

# THE IMPACT OF CONCUSSIONS ON HIGH SCHOOL ATHLETES

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## HEARING

BEFORE THE

COMMITTEE ON

EDUCATION AND LABOR

U.S. HOUSE OF REPRESENTATIVES

ONE HUNDRED ELEVENTH CONGRESS

SECOND SESSION

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HEARING HELD IN WASHINGTON, DC, MAY 20, 2010

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## **THE IMPACT OF CONCUSSIONS ON HIGH SCHOOL ATHLETES**

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**Thursday, May 20, 2010**

**U.S. House of Representatives  
Committee on Education and Labor  
Washington, DC**

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The committee met, pursuant to call, at 9:02 a.m., in room 2175, Rayburn House Office Building, Hon. George Miller [chairman of the committee] presiding.

Present: Representatives Miller, Payne, Andrews, Woolsey, McCarthy, Tierney, Kucinich, Davis, Bishop of New York, Loeb sack, Shea-Porter, Kline, McKeon, Biggert, Guthrie, and Roe.

Also present: Representative Pascrell.

Staff present: Andra Belknap, Press Assistant; Calla Brown, Staff Assistant, Education; Jody Calemine, General Counsel; Lynn Dondis, Labor Counsel, Subcommittee on Workforce Protections; Denise Forte, Director of Education Policy; David Hartzler, Systems Administrator; Ryan Holden, Senior Investigator, Oversight; Sadie Marshall, Chief Clerk; Alex Nock, Deputy Staff Director; Lillian Pace, Policy Advisor, Subcommittee on Early Childhood, Elementary and Secondary Education; Helen Pajcic, Education Policy Associate; Kristina Peterson, Legislative Fellow; Alexandria Ruiz, Staff Assistant; Melissa Salmanowitz, Press Secretary; Michele Varnhagen, Labor Policy Director; Mark Zuckerman, Staff Director; Kirk Boyle, General Counsel; Allison Dembeck, Professional Staff Member; Angela Jones, Executive Assistant; Barrett Karr, Staff Director; Alexa Marrero, Communications Director; Susan Ross, Director of Education and Human Services Policy; and Linda Stevens, Chief Clerk/Assistant to the General Counsel.

Chairman MILLER [presiding]. A quorum being present, the committee will come to order for the purposes of conducting this hearing on the impact of concussions on high school athletics and athletes.

Welcome to the witnesses that will be testifying this morning. Thank you for your time and your expertise.

We are kind of jamming this hearing—when we planned this hearing we didn't have a joint session of Congress at 11 o'clock with the president of Mexico, and so we have moved the time up, and that interferes into the caucuses of both parties, so I want to thank Mr. Kline for being here and the other members that are here.

But we felt rescheduling was going to make it more difficult, so we wanted the—we wanted to get this hearing on the record. We think it is a very important matter for this—for this committee.

Today we will examine how concussions experienced by high school athletes on the playing field are impacting their academic well being and their quality of life.

We will also learn more about how schools and the medical community can provide appropriate management and support for these young student athletes.

One of our committee's key priorities has been looking at how we can keep students safe and protected in school. This is our first hearing looking into what happens on the athletic field, where many school injuries occur.

Last year, Congressman Andrews, Congresswoman Bono-Mack and I asked the Government Accountability Office to look into concussions in high school athletics after several professional athletes suffered debilitating and news-making head injuries diagnosed as concussions.

It was clear to us that if the NFL was paying attention to concussions at the professional level, we should be doing the same at the high school level, when students' bodies and minds are still growing and therefore somewhat more vulnerable.

Today, the GAO will share the findings of their report. We will hear about the incidents of concussions in high school sports and what federal programs exist to help prevent these catastrophic injuries from sidelining students.

This is the first comprehensive look at what is being done to prevent and manage these injuries. When a student suffers a concussion, serious repercussions can occur both on the field and in the classroom.

On the playing field, concussions can pose significant health risks to students. High school athletes are at greater risk of sports-related concussions than college or professional athletes because of—their younger brains are more susceptible to injury.

In the last 3 school years alone, 400,000 concussions were reported in high school athletics, and this is—this could also be a low estimate. Studies show that the prevalence of sport-related concussions is much higher than reported.

A concussion, unlike a sprain or a broken bone, is not always easily detected. Ninety percent of concussions occur without a loss of consciousness. Concussions can cause a range of symptoms, from altered mental status to physical symptoms such as headaches or dizziness, to emotional changes like irritability and difficulty in sleeping.

The number and types of symptoms may vary in each person. But unless a student takes time off from the field after suffering a concussion, he or she may be prolonging their recovery and their success in school may suffer.

Unfortunately, the symptoms of concussions are not only difficult to detect but they are not always taken seriously. In the sports injury community, there is a saying, "When in doubt, sit it out."

But recent studies show that more than half the high school girls' volleyball and boys basketball and baseball players who suf-

ferred concussions return to play too soon. This is a problem that isn't limited to student athletes.

College and professional athletes also feel the pressure to compete and stay in—stay in the game. The pressure to play is overriding medical concerns and, potentially, a student's academic and health future.

Failing to “sit it out” after concussions can negatively affect students in the classroom. One of our witnesses will tell us that almost 90 percent of girls recovering from a concussion reported their symptoms worsened by trying to focus on schoolwork.

Any parent can tell us that participating in sports doesn't just get their kids up and moving, it gives them skills that will come in handy in school, on the job and throughout their lives. Our goal today is to make sure that our kids can continue to participate in sports safely and to continue to reap the benefits both on and off the field.

I look forward to hearing from our witnesses today about what schools can be doing to better help support high school athletics and testimony on the effects of concussion on student achievement.

With that, I would like now to recognize the senior Republican this morning, Mr. Kline.

[The statement of Mr. Miller follows:]

**Prepared Statement of Hon. George Miller, Chairman, Committee on  
Education and Labor**

Good morning.

Today we'll examine how concussions, experienced by high school athletes on the playing field, are impacting their academic well being and quality of life.

We'll also learn more about how schools and the medical community can provide appropriate management and support for these young student athletes.

One of our committee's key priorities has been looking at how we can keep students safe and protected in school.

But this is our first hearing looking at what happens on the athletic field, where many school injuries occur.

Last year, Congressman Andrews, Congresswoman Bono-Mack and I asked the Government Accountability Office to look into concussions in high school athletics after several professional athletes suffered debilitating and news-making head injuries diagnosed as concussions.

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Ninety percent of concussions occur without loss of consciousness.

Concussions can cause a range of symptoms, from altered mental status to physical symptoms such as headaches or dizziness to emotional changes like irritability and difficulty sleeping.

The number and type of symptoms vary widely for each person.

But unless a student takes time off the field after suffering a concussion, he or she may be prolonging their recovery and their success in school may suffer.

Unfortunately, we also know that the symptoms of concussions are not only difficult to detect, but are not always taken seriously.

In the sports injury community, there is a saying: “When in doubt, sit it out.”

But a recent study shows that more than half of high school girls’ volleyball and boys basketball and baseball players who suffered concussions return to play too soon.

This is a problem that isn’t limited to student athletes. College and professional athletes also feel the pressure to compete and stay in the game.

What we see here is pressure to play is overriding medical concerns and—potentially—a student’s academic future.

As we will learn more about today, failing to “sit it out” after a concussion can negatively affect students in the classroom.

One of our witnesses will tell us that almost 90 percent of girls recovering from a concussion reported that their symptoms worsened after trying to focus on schoolwork.

Any parent can tell you that participating in sports doesn’t just get their kids moving—it gives them skills that will come in handy in school, on the job and throughout their lives.

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I look forward to hearing from our witnesses today about what schools can be doing better to help support high school athletes, and testimony on the effects of concussions on student achievement.

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Mr. KLINE. Thank you, Mr. Chairman.

Good morning, all. Welcome to our witnesses. We are here this morning to discuss research recently conducted by the Government Accountability Office on concussions among high school athletes. The findings of the GAO will be illuminated by experts in the field and individuals who have firsthand experience with this type of injury.

Concussions are functional traumatic brain injuries suffered as a result of force. For instance, they could be caused by collision of the head or a blow to the body. Although the federal government is not responsible for the treatment or tracking of this type of injury, concussions are of interest to this committee because of their implications to students.

Hearings such as this provide an opportunity to shine a spotlight on the issues dealt with by states and local communities and highlight the resources and best practices available to help students, parents, coaches and school leaders prevent these injuries and respond appropriately when they do occur.

Research in this area is ongoing, but we know concussions among high school athletes have drawn increasing attention in recent years. One reason is because younger people appear to be more vulnerable to this type of injury than adults.

Recent research indicates high school athletes with recent or repeated concussions have difficulty concentrating, lower attendance rates and significantly lower cumulative grade point averages than high school athletes with no history of concussion. In other words, this affects not just student health but also academics.

As with many dangers to our children, prevention is the best medicine. That is why we will hear today about education programs and resources designed to help prevent concussions in student athletes.

We will also hear about programs and guidance for coaches, administrators, parents, and medical personnel that address what to



do when a concussion occurs or is suspected, including best practices for determining when athletes can most safely return to the field of play.

I want to thank the witnesses for being here to discuss this topic and help bring attention to the steps student athletes and the adults who supervise them can take to prevent and respond to this type of injury.

Thank you, and I yield back.

[The statement of Mr. Kline follows:]

**Prepared Statement of Hon. John Kline, Senior Republican Member,  
Committee on Education and Labor**

Thank you Mr. Chairman. Good morning and welcome to our witnesses.

We're here this morning to discuss research recently conducted by the Government Accountability Office into concussions among high school athletes. The findings of the GAO will be illuminated by experts in the field and individuals who have firsthand experience with this type of injury.

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Chairman MILLER. Thank you.

I would like now to introduce our panel of witnesses. Gerard Gioia is the director of neuropsychology at the Children's National Medical Center in Washington, D.C. Dr. Gioia oversees the pediatric neuropsychology program and Safe Concussion Outcome, Recovery & Education Program at Children's National Medical Center in Washington, D.C.

Dr. Gioia is internationally recognized as an expert in youth concussions. His concussion management guidelines for youth athletes were recently adopted by International Conference of Concussions in Sports.

Combining his expertise with his experience as a school psychologist at Howard County Public Schools, Dr. Gioia helped the Centers for Disease Control develop in-school concussion materials released this month.

Dr. Gioia is expected to discuss the proper concussion management in high—in the high school setting.

Michelle Pelton is a former high school athlete from Fall River, Massachusetts. Michelle Pelton suffers from cumulative effects of concussions she sustained during her adolescence, five of which occurred while participating in softball and basketball at her school.

After sustaining three concussions in a row in her senior year, Michelle retired from sports and sought proper treatment. She managed to graduate from Diman Regional Vocational High School with the support of a 504 plan but she lost her opportunity to attend college with a scholarship and continues to struggle with work and academics.

Michelle has helped improve concussion safety for other high school athletes and recently received a local community service award for her—for her efforts.

Linda Kohn is the director of health care issues at the Government Accountability Office and is the lead investigator into concussions in high school sports. She will present findings on the incident rates of concussions among high school athletes and the characteristics and state laws and athletic association guidelines that are in place to protect student athletes from these injuries.

Michael Monacelli serves as the athletic director and head varsity football coach at Caledonia-Mumford Central School. During the course of his career, Mr. Monacelli has led his team to five state championships many times, including this past season, and received many awards for his coaching from the state of New York.

After coaching high school sports for over 30 years, Mr. Monacelli instituted comprehensive concussion management guidelines at his school, and his district has established similar standards.

James C. Schmutz is the director of American Sports Education Program. Mr. Schmutz is the—joined Human Kinetics Publishing as executive director of the American Sports Education Program in March 2009.

Previously he worked for the Special Olympics for 19 years, including roles in Virginia and the District of Columbia where he oversaw coach and volunteer recruitment and training.

He has served as a volunteer youth sport coach for soccer, hockey, basketball, baseball. Jim utilizes his experience and knowledge to advance this mission and make sports safer and more enjoyable and more valuable to athletes by developing an educational program and resources for coaches, administrators and parents and officials.

Welcome to all of you. Thank you for your time and your expertise, as I said earlier.

And, Mr. Gioia, we are going to begin with you. When you start, a green light will go on in those little boxes in front of you. When you have a minute left, which will be about 4 minutes into your testimony, an orange light will go on, and then a red light, when we would ask you to try and summarize and finish your testimony. And so welcome.

**STATEMENT OF GERARD GIOIA, CHIEF, DIVISION OF PEDI-  
 ATRIC NEUROPSYCHOLOGY, DIRECTOR, SAFE CONCUSSION  
 OUTCOME, RECOVERY AND EDUCATION (SCORE) PROGRAM,  
 CHILDREN'S NATIONAL MEDICAL CENTER**

Mr. GIOIA. Thank you, Chairman. Good morning to you and to the members of the committee, and thank you for the opportunity to speak today about this very important topic, the academic effects of sport-related concussion in our youth.

Again, my name is Dr. Gerry Gioia. I serve as the chief of the division of pediatric neuropsychology at Children's National Medical Center and run a very active concussion program here in the district.

I am also the national leader of the mild traumatic brain injury care system of the Sarah Jane Brain Foundation, which has written an extensive national plan for universal care for children with traumatic brain injuries, the PABI Plan, which I believe you have.

As we know, much attention has been previously directed toward concussion in football and at the professional and collegiate levels.

Well, what we are going to talk about today is moving away from that tip of the iceberg. We focus on a larger problem today which is concussion in the student athlete, in youth sports, and the effect of that brain injury on academic learning and performance.

We know that learning in school is the child's job, and that job is impaired after a concussion. Concussions are a serious matter, and it is not simply a football matter. Concussions occur in all sports, and let's watch a quick video just to demonstrate that.

That is hit number one. Here is our problem. He plays the next day. So this is the clip of two hits, two injuries, two concussions. The second injury was likely made much worse because the first was not recognized.

Now, the athlete, when you talk with him, actually reported symptoms, but he didn't know what to do with them, and no one recognized them on the ice. So this is our first big problem, poor recognition of the injury. It highlights our need to improve that identification much more acutely.

As a result of this injury, it took the student athlete a month to recover rather than a much shorter period of time had we identified it early.

We also have in our presence today a guest, 14-year-old Sarah Rainey of Alexandria, Virginia, who is currently recovering from a concussion sustained in April playing soccer, where poor recognition of the injury contributed to her lengthy recovery.

And let me tell you, I have provided written testimony, but if you only have limited time, read Sarah's testimony, not mine. I think it is much more effective.

So what is a concussion? What happens to the student athlete's brain when hit? A concussion is a brain injury. It is a force to the head and brain that results in electrical and chemical changes, and it changes that brain's biological software. It produces a whole host of signs and symptoms, physical, cognitive, emotional, and disrupts sleep.

And with our next slide here, we are going to take a look—because what we see in this next slide is that the time to recovery from brain injury varies widely, from months—weeks to months

and for some years and beyond. And this slide that is coming up shows the wide range of time to recover of a group of high school athletes.

And the brain is impaired during this time. If the slide doesn't come up, that is fine. The point is that it took a long period of time for these kids to recover. And one of the aspects of that slide actually shows us is that those who have sustained more than one concussion took longer to recover.

Now, how does this brain injury, then, affect the academic functioning? Well, if you take this combination of symptoms—cognitive, emotional, physical—it clearly affects that individual's ability to learn and to remember. And it decreases their tolerance for performance.

So the new learning is impaired. They cannot perform reading, math and writing effectively. They are slowed down. Their access to their knowledge and information at tests is also a problem.

We also know that schoolwork places a significant demand on the brain's impaired software and that the symptoms worsen as they try to think and learn. So this is called cognitive exertion, and it worsens symptoms as you try to mentally concentrate. And we believe that this becomes a major problem. And if you overexert for too long, then it can delay recovery.

This next slide that you see here is some recent research that we have done that shows that 80 to 90 percent of the students in this study in our clinic experienced these negative effects in the first month of injury and about half of them continued to have those problems well into a month and a half. So learning is impaired through this entire time.

Well, how big is the academic impairment following concussion? Well, we don't know that at this point. What we know is that most of our student athletes, certainly as this sample shows, have impairment over a period of time lasting a month or longer.

What we don't know is the extent of the long-term problems yet. That is something that we need to understand. And what we cannot predict is who that individual will be that will have the short- to medium-term problem and the long-term problem.

So what we have got to do here is to work toward changing this. School systems must be active partners to assist in students' recovery. But currently schools are not prepared for this, so they are not aware when students come back into their presence, and we need to improve that medical to school communication linkage.

We also need to train our school staff to understand and recognize concussion-related learning problems and what to do about them.

The good news is we are beginning to develop these materials to address these problems. We have materials such as the ACE Care Plan, which is part of the CDC's physicians' toolkit that we use regularly to guide students' reentry, and the new CDC toolkit, "Heads Up to Schools: Know Your Concussion ABCs," which is actually being released today, as we understand, on the CDC Web site, with excellent materials for school nurses, counselors, psychologists, teachers and parents.

Also in Colorado and in Oregon they have been developing school concussion management programs.

So our challenge is to implement as a nation supports for students with brain injuries universally and to study the most effective ways to help them and to reduce these problems, minimize the negative academic outcomes.

So let me just sum up now by saying that youth participation in sports is essential. It is essential to their development. It is a positive thing. But concussions in youth and high school sports are significant with direct effects on their academic performance.

Learning in school is the child's job and that job is impaired after the injury. We must better prevent, identify acutely and treat early, communicate between the medical school and athletic health systems, and effectively return students back to school appropriately.

To do so, we need a universally accessible care system that really integrates all these key components together for student athletes with these injuries, but also for all students with acquired brain injuries.

The PABI Plan is something that we have developed, a set of professionals across the country, to put this in place, and I believe you all have a copy of that. We really look forward to collaborative efforts between the groups—the Sarah Jane Brain Foundation, the CDC, NIH, Departments of Education, sports, and medical groups to develop this appropriate universal evidence-based system of care.

I would also like to acknowledge the 14 members of the committee who are co-sponsors of this current—concurrent resolution 198—Michael Castle, Yvette Clarke, Joe Courtney, Marcia Fudge, Raul Grijalva, Mazie Hirono, Rush Holt, Dale Kildee, Dave Loebsack, Donald Payne, Robert Scott, Carol Shea-Porter, Dina Titus and David Wu—as we are really looking now to change the system.

And I thank you for your attention, for your invitation, and I look forward to answer questions later. Thank you.

[The statement of Mr. Gioia follows:]

**Prepared Statement of Gerard A. Gioia, Ph.D., Chief, Division of Pediatric Neuropsychology; Director, Safe Concussion Outcome, Recovery & Education (SCORE) Program, Children's National Medical Center**

*About Children's National Medical Center*

Children's National Medical Center, a 283 bed not-for-profit academic medical center in Washington, DC, has provided hope to sick children and their families throughout the metropolitan region for nearly 140 years. The mission of Children's National is to improve health outcomes for children regionally, nationally and internationally; to be a leader in creating innovative solutions to pediatric healthcare problems; and to excel in care, advocacy, research and education to meet the unique needs of children, adolescents and their families. Children's National is ranked among the best pediatric hospitals in America by U.S. News & World Report and the Leapfrog Group. It is a Magnet recognized pediatric hospital, one of a handful of elite healthcare facilities nationwide.

*Children's Safe Concussion Outcome, Recovery & Education Program*

Children's National has long been an advocate for child safety and injury prevention. Safe Kids Worldwide, the first national advocacy organization solely dedicated to pediatric injury prevention, was founded by Children's National in 1987. With respect to concussions, Children's Safe Concussion Outcome, Recovery & Education (SCORE) Program is the first and only program in the greater Baltimore-Washington region that specializes in the clinical evaluation and treatment of concussions in children, as well as conducting research and delivering public health education and advocacy nationally and internationally. The SCORE program evaluates and

treats children and adolescents with concussions (also known as a mild traumatic brain injury or mTBI). In 2009-2010, the SCORE program at Children's National treated more than 1,000 children in its concussion clinics.

#### *Pediatric Acquired Brain Injury (PABI) Plan*

Pediatric Acquired Brain Injury (PABI), of which concussions are a large component, is a significant national issue for our youth. Because a brain injury is typically "invisible," it remains unrecognized or under-recognized, thereby markedly increasing the burden of care in all aspects of society. The effects of a PABI are complex and require the integration of medical, educational, judicial and social service systems. A large number of brain injury professionals and family members have come together within the Sarah Jane Brain Foundation committed to develop a seamless, standardized, evidence-based system of care universally accessible for all children/young adults and their families regardless of where they live in the nation. This system of care is called the National Pediatric Acquired Brain Injury Plan (PABI Plan). The PABI Plan has been developed into seven overlapping "Categories of Care" for treating brain injuries in children and young adults: 1) Prevention, 2) Acute Phase, 3) Mild TBI Assessment / Treatment, 4) Reintegration / Long-term care, 5) Adult Transition Phase, 6) Rural / Telehealth and 7) The Virtual Center. For each Category of Care, the PABI Plan establishes a nationwide standard for collecting translational data, a standard set of training, education and dissemination of information, and the ability to monitor and develop basic science research. I serve as the National Lead for the Mild TBI Category of Care and a member of the Steering Committee of the Sarah Jane Brain Foundation's PABI Plan.

