Background

• Concussion in youth sports is a major public health concern.
• Approximately 144,000 youths are treated for a concussion in an emergency department each year in the United States.
• Youths’ developing brains may be more vulnerable to concussion-associated sequelae such as school absenteeism, reading disturbances, or neurobehavioral deficits.
• Little is known about concussion treatment disparities for youths seen in an emergency department (ED) setting.

Objective

The aim of this study was to explore the way that concussions are diagnosed, treated, and managed in youths seen in an ED setting with a focus on health disparities.

Methods

• An IRB approved retrospective ED chart review was performed at Thomas Jefferson University Hospital.
• The study period was from 2011 to 2015 and the sample population included youths between 4 and 21 years old presenting to the ED with a concussion. Table 1 describes the study sample.
• ICD-9 codes were used to define a concussion diagnosis.
• Predictive variables included estimated median household income, age, gender, race/ethnicity, insurance status, concussion mechanism, headgear status, number of symptoms, prior concussions, and mode of arrival to the ED.
• Outcome variables included discharge to a specialist or primary care provider, imaging, and prescription of medications.

Results

• 14% of cases sample were between 4 - 11 years old, 71% were 12 - 19 years old, and 14% were 20 - 21 years old, with a mean age of 16.
• Females comprised 42% of the sample.
• 55% of patients were white, 35% were African American, 7% were Asian, and 2% were Hispanic.
• 83% of the sample had health insurance.
• Table 1 describes the results of a univariate logistic regression.
• The most common symptom was headache (68%).
• 21% of patients reported a loss of consciousness.
• 96% of patients were discharged to their primary care provider, 18% to a specialist, and 8% to another provider.
• Three patients were admitted to the hospital.
• Acetaminophen and NSAIDs were the two most frequently prescribed medications (both 19%).
• Among patients with sports-related concussions, biking (33%), and football (15%) were the most frequently reported sports at time of injury. For details, refer to Figure 1.

Conclusions

• This study indicated that older youths, uninsured youths, and youths with three or more symptoms were more likely to receive a CT scan.
• Females and youths who were not wearing headgear were less likely to be discharged to a specialist, while youths with prior concussions were more likely to be discharged to a specialist.
• There were no racial or ethnic treatment disparities found in ED care for concussions in the sample population.
• Youths participating in biking activities were more likely to be seen in the ED for a concussion compared to other sports.

Table 1. Relationship Between Predictive and Outcome Variables

<table>
<thead>
<tr>
<th>Covariates</th>
<th>Discharged to Specialist OR (p value)</th>
<th>CT Scan OR (p value)</th>
<th>Prescribed Medications OR (p value)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Median Household Income (by Zip Code)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;$56,516</td>
<td>1.0</td>
<td>1.0</td>
<td>1.0</td>
</tr>
<tr>
<td>≥$56,516</td>
<td>1.37 (0.46)</td>
<td>0.84 (0.60)</td>
<td>0.67 (0.30)</td>
</tr>
<tr>
<td>Increasing Age</td>
<td>1.03 (0.57)</td>
<td>1.22 (&lt;0.001)*</td>
<td>1.03 (0.59)</td>
</tr>
<tr>
<td>Nonwhites</td>
<td>0.45 (0.08)</td>
<td>0.79 (0.52)</td>
<td>1.07 (0.85)</td>
</tr>
<tr>
<td>Females</td>
<td>0.21 (0.003)*</td>
<td>0.74 (0.41)</td>
<td>1.26 (0.54)</td>
</tr>
<tr>
<td>Uninsured</td>
<td>1.82 (0.25)</td>
<td>3.03 (0.03)*</td>
<td>0.77 (0.60)</td>
</tr>
<tr>
<td>Sports-Related Concussion</td>
<td>1.68 (0.21)</td>
<td>1.25 (0.53)</td>
<td>1.42 (0.34)</td>
</tr>
<tr>
<td>Three or More Symptoms</td>
<td>0.65 (0.37)</td>
<td>2.53 (0.02)*</td>
<td>1.10 (0.80)</td>
</tr>
<tr>
<td>No Headgear</td>
<td>0.29 (0.03)*</td>
<td>0.58 (0.34)</td>
<td>0.48 (0.19)</td>
</tr>
<tr>
<td>Prior Concussion</td>
<td>5.87 (0.01)*</td>
<td>1.58 (0.50)</td>
<td>1.08 (0.91)</td>
</tr>
<tr>
<td>Mode of Arrival to ED</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Walked In</td>
<td>1.0</td>
<td>1.0</td>
<td>1.0</td>
</tr>
<tr>
<td>Ambulance</td>
<td>1.39 (0.48)</td>
<td>2.02 (0.09)</td>
<td>1.13 (0.76)</td>
</tr>
</tbody>
</table>

*Significant results

Figure 1: Sports-Related Concussions

28% Football
13% Baseball
33% Soccer
11% Biking
15% Other

Contact

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Acknowledgements