCAA Committee on Competitive Safeguards and Medical Aspects of Sports' recommendation for mandatory eye protection in women's lacrosse, the NCAA Men's Ice Hockey Rules Committee's recommendation for stricter penalties for hitting from behind, checking into the boards, and not wearing a mouthpiece, and the NCAA Men's Basketball Rules Committee's recent discussions of widening the free-throw lane to prevent injuries related to player contact. Unfortunately, because an equivalent injury surveillance system to collect injury and exposure data from a nationally representative sample of high school athletes had not previously existed, injury prevention efforts targeted to reduce injury rates in this population were based largely upon data collected from collegiate athletes. This is unacceptable because distinct biophysiological differences (e.g., lower muscle mass, immature growth plates, etc.) means high school athletes are not merely miniature versions of their collegiate counterparts.

The successful implementation and maintenance of the National High School Sports-Related Injury Surveillance Study demonstrates the value of a national injury surveillance system at the high school level. Dr. Comstock and her research staff are committed to maintaining a permanent national high school sports injury surveillance system.

While the health benefits of a physically active lifestyle including sports participation are undeniable, participants are at risk of injury because a certain endemic level of injury can be expected during any physical activity, especially those with a competitive component. However, injury rates among high school athletes should be reduced to the lowest possible level without

discouraging adolescents from engaging in this important form of physical activity. This goal can best be accomplished by monitoring injury rates and patterns of injury among high school athletes over time; investigating the etiology of preventable injuries; and developing, implementing, and evaluating evidence-based preventive interventions. Surveillance systems such as the model used for this study are critical in achieving these goals.

SUMMARY REPORT

NATIONAL HIGH SCHOOL SPORTS-RELATED INJURY SURVEILLANCE STUDY

2008-2009 School Year

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High School RIO™

High School Sports-Related Injury Surveillance Study

presented by the Center for Injury Research & Policy



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Note

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

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I. Introduction & Methodology

1.1 Project Overview

To combat the epidemic of obesity among youth in the United States (US), adolescents must be encouraged to get up off the couch and participate in physically active sports, recreation, and leisure activities. Participation in high school sports, one of the most popular physical activities among adolescents, has grown rapidly from an estimated 4.0 million participants in 1971-72 to an estimated 7.4 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, and girls' softball. This surveillance has been conducted using the time- and cost-efficient RIOTM (Reporting Information One) surveillance system. The first three study years were funded by the Centers for Disease Control, the Research Institute at Nationwide Children's Hospital, DonJoy Orthotics, EyeBlack, 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 maintain the National High School Sports-Related Injury Surveillance System among a nationally representative sample of US high schools. The specific aims of this study are:

- A) To determine the incidence (number) of injuries among US high school boys' football, boys' and girls' soccer, girls' volleyball, boys' and girls' basketball, boys' wrestling, boys' baseball, and girls' softball athletes.

- B) To calculate the rate of injuries per 1,000 athlete-competitions, per 1,000 athlete-practices, and per 1,000 athlete-exposures for US high school athletes in the 9 sports of interest.
- C) To provide detailed information about the injuries sustained by US high school athletes including the type, site, severity, initial and subsequent treatment/care, outcome, etc.
- D) To provide detailed information about the injury events including athlete demographics, position played, phase of play/activity, etc.
- E) To identify potential risk or protective factors.
- F) To compare injury rates and patterns from the 2005-06 through the 2008-09 school years.

1.4 Project Design

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

- A) An injury that occurred as a result of participation in an organized high school competition or practice and
- B) Required medical attention by a team physician, certified athletic trainer, personal physician, or emergency department/urgent care facility and
- C) Resulted in restriction of the high school athlete's participation for one or more days beyond the day of injury and
- D) Any fracture, concussion, or dental injury regardless of whether or not it resulted in restriction of the student-athlete's participation.

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

- A) Number of athlete-practices = the sum of the number of athletes at each practice during the past week. For example, if 20 athletes practiced on Monday through Thursday and 18 practiced on Friday, the number of athlete-practices would equal 98.
- B) Number of athlete-competitions = the sum of the number of athletes at each competition during the past week. For example, if 9 athletes played in a Freshman game, 12 in a JV game, and 14 in a Varsity game, the number of athlete-competitions would equal 35.

1.5 Sample Recruitment

All eligible schools (i.e., all US high schools with a National Athletic Trainers' Association (NATA) affiliated certified athletic trainer (ATC) willing to serve as a reporter) were categorized into 8 sampling strata by geographic location (northeast, midwest, south, and west) and high school size (enrollment $\leq 1,000$ or $> 1,000$ students). Participant schools were then randomly selected from each substrata to obtain 100 study schools. To maintain a nationally representative sample, if a school dropped out of the study, another school from the same stratum was randomly selected for replacement. Participating ATCs were offered a \$300 honorarium along with individualized injury reports following the study's conclusion.

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 44 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. With the exception of injury rates, data were weighted for all analyses to produce national estimates. For each sport in each stratum, weights account for the total number of US schools offering the sport and the average number of participating study schools reporting each week for that sport. For example, following is the algorithm used to calculate football weights for the small (enrollment ≤ 1,000) west stratum:

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

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

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

Injury proportions were compared using injury proportion ratios (IPR) and corresponding confidence intervals calculated using the Complex Samples module of SPSS in order to account for the sampling weights and the complex sampling design. Following is an example of the IPR calculation comparing the proportion of male soccer concussions to the proportion of female soccer concussions:

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

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

II. Overall Injury Epidemiology

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

| | # Injuries | # Exposures | Injury rate (per 1,000 athlete- exposures) | Nationally Estimated # Injuries |
|-------------------------|--------------|------------------|--|---------------------------------------|
| Overall total | 4,255 | 2,112,479 | 2.01 | 1,248,126 |
| Competition | 2,311 | 570,177 | 4.05 | 690,525 |
| Practice | 1,944 | 1,542,302 | 1.26 | 557,601 |
| Boys' football total | 2,061 | 588,876 | 3.50 | 527,321 |
| Competition | 1,121 | 99,532 | 11.26 | 288,637 |
| Practice | 940 | 489,344 | 1.92 | 238,684 |
| Boys' soccer total | 350 | 215,699 | 1.62 | 149,229 |
| Competition | 218 | 63,636 | 3.43 | 87,082 |
| Practice | 132 | 152,063 | 0.87 | 62,147 |
| Girls' soccer total | 381 | 184,268 | 2.07 | 192,108 |
| Competition | 251 | 54,670 | 4.59 | 123,312 |
| Practice | 130 | 129,598 | 1.00 | 68,796 |
| Girls' volleyball total | 167 | 188,075 | 0.89 | 56,609 |
| Competition | 58 | 64,294 | 0.90 | 19,764 |
| Practice | 109 | 123,781 | 0.88 | 36,845 |
| Boys' basketball total | 319 | 236,419 | 1.35 | 79,230 |
| Competition | 160 | 69,043 | 2.32 | 40,152 |
| Practice | 159 | 167,376 | 0.95 | 39,078 |
| Girls' basketball total | 295 | 191,871 | 1.54 | 64,933 |
| Competition | 177 | 56,555 | 3.13 | 38,277 |
| Practice | 118 | 135,316 | 0.87 | 26,656 |
| Boys' wrestling total | 392 | 180,641 | 2.17 | 88,996 |
| Competition | 160 | 47,770 | 3.35 | 39,029 |
| Practice | 232 | 132,871 | 1.75 | 49,967 |
| Boys' baseball total | 144 | 185,622 | 0.78 | 39,869 |
| Competition | 86 | 65,359 | 1.32 | 25,584 |
| Practice | 58 | 120,263 | 0.48 | 14,285 |
| Girls' softball total | 146 | 141,008 | 1.04 | 49,831 |
| Competition | 80 | 49,318 | 1.62 | 28,688 |
| Practice | 66 | 91,690 | 0.72 | 21,143 |

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

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

| | ≥1 days time loss | <1 day time loss | Total |
|-------------------|-------------------|------------------|-------------|
| Overall | 98.6% | 1.4% | 100% |
| Boys' football | 98.5% | 1.5% | 100% |
| Boys' soccer | 98.3% | 1.7% | 100% |
| Girls' soccer | 99.2% | 0.8% | 100% |
| Girls' volleyball | 99.4% | 0.6% | 100% |
| Boys' basketball | 96.6% | 3.4% | 100% |
| Girls' basketball | 98.6% | 1.4% | 100% |
| Boys' wrestling | 99.5% | 0.5% | 100% |
| Boys' baseball | 98.6% | 1.4% | 100% |
| Girls' softball | 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 | 176,340 (19.9%) | 89,339 (24.6%) |
| Sophomore | 211,262 (23.9%) | 102,792 (28.3%) |
| Junior | 231,294 (26.1%) | 79,301 (21.8%) |
| Senior | 262,028 (29.7%) | 86,481 (23.8%) |
| Total† | 880,924 (100%) | 357,913 (100%) |
| Age (years) | | |
| Minimum | 13 | 13 |
| Maximum | 19 | 19 |
| Mean (St. Dev.) | 16.0 (1.3) | 15.8 (1.2) |
| BMI | | |
| Minimum | 9.6 | 15.4 |
| Maximum | 49.0 | 48.8 |
| Mean (St. Dev.) | 24.8 (4.4) | 22.3 (3.8) |

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

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

Figure 2.1 Injury Diagnosis by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

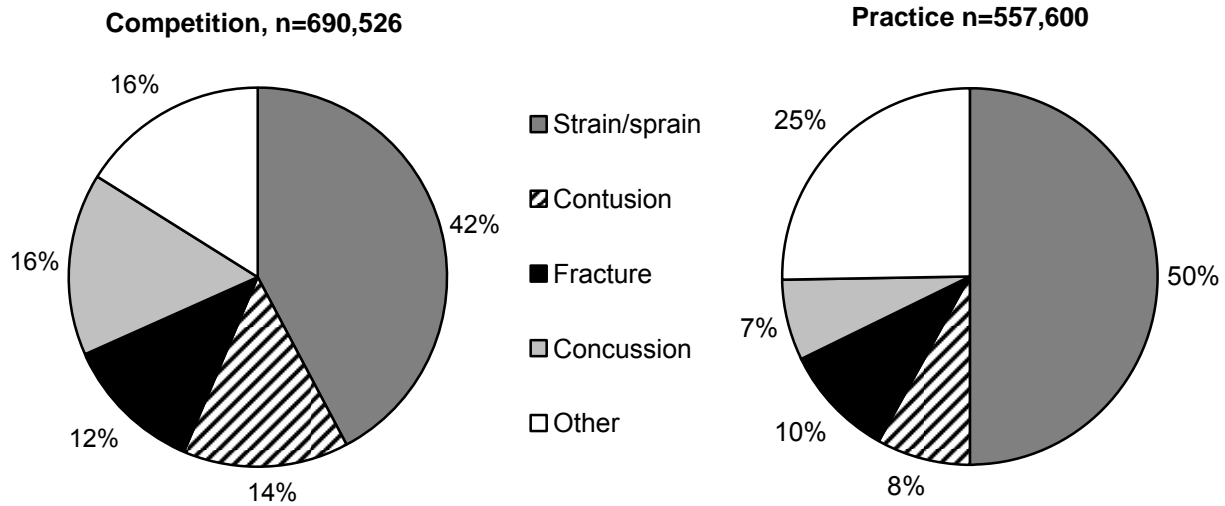


Table 2.4 Body Site of Injury by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

| Body Site | Competition | | Practice | | Overall | |
|---------------------|----------------|-------------|----------------|-------------|-------------------|-------------|
| | n | % | n | % | n | % |
| Ankle | 107,559 | 15.7% | 96,689 | 17.4% | 204,248 | 16.4% |
| Head/face | 137,272 | 19.9% | 53,881 | 9.7% | 191,154 | 15.4% |
| Knee | 110,844 | 16.1% | 73,795 | 13.3% | 184,639 | 14.8% |
| Hip/thigh/upper leg | 51,415 | 7.5% | 76,706 | 13.8% | 128,121 | 10.3% |
| Hand/wrist | 61,214 | 8.9% | 55,473 | 9.9% | 116,687 | 9.4% |
| Shoulder | 60,412 | 8.8% | 45,148 | 8.1% | 105,560 | 8.5% |
| Trunk | 38,947 | 5.6% | 42,990 | 7.7% | 81,936 | 6.5% |
| Lower leg | 38,709 | 5.6% | 33,749 | 6.1% | 72,458 | 5.8% |
| Foot | 30,899 | 4.5% | 31,975 | 5.7% | 62,874 | 5.1% |
| Arm/elbow | 29,797 | 4.4% | 21,796 | 3.9% | 51,593 | 4.2% |
| Neck | 10,001 | 1.5% | 13,240 | 2.4% | 23,241 | 1.9% |
| Other | 10,194 | 1.5% | 11,323 | 2.0% | 21,517 | 1.7% |
| Total | 687,263 | 100% | 556,765 | 100% | 1,244,028* | 100% |

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

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 | 96,937 | 79.7% | 69,285 | 83.8% | 166,222 | 81.4% |
| Calcaneofibular ligament | 34,690 | 28.5% | 25,424 | 30.7% | 60,114 | 29.4% |
| Anterior tibiofibular ligament | 32,627 | 26.8% | 21,455 | 25.9% | 54,082 | 26.5% |
| Posterior talofibular ligament | 8,328 | 6.9% | 15,950 | 19.3% | 24,278 | 11.9% |
| Posterior tibiofibular ligament | 6,920 | 5.7% | 4,889 | 5.9% | 11,809 | 5.8% |
| Total | 121,556 | 100% | 82,692 | 100% | 204,248 | 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 | 50,255 | 38.7% | 11,855 | 21.6% | 62,110 | 33.6% |
| Torn cartilage (meniscus) | 25,069 | 19.3% | 12,907 | 23.5% | 37,976 | 20.6% |
| Patella/patellar tendon | 23,326 | 18.0% | 12,339 | 22.5% | 35,665 | 19.0% |
| Anterior cruciate ligament | 22,498 | 17.3% | 12,594 | 23.0% | 35,092 | 19.0% |
| Lateral collateral ligament | 9,976 | 7.7% | 4,488 | 8.2% | 14,464 | 7.8% |
| Posterior cruciate ligament | 697 | 0.5% | 1,552 | 2.8% | 2,249 | 1.2% |
| Total | 129,796 | 100% | 54,842 | 100% | 184,638 | 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

| Diagnosis | Competition n=687,266 | | Practice n=556,764 | | Overall n=1,244,026 | |
|-----------------------------------|--------------------------|-------|-----------------------|-------|------------------------|-------|
| | n | % | n | % | n | % |
| Ankle Strain/Sprain | 100,400 | 14.6% | 87,265 | 15.7% | 187,665 | 15.1% |
| Head/Face Concussion | 107,063 | 15.6% | 39,060 | 7.0% | 146,123 | 11.7% |
| Knee strain/sprain | 64,726 | 9.4% | 34,388 | 6.2% | 99,113 | 8.0% |
| Hip/thigh/upper leg strain/sprain | 33,522 | 4.9% | 62,973 | 11.3% | 96,495 | 7.8% |
| Knee other | 26,076 | 3.8% | 29,539 | 5.3% | 55,615 | 4.5% |
| Shoulder other | 27,755 | 4.0% | 21,959 | 3.9% | 49,714 | 4.0% |
| Hand/wrist fracture | 28,501 | 4.1% | 21,155 | 3.8% | 49,657 | 4.0% |
| Shoulder strain/sprain | 26,893 | 3.9% | 19,371 | 3.5% | 46,264 | 3.7% |
| Hand/wrist strain/sprain | 17,148 | 2.5% | 19,267 | 3.5% | 36,416 | 2.9% |
| Trunk strain/sprain | 13,276 | 1.9% | 21,759 | 3.9% | 35,035 | 2.8% |

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

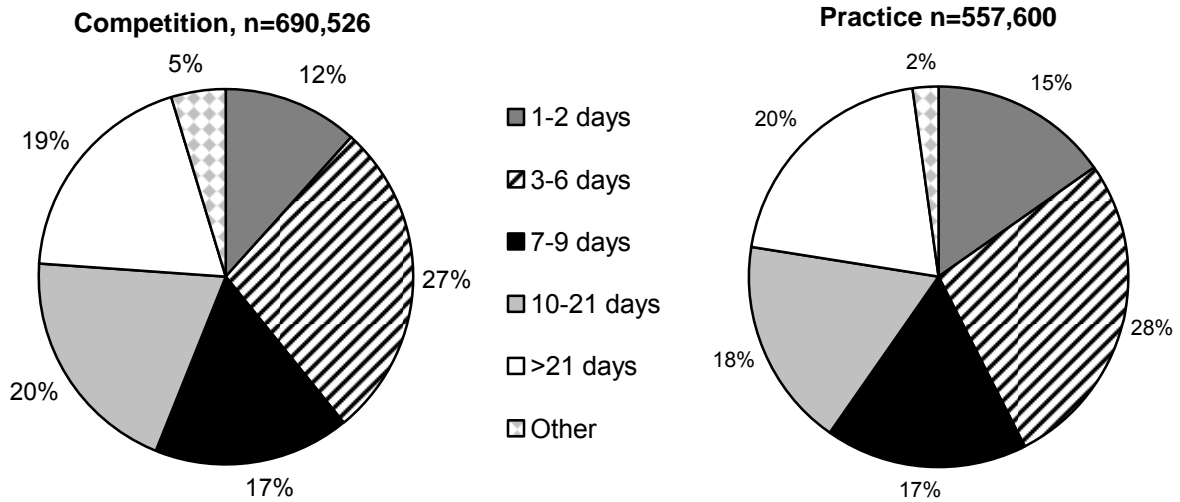


Table 2.8 Injuries Requiring Surgery by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

| | Competition | | Practice | | Overall | |
|-------------------------|----------------|-------------|----------------|-------------|------------------|-------------|
| | n | % | n | % | n | % |
| Need for surgery | | | | | | |
| Required surgery | 54,252 | 8.1% | 26,617 | 4.9% | 80,869 | 6.7% |
| Did not require surgery | 618,266 | 91.9% | 515,303 | 95.1% | 1,133,569 | 93.3% |
| Total | 672,518 | 100% | 541,920 | 100% | 1,214,438 | 100% |

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

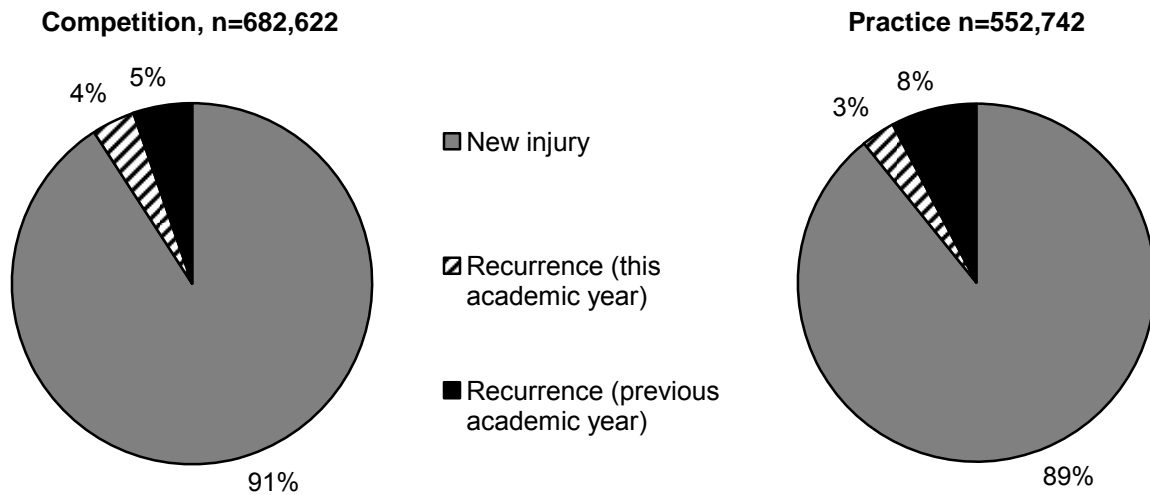


Table 2.9 Time during Season of Injury, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

| | n | % |
|-----------------------|------------------|-------------|
| Time in Season | | |
| Preseason | 315,289 | 25.3% |
| Regular season | 887,866 | 71.4% |
| Post season | 41,298 | 3.3% |
| Total | 1,244,453 | 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 | 553,920 | 86.1% |
| Yes, and ruled foul play | 27,971 | 4.3% |
| Yes, but not ruled foul play | 29,489 | 4.6% |
| Unknown | 32,250 | 5.0% |
| Total | 643,630 | 100% |

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

| | n | % |
|-------------------------|----------------|-------------|
| Time in Practice | | |
| First 1/2 hour | 62,213 | 12.5% |
| Second 1/2 hour | 112,246 | 22.5% |
| 1-2 hours into practice | 251,132 | 50.3% |
| >2 hours into practice | 73,803 | 14.8% |
| Total | 499,394 | 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 | 1,183,807 | 54.1% |
| Physician | 465,115 | 21.3% |
| Dentist/oral surgeon | 5,045 | 0.2% |
| Nurse practitioner | 10,297 | 0.5% |
| Physician's assistant | 12,352 | 0.6% |
| Other | 510,705 | 23.3% |
| Total | 2,187,321 | 100% |
| % of Injuries Assessed by:* | | |
| Evaluation | 1,251,594 | 60.4% |
| X-ray | 550,237 | 26.6% |
| MRI | 152,234 | 7.3% |
| CT-scan | 55,099 | 2.7% |
| Surgery | 17,787 | 0.9% |
| Blood work/lab test | 20,377 | 1.0% |
| Other | 23,899 | 1.2% |
| Total | 2,071,227 | 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) | Nationally Estimated # Injuries |
|--------------|--------------|----------------|--|---------------------------------------|
| Total | 2,061 | 588,876 | 3.50 | 527,321 |
| Competition | 1,121 | 99,532 | 11.26 | 288,637 |
| Practice | 940 | 489,344 | 1.92 | 238,684 |

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 | 107,529 (20.5%) |
| Sophomore | 124,352 (23.7%) |
| Junior | 133,108 (25.4%) |
| Senior | 159,938 (30.5%) |
| Total† | 524,927 (100%) |
| Age (years) | |
| Minimum | 13 |
| Maximum | 19 |
| Mean (St. Dev.) | 16.0 (1.3) |
| BMI | |
| Minimum | 9.6 |
| Maximum | 45.4 |
| Mean (St. Dev.) | 25.9 (4.6) |

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

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

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

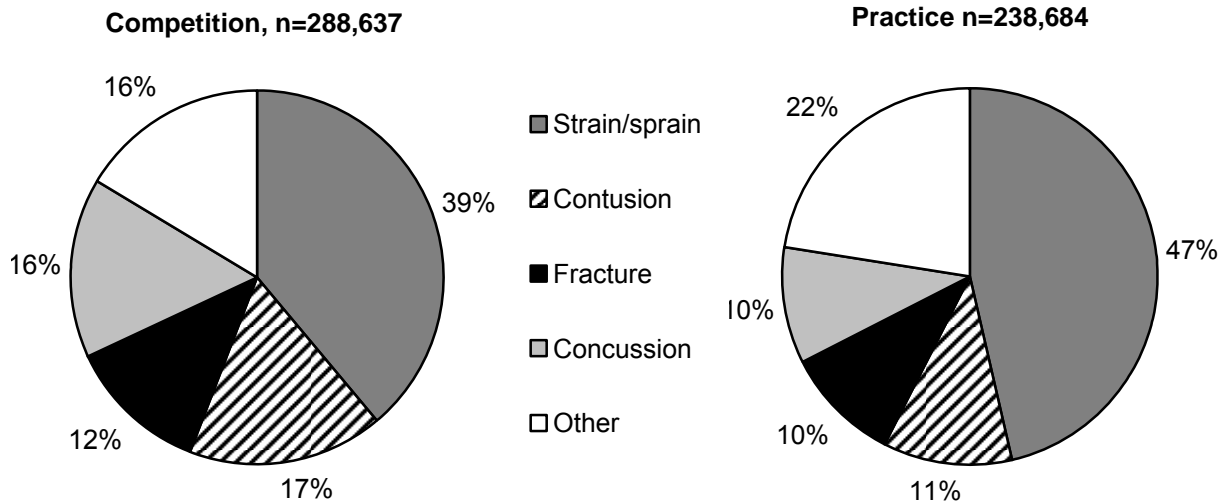


Table 3.3 Body Site of Football Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year*

| Body Site | Competition | | Practice | | Overall | |
|---------------------|----------------|-------------|----------------|-------------|----------------|-------------|
| | n | % | n | % | n | % |
| Knee | 56,116 | 19.5% | 32,779 | 13.7% | 88,894 | 16.9% |
| Head/face | 49,140 | 17.1% | 26,575 | 11.1% | 75,714 | 14.4% |
| Ankle | 32,364 | 11.2% | 32,184 | 13.5% | 64,548 | 12.3% |
| Hand/wrist | 32,156 | 11.2% | 25,782 | 10.8% | 57,937 | 11.0% |
| Shoulder | 32,848 | 11.4% | 23,849 | 10.0% | 56,697 | 10.8% |
| Hip/thigh/upper leg | 18,041 | 6.3% | 30,536 | 12.8% | 48,577 | 9.2% |
| Trunk | 22,832 | 7.9% | 21,486 | 9.0% | 44,319 | 8.4% |
| Lower leg | 14,133 | 4.9% | 11,014 | 4.6% | 25,147 | 4.8% |
| Arm/elbow | 14,455 | 5.0% | 10,081 | 4.2% | 24,536 | 4.7% |
| Foot | 8,283 | 2.9% | 7,863 | 3.3% | 16,146 | 3.1% |
| Neck | 4,825 | 1.7% | 11,036 | 4.6% | 15,861 | 3.0% |
| Other | 2,883 | 1.0% | 5,500 | 2.3% | 8,383 | 1.6% |
| Total | 288,074 | 100% | 238,685 | 100% | 526,758 | 100% |

