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IMPROVING SPORTS SAFETY: A MULTIFACETED APPROACH

THURSDAY, MARCH 13, 2014

House of Representatives,

Subcommittee on Commerce, Manufacturing and Trade

Committee on Energy and Commerce

Washington, D.C.

The subcommittee met, pursuant to call, at 10:20 a.m., in Room 2322 of the Rayburn House Office Building, Hon. Lee Terry [Chairman of the Subcommittee] presiding.

Members present: Representatives Terry, Lance, Harper, Guthrie, McKinley, Johnson, Kinzinger, Long, Bilirakis, Schakowsky, Sarbanes, Matheson, Christensen and Waxman (ex officio).

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Staff present: Charlotte Baker, Press Secretary; Kirby Howard, Legislative Clerk; Nick Magallanes, Policy Coordinator, CMT; Brian McCullough, Sr. Professional Staff Member, CMT; Shannon Weinberg Taylor, Counsel, CMT; and Tom Wilbur, Digital Media Advisor.

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Mr. {Terry.} I want to thank everyone for being here, and we are now with the full committee ranking member, the gentleman from California, joins us. We now have the ability to start our hearing. So I will introduce you after my statement and before you start your testimonies. So I will open with my opening statement. Morning, Jan.

So good morning and welcome to this morning's hearing. Today, it is my hope to learn what steps are being taken to make sports participation safer for all athletes.

Every day, parents make choices about whether or not to let their son or let their daughter play soccer, or what kind of mouthpiece to buy their son for his first day of Pop Warner football. Unfortunately, it seems like every day we hear about how participation in certain sports can be dangerous. It is easy to understand how what parents see in the news inevitably affects youth participation in sports.

Case in point, earlier this year, President Obama said publicly that if he had a son, he wouldn't let him play pro football. Then the First Lady wants us all to move. Seems to conflict. Messages.

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So now, we want a better understanding of the innovations being made by sports leagues, equipment manufacturers and the medical community to make all sports safer. One clear example is the NHL which has been working hand in hand with the NHLPA to make hockey safer. Dating back to 1997, the NHL recognized the dangers of head injuries and took the proactive step of forming a Joint Concussion Committee. Additionally, the NHL also established a Department of Player Safety at its headquarters, the first of its kind for any professional league. USA Hockey and USA Football, two organizations that help oversee youth sports in the United States, have followed the lead of their professional counterparts by employing a multipronged approach to making participation safer. USA Hockey now requires coaches to complete an Online education module specific to the age group they are coaching at, and that includes safety information, concussion education, proper-- and proper techniques. USA Football, which is endowed by the generosity of the NFL and the NFLPA, was the first national governing body for any sport to participate in the CDC's heads-up concussions in youth sports.

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Initiatives and all engaged in providing youth with non-tackling alternatives to develop their skills. Additionally, USA Football's heads-up football program encompasses 6 elements meant to make youth's football safer, including coach education and concussion recognition.

Proactive actions like the ones I just mentioned are exactly what parents need in order to be assured that everything possible is being done to keep their child as safe as possible while they are on the field or ice.

Researchers have also been hard at work to improve the tools that coaches and doctors have at their disposal when treating an athlete. For example, Dr. Dennis Molfese, sorry, Doc, who runs the University of Nebraska's Brain, Biology and Behavior Center located inside the Huskers Football Stadium, has been developing an MRI machine that can be used on game day to assess a head injury. This would allow medical staff to determine if a player has suffered a concussion, how severe the injury is, and if that player is able to return.

Equipment manufacturers are also using technology to make innovation changes to helmets, mouth guards, footwear and other equipment, all in order to reduce injuries. I feel

confident saying that given the recent rule changes and the rate which technology is advancing, playing a contact sport today is likely safer than it has been in the past, however, we must accept that there is no silver bullet, no helmet or pad is going to prevent 100 percent of the injuries 100 percent of the time. This is why we need to consider a multipronged approach aimed at keeping our kids safer, while still promoting youth participation--aimed at keeping our kids safer, while still promotion youth participation in sports. This involves listening to how leaders like the NFL, NHL, youth leagues and top tier university researchers are partnering to make progress towards making sports safer. These are the types of innovations and paradigm shifts needed to give parents the assurance that all the possible steps are being taken to improve the safety of their child on the field.

And I would like to thank our panelists for joining us here today, and willing to answer our questions. And I would especially like to thank Dennis Molfese and Dr. Tim Gay for making the trips to Washington, DC, from Lincoln, Nebraska.

[The prepared statement of Mr. Terry follows:]

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105 ********** COMMITTEE INSERT **********

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Mr. {Terry.} And my time is over, so I will recognize the Ranking Member, the--Jan Schakowsky, from Illinois.

Ms. {Schakowsky.} Thank you, Mr. Chairman. This is a very important hearing on improving sports safety. I look forward to hearing from all of our witnesses on both panels about their perspectives, experiences, proposals about how to make sports safer for everyone, from children to professional athletes.

Athletes are continually becoming bigger and faster and stronger, and despite some efforts to make sports safer, much work remains. Three hundred thousand sports-related traumatic brain injuries occur annually in the United States. Sports are the second leading cause of traumatic brain injury among people age 15 to 24 years old, second only to motor vehicle accidents. This is a crisis and one this subcommittee should do everything in its power to address.

