

# Catastrophic Sport-Related Injuries and Illnesses in High School and Collegiate Baseball Players, 2002-2022



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## INTRODUCTION

Baseball has been a very popular sport for many years and is often referred to as America's National Pastime. In the US alone, 19 million people participate in organized baseball in any given year, with 5 million of them under the age of 14 and including more than 400,000 high school and 20,000 collegiate participants.<sup>1</sup> It is often considered a safe sport because of it being a non-contact sport.<sup>2</sup> However that isn't always true, whether the mechanism of injury being hit by a ball, a bat, or running into another person or inanimate object.<sup>1</sup> The National Center for Catastrophic Sport Injury Research (NCCSIR) reports catastrophic injuries of all sports and includes catastrophic baseball injuries. The last study regarding catastrophic injuries in high school and baseball players was performed by Boden et al. and included data from 1982-2002. This study will examine data from 2002-2022 and will identify factors to reduce these injuries.

## PURPOSE

The purpose of this study was to describe the mechanisms and frequencies of catastrophic sport-related injuries and illnesses among college and high school baseball players.

## METHODOLOGY

- The NCCSIR conducts surveillance of catastrophic injuries and illnesses related to participation in organized sports in the US at collegiate, high school, and youth levels of play (<https://nccsir.unc.edu/>)
- NCCSIR categorizes a catastrophic injury as: fatal, nonfatal, and nonfatal with recovery. Sport-related injuries were considered direct or indirect, direct injuries resulting from participation in the skills of the sport and indirect injuries caused by a systematic failure as a result of exertion while participating in a sport activity
- We included catastrophic injuries and sport-related illnesses sustained during baseball play at the high school and collegiate levels for the years of 2002-2022.
- Outcomes of interest were described overall and by level of play (high school and college):
  - Mechanism of injury
  - Type of injury/illness between collegiate and high school
    - 1 = traumatic injury (direct)
    - 2 = exertional or medical condition (indirect)
    - 3 = non-sport related
  - Severity
    - Fatal
    - Disabling
    - Recovery

## RESULTS

- A total of 94 direct and indirect collegiate and high school baseball injuries and illnesses were reported to the NCCSIR between 2002 and 2022.
- The most common mechanism of injury between 2013-2022 was contact with apparatus or object (61%), followed by contact with player (31%), and then contact with ground/surface (8%). (Figure 1)
- Among high school events, injuries and illnesses occurred most frequently during competitions (37.7%) and practices (34.8%), while among collegiate level events, they occurred most frequently during competition (32%) and non-athletic activities (28%).