*Totals and n's are not always equal due to slight rounding of weighted number of injuries

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

| Diagnosis | Competition n=288,633 | | Practice n= 238,687 | | Total n= 527,320 | |
|-----------------------------------|--------------------------|-------|------------------------|-------|---------------------|-------|
| | n | % | n | % | n | % |
| Head/face concussion | 44,316 | 15.4% | 23,850 | 10.0% | 68,166 | 12.9% |
| Ankle strain/sprain | 29,344 | 10.2% | 27,686 | 11.6% | 57,031 | 10.8% |
| Knee strain/sprain | 36,975 | 12.8% | 17,142 | 7.2% | 54,116 | 10.3% |
| Hip/thigh/upper leg strain/sprain | 8,850 | 3.1% | 23,001 | 9.6% | 31,851 | 6.0% |
| Shoulder other | 17,716 | 6.1% | 11,162 | 4.7% | 28,878 | 5.5% |
| Hand/wrist fracture | 15,011 | 5.2% | 7,533 | 3.2% | 22,544 | 4.3% |
| Shoulder strain/sprain | 11,528 | 4.0% | 9,062 | 3.8% | 20,591 | 3.9% |
| Knee other | 9,937 | 3.4% | 9,539 | 4.0% | 19,476 | 3.7% |
| Hand/wrist strain/sprain | 7,978 | 2.8% | 9,365 | 3.9% | 17,343 | 3.3% |
| Knee contusion | 8,490 | 2.9% | 4,540 | 1.9% | 13,030 | 2.5% |

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

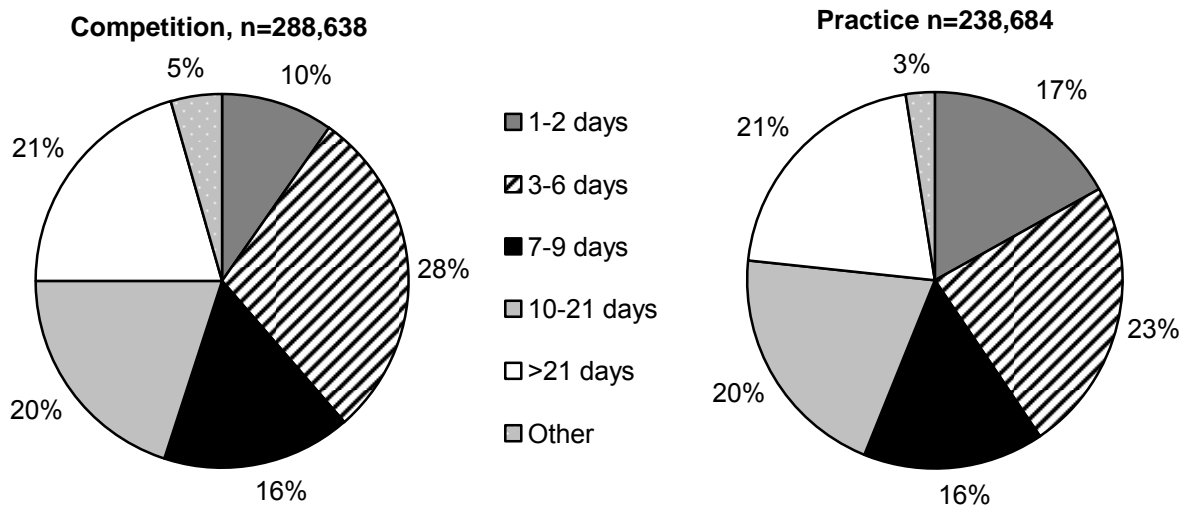


Table 3.5 Football Injuries Requiring Surgery by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year*

| | Competition | | Practice | | Overall | |
|-------------------------|----------------|-------------|----------------|-------------|----------------|-------------|
| | n | % | n | % | n | % |
| Need for surgery | | | | | | |
| Required surgery | 25,694 | 9.1% | 15,385 | 6.7% | 41,078 | 8.0% |
| Did not require surgery | 256,055 | 90.9% | 215,947 | 93.3% | 472,002 | 92.0% |
| Total | 281,749 | 100% | 231,332 | 100% | 513,081 | 100% |

*Totals and n's are not always equal due to slight rounding of weighted number of injuries

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

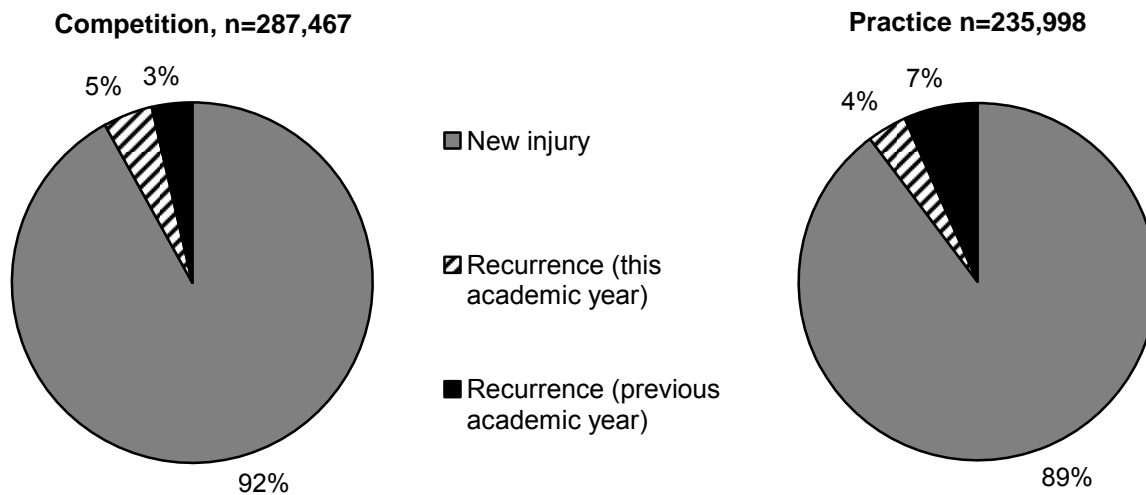


Table 3.6 Time during Season of Football Injuries, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

| | n | % |
|-----------------------|----------------|-------------|
| Time in Season | | |
| Preseason | 155,906 | 29.6% |
| Regular season | 353,907 | 67.3% |
| Post season | 16,310 | 3.1% |
| Total | 526,124 | 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 | 4,246 | 1.5% |
| First quarter | 36,853 | 13.4% |
| Second quarter | 81,606 | 29.7% |
| Third quarter | 87,397 | 31.8% |
| Fourth quarter | 64,073 | 23.3% |
| Overtime | 372 | 0.1% |
| Total | 274,546 | 100% |
| Injury Related to Foul Play | | |
| No | 242,690 | 91.8% |
| Yes, and ruled foul play | 5,426 | 2.1% |
| Yes, but not ruled foul play | 6,754 | 2.6% |
| Unknown | 9,425 | 3.6% |
| Total | 264,295 | 100% |
| Field Location | | |
| Between the 20 yrd lines | 213,048 | 77.1% |
| Red zone | 55,543 | 20.1% |
| End zone | 5,350 | 1.9% |
| Off the field | 2,424 | 0.9% |
| Total | 276,365 | 100% |

*Totals and n's are not always equal due to slight rounding of weighted number of injuries

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 | 22,390 | 10.7% |
| Second 1/2 hour | 45,694 | 21.8% |
| 1-2 hours into practice | 107,497 | 51.3% |
| >2 hours into practice | 34,042 | 16.2% |
| Total | 209,624 | 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

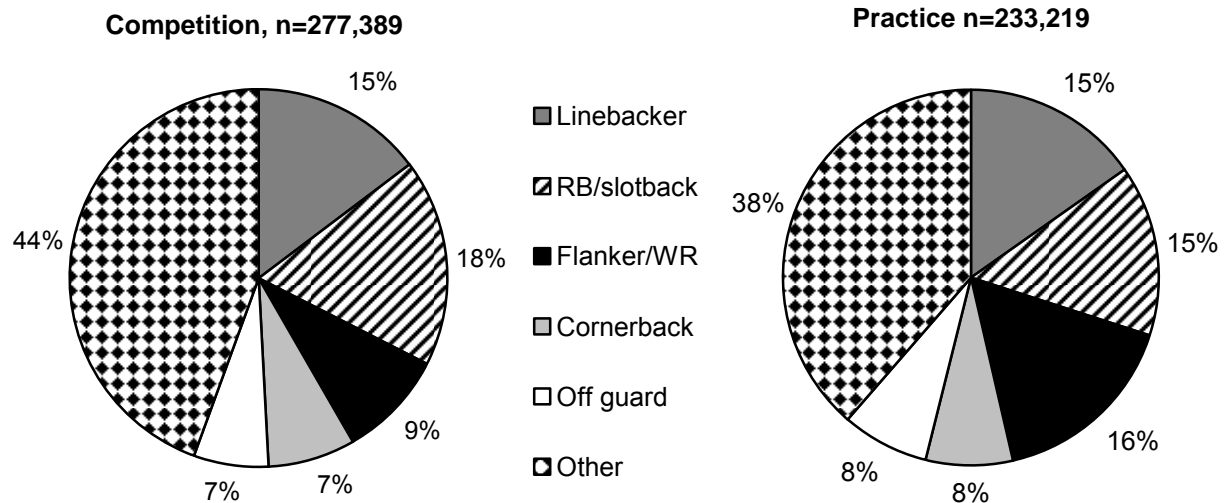
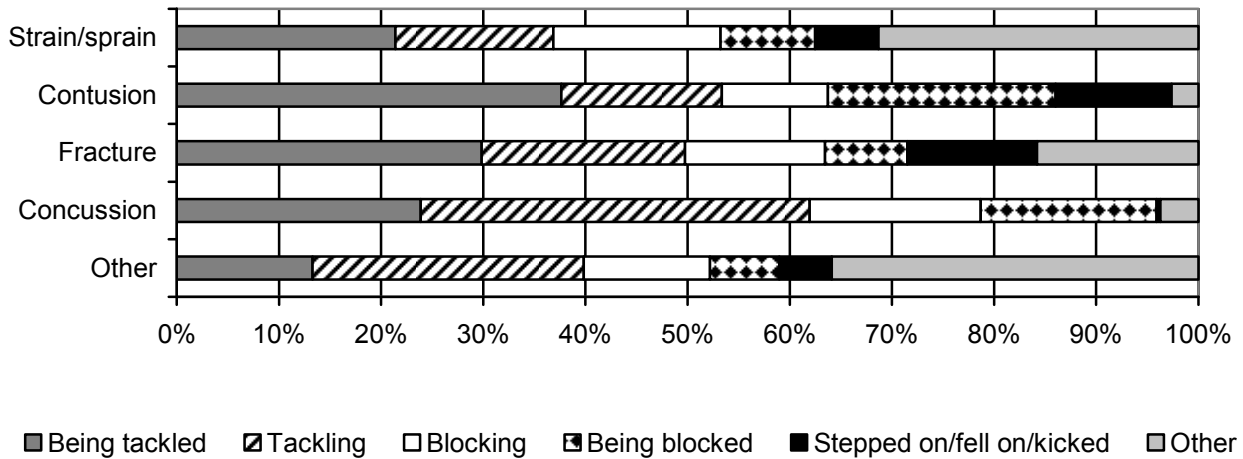


Table 3.9 Activities Leading to Football Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

| Activity | Competition | | Practice | | Overall | |
|--------------------------------|----------------|-------------|----------------|-------------|----------------|-------------|
| | n | % | n | % | n | % |
| Being tackled | 80,767 | 28.9% | 39,959 | 17.0% | 120,725 | 23.5% |
| Tackling | 68,770 | 24.6% | 39,149 | 16.7% | 107,919 | 21.0% |
| Blocking | 40,806 | 14.6% | 33,756 | 14.4% | 74,562 | 14.5% |
| Being blocked | 41,599 | 14.9% | 17,714 | 7.5% | 59,313 | 11.5% |
| N/A, chronic/overuse | 4,915 | 1.8% | 42,245 | 18.0% | 47,160 | 9.2% |
| Stepped on/fell on/kicked | 16,616 | 5.9% | 17,981 | 7.7% | 34,597 | 6.7% |
| Rotation around a planted foot | 9,350 | 3.3% | 18,383 | 7.8% | 27,733 | 5.4% |
| Other | 16,734 | 6.0% | 25,728 | 10.9% | 42,463 | 8.2% |
| Total | 279,557 | 100% | 234,915 | 100% | 514,472 | 100% |

*Totals and n's are not always equal due to slight rounding of weighted number of injuries

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) | Nationally Estimated # Injuries |
|--------------|------------|----------------|--|---------------------------------------|
| Total | 350 | 215,699 | 1.62 | 149,229 |
| Competition | 218 | 63,636 | 3.43 | 87,082 |
| Practice | 132 | 152,063 | 0.87 | 62,147 |

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 | 25,276 (17.0%) |
| Sophomore | 33,286 (22.3%) |
| Junior | 39,070 (26.2%) |
| Senior | 51,301 (34.4%) |
| Total† | 148,933 (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 (2.5) |

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

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

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

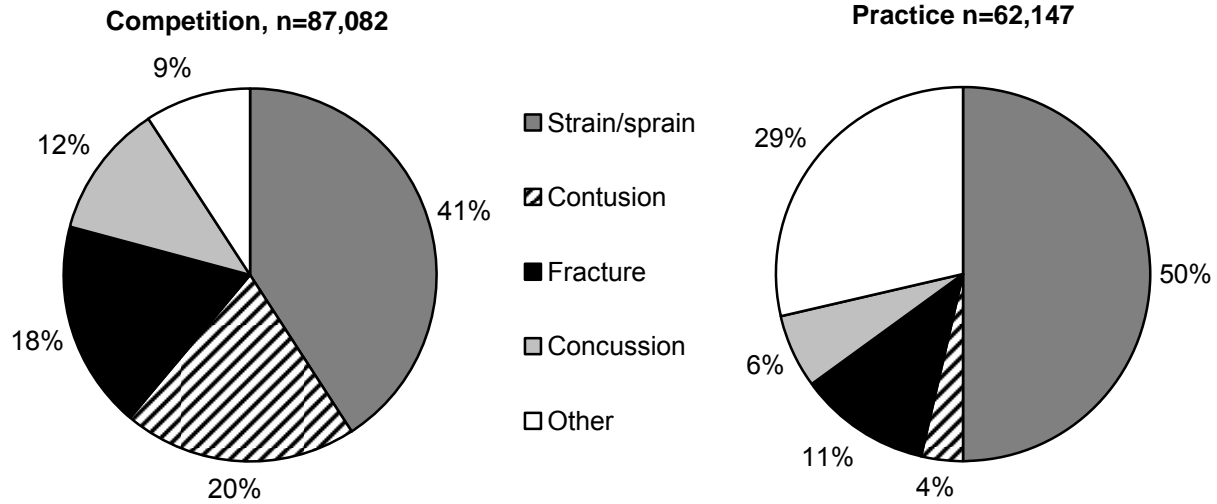


Table 4.3 Body Site of Boys' Soccer Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

| Body Site | Competition | | Practice | | Overall | |
|---------------------|---------------|-------------|---------------|-------------|----------------|-------------|
| | n | % | n | % | n | % |
| Hip/thigh/upper leg | 10,014 | 11.5% | 16,161 | 26.0% | 26,175 | 17.5% |
| Ankle | 15,656 | 18.0% | 8,912 | 14.3% | 24,568 | 16.5% |
| Lower leg | 12,305 | 14.1% | 7,963 | 12.8% | 20,267 | 13.6% |
| Head/face | 14,210 | 16.3% | 4,294 | 6.9% | 18,504 | 12.4% |
| Knee | 11,009 | 12.6% | 6,572 | 10.6% | 17,581 | 11.8% |
| Foot | 6,654 | 7.6% | 7,988 | 12.9% | 14,642 | 9.8% |
| Hand/wrist | 6,534 | 7.5% | 3,000 | 4.8% | 9,534 | 6.4% |
| Trunk | 4,100 | 4.7% | 4,588 | 7.4% | 8,688 | 5.8% |
| Shoulder | 4,414 | 5.1% | 1,202 | 1.9% | 5,616 | 3.8% |
| Arm/elbow | 1,265 | 1.5% | 1,123 | 1.8% | 2,388 | 1.6% |
| Neck | 663 | 0.8% | 0 | 0.0% | 663 | 0.4% |
| Other | 258 | 0.3% | 345 | 0.6% | 602 | 0.4% |
| Total | 87,082 | 100% | 62,147 | 100% | 149,229 | 100% |

*Totals and n's are not always equal due to slight rounding of weighted number of injuries

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

| Diagnosis | Competition n= 87,081 | | Practice n= 62,147 | | Total n=149,228 | |
|-----------------------------------|--------------------------|-------|-----------------------|-------|--------------------|-------|
| | n | % | n | % | n | % |
| Hip/thigh/upper leg strain/sprain | 6,472 | 7.4% | 14,171 | 22.8% | 20,643 | 13.8% |
| Ankle strain/sprain | 13,800 | 15.8% | 6,699 | 10.8% | 20,499 | 13.7% |
| Head/face concussion | 10,253 | 11.8% | 3,962 | 6.4% | 14,215 | 9.5% |
| Hand/wrist fracture | 5,411 | 6.2% | 2,485 | 4.0% | 7,895 | 5.3% |
| Knee strain/sprain | 4,430 | 5.1% | 3,003 | 4.8% | 7,433 | 5.0% |
| Lower leg fracture | 4,346 | 5.0% | 2,264 | 3.6% | 6,611 | 4.4% |
| Lower leg contusion | 5,856 | 6.7% | 258 | 0.4% | 6,114 | 4.1% |
| Foot strain/sprain | 2,591 | 3.0% | 2,668 | 4.3% | 5,258 | 3.5% |
| Knee contusion | 4,014 | 4.6% | 539 | 0.9% | 4,553 | 3.1% |
| Shoulder sprain/strain | 3,076 | 3.5% | 227 | 0.4% | 3,303 | 2.2% |

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

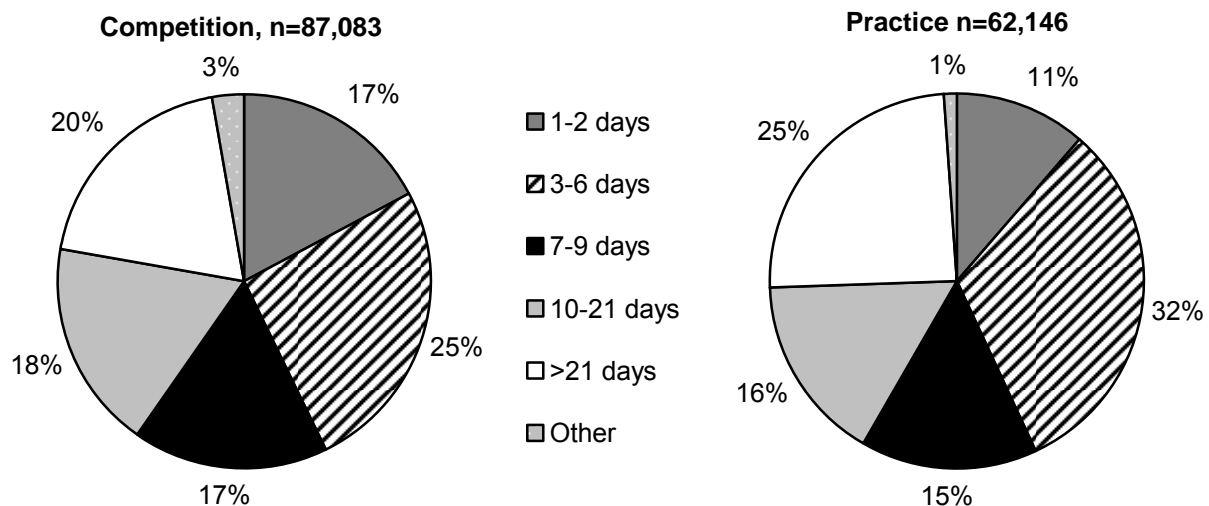


Table 4.5 Boys' Soccer Injuries Requiring Surgery by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

| | Competition | | Practice | | Overall | |
|-------------------------|---------------|-------------|---------------|-------------|----------------|-------------|
| | n | % | n | % | n | % |
| Need for surgery | | | | | | |
| Required surgery | 5,583 | 6.5% | 730 | 1.2% | 6,313 | 4.3% |
| Did not require surgery | 80,080 | 93.5% | 60,083 | 98.8% | 140,163 | 95.7% |
| Total | 85,663 | 100% | 60,813 | 100% | 146,476 | 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

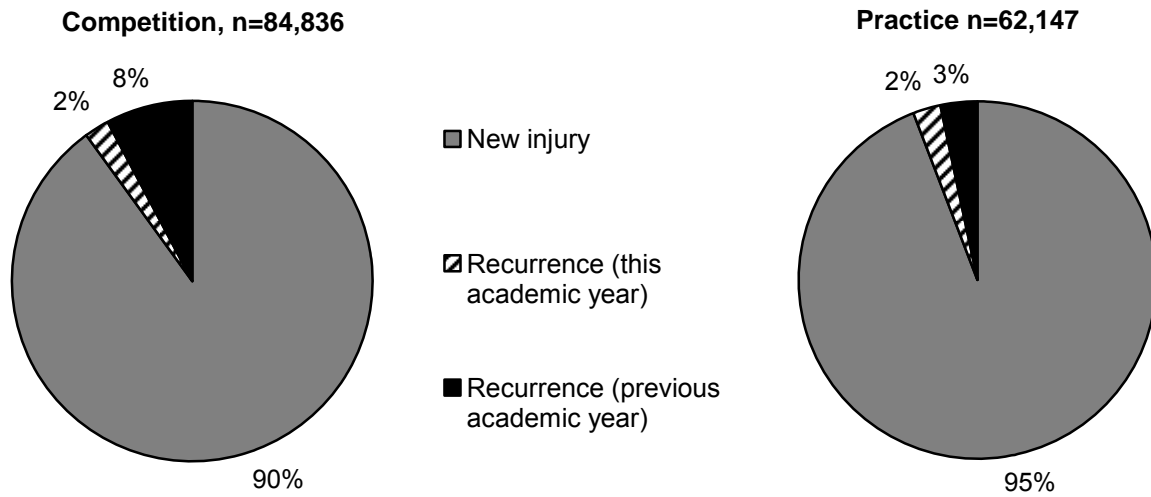


Table 4.6 Time during Season of Boys' Soccer Injuries, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

| | n | % |
|-----------------------|----------------|-------------|
| Time in Season | | |
| Preseason | 41,877 | 28.1% |
| Regular season | 102,338 | 68.7% |
| Post season | 4,669 | 3.1% |
| Total | 148,884 | 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 | 2,889 | 3.5% |
| First half | 26,878 | 32.6% |
| Second half | 51,652 | 62.6% |
| Overtime | 1,106 | 1.3% |
| Total | 82,526 | 100% |
| Injury Related to Foul Play | | |
| No | 64,025 | 76.6% |
| Yes, and ruled foul play | 6,129 | 7.3% |
| Yes, but not ruled foul play | 8,878 | 10.6% |
| Unknown | 4,595 | 5.5% |
| Total | 83,628 | 100% |
| Field Location | | |
| Top of goal box extended to center line (offense) | 28,141 | 34.60% |
| Goal box (defense) | 15,206 | 18.70% |
| Top of goal box extended to center line (defense) | 13,169 | 16.20% |
| Side of goal box (offense) | 9,639 | 11.80% |
| Goal box (offense) | 9,120 | 11.20% |
| Side of goal box (defense) | 4,678 | 5.70% |
| Off the field | 1,435 | 1.80% |
| Total | 81,387 | 100% |

*Totals and n's are not always equal due to slight rounding of weighted number of injuries

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 | 2,617 | 4.6% |
| Second 1/2 hour | 12,248 | 21.6% |
| 1-2 hours into practice | 28,780 | 50.8% |
| >2 hours into practice | 12,975 | 22.9% |
| Total | 56,619 | 100% |

*Totals and n's are not always equal due to slight rounding of weighted number of injuries

