

EPIDEMIOLOGY OF YOUTH BASEBALL INJURIES IN SUMMER CAMP AND TOURNAMENT PLAY

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INTRODUCTION

With nearly five million participants aged 5 to 14 years and an additional half million players at the scholastic level, baseball is among the most popular youth sports in the United States. Detailed injury surveillance collected by on-site athletic trainers offers a thorough assessment of the spectrum of injury in youth baseball.

METHODS

STUDY POPULATION & DATA COLLECTION

- Institutional Review Board approval was obtained from the MedStar Research Institute
- We prospectively investigated youth baseball injuries at Ripken Baseball Academy (Aberdeen, Maryland), April to October 2006
- Data were collected at 2- to 4-day tournaments and 5-day camps
- Study population: boys aged 8 to 16 years
- Data collection software: Sports Injury Management System (SIMS) (FlanTech, Iowa City, IA)
- Data entry: certified athletic trainers (ATCs) entered data after they evaluated and treated players
- Reportable event: any injury requiring attention from an athletic trainer during any organized activity, regardless of time loss
- Injuries not related to sports were recorded but were excluded from data analysis
- Athletic exposure (AE): 2-hour game or 2-hour practice
- Total AEs: camp, 15,470; tournament, 20,430; combined 35,900

ANALYSIS

- Injuries were evaluated based on nature of injury, body part injured, and player activity when injured
- Injury frequency and incidence density (number of injuries per 1000 AEs)
- Incidence rate ratios (IRR) and 95% confidence intervals (95% CI) calculated using Stata software (Stata Corp., College Station, TX)

TABLE 1. INJURY BY SESSION TYPE

Play	Frequency, n (%)	Athletic-Exposure	Incidence Rate *
Camp	213 (73)	15,470	13.8
Tournament	78 (27)	20,430	3.8
Total	291 (100)	35,900	8.1

*Incidence rates represent the number of injury cases per 1000 athletic exposures

TABLE 2. FIVE MOST COMMON INJURY SCENARIOS IN CAMP PLAY

Rank Order	Body Part	Nature of Injury	Number of Cases	Player Activity
1	Wrist/Hand	Blister	23	Spontaneous (52%)
2	Head/Face	Contusion	20	Object to Body (90%)
3	Hand	Contusion	18	Object to Body (89%)
3	Systemic Condition	Heat Illness	18	Not Applicable (44%)
5	Hand	Sprain	10	Object to Body (30%), Contact with Ground (30%)