#### *Introduction*

Recent national media coverage has shined a bright light on sport related concussions and their effects on college and professional athletes, but less attention has been given to the effects of concussions on the developing brains of children and adolescents. As a sports medicine clinician, I am very much in favor of our nation's 40+ million children and adolescents participating in sports. I have three children who have been active student-athletes—and they have gained tremendous benefit in their physical, social, emotional, and cognitive maturity as a result of their participation in sports. But it is critical that we balance these significant benefits with careful attention to safety issues—especially when it involves the precious resource of the student-athlete's brain.

The current state of affairs in addressing mild traumatic brain injury in our student-athletes is largely one of under-identification and arbitrary treatment. A concussion is an injury to the brain as a result of a traumatic force applied directly or indirectly to the head. Many prefer to use the more comforting term "concussion"—but make no mistake—a concussion is an injury to the brain. Improving care systems for these brain injuries, and thus reducing risk to the lives of children and adolescents, is an attainable goal if we can direct proper attention, effort, and resources to the appropriate places and persons.

#### *About Concussion/Traumatic Brain Injuries*

A concussion involves a strong, violent force applied to the brain that, in most people, changes the brain's electrochemistry (i.e., software); in some people it may alter the brain's structure (i.e., hardware). We know from the work with repeated concussions that if this injury goes unchecked, the brain's hardware can be permanently damaged with dire consequences for the individual's long-term cognitive, social, and emotional quality of life.

The incidence of traumatic brain injuries (TBI) occurring to children annually is significant, but the full extent of the problem is as yet unknown. The existing epidemiologic methods are not yet developed to precisely identify the number of concussions. With current figures as likely underestimates, the Centers for Disease Control and Prevention (CDC) studied emergency department visits, hospitalizations and deaths between 2002-2006 and reported 1.7 million people sustain TBI annually, of which 52,000 died, 275,000 were hospitalized, and 1.365 million were treated and released from the Emergency Department.<sup>1</sup> These data do not include, however, concussions diagnosed in primary or specialty care office settings, or concussions that go unreported. Children aged 0 to 4 years and older adolescents aged 15-19 years, together with senior citizens over 75 years of age, are most likely to sustain a TBI.

Other data sources tell us that the majority of TBIs (80-90%) are of a "mild" nature. With respect to sports, recent data (Yard & Comstock, 2009) indicates an estimated 400,000 sport related concussions reported to athletic trainers at the high

<sup>1</sup>Blue Book, March 2010 [www.cdc.gov/traumaticbraininjury](http://www.cdc.gov/traumaticbraininjury)

school level in five major male sports and four female sports. The true figures, though, are significantly higher as many other sports (e.g., ice hockey, field hockey, lacrosse, equestrian, rugby, cheerleading) were not included in these estimates, nor were non-scholastic high school or younger-age youth sports. In addition, a significantly higher rate of sport related concussion occurs than what is formally reported to the athletic trainer.

The developing brain of children and adolescents is much more vulnerable to injury than that of adults. In fact, according to recently published consensus recommendations by the International Concussion in Sport Group (CISG)—an international panel of experts of which I am a member—differences in identifying and treating concussions in children and adolescents versus adults must be recognized. The CISG guidelines, published in the May 2009 issue of *The British Journal of Sports Medicine*, recommend that children and teens:

- be removed from play if any sign or symptom of concussion is exhibited,
- be strictly monitored; and
- be restricted from activities until they're fully healed. The important roles of parents and the school were also highlighted.

When managing concussions in children and adolescents, the guidance strongly reiterates several key points for coaches, parents, and physicians:

- Injury to the developing brain, especially repeat concussions, may increase the risk of long term effects in children, so no return-to-play until completely symptom free.
- No child or adolescent athlete should ever return to play on the same day of an injury, regardless of level of athletic performance.
- Children and adolescents may need a longer period of full rest and then gradual return to normal activities than adults.

#### *Academic Consequences of Sport Related Concussion*

There are significant threats to the child and adolescent as a result of an injury to the developing brain from concussion. Today we focus on the all-important consequences of a concussion on the academic learning and performance of the student-athlete. The effects of a concussion are quite significant and potentially wide ranging, with an adverse impact on the student-athlete's ability to think and learn (e.g., concentration, memory, speed of thinking—and therefore school performance), and his or her social and emotional functioning (e.g., irritability, depression). The student-athlete also typically experiences physical pain and/or significant fatigue. This is debilitating and disabling for a child's learning and social interactions. The length of time for a full recovery following a concussion—and of functional impairment—varies from days to months. For most, it takes at least several weeks. For others, the effects can be long-term. Second injuries result in a significantly longer period of recovery and in some instances may result in permanent disability and even death.

The nature of the academic problems associated with sport related concussions is an understudied problem. Clinically, these problems can be viewed in two categories: short- or medium-term, and long-term. Clinically, we observe that the majority of concussed student athletes recover fully with no long-term academic problems. Nevertheless, almost all student-athletes experience significant short- to medium-term challenges in their academic performance during their period of recovery. Many experience direct neurocognitive dysfunction in their attention/concentration, memory, and speed of processing and performance. Others experience cognitive difficulties secondary to the effects of post-concussion fatigue or other somatic or emotional symptoms. As such, much of the time spent with concussed student-athletes and their families in our clinics is associated with managing school learning issues.

A smaller subgroup of student-athletes—the numbers of which we do not know—report persisting problems with attention and memory, or significant headaches and fatigue that adversely affect school learning for longer periods of time. The underlying reasons for these prolonged post-concussion learning difficulties are not fully understood, and need further study to identify the best treatment.

Why does the academic learning and performance of the student-athlete suffer after a concussion? The primary organ for learning is the brain. The brain is a very complex biological computer that requires properly working software and hardware systems. Concussions render the biological software systems dysfunctional, which produces functional deficits and symptoms, and consequently impair the learning process. Students with concussions experience difficulties focusing their attention, maintaining information process and learn actively in mind to, performing multi-step tasks, putting new information into their memories, and processing information and completing tasks at a normal speed. Without these neurocognitive abilities functioning properly, school learning and performance becomes significantly com-

promised. Academic problems can also have significant downstream effects, especially for the high school student-athlete. For example, concussions at the end of a semester can significantly reduce performance and grades on a final exam, reducing the student-athlete's grade point average. Taking the SAT prior to recovery from a concussion can also have a significant adverse impact on the student-athlete's future college options.

To further compound the academic difficulties, a high percentage of student-athletes experience "cognitive exertional effects", which are defined as an increase or re-emergence of symptoms following a period of cognitive activity (e.g., concentrating on a lecture, reading a textbook, performing math calculations). The reality is that the school learning environment places significant physiological demands on the recovering brain of the student-athlete.

In a recently completed study with concussed student-athletes seen in our clinics at Children's National Medical Center, over 80% reported a significant worsening of symptoms over the first four weeks as they attempted school learning activities. Half of this group was still experiencing the cognitive exertional effects 6 weeks post-injury. The typical concentration and memory requirements of school place significant demands on the brain's biological software. When these cognitive demands are placed on a brain in an impaired state, the result is an increase in post-concussion symptoms. Interestingly, symptom increase occurred less frequently with physical activity (37%) relative to cognitive/learning activities. We believe that if the brain continues to over-exert in this way during recovery, the length of time to recovery will be delayed. For example, attempting to do an academic task with a worsening headache further impairs school performance.

In addition to these cognitive challenges, students' poorly controlled emotions, such as irritability and a heightened emotional response to stress, have a direct and adverse effect on school performance. As student-athletes experience ongoing challenges with school learning and performance, they can experience secondary emotional effects such as feelings of nervousness or sadness. Finally, the physical/somatic post-concussion symptoms of headache, fatigue, and sensitivity to light and noise can contribute to impairments in learning due to adverse effects on sustained schoolwork. Thus, academic challenges following a concussion can result from a variety of sources.

The medical provider treating the concussed student needs to work closely with school personnel as a team to carefully manage the school learning activities. Thus, the majority of time spent in our clinics is related to planning academic treatment accommodations—both to assist effective learning and to facilitate appropriate recovery. With active management, our research demonstrates gradual reduction of cognitive exertional effects helping the student-athlete achieve an appropriate recovery.

Our clinical work also highlights that fact that schools are not adequately prepared with the necessary knowledge and skills to properly support the return of the concussed student-athlete. Several excellent tools are now available to help schools transition the concussed student athlete back into the classroom. In 2005, Dr. Micky Collins and I developed the Acute Concussion Evaluation (ACE) Care Plan, to provide the family, student-athlete, and school team with a written plan of specific academic accommodations each stage of recovery. This ACE Care Plan is updated regularly at each clinic appointment with new recommendations based on the recovery progress of the student-athlete. The ACE Care Plan is available to download within the Centers for Disease Control and Prevention's (CDC) "Heads Up: Brain Injury in Your Practice" physician's toolkit ([www.cdc.gov/concussion](http://www.cdc.gov/concussion)).

While this Care Plan is useful in assisting the individual student-athlete, often school personnel are not prepared with the necessary knowledge and skill to easily implement the student's recommended accommodations. Increasing the knowledge and skill of school personnel is the focus of the CDC's May 2010 release of a school concussion toolkit called "Heads Up to Schools: Know Your Concussion ABCs." This toolkit provides key information for school nurses, counselors, school psychologists, teachers, parents, and student-athletes to assist students with concussions in their return to school.

To fully address the problem of concussion/mild TBI and reduce risk for long-term academic and social problems, clinical, research and public health program development at Children's National and the PABI Plan focus in three areas:

1. Prevention of the injury;
2. Early, acute identification of the injury and protection of the youth athlete from further injury; and
3. Active, early treatment to promote the fastest recovery possible and reduce the period of impaired function, including an active plan to implement effective training



of school personnel with the CDC's "Heads Up to Schools: Know Your Concussion ABCs" toolkit.

*Conclusion*

Sport related concussion to the student-athlete is an injury to the developing brain that presents a unique set of risks and challenges for their future. Specifically, learning in school is the job of the child and adolescent, and is particularly challenged by this injury given: (1) the direct effects of the concussion on neurocognitive functioning, and (2) the adverse effects of the cognitive/learning demands on the brain's dysfunctional biological software. A portion of students have persisting problems with school learning and performance long after the acute effects of the concussion. We do not yet understand the reasons for these poor long-term outcomes, and must study them further. A high percentage of student-athletes with concussion/mild TBI experience short- and medium-term problems with school learning and performance. These academic problems, even if temporary, can have potential negative consequences for the student down the road. And, if unidentified and untreated, these problems can have significant long-term consequences for the student. To address this problem, it is essential that we implement a national system of care for student-athletes with concussion/mild TBI—as outlined in the national PABI Plan and supported by public health efforts at the CDC. This system must include directed efforts at prevention, education of key stakeholders, early acute identification and treatment, and effective reintegration of the student-athlete into the school system.

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Chairman MILLER. Thank you very much.

Michelle, welcome to the committee. We look forward to your testimony. Thank you for being here.

**STATEMENT OF MICHELLE PELTON, FORMER HIGH SCHOOL ATHLETE**

Ms. PELTON. Thank you. Good morning. First, I would like to thank you for inviting me here today. This is a great honor to be here to talk about the effects of a concussion.

When I was told about this opportunity, I quickly agreed because I want to make a difference and help athletes be aware of what could happen.

Everyone thinks that something like this would never happen to them. I thought the same thing. But I am a perfect example. I am here today to share with you my traumatic story on how much concussions have affected me and my life.

I played my first basketball game when I was just 7 years old and instantly fell in love with the sport. I was even named "rookie of the year." That following spring, I had the opportunity to fall in love with softball as well. My life revolved around sports.

In junior high school my basketball coach loved how aggressive I was. But maybe I was too aggressive. A girl from the other team and I collided while fighting for the ball. We both fell to the ground. All I thought was, "Ouch, my head," and just got up and continued to play.

Even though we both fell to the ground holding our heads, coaches, refs nor parents had thought anything of it. That was the start of my series of seven concussions over the next 4 years.

The day following my collision, I stood home from school due to an unbearable headache. I then passed out and my mother called 911. At the emergency room, they in fact did diagnose me with a concussion and said I could return to play in 2 weeks or when my symptoms were gone.

As would any athlete, I convinced my parents that after 2 weeks I was symptom-free. That was a big lie. I was still having headaches, but I thought I was fine to go back to play. After all, it was just a headache.

And as fate would have it, the first game I return to, I collide with a girl again, this time leaving me hospitalized with a second concussion. At the hospital I did not know where I was, what happened or even what school I attended. I had no idea how my life would change because of this concussion.

In the days, weeks and months to come my daily life changed. Daily headaches, dizziness, memory loss, lack of concentration, depression are just a few of the symptoms that are part of my everyday life. School would never be the same, and no more sports.

I had the worst case of post concussion syndrome that my pediatrician had ever seen. This would lead to a series of specialists that I would see over the next several years.

I went to the Head Trauma Clinic at Boston Children's Hospital several times for evaluations and recommendations. I also saw a chiropractor, went for weekly acupuncture, had a speech therapist, massage therapy and a therapist, all to help me learn to live with what had happened.

Two weeks is definitely not enough time to let your brain rest and recover. I learned this at my first visit with Dr. Neil McGrath from the Sports Concussion New England Clinic. During the visit I took the ImPACT test, and my scores showed that I was nowhere near ready to go back to play.

At first I resented Dr. McGrath, because he was taking away something that I loved. However, I know now the risks involved with not taking care of your brain. The ImPACT test can show something that no x-ray, C.T. scan or MRI can.

During my high school years, I excelled in basketball and even more so in softball. I had college coaches looking at me in softball when I was only a sophomore. I couldn't wait for my senior year. However, it was nothing like how I had imagined it.

I received five concussions during my high school years that left me without half of my senior year, including softball. For the last 5 months of my senior year, I was home tutored. Each morning was a struggle to get up and face the day. The girl that fell in love with basketball when she was only seven dreaded going to practice every day.

I had headaches, lack of concentration, mood swings, depression and I just did not care about anything. I lost the pride and the joy of finally being a senior and captain on my softball team. If I had played, I would have been named female athlete of the year.

While all my classmates were involved in senior activities, I was home depressed and in constant pain, and life had become a blur. I wasn't involved in any senior activities or the fun of just being a senior. I lost potential 4-year scholarships to play the sport I love. My dreams were crushed.

I cannot even begin to explain the daily struggle my life has become and everything I have lost because of my concussions. No one can see my injury, but it is there. I know I have learned to overcome and compensate for my injuries because I am so determined

to keep as many of my dreams in my life as possible, but not without a tremendous price.

Every day I endure memory loss, lack of concentration, depression, slow processing speed and cognitive effects that makes my everyday life a battle. Yes, I have overcome many obstacles and accomplished a lot considering my injuries, but no one but me truly understands what it is like to live every day like this.

If I can prevent even one person from experiencing what has happened to me then my trip here was a huge success.

Concussions have been called the invisible injury. From my brief story I hope this committee realizes the long-term effects in—of concussions are not invisible.

Thank you for your time today and for careful consideration on this very important public health issue. It can and will impact a lot of athletes. Thank you.

[The statement of Ms. Pelton follows:]

**Prepared Statement of Michelle Pelton, Former High School Athlete**

Good Morning! First I would like to thank you for inviting me here today. This is great honor to be here to talk about the affects of a concussion. When I was told about this opportunity, I quickly agreed because I want to make a difference and help athletes be aware of what could happen. Everyone thinks that something like this would never happen to them, I thought the same thing, but I am a perfect example.

I am here today to share with you my traumatic story on how much concussions have affected me and my life. I played my first basketball game when I was just seven years old and instantly fell in love with the sport. (I was even named “rookie of the year”.) That following spring, I had the opportunity to fall in love with softball as well. My life revolved around sports.

In junior high school my basketball coach loved how aggressive I was. But maybe I was too aggressive. A girl from the other team and I collided while fighting for the ball. We both fell to the ground. All I thought was “ouch my head” and just got up and continued to play. Even though we both fell to the ground holding our heads, coaches, refs nor parents had thought anything of it. That was the start of my series of seven concussions over the next four years.

The day following my collision, I stood home from school due to an unbearable headache. I then passed out and my mother called 911. At the emergency room, they in fact did diagnose me with a concussion and said I could return to play basketball in 2 weeks or when my symptoms were gone. As would any athlete, I convinced my parents that after the 2 weeks, I was symptom free. That was a big lie, I was still having headaches but I thought I was fine to go back a play, it was just a headache. And as fate would have it, the first game I return to, I collide with a girl again, this time leaving me hospitalized with a second concussion. At the hospital I did not know where I was, what happened or even what school I attended. I had no idea how my life would change because of this concussion.

In the days, weeks and months to come my daily life changed. Daily headaches, dizziness, memory loss, lack of concentration, depression are just a few of the symptoms that were part of my everyday life. School would never be the same and NO MORE SPORTS. I had the worst case of Post Concussion Syndrome that my pediatrician had ever seen. This would lead to a series of specialist that I would see over the next several years. I went to the Head Trauma Clinic at Boston Children’s Hospital several times for evaluations and recommendations, I also saw a Chiropractor, went for weekly acupuncture, had a speech therapist, massage therapy and a therapist, all to help me learn to live with what had happened.

Two weeks is definitely not enough time to let your brain rest and recover. I learned this at my first visit with Dr. Neil McGrath from the Sports Concussion New England clinic. During the visit, I took the ImPACT test, and my scores showed that I was nowhere near ready to go back to play. At first I resented Dr. McGrath, because he was taking away something that I loved. However, I now know the risks involved with not taking care of your brain. The ImPACT test can show something that no x-ray, CT scan or MRI can.

After several months my symptoms finally got better and I was cleared by Dr. McGrath to go back to play sports. You see, my love for sports far outweighed the

potential risk of playing again. To me life without basketball and softball just wasn't life.

During my high school years, I excelled in basketball and even more so in softball. I had college coaches looking at me in softball when I was only a sophomore. I couldn't wait for my senior year; however it was nothing like how I had imagined it. I received 5 concussions (2 playing softball, one from basketball, one from being punched by a client at my co-operative employment job and the final concussion sustained in December of 2008, a car accident) during my high school years that left me without half of my senior year, including softball. For the last 5 months of my senior year, I was home tutored. Each morning was a struggle to get up and face the day. The girl that fell in love with basketball when she was seven dreaded going to practice every day. I had headaches, lack of concentration, mood swings, depression and I just did not care about anything. I lost the pride and the joy of finally being a senior and a captain on my softball team. If I had played, I would have been named female athlete of the year. While all my classmates were involved in senior activities I was home depressed and in constant pain, and life had become a blur. I wasn't involved in any senior activities or the fun of just being a senior. I lost potential 4 year scholarships to play the sport I love. My dreams were crushed.

I cannot even begin to explain the daily struggle my life has become and everything I have lost because of my concussions. No one can see my injury but it's there. I know I have learned to overcome and compensated for my injuries because I am so determined to keep as many of my dreams in my life as possible, but not without a tremendous price. Every day I endure memory loss, lack of concentration, depression, slow processing speed and cognitive effects that makes my everyday life a battle. Yes, I have overcome many obstacles and accomplished a lot considering my injuries but no one but me truly understands what it is like to live everyday like this. If I can prevent even one person from experiencing what has happen to me then my trip here was a huge success.

I recently watched an ESPN special on a young man named Preston Plevretes who suffered only two concussions; however his second one changed his life forever. This shows that every concussion can be life threatening, even if you've had 1, 2, or 7. His second concussion caused him to lose consciousness; he woke for a few minutes, and then lapsed into a coma. He had a massive blood clot, and needed life-saving surgery. His first concussion was not treated properly. I will quote from the young man: he stated "I could have sat on the sidelines for a season, but now I will sit on the sidelines for the rest of my life". Preston is now in a wheelchair, has a home health aide, and receives intense physical and speech therapy. Preston is only 23 years old.

Concussions have been called the invisible injury; from my brief story I hope this Committee realizes the long term effects of concussions are not invisible. Over the last few years I have learned six important factors that cause concern for high school athletes

1. From my PSY 51 college course I learned the human brain does not fully develop until around the age of 24.

2. Research by the University of Pittsburgh Medical School found that high school athletes do not recover from concussions as quickly and report more symptoms than college athletes.

3. The National Athletic Trainers Association reports that over 50% of US high schools do not have access to an athletic trainer.

4. According to the Center Disease Control the main reason a high school athlete does not report a concussion is not the fear of losing playing time, but the lack of knowledge of what a concussion is and the potential long term effects if not reported and treated correctly.

5. Recent studies show that more than 62,000 concussions occur each year in high school sports, with football for accounting for about 60% of them. However, this is not solely a male/football issue in high school. The concussion rate in high school soccer is 68 % higher for girls than it is for boys. In high school basketball, female concussion rates nearly triple the boys' rate according to a study completed at Ohio State. Other studies show similar % differences between girls' softball and boys' baseball.

6. High school athletes are 3 times more likely to experience a second concussion if concussed once during a season.

Every concussion is unique and there is no one formula that can handle an injury so complex. Main care for all concussions will include rest periods, since the only way to start the recovery period is usually complete rest, both physical and mental. However this Committee should encourage a standard Athletic Concussion School Policy that would be used as a guide by all schools in the US. Such an initiative could follow the steps that were used to ensure all public schools created a Wellness

Plan if they wanted to participate in the National School Lunch Program. Such a national athletic concussion policy could include:

1. Concussion education for players, parents, coaches and school staff.
2. Pre-season baseline computerized testing to establish levels of memory, reaction time and processing speed. (ImPACT testing is the best researched and most commonly used tool to accomplish this task)
3. Use of a standard sideline test that screens for common concussion symptoms (SAC—the Sideline Assessment of Concussion is a reliable tool to accomplish this initial assessment)
4. Once a concussion has been identified, the athlete should visit the emergency room to be sure the injury has not caused any head trauma issues beyond a concussion. A follow up visit with their primary care physician would be encouraged.
5. Recovery period will include follow up ImPACT testing, on-going medical visits, reduced academic classroom demands reflected in an IEP or 504 Plan and gradual return to some form of physical activity.
6. The return to play should be decided by a team that includes parents, coach, trainer, teachers, school nurse, guidance counselor and athlete. These decisions should be based on all the clinical information available, concussion history, length of time since the concussion, performance in the classroom and lack of symptoms during rest and light exercise.