We are going to hear today from Ian Heaton, a high school senior, who suffered a severe head injury during a lacrosse game in his sophomore year. Despite his impressive recovery, that hit, later identified as his third head

injury, left him with a limited ability to enjoy the types of activities many of his high school students, classmates, take for granted. His story should serve as a reminder that youth sports injuries can have a--have devastating and lasting consequences. And we will also hear on this panel from Briana Scurry, an Olympic and World Cup soccer champion, a goalie, forced from the field after a career-ending traumatic brain injury almost 4 years ago. Her struggle to overcome the cognitive, physical and psychological injuries that follow--followed illustrate that even our sports heroes are vulnerable to the worst sports injuries.

Both Ian and Briana should be commended for their courage, and I thank you, Briana, in their recoveries and for their willingness to testify on this critical issue.

Dave Duerson, a Pro Bowl and Super Bowl wining safety, and former member of my hometown, Chicago Bears, tragically committed suicide over--just over 3 years ago. In doing so, he shot himself in the chest to avoid any impact on his brain, which he asked to have donated to medical research in order to allow scientists to study the impact of the brain trauma he suffered over his 11 year professional career. It

was later disclosed that Duerson suffered from a ``moderately advanced'' case of chronic traumatic encephalopathy, a disease linked to repeated blows to the head, which can result in memory loss, depression and dementia.

The Heaton and Scurry stories prove that even--that severe career-ending sports injuries can occur at any level of competition, and the Duerson case should make it clear to all of us that the impacts of brain trauma go way beyond an athlete's days on the field, and can become more severe over time.

We will also hear today from medical and scientific experts who have studied the impacts of brain injuries on athletes of all ages. We will hear about the importance of taking athletes off the field of play as soon as there is a suspicion of a brain injury, and keeping them off until they are cleared by a responsible and trained individual.

And finally, we will hear from the NHL, the NFL, and youth hockey and football leagues that are responsible for mitigating traumatic brain injury in their sports. I hope to learn what changes they have implemented, and will implement, to rules, practice drills and other aspects of the games that

will reduce the risk of brain injury moving forward.

I am not advocating for an end to sports as we know it, or maybe not exactly as we know it right now, but I also feel strongly that 300,000 head injuries per year are too many to overlook. We should take reasonable steps to reduce the risk. And I look forward to hearing from all of our witnesses. I hope this hearing will help the subcommittee to better understand the safety risks in sports, and what we can and should be done to limit these risks.

And I yield back the balance.

[The prepared statement of Ms. Schakowsky follows:]

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Mr. {Terry.} Thank you very much. At this time, recognize the Vice Chairman of the Committee, Mr. Lance, from New Jersey.

Mr. {Lance.} Thank you very much, Mr. Chairman, and thank you for holding this extremely important hearing. I want to thank Dr. James Johnston, who will be one of the witnesses, who came to my office earlier this morning. Thank you, Dr. Johnston.

Experts generally agree that a concussion can be classified as a brain injury, ranging in seriousness from mild to dramatic. The Center for Disease Control states a concussion is caused by a bump, a blow or a jolt to the head, or blow to the body that causes the head to move quickly. According to the CDC, the sports that reported the highest number of traumatic brain injuries were bicycling, football, playground activities, basketball and soccer.

From 2010 through 2013, the participation rate of children in youth soccer and football dropped considerably, and some have pointed to the increased risk of TBI's as a result of participating in these sports as a reason for the

drop in that participation.

The increased spotlight on concussions in sports has resulted in an increased amount of research in brain injuries, as well as research on how to improve sports equipment in order to prevent such injuries from occurring. Collegiate and professional sports leagues have implemented standards and revised their rules in order to decrease the number of brain injury incidents. The NHL has, as has been indicated, has required its players to wear helmets on the ice, and the NFL instituted new standards for evaluating concussions on the sidelines after the League reported an occurrence of 223 concussions in just over 300 games in the 2010 season.

And state and federal governments have also been involved in tightening safety standards, and since 2009, all 50 states and the District of Columbia have adopted laws protecting youth and high school athletes from returning to play too soon after suffering a concussion or a potential concussion.

This hearing will focus on what more can be done to prevent brain injuries from occurring in sports, and this is

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at the youth level, the amateur level and at the professional level. And I look forward to the testimony of our distinguished panels.

Thank you, Mr. Chairman.

[The prepared statement of Mr. Lance follows:]

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Mr. {Lance.} I have two and a half minutes remaining. Is there any other member on the Republican side who would like to speak with an opening statement?

Mr. {Terry.} Okay.

Mr. {Lance.} I yield back the balance of my time.

Mr. {Terry.} Especially Missouri. Do they play sports? And on behalf of the Big 10, I want to welcome Rutgers to the Big 10. At this time--

Mr. {Lance.} Thank you very much.

Mr. {Terry.} --5 minutes to the Full Ranking Member of the Energy and Commerce Committee, Mr. Waxman.

Mr. {Waxman.} Thank you very much, Mr. Chairman.

