

Prevention, Recognition and Management of Sports-Related Concussions Among Youth

Safe States Alliance Supports Efforts to Prevent Sports-Related Concussions Among Youth.

Safe States Alliance supports the following recommendations to prevent and minimize the short-term and potentially serious, long-term health consequences of one or multiple concussions among young athletes of elementary school- through college-age in the U.S.

FUNDING AND CAPACITY

- **Seek appropriate additional funding for the Centers for Disease Control and Prevention’s (CDC) National Center for Injury Prevention and Control** to continue to address the prevalence of concussions in youth athletes.
- **Increase funding for, and strengthen capacity of, national, state and tribal agencies** to reduce youth sports-related concussions through expanded and improved capacity to plan, implement, monitor, and evaluate youth sports-related concussion prevention programs and policies.

SURVEILLANCE

- **Support CDC’s efforts to establish and oversee a National Concussion Surveillance System** for the incidence of TBIs, including sports-related concussions for elementary school through college-age youth.
- **Strengthen and improve the capacity of state, tribal and local health agencies to document, code and report** sports-related concussions among youth. Data sources may include:
 - National injury data bases managed by the National Center for Health Statistics and CDC;
 - State hospitalization and emergency department visit databases, and state trauma registries;
 - Tribal databases managed by individual American Indian Tribes or the Indian Health Service;
 - Payer claims data and/or electronic health records; and/or
 - Special, population-based databases for concussion injuries.

PRIMARY AND SECONDARY PREVENTION

- **Promote wide-spread adoption of effective prevention strategies**, including primary prevention (e.g., beliefs, attitudes, social norms) and secondary prevention (e.g., increasing awareness of concussion signs and symptoms, promoting concussion recognition and quick, appropriate response) of youth sports-related concussions.
- **Promote a change in the culture of youth sports** that promotes the primary prevention of concussions, including:
 - Using protective equipment;
 - Changing rules to better promote safety;
 - Coaching safe, sports-specific skills and banning or limiting the use of certain drills or techniques;
 - Promoting fair play policies (expect, model and reinforce safe and fair play);

- Promoting the belief that concussions are serious injuries that should be reported by athletes, coaches, parents, and/or health care providers; and
 - Changing the way concussions are talked about so athletes know they cannot continue to play with a concussion or hide their symptoms.
- **Promote effective and standardized concussion prevention, recognition and management education and training**, including:
 - Promote the free, online and tailored education and training resources available through [CDC's Heads Up](#) concussion prevention toolkits.
 - Ensure outreach and education efforts target all the key individuals involved, including athletes, parents, coaches, school administrators, athletic directors, teachers, athletic trainers, physicians, and other health care providers.
 - Promote standardized training at national, state, tribal, and local levels among the above audiences for the prevention, recognition, and management of youth sports-related concussions.

CONCUSSION LAWS, PROTOCOLS AND REGULATIONS

- **Promote greater standardization of evidence-based youth sports-related concussion laws, protocols and/or regulations** at state, tribal and local levels.
- **Promote the inclusion of physical, cognitive *and* emotional rest in concussion management protocols** to reflect current recommendations on Return to Play and Return to Learn.
- **Improve the effective implementation of youth sports-related concussion laws, protocols and regulations by:**
 - Ensuring all stakeholders required for full implementation of concussion laws, protocols or regulations are involved in implementation planning and are included in outreach, education and training efforts;
 - Improving state, tribal and local surveillance of the implementation of, and compliance with, current concussion laws, protocols or regulations;
 - Ensuring data collected to assess compliance and monitor implementation does not place an excessive burden on the policy implementers, coaches, school/league administration, and/or the student athletes and their families;
 - Considering incentives and supports for compliance, such as technical assistance to schools on successful implementation of and compliance with the law and/or regulation.

EVALUATION AND RESEARCH

- **Support continued national and state level evaluation and/or research to:**
 - Determine the efficacy and impact (both intended and unintended) of current concussion laws, protocols and regulations, including Return to Play and Return to Learn;
 - Identify best practices for implementation of these laws, protocols and regulations; and
 - Explore the expansion of regulations to youth sport populations not currently covered under current state laws, protocols or regulations.