Beyond this school policy this Committee could encourage the use of Public Service Announcements during national sporting events that address the dangers of untreated athletic concussions and promote the distribution of the Center for Disease Control athletic concussion products called “Heads Up” to all national organizations that work with schools and athletic associations.

Thank you for your time today and for careful consideration on this very important public health issue. It can and will impact a lot of athletes.

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Chairman MILLER. Thank you, Michelle, for your testimony. And I want to thank your mother and your stepfather for also being here at this hearing.

Thank you.

And I would like to recognize Sarah Rainey.

Sarah, would you just raise your hand so the members of the committee can see where you are?

Her testimony is in our packets, and as Dr. Gioia made the point, it is certainly worth the members reading.

I would like to also, with the—move that without objection the committee is joined today by Congressman Pascrell from New Jersey who has been a leader in the efforts to treat and prevent concussions in school-aged children.

He founded the Congressional Brain Injury Task Force in 2001 and has introduced H.R. 1347, the Concussion Treatment and Care Tools Contact—Act, providing for, among other things, the establishment and implementation of concussion management guidelines for school-aged children.

Mr. Pascrell, we are pleased to have you here. You don't have to sit there. You can come and join one side or the other in the—yes, you are always on the outside there. [Laughter.]

So I just say that for the witnesses, because he will be joining us in the questions later on.

But thank you for joining us.

And I don't know if Congresswoman Bono-Mack will be joining us, but I extend the same request for her to sit with the committee and participate in the questioning.

And, Dr. Kohn, we will come to you now. Thank you.

**STATEMENT OF LINDA KOHN, DIRECTOR OF HEALTH CARE  
ISSUES, GOVERNMENT ACCOUNTABILITY OFFICE**

Ms. KOHN. Thank you, Chairman Miller, Ranking Member Kline and members of the committee. Thank you for inviting me here today to talk about concussions in high school sports.

Because it can be a very serious injury, you asked us what is known about the occurrence of concussion among high school athletes while playing or practicing competitive sports and about activities addressing the issue.

In terms of the first question, the frequency of occurrence, we found that the available information cannot provide an overall national estimate how—of how often concussion occurs and that, moreover, the figures that are available likely underestimate the magnitude.

We identified three sources of information that each capture one piece of the story. For example, a database at the Nationwide Children's Hospital in Columbus, Ohio monitors the occurrence of injuries, including concussion, at a sample of 100 high schools. But it only obtains—the figures they have published from that database only cover nine sports, not all sports.

Another database we identified is sponsored by the Consumer Product Safety Commission, and that captures information from people who are present with injuries at emergency rooms, but not everybody with a suspected concussion goes to an emergency room.

It is not that the numbers are wrong. It is just that it is not the full picture. And although it is useful to know how often concussion occurs among high school athletes, the goal isn't to get a perfect number. After all, if you are a parent and it is your child, there is really only one number that counts.

The other part of the issue is what to do when it happens, and we found activities targeted to this issue at both national and state levels.

At the federal level, the Centers for Disease Control and Prevention in the Department of Health and Human Services sponsors the primary educational initiative that is specifically directed at preventing concussion in high school sports, and you heard it referenced before. It is called "Heads Up: Concussion in High School Sports."

It provides educational materials for coaches, athletic trainers and directors, parents, and athletes. The program was initially rolled out in 2005 and the agency continues to update the materials.

At the state level, three states were identified to us as being key in terms of having passed legislation specific to concussion management in school sports, Oregon, Texas and Washington. All three state laws contain provisions regarding concussion education and also provisions regarding how quickly athletes can return to play after a suspected concussion, although the laws do vary.

For example, in terms of concussion education, Oregon targets the coaches; Washington targets the coaches, athletes and parents; and Texas targets coaches, trainers, physicians who work with the teams, athletes and directors of the marching band.

All three states require that an athlete returning to play be cleared in writing by some type of health professional.

We also identified five sets of voluntary guidelines that covered—nationwide guidelines that addressed the management of concussion in sports. All five guidelines are similar in that they recommend an athlete with a suspected concussion be monitored on the sidelines and return to play gradually.

Only one of the guidelines, that from the National Federation of State High School Associations, specifically targets high school sports, and that guideline recommends gradual increase in both physical and mental activity. So for example, the student may be—the athlete may be on an abbreviated school day, progress to a full school day, and then increasingly engage in physical activity.

When we looked at these various activities across CDC, the state laws, the guidelines, I personally was struck by how many people have the potential to observe the effects of a concussion in a high school athlete, as the graphic illustrates.

Certainly, the coaches and trainers are there, but so are the teammates, the parents, the teachers who may notice something a day after an injury, the school nurse, the family physician, the emergency room physician who may examine the athlete. There are lots of people around these kids, and everybody has an opportunity to contribute to making competitive sports as safe as they can be.

I will be happy to answer any questions you may have. Thank you very much.

[The statement of Ms. Kohn may be accessed at the following Internet address:]

*<http://www.gao.gov/new.items/d10569t.pdf>*

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Mr. TIERNEY [presiding]. Thank you, Doctor.  
Coach Monacelli?

**STATEMENT OF MICHAEL MONACELLI, ATHLETIC DIRECTOR  
AND HEAD VARSITY FOOTBALL COACH, CALEDONIA-  
MUMFORD CENTRAL HIGH SCHOOL**

Mr. MONACELLI. Good morning, Mr. Chairman and other distinguished members of the House Education and Labor Committee. Thank you for inviting me to speak on concussion management and how it is integrated into our district procedure.

In 2006 at an athletic director's conference, I sat in on a workshop that briefed us on concussion management program ImPACT. Being in the coaching business for close to 40 years and a witness to these types of injuries, this program and those like it had my attention.

After taking this information back to our district superintendent, it was an easy sale. Any program or policy that would reduce injury risk to our student-athletes is a priority for us.

We were able, within our school schedule, to not only test our student-athletes but all our middle school and high school students. Each student is tested every other year. Our district, Caledonia-Mumford Central School, felt that an injury that can affect cognitive functions can happen to any of our students, at home, to and from school, gym class, car accidents, etc.

Coverage for our total middle school and high school student population, and not just athletes, is important. We tested grades six, eight and 10 this spring.

For me personally as a coach, it has taken the guesswork out of determining when a player is ready to return to action after a concussion. In the past, the return to play was based more on “feel” than facts: “How many fingers am I holding up here?” “What is your girlfriend’s name?”

Basically you waited until the athlete was symptom-free—no headaches—if they were really honest with telling you that and their primary care physician this. We would keep them out for a day and then let them return to practice.

As a coach under the present system, I am much more comfortable relying on the post-testing and the re-entry protocol to aid in determining when an athlete is ready to compete or not. No real amount of thought was put into how severe the concussion was in the past, just when they could play.

“Second-impact syndrome” was not in our thoughts at all. Now we know that a second blow to the head while recovering from the first concussion is dangerous. It takes a lot less force to re-injure that brain.

This testing is very important because it reveals the second-impact syndrome, which is catastrophic and even fatal. The testing establishes when it is safe for the return—the athlete to return to play. But there is no real standard recovery time.

Our district initiated this testing in 2006. There was a question by parents of our student-athletes as to why we were doing this and if it would be restricting their playing time. No parent or athlete wants to hear that any significant amount of playing time will be missed.

But as our community became more aware of the safety rationale, they have become advocates for the testing, knowing their child’s concussion will be managed properly.

Another aspect of our testing has been to educate our classroom teachers. The student-athlete that is concussed can have serious cognitive difficulties that will impact their classroom learning. Oftentimes there has not been communication between athletics and academics regarding how an athletic injury can affect classroom achievement.

The student that is now quiet, listless, having headaches, dizzy, not responsive can have a legitimate medical reason due to being concussed, and academic aid can be used to address this.

To personalize concussion management even more, this past season my starting tailback became concussed. The district, parents, medical staff followed the protocol outlined in ImPACT. All felt that he was ready—was well on his way to recovery to play again this season.

That was until he reached Phase 4 of the re-entry protocol, that being non-contact skill drills that are sports specific, where he was having headaches. Again, following protocol, he had to retrace his recovery steps. He did not return this season as an active player.

He did, though, fully recover, start on our basketball team, competitively lift during our football off-season and is now enjoying a



good track season. He will be ready for this fall's football season, his true passion.

As his coach, I did not want to lose my number one back, but most assuredly I did want him to be healthy and safe. That was the real number one in my life and in his life.

We are in a comfort zone with concussion management in our district. We have full confidence in the system. Most assuredly, as coaches, we do not want to see these injuries. But we know now that a concussed student can be properly diagnosed and managed. The student-athlete will get better and will play again.

Thank you for the opportunity to testify today, Mr. Chairman, and I will be happy to answer any questions.

[The statement of Mr. Monacelli follows:]

**Prepared Statement of Michael T. Monacelli, Director of Athletics, Football Coach, Caledonia-Mumford Central School District**

Good morning Mr. Chairman, and other distinguished members of the House Education and Labor Committee. Thank you for inviting me to speak on concussion management and how it is integrated into our district procedure.

In 2006 at an athletic director's conference, I sat in on a workshop that briefed us on the concussion management program—ImPACT. Being in the coaching business for close to 40 years and a witness to those injuries, this program and those like it had my attention. After taking this information back to our district superintendent, it was an easy sale. Any program/policy that will reduce injury risks to our student-athletes is a priority.

We were able within our school schedule to not only test our student-athletes but all our middle school and high school students. Each student is teacher every other year. Our district, Caledonia-Mumford Central School, felt that an injury, that can affect cognitive functions, can happen to any of our students—at home, to and from school, gym class, car accidents, etc. Coverage for our total middle school and high school student population, not just athletes, is important. We tested grades 6, 8 and 10 this spring.

For me personally as a coach, it has taken the guesswork out of determining when a player is ready to return to action after a concussion. In the past, the return to play was based more on “feel than facts”—“how many fingers am I hold up here”—“what's your girl friends name”, etc. Basically you waited until the athlete was symptom free—no headaches (if they were really honest with telling you and their primary care physician this). We would keep them out another day after before letting the student return to practice. As a coach under the present system, I am much more comfortable relying upon the post-testing and re-entry protocol to aid in determining whether the athlete is ready to compete or not.

No real amount of thought was put into how severe the concussion was in the past—just when they can play. “Second-impact syndrome” was not in our thoughts at all. Now we know that a second blow to the head while recovering from the first concussion is dangerous. It takes a lot less force to reinjure the brain. This testing is very important because it reveals second-impact syndrome: which is catastrophic, even fatal. The testing establishes when it is safe for the athlete to return to play. There is no standard recovery time.

When our district initiated this testing in 2006 there was a question by parents of our student-athletes as to why we were doing this and would it be restricting their playing time. No parent or athlete wants to hear that any significant amount of playing time will be missed. But as our community became more aware of the safety rationale they have become advocates for the testing, knowing that their child's concussion will be managed properly.

Another aspect of our testing has been to educate our classroom teachers. The student-athlete that is concussed can have serious cognitive difficulties that will impact their classroom learning. Oftentimes there had not been communication between athletics and academics regarding how an athletic injury can affect classroom achievement. The student that is now quiet, listless, having headaches, dizzy and not very responsive can have a legitimate medical reason due to being concussed and academic aid can be used to address this.

To personalize concussion management even more, this past season my starting tailback became concussed. The district, parents and medical staff followed the protocol outline in ImPACT. All felt that he was well on his way to recovery to play

again this season. That was until he reached Phase 4 of the re-entry protocol—that being non-contact skill drills sports specific—where he was having headaches. Again, following protocol, he had to retrace his recovery steps. He did not return this season as an active player. He did, though, fully recover and start on our basketball team, competitively lift during our football off-season and is now enjoying a good track season. He will now be ready for this fall's football season, his true passion. As his coach, I did not want to lose my #1 back but most assuredly I did want him to be healthy and safe. That was the real #1 in my life and his.

We are in a comfort zone with concussion management in our district. We have full confidence in the system. Most assuredly as coaches, we do not want to see these injuries. But we know that now the concussed student can be properly diagnosed and managed. The student-athlete will get better and will play again.

Thank you again for this opportunity to testify today. Mr. Chairman, I would be happy to answer any question you or the other committee members may have.

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Mr. TIERNEY. Thank you, sir.  
Mr. Schmutz?

**STATEMENT OF JAMES C. SCHMUTZ, EXECUTIVE DIRECTOR,  
AMERICAN SPORT EDUCATION PROGRAM**

Mr. SCHMUTZ. Mr. Chairman and Representative Kline, members of the committee, good morning. Thank you for your leadership on this important issue on the impact of concussions on high school athletes.

Athletes first, winning second. That is the foundation of our approach at American Sport Education Program. My name is Jim Schmutz, and I am the executive director of ASEP.

We have been providing coach education to youth and scholastic sport coaches since 1981, and we have touched 1 million coaches in that time with our—with our courses.

Since 1990 we have joined forces with the National Federation of High Schools to develop an instructional program that is responsible for educating over 600,000 scholastic coaches in principles of coaching and sport first aid.

Our primary coaching text is Successful Coaching. It is also a best seller, recognized in the educational community and by coaches in the trenches.

Clearly, the incidence and prevalence of sport-related concussions is a matter that we at ASEP feel compelled to address. In a 2009 study by Yard and Comstock using nine sports, they revealed that there were 395,000 concussions sustained by high school athletes nationally. This goes back to Dr. Kohn's issue about the data that is out there and the penetration of it.

It is important to note that, again, this is not just a football issue. But one of the most alarming findings in the research was that 15.8 percent of football injuries returned more quickly, 1 day after the injury, and these were Grade III concussions, the most severe level of concussions.

The authors of this study concluded that too many adolescent athletes are not adhering to those recommended return-to-play guidelines, and that coaches, sport medicine professionals, parents and sports administrators must work together more effectively to ensure that athletes do follow those guidelines.

The problem is that those who are most often closest to the athletes when concussions occur are of significant influence in deter-

mining their condition. And a key figure in their return to action, the coaches, are seldom prepared to handle the responsibility.

Coach Monacelli is a great example of what we need to accomplish. His level of preparedness provides a safe environment for his athletes.

Even less frequently is a clearly defined and understood program in a place within schools' athletic departments to deal with concussion injuries. Again, I think Coach Monacelli is unique and a model for us to all look at.

At the national level, ASEP works with organizations like the National Federation of High Schools, American Football Coaches Association, the National Interscholastic Athletic Administrators Association, and ImPACT, which is an organization that provides assessment tools and services used by medical professionals, all working with the CDC to perpetuate change at the grassroots level. And you heard from Dr. Kohn about the efforts on the part of the CDC.

At the state level, state high school associations and athletic directors associations are doing similar work. The Pennsylvania State Athletic Directors Association under the leadership of Executive Director Bob Buckanavage has forged an alliance and it can serve as a model for other states across the country.

By including a full range of state leaders, including school board associations, elementary and high school, secondary school, principals and the Department of Education, Bob has engaged all key stakeholders at the high school level across the state.

This includes attention to concussion as part of a broader agenda to ensure a safe and healthy environment and a meaningful high school sports experience. The best evidence of success related to concussion is the fact that they have more high schools than any other state engaged in using concussion assessment tools through their relationship with Pittsburgh-based ImPACT.

No evidence would suggest that coaches in general are derelict in their duty to provide a safe environment for athletes. What is clear is in the case—that often less apparent—cumulative injuries like concussion, the uninformed, the untrained coach is over-matched by the role that he or she is expected to play in identifying and treating it.

As Dr. Kohn pointed out, the good news is more resources exist to prevent and manage concussions today than ever before. At every turn the CDC is connected with the organizations that I cited in partnering to address this very serious health issue.

The "Heads Up: Concussion in High School Sports" that Dr. Kohn referred to is an initiative under the leadership of Kelly Sarmiento, who is in daily contact with organizations across the country in trying to help and support the proliferation of this material.

It is also obviously encouraging that those materials be continued—be continued to be updated.

ASEP believes that a systematic education is critical to working hard to address the need to enhance and expand concussion education by revising our sport first aid course to include more comprehensive current information on concussion management with the intention of providing access to a full range of CDC resources.

By incorporating more concussion management education into a sport first aid course, coaches in states like California, where they are required to be first-aid certified, will benefit without added expense.

We have a serious problem in this country and need to do better. While it is clear that there is no shortage of resources, we also know that we have a great deal of work ahead of us. We need to perpetuate a culture of athlete and safety first.

We need to take advantage of the CDC and other resources in the process of formally educating coaches so that they can implement preventive measures to reduce the incidence of concussions and be better equipped to recognize and manage concussions when they do occur.

Thank you for giving me the opportunity to appear here today.  
[The statement of Mr. Schmutz follows:]

**Prepared Statement of James Schmutz, Executive Director, American Sport Education Program (A Division of Human Kinetics)**

Chairman Miller and Representative Kline, members of the committee, good morning. Thank you for your leadership on this important issue of The Impact of Concussions on High School Athlete.

“Athletes First, Winning Second.” That phrase is the foundation of the American Sport Education Program. My name is Jim Schmutz and I am the Executive Director of ASEP, a division of Human Kinetics. ASEP has been the leading provider of coach education for youth sport and scholastic coaches since 1981. Since that time, more than one million coaches have taken part in our courses.

In 1990 ASEP joined forces with the National Federation of High Schools to develop an instructional program that is responsible for educating over 600,000 coaches in the principles of coaching and sport first aid. Our primary coaching text, *Successful Coaching*, is the best selling general coaching text over the past 30 years and has received critical acclaim by both the educational community and coaches in the trenches.

In addition, ASEP has reached more than 400,000 youth sport and national sport governing body coaches with a wide range of high quality education courses. Our mission is simply to make sport safer, more enjoyable and a more valuable experience for athletes by developing education programs and resources for coaches, as well as officials, administrators, and parents.

*Defining the Problem*

Clearly, the incidence and, as we are discovering through more research findings, the prevalence of sport-related concussions is a matter that we in ASEP feel compelled to address. Yard and Comstock (2009) in *Brain Injury* reported an estimated 395,274 concussions sustained by high school athletes nationally in 9 sports during 2005-2008. Those sports included baseball, basketball, football, soccer, and wrestling for boys and basketball, soccer, softball, and volleyball for girls. Concussion rates were highest in football and softball.

Moreover, the study discovered a disturbing disregard for the seriousness of the injury, with athletes often returning to practice and competition before it was safe and appropriate for them to do so.

Average time missed due to concussions:

- 3-6 days (24.4%)
- 7-9 days (28.9%)
- 10 days (10.1%)
- More than 21 days (10%)

Perhaps the most alarming finding was that 15.8% of football players with the most severe (Grade III) concussions returned to play less than one day after incurring the injury. The authors of the study concluded that too many adolescent athletes are not adhering to recommended return-to-play guidelines, and that coaches, sports medicine professionals, parents, and sports administrators must work together more effectively to ensure athletes follow recommended guidelines. (A summary of this report can be found at: <http://informahealthcare.com/doi/abs/10.1080/02699050903283171>.)

The problem is that those who are most often closest to the athletes when concussions occur, of significant influence in determining how forthcoming athletes are

about their condition, and a key figure in their return to action-coaches-are seldom prepared to handle this responsibility. And, even less frequently is a clearly defined and understood program in place within school's athletic departments and sport organizations to deal with concussion injuries.

ASEP and others are trying to change that. And, from here on, I will highlight the two topics on which I was asked to speak today:

1. The important concussion prevention training efforts that are underway.
2. The resources available to coaches to help them employ effective concussion prevention and management measures.

#### *Concussion Prevention and Management Training*

No evidence would suggest that coaches, in general, are derelict in their duty to provide for the safety of their athletes. What is clear is that, in the case of what are often less apparent and cumulative injuries like concussion, the uninformed and untrained coach is overmatched by the role he or she is expected to play.

A study by Guilmette et al. (2007) found that New England high school head football coaches received information about concussions from this range of sources:

- 80% from coaching associations
- 79% from conferences
- 65% from magazines/newspapers/TV
- 31% from a CDC concussion kit

When asked to rate the helpfulness of the information from various sources, 59% said the Center of Disease Control (CDC) concussion kit was "very helpful." Next (55%) was input from health professionals, and third (53%) was the information gleaned at conferences.

Tools like the CDC kit can have a positive impact on coaches' awareness of concussion symptoms and their ability to act when concussions occur. In a recent survey (Sawyer et al., 2010, Health Promotion) of 487 coaches from five states

1. 50—66% reported having access to the toolkit materials (this varied by state)
2. 96% of coaches without a concussion plan indicated that the toolkit would be used to develop one
3. 87.9% recalled the laminated card listing the signs and symptoms
4. 83.7% reported looking at the toolkit's materials
5. Only 7.2% had disseminated the Fact Sheet for Athletes but 76% planned to do so
6. Only 4.4% had disseminated the Fact Sheet for Parents but 75% planned to do so

The good news is more resources exist to prevent and manage concussions today than ever before. Additionally, more attention through multiple channels is making concussion management a higher priority at all sport participation levels across the country. The Centers for Disease Control has taken a leadership role as a champion for providing a safer environment for scholastic sport participation. At every turn the CDC is connected with other organizations which are playing important roles in addressing this very serious health issue of epidemic proportion.