Decades ago, many thought that head injury was serious only if a player was completely knocked out unconscious, and/or suffered a severe contusion, after frequent painful blows, even a young athlete could continue to play, but we now have strong indications that the effects of repeated brain trauma in sports, even those received during one's youth, can accumulate with consequences that are long-term debilitating and even life-threatening. These consequences

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can stem from injuries once considered minor, known as subconcussive blows, which may not be accompanied by any immediate adverse symptoms.

Serious psychological and emotional disorders have been documented among former athletes that have suffered repetitive brain trauma. Researchers have, a number of times, found evidence of the neurodegenerative disease, CTE, when examining the brain tissue of dozens of deceased former NFL players. New imaging technologies have been able to show the metabolic changes in the brain associated with concussions and subconcussive blows.

Brain injuries in sports can occur in a wide variety of situations, and different athletes' brains may respond differently to an injury. Sports-related brain injury is a complex matter, requires addressing many interconnected issues, so when the title of this hearing suggests we take a multifaceted approach to improve sports safety, I could not agree more.

First, we need more neuroscience research, radiological and longitudinal research methods can lead to earlier, more accurate diagnoses, a better understanding of the risk

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factors, and maybe a treatment--better treatment options for brain injuries.

Second, doctors, league associations, coaches, parents, players need to work together to establish health regulations, game rules and a sporting culture that reflects the seriousness of brain injury, and put the athlete's health first.

Third, we must address the health and safety risks associated with the athletic equipment, and pursue a better understanding of how this equipment might be improved.

Three years ago, Congressman Butterfield and I wrote to then-Chairman at the time of the subcommittee and full committee chairman, calling for hearings about inadequate testing standards, lax reconditioning certifications, economic disparities regarding the safety of football helmets used by millions of American athletes. We are going to touch on some of those issues today, but I believe those issues merit deeper consideration than they are likely to get at today's hearing, and the subcommittee chairman might consider holding separate hearings on these matters.

I think it is valuable that the National Football League

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is testifying here today, given recent and ongoing disputes between the League and its players on this very topic. I believe--however, I believe its players organizations should also testify. Unfortunately, the late notification of the NFL testifying made it difficult for us to secure players' witness.

Mr. Chairman, today's hearing is important. I appreciate the subcommittee review of sports-related brain injuries, and I look forward that we all--working together, all of us, on this issue in the months ahead. Thank you for holding the hearing, and I look forward to the testimony of the witnesses.

Yield back my time.

[The prepared statement of Mr. Waxman follows:]

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Mr. {Terry.} Have--still have a minute left, if the gentleman from Utah wanted to use it.

Mr. {Waxman.} Well, I might just point out that moving physically and conditioning the body is not anywhere near dangerous as subjecting oneself to brain injuries, so I don't think they are contradictory.

Mr. {Terry.} Yeah. It is interesting, but the issue is we want kids to go out and play. We want them to join youth leagues.

Mr. {Waxman.} And we want sports, but we want to make it as safe as possible.

Mr. {Terry.} Absolutely. And this is--to use your last 26 seconds then, this is one of those where Jan and I both agreed was necessary. So this has been a bipartisan effort.

So with that let us move on to our witness panel. And I am going to introduce the entire panel now, and then we will start with Mr. Daly. So are blessed to have Mr. William Daly, III, Deputy Commissioner of NHL. Next to him is David Ogrean, Executive Director of USA Hockey. Then we have Mr. Jeff Miller, Senior Vice President, Player Health and Safety

Policy, National Football League. Thank you very much for being here. And then Scott Hallenbeck, Executive Director, USA Football. Then a face of a brain injury, concussions--multiple concussions, within soccer, Briana Scurry, a former professional goalkeeper, U.S. Women's National Soccer Team. In the next panel we will have Ian, who is the other face of high school level concussions.

So with that, Mr. Daly, you are now recognized for your 5 minutes.

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^STATEMENTS OF WILLIAM DALY III, DEPUTY COMMISSIONER, NATIONAL HOCKEY LEAGUE; DAVID OGREAN, EXECUTIVE DIRECTOR, USA HOCKEY; JEFFREY MILLER, SENIOR VICE PRESIDENT, PLAYER HEALTH AND SAFETY POLICY, NATIONAL FOOTBALL LEAGUE; SCOTT HALLENBECK EXECUTIVE DIRECTOR, USA FOOTBALL; AND BRIANA SCURRY, FORMER PROFESSIONAL GOALKEEPER, U.S. WOMEN'S NATIONAL SOCCER TEAM.

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^STATEMENT OF WILLIAM DALY III

} Mr. {Daly.} Thank you. I would like to thank the Chairman, the Ranking Member and the subcommittee members for inviting me to testify today regarding the National Hockey League, and the proactive steps it has taken to promote the health and safety of the best professional hockey players in the world.

As its playing surface is enclosed by boards and glass, making it the only major professional sport with no out of bounds, hockey is a physical game. At the NHL level--

Mr. {Terry.} Is your mike on?

Mr. {Daly.} It was, yes.

Mr. {Terry.} Just pull it a little lower and closer.

Mr. {Daly.} I will bring it closer. At the NHL level, our players want it to be physical and our fans want it to be physical, but importantly, all constituent groups associated with the game also want it to be safe. This objective necessarily includes promoting safe and responsible play in our game, and the National Hockey League, working together with the National Hockey League Players' Association, has gone to elaborate lengths to do that, and will continue to do so.