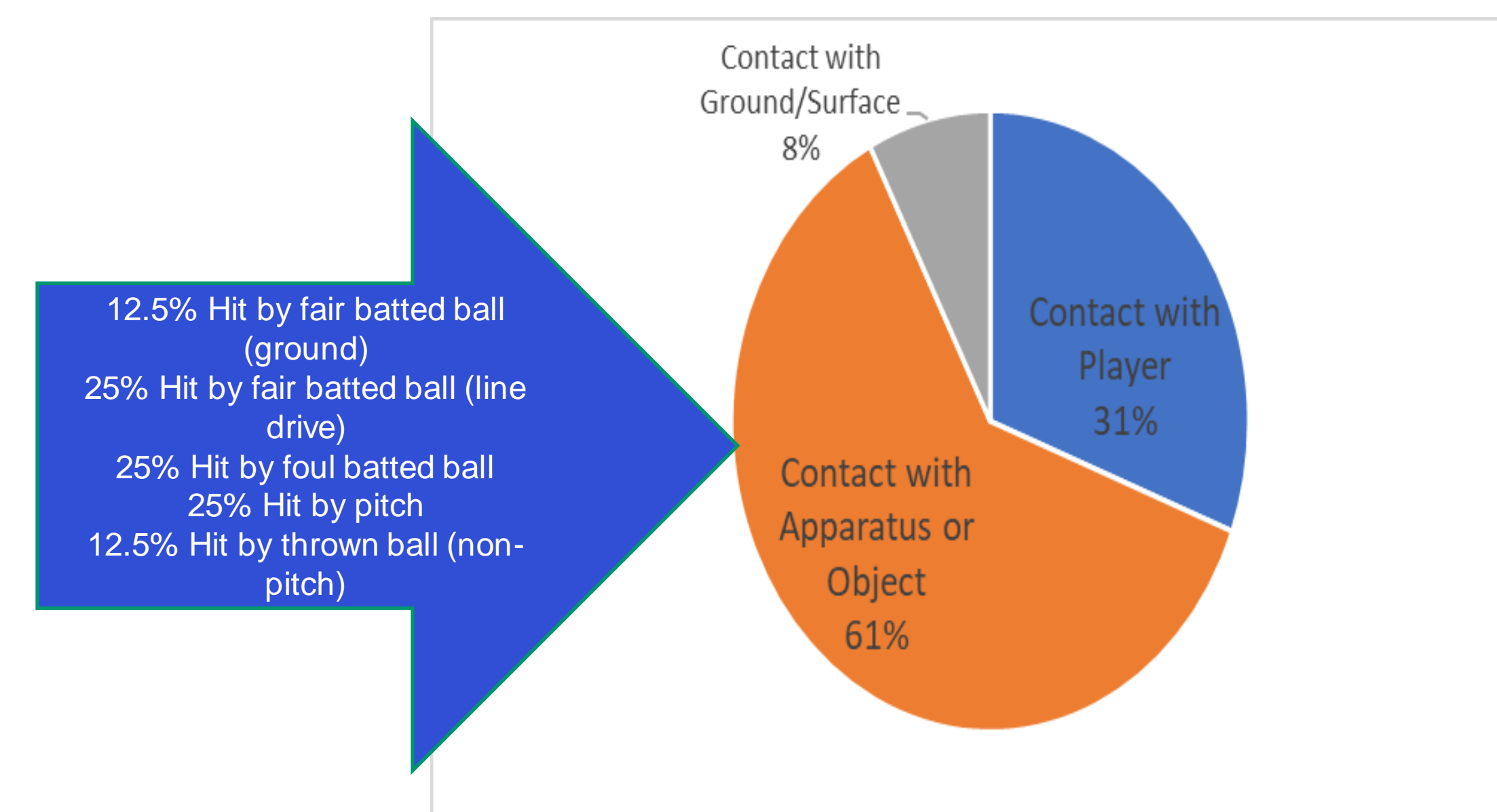


Figure 1: Crosstabulation of injuries by Specific and Basic Mechanism for direct injuries from 2013-2022 in the NCCSIR data

