Investigating the Distribution of Playground Injury Severities from Public School Surveillance Reports

Eric Kennedy[1] Heather Olsen[2] Zane Patterson[1,] Drew Filchner[1]
[1] Biomedical Engineering Department, Bucknell University
[2] Department of Health & Recreation, University of Northern Iowa

INTRODUCTION

American emergency departments treat an estimated 186,000 playground-related injuries annually among children aged 1-10, making them the most frequent recreational injury among children in this age range (Figure 1).

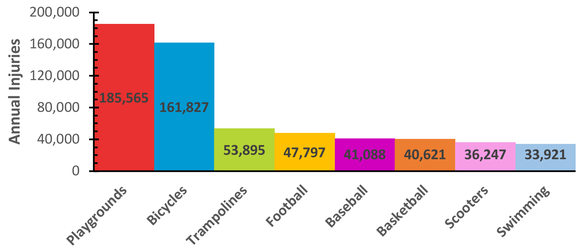

Figure 1: The top eight most common recreational injuries requiring emergency care among children aged 1-10 in the United States annually (Schwebel, 2014).

Playground injury studies have not accounted for injuries of lower severity due to their usage of emergency department data. In contrast to emergency departments, public school health departments treat injuries of all severity levels, many of which are playground injuries. This study was used a public school-sourced injury database to determine the frequency and severity of playground injuries in different areas of the body.

Figure 2: An example of an elementary school playground. The diversity of the play areas (hard surface playing courts, composite playground structure, open grass area) is typical of most school playgrounds.

METHODOLOGY

The database used to conduct this study came from a large American public-school district with over 190,000 students. Each school submitted injury data using an anonymous injury surveillance form over an 8-year period from 2010 to 2018. The subset of this injury data used for analysis came from September 2016 to June 2018. Injuries which occurred on playgrounds in this time period were filtered out of the larger database and analyzed. Four specific body areas were analyzed to determine the frequency and severity of playground injuries within them: the head and neck, the upper extremities, the lower extremities, and the trunk. The process by which injury categories were determined for analysis is shown in Figure 3.

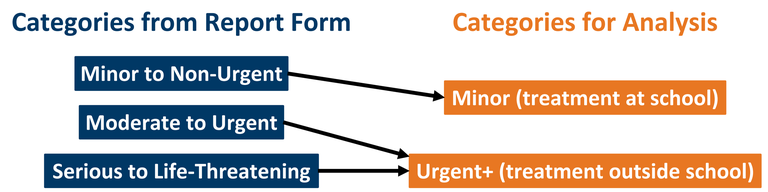

Figure 3: The process used to create the injury categories used for analysis from the injury categories on the report form.

RESULTS/DISCUSSION

In total, 15,870 injuries were reported in the school district during the 22-month time period, of which 17.7% occurred on playgrounds. In elementary schools, playground injuries comprised 25% of all injuries. This proportion was equivalent to classroom injuries (also 25%) and over double the rate of the next closest activity (physical education, 10%), despite dramatic differences in time exposure between the activities (Figure 4).

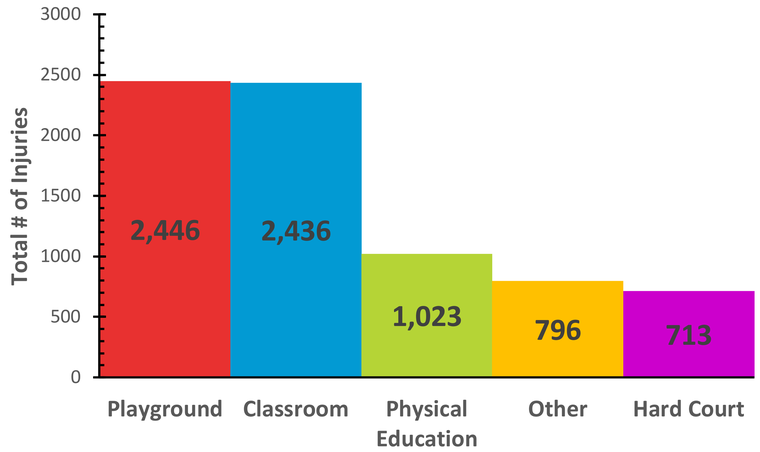

Figure 4: The top five most common locations where children were injured in elementary schools in the district, 2016-2018.