We are pleased to have this opportunity to share with this subcommittee some of the measures enacted in this pursuit. The National Hockey League was the first major professional sports league to launch a comprehensive league-wide program to evaluate players after they incur head injuries. Beginning in 1997, the NHL/NHLPA Concussion Program has required that all players on all clubs undergo preseason baseline neuropsychological testing. After a player is diagnosed with a concussion, he undergoes post-injury neuropsychological testing, and his pre- and post-injury test results are compared to determine when the player

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is safe to return, or returns to neurological baseline, which is a relevant determination in the player's ability to safely return to play.

Data collected and analyzed pursuant to the NHL/NHLPA Concussion Program confirmed to us early on that neuropsychological testing results had added value, and should be taken into account, along with player reported symptoms when making return-to-play decisions.

The NHL/NHLPA Concussion Committee also has taken affirmative and proactive steps to issue league-wide protocols regarding the diagnosis, management and treatment of concussion. Education regarding concussions and, importantly, the issuance of warnings to players relating to the risks of returning to play before the recovery from a prior concussion is complete, have been a core component of the NHL/NHLPA Concussion Program sits--since its inception. Education is provided regularly to all relevant constituents in our league, including our players, club personnel and NHL on-ice officials.

In addition to enforcing existing player rules--playing rules, such as charging, crosschecking and high-sticking, and

more stringently penalizing dangerous contact, several new playing rules have been adopted specifically to prohibit involving a player's head. Our current rule specifically prohibits any body contact with an opponent's head when the contact is otherwise avoidable, and the head is the main point of contact. Changes this season to adopt the hybrid icing rule, and modifications of rules regarding fighting, have further enhanced player safety. With respect to the fighting issue in particular, while it remains a small part of the game, its role is diminishing. Through 75 percent of the 2013/2014 regular seasons, 68 percent of the games played have been completely free of fighting, the highest such percentage since 2005/2006. In addition, the number of major penalties assessed for fighting is down 15 percent from last season, and down 31 percent from the 2009/2010 season.

In this important area, it would be the League's intention to raise, discuss and negotiate any potential playing rule changes regarding fighting directly with the National Hockey League Players' Association. Ultimate enforcement of the playing rules through supplementary discipline is in the hands of the Department of Player

Safety, the first League department of its kind in professional sports. This department monitors every one of our 1,230 regular season games, plus all of our playoff games, and assesses every hit, indeed, every play, to ensure the League's standards for safety and responsible play are being adhered to. When the Department determines that the standard has been violated, supplemental discipline is assessed in the form of a suspension or a fine, and the Department creates a video that explains to our players and our fans why the behavior merited punishment. The cumulative effect of these efforts has begun to change the culture of the game in a positive way. As we can see on a nightly basis, players avoiding dangerous plays and gratuitous contact that they, no doubt, would have engaged in just a few short years ago.

Since the adoption of the mandatory helmet rule in 1979, the NHL, together with the NHLPA, has continued to impose a series of additional regulations regarding player equipment relating to player safety generally, but also to head injuries more specifically, including most recently a rule adopted prior to the start of this season that mandated the

use of face shields by all incoming players, the effect of which should reduce head injuries generally, in addition to providing enhanced protection for players' eyes.

The NHL also has participated in concussion initiatives that extend beyond the NHL, including its representatives' participation at each of the 4 International Concussion and Sport Conferences between 2001 and 2012, its support of federal and state legislative initiatives regarding concussions, and the League's support and assistance in the development of concussion educational programs for youth and junior-age hockey players.

To summarize, while recognizing there is considerable work to be done, the National Hockey League has been, and will remain, absolutely committed to promoting the safety of its players. We firmly believe it is not only the right thing to do for our players, but it is the right thing to do for our business, both in terms of promoting participation at the youth hockey level, and in maximizing interest by fans and consumers of the sport at the professional level.

Again, I thank the Chairman, the Ranking Member and the subcommittee members for your time and invitation to speaking

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to you this morning.

[The prepared statement of Mr. Daly follows:]

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Mr. {Terry.} Thank you. Mr. Ogrean, you are recognized for your 5 minutes.

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^STATEMENT OF DAVID OGREAN

} Mr. {Ogrean.} Thank you, Chairman Terry, Ranking Member Schakowsky, and distinguished members of the subcommittee. It is a privilege to be with you today to discuss an issue that is the top priority every day at USA Hockey, and that is the safety of our participants both on and off the ice.

We have adapted well to changing environments over time, and we have two particular leaders that we wish to thank, and who guide a great deal of our decision-making. One is Dr. Mike Stewart, our Chief Medical Officer, who is the head of sports medicine at the Mayo Clinic in Rochester, Minnesota, the other is Dr. Alan Ashare from Saint Elizabeth's Medical Center in Boston, who is also the chair of our Safety and Protective Equipment Committee. That committee has been in existence at USA Hockey for 40 years, and it is an important group helping to guide our Board in making its decisions.

We have a Risk Management Committee which is concerned with the safety of the playing environment and the surrounding area, and in 1999, in cooperation with U.S.