ASEP believes, and there is evidence to support this belief, that systematic education and not simply a troubleshooting toolkit is critical for the ability of coaches to handle all of the complex issues associated with concussion prevention, identification, notification, consultation, and decision-making. We would underscore the importance of professionalizing the role of high school coaches if we are going to demand more accountability and place more responsibilities on them, including concussion management. Similarly, the millions of youth sport coaches overseeing the participation of over 74 million children between ages 7 and 17 must have sufficient knowledge and training to prevent injury where possible and act properly when it does occur.

ASEP's two comprehensive text books *Successful Coaching* and *Sport First Aid* are ideal for high school coaches. Our classroom education courses led by certified instructors are the gold standard as activity/exercise based instruction provides interactive opportunities for coaches that cannot be replicated in our online versions of these courses. Additionally, we offer sport specific courses that help educate coaches on how to effectively prepare athletes to properly and safely perform skills. ASEP is working hard to address the need to enhance and expand concussion education by revising the *Sport First Aid* course to include more comprehensive current information on concussion management with the intention of providing access to the full range of CDC resources. By incorporating more concussion management education into the ASEP *Sport First Aid* course coaches in states like California where they are required to be first aid certified will benefit without added expense. <http://www.asep.com/>

In addition to ASEP the list of groups actively attempting to educate coaches about concussions and how to respond appropriately includes but is not limited to:

- The American Football Coaches Association
- The National Federation of High Schools
- The National Interscholastic Athletic Administrators Association
- National (Sport) Governing Bodies (US Lacrosse and USA Hockey)
- State Athletic Directors Associations
- State High School Associations
- ImPACT

*Centers for Disease Control (CDC)*

*Heads Up: Concussion in High School Sports*

Initially launched in 2005, the “Heads Up: Concussion in High School Sports” initiative continues to grow in popularity. The materials were developed for high school coaches, athletic directors, athletic trainers, parents, and athletes with the goal of raising awareness and improving prevention, recognition, and response to concussion. An evaluation study conducted by CDC in 2006, found that the materials lead to positive changes in high school coaches’ knowledge, attitudes, and behavior and skills related to concussion prevention and management. CDC revised the content in the initiative’s educational materials in 2009 to reflect the updates in the most recent international concussion consensus guidelines. The revised materials are scheduled to be re-released in summer 2010 to coincide with the release of an online training for high school coaches developed in partnership with the National Federation of State High School Associations. (See NFHS p. 5) <http://www.cdc.gov/concussion/HeadsUp/high-school.html>

*American Football Association (AFCA)*

ASEP has also developed strategic partnerships with organizations like the American Football Coaches Association to foster collaborative coaching education efforts. While most members are college coaches, the AFCA has defined the recruitment of high school coaches as a strategic objective. One value added benefit of membership is price discounts on three ASEP courses that offer Michigan State University and Michigan State Board of Education continuing education credits. <http://www.humankinetics.com/Continuing-Education-for-Coaches>

*The National Federation of High School Associations (NFHS)*

The NFHS has led the development of education-based interscholastic sports and activities that help students succeed in their lives. The NFHS launched on May 19, 2010 an online course entitled “Concussion in Sports-What You Need to Know” at no cost to the user. It will be available at [www.nfhslearn.com](http://www.nfhslearn.com). They have partnered with the CDC to deliver a course that will provide coaches, officials, parents and students information that will minimize the incidence and severity of head injuries. To highlight the continuing importance of this issue, the NFHS Sports Medicine Advisory Committee (SMAC) and each sport’s rules committee have taken the unprecedented step of including Concussion Recognition and Management as a point of emphasis in each NFHS sport rules book for the 2010-11 year.

*The National Interscholastic Athletic Administrators Association*

The mission of the NIAAA is to develop, enhance and preserve the educational values of interscholastic athletics. The NIAAA serves its members by providing resources to develop and to enhance leadership skills and to offer opportunities for professional growth. To that end they established a Leadership Training Institute to foster professional development in 1996. Athletic Administration courses like Legal Issues I (Risk Management) and Administration of Interscholastic Sports Medicine Programs Among are examples of the type of education course offering available to athletic administrators designed help them manage athletic address critical issues like concussion management as part of a holistic approach to providing the safest environment that also mitigates risk. <http://www.niaaa.org/Leadership-Training/leadership-training.asp>

*National (Sport) Governing Bodies*

US Lacrosse and USA Hockey are contact sports where athletes are exposed to the potential for concussions. USA Hockey provides CDC developed resource information to coaches via their website and Director of Coaching, Mark Tabrum is a strong advocate for safety as evidenced by the development of Heads Up Hockey technique as part of their beginner levels introduction to body contact. <http://www.usahockey.com/uploadedFiles/USAHockey/Menu-Coaches/Menu-Coaching-Materials/Menu-CEP-Materials/Introduction%20to%20Body%20Contact%2008.pdf>

US lacrosse has branded the CDC Heads Up fact sheet for concussions and they provide it online for their coaches. Additionally, CEO, Steven Stenersen is a strong proponent of effective concussion management as evidenced by his March 8, 2010 blog in which he closed with the strong definitive statement “When in doubt, sit ‘em out.” <http://www.uslacrosse.org/LinkClick.aspx?fileticket=ZakC3rKDnT4%3D&tabid=2351>

#### *State Athletic Directors Associations and State High School Associations*

For insight on how Administrators from a number of State Athletic Directors Associations and State High School Associations are responding to this challenge please refer Appendix D.

#### *ImPACT*

ImPACT Applications, Inc. is a premier provider of computerized neurocognitive assessment tools and services used by medical professionals to assist them in determining an athlete’s fitness to return to play after suffering a concussion. The ImPACT test provides an objective measurement of memory, reaction time, attention span, and other factors to help a clinician diagnose a concussion and decide when the patient has recovered.

ImPACT is a sophisticated, research-based computer test developed to help clinicians evaluate recovery following concussion. ImPACT is a 20-minute test battery that can be administered in the pre-season for a baseline and post-injury to track a concussion. ImPACT promotes an athlete’s full recovery from injury and assists clinicians in making a safe return-to-play decision and reducing the chance of follow-up concussions.

The ImPACT baseline test is ideally administered under the supervision of a clinician, athletic trainer, coach, or even a parent. The test involves tasks that measure a variety of factors. An initial test or “baseline test” is taken before a concussion occurs and establishes baseline results. When a concussion is suspected, a follow-up or “post-injury” test is administered to see if the results have changed from the baseline to help diagnose and manage the concussion. Additional follow-up tests may be administered over several days or weeks to assist the clinician with the return to play decision.

ImPACT provides comprehensive in-person or online training in the interpretation of test results, advice and consultation in the doctors’ community, and many other resources to help clinicians make the best use of test results.

ImPACT is designed to provide sensitive information in the form of cognitive data and symptom reporting in athletes suspected of sustaining a concussion. This information can be used to help determine recovery from injury and safe return to participation and overall clinical management issues.

ImPACT was founded in May 2002 by Mark Lovell, Ph.D, ABPN, Joseph Maroon, M.D., and Michael Collins, Ph.D. ImPACT team members have dedicated the past 15 years to the scientific study of sports-related concussion and the clinical application of this knowledge throughout professional and amateur sports.

#### *Sample of Current Users of ImPACT*

All NFL Teams • Cirque du Soleil • All MLB Teams • USA Rugby • All National Hockey League Teams • Irish Rugby • All Major League Soccer Teams • New Zealand Rugby • Major/Minor League Baseball Umpires • South African Rugby • USA Hockey • US Army • USA Olympic Hockey • US Navy • Ontario/Western Hockey Leagues • US Air Force Academy • USA Ski Team • 180+ Professional Sports Teams • US Soccer Federation • 2000+ High Schools • Swedish Soccer • 700+ Colleges and Universities • US Lacrosse • 550+ Clinical Centers • World Wrestling Entertainment • 180+ Credentialed ImPACT Consultants. ImPACT Web site: [www.impacttest.com](http://www.impacttest.com)

ESPN’s Questions vital to diagnosing concussion: <http://sports.espn.go.com/espn/e60/news/story?id=5162747>

Peer Reviewed Articles on ImPACT: Sensitivity and specificity of the ImPACT Test Battery for concussion in athletes <http://www.impacttest.com/pdf/SchatzSensitivityAccept.pdf>

It should be noted that in addition to ImPACT, Headminder Concussion Resolution Index and CogState Sport are two other organizations that have also established assessment tools.

#### *From the CDC Did you know? File*

- Each year, U.S. emergency departments treat an estimated 135,000 sports- and recreation-related TBIs, including concussions, among children ages 5 to 18. (MMWR July 2007)

- Athletes who have ever had a concussion are at increased risk for another concussion.
- Children and teens are more likely to get a concussion and take longer to recover than adults.

We have a serious problem and need to do better. While it is clear that there is no shortage of resources, we also know that we have a great deal of work ahead of us. We need to continue to move away from the old paradigm where the perception is an athlete is weak if they don't attempt to play through getting their "bell rung". We need to perpetuate a culture of athlete and safety first and action that results in "when in doubt, sit 'em out." We need to take advantage of the CDC and other resources not just to be distributed only to sit on a shelf. We need to use the resources in the process of formally educating coaches so that they can implement preventive measures to reduce the incidence of concussions. Through that education coaches will be better equipped recognize and manage concussions when they do occur.

Our experience at ASEP tells us that in order to achieve wide and deep penetration, coach education needs to be required. Our four year relationship with Babe Ruth League (BRL) and Ripken Baseball (RB) illustrates this point. Since implementing the mandate three years ago, over 91,000 BRL-RB coaches have been educated. Contrast that with multiple other youth sport organizations for whom ASEP built customized courses. These organizations recommend that coaches take their course and consequently less than 3% of their volunteer coaches opt to take the course. In a new collaborative effort with American Youth Football, President Joe Galat has made the commitment to require coaches to take an ASEP developed online course Coaching Youth Football the AYF Way online course in order to compete at tournaments. This course includes CDC information on concussion management.

As right minded as we might be, until extensive quality concussion education is mandated at the state or local level(see Virginia Beach example, appendix D p.14) we won't make a significant dent. Fewer concussions and fewer second impact incidents can only be achieved by action that results in requiring comprehensive education. Once in place:

1. Coaches must be held accountable by the state or local organization for meeting the requirement—there must be consequences for failure to comply.

2. The requirement must be comprehensive and include:

- a. Coaching principles that address coaching philosophy and season planning that includes a detailed concussion management component

- b. Comprehensive first aid specifically geared toward coaches, which includes concussion management protocols that are integrated into season planning component, parent orientation meeting, other stakeholder information dissemination etc. Remember the research that indicated—only 7.2% of the coaches disseminated information to athletes and 4.4% delivered the fact sheets to parents—we need to do better

- c. Continued emphasis on proper sport specific skill instruction, for example in football that would include proper tackling and blocking techniques among others

- d. Information and instruction on proper equipment fitting

- e. Attention to rules like the leadership role that NFHS took (p. 5 of this report)

3. Key stakeholders must agree on how concussion management systems will be implemented. The stakeholders include the athlete, coach, athletic trainer (if one exists), athletic director, school principal, school board, superintendent. All need to be accountable on some level for having been exposed to information and understanding the protocol and committing to the system.

4. A trained qualified doctor must be identified as part of the system as the final arbiter in making return to play decisions.

5. Financial resources have to be raised and/or committed by organizations at the state and community based level in order to meet the demands of the system. ASEP's recent collaboration with the LA84 Foundation and the LA City Section of the California Interscholastic Federation illustrates one potential model for alternative funding sources that could be applied to pursuing underwriting costs related to implementing a coaching education program. In this case the LA84 Foundation provided a grant to help underwrite a portion of the required course fee. As a result 250 coaches who need to meet the CIF coaching education course requirement will access the course for \$18 instead of \$38.

6. Human resources need to be dedicated to plan, implement and measure the impact/success of the system.

Over the years we have seen dramatic and positive impact of such educational efforts. Take for example the salt tablet and water deprivation. This was common practice in the 1970s. But scientists (nutritionists) and sports medicine specialists decried this accepted training tactic and studies pointed to the serious health risks



involved, thinking on this slowly turned. And not until coaching education services hammered this message home and taught alternate, safe hydration and heat illness prevention guidelines did this practice, with exceptions, stop altogether. We should be mindful of those exceptions so that we sustain a relentless approach to educating every coach.

I said earlier that this has to be a catalyst for professionalizing the role of being a high school coach. And we cannot be hostage to a bad economy and widespread school budget cuts. We must find a way to utilize the vast, high quality resources to educate our coaches. Together, we can do better. Together we can make a difference in the lives of millions of scholastic athletes.

Members of the committee, coach education is the foundation from which success can be built in managing the impact on concussions on high school athletes. Our ASEP team has a great deal of respect for the committee's leadership on this issue. We look forward to continued collaboration with key stakeholders and resource developers so that we can help pave the way for standards of care which lead to decisions that are made with the athlete's health and safety as the first priority and only consideration.

Thank you for giving me the opportunity to appear before you today.

*Athletes First, Winning Second*

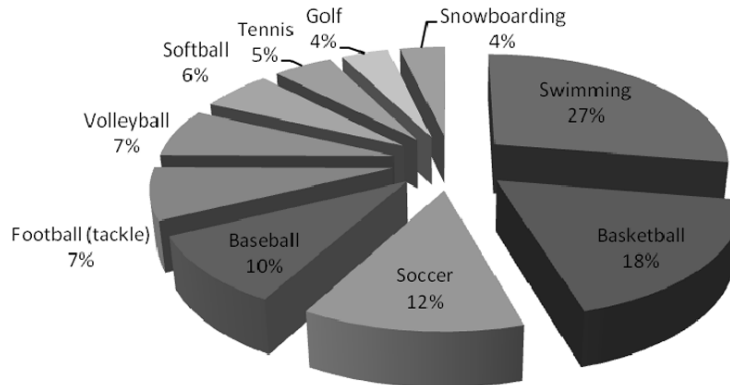
APPENDIX A

**2008 Sporting Goods Manufacturers Association Survey Results**

GENERAL YOUTH SPORTS INFORMATION

[Source: Sporting Goods Manufacturers Association]

Sport	2008 Participants (ages 7-17)
Swimming .....	20,532,000
Basketball .....	13,288,000
Soccer .....	9,284,000
Baseball .....	7,268,000
Football (tackle) .....	5,508,000
Volleyball .....	5,135,000
Softball .....	4,247,000
Tennis .....	3,542,000
Golf .....	2,847,000
Snowboarding .....	2,725,000



Category = Participation (Ages 7+) Ranking: Total Ages 7-17 (No. of Part. in Thous.)

APPENDIX B

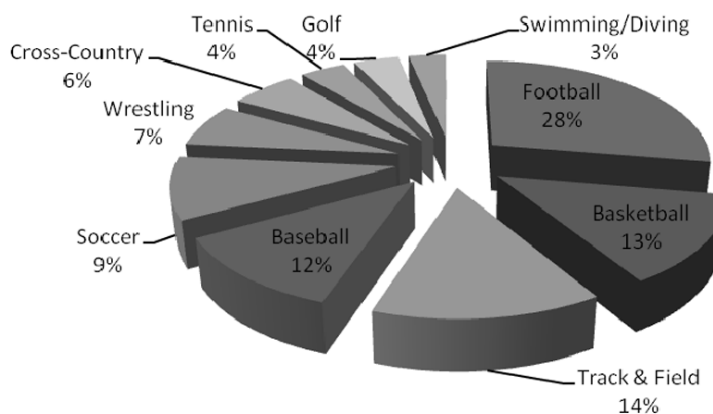
TABLE 1: TOP TEN SPORTS BY PARTICIPATION (BOYS)

[Total Number of High School Athletes (Boys): 4,422,662]

Sport	2009 Participants (high school boys)	2009 Teams (high school boys)
Football .....	1,112,303	12,105
Track & Field .....	558,007	15,936
Basketball .....	545,145	17,869
Baseball .....	473,184	15,699
Soccer .....	383,824	11,139
Wrestling .....	267,378	10,254
Cross-Country .....	231,452	13,647
Tennis .....	157,165	9,499
Golf .....	157,062	13,543
Swimming/Diving .....	130,182	6,556

Source: National Federation of State High School Associations.

TABLE 2: TOP TEN SPORTS BY PERCENTAGE OF PARTICIPATION (BOYS)



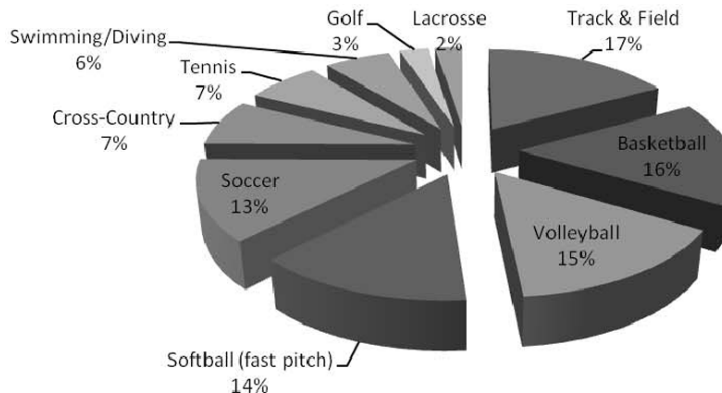
APPENDIX C

TABLE 3: TOP TEN SPORTS BY PARTICIPATION (GIRLS)

[Total Number of High School Athletes (Girls): 3,114,091]

Sport	2009 Participants (high school girls)	2009 Teams (high school girls)
Track & Field .....	457,732	15,864
Basketball .....	444,809	17,582
Volleyball .....	404,243	15,069
Softball (fast pitch) .....	368,921	15,172
Soccer .....	344,534	10,548
Cross-Country .....	198,199	13,457
Tennis .....	177,593	9,693
Swimming/Diving .....	158,879	6,902
Golf .....	69,223	9,344
Lacrosse .....	64,929	1,780

TABLE 4: TOP TEN SPORTS BY PERCENTAGE OF PARTICIPATION (GIRLS)



## APPENDIX D

*State Athletic Directors Associations and State High School Association Related Action*

The Pennsylvania State Athletic Directors Association (PSADA) is one example of how athletic administrators can take a leadership role. PSADA Executive Director, Bob Buckanavage chairs the PA Alliance in Sport Committee which represents the PA School Boards Association, the PA Association of School Administrators, The PA Association of Elementary and Secondary School Principals, the PA Interscholastic Athletic Association, the PA State Athletic Directors Association, and the PA Department of Education. The group met most recently, on Monday May 10, 2010 to discuss relevant issues in the sport arena.

One of the important issues has to do with concussion management legislation that the members of the alliance are monitoring, namely, HB 2060 and SB 1241. Both bills appropriately address the Management of Concussions and Head Injuries and the alliance is fully supportive of this legislation.

PIAA Executive Director Brad Cashman presented a comprehensive report which included the following:

1. The National Federation of High Schools (NFHS) position regarding rule changes for the 2010-11 sport season and Suggested Guidelines for Management of Concussions.
2. The NFHS Coach Education module "Concussions in Sport—What You Need to Know."
3. The Center for Disease Control and Prevention has developed a tool kit for coaches titled: Heads Up: Concussion In High School Sports.
4. The PIAA Sport Medicine Advisory Committee's decision to incorporate appropriate language in its Comprehensive Initial Pre-Participation Physical Evaluation form (CIPPE ) addressing the management of concussions.

The alliance unanimously approved of the report that Mr. Cashman presented and supports the premise that a student-athlete shall not return to play until they are evaluated by a licensed health care provider trained in the evaluation and management of concussions.

BOB BUCKANAVAGE, *Executive Director,*  
*Pennsylvania State Athletic Directors Association.*

In light of the new NFHS Rules, procedures and suggested guidelines for concussion management, Kansas is actively working on developing a protocol for our schools to ensure all coaches and administrators understand their responsibilities toward young people who experience concussion or related symptoms while participating in sports and activities. We anticipate promoting widespread utilization of the NFHS Concussion Management course when it becomes operational this summer by all schools as in-service for their personnel, students and even parents. We are currently working with legal counsel and the Kansas Board of Healing Arts to

determine who the “appropriate health care professionals” are to evaluate kids and make determinations about return to play.

GARY MUSSELMAN, *Executive Director,*  
*Kansas State High School Activities Association.*

Our Sports Medicine Advisory Committee, which is made up of doctors and trainers, recommended updated guidelines to our MHSAA Executive Committee. These newly adopted concussion guidelines are in conjunction with the NFHS guidelines. They have been officially released to our 574 member schools for use during the 2010-2011 school year.