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

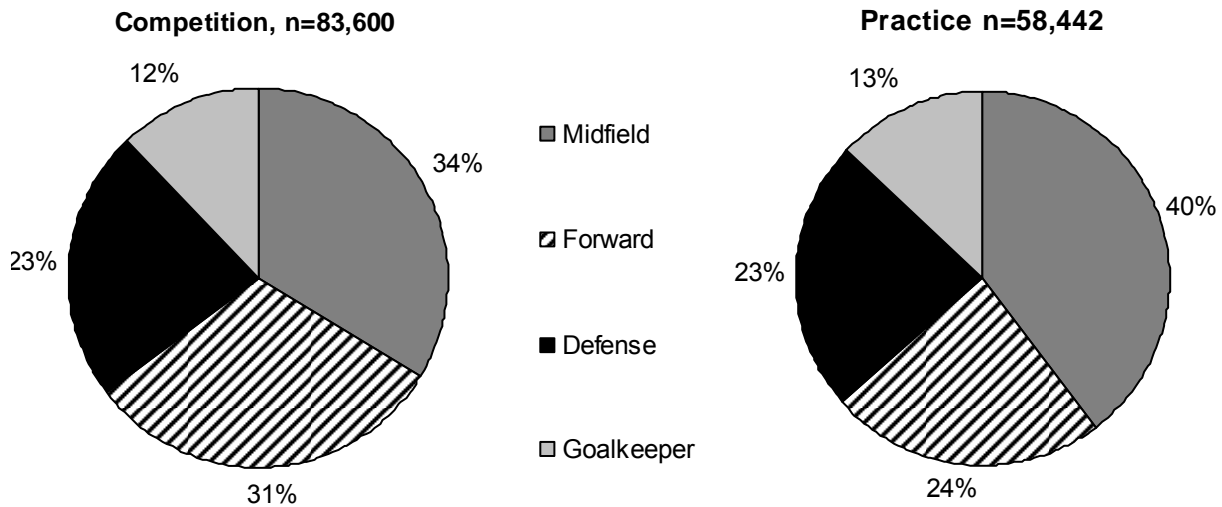
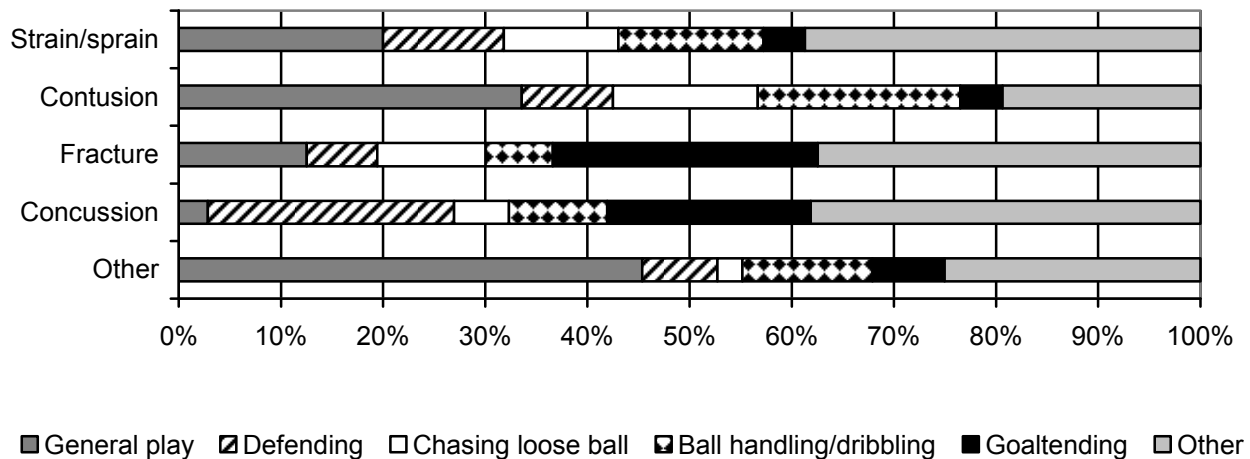


Table 4.9 Activities Leading to Boys' Soccer Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

| Activity | Competition | | Practice | | Overall | |
|-------------------------|---------------|-------------|---------------|-------------|----------------|-------------|
| | n | % | n | % | n | % |
| General play | 12,697 | 15.4% | 20,236 | 34.1% | 32,933 | 23.2% |
| Ball handling/dribbling | 14,228 | 17.3% | 4,438 | 7.5% | 18,666 | 13.2% |
| Defending | 9,776 | 11.9% | 6,085 | 10.3% | 15,861 | 11.2% |
| Chasing loose ball | 9,818 | 11.9% | 3,656 | 6.2% | 13,474 | 9.5% |
| Goaltending | 7,225 | 8.8% | 6,047 | 10.2% | 13,272 | 9.4% |
| Passing (foot) | 4,443 | 5.4% | 5,323 | 9.0% | 9,766 | 6.9% |
| Shooting (foot) | 6,048 | 7.3% | 3,547 | 6.0% | 9,596 | 6.8% |
| Heading ball | 6,075 | 7.4% | 1,622 | 2.7% | 7,697 | 5.4% |
| Receiving pass | 3,608 | 4.4% | 1,451 | 2.4% | 5,059 | 3.6% |
| Other | 8,559 | 10.3% | 6,886 | 11.6% | 15,443 | 10.8% |
| Total | 82,477 | 100% | 59,291 | 100% | 141,767 | 100% |

*Totals and n's are not always equal due to slight rounding of weighted number of injuries

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) | Nationally Estimated # Injuries |
|--------------|------------|----------------|--|---------------------------------------|
| Total | 381 | 184,268 | 2.07 | 192,108 |
| Competition | 251 | 54,670 | 4.59 | 123,312 |
| Practice | 130 | 129,598 | 1.00 | 68,796 |

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 | 42,263 (22.4%) |
| Sophomore | 58,557 (31.1%) |
| Junior | 41,727 (22.1%) |
| Senior | 45,862 (24.3%) |
| Total† | 188,409 (100%) |
| Age (years) | |
| Minimum | 14 |
| Maximum | 18 |
| Mean (St. Dev.) | 15.8 (1.2) |
| BMI | |
| Minimum | 15.4 |
| Maximum | 45.4 |
| Mean (St. Dev.) | 21.9 (3.7) |

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

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

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

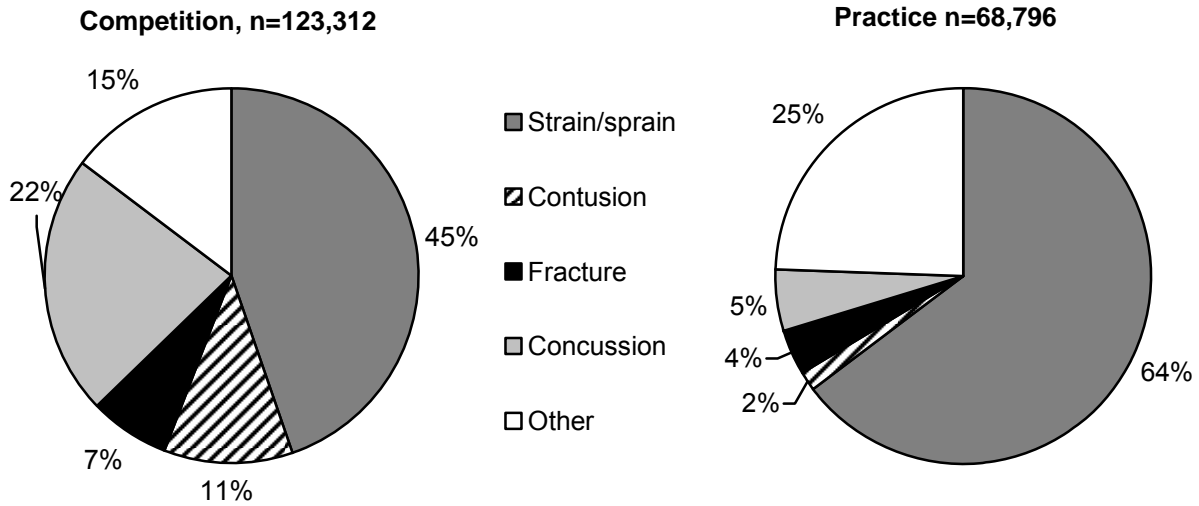


Table 5.3 Body Site of Girls' Soccer Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

| Body Site | Competition | | Practice | | Overall | |
|---------------------|----------------|-------------|---------------|-------------|----------------|-------------|
| | n | % | n | % | n | % |
| Head/face | 31,654 | 25.7% | 3,873 | 5.6% | 35,527 | 18.5% |
| Ankle | 19,121 | 15.5% | 15,986 | 23.2% | 35,108 | 18.3% |
| Hip/thigh/upper leg | 15,703 | 12.7% | 18,168 | 26.4% | 33,871 | 17.6% |
| Knee | 21,305 | 17.3% | 8,867 | 12.9% | 30,173 | 15.7% |
| Foot | 8,497 | 6.9% | 5,016 | 7.3% | 13,513 | 7.0% |
| Lower leg | 5,206 | 4.2% | 6,439 | 9.4% | 11,645 | 6.1% |
| Trunk | 4,218 | 3.4% | 4,022 | 5.8% | 8,241 | 4.3% |
| Hand/wrist | 2,857 | 2.3% | 2,261 | 3.3% | 5,118 | 2.7% |
| Arm/elbow | 3,079 | 2.5% | 866 | 1.3% | 3,946 | 2.1% |
| Neck | 3,120 | 2.5% | 309 | 0.4% | 3,429 | 1.8% |
| Shoulder | 1,965 | 1.6% | 558 | 0.8% | 2,522 | 1.3% |
| Other | 6,585 | 5.3% | 2,430 | 3.5% | 9,015 | 4.7% |
| Total | 123,312 | 100% | 68,796 | 100% | 192,108 | 100% |

*Totals and n's are not always equal due to slight rounding of weighted number of injuries

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

| Diagnosis | Competition n=123,313 | | Practice n= 68,798 | | Total n=192,109 | |
|-----------------------------------|--------------------------|-------|-----------------------|-------|--------------------|-------|
| | n | % | n | % | n | % |
| Ankle strain/sprain | 17,214 | 14.0% | 15,856 | 23.0% | 33,070 | 17.2% |
| Head/face concussion | 27,684 | 22.5% | 3,564 | 5.2% | 31,248 | 16.3% |
| Hip/thigh/upper leg strain/sprain | 13,802 | 11.2% | 16,324 | 23.7% | 30,126 | 15.7% |
| Knee strain/sprain | 11,153 | 9.0% | 3,871 | 5.6% | 15,024 | 7.8% |
| Knee other | 7,758 | 6.3% | 4,735 | 6.9% | 12,493 | 6.5% |
| Lower leg other | 1,593 | 1.3% | 5,391 | 7.8% | 6,983 | 3.6% |
| Trunk strain/sprain | 3,707 | 3.0% | 2,430 | 3.5% | 6,136 | 3.2% |
| Foot strain/sprain | 4,331 | 3.5% | 1,901 | 2.8% | 6,233 | 3.2% |
| Foot other | 2,020 | 1.6% | 2,446 | 3.6% | 4,466 | 2.3% |
| Foot contusion | 2,016 | 1.6% | 668 | 1.0% | 2,684 | 1.4% |

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

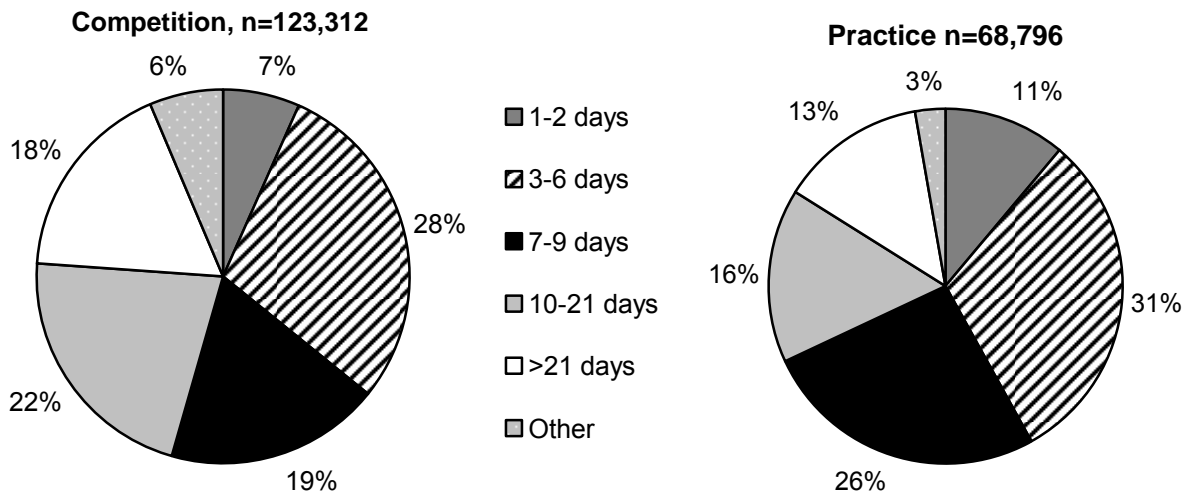


Table 5.5 Girls' Soccer Injuries Requiring Surgery by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

| | Competition | | Practice | | Overall | |
|-------------------------|----------------|-------------|---------------|-------------|----------------|-------------|
| | n | % | n | % | n | % |
| Need for surgery | | | | | | |
| Required surgery | 8,975 | 7.4% | 1,410 | 2.1% | 10,384 | 5.5% |
| Did not require surgery | 112,559 | 92.6% | 65,434 | 97.9% | 177,993 | 94.5% |
| Total | 121,534 | 100% | 66,843 | 100% | 188,377 | 100% |

*Totals and n's are not always equal due to slight rounding of weighted number of injuries

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

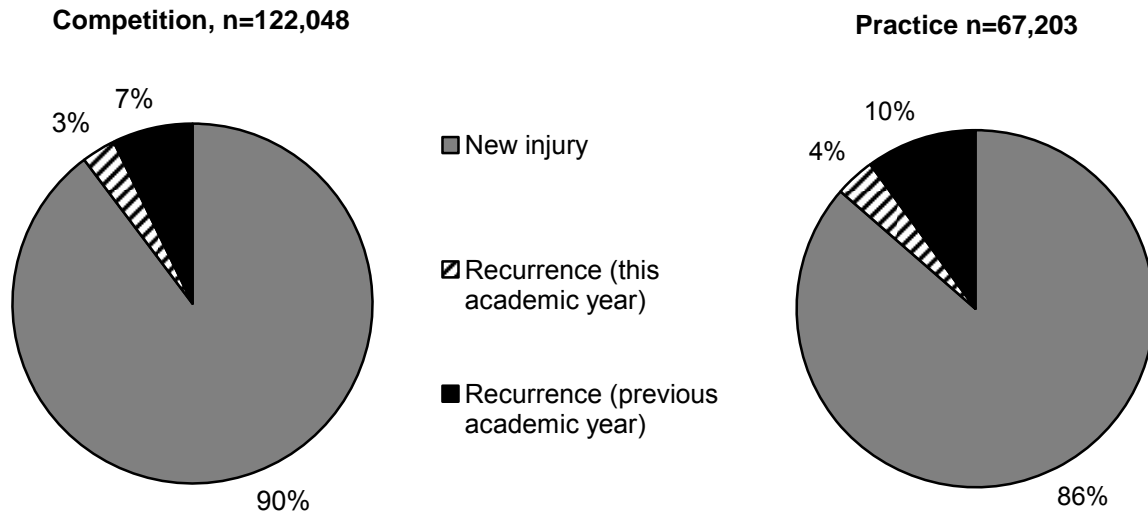


Table 5.6 Time during Season of Girls' Soccer Injuries, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

| | n | % |
|-----------------------|----------------|-------------|
| Time in Season | | |
| Preseason | 38,255 | 19.9% |
| Regular season | 147,297 | 76.7% |
| Post season | 6,556 | 3.4% |
| Total | 192,108 | 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 | 1,706 | 1.5% |
| First half | 41,143 | 36.1% |
| Second half | 71,112 | 62.3% |
| Overtime | 131 | 0.1% |
| Total | 114,091 | 100% |
| Injury Related to Foul Play | | |
| No | 91,373 | 77.4% |
| Yes, and ruled foul play | 8,966 | 7.6% |
| Yes, but not ruled foul play | 7,201 | 6.1% |
| Unknown | 10,448 | 8.9% |
| Total | 117,988 | 100% |
| Field Location | | |
| Top of goal box extended to center line (offense) | 36,424 | 34.1% |
| Top of goal box extended to center line (defense) | 24,861 | 23.3% |
| Goal box (defense) | 12,955 | 12.1% |
| Goal box (offense) | 9,550 | 9.0% |
| Side of goal box (offense) | 9,430 | 8.8% |
| Side of goal box (defense) | 7,212 | 6.8% |
| Off the field | 6,239 | 5.8% |
| Total | 106,671 | 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 | 10,950 | 17.8% |
| Second 1/2 hour | 11,969 | 19.5% |
| 1-2 hours into practice | 31,145 | 50.7% |
| >2 hours into practice | 7,323 | 11.9% |
| Total | 61,386 | 100% |

*Totals and n's are not always equal due to slight rounding of weighted number of injuries

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

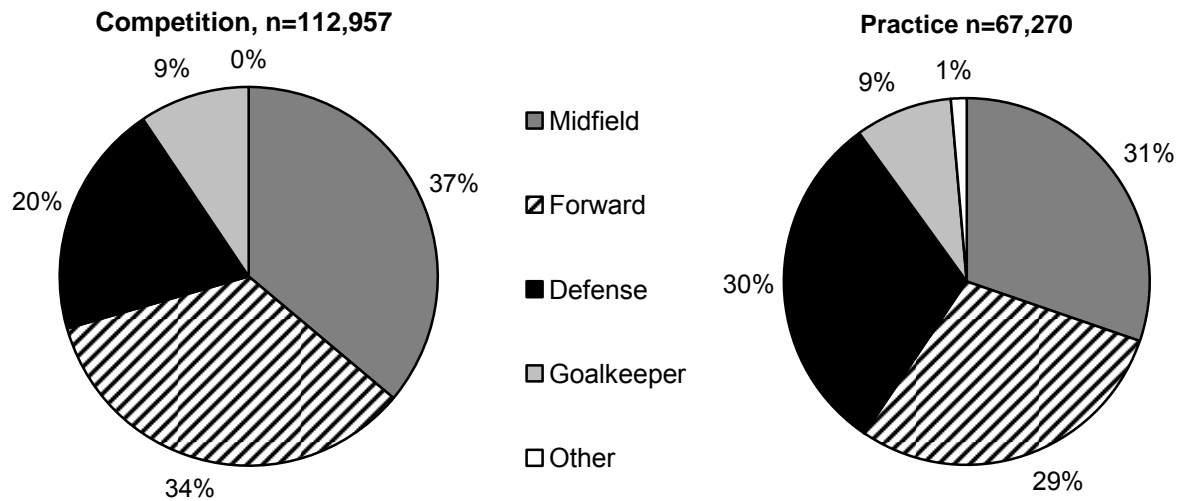
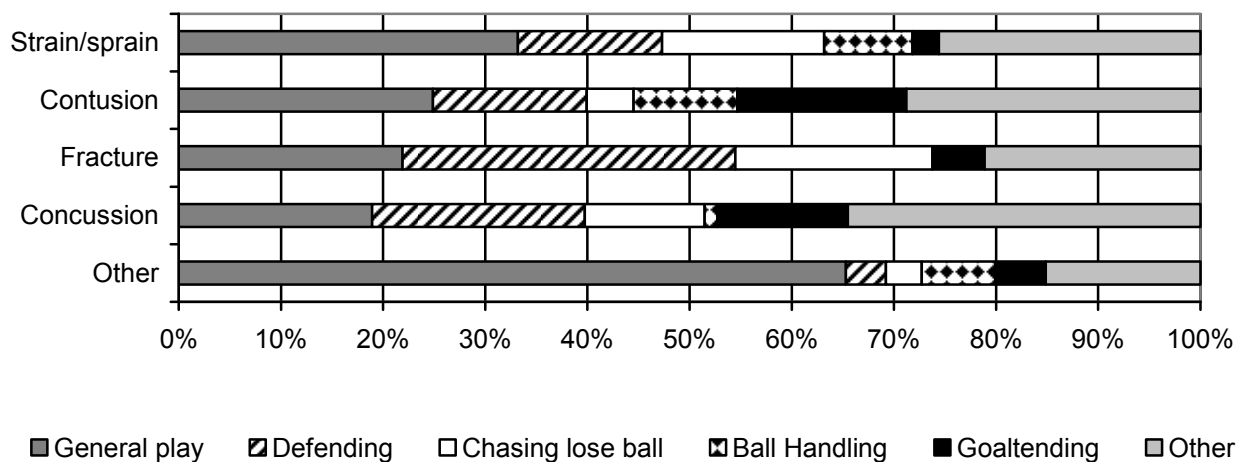


Table 5.9 Activities Leading to Girls' Soccer Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

| Activity | Competition | | Practice | | Overall | |
|-------------------------|----------------|-------------|---------------|-------------|----------------|-------------|
| | n | % | n | % | n | % |
| General play | 34,964 | 29.6% | 31,718 | 46.6% | 66,683 | 35.8% |
| Defending | 20,622 | 17.5% | 5,859 | 8.6% | 26,481 | 14.2% |
| Chasing loose ball | 19,566 | 16.6% | 3,165 | 4.6% | 22,731 | 12.2% |
| Ball handling/dribbling | 10,242 | 8.7% | 2,643 | 3.9% | 12,885 | 6.9% |
| Goaltending | 7,864 | 6.7% | 2,930 | 4.3% | 10,794 | 5.8% |
| Shooting (foot) | 2,816 | 2.4% | 7,893 | 11.6% | 10,708 | 5.8% |
| Passing (foot) | 4,623 | 3.9% | 3,567 | 5.2% | 8,190 | 4.4% |
| Receiving pass | 5,453 | 4.6% | 2,454 | 3.6% | 7,907 | 4.2% |
| Conditioning | 0 | 0.0% | 5,193 | 7.6% | 5,193 | 2.8% |
| Blocking shot | 2,723 | 2.3% | 0 | 0.0% | 2,723 | 1.5% |
| Other | 9,128 | 7.7% | 2,686 | 3.9% | 11,814 | 6.3% |
| Total | 118,001 | 100% | 68,108 | 100% | 186,109 | 100% |

*Totals and n's are not always equal due to slight rounding of weighted number of injuries

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) | Nationally Estimated # Injuries |
|--------------|------------|----------------|--|---------------------------------------|
| Total | 167 | 188,075 | 0.89 | 56,609 |
| Competition | 58 | 64,294 | 0.90 | 19,764 |
| Practice | 109 | 123,781 | 0.88 | 36,845 |

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 | 16,969 (30.2%) |
| Sophomore | 14,949 (26.6%) |
| Junior | 12,211 (21.7%) |
| Senior | 12,022 (21.4%) |
| Total[†] | 56,151 (100%) |
| Age (years) | |
| Minimum | 13 |
| Maximum | 18 |
| Mean (St. Dev.) | 15.5 (1.3) |
| BMI | |
| Minimum | 16.6 |
| Maximum | 34.1 |
| Mean (St. Dev.) | 22.0 (4.0) |

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

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

Figure 6.1 Diagnosis of Volleyball Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

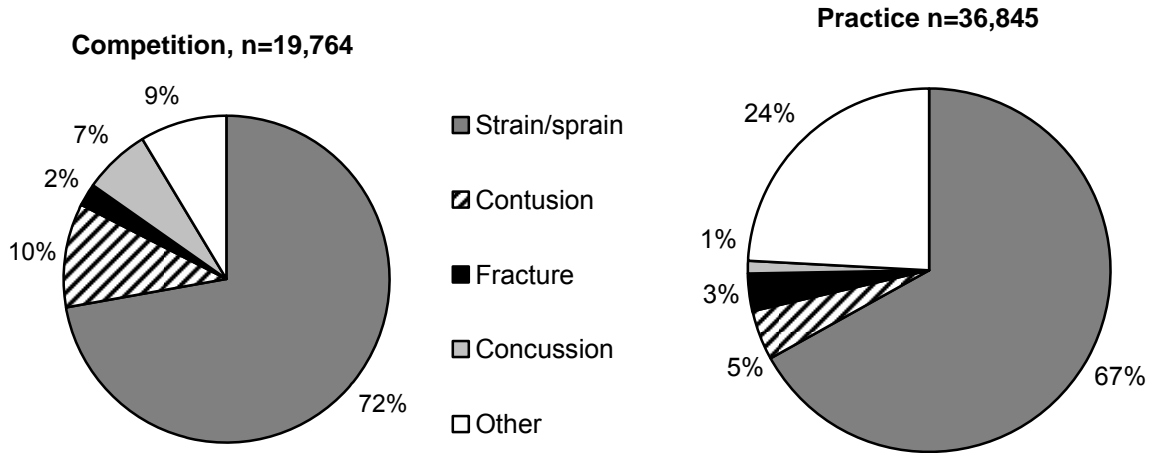


Table 6.3 Body Site of Volleyball Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

| Body Site | Competition | | Practice | | Overall | |
|---------------------|---------------|-------------|---------------|-------------|---------------|-------------|
| | n | % | n | % | n | % |
| Ankle | 8,622 | 43.6% | 11,926 | 32.4% | 20,548 | 36.3% |
| Shoulder | 694 | 3.5% | 6,018 | 16.3% | 6,712 | 11.9% |
| Knee | 2,086 | 10.6% | 4,133 | 11.2% | 6,219 | 11.0% |
| Hand/wrist | 1,475 | 7.5% | 3,734 | 10.1% | 5,209 | 9.2% |
| Hip/thigh/upper leg | 1,480 | 7.5% | 1,920 | 5.2% | 3,401 | 6.0% |
| Lower leg | 1,050 | 5.3% | 2,372 | 6.4% | 3,423 | 6.0% |
| Trunk | 788 | 4.0% | 2,152 | 5.8% | 2,941 | 5.2% |
| Arm/elbow | 1,457 | 7.4% | 788 | 2.1% | 2,246 | 4.0% |
| Head/face | 1,327 | 6.7% | 474 | 1.3% | 1,802 | 3.2% |
| Foot | 314 | 1.6% | 1,481 | 4.0% | 1,795 | 3.2% |
| Neck | 468 | 2.4% | 379 | 1.0% | 848 | 1.5% |
| Other | 0 | 0.0% | 1,467 | 4.0% | 1,467 | 2.6% |
| Total | 19,764 | 100% | 36,845 | 100% | 56,609 | 100% |