Head injuries comprised the majority (56%) of injuries suffered on playgrounds, nearly three times the incidence of any other location (Figure 5A). However, upper extremity injuries were twice as likely as injuries in other areas of the body to be of higher severity and require outside medical treatment; over one in five injuries of the upper extremities suffered on playgrounds required treatment at an external facility compared to approximately one in ten for other areas of the body (Figure 5B).

CONCLUSIONS

Impact attenuation standards for playgrounds have been focused on the management of head injury risk for quite some time. This is most likely due to the prevalence of head injuries on playgrounds compared to other injury types. However, the injury severity statistics suggest the need for further attention to the upper extremities (Figure 6) when it comes to impact attenuation, as the current standards do not account for injuries to the upper extremities to an appropriate level.

Figure 6: The severity of upper extremity injuries on playgrounds may indicate that impact attenuation standards need to reflect the upper extremities to a greater degree.

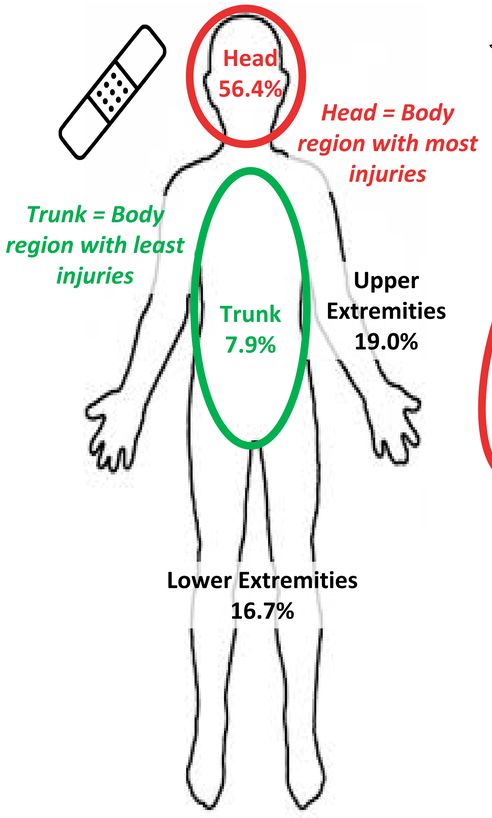

Figure 5A: Percentage of playground injuries in each body region (all injuries), 2016-2018.

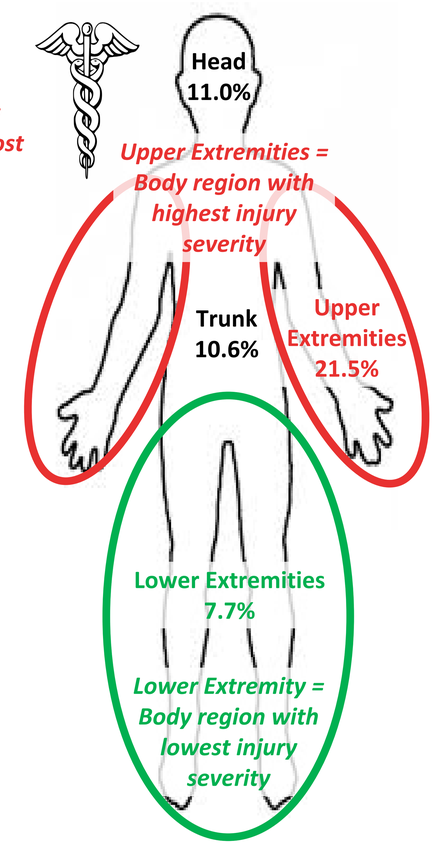

Figure 5B: Percentage of playground injuries in each body region which required outside medical attention, 2016-2018.

The high percentage of upper extremity injuries which required outside medical attention indicates that further injury surveillance is necessary to better understand the injury patterns and modalities of these injuries. Additionally, field test methods to evaluate surface impact attenuation should be modified or expanded to generate a better understanding of injury prevention strategies.

The breadth of information presented in the database allows for more widespread analysis of playground injury statistics. For example, the data could be used to determine which body regions were more likely to require hospitalization or ambulance transportation when injured, or to find out which schools had the highest number of injuries on playgrounds annually and whether injury counts in different schools stayed relatively constant from year to year or changed in some way. Coupled with the information already gathered from the database, additional research could be used to generate a specific protocol for addressing playground injuries in this district and in others.

ACKNOWLEDGEMENTS

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REFERENCES

1) Schwebel DC (2014). Athletic Training 49(6).
2) ASTM F1292-13 (2014).

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