Figure Skating, we began an organization called Serving the American Rinks, or STAR, which is essentially a trade and education organization for ice facilities, focusing on a variety of operational aspects, including safety issues in rinks.

In terms of the safety of our participants, we believe we can and do positively affect the landscape through 3 primary areas; education, rules and rules enforcement, and risk management. Education related to safety happens on an ongoing basis at USA Hockey, and we utilize many avenues to communicate. We have, very fortunately, direct electronic communication with every single home, every player, every parent, every official and every coach in our organization, through our database. We are constantly in communication with them with educational bulletins and news. Our coaches have a huge influence in providing a safe and responsible environment, and our coaching education program has long been heralded in the amateur sports world as the gold standard for coaching education.

As Congressman Terry referenced, this last year--or, excuse me, two seasons ago, we added an online educational

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501 module that is age-specific in nature, which also contains
502 critical safety information, including concussion education.
503 Officials, obviously, play a very important part in how our
504 game is made safe as well, and they receive regular
505 evaluation and education electronically, and are sent video
506 clips and also access to our national reporting system which
507 tracks penalties, to help us understand and assess behavior
508 trends. We annually mail posters to every ice facility in
509 the country to help deliver our messaging, and, over the
510 years, those posters have focused on topics including
511 concussion prevention, concussion education, playing rules
512 emphases, and our heads-up, don't duck program, to name a
513 few.
514 As for rules and rules enforcement, we have modified our
515 rules to adapt to the evolving landscape of the game on an
516 ongoing basis, from mouth guard and helmet issues to rules
517 aimed at eliminating dangerous behavior. Another recent
518 modification in USA Hockey came in June of 2011 when our
519 Board voted to change the allowable age for body checking in
520 games from the peewee, or age 11 and 12 level, up to the
521 bantam age group of 13 and 14. This was done despite many

522 voices around the country in opposition to change, which
523 nobody seems to like, but research based on both athlete
524 development and safety guided our Board decision. It is
525 worth noting that 2 years later, Hockey Canada followed our
526 lead.
527 Regarding equipment and its impact on safety, USA Hockey
528 took a significant step in 1978 when it called for the
529 creation of the Hockey Equipment Certification Council, or
530 HECC. HECC's mission is to seek out, evaluate and select
531 standards and testing procedures for hockey equipment for the
532 purpose of product certification. It is very similar to
533 NOCSAE, which a lot of you may be familiar with, that
534 football uses in certifying its helmets. It is a completely
535 independent body made up of attorneys, doctors, engineers,
536 manufacturers, testers and sportspeople. It validates the
537 manufacturer's certification that the equipment they produce
538 has been tested, and meets the requirements of the most
539 appropriate performance standards, and it has been an
540 important part of our safety story for 35 years.
541 Before closing, I would like to share with you briefly
542 our newest off-ice safety program called USA Hockey Safe

Sport, following the lead of the United States Olympic Committee, this is protect our participants and--on policies regarding hazing zero tolerance, locker room supervision, and abuse of any kind. In the early 1990s, we were one of the very first youth sports organizations to require screening of all adults that have regular access to our youth participants. We follow-up on 100 percent of calls we receive around the country of alleged abuse, and our 34 affiliate associations each have a volunteer safe sport coordinator that helps us as boots on the ground to provide the safest possible environment for our participants.

Our sport has enjoyed tremendous growth in the last 25 years, more than doubling in the number of youth players that we have. As we continue to provide opportunities for young people, we know that in doing so, we have the responsibility to make our game as safe as possible, and will only continue to grow if we are successful in doing so.

Thank you.

[The prepared statement of Mr. Ogrean follows:]

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Mr. {Terry.} Thank you. Mr. Miller, you are recognized for your 5 minutes.

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^STATEMENT OF JEFFREY MILLER

} Mr. {Miller.} Chairman Terry, Ranking Member Schakowsky, members of the subcommittee, appreciate the opportunity to testify this morning on behalf of the National Football League on an issue of great importance to the League, and I commend the committee for taking up this issue.

There is nothing more important to the NFL than the safety of our players. Commissioner Goodell has stated repeatedly in the past that he spends more time on the health and safety of our sport than any other issue that comes before him.

Football has earned a vital place in the rhythm of American life. There are nearly 6 million kids who play tackle or flag football across our country, another 1.1 million that play in high school, 75,000 in college. And so whether it is touch games in our backyards at Thanksgiving, or games played in our local parks by our kids, or Friday night high school games, Saturdays with college, or hopefully plenty of people watching the NFL on Sundays and Mondays, and

occasionally Thursdays, football plays a significant role in our lives, and we take that popularity seriously. With it comes a great deal of responsibility, and that is one that we embrace.

We understand the decisions that we make at our level affect football at all levels, and probably far beyond that, and so I appreciate the opportunity to share the NFL's work with the subcommittee on the health and safety of our athletes who play our game.

Now, football has always evolved. The rules have always changed, and so I would like to share with the subcommittee a few examples of that over the last couple of years, and the impact that that has had at our level.

It has only been a couple of years ago that we changed the kickoff line at the NFL, moving it forward 5 yards. We did that because we had identified the kickoff and the kickoff return is the single most dangerous play in our sport as related to the number of concussions. So by moving it forward 5 yards, we decreased the number of concussions on that particular play by 40 percent. That was in the first year alone, and that number has stayed steady in successive

605 years.