BACKGROUND

OVERVIEW OF TRAUMATIC BRAIN INJURIES/CONCUSSIONS

A concussion is a type of traumatic brain injury (TBI) “caused by a bump, blow, or jolt to the head or by a hit to the body that causes the head and brain to move rapidly back and forth. This sudden movement can cause the brain to bounce around or twist in the skull, stretching and damaging the brain cells and creating chemical changes in the brain.”¹ Most TBIs – about 75% – are concussions and other forms of “mild” TBI, where there is only a brief change of mental status or consciousness.² However, the effects of even a mild TBI can be serious, including impaired thinking or memory, movement, sensation (e.g., vision or hearing), emotional functioning (e.g., personality changes, depression). Concussions can have short- and long-term impact on individuals, their families and communities.² The National Association of School Psychologists suggests that a concussion should be viewed as both a short-term and potentially long-term process where primary and secondary brain injury occurs, rather than as a brief, point-in-time occurrence.³

SPORTS- and RECREATION-RELATED CONCUSSIONS and TBIs

In 2012, an estimated 329,290 children (age ≤ 19) were treated in U.S. emergency departments (EDs) for sports- and recreation-related injuries that included a diagnosis of concussion or TBI. During 2001-2012, about 70% of all ED visits for sports- and recreation-related TBIs occurred among persons age ≤ 19 . During this same period, the rates of sports and recreation-related TBI ED visits per 100,00 population increased significantly for all age groups, and among both males and females age ≤ 19 . Reasons for these increases may include an increased knowledge of the importance of early diagnosis and management of mild TBI among healthcare providers, sports coaches, parents, and the public.⁴

Sports- and recreation-related TBI ED visits varied by age group and sex during 2001-2012. For males and females age ≤ 9 , these TBIs occurred frequently during bicycling and playground activities. For youth age 10-19, males sustained TBIs most often while bicycling or playing football, while females sustained these TBIs most often while playing soccer and basketball.⁴

Repeat concussions can have dire consequences. For example, when multiple concussions occur over months or years, cumulative cognitive and neurological deficits can occur.⁵ Other consequences include the “second impact syndrome”, which occurs when an athlete who has sustained a head injury returns to play and sustains a second concussion before symptoms from the initial head injury have fully cleared. This second impact concussion can result in significant brain damage or death.^{6,7}

To improve TBI surveillance, CDC is working to establish and oversee a National Concussion Surveillance System to accurately determine how many children, youth and adults get a concussion each year and how the injury happened. This system will provide the first national estimates of numbers of sports-related concussion among youth (elementary school- through college-age) that occur both in and outside of organized sports.⁸

PRIMARY AND SECONDARY PREVENTION

Sports-related concussion prevention, recognition and management among children and youth requires a combination of primary and secondary prevention strategies. Laws and protocols addressing youth sports-related concussions are also prevention strategies, and are addressed in a section below.

Primary prevention strategies to reduce the incidence, severity and negative health effects of concussions among children and youth include⁹:

- Increasing awareness of TBI risks from sports and recreation;

- Employing proper technique and the use of protective equipment; and
- Promoting and following game rules, good sportsmanship and strict officiating.

Secondary prevention strategies after a concussion has occurred include⁹:

- Increasing awareness of TBI signs and symptoms;
- Promoting how to recognize suspected TBIs;
- Responding quickly and appropriately to suspected TBIs, including removing the athlete from play, never returning to play the same day, and returning to play only after being evaluated and cleared by a health care provider trained in TBI diagnosis and management; and
- Following recommendations for physical, cognitive *and* emotional rest in concussion management protocols to allow for gradual Return to Play *and* Return to Learn to promote full recovery.

Concussion education and recognition are essential for improving the care of athletes with concussions, and this education should target a broad range of stakeholders (e.g., athletes, parents, coaches, school administrators, athletic directors, teachers, athletic trainers, physicians, and other health care providers).¹⁰ CDC's free HEADS UP concussion toolkits are examples of prevention education targeting these diverse audiences through tailored, online education and training resources.¹¹

Prevention challenges

While progress has been made in promoting, implementing and, in some cases, evaluating the prevention strategies described above, many challenges remain, particularly in concussion knowledge and awareness, and in the culture of sports.¹²

– Knowledge and awareness

Knowledge and awareness of concussions risk, recognition and management is increasing in the U.S., but research indicates that too many young athletes still do not report their concussion symptoms, are not removed from play and continue to play with symptoms, or return to play too soon.^{13,14,15,16,17,18,19} Young athletes and their parents may not be familiar concussion signs and symptoms, nor with state concussion laws or school or league protocols guiding when a child can return to learn and/or play.^{20, 21} Coaches may not be able to recognize the more subtle signs of a concussion, nor understand the importance of managing both athletic and cognitive activities following a concussion.^{12, 22,23} Health care providers may not have adequate concussion training and may not use evidence-based and standardized assessment tools and guidelines.^{24,25,26}

– Sports culture

The concussion-related views and actions of a young athlete are influenced by a “sports culture” that is created and influenced by parents, coaches, teammates, spectators, and the athletes themselves. This culture is created in part by how parents and coaches talk about what is acceptable or unacceptable for the team, and how to follow safe play and rules of the sport. This culture influences concussion reporting and management by both the athlete and the coach.¹¹ When young athletes receive positive messages about reporting a concussion from their coach, they are more likely to report concussion symptoms correctly.¹²

