



Testimony
Before the Subcommittee on Health
Committee on Energy and Commerce
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**Protecting School-age Athletes From Sports-
Related Concussion Injury**

Statement of

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Good afternoon Chairman Pallone, Ranking Member Shimkus and other distinguished Members of the Subcommittee. My name is Dr. Vikas Kapil and I am an emergency medicine and public health physician. I serve as the Associate Director for Science in the Division of Injury Response (DIR), at the National Center for Injury Prevention and Control (NCIPC) within the Centers for Disease Control and Prevention (CDC). Thank you for the opportunity to appear before you on behalf of CDC to discuss our Agency's efforts to address school sports concussion. At CDC we work to ensure that all people live life to their fullest potential through the prevention and appropriate response to injuries such as concussion and other types of traumatic brain injuries (TBI).

Regardless of gender, race or economic status, injuries are a leading cause of death for young Americans. TBIs are a particularly serious threat to the health and well-being of children and adolescents age 0-19 in the United States, particularly children and adolescents playing sports, because of the danger of repeat concussion. In order to address the seriousness of this issue, CDC has taken a leading role in the nation's efforts to improve prevention, recognition, and response to concussion through the authority provided to us in the TBI Act of 1996 (Public Law 104-106). We collect data on TBIs to ensure an understanding of the problem and to measure the success of prevention efforts, educate the public and key stakeholders on how to respond appropriately when brain injuries occur, and conduct research to inform the evidence base for prevention, detection and response efforts.

I will begin my testimony today by providing an overview of TBIs, particularly in high school and middle school athletes, describing the signs and symptoms as well as who is affected. I will also describe the evidence base for prevention efforts, and I will close by highlighting some of the work we at CDC have undertaken in this area with a particular emphasis on work we have been doing in partnership with the National Football League (NFL).

Overview, Signs and Symptoms of Concussion

TBIs are caused by a bump, blow or jolt to the head, or a penetrating head injury that disrupts the normal function of the brain. Not all blows or jolts to the head result in a TBI. The severity of a TBI may range from "mild," with a brief change in mental status or level of consciousness, to "severe," with an extended period of unconsciousness or amnesia after the injury. The majority of TBIs that occur each year are concussions or other forms of mild TBI. In addition to a bump, blow or jolt to the head, concussions can also occur from a blow to the body that causes the head to move rapidly back and forth. Most concussions occur without loss of consciousness. Health care professionals may describe a concussion as a mild TBI because concussions are usually not life-threatening; however, they can cause significant and serious health consequences. This is particularly true for athletes who may be at risk for experiencing multiple concussions.

The most recent CDC data show that an estimated 1.7 million deaths, hospitalizations, and emergency department visits related to TBI occur in the United States each year.

TBI is a contributing factor in approximately one-third of all injury-related deaths for all ages. Children aged 0 to 4 years, and adolescents aged 15 to 19 years, are most likely to sustain a TBI. However, the magnitude of TBI is not easily determined and is likely underrepresented because many cases are not treated in hospitals or emergency departments.

Each year, U.S. emergency departments treat an estimated 135,000 sports-and-recreation related TBIs, including concussions, among children ages 5 to 18. There is also an increased risk for subsequent concussions among athletes who have had at least one previously. Repeated mild TBIs occurring over an extended period of time (*i.e.*, months, or years) can result in cumulative neurological and cognitive deficits. Repeated mild TBIs occurring within a short period of time (*i.e.*, hours, days, or weeks) can be catastrophic or fatal. In rare cases, repeat concussion can result in brain swelling, permanent brain damage, and even death.

In addition to the physical and emotional burden of TBIs, the economic burden is staggering. In 2000, CDC estimated that the cost of TBI in the United States totaled \$60 billion, including \$9.222 billion in lifetime medical costs and \$51.212 billion in productivity costs. (*See Finkelstein EA, Corso PS, Miller TR. The Incidence and Economic Burden of Injuries in the United States. New York: Oxford University Press; 2006.*) This figure takes into account loss of productivity, loss of patient and caregiver time, non-medical expenditures, and a diminished quality of life and long term health consequences.