ENNIS PROCTOR,  
*Mississippi High School Activities Association.*

For almost twenty years now the Virginia Beach City Public Schools have been offering education courses for athletic coaches. As you can imagine, a school division of close to 70,000 students employs a large number of individuals to serve as coaches at the middle and high school levels. That also means there are a large number of individuals who are representing the school system with their actions on and off the sidelines, some of which have no formal training in working with students and parents. Some may have been blue-chip athletes in their own right, but that doesn't always translate into a quality coach. Fortunately, our school system saw the need to offer courses in coaching in the late 1980's. From the start and because it was not mandatory at the time, coaches who chose to take the classes gave the courses high marks, for the most part, on their evaluations. But classes were relatively small compared to the total number of coaches in the school system. About five years ago, our division implemented mandatory coaches education as part of a plan to enhance coaches' professionalism. We had three years to certify over four hundred coaches. Although most probably were not interested in adding another time commitment to spend sixteen hours in the classroom and several more on three online tests, we always received a large, large majority of positive evaluations from our coaches. Once they went through the program, the value was apparent to them. We were able to meet our goal; at this point, all of our middle school and high school athletic coaches with two or more years of experience in our school division have completed our coaches education requirements. It definitely has not been a cheap endeavor, but it has definitely been a worthwhile endeavor. I feel like our coaches have a good understanding of our school system's expectations, and they also know that their competitor colleague on the opposite side of the field has heard the same instruction and is playing by the same rules. I am a strong proponent of school systems utilizing a quality coaches education program. David Rhodes, CAA, Coordinator, Student Activities, Virginia Beach City Public Schools

The Wisconsin Interscholastic Athletic Association has been one of the leading state associations (if not the leader) in sports medical concerns in the country. Our committee meets twice a year and communicates amongst one another and our staff throughout the year. They have been out front in many areas, PES, MRSA, H1N1, and concussion. Our sports medical team has provided concussion management protocols to our member schools for years. They have created a Medical Policies and Procedures Manual which has been provided to our member schools. <http://www.wiaawi.org/publications/medicalproceduresguide.pdf>

Last year, our committee implemented the Zurich conventions and implemented the most stringent concussion rule in the NFHS with new rules and guidelines:

- If you think your athlete has sustained a concussion \* \* \* IMMEDIATELY take him/her out of play, and seek the advice of a health care professional experienced in evaluating for concussion.

- WIAA Rule: A student who displays symptoms of concussion and/or is rendered unconscious may not return to practice or competition during the same day without a physician's written approval.

- WIAA Rule: An apparently unconscious player is determined by the game officials. The player may not return to play in the game (without written authorization from a physician).

Before every sport season, our assistant directors hold sport meetings. Materials on concussion, performance enhancing substances, heat stroke, and other materials are provided to our coaches in our sports. Our web site has sections which cover each of these areas and are used by our coaches, parents, and member schools. This year, we will be utilizing the materials provided by the NFHS to require our member schools to educate their coaching staffs, parents, and athletes in concussion

management. I truly believe our people have done a tremendous job. I've copied in our Doctors to respond to your message as well.

WADE LABECKI, *Deputy Director,*  
*Wisconsin Interscholastic Athletic Association.*

In Ohio, we have been working hard with our constituents and our legislature. The following is a review of what we have been doing this past school year. The OHSAA has made a concerted effort to provide educational resources to member schools on this vital topic of concussion management. The following are resources that are currently available:

1. Suggested Guidelines for Concussion Management in Sport—a publication from the NFHS
2. Questions vital to diagnosing concussion—Q& A and a video from an ESPN special on concussions—<http://sports.espn.go.com/espn/e60/news/story?id=5162747>
3. Concussion in Sports—What you Need to Know—[www.nfhslearn.com](http://www.nfhslearn.com).
4. Centers for Disease Control—Resources to Prevent and Recognize Concussions—<http://www.cdc.gov/Features/Concussion>
5. Fact Sheets for Parents, Coaches and Athletes—<http://www.ohsaa.org/medicine/ParentsFactsheet.pdf>;  
<http://www.ohsaa.org/medicine/CoachGuide%20on%20Concussion.pdf>;  
<http://www.ohsaa.org/medicine/AthleteFactsheet.pdf>
6. Video from the Washington Interscholastic Activities Association—Recognizing Sports Concussions <http://www.ohsaa.org/medicine/Concussion%20Stuff/DVD-1-0000.wmv>
7. The OHSAA has adopted the following sports regulation:

Any athlete who exhibits signs, symptoms or behaviors consistent with a concussion (such as loss of consciousness, headache, dizziness, confusion or balance problems) shall be immediately removed from the contest and shall not return to play until cleared with written authorization by an appropriate health care professional. In Ohio, an “appropriate health care professional” shall be a physician, as authorized under ORC Chapter 4731 and includes both doctors of medicine (M.D.) and doctors of osteopathy (D.O.) and an athletic trainer, licensed under ORC Chapter 4755.

Note: This information will be included in all preseason manuals for coaches and officials, posted to the respective sports and officiating pages of the web site and presented at mandatory rules interpretation meetings. Deborah B. Moore, Ph.D., Associate Commissioner, Ohio High School Athletic Association

The California Interscholastic Federation (CIF) has some new concussion bylaws which of course all sections will be following. In our CIF/Central Coast Section, we are working on getting a Doctor trained in concussions to speak at our Fall Administrators' workshops which all our school principals, VPs and AD's are required to attend. <http://www.cifstate.org/health-safety/pdf/Play-It-Safer-Top-Ten-Tips-For-Parents-in-English-&-Spanish.pdf>

NANCY LAZENBY BLASER, *CIF,*  
*Central Coast Section Commissioner.*

Mr. TIERNEY. Thank you very much, Mr. Schmutz.

Thank all of our witnesses for their testimony today. It is extremely helpful to all the members here. We are going to start on our question-and-answer section of this with 5-minute segments, beginning with Mr. Payne.

Mr. Payne, you are recognized.

Mr. PAYNE. Thank you very much.

Let me thank you all for coming and in particular our young athlete. Just some questions, maybe starting with the coach.

You know, the way that you have approached coaching, I think, is great. And I don't know whether you are the exception to the rule or the rule. I would hope that you are the rule, not the exception.

However, having been involved in sports when I was young, I know that coaches tend to want to win, and that is the way it was and is today. I would even imagine that when you—if you played ball—I assume you did—coaches used to tell you, you know, if you are injured, just keep going, you know, if you—not necessarily a

concussion, but an injury, say, to an ankle or something, you know, would almost encourage you if you were one of, you know, the stars that you have got to—for the team, you have got to go out there because we have got to win the game, don't let your teammates down. That is the way it was years ago when I was playing ball.

Do you think that there is still much of that philosophy still going on? And I might also ask Mr. Schmutz, since you have gathered information in general.

In high school, do you think it is still that drive to win at all costs, Coach?

Mr. MONACELLI. I think as New York State has evolved into coaching education classes, philosophy and principles in sports—in managing sports—we have started—we are involved in schooling our young coaches, the new coaches, into—or away from this idea, win at all costs, to hey, liability is important. This young man has—or young woman has another life here besides what we think is evolved around our life, or the school's life, or the community's life.

And I think that has helped a great deal in our state in making that mandatory to get that important principle of safety and liability out there, and it is—there is more to this than the game.

Mr. PAYNE. Mr. Schmutz?

Mr. SCHMUTZ. In addressing your first question, I would say Coach Monacelli is closer to the exception than he is the rule. But I think it is a really good example, because he absolutely puts his athletes first, and yet he has won five state titles. I think it really emphasizes the value of putting the athletes first, and that if you do that, winning becomes a by-product.

The reality is the philosophy with which coach comes to practice every day and instills in his players results in their ability to come together as a team. And if we can continue to use coaches like Coach Monacelli to educate the young coaches as he described, we will move much closer to him—other coaches being more the rule than the exception.

Mr. PAYNE. Thank you. You know, we look at, say, the real contact sports—football is probably the one that comes to mind the most. Hockey in high school is probably, you know, less of a sport since many of the schools don't have it.

But what is the danger of concussions—the problem of concussions only being sort of focused on football but other sports even where kids have less protection? You know, the opportunity—just like basketball, you don't think of basketball as being a sport where a concussion—you are worried about the football team.

How is that handled? Because concussions can happen in whatever sports you are playing. Mr. Schmutz or anyone else?

Mr. SCHMUTZ. Well, I would also defer to Dr. Gioia with his research. But women's soccer is a really good example of a sport where there is a high prevalence of concussions, and clearly there is no equipment there.

I think, you know, from a prevention standpoint, coaching education on specific skill development and how one positions themselves to play a ball, how one positions themselves to brace physical contact—as much as soccer is a artistic sport, it is also a very physical sport.

And so I think it underscores that this is not just a football issue and that, in fact, education both on the skill side and teaching the proper skills but also on recognition and prevention and management—all of that—the comprehensive piece—this has to be a holistic approach and can't be dealt in isolation.

Mr. PAYNE. Doctor?

Mr. GIOIA. Yes, I think the other point is that, you know, certainly in our clinic and in our research we see these injuries happening in all sports. We think about football but, really, ice hockey, lacrosse, basketball, wrestling, cheerleading, gymnastics—you know, the—and we have already mentioned soccer.

You know, these are all sports where there is either a direct collision or there is a high risk for that. And I think that the focus certainly on the education has been in all sports, and if we look at what the CDC has provided in their Heads Up toolkit, this can go to all coaches, information about the signs and symptoms, regardless of whether, you know, you are in a sport that may not have a high incidence.

It is all about understanding what the nature of that injury is, the sign, the symptom, and when in doubt you pull them out. So I think it is important that we get that across broadly and universally.

Mr. PAYNE. Well, thank you very much.

And I would like to also commend my colleague from New Jersey for his legislation and I am really glad as a former coach and a former athlete to really see the attention drawn to this, because some of the fellows I played with are still suffering from concussions that—you were supposed to play whether you had a concussion or not, you know.

Thank you. I yield back.

Mr. TIERNEY. Thank you, Mr. Payne.

Mr. Kline?

Mr. KLINE. Thank you. I want to thank the witnesses again. Excellent testimony, and it sounds like you are all doing excellent work. I particularly want to thank Ms. Pelton for sharing her story—sharing your story. It is a compelling story.

Share a short story of my own—I have a staff member who suffered a traumatic brain injury a couple of years ago now. She is a mother of two, an adult, and that injury forced her to the point where she couldn't walk, she couldn't read, she couldn't write, she couldn't drive. She really couldn't be a mother, although she was, in fact, a mother of two, and it made for an interesting relationship when her emotional state was younger than her children.

But she has recovered almost 100 percent. She can read and write and drive and function as a mother. It took a lot of work. And so I would recommend to you that you stay at it, and you will be—you, too, will be 100 percent. But it shows how in a blink of an eye a life can change with one of these concussions, one of these injuries.

And to that end, Dr. Gioia, I was noticing that you said that you and your staff at the Children's Medical Center spent a lot of time trying to help these student athletes cope with an academic life, a school life. Can you just take a moment and kind of explain how you do that?

Are you working with the teachers, or is this coaching the student athlete? Is it working through the doctors? How do you help them make that adjustment?

Mr. GIOIA. Yes, thanks for that question. Thanks for that question, because it is—as Sarah can, again, probably give her personal experience and actually does in her testimony as well, when we have kids that come into our clinic, the first thing we are doing is we are evaluating the extent of the injury, the extent of the symptoms—you know, do they reach into the cognitive area, do they have headaches, fatigue, are they having problems with light sensitivity or noise, sounds, are they more irritable?

So we are looking at really that pattern and profile of things that are impaired. We then look at what can they tolerate based on that symptom profile. And the whole idea in concussion management is to allow recovery but also to allow the student back into as much as they can tolerate, and that is a key point here, because when we are talking about kids, and we are talking about school, we have to very carefully manage and measure what they should and should not be doing.

And so part of our program is to identify what is that tolerable level up to which the symptoms do not worsen, do not exacerbate. And then based on that, we write out a care plan for every student athlete that is going back into school with very explicit, detailed instructions for the school.

As Sarah knows, we go through what is first period, what is second period, what is third period. How do we build those breaks into the day? We don't want that brain to be driving itself down. We want to be sure that you are alert and capable, but when you do feel the symptoms worsen that is when you build that break in.

We need the teachers, of course, to be a part of that, so we are always looking for that individual inside the school, and the school nurses oftentimes play an important role—the school counselors—to really, then, work with that academic team, to get the message out, to distribute that care plan, and to really work with that student to be sure that they are not overtaxing them.

So it is important, again, to normalize life as much as you can, but only as much as is tolerable. And it is really that communication back and forth with the school that is critical.

It is why that—the new school toolkit that the CDC is just introducing today is critically important. We have to get training out to the schools. Once they understand it, then the pressure is taken off the parent and the student to have to convince them of it. It is all critically important.

Mr. KLINE. Great. Thank you. Thank you very much.

I want to shift now to the coach.

In your testimony and in your responses so far, it is clear that you have achieved buy-in from the community. This is not just a question of you and your fellow coaches being more aware and having a plan and being able to deal with it, but as you said, you—it was kind of a hard sell for—sometimes for the parents and for the community, who want that championship and are questioning why the quarterback is not in the game.



How do you envision that—how did you get that outreach, and what do you recommend be done to get that buy-in from the community?

Mr. MONACELLI. Well, at the beginning we put it on our Web site, the back—all the background was given to our school health nurse, who fields an awful lot of phone calls. As the athletic director, I took care of communication on some of that also.

It was put on our district calendar that would go out to everybody in the district. And I think when it came to the point regardless of our success and sports programs there, it didn't take long for them to say, "Well, this just isn't another test, you know? We are not—this is not a time-waster."

And after the second year, and we found out that it was more than just athletes that we are—now we are testing everybody and tried to, again, educate the community that it was more than just the athletic injury, that it could be the accident at home, too, and that it wasn't just athletics, it was their cognitive ability, their ability to be a good student, then things fell into place.

Mr. KLINE. Thank you.

Thank you, Mr. Chairman.

Chairman MILLER [presiding]. Thank you. I would ask unanimous consent that instead of—we keep referring to Sarah.

Sarah, if you would like to come sit next to Dr. Gioia and then if you think it is appropriate to speak up on one of these answers, just elbow your way in there, and let us have the benefit of your thinking and experiences along with Michelle's. Thank you.

Mr. Tierney?

Mr. TIERNEY. Thank you, Mr. Chairman. That was timely, because I do want to ask Sarah and Michelle a question. We have talked about the perspective of the coaches and the teachers and the community on that.

What kind of support did you get or not get from your fellow students when you were going through this process of recovery? And what do you think that we ought to be doing to make that an easier transition? Whichever one wants to go first.

Michelle, why don't you start?

Ms. PELTON. Well, a lot of people did think that I was just lazy and that I was beating the system, and they didn't understand at all what I was going through. My friends, you know, did help a lot, and my teachers—they followed the 504 plan that I was on, which gives me, you know, extra time to do my work and everything.

And I actually had a one on one with my teachers at home which helped a lot. That made me, you know, pass actually my senior year. That is one reason why I passed. And that is pretty much it.

Ms. RAINEY. Like Michelle said, most of the people just at our school thought that it was nothing, it was a headache and you get over it. The teachers supported me a lot, but it is hard to incorporate these breaks.

You either have to, you know, take a period off or try to figure out a system that works so you can get work done and just stay in school to get your grades up. So that was a real challenge.

Mr. TIERNEY. I bet it was.

Mr. Chairman, I would like to yield to Mr. Pascrell. He has done a lot of work on this area and I would like to give him the opportunity early on to ask a question if he would care to.

Mr. PASCRELL. I thank the gentleman. Appreciate that.

Thank the chairman, members of the committee.

Interesting. Today I am going to be meeting with the Department of Defense because we have done a lot of work with them and our soldiers who had nothing up until 3, 4 years ago when they came back—20 percent of them have suffered traumatic brain injury. God knows how many have post-traumatic stress disorder.

And pay a visit to Walter Reed Hospital and you will know what I am talking about. This is a very critical issue. Forty percent, by estimates, of people go back into the sport too early after they had—they are concussed. Very dangerous situation.

I have worked very closely with Congressman Todd Platts of Pennsylvania in putting legislation together, the ConTACT Act, which has the endorsement of all—most of the major sports—NFL—because they just cleaned up their act, too.

When you talk to many—and Congressman Payne referred to this—many of the athletes who are—no human being is a vegetable, but they have lost everything, 40, 50 years of age. They were not attended to. Nobody took them seriously. Their teams and the league ignored them and, worse, swept it under the rug.

We had a young lady in the state of New Jersey in Marlboro High School who has had 11 concussions, so she can't do any sports anymore.

So we are trying in the legislation that we proposed, Todd and myself, to get some kind of a protocol, national protocol, going to help coaches. We don't want the protocol to be defined by the Congress, God forbid. We want the protocol to be defined by professionals as an aid, so that schools throughout the nation can get help.

We have overlooked—and I am glad the two young ladies, Sarah and Michelle, are here today. But we have overlooked injuries, to a large degree, to gals, girls, ladies, females. You are more vulnerable and susceptible because of the position of the brain and the vessel within the brain that covers the brain, controls the brain—secures the brain, rather, because it is very different in males.

And so we think that girls don't get hurt, except if they break an ankle or if there is blood, and we don't take any different of an attitude, really, as we look at our soldiers. No contusion, no blood, so—we have only started to get into helping our soldiers and their families.

It is a whole family operation, as it is with you. Think about your own family and what happened after you had a concussion, and you told—and they found out about it, because your parents, many of them, want you out there in the field, are just as enthusiastic—are living, many times, through you their own inadequacies to gain favor on the basketball court or the soccer field or the football field.

Coach, I don't have to tell you, how many parents have you put up with over the years? So you know exactly what we are talking about.

But the bill first brings together a conference of stakeholders, as I said, to establish a concussion management guideline that would

prevent, identify, treat and manage concussions. It then authorizes grants to the states for adopting, disseminating and implementing these guidelines.

Look, the federal government is probably involved in too many things. I think it has a responsibility to lead, since the states are very reluctant to do it. The three states that have stepped up to the plate somewhat have very different protocols, and so there is not one that they have decided on.

And if I could, through the chair, ask a question to Dr——

Chairman MILLER. [Off mike.]

Mr. PASCRELL. Okay.

Thank you very much, Mr. Tierney.

Chairman MILLER. Mr. Poe?

Mr. POE. Thank you, Mr. Chairman.

And thank the panel. This has been a really great, enlightening panel this morning. I, too, as Congressman Payne—if you played football or participated in sports, you probably eventually got a lick on the head. I ended up in Congress. I don't know what that says about my lick on the head, but——

[Laughter.]

Coach, you remember—and I think the reason you have been successful is because you were successful and people have tremendous respect for you in your community. I know that from just listening to you.

When the coach who has won five state championships says, “You sit out,” you sit out. And I know that what you have been able to do because of the respect they have for you—there is tremendous pressure to win, and there is also tremendous pressure when you are an athlete.

You have a very short time to play, and it is—and in high school it is probably 2 or 3 years max. You are not going to play as a freshman. And there is tremendous pressure on you as an athlete and as families, so what I think you did was—and what I think is—and Dr. Gioia mentioned what is being tried is to get a protocol and some evidence-based medicine—and I am a physician, and all—and because of that ended up being the team coach for I can't tell you—and the coach for I can't tell you how many different teams through elementary school and high school.

So I think you have to educate the personnel, the coaches, and nobody rewards you when you lose. And that is a big pressure on the coaches and the families, too. And the other—on young men is that, you know, you are going to play hurt if you play football. You are going to get banged up, and you are going to play hurt.

So I think educating the coaches, educating the athlete that you can't be playing, and then the family and the community, as Congressman Kline mentioned, I think is imperative. So I think having a program in communities, through the school board or whatever, to educate—coaching clinics that you go to.

Is that how you—I heard a little bit about how you did that. Is that how you all accomplished that in your community? Was it coaching clinics?

Mr. MONACELLI. I am sorry, I didn't catch that question.

Mr. POE. Coaching clinics and very—that is how you—or it has been—it has been kind of a transition, it sounds like, in your community.

Mr. MONACELLI. Yes. I mean, this is—

Mr. POE. A progression.

Mr. MONACELLI. In the coaching world, this has been the buzzword.

Mr. POE. Okay.

Mr. MONACELLI. You know? There is still some of us dinosaurs out there, but—and that understand both sides of this, and now, really, more understand the injury side.

And we are trying to educate those younger ones coming through, and at the athletic directors conferences and the coaching conferences, this is becoming the workshop topic.

Mr. POE. Well, nobody ever got better academically by getting a kick to the head. I totally agree with that.

When these students come in, Dr. Gioia, to your clinic and—do you all evaluate them with MRI, C.T., psychological—how are they evaluated?

Mr. GIOIA. Many of the kids have had either typically C.T., maybe MRI, as a screening. But what we know is that conventional neuroimaging methods of C.T. and MRI tell us about the hardware of the brain, and we use that mostly to rule out more catastrophic problems.

Research now is looking at some of the more advanced neuroimaging that allows us to look at the software systems. But the bottom line is those are experimental research methods right now.

So what we do is we look at their neuropsychological functioning, their neurocognitive functioning. We do very specific symptom-based assessments. We ask parents and the student athlete to tell us about those—so that we use a set of information to basically look at that profile.

The cognitive testing that we use is similar to what Coach Monacelli is using, the ImpACT software, and there is a variety of ones out there. The bottom line is we need both objective and good measurable tools in order to look at that level of—well, first, impairment, and then the level of recovery and to guide that along the way.

The other thing, of course—and you will know this as much as anybody on the panel—is that the relationship with the family and that—and that patient is critical. And to understand the nature of the sports injury is critical in the athlete.

It is very difficult for them to be sitting out, and quite honestly, when I was playing, you know, high school football and wrestling and all those good sports, you know, my main focus was being on the field.

I think it is where we also have to bring perspective to the responsible caretakers, the parents, the coaches, the teachers, but at the same time, we also get a message across to the teammates.