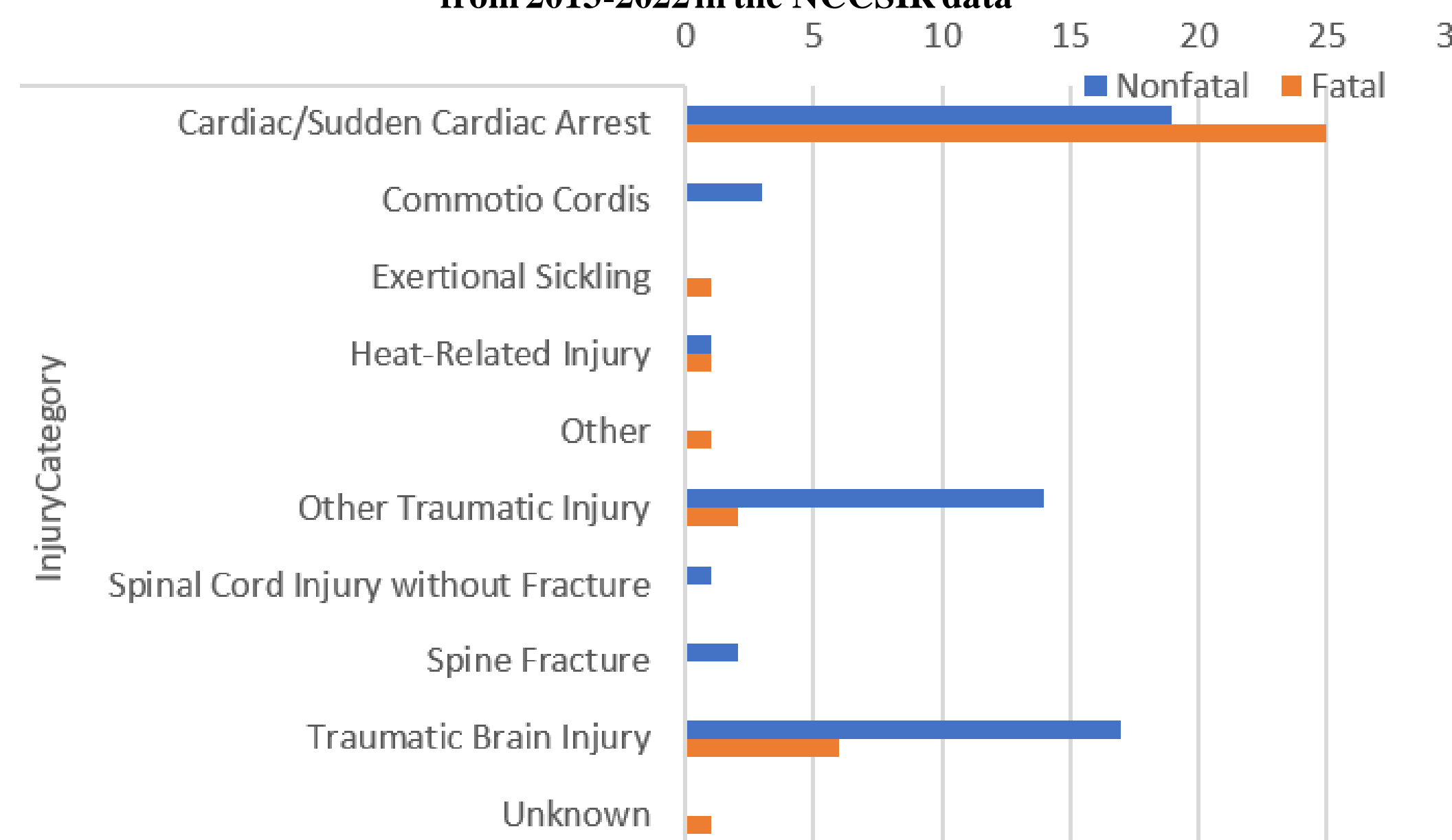


Figure 2: Crosstabulation of injuries by Injury Category and Fatality in the NCCSIR data