Most people with a concussion recover quickly and fully. Signs and symptoms of concussions fall into four categories, including: physical complaints (*e.g.*, headache, nausea, vomiting, balance or vision problems); cognitive or memory problems (*e.g.*, difficulty concentrating, feeling slowed down); emotional or mood related symptoms (*e.g.*, irritability, sadness); and, sleep disturbance (*e.g.*, sleeping more or less than usual or disturbed sleep). Some of these symptoms may appear right away, while others may not be noticed for days or months after the injury, or until the person starts resuming their regular activities and more demands are placed upon them. Sometimes, people do not recognize or admit that they are having problems. Others may not understand the nature of their problems, which can make them more nervous and upset, further exacerbating their condition. Early on, problems may be missed by the person with the concussion, family members, or doctors. It is critical to ensure that young athletes who sustain a concussion are not allowed to play through it, and graduated return to play or return to classroom programs may be needed. This type of progressive reentry can protect the health of the athlete and prevent further injury.

In addition to appropriate response, there are strategies that can be used to prevent concussions. Rules and policies on how sports should be played can be implemented to maximize safety. Appropriate protective equipment can be used to protect the brain, and improvements to existing protective equipment could be made to improve current technologies. Additionally, education of athletes, parents, coaches, clinicians, school

staff, and others is needed to ensure all adults who work with children and adolescents in sports settings or related environments can promote safe practices.

Prevention Efforts: Evidence-Based and Promising Interventions

CDC has identified a number of strategies and practices that can strengthen prevention and response for sports-related TBI and improve its management. The majority of these strategies have been tailored for various audiences through the CDC's Heads Up educational initiative. Heads Up was developed by CDC in partnership with other federal agencies, professional associations, and many national organizations. Heads Up consists of several specific versions of educational materials. "Heads Up: Concussion in Youth Sports" is designed for coaches of children participating in youth sports. "Heads Up: Concussion in High School Sports" was developed for high school coaches, as well as athletic trainers and directors. CDC also worked with organizations such as USA Football, to provide "Heads Up" fact sheets and awareness video to athletes and coaches. The "Heads Up: Brain Injury in Your Practice" version was designed to assist health care professionals in identifying and responding appropriately to sports related concussions among children and adolescents. Lastly, "Heads Up to Schools: Know Your Concussion ABCs" was released in May 2010 to help school professionals identify and respond to concussions in school settings.

The Heads Up initiative for youth and high school coaches provides tool kits that include practical and essential information such as easy-to-read fact sheets for coaches, parents and athletes; online training; videos; a clipboard; posters; magnets; and a quiz to test concussion knowledge. The tool kits were developed for coaches and administrators who work with athletes ages 5 to 18 in a broad range of sports activities. Consequently, the promotion of these programs has motivated parents, coaches/athletic trainers, athletes and medical professionals to change their behavior and increase their knowledge of how to recognize and respond to concussions. This enhanced knowledge and behavior change around concussion care giving practices allow youth affected by TBI to live their lives to the fullest potential. Since the beginning of the Heads Up initiative in 2005, more than 1.5 million print copies of the Heads Up materials have been disseminated.

Complementing the Heads Up initiative, a number of states have undertaken additional efforts to address sports concussion among youth and high school students. Several states have passed legislation requiring training of high school sports coaches and implementation of rules for schools to follow when athletes sustain concussions. These laws show great promise in addressing some of the key concerns related to sports associated concussions among young athletes. In FY 2010, CDC undertook an effort to begin evaluating these laws and to develop a framework to better assess their intended impact, their potential implementation successes and challenges, and their unintended consequences.

CDC's CORE State Injury Program (CORE Program) supports some of these efforts. CDC currently funds 30 states to conduct injury surveillance, develop strategic plans, and engage in coalition building work to broadly address injuries and violence. The CORE

Program collects information on injuries to ensure that data collection can inform our understanding of the circumstances surrounding injuries as well as to ensure that prevention efforts can be measured. The CORE Programs in several states have also been instrumental in providing technical assistance and data to inform states' efforts to implement TBI prevention legislation. While the CORE Program provides a strong basis for collection of broader injury data, TBI is an area that could benefit from a more specific and robust approach to ensure that the circumstances surrounding TBI are better understood and to better inform prevention efforts.