606 In addition, for those of you who are fans, you have
607 seen a greater emphasis on eliminating helmet-to-helmet hits
608 in our game, you have seen a greater emphasis on eliminating
609 the use of the crown of the helmet in our game, and you have
610 seen fines and suspensions, not to mention penalties, as a
611 result of them. And these are the sorts of things that we
612 are looking to do to change the culture of how our sport is
613 played. We have encouraged players to lower their target
614 zones as they tackle, we have emphasized through our coaching
615 that there are better ways to go about what they are doing,
616 and we have seen the results. In the past year alone,
617 between 2012 and 2013, the NFL has seen a decrease in the
618 number of concussions at our level by 13 percent. A decrease
619 in helmet-to-helmet hits causing concussions has been down 23
620 percent in one year alone. Now, that is not a victory, that
621 is a trend, and one that we find encouraging, but there is
622 more work to be done as we begin to change the culture of the
623 sport as it relates to that.

624 And we have added other protocols to our sideline to
625 take care of our players. There is one rule that governs us,

and that is that medical concerns will always trump competitive ones. So we have added unaffiliated neurotrauma consultants on the sideline. That is a concussion expert in every city to help the team physician identify concussions and treat the players. We have added athletic trainers in skyboxes for the sole purpose of watching the game, and calling down to the sideline if they identify an injury, concussive or otherwise, to make sure that the player is attended to appropriately. And we have mandated uniform sideline protocols across all 32 of our teams so that everybody is working off the same playbook, and those protocols are based on internationally accepted medical guidelines. We would expect nothing less. And we know as we change the culture of our sport as it relates to health and safety, we have an impact far beyond. And so let me cite two examples of that for the subcommittee. One is our support for USA Football, and you will hear from Mr. Hallenbeck in a moment. Their Heads-up Program, among their other offerings, are changing the game in our parks, in our communities around the country literally as we speak. The popularity of these programs, which I won't steal Scott's thunder on, have been

tremendous, and the NFL is a proud supporter of USA Football, and will continue to be in all that they do to change the game, and we are proud of his work particularly.

In addition, the NFL used as inspiration a young child named Zackery Lystedt who was a 13-year-old youth football player in Washington State several years ago who suffered catastrophic injuries playing his sport. He was returned to play too soon after suffering a concussion. And Zackery still struggles with the challenges that come from that. His advocates were able to pass a Youth Concussion Law in Washington State which our commissioner said we will replicate in all 50 states around this country to make sure that all youth sports, not just football, are played more safely, that kids and their coaches are aware of the risks of concussion, that they are removed from play should it appear that they suffer concussion, and most importantly, not return to play until a medical professional has cleared them. Just this past month, we are proud to say that the fiftieth state passed that law, and now the NFL isn't solely responsible for that work, but we are happy to lead and to be in many of these states to get this done.

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And as my time expires, let me just mention two other quick components. We have been proud to work with the CDC promoting concussion materials that have gone out to millions of kids, posters in locker rooms, and to fund much of their Heads-up Program. We have also invested tens of millions of dollars in research; $30 million with the NIH, which is the largest grant that the NFL had ever given, and the first $12 million of that has been--has gone out already to study chronic traumatic encephalopathy. In addition, we are very proud of a $60 million effort we have with General Electric and Under Armour, both to improve the diagnosis and prognosis of concussion by developing better tools, and then secondly to find better ways to protect against concussion in the first place. These are ongoing issues and ones that we think are going to yield significant successes in a short time.

So I apologize for exceeding my limit, Mr. Chairman, but I appreciate the time.

[The prepared statement of Mr. Miller follows:]

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Mr. {Terry.} At this time, Mr. Hallenbeck, you are recognized for your 5 minutes.

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^STATEMENT OF SCOTT HALLENBECK

} Mr. {Hallenbeck.} Chairman Terry and members of the committee, thank you for the invitation to testify.

USA Football creates and directs programs and resources that establish important standards rooted in education for youth and high school football. We stand with experts in medicine, child advocacy and sport who believe that education changes behavior for the better. This is precisely what we are seeing through our Heads-up Football Program, which is already benefitting more than 25 percent of youth football leagues across the country in its first 14 months, and we expect to double that this year.

We advance safety through evidence-based studies by independent experts, we also lead fun and dynamic instructional football initiatives for young players, as well as a national non-contact flag football program. More on these and other aspects of our work resides in my written testimony. The remainder of my time will be showing a video of how Heads-up Football High School Pilot Program is

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improving player safety within the Fairfax County Public School system, which earned high marks from parents, coaches, administrators in its first season. It paid close attention to hearing from the athletic directors and the principals and the superintendents of the schools on how this program is making a difference.

[Video shown.]

[The prepared statement of Mr. Hallenbeck follows:]

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Mr. {Terry.} Thank you. Now Briana Scurry, appreciate you being here, and you are recognized for 5 minutes.

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^STATEMENT OF BRIANA SCURRY

} Ms. {Scurry.} Thank you very much.

