



WHAT IS A CONCUSSION?

A concussion is an injury caused by direct or indirect force to the brain precipitating a disruption of brain function accompanied by a range of symptoms and signs of altered cognitive function. Though the symptoms of concussion can vary, typical symptoms are headache, imbalance, dizziness, memory loss, cognitive slowing, photosensitivity, fatigue, and concentration difficulties.

KEY POINTS

- The prevalence and negative consequences of sports-related concussions (SRCs) have led the Centers for Disease Control and Prevention (CDC) to consider SRC a major public health problem among children and young adults.
- Studies have shown that state-level helmet and concussion laws result in a higher diagnosis rate for concussions and increased helmet use in children.
- Research indicates that the highest risk of concussion is among the youngest athletes, *but Mississippi law only applies to school athletic events in grades 7-12* and does not cover recreational sports.
- Mississippi law does not address return to learn (RTL) protocols that make accommodation to help return children to the classroom after suffering a concussion.
- Research indicates sports-related concussions SRCs are under-reported, and Mississippi law does not require reporting for SRCs.

Sports-related injuries are one of the most common causes of concussion in children and young adults. Outcomes associated with concussion are cognitive and behavioral issues that can be disruptive to a child's life and ability to learn. Long-term impacts of concussions have been linked with slower recovery, persistent cognitive impairment, chronic traumatic encephalopathy (CTE), and chronic neuropsychiatric symptoms such as depression. Concussion symptoms typically resolve within seven to ten days post-injury, with full recovery in most cases occurring within three months. In some cases recovery can last over three months up to several years. However, prior concussions have been linked with subsequent concussions indicating susceptibility to repeat injury, especially during recovery. If not identified and managed, concussion can lead to brain swelling, permanent brain damage, and even death.

Impact on Children and Young Adults

WHAT IS SECOND IMPACT SYNDROME?

Second Impact Syndrome occurs when a second concussion happens before a first concussion has properly healed causing rapid and severe brain swelling. This can occur days or weeks after the first concussion.

Research indicates that the impact of concussions on children is severe given that their brains are still developing, making them more susceptible than adults to repeat injuries. The symptoms and long-term impacts of concussions have been shown to impair children academically. According to the CDC, concussion rates among children ages 10-19 increased by nearly 100,000 in 2009 compared with 2001. According to the Youth Risk Behavior Survey, SRCs affected about 2.25 million high school students in 2017. These numbers are likely underestimated given that reported data frequently does not capture injuries that would have qualified as a concussion if medical attention had been received. As of 2015, 113,136 children and young adults were participating in high school athletics in Mississippi. In the state, between 2015 and 2018 4,900 concussions were diagnosed in a clinical setting for children ages four to 19.

The highest risk sports for concussion are basketball, soccer, lacrosse, baseball and softball, football, cheerleading, ice hockey, and horseback riding. Interventions such as helmets have been found to have a significant impact on mitigating severe

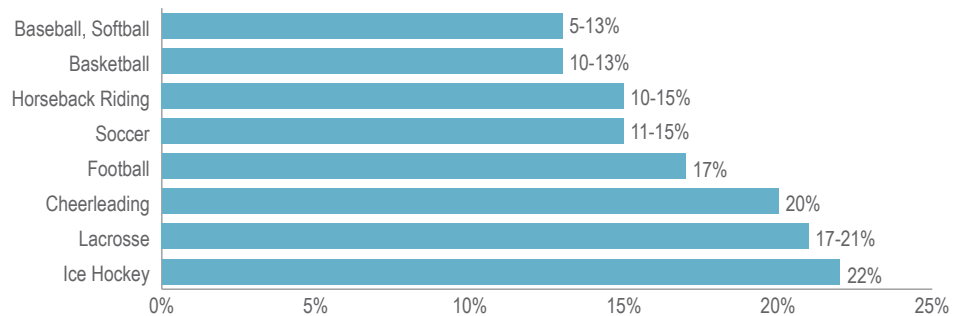
A recent survey among Mississippi 4-H horse show participants found that when asked whether minors should have to wear a riding helmet in Mississippi anytime they are mounted on a horse on public property respondents indicated an average favorability of 2.67 out of 5.