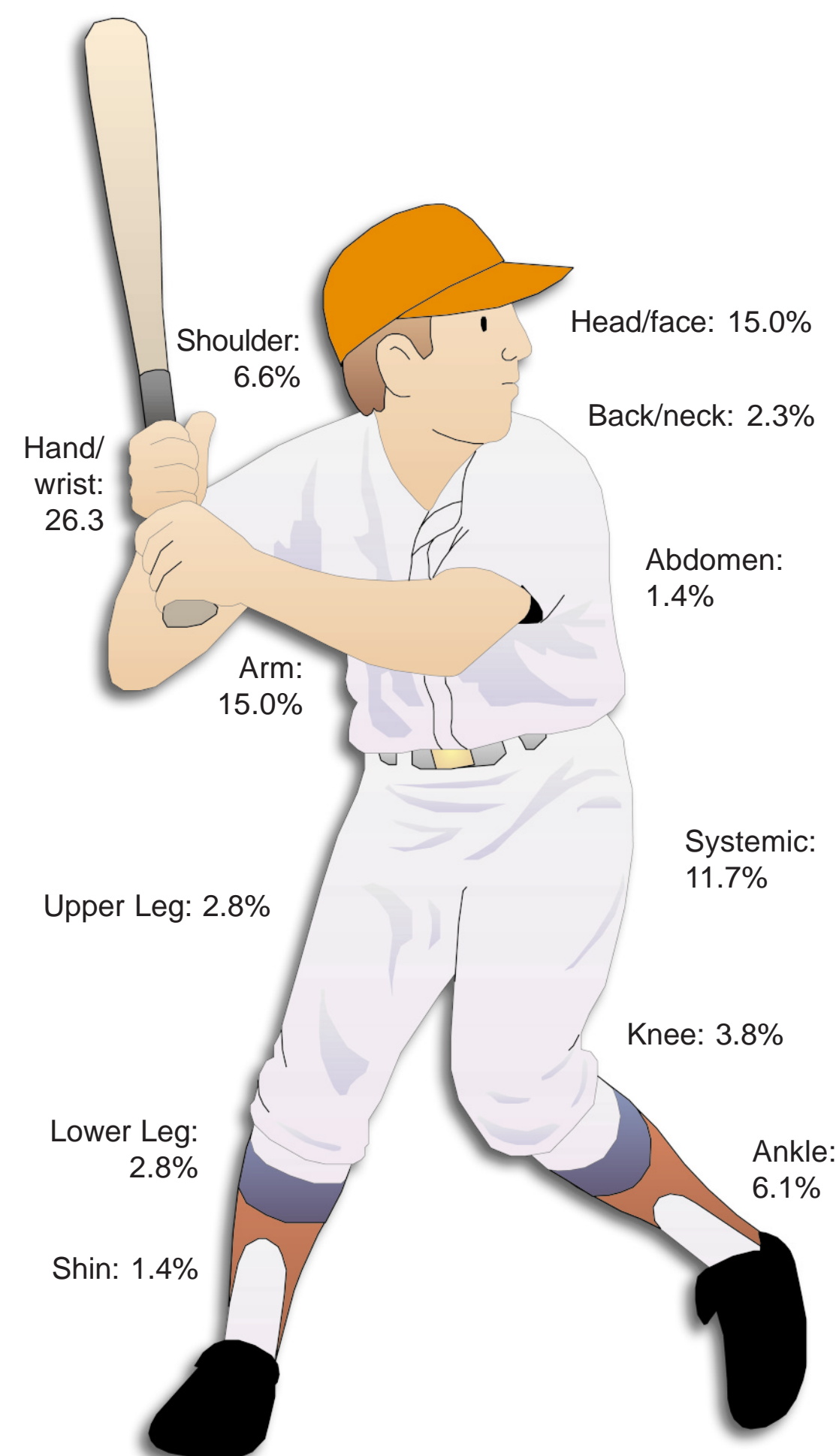


FIGURE 1. INJURY BY BODY REGION, YOUTH BASEBALL SUMMER CAMPS (N=213), 2006

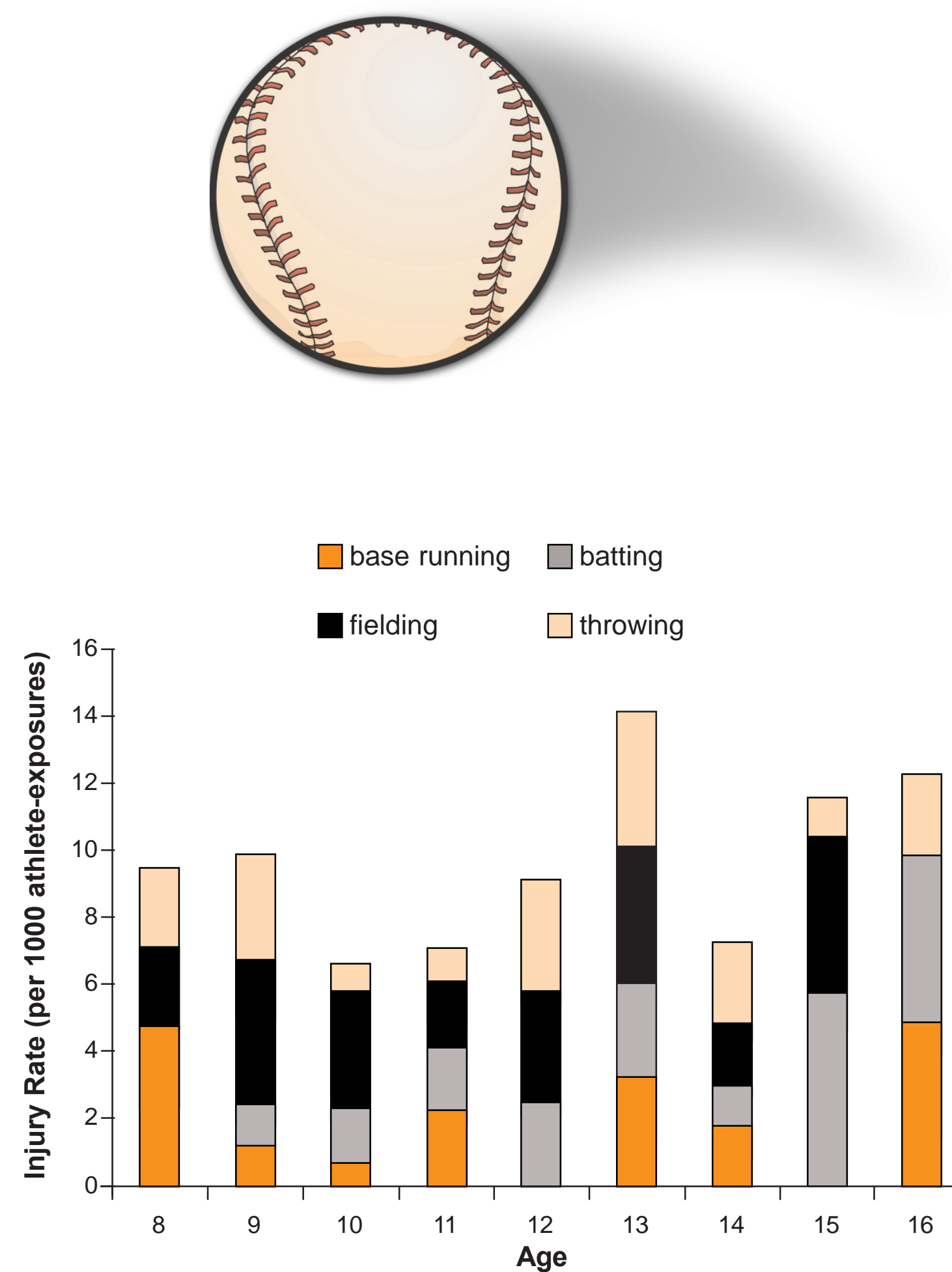


FIGURE 2. INJURY RATE BY AGE AND PLAYER ACTIVITY, YOUTH BASEBALL CAMP, 2006 (N=213)

RESULTS

- Total injuries: 291 (213 in camps, 78 in tournaments) (Table 1)
- Incidence rate in camps was significantly higher than in tournaments (IRR: 3.60, 95% CI: 2.77 - 4.74)
- Most common nature of injury
 - Camp: contusion 32.4%, blister 11.7%, sprain 10.3%
 - Tournament: contusion 56.4%, sprain 11.7%
 - Four fractures and two concussions in tournament players
- Most commonly injured body region: upper extremity (Figure 1)
- Position when injured: fielders other than catcher or pitcher (27.5%), batters (21.3%), base runners (15.5%), pitchers (4.7%), catchers (4.1%)
- Most common injury scenarios: Table 2
- Head and facial injuries caused by the ball: fielding players (48%), batters (7%)
- Injuries to pitchers (n = 13)
 - Upper extremity injuries: 7, all inflammatory (sprain, strain, or tendinitis)
 - Hit with batted ball: 2 contusions were sustained
- Injury distribution by age: 13-year-olds had highest injury rate (18.6/1000 AE) (Figure 2)

DISCUSSION

Age was significantly related to risk of injury. Players aged 13 years had the highest injury rate, which coincides with the change from developmental-sized fields to regulation-sized fields. The higher rate of injury in camp play may reflect the greater exposure to active situations and potential for overuse injuries. The presence of head/face contusions from ball to body contact is among the most common injury scenarios and suggests the potential for serious injuries in youth baseball. Interventions for fielders at risk of ball-related head/face injuries may be warranted. Pitchers were not at higher risk of injury than other players. Safety standards in place, including limiting pitchers to two or three innings per game, may have minimized the risk of injury.

CONCLUSION

These data provide a baseline of minor and severe injuries associated with youth baseball. This information should be useful in supporting efforts by the youth baseball community to generate interventions and evaluate the effectiveness of safety measures.

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