*Totals and n's are not always equal due to slight rounding of weighted number of injuries

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

| Diagnosis | Competition n=19,760 | | Practice n=36,844 | | Total n=56,606 | |
|-----------------------------------|-------------------------|-------|----------------------|-------|-------------------|-------|
| | n | % | n | % | n | % |
| Ankle strain/sprain | 8,622 | 43.6% | 11,926 | 32.4% | 20,548 | 36.3% |
| Hand/wrist strain/sprain | 1,244 | 6.3% | 2,881 | 7.8% | 4,125 | 7.3% |
| Shoulder other | 379 | 1.9% | 3,326 | 9.0% | 3,705 | 6.5% |
| Shoulder strain/sprain | 314 | 1.6% | 2,692 | 7.3% | 3,007 | 5.3% |
| Knee other | 474 | 2.4% | 2,413 | 6.5% | 2,887 | 5.1% |
| Knee strain/sprain | 1,416 | 7.2% | 1,233 | 3.3% | 2,649 | 4.7% |
| Trunk strain/sprain | 474 | 2.4% | 1,998 | 5.4% | 2,472 | 4.4% |
| Hip/thigh/upper leg strain/sprain | 694 | 3.5% | 1,446 | 3.9% | 2,140 | 3.8% |
| Lower leg strain/sprain | 671 | 3.4% | 1,073 | 2.9% | 1,744 | 3.1% |
| Head/face concussion | 1,327 | 6.7% | 394 | 1.1% | 1,722 | 3.0% |

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

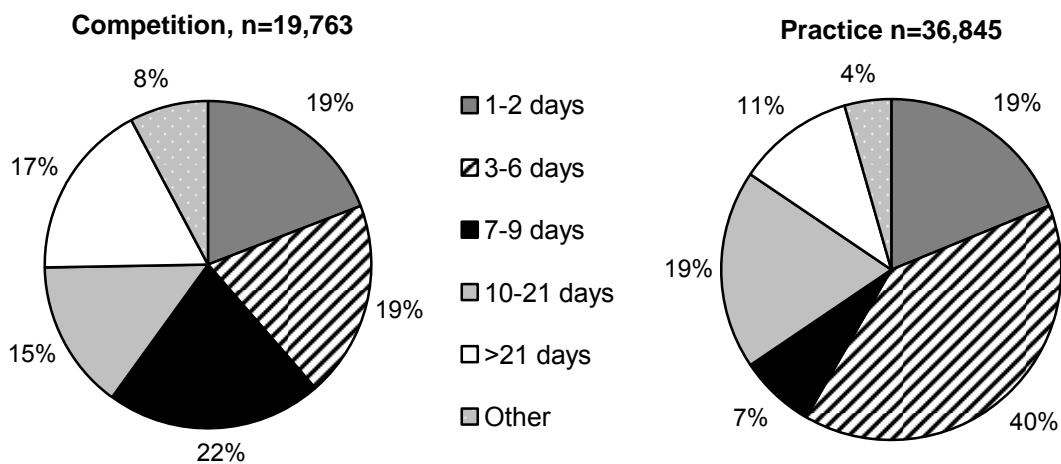


Table 6.5 Volleyball Injuries Requiring Surgery by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

| | Competition | | Practice | | Overall | |
|-------------------------|---------------|-------------|---------------|-------------|---------------|-------------|
| | n | % | n | % | n | % |
| Need for surgery | | | | | | |
| Required surgery | 788 | 2.2% | 0 | 0.0% | 788 | 1.4% |
| Did not require surgery | 18,502 | 97.8% | 35,109 | 100.0% | 53,611 | 98.6% |
| Total | 19,290 | 100% | 35,109 | 100% | 54,399 | 100% |

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

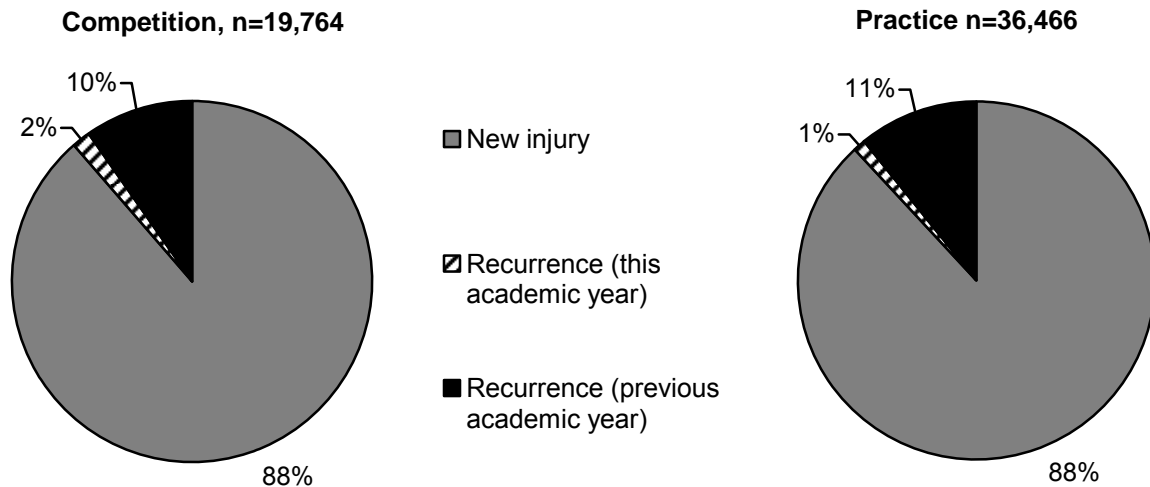


Table 6.6 Time during Season of Volleyball Injuries, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

| | n | % |
|-----------------------|---------------|-------------|
| Time in Season | | |
| Preseason | 14,553 | 25.9% |
| Regular season | 40,021 | 71.2% |
| Post season | 1,657 | 2.9% |
| Total | 56,230 | 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 | 3,170 | 16.2% |
| First game | 4,122 | 21.0% |
| Second game | 7,913 | 40.4% |
| Third game | 4,399 | 22.4% |
| Total | 19,604 | 100% |
| Injury Related to Foul Play | | |
| No | 19,305 | 100.0% |
| Yes, and ruled foul play | 0 | 0.0% |
| Yes, but not ruled foul play | 0 | 0.0% |
| Unknown | 0 | 0.0% |
| Total | 19,305 | 100% |
| Court Location | | |
| Middle forward | 7,224 | 39.1% |
| Right forward | 4,987 | 27.0% |
| Left back | 3,304 | 17.9% |
| Left forward | 2,517 | 13.6% |
| Outside court (your side) | 308 | 1.7% |
| Right back (server) | 116 | 0.6% |
| Off the court | 0 | 0.0% |
| Outside court (opponent's side) | 0 | 0.0% |
| Total | 18,455 | 100% |

*Totals and n's are not always equal due to slight rounding of weighted number of injuries

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 | 3,741 | 10.9% |
| Second 1/2 hour | 10,858 | 31.6% |
| 1-2 hours into practice | 14,471 | 42.1% |
| >2 hours into practice | 5,340 | 15.5% |
| Total | 34,410 | 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

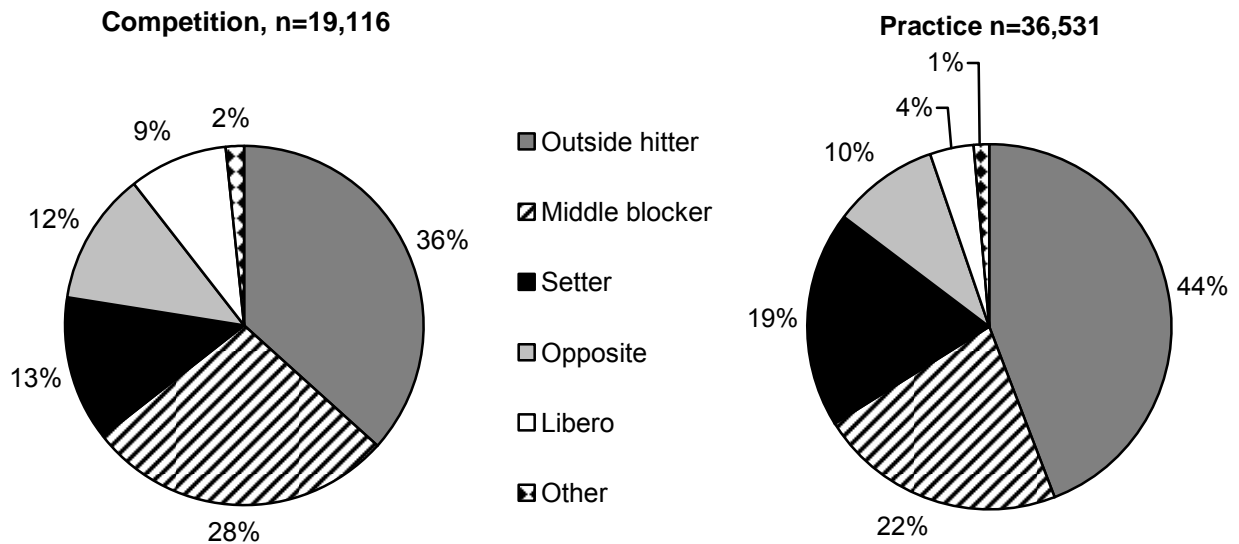
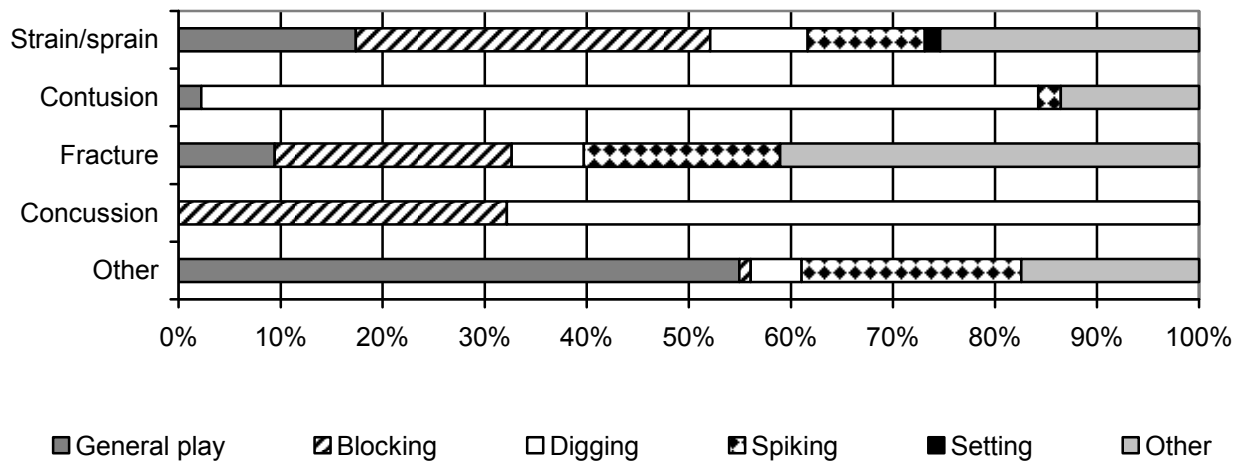


Table 6.9 Activities Leading to Volleyball Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

| Activity | Competition | | Practice | | Overall | |
|--------------|---------------|-------------|---------------|-------------|---------------|-------------|
| | n | % | n | % | n | % |
| Blocking | 5,638 | 28.9% | 8,698 | 24.2% | 14,336 | 25.8% |
| General play | 3,173 | 16.3% | 9,339 | 26.0% | 12,511 | 22.6% |
| Digging | 6,097 | 31.3% | 2,295 | 6.4% | 8,392 | 15.1% |
| Spiking | 1,971 | 10.1% | 5,033 | 14.0% | 7,004 | 12.6% |
| Passing | 1,547 | 7.9% | 4,027 | 11.2% | 5,574 | 10.0% |
| Serving | 0 | 0.0% | 3,034 | 8.4% | 3,034 | 5.5% |
| Conditioning | 0 | 0.0% | 2,727 | 7.6% | 2,727 | 4.9% |
| Setting | 575 | 2.9% | 0 | 0.0% | 575 | 1.0% |
| Other | 488 | 2.5% | 825 | 2.3% | 1,313 | 2.4% |
| Total | 19,489 | 100% | 35,978 | 100% | 55,467 | 100% |

*Totals and n's are not always equal due to slight rounding of weighted number of injuries

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) | Nationally Estimated # Injuries |
|--------------|------------|----------------|--|---------------------------------------|
| Total | 319 | 236,419 | 1.35 | 79,230 |
| Competition | 160 | 69,043 | 2.32 | 40,152 |
| Practice | 159 | 167,376 | 0.95 | 39,078 |

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 | 17,446 (22.0%) |
| Sophomore | 18,118 (23.0%) |
| Junior | 24,056 (30.5%) |
| Senior | 19,143 (24.3%) |
| Total† | 78,763 (100%) |
| Age (years) | |
| Minimum | 13 |
| Maximum | 19 |
| Mean (St. Dev.) | 16.1 (1.2) |
| BMI | |
| Minimum | 14.3 |
| Maximum | 42.3 |
| Mean (St. Dev.) | 22.8 (3.1) |

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

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

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

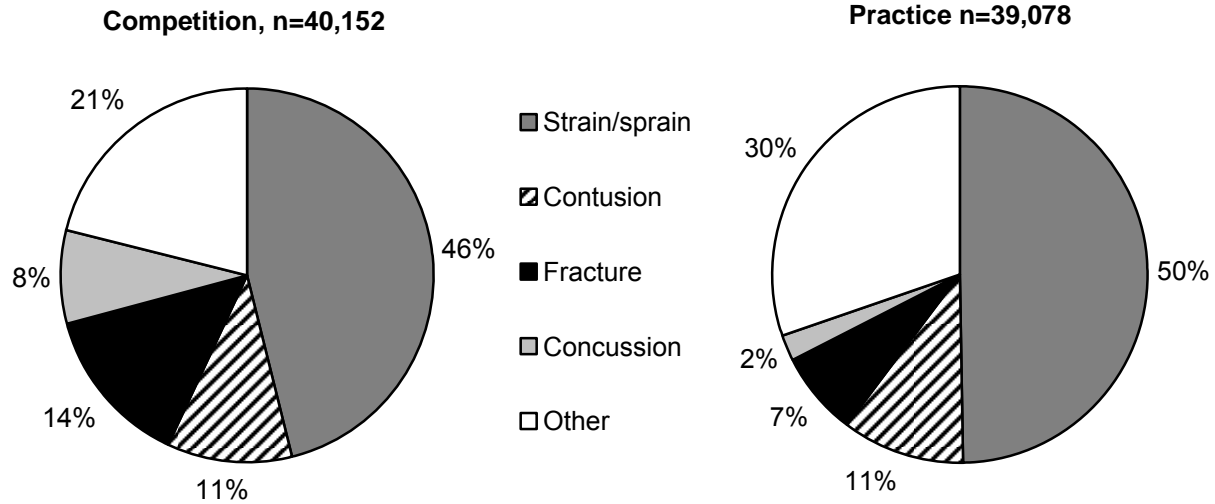


Table 7.3 Body Site of Boys' Basketball Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

| | Competition | | Practice | | Overall | |
|---------------------|---------------|-------------|---------------|-------------|---------------|-------------|
| | n | % | n | % | n | % |
| Body Site | | | | | | |
| Ankle | 12,023 | 29.9% | 11,553 | 29.6% | 23,575 | 29.8% |
| Head/face | 8,311 | 20.7% | 4,167 | 10.7% | 12,478 | 15.7% |
| Knee | 4,905 | 12.2% | 5,117 | 13.1% | 10,021 | 12.6% |
| Hand/wrist | 3,236 | 8.1% | 4,571 | 11.7% | 7,807 | 9.9% |
| Hip/thigh/upper leg | 2,716 | 6.8% | 3,792 | 9.7% | 6,508 | 8.2% |
| Foot | 2,800 | 7.0% | 3,599 | 9.2% | 6,399 | 8.1% |
| Trunk | 1,210 | 3.0% | 2,840 | 7.3% | 4,050 | 5.1% |
| Shoulder | 1,958 | 4.9% | 1,269 | 3.2% | 3,226 | 4.1% |
| Arm/elbow | 1,746 | 4.3% | 1,073 | 2.7% | 2,819 | 3.6% |
| Lower leg | 996 | 2.5% | 633 | 1.6% | 1,629 | 2.1% |
| Neck | 0 | 0.0% | 0 | 0.0% | 0 | 0.0% |
| Other | 251 | 0.6% | 466 | 1.2% | 717 | 0.9% |
| Total | 40,152 | 100% | 39,078 | 100% | 79,230 | 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

| Diagnosis | Competition n=40,151 | | Practice n=39,075 | | Total n=79,231 | |
|-----------------------------------|-------------------------|-------|----------------------|-------|-------------------|-------|
| | n | % | n | % | n | % |
| Ankle strain/sprain | 11,863 | 29.5% | 10,999 | 28.1% | 22,862 | 28.9% |
| Knee other | 2,393 | 6.0% | 2,543 | 6.5% | 4,936 | 6.2% |
| Head/face other | 2,703 | 6.7% | 2,232 | 5.7% | 4,936 | 6.2% |
| Head/face concussion | 3,216 | 8.0% | 808 | 2.1% | 4,024 | 5.1% |
| Hip/thigh/upper leg strain/sprain | 981 | 2.4% | 2,994 | 7.7% | 3,976 | 5.0% |
| Knee strain/sprain | 1,972 | 4.9% | 1,738 | 4.4% | 3,710 | 4.7% |
| Hand/wrist strain/sprain | 1,608 | 4.0% | 1,229 | 3.1% | 2,837 | 3.6% |
| Foot other | 0 | 0.0% | 2,835 | 7.3% | 2,835 | 3.6% |
| Head/face fracture | 2,175 | 5.4% | 633 | 1.6% | 2,808 | 3.5% |
| Hip/thigh/upper leg contusion | 1,735 | 4.3% | 2,994 | 7.7% | 2,532 | 3.2% |

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

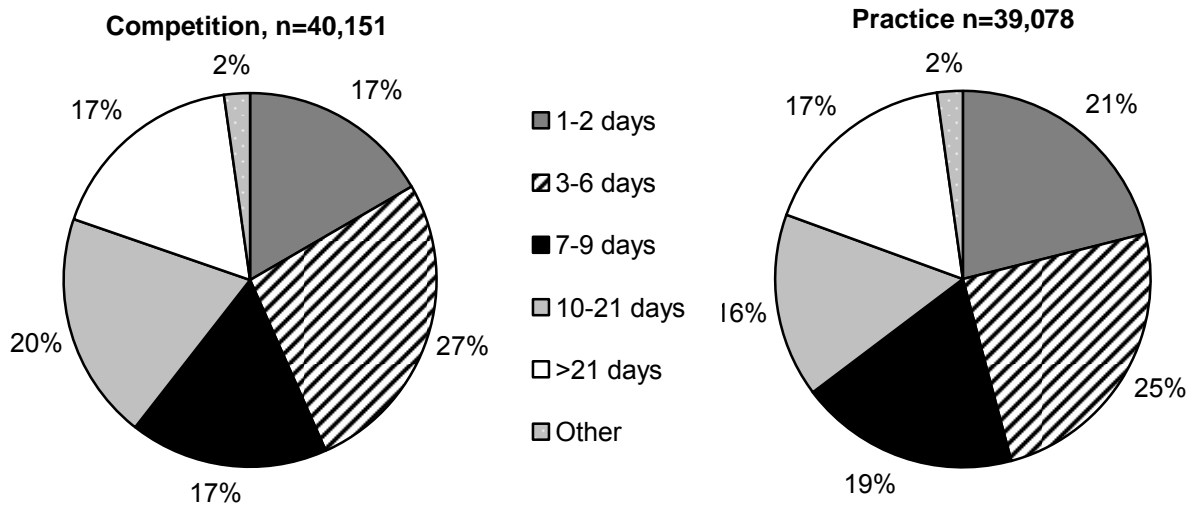


Table 7.5 Boys' Basketball Injuries Requiring Surgery by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

| | Competition | | Practice | | Overall | |
|-------------------------|---------------|-------------|---------------|-------------|---------------|-------------|
| | n | % | n | % | n | % |
| Need for surgery | | | | | | |
| Required surgery | 2,748 | 7.1% | 2,549 | 6.8% | 5,296 | 6.9% |
| Did not require surgery | 35,885 | 92.9% | 35,164 | 93.2% | 71,049 | 93.1% |
| Total | 38,633 | 100% | 37,713 | 100% | 76,346 | 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

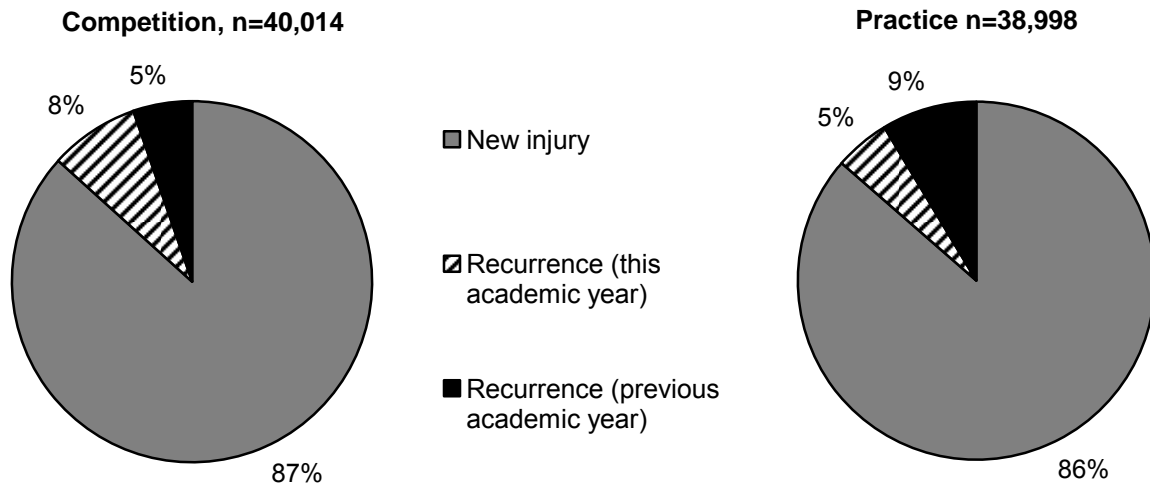


Table 7.6 Time during Season of Boys' Basketball Injuries, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

| | n | % |
|-----------------------|---------------|-------------|
| Time in Season | | |
| Preseason | 14,862 | 18.8% |
| Regular season | 62,870 | 79.4% |
| Post season | 1,498 | 1.9% |
| Total | 79,230 | 100% |

*Totals and n's are not always equal due to slight rounding of weighted number of injuries

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 | 745 | 1.9% |
| First quarter | 4,589 | 11.5% |
| Second quarter | 9,480 | 23.8% |
| Third quarter | 14,116 | 35.4% |
| Fourth quarter | 10,399 | 26.1% |
| Overtime | 571 | 1.4% |
| Total | 39,901 | 100% |
| Injury Related to Foul Play | | |
| No | 30,685 | 80.9% |
| Yes, and ruled foul play | 4,572 | 12.0% |
| Yes, but not ruled foul play | 750 | 2.0% |
| Unknown | 1,941 | 5.1% |
| Total | 37,948 | 100% |
| Court Location | | |
| Inside lane (offense) | 10,663 | 26.8% |
| Inside lane (defense) | 10,648 | 26.8% |
| Between 3 pt arc and lane (defense) | 4,687 | 11.8% |
| Between 3 pt arc and lane (offense) | 4,339 | 10.9% |
| Outside 3 point arc (defense) | 2,964 | 7.4% |
| Outside 3 point arc (offense) | 2,880 | 7.2% |
| Backcourt | 2,192 | 5.5% |
| Out of bounds | 1,420 | 3.6% |
| Off the court | 0 | 0.0% |
| Total | 39,793 | 100% |