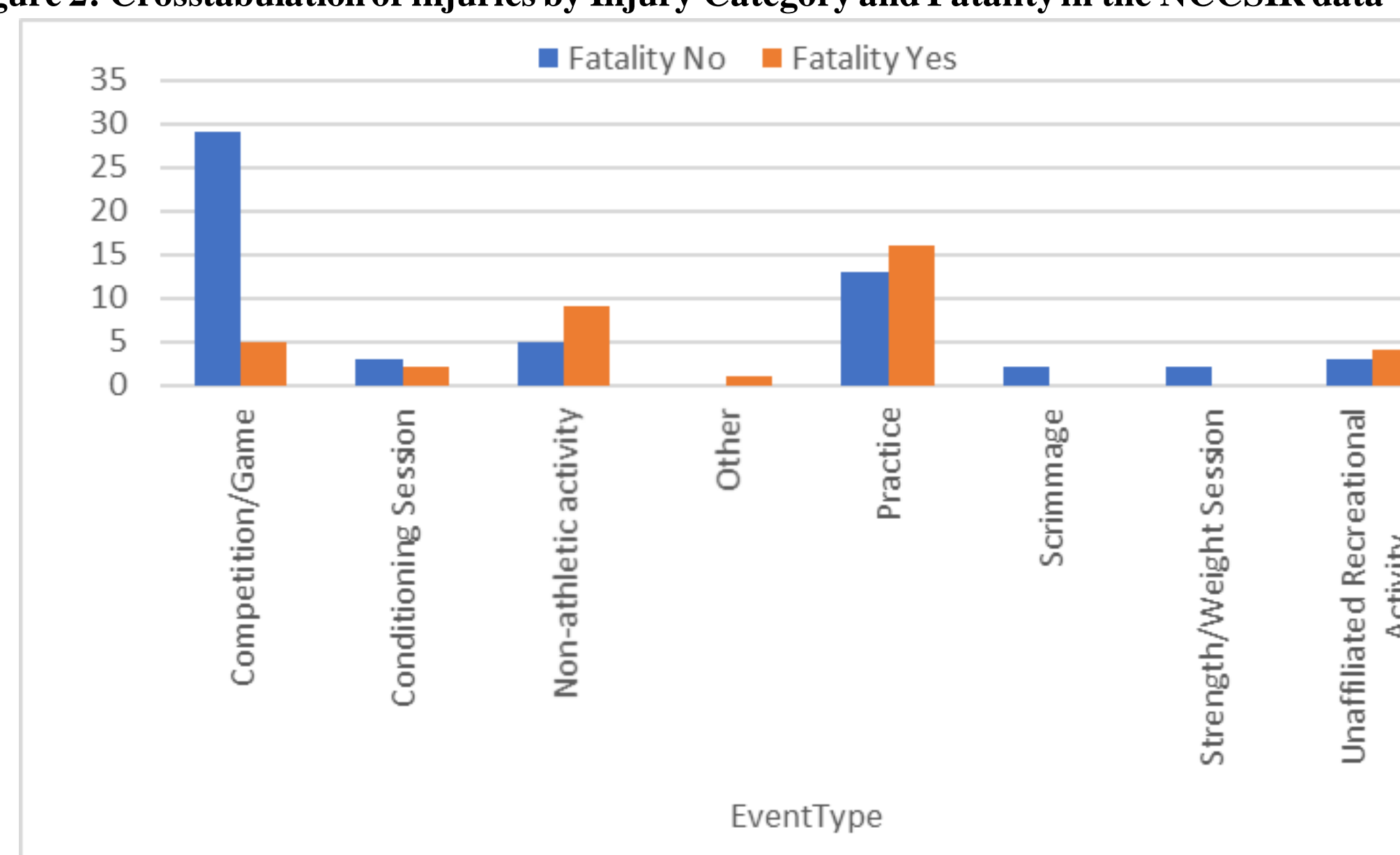


Figure 3: Crosstabulation of injuries by Fatality and Event type in the NCCSIR data

- Direct traumatic injuries had the highest occurrences of injury among collegiate (10) and high school (36) baseball players. (Table 1)
- 37 of the 94 injuries (39.4%) resulted in death with high school baseball players accounting for 78.4% of deaths.
- The most common cause of death was cardiac/sudden cardiac arrest which accounted for 62.2% of all fatalities, followed by traumatic brain injury (13.5%). (Figure 2)
- The greatest number of fatalities occurred during practice (43.2%) and non-athletic activity (24.3%) while the greatest number of nonfatalities occurred in competition. (Figure 3)

Direct/Indirect Injury	Collegiate (n)	%	High School (n)	%	Total (n)	%
1 (traumatic injury (direct))	10	40%	36	52.2%	46	48.9%
2 (exertional or medical condition (indirect))	8	32%	26	37.7%	34	36.2%
3 (non-sport related)	7	28%	7	10.1%	14	14.9%
<b>Total</b>	<b>25</b>	<b>100%</b>	<b>69</b>	<b>100%</b>	<b>94</b>	<b>100%</b>

Table 1: Crosstabulation of injuries by DIRIND and Player Type in the NCCSIR data

## DISCUSSION

- 24.3% of the injuries resulted in fatalities from this study in comparison to 24.4% from Boden's study conducted between 1982-2002, showing no change in the percentage of fatalities.
- Considering the fact that the majority of fatalities were caused by cardiac arrest, suggesting access to AEDs and training in CPR and AED use is critical and should be encouraged to reduce these fatalities.
- Many injuries were due to being hit by a ball, pitch and/or batted ball, future research is needed to decrease the risk of injuries due to these mechanisms.

## REFERENCES

- Tator CH. Catastrophic Injuries in Sports and Recreation: Causes and Prevention: A Canadian Study. Toronto: University of Toronto Press; 2008.
- Boden BP, Tacchetti R, Mueller FO. Catastrophic injuries in high school and college baseball players. *Am J Sports Med.* 2004;32(5):1189-1196. doi:10.1177/0363546503262161