Yes, my name is Briana Scurry and I am 42 years old. I served as a starting goalkeeper for the United States Women's National Soccer Team from the years 1994 to 2008. During that time, I helped lead the team in winning two Olympic gold medals in 1996 Atlanta games and 2004 Athens, and played 173 international games over 15 years for the United States, which is a record among female goalkeepers.

In the summer of 1999, my 20 amazing teammates and I captured the hearts of America by beating China in a penalty kick shootout live in front of 90,000 screaming fans at the Rose Bowl in Pasadena, California. I was the one that made the single save during the penalty kicks before Brandi Chastain took off her shirt. Yes, now I will be many of you recall exactly where you were at that moment. It was the kind of event that transforms lives forever for the better. My passion and my mission was soccer. My ultimate reward was living my dreams and inspiring the dreams of countless

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others.

Today, I am here before you to share my new mission with you. My new mission is to provide a new face and voice to those who have had and may suffer the long and difficult recovery of a devastating traumatic brain injury and concussion.

My life story reads like a script from Oprah Winfrey's Where Are They Now. Like many of Oprah's guests, I too have been lost in deep, dark places with my face in the dirt, and have only recently begun to claw my way back to my life.

On April 25, 2010, my life changed forever. During that day, I played a women's professional game against the Philadelphia Independence in Philadelphia, and in that game, I suffered a traumatic brain injury that abruptly ended my beloved soccer career. That was nearly four years ago.

I struggled with intense piercing headaches that were so bad that, by the evening, it was all I could do not to cry myself to sleep. I had to take naps on a daily basis just because my sleep was so disrupted. I couldn't concentrate and I was very moody. I felt completely disconnected from everything and everyone. I was anxious and depressed every

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day, and I wondered if I would ever get better.

I recently moved to DC to have bilateral occipital nerve surgery at Georgetown to eliminate severe headaches that plagued me daily. Fortunately for me, the surgery appears to have worked, however, I am still being treated for symptoms such as lack of concentration, balance issues, memory loss, anxiety and depression. I have purposefully and intentionally had my concussion recovery story documented by media outlets, such as the USA Today, The Washington Post and Brainline.org, in order to bring attention and a ray of hope to those suffering from TBI like me.

In September, I was alarmed to learn that the number of reported cases of concussion in soccer was second highest in the United States, with only American football having more cases. Additionally, a recent article published in November stated that one of two female youth soccer players will suffer a concussion while playing. I feel the numbers of reported cases are likely understated, and didn't designate those who suffered multiple concussions like I have. Statistics like these have solidified my urgency of purpose to shed light on the high frequency of concussions in youth,

and the devastating emotional toll that prolonged symptoms often cause, yet are too frequently dismissed.

I sincerely hope that my presence here today will inspire increased awareness, understanding and assistance to help the thousands of young TBI sufferers across this country.

I thank you all for allowing me to give testimony. I am grateful and humbled to have been invited to do so. Thank you.

[The prepared statement of Ms. Scurry follows:]

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Mr. {Terry.} Thank you very much. And that was powerful.

So this is our opportunity now, each of us have 5 minutes to ask you questions.

So, Ms. Scurry, let me ask you this one. I too was shocked to learn that soccer had the second most concussions, which is a really dominant youth sport. Are you seeing changes within soccer and, unlike there is an obvious top-to-bottom connection that we heard from the NHL and the NFL, is anything like that occurring in soccer?

Ms. {Scurry.} Thank you for the question. I too was very surprised to read that statistic. I think it is so high in part because the explosion of players that are playing soccer now in the last 10 years.

I am not finding that soccer has completely grasped the alarm or the situation like USA Football, USA Hockey have. Part of the reason I am here today is to shed light that soccer too should be instrumenting different protocol like NHL and the NFL are, and hopefully the governing body for soccer, which is U.S. Soccer, will start to understand that

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our great sport is in danger of having too many head injuries, and that something does need to be done about it, and something needs to be instrumented.

Mr. {Terry.} All right. And thank you, and I think your assessment of the game that you played, and winning that championship over China, we all, at least I, remember that one event.

Ms. {Scurry.} Thank you.

Mr. {Terry.} It was a great game.

Now, to Mr. Miller, and--the NFL has taken, I think, seriously, undertaken effort to get the so-called return to play guidelines adopted at all state levels. Can you tell us more about what the guidelines are and how they are developed?

Mr. {Miller.} Sure, and thank you for the question.

The Zackery Lystedt Law, which is the model law that was passed out in Washington State, contained three primary elements, the first of which would be that parents and their kids would have to sign off on an education sheet a notification about the risks, signs and symptoms, related to concussion before they were allowed to participate. The

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second was that a child who appeared to have suffered a head injury must be removed from play immediately, in other words, the coaches were asked to act conservatively. And finally, that a licensed medical Provider who has a training in the management and evaluation of concussions has to return every child to play. And that part was done in large part to eliminate the danger that was--that Zackery faced when he returned to play in the same game too soon.

And all these laws are very new, and so I know that there are academics who are studying them to see their success, but I just know, as one anecdote in Washington State, the one that had the first one, in the years after the Lystedt Law was passed, they didn't see a single brain injury, in other words, a blood--blood on the brain of any single football player in the State of Washington, and they had normally seen three or four significant brain injuries on an annual basis and those were eliminated.