A teammate that sees their friend impaired and who has knowledge now about the dangers of this injury really has responsibility for helping that teammate get off the field, letting the coach know. You are not snitching on your teammate, you are actually respon-

sible for their health. They may not be able to make that decision on the field.

So there is a variety of places where we really need to get that message across, and the relationship is very important.

Mr. POE. Okay.

Thank you, Mr. Chairman.

Chairman MILLER. Mrs. McCarthy?

Mrs. MCCARTHY. Thank you.

And I thank you for your testimony. It certainly is a subject that we should be definitely doing something about. And I want to thank again my colleague from New Jersey for the work that he has done on TBI.

One of the things that I have been working on for a number of years is making sure or hoping to make sure that we have school nurses in all schools. When I started looking at the issue, some schools have one nurse for 5,000 to 7,000 students, which is totally unacceptable.

But with that being said, we know that some schools have school nurses, they have athletic trainers, as far as picking up the symptoms.

But I think the most important thing for why you are all here—and certainly, there is a number of pieces of legislation to work on that—what would you all like to see as far as what we need to do to certainly make it more aware and to help you and, certainly, the coach, the doctors, the students to make this, certainly, as safe as possible? What would you want us to do?

Ms. RAINEY. Well, currently, what I have been doing is I have been going to two of my classes and then I have been taking a nap at the nurse's office during the third class and then trying to make it to my fourth.

Sometimes I have had to leave early, but, I mean, having my school nurse there has really been a help for me in my situation.

Mr. GIOIA. You know, again, I think, really, what—first of all, having the committee recognize this problem, you know, at the youth level is critical. We always show the triangle, and we talk about the elite athlete at the very tip of that triangle and, really, the youth are at the majority of that triangle.

We really have to work to put universal education and management programs in our schools, but it is—and I think it is important to recognize this is not simply a high school problem. It is also a youth sport problem below the high school level as well. And in fact, one might argue that that is even less sort of structured around that.

I think what we need to do is to build some good coalitions together. And I think, certainly, you know, with the leadership of Congressmen Pascrell and Platts and looking nationally at this problem, but also looking at the state level.

I think our individual states need to understand how can we put in place the education of all stakeholders, including the school personnel, not just the coaches, parents, student athletes, officials, but the school personnel, because that will be where the kids spend most of their recovery time, not on the field.

And in doing so, you know, looking at the collaborative efforts that are going on right now, the American College of Sports Medi-

cine together with the Sarah Jane Brain Foundation, a number of the national governing bodies of sports are looking at this together. How do we really build those coalitions?

But the other problem is that we don't have all of those personnel in place. I think each state needs to look at what are their resources that will allow us to build that proper team to both identify the problem and to manage it properly so that child goes back onto the field when they are ready, and that their education is managed properly.

Looking at that team in the school, in the medical community, we truly don't yet understand this injury entirely. I mean, when I am managing this in the clinic, I am using my best available knowledge. We really need more research on these issues.

We know that an injury to that 6-year-old is very different than the 11-year-old and the 16-year-old. What we are hearing and what we are believing is that the difference between boys and girls may be really substantial.

And then we also know that kids that come into sports with other kinds of developmental or neurological disabilities—ADHD, learning disabilities—that is a different brain, and the response to that injury is different.

But we don't entirely know how that plays out individually, so we have got to understand this research-wise and put that into evidence-based practice. And again, I think Dr. Kohn's slide was really important. It shows the community of individuals that really deal with this injury. It is not just medical. It is not just the coaches. It is the entire school, medical, athletic systems together.

So I think if the committee can see, you know, what is that—you know, what is a universal plan that can really coordinate nationally but also look at individual adaptations per state—certainly, we have tried to articulate some of that in our PABI Plan as a start, and I certainly would like the committee to give that some serious consideration.

But then looking at what are the resources that we need to then bring together the people to put this in place—and I know, Congressman Pascrell, you have talked about how can we then convene the professionals.

Certainly, the CDC has been an important champion for this, and the guidelines in bringing together the American Academy of Pediatrics, the American Academy of Neurology, is something they are trying to pull together as well.

So it is a big problem with many different facets, but if we can at least begin to bring the coalitions together and really think about what is that first road map for implementation, we will be much further along the way than we were last year. Big task.

Mrs. MCCARTHY. Thank you.

Chairman MILLER. Congresswoman Woolsey?

Ms. WOOLSEY. Thank you. Mr. Chairman, I would be delighted to yield some of my time to Sarah so she can tell us her question—her story, if you are willing, Sarah.

Ms. RAINEY. Well, I was playing on the right side, and a ball—over and I was running after it—

Ms. WOOLSEY. What was your sport?

Ms. RAINEY. Soccer.

Ms. WOOLSEY. Okay.

Ms. RAINEY [continuing]. When a defender on the other team blind-sided me from my left side and drove through the side of my head, and I was knocked unconscious for a couple of seconds.

Later a trainer helped me off the field. I got a drink of water and the coach put me back in for the remaining 2 minutes of the game and overtime.

Ms. WOOLSEY. And the result?

Ms. RAINEY. When I got in the car I was having massive headaches, throbbing, and I told my dad, and we went to the emergency room later that night. And I stayed home the next day, and I didn't return to school until, I think, Thursday, and this happened on a Monday.

And school has continued to be a challenge, and I haven't returned to any physical activity so far.

Ms. WOOLSEY. Well, thank you for sharing your story with us.

Ms. RAINEY. Thank you.

Ms. WOOLSEY. And thank you, too, Ms. Pelton. Thank you very much.

You know, I want to talk about the parents' involvement in all of this, how difficult this must be to—for coaches and doctors, et cetera, because parents get really, really involved in their kids' sports activities.

I am the mother of a son who graduated college and was an All American football player for two—his junior and senior year. And when he graduated, he came home, and he said, "Mother, I want to take you for a walk." Okay. He was a defensive guard, so he is a big guy. Okay.

He said, "I am through with football, and I want you to get over it." [Laughter.]

Okay. I mean, you know, I mean—but that is—you know, we were so supportive of him, and he knew, and he had not been hurt, and he was—he said, "My knees are good. My feet are good. I want to go on and have a different life." So you know, I believe that parents play a big role in this.

In my district, I represent Marin County, just north of the Golden Gate Bridge, and in March a high school student in Marin was hit in the head by a baseball that was hit off a metal bat. And thankfully, he is recovering, but he spent weeks in the hospital in a coma.

And his injuries spurred the debate in the league about whether or not metal bats are appropriate. Well, it was the parents in the other districts in this league that absolutely insisted that metal bats continue to be used, because they did not want their students to be—their kids to be disadvantaged.

Marin County is not going to use metal bats and are willing to take the consequences. But parents—you know, they need to learn, and what—you are here, and your voices and the student voices—because not all parents are as wonderful as your parents are, so be very thankful for that.

So I just wanted to point that out. Parents need to be part of this, and they need to be educated.

I do have a couple questions. One question I have of Dr. Gioia is can a student who has been appropriately treated recover 100 percent or will they be vulnerable for the rest of their lives?

Mr. GIOIA. You know, every injury is different, but you know, both through—our clinical experience and the research to date shows that most students do—if managed properly—identified early and managed properly do recover to their full capacity.

But there are some caveats in there. Again, what we know is that if you have multiple injuries that have been repeated that have not been managed or identified, there can be a cumulative effect, and so—but certainly, in the kids that we have seen, where it has been a single—what we call uncomplicated injury, meaning that there aren't a variety of other complicating medical factors, their recovery is actually quite good when given the proper time and managed individually.

Ms. WOOLSEY. I thank you.

Coach, I have a question for you. First of all, I want to tell you I think you are great. My question to you—and I am—is what do you do for prevention. I mean, I am going to assume that your athletes are as fit as they can possibly be, because that—does that not make a difference in prevention in the first place?

Mr. MONACELLI. Well, in the scheme of things, yes. Fitness is. In practice, you try to match up body sizes when you are in drills. But when the game comes, it is different. And that is where, you know, your other players, as you mentioned—somebody mentioned they recognize that something is not right in the huddle. Your athletic trainer is there. And then the process starts, you know.

As coaches, we are trying to do as much as we can, and you know, it is good—it is good she is here, but not good she is here, that we are looking at female athletes, too, because we are all looking at bigger, faster, stronger here. And it is both genders.

And so, you know, the process is out there to educate the parents, the students, to the fact that no, they are not laying off this practice or these drills and they are not relaxing here, and same thing with the coaches, too, so—

Chairman MILLER. Thank you.

Mr. Loeb sack?

Mr. LOEB SACK. Thank you, Mr. Chair. This really is an important hearing, and I am really glad to be here, and—to listen to and read the testimony of all of you, especially Sarah and Michelle. Thank you. It takes a lot of courage to come to a place like this and to offer your testimony.

I do want to thank my colleague, Mr. Pascrell. He has been working so hard on TBI issues. I am on the Armed Services Committee and been overseas to Afghanistan, Iraq and the Landstuhl Regional Medical Center and done a lot with the V.A. hospital in Iowa City. TBI is such a huge issue for our military.

But putting what you are talking about today into that larger context of TBI I think is really absolutely critical, because this is a part of a much larger problem. And again, I want to thank Congressman Pascrell for being here today as well and participating in this.



I like the focus on community, Doctor. I think we have to do that in—with respect to so many aspects of education and athletics. We don't do enough of it, and especially the awareness part of it.

Also, I think whatever we do, it does, as I think everybody here agrees, has—it has to be evidence-based. And I noticed on page three of your testimony that we really don't still have a handle on the exact scope of this problem, because we don't know the incidence of concussion in every sport.

How do we do better, first of all, at identifying the problem?

Mr. GIOIA. Well, it has got to be at multiple tiers, but the bottom line is by making sure that we educate people at all levels—parents, coaches, kids, medical professionals, school professionals—so they have the awareness and the knowledge, number one. But we have to put a reporting system in place that really captures that information.

Again, the good work that has been done at Nationwide Children's by Dawn Comstock and her group is very good data, except what we know is that data reported only to the athletic trainer is, again, another tip of the iceberg.

When we ask athletes after the season, when their threat is gone for losing time, and/or we ask them a different question rather than, "Did you have a concussion," instead we start to articulate what that means, we see much higher rates.

So we have got to find and develop—and we can do this—data systems and data capture systems that really look at the reality of the problem, and in ways that, you know, are collaborative. I know athletes feel threatened at times. But again, if they understand the nature of the problem, we hope that they will be on board a bit more with us.

That is a tall task, but I think it is an attainable task, and it is going to be different than the more narrow-based approaches that we have right now.

I mean, certainly, being in this field, there isn't a day that goes by that I don't see a friend and I hear about their child or, you know, their friend's, you know, concussion. And most of those weren't reported along the way, so we know that we have to have a different system in place.

Mr. LOEBSACK. In some ways, it is not unlike trying to determine just how prevalent TBI is—

Mr. GIOIA. Yes.

Mr. LOEBSACK [continuing]. Among our veterans and trying to screen as best we can, obviously, for TBI there.

But to me, just finding the incidence and getting the actual accurate data for just how many athletes in particular sports in the aggregate actually suffer concussions—we have to have those data in the first place before we can deal with the issue, it seems to me.

And I want to go back to prevention. Congresswoman Woolsey mentioned that. Obviously, the only way that we can prevent concussions in athletes is to not have contact sports, but that is not going to happen. None of us would like to see that happen, I don't think. We would like to see sports continue. They are wonderful for a variety of reasons.

But can any of you—and, Coach, if you would like to speak just a little bit more—you didn't have a lot of time to answer Congress-

woman Woolsey's question. But how do we prevent this from happening in the first place? And anyone else who might like to weigh in on this.

Mr. MONACELLI. Well, it is tough. You know, as much safety procedures that you have in place on the practice field, on the game field—again, I go back to what athletes are—those young men and women are competitors, and they want to play, and they want to get at it.

Excuse the expression, but they want to play the game, you know? And they are going to play it hard whether it is male or female, and sadly, these things happen, just like the sprained ankle or the blown knee. The issue is now we are recognizing this. It is so easy to recognize the blown knee and the broken ankle or whatever. But it is not and it has never been very easy, and still isn't, to recognize this internal injury.

So education is the preventive tool. Safety equipment is a preventive tool. Safe practices in practice and games is prevention. But that is no panacea for what is going to—the possibility that it is going to happen.

Mr. GIOIA. Yes, there is a—you know, a big focus right now on a number of those levels that the coach mentioned. Many of the national governing bodies are looking at their sport. How can we address the coaching technique? So in football—again, we use that—but in hockey, in lacrosse, in soccer—and how do we also reinforce the rule enforcement around those rules?

Are there particular aspects of sports where we need to modify the game? We know that some of the most catastrophic injuries in football happen on the kickoff. Is there something we need to do to modify that?

Then, is there equipment that can be protective? We know that is not the whole answer. A lot of people say, "If I only had a better helmet." Well, no. The helmet is going to absorb some force, and more and more technology is being developed to absorb that force to an even greater extent than the foam that we previously had used. But we know that that is only part of the answer there as well.

The good news is that many of the national governing bodies—and literally this past Tuesday—met with a group—our collaborative sports medicine group to look at what is the next steps we take with our organizations at all of those levels.

Mr. LOEBSACK. Thank you all. Thank you.

Thank you, Mr. Chair. Mr. Chair, thanks.

Chairman MILLER. Mrs. Biggert?

Mrs. BIGGERT. Thank you, Mr. Chairman.

Dr. Gioia—is that right? Thank you. I was surprised to see that according to a study by Dr. Luke Gessel published in the Journal of Athletic Training the sport with the highest—second highest number and percentage of student concussions was girls' soccer, and it was second only to boys' football.

Do you have any concern—are there any concerns that girls and boys may react differently to head trauma? And is there any research in this area?

Mr. GIOIA. This has been a topic of discussion and research as well. What we see when we pair together similar sports—girls' soc-

cer, boys' soccer—we look at baseball, softball and basketball—those are our three closest sports. When we look at lacrosse, they are—the game is played differently. We have got hockey. It is a little bit different. There are similarities, but there are a lot of differences.

What we see is there tends to be a relatively higher incidence of the injury in the girls' sports. What we are trying to understand is why that is. This is a biomechanical injury. Now, it may be that there is something about the brain that doesn't take that force as well in the girl.

It may also be that the neck is different so that the head, when it is taking that force, is not buffering it through the whole body because it is not as solidly attached, so to speak. And so there may be a variety of factors. Some say maybe the girls are reporting the injuries more so.

I can tell you that at the upper levels—and my own daughters played upper level lacrosse—they will lie just as simply and easily as the boys will, so I am not entirely sure that is the simple answer, but it may be a combination of factors.

So there seem to be differences. We don't quite understand what those—what is behind those differences. We need to understand that further with more research. And again, I will also throw the age factor in there, too. We need to understand why younger kids are taking longer to recover than older—than college and professionals.

Mrs. BIGGERT. And then are you concerned about the potential for head trauma from repeated sub concussive blows?

Mr. GIOIA. Oh, absolutely. I know Dr. Cantu and the group in Boston has been talking about that. Again, this is where research is going to come in. If we can put in place some of the things that are happening in helmeted sports, where we have accelerometers that can start to look at the extent, magnitude and direction of that force to the head, and look to see are there—are those producing concussions—and again, that goes back, then—is there a different way to coach the game that may reduce the amount of that sub concussive blow.

Mrs. BIGGERT. Well, in one of my former lives I was an assistant soccer coach for girls, and teaching them to do the header—is that something that should be avoided? And I heard that it was bad, so we stopped doing it but, I mean, except for very, you know—

Mr. GIOIA. Yes, the data actually has not shown that purposeful—purposeful—heading is the reason for concussions in most kids. Now, there are always exceptions. Why is that? Purposeful heading is when you are preparing the body now for that blow. And again, it is all about distributing that force biomechanically through the body.

When the head is hit by an errant soccer ball or you are not prepared for it, that is when we see the injuries. And again, it is a different biomechanical load on the brain at that time.

Mrs. BIGGERT. Right. Well, then, in my district we have done some preliminary research or have seen some—some research on treating returning veterans with TBI in hyperbaric chambers and also looking at even autistic children. Do you see any potential for eventually treating athletic traumas in this way?

Mr. GIOIA. You know, the whole area of treatment—we are really on the forefront right now. It is just beginning. And so part of the issue here is we need to understand what is happening to the software of that brain, to then look at what are the treatments we want to put in place.

My colleagues at the University of California, Los Angeles, UCLA, in their Brain Injury Research Center are using very interesting models of research in looking at this problem. We are starting a software imaging study where we can look at what are the chemical changes. That, then, will allow us to say what are either the medicines or the other kinds of treatments that we want to put in place acutely.

Mrs. BIGGERT. Have you seen the hyperbaric—

Mr. GIOIA. I have seen that. It has not yet been, obviously, applied to the sports or to kids all that much.

Mrs. BIGGERT. Okay, thank you.

And if I have got one more time, Dr. Kohn, in your view, how successful have the state laws in Washington and Texas and Oregon and Virginia been at educating teachers and coaches and parents in how to identify and treat concussions?

Ms. KOHN. All three state laws were passed relatively recently. The oldest one is Texas, which was passed in 2007, has been in place for 3 school years. Washington and Oregon laws were passed in 2009. The Washington law was implemented for just the school year that is ending. Oregon is not in place yet.

So they are all really relatively newly implemented, and I—we were not aware of the evaluations yet that have been done—

Mrs. BIGGERT. Okay, so you wouldn't know which provisions have the greatest possible effect yet, but—

Ms. KOHN. We don't know of the evaluations that have been done on them yet. They are all really quite new.

Mrs. BIGGERT. Great, thank you.

I yield back.

Chairman MILLER. Thank you.

Mr. Andrews?

Mr. ANDREWS. Thank you, Mr. Chairman.

I would like to thank the panel for their excellent testimony this morning. We have heard from a lot of different perspectives, all of them very valuable. Thank you.

Dr. Kohn—is it Kohn or Khan? I am sorry.

Ms. KOHN. Kohn, but I will answer to anything.

Mr. ANDREWS. Okay, Dr. Kohn. Thank you for the excellent work that you and your colleagues at GAO do. I understand there are three national databases that exist that you took a look at, is that right?

Ms. KOHN. That is right.

Mr. ANDREWS. And the conclusion that you drew is that you really can't draw any conclusions from the databases about the incidence of concussions among high school athletes. Is that right?

Ms. KOHN. Correct.

Mr. ANDREWS. What could those databases do that would permit us to have more robust data so we could draw some conclusions? What is missing?

Ms. KOHN. The database that is most targeted to the population of interest here, high school—high school athletes, is the database out of Columbus, Ohio that I referenced earlier. That database has produced the incidence numbers that have been widely cited, and it is only based on nine sports.

Over time, since those studies have been done, as recent as they are, more sports have been added to the database, so they now cover 20 sports. So that is a growing expansion of the coverage of sports that we have information on.

The databases, all three of them, also have information on the circumstances under which the injury occurred.

Mr. ANDREWS. I assume that you would agree that the more data we have, the more effective we can be at diagnosing the causes and eventually treatments. Is that correct? You want more robust data.

Ms. KOHN. More information on the circumstances under which the—

Mr. ANDREWS. Right.

Ms. KOHN [continuing]. Injury occurred can provide actionable information to develop and target programs—

Mr. ANDREWS. Do you have any suggestions as to things Congress might do to encourage or facilitate the gathering of more meaningful data?

Ms. KOHN. At the current time, CDC does support a couple of the databases. The one at Columbus has received federal support, as does the one at Consumer Products Safety Commission.

Mr. ANDREWS. So it would be more a matter of the CDC continuing that support, perhaps doing a bit more with it. Who maintains the database in Columbus? Who is the sponsor or keeper of it?

Ms. KOHN. It is at the Nationwide Children's Hospital. It is a private effort with public support.

Mr. ANDREWS. Okay. And are the data that are in that database publicly available for researchers to take a look at?

Ms. KOHN. It is not a searchable database at the moment. It is not available to the public. The researchers aggregate information. They publish it in peer-review journals. But it is not available to researchers.

The database at Consumer Products Safety Commission is a public searchable database.

Mr. ANDREWS. Now, Coach, thank you for the leadership role you have taken in protecting your athletes, educating your athletes and your peers as well. What tools do you think a coach needs to be sure that he or she can make the maximum effort that you have made? What are the critical pieces to a successful education, prevention and treatment program in this area?

Mr. MONACELLI. In New York State, we mandate that they have to take coaching courses, philosophy and principles and so on, which starts getting into just what it is, philosophy. It is not just winning. It is participation and all the good things that go along with that. That is critical.

Also, good leadership within your own district, you know? We are looking at where can the government help, and we only have three states, really, on board. Each state really—and then it is trickle-

down from that. The states and the—their local districts have to get on board to make this mandatory. This is important.

Mr. ANDREWS. What are the actual tools needed, though? For instance, do you need access to—let me ask you this question. Do you have a team physician that works with you?

Mr. MONACELLI. We are a small district. We have a better situation than some small districts. We have an athletic trainer on site for all collision sports, but not every sport. It is not softball or baseball, where something can happen.

Mr. ANDREWS. Is that a paid school district employee, that trainer?

Mr. MONACELLI. Pardon?

Mr. ANDREWS. Is the school district paying the trainer?

Mr. MONACELLI. Yes.

Mr. ANDREWS. Is that an employee?

Mr. MONACELLI. Yes.

Mr. ANDREWS. Is that typical in your part of New York or atypical?