LAWS, PROTOCOLS AND REGULATIONS

Many states, schools, and sports leagues and organizations have responded to the problem of sports-related concussions among children and youth by creating concussion laws, protocols and/or regulations for youth and high school sports. Since 2009, when Washington State passed the first state law to

require young athletes to be removed and cleared before returning to play, legislation addressing youth sports-related concussions in school sports – typically referred to as “Return to Play” laws – has been enacted in all 50 states and the District of Columbia. The intent of most of these laws is to raise awareness about youth sports-related concussions among students, parents, coaches, and other school personnel; address concussion management in youth athletics; and prevent the adverse short- and long-term health consequences of concussions.²⁷ In addition, national athletic trainer and school sports associations have published comprehensive best-practice guidelines and position statements for concussion management and return to play and learn.^{28,29}

The requirements of “Return to Play” laws vary but typically include some combination of the following³⁰:

- Mandatory removal from play
- Mandatory bench times
- Required medical clearance
- Required training/education for coaches, parents, and athletes
- Informed consent of parents and athletes

Law, protocol and regulations challenges

Despite the nationwide existence of concussion laws, protocols and regulations, these policies often need improvements in content and scope, implementation, monitoring, and compliance.

– Variable or limited content/scope

Initiatives such as CDC’s Heads Up program have communicated what is needed to meet recommended sports-related concussion prevention, recognition and management requirements. However, some state and local protocols have included conflicting recommendations, lacked a scientific base or clinical evidence, and/or reflected potential conflicts of interest.³ The scope of existing laws and protocols also varies, as many apply only to school-based sports or those that practice on school grounds, and not to recreational or other organizational sports leagues for children and youth.³¹

Many “Return to Play” laws and protocols focus on when young athletes may resume participating in sports, but fail to address when these athletes have recovered sufficiently to also function in the classroom, at home, and in social settings. With a growing understanding of the importance of cognitive and emotional rest as part of sports-related concussion management, CDC and other organizations recommend that “Return to Learn” considerations and guidelines be more clearly and operationally defined in existing concussion laws and protocols.^{3,11}

As part of their legislation or protocols, only 21 states currently require coaches to be trained in youth sports concussion recognition and awareness.²⁶ Some school and league concussion policies or implementation plans go beyond basic recommendations to include additional strategies such as concussion emergency medical action plans, changes to sports rules or practice drills, and concussion management plans to help athletes return to school.³²

– Implementation

Evaluation or research examining state efforts to implement sports-related concussion laws and protocols suggests considerable variation in, and challenges to, implementation of these policies at state and local levels.^{29,30} These include:

- Lack of, or unclear, delegation of authority for the official implementation, monitoring and/or enforcement of the state laws or protocols;
 - Lack of or limited funding for implementation (i.e., unfunded mandate);
 - Lack of or limited capacity for implementation (e.g., staff, time); and
 - Variance in how, when and to what extent to collect implementation and monitoring data.
- **Compliance**
- Compliance with existing sports-related concussion laws or protocols can be a challenge at state and local levels. In many states, only a limited section of the student athlete population is required to comply with sports-related concussion policies, as existing laws or protocols may not include recreational or other youth sports leagues. It also remains unclear whether youth sports programs at schools or through other organizations addressed by existing laws have appropriately implemented and are in compliance with those laws.³⁰ Lack of adequate funding and personnel resources and/or time at state, school or league levels can hinder adequate implementation and monitoring of state and local concussion laws and protocols.²⁹
- **Training**
- Only 21 states currently require coaches to be trained in youth sports concussion recognition and awareness,²⁶ and training requirements included in state Return to Play laws vary widely.²⁹ For example, Massachusetts requires that many, diverse stakeholders receive training, while Washington State only requires coaches and athletic trainers to receive training.

ACCESSING APPROPRIATE HEALTH CARE

Accessing appropriate health care after a potential concussion can be a challenge for athletes and their families, particularly in rural areas of the U.S. If health care is available, some primary care physicians, pediatricians and other health care professionals may not be aware or knowledgeable of, nor have received adequate training on, best practices in concussion assessment and management, including recommended protocols for returning to learn and play.¹¹ After presenting at an emergency department with concussion symptoms, as many as a third of young athletes do not receive clear discharge instructions.^{33,34} When discharge instructions are provided, health care providers often give instructions on return to play but not on return to learn.^{32, 35}

EVALUATION AND RESEARCH

Further evaluation and research is needed to expand the evidence base around the impact of laws created to reduce the impact of youth sports and recreation-related concussions, identify best practices for implementation, and identify any unintended consequences of Return to Play laws.²⁹

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