

Sports-Related Concussions among Massachusetts Youth

Injury Surveillance Program, Massachusetts Department of Public Health

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Understanding Concussions among Youth

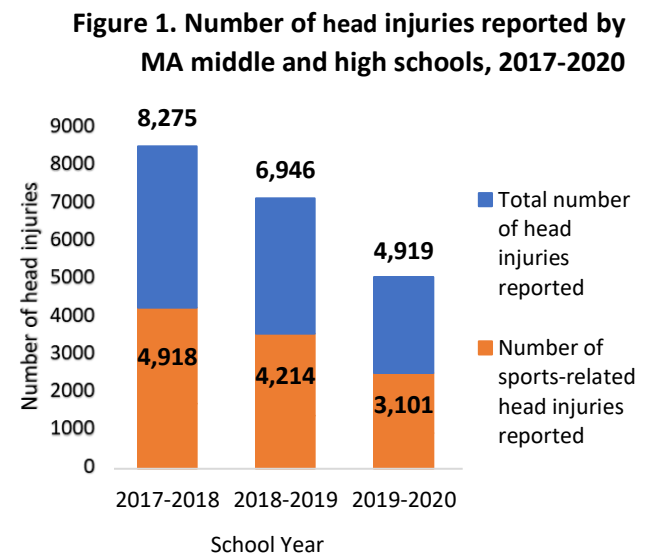
A concussion is a type of traumatic brain injury (TBI) caused by a bump, blow, or jolt to the head or body that causes the head and brain to move rapidly back and forth. This sudden movement can create chemical changes in the brain and sometimes damage brain cells. Although concussions are usually not life-threatening, the effects of a concussion can cause serious long-term disability, such as memory, learning, motor control, and/or speech problems.

According to the Centers for Disease Control and Prevention (CDC), an estimated 283,000 children seek care in U.S. emergency departments (ED) each year for a sports- or recreation-related traumatic brain injury (SRR TBI)¹. The top five most frequent activities contributing to ED visits for sports injuries between 2010 and 2016 were football (14.1%), basketball (12.5%), pedal cycling (9.9%), soccer (7.1%), and ice or roller skating or skateboarding (6.9%)².

Among Massachusetts (MA) Youth³: 4,900 visit the ED each year on average for SRR TBI (327.7 per 100,000)
103 are hospitalized each year on average for SRR TBI (6.9 per 100,000)

Prevalence of Concussions in MA Middle and High Schools

- In 2017-2018, MA high schools reported an average rate of 26 head injuries per 1,000 students enrolled. MA middle schools reported an average rate of 15 head injuries per 1,000 students enrolled.
- Figure 1 illustrates a decrease in the number of head injuries from 2017-2018 to 2018-2019. However, the distribution of sports-related head injuries remained similar each year: approximately 60% of the total head injuries reported by schools were sports-related.
- There are limitations to the data captured in 2019-2020. In March 2020, MA issued stay-at-home orders due to the Novel Coronavirus disease outbreak (COVID-19). Since extracurricular activities were cancelled for the remainder of the year, data from 2019-2020 does not represent head injuries reported in a typical school year.



Source: Year End Reporting Form 2017-2020

Prevalence of Sports-Related TBI Symptoms and Actions Taken

The Massachusetts Youth Health Survey (YHS) assesses youth experiences of sports-related TBI symptoms. Public middle school and high school students are asked if they have experienced symptoms of a TBI/concussion associated with a blow or jolt to the head while playing on a sports team in the last year, and if so, what actions were taken.

- In 2019, 15% of middle school and 12% of high school students reported symptoms of sports-related TBI.⁴

¹ Sarmiento K, Thomas KE, Daugherty J, et al. Emergency Department Visits for SRR TBI Injuries Among Children – U.S., 2010-2016. MMWR Morb Mortal Wkly Rep 2019; 68:237-242. DOI: <http://dx.doi.org/10.15585/mmwr.mm6810a2>

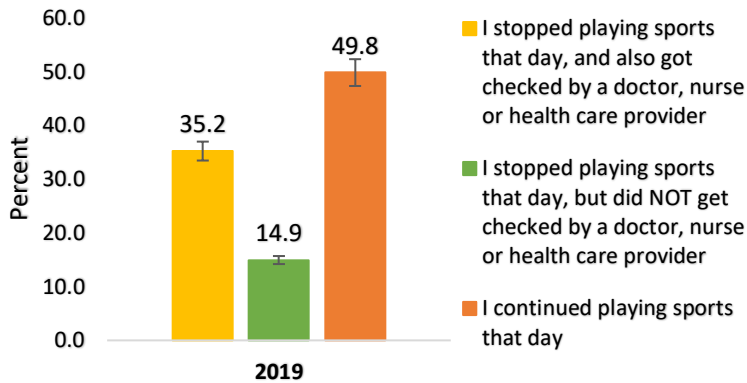
² Rui P, Ashman JJ, Akinseye A. Emergency department visits for injuries sustained during sports and recreational activities by patients aged 5–24 years, 2010–2016. National Health Statistics Reports; no 133. Hyattsville, MD: National Center for Health Statistics. 2019.