Mr. MONACELLI. Not typical. Depends on finances.

Mr. ANDREWS. Yes. Can you describe to us what the risks are if a trained athletic trainer is not present?

Perhaps, Doctor, you would like to join in that, too. You know, what if a kid has a head injury during a game? What kind of things does a trainer do right on spot to deal with the problem?

Mr. MONACELLI. Well, now it goes back to when I coach without a medical personnel, and we are talking athletic trainer, not the local physician, too, and—

Mr. ANDREWS. Yes.

Mr. MONACELLI [continuing]. The local physician has—they have their expertise, too. But athletic injuries is a different wrinkle. And to have someone trained in athletic injuries and diagnosing those on the spot—it makes safety a heck of a lot easier for us—

Mr. ANDREWS. I see my time is up, but if, Doctor, you would like to briefly answer the question—

Mr. GIOIA. Yes, Congressman Andrews, you are hitting on an important point here. Only 42 percent of the high schools in the United States have certified athletic trainers. They are our immediate athletic health professional that identifies and diagnoses that injury. They are critical. They are critical at the high school level. They are critical at the youth level.

Mr. ANDREWS. How are they critical medically? What kind of things can a trainer do right on spot when the athlete gets hurt that could make a big difference?

Mr. GIOIA. They are doing active medical evaluation of that injury. You know, when somebody goes down, there are many, many possibilities that it could be. Some of them could be life threatening. Some could be, you know, permanently impairing, like a spinal cord injury. They are doing very important early diagnoses of the capacity to breathe, to move—

Mr. ANDREWS. Right.

Mr. GIOIA [continuing]. Blood circulation, the important things there. And then they go through their checklist. They are live-saving individuals, in addition to disability reducing individuals as well. Critically important.

Mr. ANDREWS. Thank you very much.

Thank you, Mr. Chairman.

Chairman MILLER. Mrs. Davis?

Mrs. DAVIS. Thank you, Mr. Chairman.

Thank you to all of you for being here. Wanted to ask you about school-based health centers. There were two provisions in the health care bill that relate to this.

And I wonder whether you have had a chance to look and see whether they play any role at all, whether schools that have school-based health centers do a better job educationally, do a better job in follow up, and just generally, I think, trying to disseminate better information for students about injuries that they receive.

Mr. GIOIA. You are asking—

Mrs. DAVIS. Sure, go ahead.

Mr. GIOIA. Yes. You know, I will say that the most interested group that I have worked with in the school system are the school nurses and the school health professionals. We have health aides in Maryland as well.

And I think they are a central place where both they identify an injury that could happen in the school—a child falling—but also they are the place that receives the information and disseminates that, then, to the—to the teachers.

So I will be quite honest with you that I am not as familiar with the health center concept, but I can tell you that the individuals that populate those centers, I am sure, are critical folks, and they have been our greatest advocate as we then go from the kids back to the schools, making sure they get those care plans, they understand that.

And again, the nice thing about the new school toolkit is it has very specific tools, assessment tools—monitoring of symptoms, management strategies that they can reinforce in the schools. So I think putting those into the health center concept will really be quite useful in helping kids return to school.

Mrs. DAVIS. Coach, I don't know whether any of you have any experience with school-based centers, whether that provides a model in schools. And certainly at the state level, looking at that issue, that might be helpful.

Mr. MONACELLI. I am sorry, I didn't catch that.

Mrs. DAVIS. The school-based health centers that are located on school grounds, particularly in high schools—you are not familiar with the—

Mr. MONACELLI. Again, with being—

Mrs. DAVIS. Okay.

Mr. MONACELLI [continuing]. A small district, we are—

Mrs. DAVIS. Right.

Mr. MONACELLI [continuing]. Very fortunate—

Mrs. DAVIS. I understand.

Mr. MONACELLI [continuing]. To have an athletic trainer, you know?

Mrs. DAVIS. Yes, okay. One of the things that I think is very positive about that is it is really the education piece, and that is—part of the concern, I think, is that we know that the incidence of reporting perhaps isn't as high as it should be, and that, you know, for whatever reason—because kids don't want to say anything, they

don't recognize the symptoms—I don't know whether there is any disparity in terms of gender and whether the fact that you have more women who seem to be affected is by these injuries—whether reporting is any different, a higher incidence and recognizing symptoms. I don't know if that is an issue.

I wanted to just go to—for a second, though—I think in Congressman Pascrell's legislation that that is being thought through—one of the issues is about having a baseline in order to determine the extent of an injury and what is going on, you know, with a youngster after perhaps a fall or an injury—whatever.

And I know that we are struggling in the Armed Services Committee, actually, on traumatic brain injury, and there is some controversy over whether there is a good baseline tool to determine that. Do you think that that is an area that there is a lot of promise in in terms of high school injuries?

Would it be that every person playing sports would have some basic test to determine kind of their baseline so that you have something to go on later on? How do you see that coming together?

Mr. GIOIA. Well, I know that Coach Monacelli is doing that, and we are doing baseline testing in a variety of school systems around the Baltimore-Washington area.

In the ideal, having a baseline on every student athlete would be very useful. There are some challenges, though, both logistically and there—the tools that we are using are not perfect. And one of the things that we have to respect is that it may be a challenge to get.

And we are doing this, actually, in the Howard County school systems here in Maryland this year. We are going to have all of our high school athletes, with the exception of very few sports, baselined. But we have to start that early. Because of the crush of fall sports it is a challenge.

The personnel that are available are limited. If you have a school without a certified athletic trainer, you are going to have—it is going to be hard to do that.

You also need doctors who are familiar with the interpretation of that information as well. So you have got to build a resource system around that, as well as a logistical process.

And then we also have to recognize that these aren't perfect measures, and that is where the clinician—

Mrs. DAVIS. Is there an element of self-reporting that you think is helpful on the part of the students to be able to fill out questionnaires and—I understand that is definitely not a perfect tool, but—

Mr. GIOIA. Yes.

Mrs. DAVIS [continuing]. I wonder, to the extent that schools are actually doing that and trying to ascertain the extent to which students have headaches—

Mr. GIOIA. Yes, I mean, that—part of the baseline test is actually a baseline symptom report as well. What are the normal degree of headache in that individual, concentration problems, and that sort of thing? So that is the important part to know ahead of time. So again, the concept, I think, is an important one. Implementation is going to be a challenge, and we need to think—

Mrs. DAVIS. Sure.



Mr. GIOIA [continuing]. About the resources to do that.

Mrs. DAVIS. Right. Thank you.

Thank you, Mr. Chairman.

Chairman MILLER. Thank you.

If I might, Dr. Gioia and Sarah and Michelle, it seems that the aftermath of this—of a serious concussion incident is somewhat of an isolating event for young people. You are kind of—you are thrown out of your normal schedule. You are thrown out of your normal activities. And you are kind of on your own to navigate this the best you can, and whether or not you have access to a knowledgeable doctor or medical personnel would be very important in that.

And I just wondered, are there discussions—and maybe, Mr. Schmutz, you can come in. Are there efforts to try to provide some support groups in a region or an area for young people who are going through this?

Because it challenges many of your own self-concepts about where you thought you were going with your future—in your case, going to college to play softball, Ms. Pelton, and this was the sport you loved, and all—and all that is kind of brought to an abrupt halt, and I just wondered how we deal with that. Are there examples of dealing with that side of it?

Mr. GIOIA. You know, one of the groups that we have not mentioned, and we are remiss in doing this, are the brain injury associations in each of the states. They play really important roles and are truly the advocating organizations for families and for kids and for individuals that have had the brain injuries. And many times they will provide those kind of support structures.

But I also think that in their collaboration with school systems, if we think about whether that is a place where some of this education would happen, some of that support, if you will, would happen, that would be a good collaboration, brain injury associations and school systems.

But I think it is important—you know, the—and I would actually leave it to Michelle and—

Chairman MILLER. Michelle or—

Mr. GIOIA [continuing]. Sarah to talk about.

Chairman MILLER. I mean, who do you turn to? Your mother and your stepfather are here.

And, Sarah, your family. But this is kind of a tough discussion, because it is a limitation on what your normal activities are. You said your friends supported you. I just wondered if you think there should be other support systems in place.

Ms. PELTON. Yes, there should be. I actually—there was a girl from my high school that got a concussion from—it wasn't sport-related, however, but I did sit down and talk with her and everything, and she found it helpful, because I could understand what she was going through.

And you know, there is—in my dugout where I played softball for several years, there is going to be a sign up for—in the dugout for signs and symptoms of a concussion where, you know, coaches will know when to take the kid out of the game.

Chairman MILLER. Thank you.

Sarah?

Ms. RAINEY. I think it goes back to the awareness part. I mean, it is hard because the teachers then—I mean, before I got a concussion, I didn't know what a concussion was, or stuff like that.

Chairman MILLER. Yes. Thank you.

Mr. Schmutz?

Mr. SCHMUTZ. Yes, I am not familiar with support groups, but I think it underscores the point of a holistic approach as it relates to the education. You know, I had an experience where—similar to some of these experiences, where a friend of mine's son, 10-year-old hockey player, comes off the ice, takes his helmet off. Coach—he is the best player on the team.

Coach says, "Michael, can you put your helmet on and go back in the game?" A 10-year-old kid does not really know how to say no to the coach but needs to understand how to articulate to the coach, "I can't go back in, Coach," so he doesn't expose himself. And I think the holistic piece as it relates to parents even—and athletes understanding.

Now, if they haven't experienced it, they don't know what it feels like—it is an invisible injury, as it has been told. There is no cast to sign. There is no blood. There is none of that. But to the extent that we can help dispel some of the ignorance, I think that can lead to some of these support systems being better positioned to support athletes who go through this experience.

Chairman MILLER. Thank you.

Ms. Kohn, when you listen to the cross-section of testimony here and the information you have given us, are we—are there gaps that are still missing after we listen to the recommendations and the suggestions here that we should be paying attention to?

Ms. KOHN. Certainly, the information in terms of the circumstances under which the injuries occur that can provide actionable information, so the number is important, but also just having more information to be able to take action. Action doesn't have to wait for any particular number to be developed.

And also, the other part of the federal role at the present time is the education that is in place from CDC, and I heard that today in terms of the education and the convening function that CDC is also performing, and that also seems to be based on the other comments here today, that convening function seems to be very important as well.

Chairman MILLER. Thank you.

Coach Monacelli, I played 4 years of varsity football in high school, and I played 3 years on a team where all we were told to be was tough, and we never won a varsity game.

And I played 1 year on a team that was number one year after year after year in northern California, and all they told us to be was smart. And we never had any—we only had 1 day of contact or half a practice of contact on the smart team, and on the other team all we did was just run into one another, head first, day after day after day.

Practice is a big part of this problem, I would assume, also, because people are trying to challenge one another for a position, a starting position, what have you. And in the testimony it is mentioned at different times. But that would seem to me that that is—

there is an awful lot of opportunity in practice to suffer these concussions. If people want to comment—

Mr. MONACELLI. That is why as a coach you try to match up body sizes when there is one-on-one drills and things like that. But it is not like wrestling where it is more—the match-ups are easier there. You have that 160-pounder going against that 260 on a lot of occasions, especially, you know, in game situations versus even team drills.

One-on-one drills you control. Two-on-two drills you control. But the bigger arena you can't. So that is where you encourage the off-season conditioning. That is where you spend time as a coach making sure you, as head coach, and your assistants are well aware of the situations that could put an athlete in jeopardy.

And then when you suspect, because of your background, and when you suspect, you can get them out of there and start, you know, a medical protocol to double-check this, and hopefully, you know, it is not happening. But in some sports you just can't get away from true safety issues other than to educate everybody involved.

Chairman MILLER. Thank you.

Mr. Schmutz, in your testimony, your written testimony, you really lay out that we really have a lot of opportunities for education to take place and organize youth sports and school sports and the rest of this.

And if there was ever an issue that jumps at the name of this committee, education, it clearly can have a huge impact. I mean, I always believe we solve most of the difficult problems in our society through education.

And this is one where it is clear we have so many places of entry around the involvement of these activities that it really is a rich ground for education and where people's interest, their—you know, their self-interest and the—and alignment of education kind of go together, whether they are a referee or a coach or a player or a parent or a principal of a school or a school board or what have you, that it all sort of is aligned that this knowledge is really in your best interest to acquire.

And it sounds like people are—through the various organizations they are responding.

Mr. SCHMUTZ. They are responding. Dr. Gioia referred to some of the national governing bodies. I think the key here is to continue the momentum. Clearly, we have come a long way in the last couple of years, but there is a long way to go.

On the youth level in particular, you know, you have got volunteer coaches, you know, demanding more time of a parent coach to go to another meeting. Dr. Gioia and I were talking earlier, and he talked about a meeting he had with Montgomery Youth Hockey where he asked for 15 minutes and nobody left the room for more than an hour.

So I think it is a matter of getting people to actually commit. That is where at a local—a team level, that particular meeting was required for those coaches to go. It takes somebody with the courage to require somebody and not be concerned with somebody who might say, "Well, I am not going to do that. I am going to walk

away.” If their kid wants to participate, somebody is going to step up.

I think we need to be more—hold these volunteer coaches as well as high school coaches more accountable to be—to take part in the education process. The resources are there. The need is to penetrate more.

Chairman MILLER. Anyone else? Yes, Dr. Gioia.

Mr. GIOIA. Let me just mention that, you know, I think, again, the examples of Coach Monacelli showing that he has a safe program and a successful program are really what we need to highlight, that using safe coaching practices, using the best available equipment, having knowledgeable people that can identify the injury—all of that together still produces five championships, you know, state championships, and that in that little state of New York that is not a small task, you know. That is quite a feat, having been a New Yorker myself.

And so, you know, I think that is what we have to get across. This does not compromise the game, and you—but you can still be safe.

Chairman MILLER. Great. Thank you.

Mr. Kline?

Mr. KLINE. Thank you, Mr. Chairman.

And again, I want to thank the witnesses for being here today, Dr. Kohn for your research, and I know we have got a lot more to look at. We have got a limited number of states. But I very much appreciate your input today and your work, and I am sure we will be coming back to you for more work.

And to Coach, again, congratulations. Congratulations on having winning season after winning season but really stepping up to recognize the program and get the community involvement as well as the coach involvement.

Dr. Schmutz, again, thanks for everything that you are doing.

And I think what I am hearing from all of you, and certainly including Dr. Gioia, is that in order for this to work you have to have Dr. Kohn’s diagram work where you have everybody, and it is not something that can be mandated or dictated. You have got to get to the parents, and you have got to get to the coaches, and you have got to get to the school nurse and the teachers and the students, and that—that takes work and outreach.

And so again, congratulations to you, Coach, for being successful in doing that. We need to see that everywhere if we are going to really have that awareness. As Dr. Gioia said, that you can have the winning season—well, maybe you have to have Coach Monacelli to have those winning seasons, but you can have winning seasons and still address this urgent need.

And again, mostly to Sarah and Michelle, God bless you. Thanks for coming today and for telling us your story. We certainly hope that you have every success going forward in recovery. I know that it is very, very difficult. I told the story of the woman who is on my staff, and it was a long road and not a straight path.

But you just have to stay with it, and I am sure you have got the love and support of your parents and an increasing awareness of your peers and your—and the people around you. You are going to make it.

So thank you, Mr. Chairman. I yield back.

Chairman MILLER. Thank you, Mr. Kline.

I would like to associate myself with the closing remarks of Congressman Kline and again thank all of you for being here.

And, Sarah and Michelle, thank you again on behalf of all of the members of the committee, and we look forward to working with you. We think Mr. Pascrell has a pretty good idea here, but we need some help in fleshing out the details.

So thank you very much.

Without objection, members will have 14 days to submit additional materials or questions for the hearing record. Some members may want to submit written questions to you. If you could answer them, we would deeply appreciate it.

And with that, the committee will stand adjourned. Thank you. Thank you.

[Additional submissions of Mr. Miller follow:]

### **10 Point Plan to Save Football**

In the past few years, former football players have begun being diagnosed with Chronic Traumatic Encephalopathy (CTE), a progressive neurodegenerative disease caused by repetitive trauma to the brain which eventually leads to dementia. Some were famous NFL Hall of Famers like Mike Webster and Lou Creekmur. Others, like Mike Borich, only played through college. All died sooner than they should have, and all suffered terribly in their final years.

Since the discovery of CTE in 1928, the disease has been seen almost exclusively in boxers, which is why it is often referred to as “punch drunk” syndrome. However, it is now diagnosed regularly in ex-football players, and in the past year, the Center for the Study of Traumatic Encephalopathy at Boston University School of Medicine (CSTE) has diagnosed CTE post-mortem in 11 of 11 former college and professional football players that died at ages ranging from 37-82 years. This is significant, as the disease should not naturally exist in a single human being. The early stages of the disease have even been seen in an eighteen year-old former football player. In 2009, it is clear that football is in the midst of a brain trauma crisis.

The game of football has not always been played as it is today. In fact, the most consistent aspect of the game has been change. In 1905 the game was so dangerous, regularly killing participants, that President Theodore Roosevelt summoned the coaches of Harvard, Yale, and Princeton to Washington D.C. for a summit on how to make the game safer and threatened to take action in the absence of significant reform.

From this meeting the American Intercollegiate Football Rules Committee was created, and that Committee, among other things, legalized the forward pass and made other changes to eliminate dangerous collisions. Over and over, football has had to be changed to be made safer. Now it faces a new challenge. CTE is a deceptive, quiet killer. The disease begins during a player’s career and then hides, slowly killing brain cells until the athlete begins showing symptoms years later.

Football has evolved into a something it was never intended to be.

Football collisions may now be more dangerous for the brain than ever. With the combination of bigger, stronger, and faster players and hard-shelled helmets that are often used as a weapon to initiate contact, we’ve created a type of repetitive trauma to the brain that has never existed before.

The discovery of CTE inside the brains of so many ex-football players has shown us that it is again time for change, and a new Committee. Only this time, it is a Committee to Save Football. Among high school students, football is the most popular sport in America, played by one in eight American boys. While football was first played by colleges, today football is a children’s game, with 95% of participants under the age of 18.

These children are not old enough to make informed choices. Therefore, in light of the new evidence of CTE in 100% of players studied at Boston University, it seems appropriate that we again reevaluate how we play the game of football before the 2010 season and at all levels of play: youth, high school, college, and professional.

If we can agree that the game is broken and needs to be fixed, we have an incredible number of paths to a safer game without fundamentally changing football. If

we know that practice collisions account for over 50% of brain trauma, the proposals below could easily eliminate over 75% of brain trauma and concussions today—it is simply a question of leadership.

Below are 10 paths to a safer game that can and should be used to reduce brain trauma. This would serve as the basis for evaluating the options available to the Committee to Save Football.

*1. Reevaluate how the game is practiced*

- Greater than 50% of hits to the head occur outside of games. NFL teams rarely hit in practice due to risk of injury. Youth teams could only be allowed to have full-contact once a week. Dangerous drills could be banned or used less frequently.

*2. Encourage mandatory brain trauma and concussion education for coaches, athletic trainers, parents, and athletes*

- Coaches, athletic trainers, and athletes cannot diagnose concussions if they aren't trained to look for them or know how to recognize them. Coaches, athletic trainers, and athletes will not voluntarily choose to rest concussions and reduce overall brain trauma if they don't understand why it is good for the athlete's short and long-term health.

*3. Reevaluate protective equipment*

- Investigate changes to helmets, shoulder pads, and other types of protective equipment to reduce brain trauma.

*4. Develop better methods of concussion detection and diagnosis*

- The CDC provides clipboards with concussions diagnosis protocols on the back at no cost. Coaches could be required to carry them. We can invest more in research to find simple, objective ways to diagnose concussion that can be utilized in any program.

*5. Develop better methods of concussion management*

- Return-to-play too soon after concussion can result in more extensive brain damage, and can actually result in death. It is now law in Washington state that players are required to see a medical professional with brain trauma expertise before return-to-play. Minimum return-to-play standards should be enforced at all levels.

*6. Consider minimum medical resources*

- Football is a dangerous game. Minimum medical resource standards, like having an athletic trainer or doctor on the sideline, should be considered.

*7. Reevaluate techniques of tackling and blocking*

- We can teach and enforce different methods of tackling and blocking that minimize contact to the head.

*8. Reevaluate the rules*

- Recently the NFL banned the wedge on kickoffs to reduce trauma. Many other rules could be changed, at all levels of football, to reduce brain trauma.

*9. Reevaluate rule enforcement and the role of referees*

- The NCAA recently began suspending players for intentional helmet-to-helmet hits. Referees could eject players for illegal hits to the head. Referees could be trained to identify concussed players on the field.

*10. Reconsider the culture of the game*

- Television announcers could stop glorifying illegal hits. Children could stop being pressured to play through concussions.

The evidence now exists to support immediate and radical change to the game of football to dramatically reduce brain trauma. Let us not let this opportunity pass.

*Respectfully submitted October 28, 2009.*

CHRISTOPHER NOWINSKI,  
*Harvard Football 1996-1999; President, Sports Legacy Institute,  
 Center for the Study of Traumatic Encephalopathy;  
 Co-Director, Boston University School of Medicine.*

# Concussion Signs and Symptoms Checklist



Student's Name: \_\_\_\_\_ Student's Grade: \_\_\_\_\_ Date/Time of Injury: \_\_\_\_\_

Where and How Injury Occurred: *(Be sure to include cause and force of the hit or blow to the head.)* \_\_\_\_\_

Description of Injury: *(Be sure to include information about any loss of consciousness and for how long, memory loss, or seizures following the injury, or previous concussions, if any. See the section on Danger Signs on the back of this form.)* \_\_\_\_\_

**DIRECTIONS:**

Use this checklist to monitor students who come to your office with a head injury. Students should be monitored for a minimum of 15 minutes. Check for signs or symptoms when the student first arrives at your office, five minutes later, and at the end of 15 minutes.