*Totals and n's are not always equal due to slight rounding of weighted number of injuries

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 | 4,716 | 13.2% |
| Second 1/2 hour | 9,605 | 26.8% |
| 1-2 hours into practice | 17,313 | 48.4% |
| >2 hours into practice | 4,140 | 11.6% |
| Total | 35,774 | 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

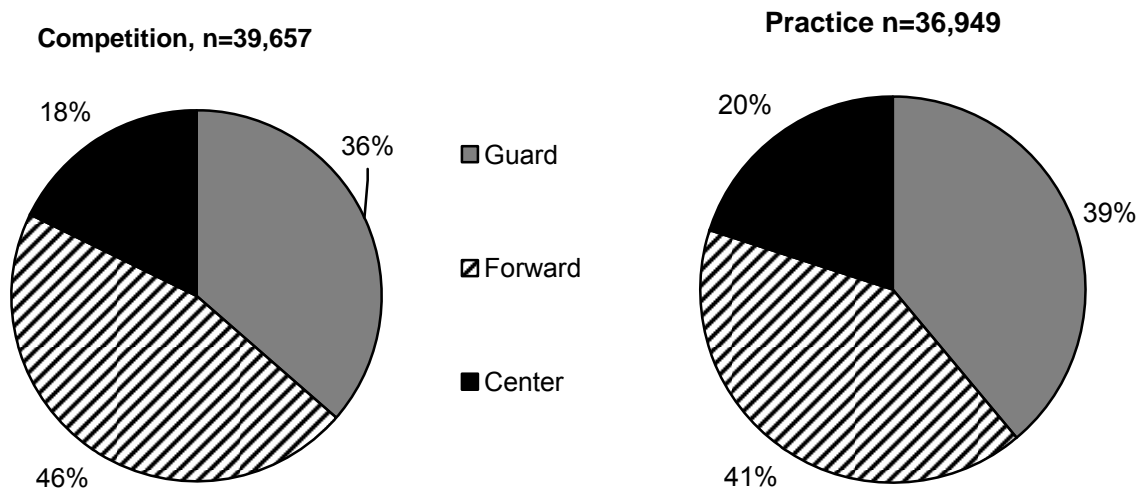
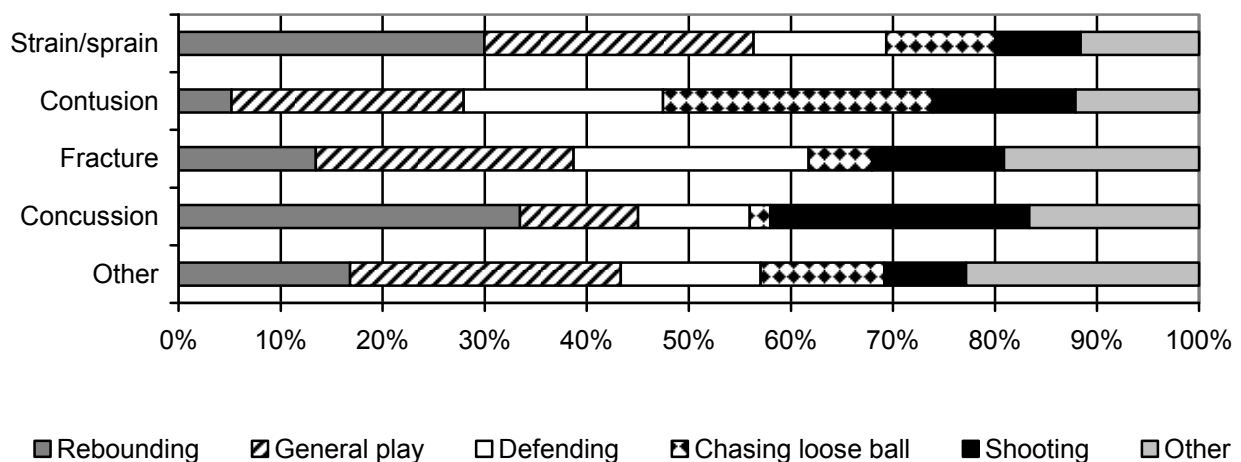


Table 7.9 Activities Leading to Boys' Basketball Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

| Activity | Competition | | Practice | | Overall | |
|-------------------------|---------------|-------------|---------------|-------------|---------------|-------------|
| | n | % | n | % | n | % |
| General play | 4,866 | 12.1% | 14,701 | 39.0% | 19,566 | 25.1% |
| Rebounding | 10,982 | 27.4% | 6,494 | 17.2% | 17,476 | 22.5% |
| Defending | 5,956 | 14.8% | 5,592 | 14.8% | 11,549 | 14.8% |
| Chasing loose ball | 7,034 | 17.5% | 2,177 | 5.8% | 9,211 | 11.8% |
| Shooting | 5,310 | 13.2% | 2,659 | 7.1% | 7,969 | 10.2% |
| Ball handling/dribbling | 3,342 | 8.3% | 1,511 | 4.0% | 4,853 | 6.2% |
| Receiving pass | 188 | 0.5% | 2,237 | 5.9% | 2,425 | 3.1% |
| Conditioning | 251 | 0.6% | 1,108 | 2.9% | 1,359 | 1.7% |
| Passing | 246 | 0.6% | 108 | 0.3% | 354 | 0.5% |
| Other | 1,976 | 4.9% | 1,094 | 2.9% | 3,070 | 3.9% |
| Total | 40,152 | 100% | 37,680 | 100% | 77,832 | 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) | Nationally Estimated # Injuries |
|--------------|------------|----------------|--|---------------------------------------|
| Total | 295 | 191,871 | 1.54 | 64,933 |
| Competition | 177 | 56,555 | 3.13 | 38,277 |
| Practice | 118 | 135,316 | 0.87 | 26,656 |

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 | 16,184 (25.3%) |
| Sophomore | 15,619 (24.4%) |
| Junior | 15,361 (24.0%) |
| Senior | 16,920 (26.4%) |
| Total[†] | 64,084 (100%) |
| Age (years) | |
| Minimum | 13 |
| Maximum | 18 |
| Mean (St. Dev.) | 15.9 (1.3) |
| BMI | |
| Minimum | 16.9 |
| Maximum | 40.4 |
| Mean (St. Dev.) | 22.5 (3.6) |

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

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

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

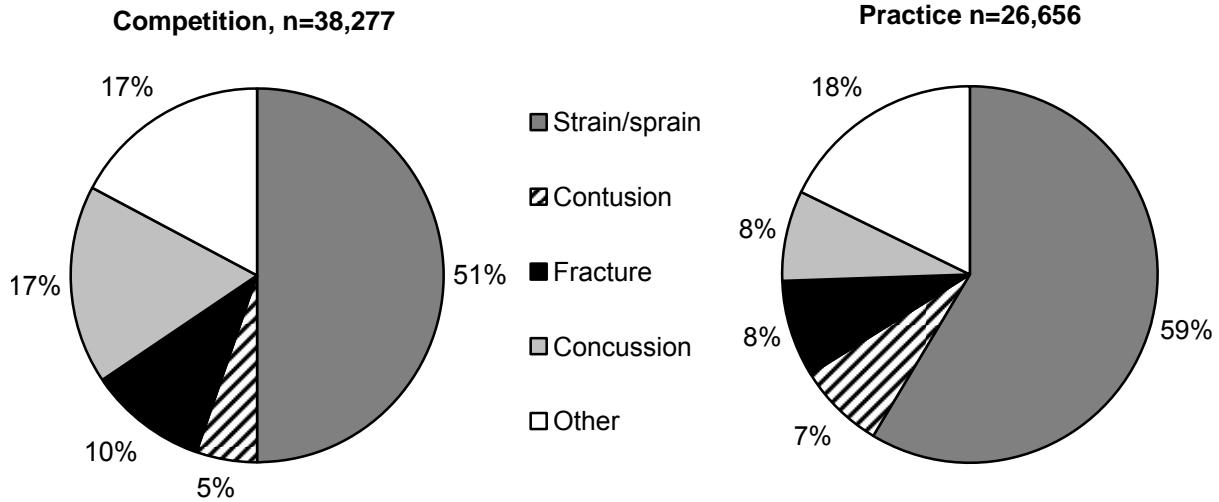


Table 8.3 Body Site of Girls' Basketball Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

| Body Site | Competition | | Practice | | Overall | |
|---------------------|---------------|-------------|---------------|-------------|---------------|-------------|
| | n | % | n | % | n | % |
| Ankle | 12,440 | 32.5% | 7,765 | 29.1% | 20,206 | 31.1% |
| Head/face | 10,134 | 26.5% | 2,512 | 9.4% | 12,646 | 19.5% |
| Knee | 5,455 | 14.3% | 5,267 | 19.8% | 10,722 | 16.5% |
| Hand/wrist | 3,296 | 8.6% | 2,788 | 10.5% | 6,084 | 9.4% |
| Lower leg | 1,925 | 5.0% | 1,362 | 5.1% | 3,286 | 5.1% |
| Shoulder | 1,833 | 4.8% | 1,264 | 4.7% | 3,097 | 4.8% |
| Foot | 903 | 2.4% | 1,926 | 7.2% | 2,829 | 4.4% |
| Trunk | 907 | 2.4% | 1,583 | 5.9% | 2,490 | 3.8% |
| Hip/thigh/upper leg | 396 | 1.0% | 1,576 | 5.9% | 1,972 | 3.0% |
| Neck | 277 | 0.7% | 251 | 0.9% | 529 | 0.8% |
| Arm/elbow | 349 | 0.9% | 0 | 0.0% | 349 | 0.5% |
| Other | 360 | 0.9% | 360 | 1.4% | 721 | 1.1% |
| Total | 38,277 | 100% | 26,656 | 100% | 64,932 | 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

| Diagnosis | Competition n=38,275 | | Practice n=26,651 | | Total n=64,931 | |
|-----------------------------------|-------------------------|-------|----------------------|-------|-------------------|-------|
| | n | % | n | % | n | % |
| Ankle strain/sprain | 12,368 | 32.3% | 7,350 | 27.6% | 19,718 | 30.4% |
| Head/face concussion | 6,643 | 17.4% | 2,057 | 7.7% | 8,700 | 13.4% |
| Knee strain/sprain | 3,643 | 9.5% | 3,270 | 12.3% | 6,913 | 10.6% |
| Hand/wrist fracture | 1,718 | 4.5% | 903 | 3.4% | 2,621 | 4.0% |
| Shoulder other | 1,418 | 3.7% | 808 | 3.0% | 2,226 | 3.4% |
| Head/face other | 2,229 | 5.8% | 0 | 0.0% | 2,229 | 3.4% |
| Hand/wrist strain/sprain | 714 | 1.9% | 1,429 | 5.4% | 2,143 | 3.3% |
| Knee other | 972 | 2.5% | 924 | 3.5% | 1,896 | 2.9% |
| Knee contusion | 731 | 1.9% | 1,073 | 4.0% | 1,804 | 2.8% |
| Hip/thigh/upper leg strain/sprain | 324 | 0.8% | 1,324 | 5.0% | 1,648 | 2.5% |

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

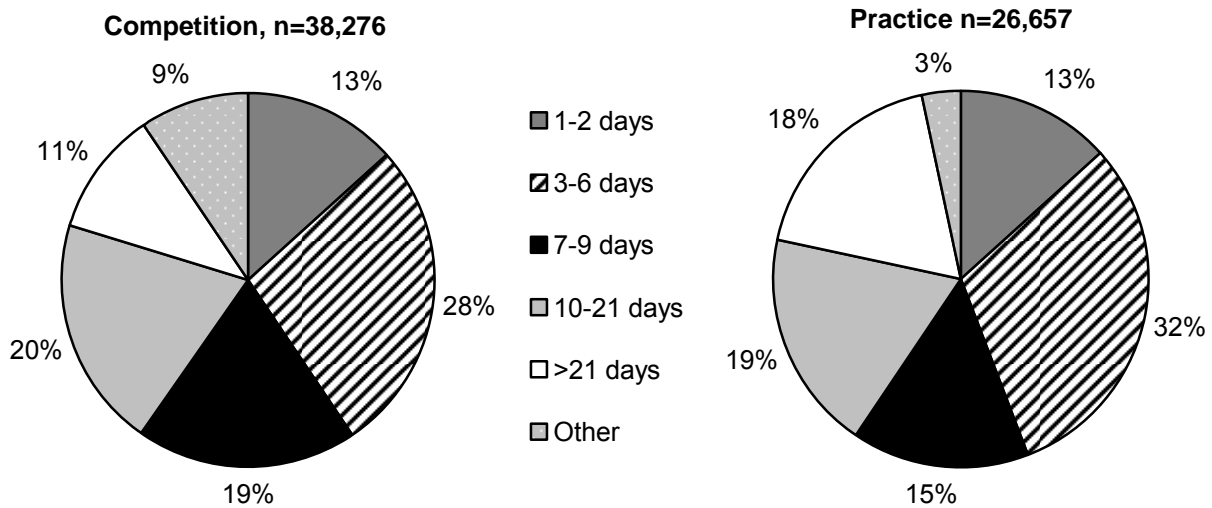


Table 8.5 Girls' Basketball Injuries Requiring Surgery by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

| | Competition | | Practice | | Overall | |
|-------------------------|---------------|-------------|---------------|-------------|---------------|-------------|
| | n | % | n | % | n | % |
| Need for surgery | | | | | | |
| Required surgery | 3,414 | 9.2% | 2,131 | 8.3% | 5,545 | 8.8% |
| Did not require surgery | 33,619 | 90.8% | 23,629 | 91.7% | 57,248 | 91.2% |
| Total | 37,033 | 100% | 25,760 | 100% | 62,793 | 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

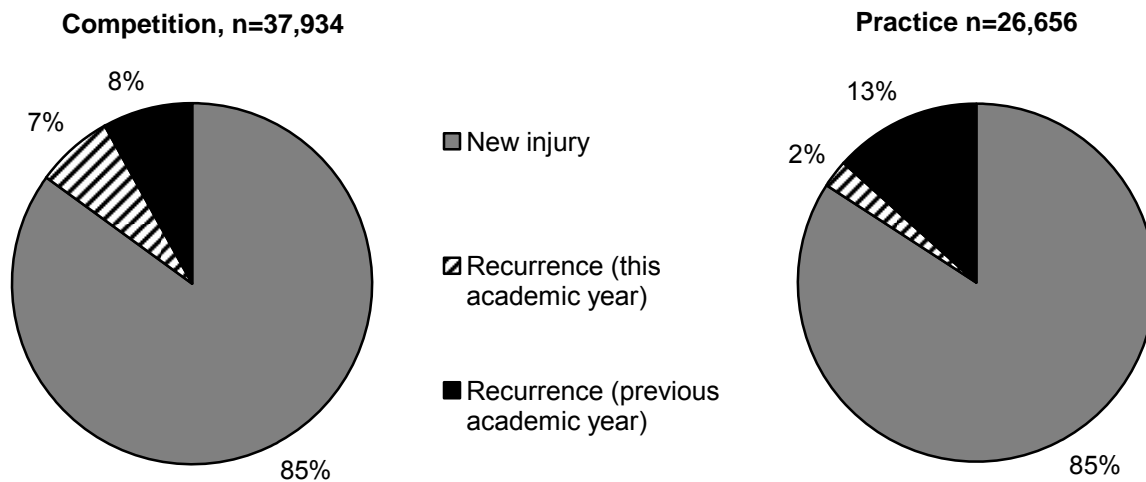


Table 8.6 Time during Season of Girls' Basketball Injuries, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

| | n | % |
|-----------------------|---------------|-------------|
| Time in Season | | |
| Preseason | 13,822 | 21.3% |
| Regular season | 49,131 | 75.7% |
| Post season | 1,979 | 3.0% |
| Total | 64,932 | 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 | 1,022 | 2.7% |
| First quarter | 4,310 | 11.6% |
| Second quarter | 10,947 | 29.4% |
| Third quarter | 10,151 | 27.2% |
| Fourth quarter | 10,850 | 29.1% |
| Total | 37,280 | 100% |
| Injury Related to Foul Play | | |
| No | 30,764 | 86.2% |
| Yes, and ruled foul play | 1,770 | 5.0% |
| Yes, but not ruled foul play | 1,921 | 5.4% |
| Unknown | 1,249 | 3.5% |
| Total | 35,705 | 100% |
| Court Location | | |
| Inside lane (defense) | 8,384 | 23.2% |
| Inside lane (offense) | 8,255 | 22.8% |
| Outside 3 point arc (offense) | 4,915 | 13.6% |
| Between 3 pt arc and lane (offense) | 4,731 | 13.1% |
| Outside 3 point arc (defense) | 4,388 | 12.1% |
| Between 3 pt arc and lane (defense) | 3,191 | 8.8% |
| Backcourt | 1,672 | 4.6% |
| Out of bounds | 627 | 1.7% |
| Off the court | 0 | 0.0% |
| Total | 36,165 | 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 | 4,958 | 20.1% |
| Second 1/2 hour | 6,490 | 26.3% |
| 1-2 hours into practice | 12,100 | 49.0% |
| >2 hours into practice | 1,137 | 4.6% |
| Total | 24,686 | 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

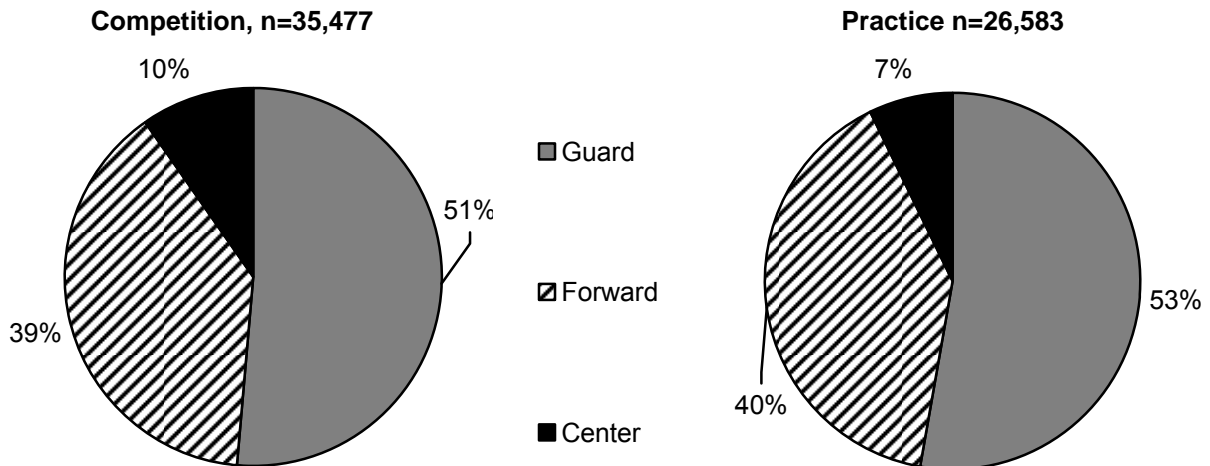
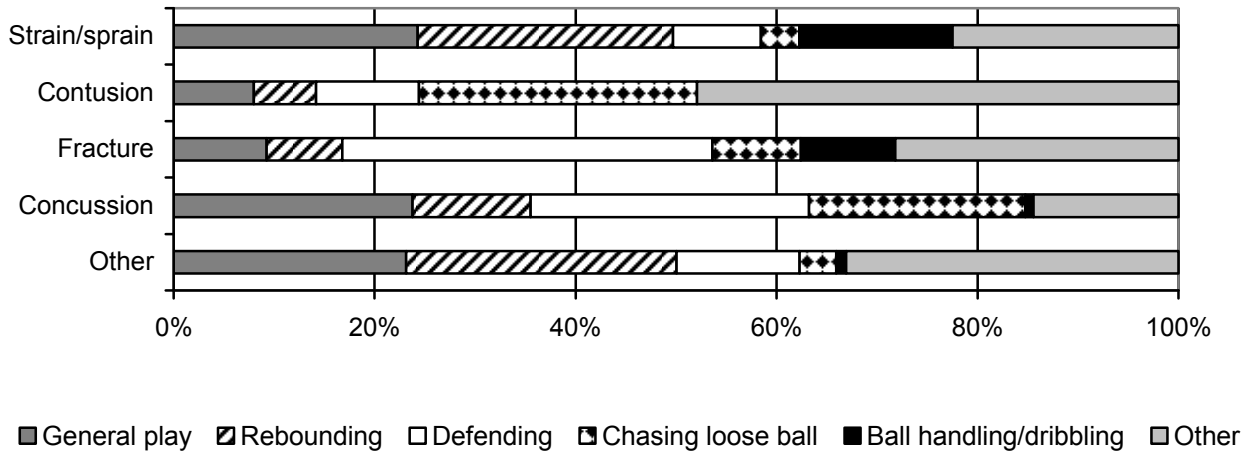


Table 8.9 Activities Leading to Girls' Basketball Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

| Activity | Competition | | Practice | | Overall | |
|-------------------------|---------------|-------------|---------------|-------------|---------------|-------------|
| | n | % | n | % | n | % |
| Rebounding | 8,071 | 21.2% | 5,867 | 22.1% | 13,939 | 21.6% |
| General play | 6,348 | 16.7% | 7,171 | 27.0% | 13,519 | 20.9% |
| Defending | 5,472 | 14.4% | 3,970 | 14.9% | 9,442 | 14.6% |
| Shooting | 4,440 | 11.7% | 1,598 | 6.0% | 6,038 | 9.4% |
| Receiving pass | 3,646 | 9.6% | 2,224 | 8.4% | 5,870 | 9.1% |
| Chasing loose ball | 4,577 | 12.1% | 679 | 2.6% | 5,257 | 8.1% |
| Ball handling/dribbling | 3,426 | 9.0% | 866 | 3.3% | 4,292 | 6.6% |
| Other | 2,007 | 5.3% | 4,208 | 15.8% | 6,213 | 9.6% |
| Total | 37,987 | 100% | 26,583 | 100% | 64,570 | 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) | Nationally Estimated # Injuries |
|--------------|------------|----------------|--|---------------------------------------|
| Total | 392 | 180,641 | 2.17 | 88,996 |
| Competition | 160 | 47,770 | 3.35 | 39,029 |
| Practice | 232 | 132,871 | 1.75 | 49,967 |

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

| Year in School | |
|-----------------------|----------------------|
| Freshman | 18,109 (20.5%) |
| Sophomore | 24,064 (27.2%) |
| Junior | 23,310 (26.3%) |
| Senior | 23,024 (26.0%) |
| Total† | 88,507 (100%) |
| Age (years) | |
| Minimum | 14 |
| Maximum | 19 |
| Mean (St. Dev.) | 16.1 (1.3) |
| BMI | |
| Minimum | 17.2 |
| Maximum | 49.0 |
| Mean (St. Dev.) | 23.7 (4.4) |