³ Statewide counts and rates are identified from MA Inpatient Hospital Discharge, Outpatient Observation Stay, and Emergency Department Discharge databases, FY 2016-2018. The definition of statewide head injuries includes youth ages 0-18 who were residents of Massachusetts at the time of injury.

⁴ Percent calculated from MYHS data do not include missing responses. MYHS data are self-reported, voluntary, cross-sectional, and from a sample of public school students. Students in private schools, state custody, or other educational settings are not represented. Students who have severe limitations or disabilities, or who are often absent from school may be underrepresented. Statistical significance set at the 95% level.

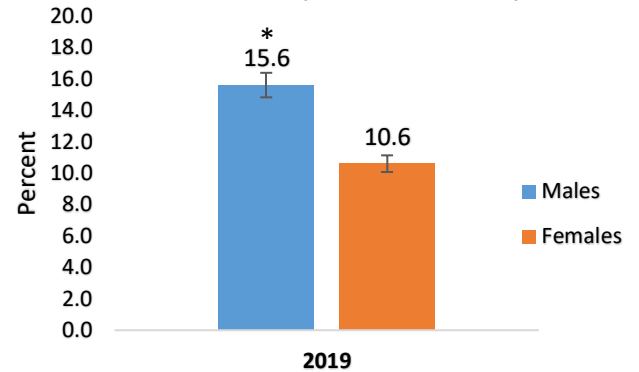
- 50% of students who reported symptoms of a sports-related TBI said they continued to play sports that day (Fig. 2).⁴
- Males had 1.4 times the odds of reporting symptoms of sports-related TBI compared to females (Fig. 3). No statistical differences were observed among race/ethnicity groups.⁴

Figure 2. Actions reported by middle and high school students following symptoms of a sports-related TBI in past 12 months



Source: Massachusetts Youth Health Survey 2019

Figure 3. Percentage of middle and high school students who reported symptoms of a TBI while playing sports in past 12 months, by sex, 2019



*Significantly different

Source: Massachusetts Youth Health Survey 2019

Strategies and Recommendations

- Schools should create a safe sport culture that guards against concussions by enforcing rules of play.
- School staff, parents, medical providers, and other students should support student athletes in reporting concussion symptoms, sitting out from play after experiencing symptoms, and recovering fully from a concussion.
- Each year since 2017, schools have reported an average of 6,713 head injuries and 4,078 sports-related head injuries. Schools subject to the MA Sports Concussion Regulation (105 CMR 201) should support concussion surveillance efforts by submitting mandated Year End Reporting data.

Resources and Related Publications

MDPH Injury Prevention and Control Program

❖ www.mass.gov/sportsconcussion

CDC Heads Up

❖ www.cdc.gov/headsup/index.html

HeadSmart

❖ The South Shore Hospital has a recovery protocol called [HeadSmart™, A Healthy Transition After Concussion](#) and is a recovery protocol developed by physicians and school nurses to facilitate a student's healthy return to school and sports following a concussion.

The Brain Injury Association of America (BIAA)

❖ <https://www.biausa.org/>

Massachusetts Sports Concussion Regulation (105 CMR 201):

Passed in 2011, the *Head Injuries and Concussions in Extracurricular Activities* regulations apply to all public middle and high schools with grades 6-12 that provide extracurricular sports activities. They also apply to other schools subject to rules of the Massachusetts Interscholastic Athletic Association (MIAA). The regulations mandate:

- ❖ Schools and school districts must have policies governing the prevention and management of concussions.
- ❖ School staff, students, and parents must take an annual training on sports-related concussions.
- ❖ Student athletes prior to every sports season must fill out and submit the Pre-participation Form.
- ❖ Any student showing signs and symptoms of a concussion must be removed from play immediately, may not return to practice that day and must be medically evaluated before returning to play.
- ❖ Every student who is diagnosed with a concussion must have a graduated "Return to Play" plan and must not return to practice until he or she is medically cleared.
- ❖ The medical providers authorized to perform medical clearances—physicians, licensed athletic trainers, nurse practitioners, physician assistants, and neuropsychologists—must verify that they have received MDPH-approved training in post-traumatic head injury management.

⁴ Percent calculated from MYHS data do not include missing responses. MYHS data are self-reported, voluntary, cross-sectional, and from a sample of public school students. Students in private schools, state custody, or other educational settings are not represented. Students who have severe limitations or disabilities, or who are often absent from school may be underrepresented. Statistical significance set at the 95% level.