Concussions comprise 91% of reported head injuries related to horseback riding.

traumatic brain injury (TBI) in sports like horseback riding, demonstrating a 96% risk reduction for intercranial bleeding associated with wearing a helmet. Currently, Mississippi’s concussion law does not address horseback riding and Mississippi does not have a law specifically requiring the use of a helmet when riding on public property or at public events.

FIGURE 1: CONCUSSION RATES BY SPORT AMONG HIGH SCHOOL AGED PARTICIPANTS



**Note: Rates indicate percentage of total injuries for each sport. Marar M., McIvain N.M., et al. (2012). Epidemiology of Concussions Among United States High School Athletes in 20 Sports. The American Journal of Sports Medicine, 40(4): 747-755; Zuckerman S., Morgan C., et al. (2015). Functional and Structural Traumatic Brain Injury in Equestrian Sports: A Review of the Literature. World Neurosurgery 86 (6):1098-1113.*

■ Legislation and Policy Covering Sports-Related Concussion

WHAT IS “RETURN TO PLAY?”

Return to play (RTP) guidelines are a preventative measure focus on the standardization of regulations for sports organizations. Many require coaches, parents, and athletes to be educated on concussions.



WHAT IS “RETURN TO LEARN?”

Return to Learn (RTL) guidelines are measures that focus on total cognitive and physical rest to ensure the concussed athlete is symptom free before returning to full coursework.

Identifying concussions quickly is important because the risk of repeat concussions is greatest in the first 24 hours post-injury.

Legislation has been a long-standing effective way to institute protections for children from sports-related TBI since the 1990’s when states began to implement bicycle helmet laws. A study conducted in San Diego an average 84% rate increase in helmet use among children after passage of a helmet law. After Wisconsin’s sports-related concussion law was passed in 2012 a study found that over half of the students who were aware of the law said the law would make them more likely to report a concussion. States with sports concussion laws demonstrate a 10% higher health care utilization rate for diagnosed concussions than states without concussion laws. The American Academy of Pediatrics cites concussion laws as having a positive impact by increasing the reporting of symptoms and decreasing instances in which athletes are allowed to return to play after exhibiting symptoms of concussion.

Overview of State-Based Approaches to Sports Concussion Laws

Since 2007, all 50 states have enacted legislation to address youth sports-related concussions. As of 2017, over half of states require educational training for coaches, parents, and students on concussion recognition and awareness. Most states require a medical professional to examine and clear a player before they can return to play. Over half of states have specific return to play (RTP) guidelines. Most state laws have RTP restrictions which set a minimum length of time for how long an athlete must wait before returning to activity based on testing by a healthcare professional and require the athlete to be free of all symptoms. As a part of RTP guidelines, the CDC recommends baseline testing of all athletes to assess balance, brain function, and presence of concussion symptoms prior to the start of an athletic season. Currently, four states have baseline testing as a component of their RTP guidelines.



The National Football League (NFL) and National Collegiate Athletic Association (NCAA) have adopted concussion protocols based on scientific research published by medical professionals as part of the recommendations from the International Conference on Concussion in Sports (ICCS). Several other medical professional associations such as Society of Sports Medicine, National Trainers Athletic Association, American Academy of Neurology, and American Academy of Pediatrics have adopted similar positions to the ICCS.

UTILITY OF ATHLETIC TRAINERS

Only 53% of athletes who sustained a sports-related concussion at schools with low trainer availability underwent return to play protocols, compared to 100% at schools with high athletic trainer availability.

Another common policy instituted among states focuses on athletes returning to school, often referred to as return to learn (RTL) guidelines. The accommodations offered by schools vary, but typically include reduced class time, modification of curriculum, and monitoring by academic staff. Presently, 12 states have laws that require a return to learn policy.