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

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

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

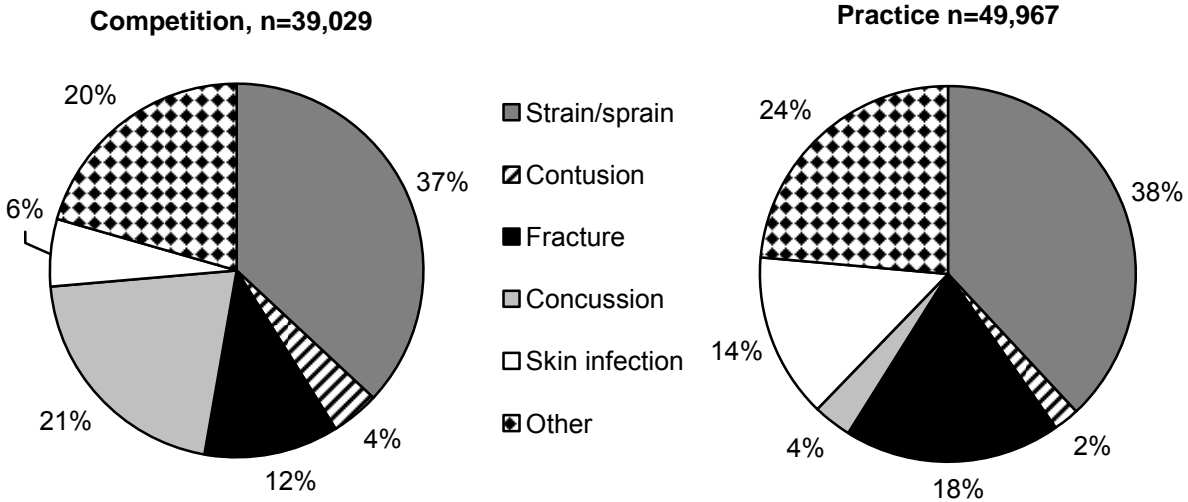


Table 9.3 Body Site of Wrestling Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

| Body Site | Competition | | Practice | | Overall | |
|---------------------|---------------|-------------|---------------|-------------|---------------|-------------|
| | n | % | n | % | n | % |
| Shoulder | 9,517 | 24.4% | 7,106 | 14.2% | 16,623 | 18.7% |
| Head/face | 10,032 | 25.7% | 5,201 | 10.4% | 15,234 | 17.1% |
| Knee | 3,294 | 8.4% | 7,837 | 15.7% | 11,130 | 12.5% |
| Hand/wrist | 2,204 | 5.6% | 8,385 | 16.8% | 10,589 | 11.9% |
| Arm/elbow | 2,900 | 7.4% | 4,556 | 9.1% | 7,457 | 8.4% |
| Trunk | 2,905 | 7.4% | 4,293 | 8.6% | 7,198 | 8.1% |
| Ankle | 2,434 | 6.2% | 4,259 | 8.5% | 6,693 | 7.5% |
| Foot | 2,290 | 5.9% | 2,536 | 5.1% | 4,826 | 5.4% |
| Lower leg | 0 | 0.0% | 2,476 | 5.0% | 2,476 | 2.8% |
| Neck | 309 | 0.8% | 1,187 | 2.4% | 1,496 | 1.7% |
| Hip/thigh/upper leg | 589 | 1.5% | 679 | 1.4% | 1,268 | 1.4% |
| Other | 2,555 | 6.5% | 1,451 | 2.9% | 4,006 | 4.5% |
| Total | 39,029 | 100% | 49,967 | 100% | 88,996 | 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

| Diagnosis | Competition n=39,029 | | Practice n=49,966 | | Total n=88,995 | |
|------------------------|-------------------------|-------|----------------------|-------|-------------------|-------|
| | n | % | n | % | n | % |
| Shoulder strain/sprain | 6,722 | 17.2% | 4,663 | 9.3% | 11,384 | 12.8% |
| Head/face concussion | 8,086 | 20.7% | 1,771 | 3.5% | 9,858 | 11.1% |
| Ankle strain/sprain | 2,364 | 6.1% | 3,544 | 7.1% | 5,908 | 6.6% |
| Knee other | 1,474 | 3.8% | 3,951 | 7.9% | 5,425 | 6.1% |
| Head/face other | 1,876 | 4.8% | 3,311 | 6.6% | 5,187 | 5.8% |
| Hand/wrist fracture | 160 | 0.4% | 4,989 | 10.0% | 5,150 | 5.8% |
| Shoulder other | 2,795 | 7.2% | 2,325 | 4.7% | 5,120 | 5.8% |
| Knee strain/sprain | 1,567 | 4.0% | 3,455 | 6.9% | 5,022 | 5.6% |
| Hand/wrist other | 1,382 | 3.5% | 2,153 | 4.3% | 3,535 | 4.0% |
| Arm/elbow other | 695 | 1.8% | 2,609 | 5.2% | 3,304 | 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

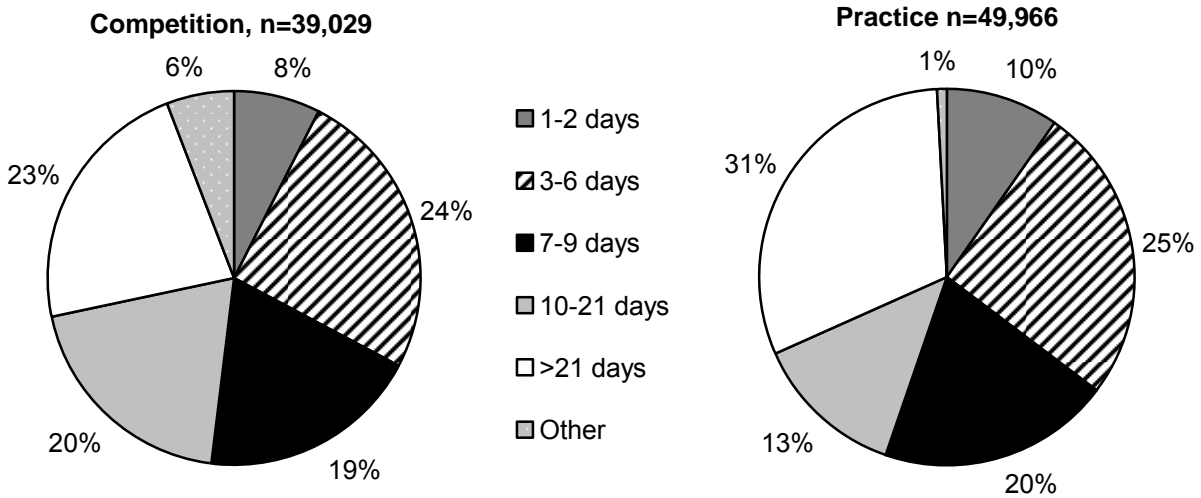


Table 9.5 Wrestling Injuries Requiring Surgery by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

| | Competition | | Practice | | Overall | |
|-------------------------|---------------|-------------|---------------|-------------|---------------|-------------|
| | n | % | n | % | n | % |
| Need for surgery | | | | | | |
| Required surgery | 2,090 | 5.7% | 2,872 | 5.9% | 4,961 | 5.8% |
| Did not require surgery | 34,275 | 94.3% | 46,198 | 94.1% | 80,473 | 94.2% |
| Total | 36,365 | 100% | 49,070 | 100% | 85,435 | 100% |

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

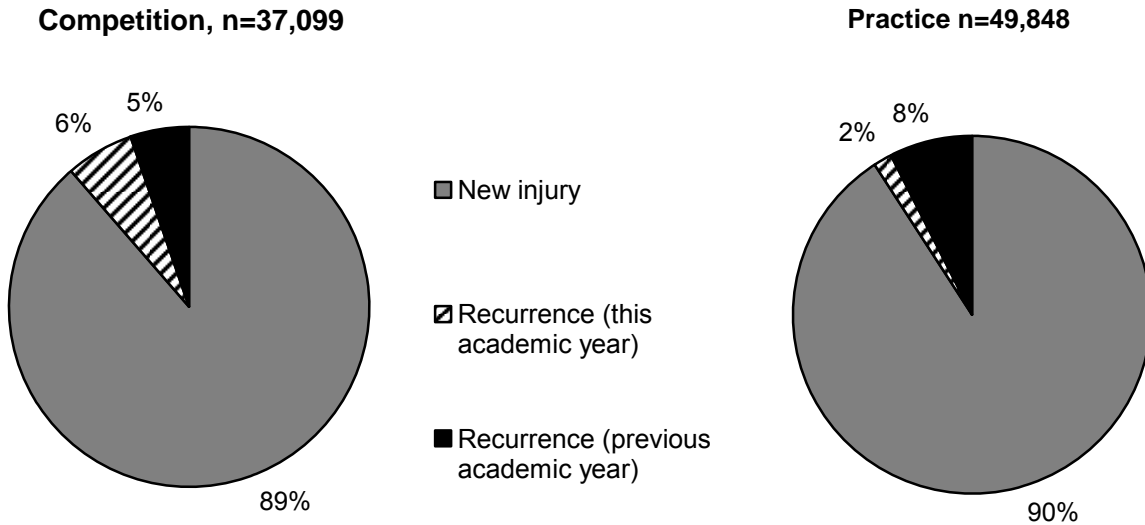


Table 9.6 Time during Season of Wrestling Injuries, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

| | n | % |
|-----------------------|---------------|-------------|
| Time in Season | | |
| Preseason | 16,551 | 19.0% |
| Regular season | 67,052 | 76.9% |
| Post season | 3,642 | 4.2% |
| Total | 87,244 | 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 | 611 | 1.7% |
| First period | 5,971 | 16.7% |
| Second period | 19,127 | 53.6% |
| Third period | 9,483 | 26.6% |
| Overtime | 462 | 1.3% |
| Total | 35,655 | 100% |
| Injury Related to Foul Play | | |
| No | 27,461 | 81.0% |
| Yes, and ruled foul play | 0 | 0.0% |
| Yes, but not ruled foul play | 3,283 | 9.7% |
| Unknown | 3,147 | 9.3% |
| Total | 33,892 | 100% |
| Mat Location* | | |
| Within circle | 72,995 | 85.4% |
| Out of bounds | 5,450 | 6.4% |
| Off mat | 7,053 | 8.2% |
| Total | 85,498 | 100% |

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

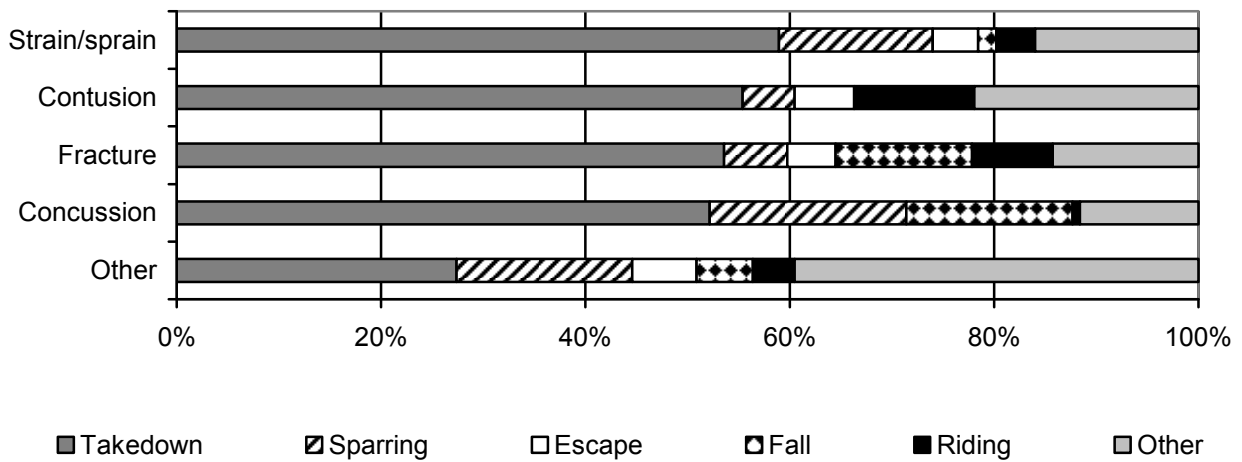
Table 9.8 Practice-Related Variables for Wrestling Injuries, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

| | n | % |
|-------------------------|---------------|-------------|
| Time in Practice | | |
| First 1/2 hour | 4,266 | 9.5% |
| Second 1/2 hour | 9,430 | 21.1% |
| 1-2 hours into practice | 26,412 | 59.0% |
| >2 hours into practice | 4,643 | 10.4% |
| Total | 44,750 | 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

| Activity | Competition | | Practice | | Overall | |
|------------------------------------|---------------|-------------|---------------|-------------|---------------|-------------|
| | n | % | n | % | n | % |
| Takedown | 18,492 | 50.3% | 22,523 | 45.2% | 41,014 | 47.3% |
| Sparring | 3,527 | 9.6% | 9,042 | 18.1% | 12,569 | 14.5% |
| N/A (Skin infection, heat illness) | 571 | 1.6% | 6,815 | 13.7% | 7,386 | 8.5% |
| Fall | 3,412 | 9.3% | 2,098 | 4.2% | 5,510 | 6.4% |
| Escape | 1,763 | 4.8% | 2,226 | 4.5% | 3,989 | 4.6% |
| Riding | 1,706 | 4.6% | 2,123 | 4.3% | 3,830 | 4.4% |
| Conditioning | 372 | 1.0% | 2,898 | 5.8% | 3,270 | 3.8% |
| Reversal | 393 | 1.1% | 1,372 | 2.8% | 1,765 | 2.0% |
| Other | 6,562 | 17.8% | 751 | 1.5% | 7,313 | 8.4% |
| Total | 36,798 | 100% | 49,848 | 100% | 86,646 | 100% |

Figure 9.4 Activity 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) | Nationally Estimated # Injuries |
|--------------|------------|----------------|--|---------------------------------------|
| Total | 144 | 185,622 | 0.78 | 39,869 |
| Competition | 86 | 65,359 | 1.32 | 25,584 |
| Practice | 58 | 120,263 | 0.48 | 14,285 |

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 | 7,980 (20.1%) |
| Sophomore | 11,441 (28.8%) |
| Junior | 11,750 (29.5%) |
| Senior | 8,622 (21.7%) |
| Total[†] | 39,793 (100%) |
| Age (years) | |
| Minimum | 14 |
| Maximum | 19 |
| Mean (St. Dev.) | 16.2 (1.1) |
| BMI | |
| Minimum | 18.7 |
| Maximum | 38.1 |
| Mean (St. Dev.) | 24.9 (3.7) |

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

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

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

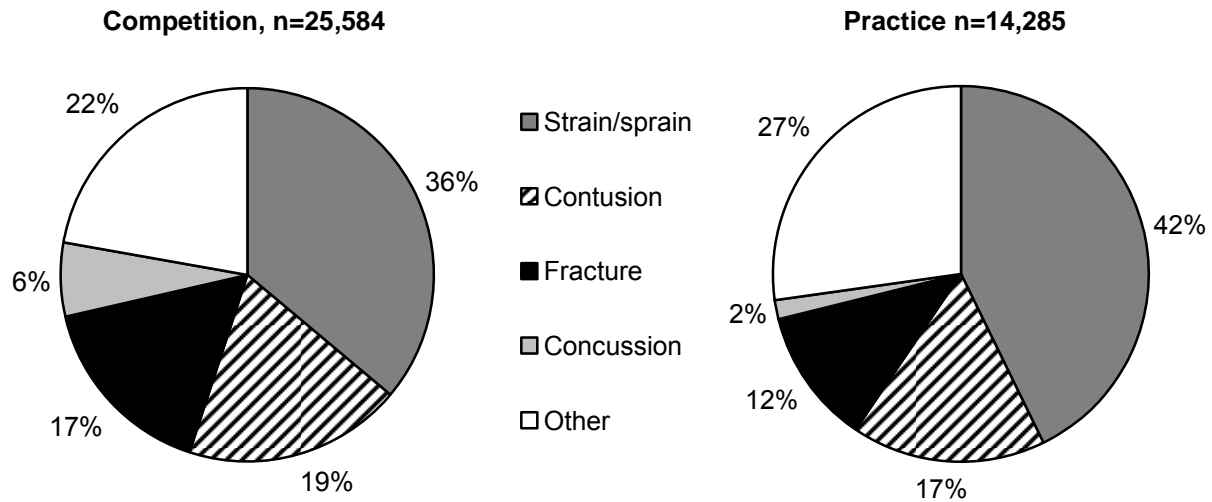


Table 10.3 Body Site of Baseball Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

| Body Site | Competition | | Practice | | Overall | |
|---------------------|---------------|-------------|---------------|-------------|---------------|-------------|
| | n | % | n | % | n | % |
| Head/face | 6,276 | 24.5% | 2,967 | 20.8% | 9,243 | 23.2% |
| Shoulder | 4,210 | 16.5% | 3,057 | 21.4% | 7,267 | 18.2% |
| Hand/wrist | 3,720 | 14.5% | 2,377 | 16.6% | 6,097 | 15.3% |
| Arm/elbow | 3,636 | 14.2% | 644 | 4.5% | 4,280 | 10.7% |
| Hip/thigh/upper leg | 1,463 | 5.7% | 1,640 | 11.5% | 3,103 | 7.8% |
| Ankle | 1,601 | 6.3% | 570 | 4.0% | 2,171 | 5.4% |
| Knee | 1,467 | 5.7% | 702 | 4.9% | 2,169 | 5.4% |
| Lower leg | 1,863 | 7.3% | 208 | 1.5% | 2,071 | 5.2% |
| Trunk | 769 | 3.0% | 983 | 6.9% | 1,752 | 4.4% |
| Foot | 580 | 2.3% | 920 | 6.4% | 1,500 | 3.8% |
| Neck | 0 | 0.0% | 77 | 0.5% | 77 | 0.2% |
| Other | 0 | 0.0% | 141 | 1.0% | 141 | 0.4% |
| Total | 25,584 | 100% | 14,285 | 100% | 39,870 | 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

| Diagnosis | Competition n=25,583 | | Practice n=14,284 | | Total n=39,869 | |
|-----------------------------------|-------------------------|-------|----------------------|-------|-------------------|-------|
| | n | % | n | % | n | % |
| Shoulder strain/sprain | 2,796 | 10.9% | 1,917 | 13.4% | 4,713 | 11.8% |
| Head/face contusion | 2,713 | 10.6% | 1,336 | 9.4% | 4,049 | 10.2% |
| Hip/thigh/upper leg strain/sprain | 1,255 | 4.9% | 1,344 | 9.4% | 2,600 | 6.5% |
| Arm/elbow strain/sprain | 1,883 | 7.4% | 503 | 3.5% | 2,386 | 6.0% |
| Hand/wrist fracture | 1,253 | 4.9% | 1,045 | 7.3% | 2,297 | 5.8% |
| Ankle strain/sprain | 1,601 | 6.3% | 570 | 4.0% | 2,171 | 5.4% |
| Shoulder other | 856 | 3.3% | 1,140 | 8.0% | 1,996 | 5.0% |
| Head/face concussion | 1,637 | 6.4% | 221 | 1.5% | 1,858 | 4.7% |
| Knee other | 1,259 | 4.9% | 561 | 3.9% | 1,820 | 4.6% |
| Head/face other | 946 | 3.7% | 765 | 5.4% | 1,711 | 4.3% |

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

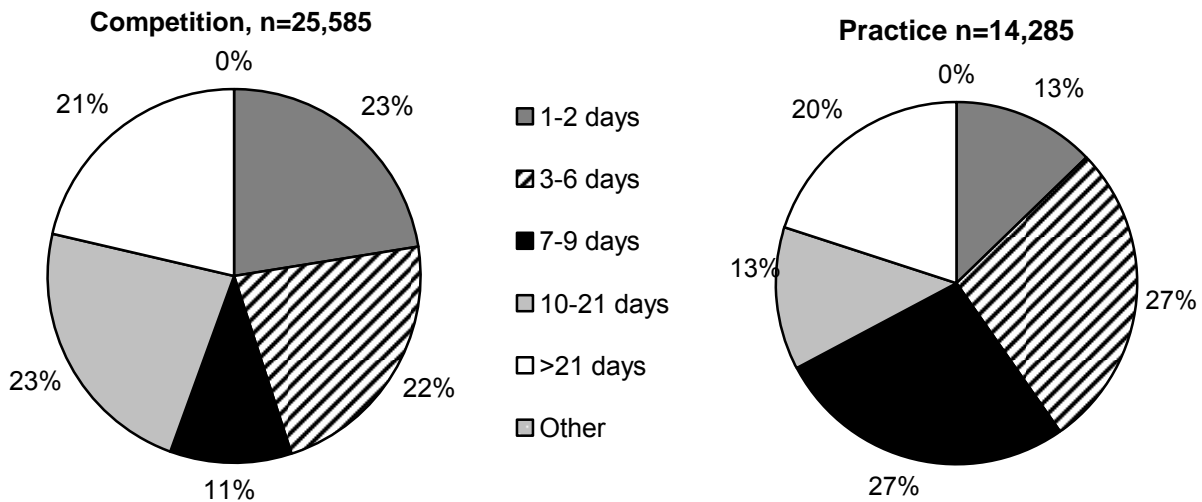


Table 10.5 Baseball Injuries Requiring Surgery by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

| | Competition | | Practice | | Overall | |
|-------------------------|---------------|-------------|---------------|-------------|---------------|-------------|
| | n | % | n | % | n | % |
| Need for surgery | | | | | | |
| Required surgery | 1,929 | 7.8% | 1,467 | 10.3% | 3,397 | 8.7% |
| Did not require surgery | 22,799 | 92.2% | 12,818 | 89.7% | 35,617 | 91.3% |
| Total | 24,728 | 100% | 14,285 | 100% | 39,013 | 100% |

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

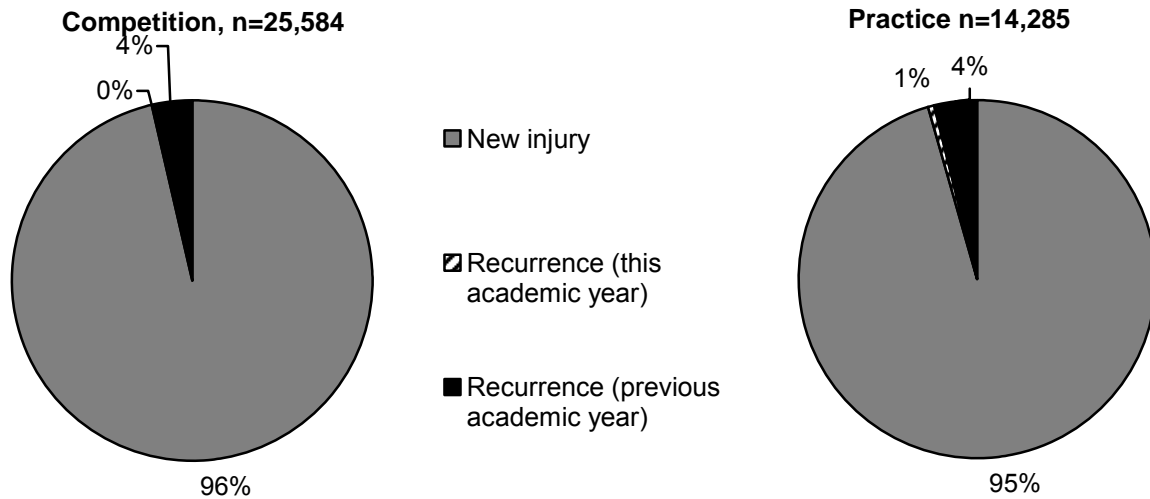


Table 10.6 Time during Season of Baseball Injuries, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

| | n | % |
|-----------------------|---------------|-------------|
| Time in Season | | |
| Preseason | 8,349 | 20.9% |
| Regular season | 29,558 | 74.1% |
| Post season | 1,963 | 4.9% |
| Total | 39,870 | 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 | 608 | 2.4% |
| First inning | 3,038 | 11.9% |
| Second inning | 2,511 | 9.8% |
| Third inning | 4,529 | 17.8% |
| Fourth inning | 5,820 | 22.8% |
| Fifth inning | 4,289 | 16.8% |
| Sixth inning | 2,806 | 11.0% |
| Seventh inning | 1,906 | 7.5% |
| Total | 25,508 | 100% |
| Injury Related to Foul Play | | |
| No | 22,582 | 95.8% |
| Yes, and ruled foul play | 295 | 1.3% |
| Yes, but not ruled foul play | 702 | 3.0% |
| Unknown | 0 | 0.0% |
| Total | 23,580 | 100% |
| Field Location | | |
| First base | 5,132 | 20.1% |
| Home plate | 3,929 | 15.4% |
| Second base | 3,876 | 15.2% |
| Third base | 3,604 | 14.1% |
| Outfield | 3,407 | 13.4% |
| Pitcher's mound | 2,896 | 11.4% |
| Infield | 1,807 | 7.1% |
| Foul territory | 0 | 0.0% |
| Other | 856 | 3.4% |
| Total | 25,508 | 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 | 1,500 | 11.7% |
| Second 1/2 hour | 1,345 | 10.5% |
| 1-2 hours into practice | 8,032 | 62.8% |
| >2 hours into practice | 1,905 | 14.9% |
| Total | 12,782 | 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

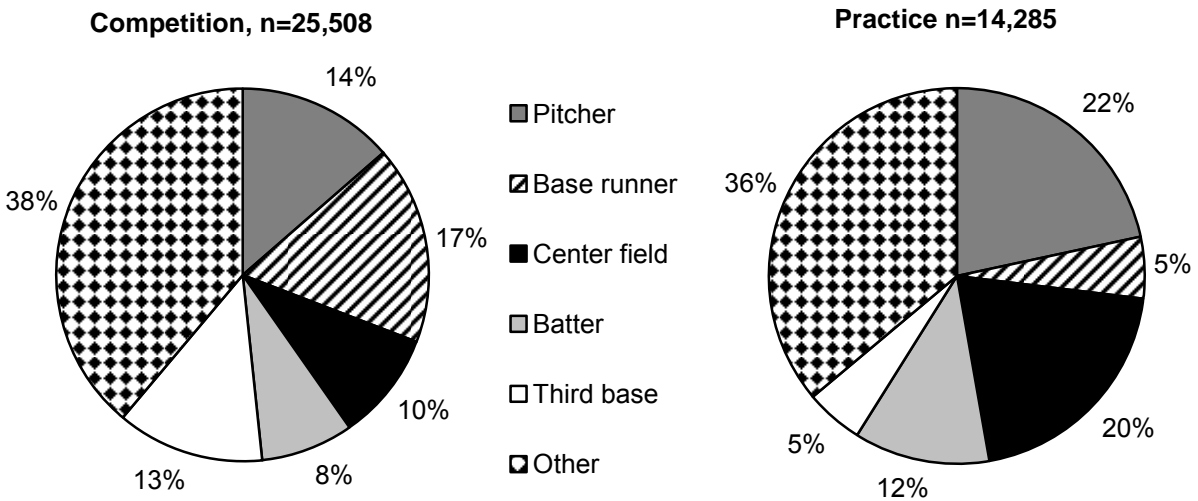
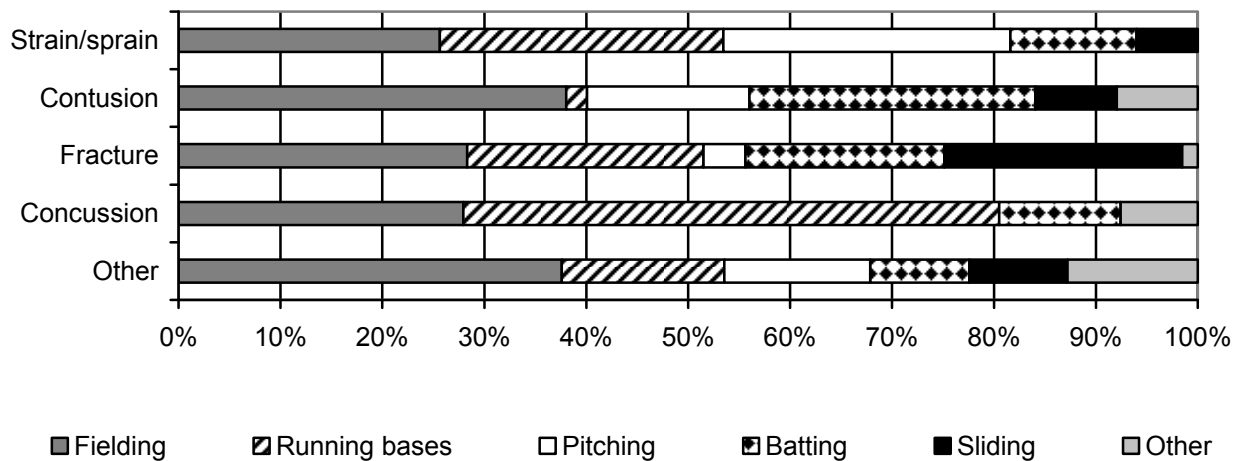