Students who experience one or more of the signs or symptoms of concussion after a bump, blow, or jolt to the head should be referred to a health care professional with experience in evaluating for concussion. For those instances when a parent is coming to take the student to a health care professional, observe the student for any new or worsening symptoms right before the student leaves. Send a copy of this checklist with the student for the health care professional to review.

To download this fact sheet in Spanish, please visit: [www.cdc.gov/Concussion](http://www.cdc.gov/Concussion). Para obtener una copia electrónica de esta hoja de información en español, por favor visite [www.cdc.gov/Concussion](http://www.cdc.gov/Concussion).

OBSERVED SIGNS	0 MINUTES	5 MINUTES	15 MINUTES	MINUTES Just prior to leaving
Appears dazed or stunned				
Is confused about events				
Repeats questions				
Answers questions slowly				
Can't recall events <i>prior</i> to the hit, bump, or fall				
Can't recall events <i>after</i> the hit, bump, or fall				
Loses consciousness (even briefly)				
Shows behavior or personality changes				
Forgets class schedule or assignments				
<b>PHYSICAL SYMPTOMS</b>				
Headache or "pressure" in head				
Nausea or vomiting				
Balance problems or dizziness				
Fatigue or feeling tired				
Blurry or double vision				
Sensitivity to light				
Sensitivity to noise				
Numbness or tingling				
Does not "feel right"				
<b>COGNITIVE SYMPTOMS</b>				
Difficulty thinking clearly				
Difficulty concentrating				
Difficulty remembering				
Feeling more slowed down				
Feeling sluggish, hazy, foggy, or groggy				
<b>EMOTIONAL SYMPTOMS</b>				
Irritable				
Sad				
More emotional than usual				
Nervous				

→ More

**Danger Signs:**

Be alert for symptoms that worsen over time. The student should be seen in an emergency department right away if she or he has:

- One pupil (the black part in the middle of the eye) larger than the other
- Drowsiness or cannot be awakened
- A headache that gets worse and does not go away
- Weakness, numbness, or decreased coordination
- Repeated vomiting or nausea
- Slurred speech
- Convulsions or seizures
- Difficulty recognizing people or places
- Increasing confusion, restlessness, or agitation
- Unusual behavior
- Loss of consciousness (even a brief loss of consciousness should be taken seriously)

**Additional Information About This Checklist:**

This checklist is also useful if a student appears to have sustained a head injury outside of school or on a previous school day. In such cases, be sure to ask the student about possible sleep symptoms. Drowsiness, sleeping more or less than usual, or difficulty falling asleep may indicate a concussion.

To maintain confidentiality and ensure privacy, this checklist is intended only for use by appropriate school professionals, health care professionals, and the student's parent(s) or guardian(s). A copy of this form may be placed in the student's file.

For more information on concussion, visit [www.cdc.gov/Concussion](http://www.cdc.gov/Concussion).

**Resolution of Injury:**

- Student returned to class
- Student sent home
- Student referred to health care professional with experience in evaluating for concussion

SIGNATURE OF SCHOOL PROFESSIONAL COMPLETING THIS FORM: \_\_\_\_\_

TITLE: \_\_\_\_\_

SIGNATURE OF SCHOOL PRINCIPAL/ADMINISTRATOR: \_\_\_\_\_

COMMENTS:

For more information on concussion and to order additional materials for school professionals FREE-OF-CHARGE, visit: [www.cdc.gov/Concussion](http://www.cdc.gov/Concussion).



**Prepared Statement of Niki Popyer, 17-Year-Old Former Basketball Player**

My name is Niki Popyer and I am a 17 year old junior in Marlboro High School, Marlboro, NJ and I appreciate the opportunity to submit my testimony regarding brain injuries in high school athletes.

I have been playing basketball since I was in kindergarten. From the very first time I touched the ball, I was instantly hooked. As I got a little older, I started working on my skills and took every opportunity I could to learn and practice. Through the years, I progressed from rec ball, to travel, to AAU, and ultimately high school varsity, where I was a starting point guard as a freshman.

Seeing my interest and dedication, my parents generously provided me with training, by coaches and professionals, who helped me hone my skills and develop into a nationally competitive player. As a freshman, I was already looking ahead to realizing my dream to play in college. I had already attended several showcases and sparked some interest. I was on top of the world, continuing my love for the game,



achieving personal success, and playing with teammates from 4th grade. Some of them are still playing together, but without me.

My first concussion was in seventh grade. My opponent and I dove for a loose ball at the same time, we collided and I hit my head on the floor. In my very next game, about a week later, I fell and slid into the wrestling mats. That was the first time we went to the emergency room where they checked me out, and told me to stay out one to two days. There were other head injuries and my parents took me to different doctors and each one told me something else. Having watched me play with broken bones, sprained ligaments, and chronic knee pain, no one was surprised to see me keep bouncing back. As long as they didn't stop me, I continued to play. I never really acknowledged how I felt, to myself or to anyone else.

The last concussion I had in a game was what seemed like a minor hit, but my knees buckled and I hit the floor. Four weeks later I got accidentally hit in the head with the gym door that was pushed open by one of my best friends. After that, I felt lousy for a long time. I couldn't stand the lights or the noise, I was dizzy and nauseous. That's when the headaches got really bad and never went away. I cried all the time, I couldn't go to school, I didn't want to see my friends—nothing. I will never forget how I felt when the doctor finally told me I had to stop playing basketball forever. It actually made me sick to my stomach.

I missed a lot of school and had teachers come to my house. When I finally went back for just a few hours a day, I was really tired and I couldn't concentrate at all. My grades dropped and I lost credit for classes I couldn't take at home. That was last year and this year I still can't make a whole day. I have had to move down to lower levels and make other changes. I struggle with subjects I used to do well in, so I lose interest quickly. Since there are so many things I can't participate in, I have lost touch with some friends. Because there are no crutches or bandages or casts, I look perfectly normal, and some people don't really believe me and that hurts. When those cynics are teachers, it sets a student up for failure.

During basketball season, I attend all the practices and games, but the athletic trainer and athletic director sit with me to protect me. It's sad to be only able to watch, but at least I can feel like part of the team.

Sports is only part of it. Life is much harder and I am left out of a lot of activities. I can't go to the movies, ride a train, swim, exercise, or ride the bus with my teammates. I wear earplugs to drown out the noise and sunglasses for the brightness, and I miss most of the parties. Still today, I am not allowed to participate in any physical activity, which is a terrible burden for someone used to being athletic. Because my brain hasn't completely healed, even a slight hit to my head makes me pass out and I continue to have setbacks like that. I have learned that it's not only the big hits, but even the dozens of somewhat minor impacts along the way that can change someone's life forever.

Once, I dreamed of playing basketball in college, at any level, because that's how much I loved the game. Everything I did was working toward that. Without that goal, I have lost my direction and determination. Every day is a challenge and I struggle to maintain normalcy. Sadly, there have been teachers, among others, who have doubted me and derailed my recovery.

What I want other kids like me to know is that it is much better to miss a month or a season or a year than it is to have your whole life changed. Many of my friends get hurt and refuse to tell anyone. They play with all kinds of injuries but with me they can't get away with trying to play after a head injury. I beg them to be honest with the school and with themselves.

It is important for parents, athletes, teachers and coaches to learn more about the seriousness of concussions. I have been interviewed on television and in newspapers and was invited to speak at a press conference in the Capitol to help Congressman Pascrell and Senator Menendez introduce a bill that would improve awareness, set guidelines, and provide funding for computerized neurological testing. I talk to kids all over the country who are going through the same thing as me and I try to help them.

I am lucky that our school now has a good support system in place. We have a certified athletic trainer who is knowledgeable about concussions and everyone uses the Impact test pre-season to get a baseline. Following a head injury, their return to play is based on the results of the post injury testing. The athletic trainer works together with the doctors to determine each case individually and prevent athletes from going back too soon. All schools should have what we have and all athletes must put aside their egos and bravado and stop thinking that they can play through anything. There is no shame in sitting out until you feel absolutely fine.

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[Additional submission of Mr. Gioia follows:]

**Prepared Statement of Sarah B. Rainey, Concussed High School Student/  
Athlete**

Good morning, Mr. Chairman and Members. Thank you for holding this important hearing on the impact of concussions on high school athletes. My name is Sarah Rainey. I am a freshman student/athlete at West Potomac High School in Alexandria, Virginia. I am still recovering from a concussion that I sustained on May 12, 2010, during a high school varsity soccer match. My concussion ended my soccer season and has significantly impaired my ability to keep up with my school work. I appreciate this opportunity to share my experience with the Committee.

*Soccer—The Beautiful Game*

My sport and passion is soccer. I have been playing organized competitive soccer since I was seven. In addition to being a starter on my high school varsity team, I play for a top club team and have been in the Virginia Youth Soccer Association's Olympic Development Program (ODP) for several years. I have played in competitive soccer matches from North Carolina to Rhode Island and in five European countries. I am a good youth player and hope to play in NCAA Division I in college. Although I'm only fourteen, I have a lot of playing experience and believe that I can speak knowledgeably about the risks of soccer at the highest youth and high school level.

Soccer is the fastest growing sport in America. According to US Youth Soccer, there are now over three million registered players ages 5 to 19 playing youth soccer in the United States. Although I don't know the numbers, soccer is now a major high school sport. Soccer is often called "The Beautiful Game" by its players and fans because of the free flowing non-stop action. However, despite the increase in popularity of the sport in the United States, many people still don't appreciate how physical the game is and that there are significant risks of injury to players. My attending emergency room physician was in that group of people. He told me how he didn't think my injury was likely to be serious because it is very rare that a player would get a concussion playing soccer. About twenty-minutes later, he was proven wrong, when a high school teammate of mine came into his ER with a concussion from the same high school game. I know that these numbers are not statistically significant, but out of the 18 girls on my high school varsity team, 2 of us have concussions now, and 3 others have sustained concussions within the past year. On my U-15 club team, 3 out of 15 players have had concussions within the past year, including me. My point is that it's not only football or hockey or some of the more obvious contact sports where players have risks of sustaining concussions. Also, girls play just as hard and are also at risk, not just the boys.

*The High School Game*

Soccer is governed by an international organization called FIFA (Federation Internationale de Football Association). FIFA establishes the laws of the game. U.S. youth soccer and high school soccer use modified FIFA rules. Because the Committee is holding this hearing on the impact of concussions on high school athletes, I assume your legislative authority must include some oversight and governance of high school athletics.

I can't speak to other high school sports, but I have a few observations about high school soccer. Soccer has developed primarily as a club sport in the United States. Most of the youth players start playing in non-school-related clubs and leagues in their elementary school years. Fairly early on, players choose to pursue either travel/elite soccer or recreation/house league, depending on their skills and commitment to the sport. By high school age, the player development and competition at the top divisions within the travel soccer leagues is generally at a higher skill level and more advanced than that of the high school leagues. I'm not saying that high school soccer isn't good quality. I loved playing on my high school team and making varsity and starting as a freshman was a great source of pride to me. There are lots of strong high school soccer programs. However, my point is simply that the technical skill level and depth of player rosters on top level travel teams generally exceed those of most high schools.

In addition to the greater variance of technical abilities among high school soccer players, there is also a larger variety of ages, sizes and fitness levels among high school players. In club soccer, both travel and house leagues, players compete against other players their same age. In travel soccer, teams are also grouped into divisions according to the team's skill level. For example, I play for a U-15 (under 15) girls team in Division 1 of the Washington Area Girls Soccer League. This past season, to expand our competition, my club team played in the U-15 girls Premier Division of Region I which was comprised of the top 16 teams in our age group from Virginia to Maine. Thus, in club play, I play against girls my age or younger and

at my skill level. By contrast, on my varsity high school team, I started as a freshman and played against players up to four years older than me. I loved playing for my high school, but there is a much bigger variance in the players competing against each other in high school soccer games and, because of this, the game is different.

Because of the big difference in age, size and technical skill levels of high school soccer players, I think there is a greater risk of injury to players in the high school game than in the most competitive club leagues. However, I don't have any statistics to back up my claim; I'm simply stating my observation from my personal experience as a player. One of the most important things I think this Committee might do is to require the recording, reporting and tracking of serious injuries, including concussions. In addition to playing soccer, I also qualified as a youth soccer referee. In the youth game, most leagues require referees to submit a game report. I am not a high school referee, but I assume there is a similar existing game report requirement. In the youth leagues, officials have to report the score and any cards (disciplinary actions) that were given. However, in my experience, there is no requirement to record or report player injuries. It seems to me that it would not be too burdensome to modify the existing game report to add a check box and short description to record any injuries that were serious enough that a player had to be removed and could not return to the match. I don't know if anybody really knows with any accuracy the frequency that concussions occur in high school sports. I think it would be important and not too costly or burdensome to monitor. Then once you had a good handle on the magnitude of the problem, you could figure out how best to manage it.

In addition to simply recording and reporting concussions and other injuries, I think there should be more awareness, training and education about the risks of concussions. I've learned first-hand that concussions are something that need to be taken very seriously. In soccer, there are generally 3 officials, a center referee and two assistant referees (sometimes called "linesmen."). The officials' primary responsibility is to ensure the safety of the players. It is not an easy job. Unfortunately, often the crowd and even some coaches and players give the referee a hard time. As a result, there is a shortage of soccer referees and, more specifically, good soccer referees. As I mentioned, I am not a qualified high school referee, but I have studied the FIFA laws and I am a qualified youth referee. There may be some different training for high school officials, but my experiences with referee training is that the courses focus on teaching the laws of the game and the mechanics of officiating.

FIFA has established 17 laws governing the game of soccer. Law 12 covers fouls and misconduct. The law lists certain fouls (e.g., kicking, tripping, jumping at, striking, pushing, etc.) and then leaves it to the discretion of the referee to determine if a player commits any of the offenses in a manner "considered by the referee to be careless, reckless or using excessive force." Obviously, there is a lot of subjectivity in the application of the laws of the game. Unfortunately, although soccer is gaining in popularity, many of the referees at the high school and youth level did not play the sport at a high level, if at all, and they don't always have a good feel for what is dangerous play. Since the referee's primary function is player safety, I'd like to see the soccer referee training and education include more on sport-specific risks and injury prevention—not just how to call a foul and restart the game, but more in-depth training and education on how keep control of the match to prevent dangerous play while at the same time not blowing the game dead for every trifling offense. Too often referees needlessly penalize meaningless perceived technical offenses, but then completely miss calling dangerous play. In my case, the player blindsided me in the head as I was sprinting full-speed tracking a flighted ball. I never saw the hit coming. I sustained a concussion, was knocked unconscious, and my season was over. The defender played me not the ball. It was a clear and dangerous foul. The same defender gave another of my teammates a concussion in the same game. The referee made no call in either case. Clearly, the officiating crew failed to recognize and appropriately deal with this player's dangerous play.

In addition to better educating the officials, I would recommend mandatory training for high school coaches, trainers and players about concussions. Even though concussions are getting a lot of press lately in the NFL, I'm not sure there is a very good understanding about the risks and impacts of concussions in other sports. I know that I had no idea how debilitating getting a concussion could be until I got one. Hindsight is twenty-twenty, but I realize now that I never should have gone back in the game after I was knocked out. It was a division game and the score was tied. There were two minutes left in regulation, we had good momentum and it seemed that we might get the win. Even though I was practically carried off the field, I was put right back in the game, after a quick sip of water. I ended up playing the rest of the game and two additional overtime periods. I don't really remem-

ber it. Fortunately, I didn't sustain any more major blows during the rest of the game. Even though I was dazed, I wanted to get back in and help my team so I told the trainer, coach, and my dad who had come down out of the stands that I was OK to play. I know now that I wasn't OK and that we collectively made the wrong decision in the heat of battle.

#### *The Academic Impact of My Concussion*

The biggest shock regarding sustaining and recovering from my concussion has been the huge impact it has had on my ability to think. I never thought it would actually hurt to think. I like school. I want to attend a good college and get an advance degree. Before the concussion, I earned straight A's and had a 4.5 weighted GPA. Now, over a month after my concussion, I'm still behind and struggling to complete my school work. Despite me working as hard as I am able, and with my parents' help, my latest progress report includes a couple of "F's," and a "D." I am determined to get my grades up, but it is going to take a lot of hard work, a lot of patience and understanding from my teachers, and some luck to get back to straight "A's." I sometimes now have to use a calculator to do simple arithmetic. It takes me three times as long to do anything. I have to keep re-writing everything and my spelling is worse than normal. I can't seem to remember facts and dates. My head still pounds when I try to read small type for more than about 15-20 minutes at a time. Bright lights bother me and I am over-sensitive to noises. I never realized how much fidgeting, finger-tapping and chair moving goes on in my high school classes. Even some of my teachers' lectures, when they change the inflection in their voices to emphasize a point, can leave me feeling sea-sick. Even when my head is not pounding, I always feel like I am wearing a compression head band.

I knew that I wouldn't be able to play sports for a while after getting a concussion. I've had a number of other injuries, bumps and bruises, sprained ankles and even a season-ending MCL sprain. I was prepared to be sidelined, although I thought I would have been back playing by now. That's why I am a little perturbed by the CDC's concussion slogan, "It's better to miss one game than a whole season." I understand their intent, but I think they minimize the seriousness of concussions by making it sound like you just need to take a game off and then you'll be good to go. I've already lost my whole high school, club and ODP seasons, including tournaments and camps.

#### *My ACE Care Plan*

The great news is that everybody is helping me. My parents took me to the emergency room immediately after the game. Then they researched about concussions on line and called everybody they knew to educate themselves about what to do. My parents took me to Children's National Medical Center and I am lucky to be being treated by Dr. Gioia who is the Director for the Safe Concussion Outcome, Recovery & Education (SCORE) Program and one of your expert witnesses testifying at today's hearing. I have now been evaluated by Dr. Gioia and his staff three times since sustaining the concussion. Each visit, he compares my progress against a baseline impact test I took at my high school before the season started. I think it is very important and helpful to have a good baseline to measure recovery. One of the most helpful tools for me has been my individualized Acute Concussion Evaluation (ACE) Care Plan. After evaluating my progress, Dr. Gioia prepares a detailed report on my current symptoms with specific recommendations, including special accommodations that I still need to cope with the challenges of school. For example, I am supposed to take breaks during and in between classes when my headaches start. My teachers have been notified that I am still impaired and am not able to keep up with the regular pace of my advanced classes and have been requested to adjust my homework and exams schedule.

My teachers, coaches, and school counselor have been tremendous in helping me. My school counselor has initiated a temporary individualized special education plan for me, called a Section 504 Plan, that formalizes many of Dr. Gioia's recommended accommodations from the ACE Care Plans. Without the expertise of my doctor, and the understanding of my parents and educators, and their willingness to work together to help me, I know that I would go from a straight-A student to a failing student because of my concussion.

Of all my soccer injuries, the concussion has been the most challenging. For one, it is not an obvious injury. I look fine. I am not on crutches, in a cast or wearing a brace. You can't see a concussion. I also don't think most people have as much knowledge about a concussion and how debilitating it can be and that the effects can last so long. Everybody bumps their head from time to time. Plus, I think that there are different levels of concussions and that some are worse than others and some people may just take longer to get over them. So as time goes by, I suspect

that it is harder for a lot of people to believe that you are still significantly impaired. In addition to concussions being somewhat of an invisible injury, it is worse because it not only keeps you from playing sports, it's a brain injury, and you need your brain for school and everyday life activities. Unlike even a serious ankle or knee injury, a concussion also affects your ability to think. As a high school student athlete, having my ability to think impaired has been a serious disability.

*In Conclusion*

A concussion can have a serious impact and consequences for high school athletes. I have the best care possible from a leading concussion doctor, a great team of teachers, counselors, coaches, school administrators and supportive parents. I was a straight "A" student and, despite the best help possible, I am now failing several classes over a month after sustaining a concussion in a high school soccer game.

I recommend that the Education Committee use its authority and oversight jurisdiction over high school athletics to require the recording and tracking of sports-related concussions, to develop new and support existing awareness, training, education and treatment programs for concussions (like SCORE). I think high school sports officials, coaches, trainers and players should be required to learn more about concussions. The Committee may also want to study the appropriateness of requiring protective headgear to prevent or minimize the occurrence of concussions. In soccer, FIFA only requires players to wear shin guards, and that requirement only became compulsory in 1990. There will be strong differences of opinions whether protective headgear works or not, and even if it does, whether there is sufficient evidence that it should be mandated for the high school game. My dad already told me that I'll be sporting some new headgear when I return to play, so I won't be waiting for an act of Congress to make that equipment decision. Additionally, I don't know if it is already a law or not, but I think that high school athletes should be able to have an individual education plan (like the 504 Plan I have) to formalize necessary temporary accommodations at school for the duration of their impairment.

Thank you again for this opportunity to share my personal experience on the impact that a concussion is having on me as a high school athlete.

[Additional submission of Ms. Kohn follows:]



## Individuals Who May Observe the Effects of a Concussion Incurred in High School Sports



Source: GAO (88). An Explosion (image).

[Whereupon, at 11:00 a.m., the committee was adjourned.]