The CDC and American Medical Society for Sports Medicine recommend laws that include all sports and children of all ages. To date, 26 states have expanded their concussion laws to cover recreational sports, broadening the protective effect of their laws beyond school-based sports. Research indicates that the highest risk of concussion is among the youngest athletes, but only half of state concussion laws applies to all grades (K-12).

Most state laws do not have specific enforcement mechanisms, but do have provisions that specifically grant immunity for medical professionals treating injured athletes and others responsible for making decisions about whether an athlete can return to play. However, Oklahoma recently passed legislation under which game officials and team officials could face incremental penalties ranging from extra training to suspension for not removing an athlete from a game if suspected of a concussion in accordance with the current law.

A recent study found that athletes at high schools with high athletic trainer availability were more likely to be diagnosed with a sports-related concussion than athletes at schools with low athletic trainer availability. Several states have explored having athletic trainers present at all high school sporting events to increase concussion identification. Arkansas and North Carolina recently developed a task force to look into how to increase the number of trainers available to provide services in the state and Oklahoma's State Board of Health supported a resolution to make athletic trainers available to all high schools in the state.

Mississippi's Sports-Related Concussion Law

EDUCATION FOR COACHES

According to the Mississippi High School Activities Association (MHSAA) School Safety Protocols all head coaches are required to take a concussion course under the National Federation of State High School Associations (NFHS) curriculum.

Mississippi sports-related concussion law does the following:

- Requires each local school board, administration of private schools, and governing bodies of charter schools to adopt a policy on concussion management and return to play policy.
- Requires removal of an athlete from play for one day if they display any symptoms or signs of concussion, and prevents the athlete from returning to play or practice until symptoms have fully resolved and they have been cleared by a health care provider.
- Requires parents to receive and sign a copy of the school's concussion policy.
- Applies to school athletic events for grades 7-12.
- Provides immunity regarding concussion protocol enforcement for private and public schools, school employees, health care providers, school and school district membership organizations and associations, private clubs, public recreational facilities, and athletic leagues.

Discussion

Legislation has a significant impact on the likelihood of athletes disclosing a possible concussion, getting patients to go to concussion clinics earlier, and speed of recovery. Mississippi's concussion law does not currently address or apply to: children not between 7th and 12th grades; concussion education for athletes; recreational sports, baseline testing; appropriate equipment for all sports where concussion is a risk; implementation of return to learn guidelines that prioritize returning to the classroom before returning to play; require reporting of incidences of concussions; safe play rules; or athletic trainer availability.

Most of the gaps in Mississippi's policy approach to concussions could be filled with minimal financial expenditure or resource allocation. For example, changing the law to apply to children of all ages and recreational sports would cover the most at-risk population, regardless of whether they are participating in scholastic-based sports or recreational leagues, at minimal cost to the state. Other policy changes, such as mandated reporting could be accomplished with current resources. Making athletic trainers available for all high school athletic events would likely require state expenditure and should be weighed against the research showing trainers are a valuable resource to help identify concussions.

An important question is how to enforce the state's concussion law. States like Oklahoma and Arkansas have provisions in their laws requiring enforcement, but these states are the minority. All states provide immunity for those responsible for carrying out the law but states struggle to decide how to mandated adherence. Most states have chosen the option of continually updating their concussion laws to what best fits their state, whether it involves enforcement or adding a provision that mitigates the need for enforcement by creating policies needed to effectively prevent injury.

A SIGNIFICANT PUBLIC HEALTH ISSUE
Medical professional organizations such as the National Academy of Medicine, American Medical Society of Sports Medicine, National Trainers' Athletic Association, American College of Sports Medicine, American Academy of Neurology, and American Academy of Pediatrics support the Center for Disease Control and Prevention's assessment that youth SRC is a significant public health issue.

Sources

A full list of sources can be found [here](#).



Center for Mississippi Health Policy

Plaza Building, Suite 700
120 N. Congress Street
Jackson, MS 39201

Phone 601.709.2133
Fax 601.709.2134

www.mshealthpolicy.com
@mshealthpolicy