Table 10.9 Activities Leading to Baseball Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

| Activity | Competition | | Practice | | Overall | |
|-------------------------|---------------|-------------|---------------|-------------|---------------|-------------|
| | n | % | n | % | n | % |
| Fielding | 6,981 | 27.3% | 3,732 | 26.3% | 10,713 | 26.9% |
| Running bases | 5,449 | 21.3% | 1,458 | 10.3% | 6,907 | 17.4% |
| Pitching | 2,612 | 10.2% | 3,242 | 22.8% | 5,854 | 14.7% |
| Batting | 3,715 | 14.5% | 1,723 | 12.1% | 5,437 | 13.7% |
| Sliding | 2,873 | 11.2% | 361 | 2.5% | 3,235 | 8.1% |
| General play | 1,320 | 5.2% | 1,433 | 10.1% | 2,752 | 6.9% |
| Throwing (not pitching) | 1,390 | 5.4% | 567 | 4.0% | 1,957 | 4.9% |
| Catching | 0 | 0.0% | 578 | 4.1% | 578 | 1.5% |
| Conditioning | 0 | 0.0% | 557 | 3.9% | 557 | 1.4% |
| Other | 1,244 | 4.9% | 558 | 3.9% | 1,803 | 4.5% |
| Total | 25,584 | 100% | 14,209 | 100% | 39,793 | 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) | Nationally Estimated # Injuries |
|--------------|------------|----------------|--|---------------------------------------|
| Total | 146 | 141,008 | 1.04 | 49,831 |
| Competition | 80 | 49,318 | 1.62 | 28,688 |
| Practice | 66 | 91,690 | 0.72 | 21,143 |

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 | 13,923 (28.3%) |
| Sophomore | 13,668 (27.7%) |
| Junior | 10,001 (20.3%) |
| Senior | 11,678 (23.7%) |
| Total† | 49,270 (100%) |
| Age (years) | |
| Minimum | 14 |
| Maximum | 18 |
| Mean (St. Dev.) | 15.9 (1.3) |
| BMI | |
| Minimum | 16.8 |
| Maximum | 34.1 |
| Mean (St. Dev.) | 23.4 (3.7) |

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

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

Figure 11.1 Diagnosis of Softball Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

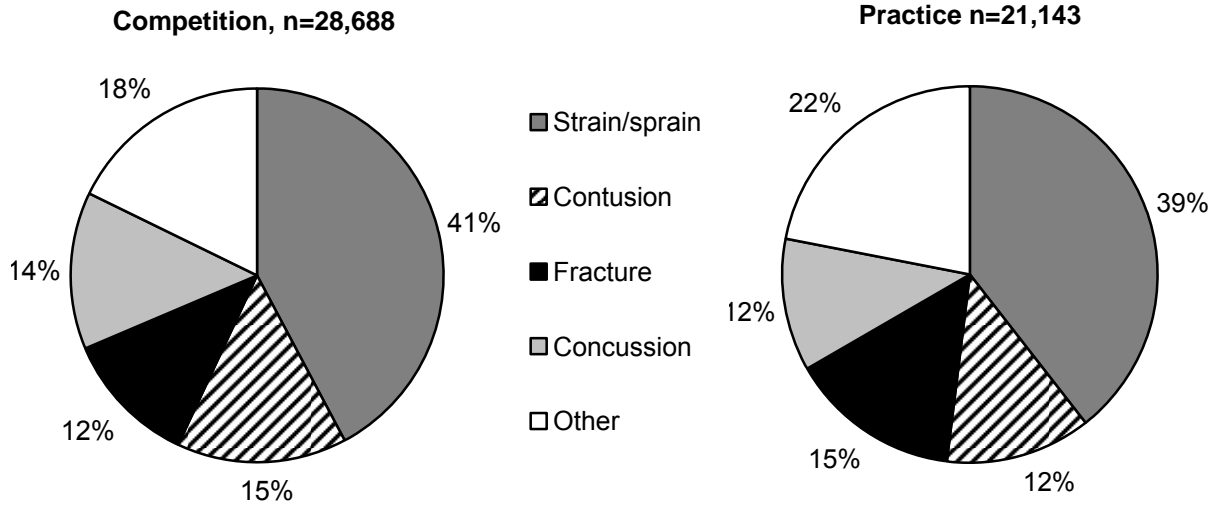


Table 11.3 Body Site of Softball Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

| Body Site | Competition | | Practice | | Overall | |
|---------------------|---------------|-------------|---------------|-------------|---------------|-------------|
| | n | % | n | % | n | % |
| Head/face | 6,189 | 21.6% | 3,818 | 18.1% | 10,007 | 20.1% |
| Hand/wrist | 5,736 | 20.0% | 2,575 | 12.2% | 8,311 | 16.7% |
| Knee | 5,207 | 18.1% | 2,521 | 11.9% | 7,728 | 15.5% |
| Ankle | 3,297 | 11.5% | 3,534 | 16.7% | 6,831 | 13.7% |
| Shoulder | 2,975 | 10.4% | 826 | 3.9% | 3,800 | 7.6% |
| Arm/elbow | 910 | 3.2% | 2,663 | 12.6% | 3,573 | 7.2% |
| Hip/thigh/upper leg | 1,013 | 3.5% | 2,234 | 10.6% | 3,247 | 6.5% |
| Lower leg | 1,231 | 4.3% | 1,284 | 6.1% | 2,515 | 5.0% |
| Trunk | 1,216 | 4.2% | 1,041 | 4.9% | 2,257 | 4.5% |
| Foot | 576 | 2.0% | 647 | 3.1% | 1,223 | 2.5% |
| Neck | 340 | 1.2% | 0 | 0.0% | 340 | 0.7% |
| Other | 0 | 0.0% | 0 | 0.0% | 0 | 0.0% |
| Total | 28,688 | 100% | 21,143 | 100% | 49,831 | 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

| Diagnosis | Competition n=28,688 | | Practice n=21,142 | | Total n=49,829 | |
|-----------------------------------|-------------------------|-------|----------------------|-------|-------------------|-------|
| | n | % | n | % | n | % |
| Head/face concussion | 3,901 | 13.6% | 2,432 | 11.5% | 6,332 | 12.7% |
| Ankle strain/sprain | 3,223 | 11.2% | 2,634 | 12.5% | 5,857 | 11.8% |
| Hand/wrist fracture | 2,340 | 8.2% | 2,088 | 9.9% | 4,428 | 8.9% |
| Knee strain/sprain | 3,362 | 11.7% | 676 | 3.2% | 4,038 | 8.1% |
| Knee other | 1,165 | 4.1% | 1,845 | 8.7% | 3,010 | 6.0% |
| Hand/wrist strain/sprain | 2,451 | 8.5% | 413 | 2.0% | 2,864 | 5.7% |
| Hip/thigh/upper leg strain/sprain | 673 | 2.3% | 1,998 | 9.5% | 2,671 | 5.4% |
| Shoulder other | 1,822 | 6.4% | 826 | 3.9% | 2,648 | 5.3% |
| Head/face contusion | 1,239 | 4.3% | 1,386 | 6.6% | 2,625 | 5.3% |
| Trunk strain/sprain | 599 | 2.1% | 1,041 | 4.9% | 1,640 | 3.3% |

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

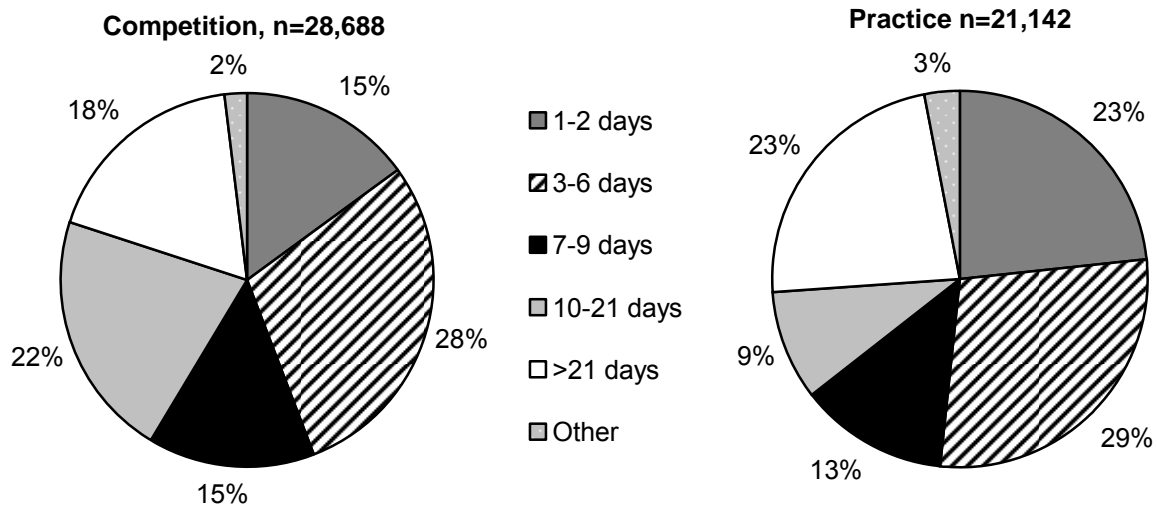


Table 11.5 Softball Injuries Requiring Surgery by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

| | Competition | | Practice | | Overall | |
|-------------------------|---------------|-------------|---------------|-------------|---------------|-------------|
| | n | % | n | % | n | % |
| Need for surgery | | | | | | |
| Required surgery | 3,032 | 11.0% | 74 | 0.4% | 3,105 | 6.4% |
| Did not require surgery | 24,491 | 89.0% | 20,921 | 99.6% | 45,413 | 93.6% |
| Total | 27,523 | 100% | 20,995 | 100% | 48,518 | 100% |

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

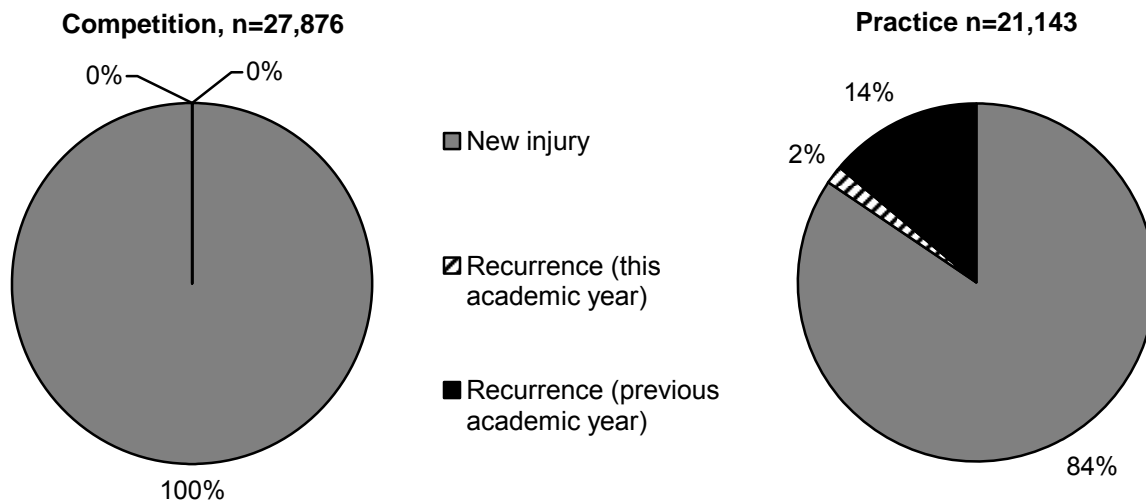


Table 11.6 Time during Season of Softball Injuries, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

| | n | % |
|-----------------------|---------------|-------------|
| Time in Season | | |
| Preseason | 11,115 | 22.3% |
| Regular season | 35,691 | 71.6% |
| Post season | 3,025 | 6.1% |
| Total | 49,831 | 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 | 487 | 1.7% |
| First inning | 2,801 | 10.0% |
| Second inning | 791 | 2.8% |
| Third inning | 7,425 | 26.6% |
| Fourth inning | 7,384 | 26.5% |
| Fifth inning | 3,840 | 13.8% |
| Sixth inning | 3,407 | 12.2% |
| Seventh inning | 1,770 | 6.3% |
| Total | 27,905 | 100% |
| Injury Related to Foul Play | | |
| No | 25,034 | 91.7% |
| Yes, and ruled foul play | 813 | 3.0% |
| Yes, but not ruled foul play | 0 | 0.0% |
| Unknown | 1,443 | 5.3% |
| Total | 27,290 | 100% |
| Field Location | | |
| Home plate | 10,711 | 37.8% |
| Second base | 4,623 | 16.3% |
| Third base | 3,772 | 13.3% |
| Outfield | 3,728 | 13.2% |
| Pitcher's mound | 2,503 | 8.8% |
| First base | 2,270 | 8.0% |
| Infield | 699 | 2.5% |
| Foul territory | 0 | 0.0% |
| Other | 0 | 0.0% |
| Total | 28,305 | 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 | 7,076 | 36.5% |
| Second 1/2 hour | 4,606 | 23.8% |
| >2 hours into practice | 2,298 | 11.9% |
| 1-2 hours into practice | 5,382 | 27.8% |
| Total | 19,362 | 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

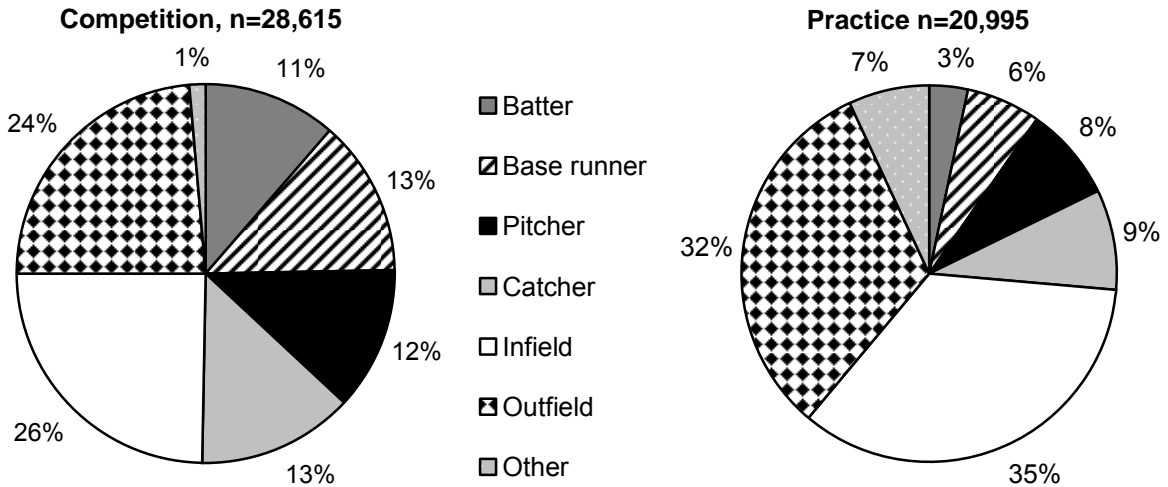
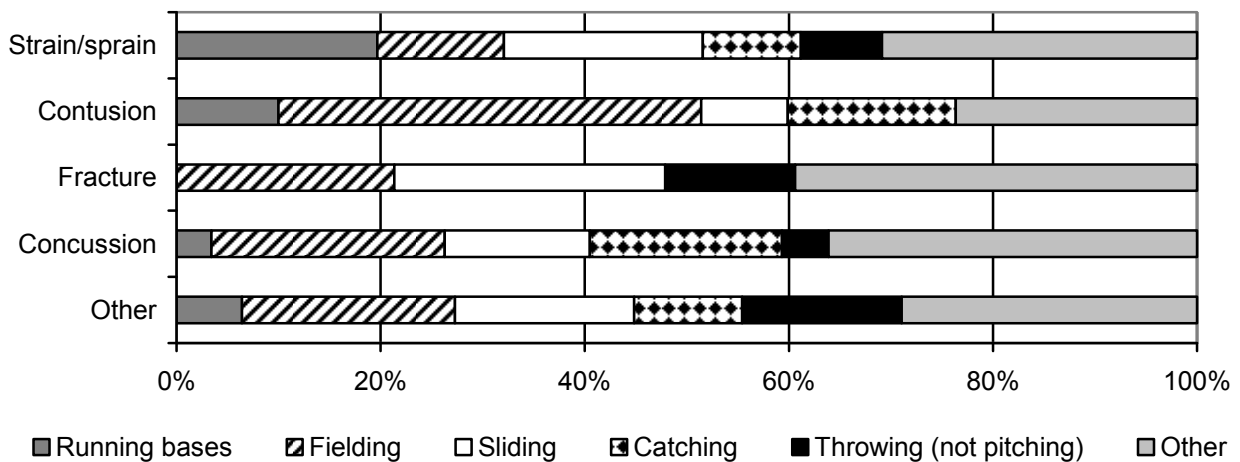


Table 11.9 Activities Leading to Softball Injuries by Type of Exposure, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

| Activity | Competition | | Practice | | Overall | |
|-------------------------|---------------|-------------|---------------|-------------|---------------|-------------|
| | n | % | n | % | n | % |
| Fielding | 5,863 | 20.5% | 4,320 | 20.5% | 10,183 | 20.5% |
| Sliding | 7,342 | 25.7% | 1,535 | 7.3% | 8,877 | 17.9% |
| Batting | 4,628 | 16.2% | 1,927 | 9.1% | 6,554 | 13.2% |
| Running bases | 2,735 | 9.6% | 2,807 | 13.3% | 5,542 | 11.2% |
| Catching | 3,705 | 12.9% | 1,582 | 7.5% | 5,287 | 10.6% |
| Throwing (not pitching) | 1,090 | 3.8% | 3,160 | 15.0% | 4,250 | 8.6% |
| Pitching | 2,225 | 7.8% | 576 | 2.7% | 2,802 | 5.6% |
| Conditioning | 0 | 0.0% | 1,783 | 8.5% | 1,783 | 3.6% |
| General play | 337 | 1.2% | 957 | 4.5% | 1,293 | 2.6% |
| Other | 690 | 2.4% | 2,422 | 11.5% | 3,113 | 6.3% |
| Total | 28,615 | 100% | 21,069 | 100% | 49,684 | 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. Gender Differences within Sports

12.1 Boys' and Girls' Soccer

Table 12.1 Comparison of Boys' and Girls' Soccer Injury Rates, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

| | Boys' soccer | Girls' soccer* | RR (95% CI) [†] |
|--------------|--------------|----------------|--------------------------|
| Total | 1.62 | 2.07 | 1.27 (1.10-1.47) |
| Competition | 3.43 | 4.59 | 1.34 (1.12-1.61) |
| Practice | 0.87 | 1.00 | 1.16 (0.91-1.47) |

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

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

Table 12.2 Comparison of Body Sites of Boys' and Girls' Soccer Injuries, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

| Body Site | Boys' soccer | Girls' soccer | IPR (95% CI) |
|---------------------|--------------|---------------|---------------------------|
| Ankle | 16.5% | 18.3% | 1.11 (0.75-1.64) |
| Knee | 11.8% | 15.7% | 1.33 (0.87-2.05) |
| Head/face | 12.4% | 18.5% | 1.49 (0.99-2.25) |
| Hip/thigh/upper leg | 17.5% | 17.6% | 1.01 (0.69-1.47) |
| Hand/wrist | 6.4% | 2.7% | 2.40 (0.93-6.22) |
| Shoulder | 3.8% | 1.3% | 2.87 (1.09-7.55) |
| Trunk | 5.8% | 4.3% | 1.36 (0.58-3.19) |
| Lower leg | 13.6% | 6.1% | 2.24 (1.25-4.01) |
| Arm/elbow | 1.6% | 2.1% | 1.28 (0.36-4.61) |
| Foot | 9.8% | 7.0% | 1.40 (0.73-2.66) |
| Neck | 0.4% | 1.8% | 4.02 (0.61-26.59) |
| Other | 0.4% | 4.7% | 11.63 (3.07-43.97) |
| Total | 100% | 100% | --- |

Table 12.3 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 | 44.7% | 51.8% | 1.16 (0.96-1.40) |
| Contusion | 13.2% | 7.9% | 1.68 (1.03-2.75) |
| Fracture | 15.3% | 5.7% | 2.67 (1.50-4.72) |
| Concussion | 9.5% | 16.3% | 1.71 (1.07-2.73) |
| Other | 17.2% | 18.3% | 1.06 (0.71-1.59) |
| Total | 100% | 100% | --- |

Table 12.4 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 | 13.7% | 17.2% | 1.25 (0.83-1.90) |
| Head/face concussion | 9.5% | 16.3% | 1.71 (1.07-2.73) |
| Hip/thigh/upper leg strain/sprain | 13.8% | 15.7% | 1.13 (0.75-1.72) |
| Knee strain/sprain | 5.0% | 7.8% | 1.57 (0.83-2.97) |
| Hand/wrist fracture | 5.3% | 1.0% | 5.33 (1.17-24.33) |

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

Table 12.5 Comparison of Time Loss of Boys' and Girls' Soccer Injuries, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

| | Boys' soccer | Girls' soccer | IPR (95% CI) |
|------------------|--------------|---------------|-------------------------|
| Time Loss | | | |
| 1-2 days | 15.1% | 8.5% | 1.77 (1.11-2.80) |
| 3-6 days | 28.4% | 30.7% | 1.08 (0.81-1.44) |
| 7-9 days | 16.5% | 22.2% | 1.35 (0.92-1.97) |
| 10-21 days | 17.3% | 20.2% | 1.16 (0.81-1.68) |
| 22 days or more | 16.7% | 10.0% | 1.67 (1.04-2.68) |
| Other | 6.0% | 8.3% | 1.39 (0.73-2.65) |
| Total | 100% | 100% | --- |

Table 12.6 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 | 29.1% | 31.5% | 1.08 (0.83-1.42) |
| Stepped on/fell on/kicked | 11.4% | 8.9% | 1.28 (0.76-2.15) |
| Rotation around a planted foot/inversion | 13.8% | 12.1% | 1.14 (0.70-1.87) |
| Overuse, heat illness, conditioning, etc. | 16.3% | 22.3% | 1.37 (0.92-2.04) |
| Contact with ball | 11.0% | 11.2% | 1.02 (0.60-1.71) |
| Uneven playing surface | 2.7% | 1.7% | 1.55 (0.63-3.82) |
| Slide tackle | 8.7% | 3.5% | 2.47 (1.37- 4.46) |
| Contact with goal | 0.5% | 0.0% | --- |
| Other | 6.5% | 8.7% | 1.35 (0.76-2.41) |
| Total | 100% | 100% | --- |

Table 12.7 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 | 23.2% | 35.8% | 1.54 (1.14-2.09) |
| Defending | 11.2% | 14.2% | 1.27 (0.79-2.04) |
| Chasing loose ball | 9.5% | 12.2% | 1.29 (0.91-1.03) |
| Ball handling/dribbling | 13.2% | 6.9% | 1.92 (1.13-3.22) |
| Goaltending | 9.4% | 5.8% | 1.64 (0.89-2.93) |
| Shooting (foot) | 6.8% | 5.8% | 1.18 (0.57-2.42) |
| Heading ball | 5.4% | 4.2% | 1.30 (0.62-2.74) |
| Passing (foot) | 6.9% | 4.4% | 1.57 (0.70-3.48) |
| Receiving pass | 3.6% | 4.2% | 1.19 (0.54-2.61) |
| Other | 10.8% | 6.4% | 1.69 (1.01-2.85) |
| Total | 100% | 100% | --- |