CDC's Partnership with the NFL

CDC is currently partnering with over 60 organizations on TBI issues. In the area of youth sports concussions, CDC and the NFL share a common goal to improve prevention, recognition, and response to sports-related concussion among youth. CDC and the NFL have partnered on a number of activities and have additional activities planned for the future to address this important public health problem. CDC also works with USA Football, an independent non-profit organization leading the development of youth, high school, and international amateur football. USA Football was endowed by the NFL and NFL Players Association in 2002. The NFL, USA Football, and CDC have worked together to ensure that young football players can play in an environment that is as safe as possible and that those who do sustain concussions are treated and reintegrated into their football practices and games appropriately.

For example, in 2008 CDC entered into a partnership with the Seattle Seahawks NFL team and the Brain Injury Association of Washington (BIAWA). This partnership was designed to raise awareness about concussion and improve prevention, recognition, and response to concussion among young athletes. Building upon CDC's "Heads Up: Concussion in High School" and "Heads Up: Concussion in Youth Sports" initiatives, these partners created the "Washington Heads Up: Concussion in Sports" campaign, which included training sessions, presentations, and public service announcements with widely-recognized football celebrities. The campaign built momentum for the adoption of the first state-based sports concussion law in the nation, the "Zackery Lystedt Law," enacted in May 2009. Named for Zackery Lystedt—a young athlete who was permanently disabled after sustaining a concussion in 2006—the law is the first of its kind in the nation. This law requires that athletes participating in school sports that exhibit signs and symptoms of a concussion be removed immediately from practice or play. In addition, parents and athletes must sign a concussion information sheet prior to the start of each sports season. The legislation passed in Washington is one example of the type of promising legislation that can help to ensure a desirable impact on high school sports practices related to concussion.

In addition to this specific partnership activity in Washington, CDC's concussion in youth sports materials are now integrated into every USA Football/NFL coaching clinic. These clinics reach more than 10,000 youth football coaches each year. The NFL also includes CDC's Heads Up information in the NFL's coaching planner, which is sent to 20,000 high school football coaches annually through the NFL's Player Development Program. CDC

assisted with the development of a poster and fact sheet on concussion for NFL players that was distributed to all NFL teams. This poster will be adapted for youth athletes playing all sports. Lastly, CDC provided significant content input into the public service announcement distributed by the NFL during the 2009-2010 NFL season. This announcement addressed the importance of detection and appropriate response to concussion among athletes.

Conclusion

As you have heard, concussions are a significant threat to our nation's youth, particularly those participating in sports. There is a strong and growing scientific basis to support appropriate prevention, identification, detection, and response for sports related concussions. There is no doubt about it; sports are a great way for teens to stay healthy while learning important team building skills. But, there are risks to pushing the limits of speed, strength and endurance. Athletes who push the limits sometime do not recognize their own limitations, especially when they have had a concussion. Through CDC's efforts to improve data collection, the national distribution and promotion of the Heads Up educational initiative with key partners such as the NFL, and our efforts to evaluate promising policies such as the Zackery Lystedt Law in Washington, CDC is focused on protecting our nation's youth who participate in sports.

CDC is focusing existing investments to expand and improve state-based data collection efforts, support increasing evaluation of states' policy and program efforts, and to expand the reach and scope of initiatives such as Heads Up that can address this critical public health issue for our nation's youth where applicable. These efforts, designed to increase awareness of the importance of responding appropriately to concussions among youth in sports as well as improving the skills of those who oversee and work with young athletes to respond appropriately, will help our nation's children and adolescents live their lives to their fullest potential.

I would like to take this opportunity to thank the Subcommittee for its continued support of CDC and its TBI programs. I would be happy to answer any questions that you many have.