12.2 Boys' and Girls' Basketball

Table 12.8 Comparison of Boys' and Girls' Basketball Injury Rates, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

| | Boys' basketball | Girls' basketball | RR (95% CI)* |
|--------------|------------------|-------------------|-------------------------|
| Total | 1.35 | 1.54 | 1.14 (0.97-1.33) |
| Competition | 2.32 | 3.13 | 1.35 (1.09-1.67) |
| Practice | 0.95 | 0.87 | 1.09 (0.86-1.38) |

Table 12.9 Comparison of Body Sites of Boys' and Girls' Basketball Injuries, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

| Body Site | Boys' basketball | Girls' basketball | IPR (95% CI) |
|---------------------|------------------|-------------------|--------------------------|
| Ankle | 29.8% | 31.1% | 1.05 (0.81-1.35) |
| Knee | 12.6% | 16.5% | 1.31 (0.86-2.00) |
| Head/face | 15.7% | 19.5% | 1.24 (0.85-1.79) |
| Hip/thigh/upper leg | 8.2% | 3.0% | 2.71 (1.49-4.92) |
| Hand/wrist | 9.9% | 9.4% | 1.05 (0.61-1.82) |
| Shoulder | 4.1% | 4.8% | 1.71 (0.52-2.66) |
| Trunk | 5.1% | 3.8% | 1.33 (0.59-3.04) |
| Lower leg | 2.1% | 5.1% | 2.46 (0.94-6.43) |
| Arm/elbow | 3.6% | 0.5% | 6.61 (2.16-20.21) |
| Foot | 8.1% | 4.4% | 1.85 (0.90-3.84) |
| Neck | 0.0% | 0.8% | --- |
| Other | 0.9% | 1.1% | 1.23 (0.31-4.90) |
| Total | 100% | 100% | --- |

Table 12.10 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 | 47.9% | 53.5% | 1.12 (0.95-1.32) |
| Contusion | 10.8% | 6.3% | 1.73 (0.93-3.21) |
| Fracture | 10.5% | 9.4% | 1.11 (0.65-1.90) |
| Concussion | 5.1% | 13.4% | 2.64 (1.53-4.54) |
| Other | 25.7% | 17.4% | 1.48 (1.06-2.08) |
| Total | 100% | 100% | --- |

Table 12.11 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 | 28.9% | 30.4% | 1.05 (0.81-1.36) |
| Knee other | 6.2% | 2.9% | 2.13 (1.00-4.58) |
| Head/face other | 6.2% | 3.4% | 1.82 (0.82-4.04) |
| Head/face concussion | 5.1% | 13.4% | 2.64 (1.53-4.54) |
| Knee strain/sprain | 4.7% | 10.6% | 2.27 (1.17-4.43) |

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

Table 12.12 Comparison of Time Loss of Boys' and Girls' Basketball Injuries, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

| | Boys' basketball | Girls' basketball | IPR (95% CI) |
|------------------|------------------|-------------------|-------------------------|
| Time Loss | | | |
| 1-2 days | 19.2% | 14.2% | 1.35 (0.92-1.98) |
| 3-6 days | 26.1% | 30.8% | 1.18 (0.89-1.56) |
| 7-9 days | 18.3% | 18.8% | 1.03 (0.72-1.47) |
| 10-21 days | 18.2% | 21.0% | 1.15 (0.83-1.62) |
| 22 days or more | 13.3% | 8.4% | 1.58 (0.95-2.62) |
| Other | 4.9% | 6.8% | 1.37 (0.73-2.57) |
| Total | 100% | 100% | --- |

Table 12.13 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 | 26.7% | 26.2% | 1.02 (0.77-1.35) |
| Jumping/landing | 25.9% | 22.3% | 1.16 (0.86-1.58) |
| Overuse, heat illness, conditioning, etc. | 8.8% | 9.2% | 1.04 (0.62-1.74) |
| Rotation around a planted foot/inversion | 9.4% | 15.6% | 1.66 (1.08-2.54) |
| Stepped on/fell on/kicked | 8.1% | 6.4% | 1.27 (0.73-2.22) |
| Contact with ball | 3.6% | 8.1% | 2.22 (1.04-4.72) |
| Other | 17.5% | 12.3% | 1.42 (0.92-2.18) |
| Total | 100% | 100% | --- |

Table 12.14 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 | 22.5% | 21.6% | 1.04 (0.76-1.42) |
| General play | 25.1% | 20.9% | 1.20 (0.88-1.64) |
| Defending | 14.8% | 14.6% | 1.02 (0.66-1.55) |
| Chasing loose ball | 11.8% | 8.1% | 1.45 (0.89-2.36) |
| Shooting | 10.2% | 9.4% | 1.10 (0.62-1.93) |
| Conditioning | 1.7% | 4.2% | 2.39 (1.05-5.45) |
| Ball handling/dribbling | 6.2% | 6.6% | 1.07 (0.58-1.96) |
| Receiving pass | 3.1% | 9.1% | 2.92 (1.29-6.60) |
| Other | 4.4% | 5.4% | 1.24 (0.61-2.53) |
| Total | 100% | 100% | --- |

12.3 Boys' Baseball and Girls' Softball

Table 12.15 Comparison of Baseball and Softball Injury Rates, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

| | Baseball | Softball | RR (95% CI) |
|--------------|----------|-------------|-------------------------|
| Total | 0.78 | 1.04 | 1.34 (1.06-1.68) |
| Competition | 1.32 | 1.62 | 1.23 (0.91-1.67) |
| Practice | 0.48 | 0.72 | 1.49 (1.05-2.12) |

Table 12.16 Comparison of Body Sites of Baseball and Softball Injuries, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

| Body Site | Baseball | Softball | IPR (95% CI) |
|---------------------|--------------|--------------|-------------------------|
| Ankle | 5.4% | 13.7% | 2.52 (1.13-5.62) |
| Knee | 5.4% | 15.5% | 2.85 (1.12-7.24) |
| Head/face | 23.2% | 20.1% | 1.15 (0.71-1.87) |
| Hip/thigh/upper leg | 7.8% | 6.5% | 1.19 (0.54-2.63) |
| Hand/wrist | 15.3% | 16.7% | 1.09 (0.61-1.96) |
| Shoulder | 18.2% | 7.6% | 2.39 (1.15-4.98) |
| Trunk | 4.4% | 4.5% | 1.03 (0.30-3.55) |
| Lower leg | 5.2% | 5.0% | 1.03 (0.38-2.81) |
| Arm/elbow | 10.7% | 7.2% | 1.50 (0.70-3.21) |
| Foot | 3.8% | 2.5% | 1.53 (0.52-4.56) |
| Neck | 0.2% | 0.7% | 3.54 (0.68-18.43) |
| Other | 0.4% | 0.0% | --- |
| Total | 100% | 100% | --- |

Table 12.17 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 | 38.4% | 41.1% | 1.07 (0.79-1.45) |
| Contusion | 18.1% | 13.8% | 1.32 (0.74-2.33) |
| Fracture | 14.8% | 13.0% | 1.14 (0.61-2.13) |
| Concussion | 4.7% | 12.7% | 2.73 (1.19-6.27) |
| Other | 23.9% | 19.4% | 1.23 (0.76-2.01) |
| Total | 100% | 100% | --- |

Table 12.18 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 | | | |
| Ankle strain/sprain | 5.4% | 11.8% | 2.16 (0.96-4.87) |
| Hand/wrist fracture | 5.8% | 8.9% | 1.54 (0.63-3.77) |
| Head/face contusion | 10.2% | 5.3% | 1.93 (0.69-5.39) |
| Hip/thigh/upper leg strain/sprain | 6.5% | 5.4% | 1.22 (0.49-3.00) |
| Shoulder strain/sprain | 13.4% | 0.0% | 5.11 (1.24-21.16) |

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

Table 12.19 Comparison of Time Loss of Baseball and Softball Injuries, High School Sports-Related Injury Surveillance Study, US, 2008-09 School Year

| | Baseball | Softball | IPR (95% CI) |
|------------------|--------------|--------------|------------------|
| Time Loss | | | |
| 1-2 days | 19.0% | 18.6% | 1.02 (0.60-1.75) |
| 3-6 days | 24.2% | 28.9% | 1.20 (0.80-1.78) |
| 7-9 days | 16.6% | 13.8% | 1.20 (0.68-2.13) |
| 10-21 days | 19.3% | 16.5% | 1.18 (0.70-1.98) |
| 22 days or more | 15.6% | 12.3% | 1.27 (0.64-2.52) |
| Other | 5.3% | 9.9% | 1.87 (0.71-4.96) |
| Total | 100% | 100% | --- |

Table 12.20 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. | 10.9% | 11.2% | 1.02 (0.49-2.13) |
| Contact with another player | 15.9% | 18.5% | 1.16 (0.65-2.08) |
| Contact with bases | 8.8% | 11.8% | 1.35 (0.68-2.70) |
| Throwing - not pitching | 5.3% | 4.0% | 1.33 (0.52-3.43) |
| Throwing - pitching | 7.9% | 5.1% | 1.56 (0.56-4.33) |
| Contact with thrown ball (non-pitch) | 5.6% | 10.4% | 1.84 (0.78-4.34) |
| Rotation around a planted foot/inversion | 4.0% | 3.3% | 1.22 (0.44-3.35) |
| Hit by batted ball | 17.9% | 6.6% | 2.71 (1.36-5.41) |
| Hit by pitch | 3.8% | 7.3% | 1.93 (0.77-4.87) |
| Other | 20.0% | 22.0% | 1.10 (0.67-1.79) |
| Total | 100% | 100% | --- |

Table 12.21 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 | | | |
| Fielding a batted ball | 22.3% | 12.7% | 1.76 (1.03-2.99) |
| Fielding a thrown ball | 4.7% | 7.8% | 1.68 (0.59-4.74) |
| Running bases | 17.4% | 11.2% | 1.56 (0.83-2.93) |
| Pitching | 14.7% | 5.6% | 2.61 (1.16-5.89) |
| Batting | 13.7% | 13.2% | 1.04 (0.56-1.92) |
| Sliding | 8.1% | 17.9% | 2.20 (1.09-4.42) |
| Throwing (not pitching) | 4.9% | 8.6% | 1.74 (0.76-3.98) |
| General play | 6.9% | 2.6% | 2.66 (1.10-6.45) |
| Conditioning | 1.4% | 3.6% | 2.56 (0.32-20.54) |
| Catching | 1.5% | 10.6% | 7.33 (2.57-20.92) |
| Other | 4.5% | 6.3% | 1.38 (0.44-4.37) |
| Total | 100% | 100% | --- |

XIII. Trends over Time

Table 13.1 Injury Rates by Sport, Type of Exposure, and Year, High School Sports-Related Injury Surveillance Study, US, 2005-09 School Years

| | 2005-06 | 2006-07 | 2007-08 | 2008-09 | p-value for trend* |
|-------------------------|-------------|-------------|-------------|-------------|--------------------|
| Overall total | 2.51 | 2.59 | 2.31 | 2.01 | 0.111 |
| Competition | 4.63 | 4.88 | 4.45 | 4.05 | 0.198 |
| Practice | 1.69 | 1.75 | 1.52 | 1.26 | 0.106 |
| Boys' football total | 4.36 | 4.45 | 4.18 | 3.50 | 0.114 |
| Competition | 12.09 | 13.50 | 12.80 | 11.26 | 0.571 |
| Practice | 2.54 | 2.68 | 2.47 | 1.92 | 0.198 |
| Boys' soccer total | 2.43 | 2.27 | 1.75 | 1.62 | 0.031 |
| Competition | 4.22 | 4.31 | 3.63 | 3.43 | 0.092 |
| Practice | 1.58 | 1.45 | 0.96 | 0.87 | 0.040 |
| Girls' soccer total | 2.36 | 2.51 | 2.35 | 2.07 | 0.276 |
| Competition | 5.21 | 5.43 | 5.15 | 4.59 | 0.227 |
| Practice | 1.10 | 1.31 | 1.16 | 1.00 | 0.552 |
| Girls' volleyball total | 1.64 | 1.37 | 1.22 | 0.89 | 0.009 |
| Competition | 1.92 | 1.40 | 1.43 | 0.90 | 0.061 |
| Practice | 1.48 | 1.36 | 1.12 | 0.88 | 0.010 |
| Boys' basketball total | 1.89 | 1.75 | 1.39 | 1.35 | 0.041 |
| Competition | 2.98 | 2.87 | 2.23 | 2.32 | 0.109 |
| Practice | 1.46 | 1.28 | 1.04 | 0.95 | 0.013 |
| Girls' basketball total | 2.01 | 2.09 | 1.61 | 1.54 | 0.121 |
| Competition | 3.60 | 3.60 | 3.30 | 3.13 | 0.052 |
| Practice | 1.37 | 1.44 | 0.90 | 0.87 | 0.127 |
| Boys' wrestling total | 2.50 | 2.51 | 2.27 | 2.17 | 0.064 |
| Competition | 3.93 | 3.80 | 3.70 | 3.35 | 0.044 |
| Practice | 2.04 | 2.06 | 1.76 | 1.75 | 0.114 |
| Boys' baseball total | 1.19 | 1.25 | 0.93 | 0.78 | 0.094 |
| Competition | 1.77 | 2.01 | 1.37 | 1.32 | 0.222 |
| Practice | 0.87 | 0.82 | 0.68 | 0.48 | 0.031 |
| Girls' softball total | 1.13 | 1.11 | 1.29 | 1.04 | 0.890 |
| Competition | 1.78 | 1.96 | 1.86 | 1.62 | 0.479 |
| Practice | 0.79 | 0.65 | 0.98 | 0.72 | 0.891 |

*Statistically significant tests for trend are bolded.

Table 13.2 Nationally Estimated Number of Injuries by Sport, Type of Exposure, and Year, High School Sports-Related Injury Surveillance Study, US, 2005-09 School Years

| | 2005-06 | 2006-07 | 2007-08 | 2008-09 |
|-------------------------|------------------|------------------|------------------|------------------|
| Overall total | 1,442,533 | 1,472,849 | 1,419,723 | 1,248,126 |
| Competition | 759,334 | 766,512 | 763,034 | 690,525 |
| Practice | 683,199 | 706,337 | 656,689 | 557,601 |
| Boys' football total | 516,150 | 574,367 | 616,665 | 527,321 |
| Competition | 280,919 | 292,316 | 311,780 | 288,637 |
| Practice | 235,231 | 282,051 | 304,885 | 238,684 |
| Boys' soccer total | 218,760 | 171,874 | 159,351 | 149,229 |
| Competition | 119,703 | 93,295 | 99,785 | 87,082 |
| Practice | 99,058 | 78,579 | 59,566 | 62,147 |
| Girls' soccer total | 185,770 | 230,769 | 215,850 | 192,108 |
| Competition | 122,803 | 149,231 | 146,102 | 123,312 |
| Practice | 62,967 | 81,538 | 69,748 | 68,796 |
| Girls' volleyball total | 81,813 | 80,493 | 72,261 | 56,609 |
| Competition | 32,677 | 27,423 | 26,539 | 19,764 |
| Practice | 49,136 | 53,069 | 45,722 | 36,845 |
| Boys' basketball total | 100,058 | 96,670 | 82,612 | 79,230 |
| Competition | 44,826 | 46,109 | 36,766 | 40,152 |
| Practice | 55,232 | 50,561 | 45,846 | 39,078 |
| Girls' basketball total | 103,566 | 102,831 | 73,283 | 64,933 |
| Competition | 53,812 | 53,703 | 45,236 | 38,277 |
| Practice | 49,753 | 49,128 | 28,047 | 26,656 |
| Boys' wrestling total | 105,542 | 101,139 | 91,625 | 88,996 |
| Competition | 36,259 | 38,750 | 40,698 | 39,029 |
| Practice | 69,283 | 62,389 | 50,927 | 49,967 |
| Boys' baseball total | 67,560 | 60,296 | 44,760 | 39,869 |
| Competition | 33,639 | 33,494 | 22,803 | 25,584 |
| Practice | 33,922 | 26,802 | 21,957 | 14,285 |
| Girls' softball total | 63,313 | 54,411 | 63,316 | 49,831 |
| Competition | 34,696 | 32,191 | 33,325 | 28,688 |
| Practice | 28,618 | 22,220 | 29,991 | 21,143 |

Table 13.3 Body Site of Injury by Year, High School Sports-Related Injury Surveillance Study, US, 2005-09 School Years*

| | 2005-06 n=1,480,557 | 2006-07 n=1,464,926 | 2007-08 n=1,411,621 | 2008-09 n=1,248,126 |
|---------------------|-------------------------------|-------------------------------|-------------------------------|-------------------------------|
| Body Site | | | | |
| Ankle | 22.7% | 19.8% | 18.5% | 16.4% |
| Knee | 14.2% | 16.6% | 14.6% | 14.8% |
| Head/face | 12.3% | 12.4% | 12.4% | 15.3% |
| Hip/thigh/upper leg | 10.8% | 10.5% | 10.2% | 10.3% |
| Shoulder | 7.9% | 8.0% | 10.1% | 9.3% |
| Hand/wrist | 8.0% | 7.5% | 9.1% | 8.5% |
| Trunk | 6.2% | 6.7% | 6.5% | 6.6% |
| Lower leg | 4.6% | 5.2% | 5.7% | 5.8% |
| Arm/elbow | 4.1% | 3.9% | 4.6% | 4.1% |
| Foot | 4.0% | 4.0% | 4.2% | 5.0% |
| Neck | 2.2% | 1.9% | 1.8% | 1.9% |
| Other | 3.2% | 3.6% | 2.4% | 2.1% |
| Total | 100% | 100% | 100% | 100% |

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

Table 13.4 Injury Diagnosis by Year, High School Sports-Related Injury Surveillance Study, US, 2005-09 School Years

| | 2005-06, n=1,444,172 | 2006-07, n=1,466,398 | 2007-08 n=1,414,139 | 2008-09 n=1,248,126 |
|------------------|--------------------------------|--------------------------------|-------------------------------|-------------------------------|
| Diagnosis | | | | |
| Strain/sprain | 52.0% | 48.2% | 48.3% | 45.7% |
| Contusion | 12.2% | 13.7% | 12.4% | 11.5% |
| Fracture | 9.8% | 8.9% | 10.2% | 10.9% |
| Concussion | 9.1% | 8.4% | 9.2% | 11.8% |
| Other | 16.8% | 20.9% | 19.9% | 20.2% |
| Total | 100% | 100% | 100% | 100% |

Table 13.5 Most Common Injury Diagnoses by Year, High School Sports-Related Injury Surveillance Study, US, 2005-09 School Years

| | 2005-06 n=1,435,954 | 2006-07 n=1,463,273 | 2007-08 n=1,410,654 | 2008-09 n= 1,248,126 |
|-----------------------------------|-------------------------------|-------------------------------|-------------------------------|--------------------------------|
| Diagnosis | | | | |
| Ankle strain/sprain | 20.6% | 17.8% | 17.3% | 15.0% |
| Head/face concussion | 9.0% | 8.4% | 9.2% | 11.7% |
| Knee strain/sprain | 7.6% | 8.8% | 7.8% | 7.9% |
| Hip/thigh/upper leg strain/sprain | 7.9% | 7.7% | 7.3% | 7.7% |
| Knee other | 4.3% | 4.9% | 4.7% | 4.5% |
| Shoulder other | 3.1% | 3.7% | 4.1% | 4.0% |
| Hand/wrist fracture | 3.2% | 3.3% | 4.0% | 4.0% |
| Shoulder strain/sprain | 3.4% | 2.9% | 3.4% | 3.7% |
| Trunk strain/sprain | 2.8% | 2.7% | 3.2% | 2.8% |
| Hand/wrist strain/sprain | 3.1% | 2.5% | 3.8% | 2.9% |

Table 13.6 Time Loss of Injuries by Year, High School Sports-Related Injury Surveillance Study, US, 2005-09 School Years

| | 2005-06 n=1,378,145 | 2006-07 n=1,423,183 | 2007-08 n=1,355,981 | 2008-09 n= 1,248,126 |
|------------------|-------------------------------|-------------------------------|-------------------------------|--------------------------------|
| Time Loss | | | | |
| 1-2 days | 22.5% | 26.6% | 22.8% | 13.7% |
| 3-6 days | 30.0% | 28.5% | 28.8% | 28.5% |
| 7-9 days | 15.3% | 14.7% | 15.8% | 17.7% |
| 10-21 days | 14.9% | 14.1% | 16.7% | 19.7% |
| 22 days or more | 17.2% | 16.1% | 15.9% | 20.3% |
| Total | 100% | 100% | 100% | 100% |

Table 13.7 Injuries Requiring Surgery by Year, High School Sports-Related Injury Surveillance Study, US, 2005-09 School Years

| | 2005-06 n=1,429,072 | 2006-07 n=1,428,960 | 2007-08 n=1,380,872 | 2008-09 n= 1,248,126 |
|-------------------------|--------------------------------------|--------------------------------------|--------------------------------------|---------------------------------------|
| Need for surgery | | | | |
| Required surgery | 5.3% | 6.4% | 6.1% | 6.7% |
| Did not require surgery | 94.7% | 93.6% | 93.9% | 93.3% |
| Total | 100% | 100% | 100% | 100% |

IX. Reporter Demographics & Compliance

During the 2008-09 school year, 118 ATCs were invited to participate in the study at the beginning of the school year. In addition, 5 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, 107 enrolled ATCs reported an average of 42 study weeks. The majority of ATCs (90%) reported all the weeks during which they were enrolled, with only 8 ATCs (7%) 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 (80%) of participating high schools were public schools, with the remainder being private. All but 2 participating ATCs provided services to athletes of their high school on 5 or more days each week. Nearly 90% (88.8%) of ATCs participating during the 2008-09 study year had previously participated in the High School RIO™ study.

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 be used to improve the National High School Sports-Related Injury Surveillance Study for the 2009-10 school year.

X. Summary

High school sports play an important role in the adoption and maintenance of a physically active lifestyle among millions of US adolescents. Too often injury prevention in this population is overlooked as sports-related injuries are thought to be unavoidable. In reality, sports-related injuries are largely preventable through the application of evidence-based preventive interventions. Such preventive interventions can include educational campaigns, introduction of new/improved protective equipment, rule changes, other policy changes, etc. The morbidity, mortality, and disability caused by high school sports-related injuries can be reduced through the development and implementation of improved injury diagnosis and treatment modalities as well as through effective prevention strategies. However, surveillance of exposure based injury rates in a nationally representative sample of high school athletes and subsequent epidemiologic analysis of patterns of injury are needed to drive evidence-based prevention practices.

Prior to the implementation of the High School Sports-Related Injury Surveillance Study by Dr. Comstock, the study of high school sports-related injuries had largely been limited by an inability to calculate injury rates due to a lack of exposure data (i.e., frequency of participation in athletic activities including training, practice, and competition), an inability to compare findings across groups (i.e., sports/activities, genders, schools, and levels of competition), or an inability to generalize findings from small non-representative samples. The value of national injury surveillance studies that collect injury, exposure, and risk factor data from representative samples has been well demonstrated by the National Collegiate Athletic Association's Injury Surveillance System (NCAA ISS). Data collected by the NCAA ISS since 1982 has been used to develop preventive interventions including changes in coaching habits, increased use of protective equipment, and rule changes which have had proven success in reducing injuries among collegiate athletes. For example, NCAA ISS data has been used to develop several interventions

intended to reduce the number of preseason heat-related football injuries including the elimination of consecutive days of multiple practices, daily hour limitations, and a gradual increase in equipment for conditioning and heat acclimation. Additionally, several committees have considered NCAA ISS data when making recommendations including the NCAA Committee on Competitive Safeguards and Medical Aspects of Sports' recommendation for mandatory eye protection in women's lacrosse, the NCAA Men's Ice Hockey Rules Committee's recommendation for stricter penalties for hitting from behind, checking into the boards, and not wearing a mouthpiece, and the NCAA Men's Basketball Rules Committee's recent discussions of widening the free-throw lane to prevent injuries related to player contact. Unfortunately, because an equivalent injury surveillance system to collect injury and exposure data from a nationally representative sample of high school athletes had not previously existed, injury prevention efforts targeted to reduce injury rates in this population were based largely upon data collected from collegiate athletes. This is unacceptable because distinct biophysiological differences (e.g., lower muscle mass, immature growth plates, etc.) means high school athletes are not merely miniature versions of their collegiate counterparts.

The successful implementation and maintenance of the National High School Sports-Related Injury Surveillance Study demonstrates the value of a national injury surveillance system at the high school level. Dr. Comstock and her research staff are committed to maintaining a permanent national high school sports injury surveillance system.

While the health benefits of a physically active lifestyle including sports participation are undeniable, participants are at risk of injury because a certain endemic level of injury can be expected during any physical activity, especially those with a competitive component. However, injury rates among high school athletes should be reduced to the lowest possible level without

discouraging adolescents from engaging in this important form of physical activity. This goal can best be accomplished by monitoring injury rates and patterns of injury among high school athletes over time; investigating the etiology of preventable injuries; and developing, implementing, and evaluating evidence-based preventive interventions. Surveillance systems such as the model used for this study are critical in achieving these goals.