Now, that is anecdotal and more work needs to be done. And I commend those states who are going back and making their laws more strict, because there--they need to be expanded to the youth level. Many of them are high school

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only. They need to be expanded to recreational spaces so it is not just school-based sports. And there is more that can be done, and there are those that are doing that, and we are happy to work with those.

Mr. {Terry.} Thank you. Mr. Ogrean, have you seen a demonstrable reduction in concussion incidents at USA Hockey after implementing new techniques?

Mr. {Ogrean.} We do not have the same statistical data that I think--excuse me. We don't have the same statistical data that I think USA Football has invested in, and, in fact, we are talking to DataList, the same company, to do that sort of thing.

We have--any concussions are too many concussions. What we have focused on is research, education and rules enforcement. The statement was made in someone's opening remarks regarding the culture of certain sports, and obviously, we know that a lot of sports at the youth level suffer from a misplaced, you know, macho attitude. A lot of coaches think they are coaching at the professional level, and they are not. And so changing that culture is very, very important. We have been very, very strict about return to

play rules, and as Scott used the phrase earlier this morning that I appreciate very much, and we adopt the same thing, when in doubt, sit them out. And I think when you are talking about a grassroots sport, in our case, we have 350,000 youth players in 2,500 programs, and that equates to about 25,000 teams, one of our big challenges is quality control. You can't get everybody to act the same way or to think the same way, but we do know, I think because of our emphasis on preventing head injuries, and what to do with them, how to recognize them, how to treat them, how to respond to them, and making sure the return to play decision is a medical decision and not a coach's decision, that the number is dropping.

Mr. {Terry.} Great. My time is over. And so the Ranking Member, Jan Schakowsky, you are recognized for your 5 minutes.

Ms. {Schakowsky.} Briana, my granddaughter has played AYSO soccer since she--the first time that she could. Now she is on a traveling team in high school. She is 16, so I am very concerned about what you are saying, and even more concerned now after you are saying that soccer actually seems

to lag behind other sports. And there have also been studies that have compared the rates of reported concussions for male and female athletes that tend to show that female athletes actually have a higher rate of reported concussions than male athletes in the same sports.

So what would you say that we need to do immediately? I mean I really do worry about her now and what could happen, so what would your advice be to female athletes, female soccer players, and to those who coach and treat them?

Ms. {Scurry.} I too find that statistic very alarming. I think one of the things that needs to occur with soccer is officials and referees, coaches need to take their heads out of the sand a little bit and realize that this is something that is plaguing our sport as well. And the video that was played by Mr. Hallenbeck earlier was a fantastic example of where to start. You start with the coaches. You teach the coaches the proper way to teach the players how to head, and do certain drills to make sure that the coaches know how to teach it instead of just letting players run around out there, and let the ball head them; instead, teach them how to head the ball, and also improve the strength of the neck

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muscles. For females, it seems to be part of the issue is they are not as strong as the male counterparts in heading. And so that needs to occur. And there just needs to be an understanding and an education of what you are looking for when a head injury does occur.

Ms. {Schakowsky.} Let me ask you a question. I don't know if soccer is the only sport where you quite deliberately use the head.

Ms. {Scurry.} Right.

Ms. {Schakowsky.} Is that an inherent problem?

Ms. {Scurry.} I don't necessarily think it is an inherent problem--

Ms. {Schakowsky.} Right.

Ms. {Scurry.} --but, obviously, I think that scenario, when there is a ball in the air you are going to head, that there is something highly probable that could happen, but I think if you teach it properly, you are going to have those head injuries no matter what you do, just like they said, when you play the sport, you are going to have injuries that happen, but I think that certain things that happen during a heading situation isn't the only reason or only time when

concussions occur.

Mine in particular happened when I was playing in the goal, going for a low ball from my left, the player came in from the right and hit me in the side of my head with her knee.

Ms. {Schakowsky.} Uh-huh.

Ms. {Scurry.} And that has nothing to do with heading--

Ms. {Schakowsky.} No.

Ms. {Scurry.} --at all, you know. Head to knee, head to foot, head to post isn't part of that.

Ms. {Schakowsky.} Well, I would love to get your advice as we move forward, and anything that I can do outside of this body, because I certainly--

Ms. {Scurry.} Fantastic.

Ms. {Schakowsky.} --worry about my granddaughter.

I want to--Mr. Miller, I wanted to ask you a question. Retired NFL players face some of the most serious health challenges of any sport, yet benefits for former players are not on a par with Major League Baseball or the National Basketball Association, despite the fact that the NFL has more than $9 billion in annual revenue.

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So yes or no, does the NFL yet provide lifetime health insurance for former players who did not pay under the current collective bargaining agreement?

Mr. {Miller.} No. The players are able to continue their medical coverage when they leave the game, but they are not provided lifetime medical coverage.

The--in the most recent collective bargaining agreement with our Players' Association, there were in excess of $600 million that went to the players who plaid pre-1993, and added pensions and benefits. All of our programs are collectively bargained with our Players' Association, and so I think during each iteration of our collective bargaining agreements, you have seen changes and improvements made, excuse me, to the programs for retired players including this year, for example, this past CBA, for example. A neurocognitive program, screening program--

Ms. {Schakowsky.} Well, I understand--

Mr. {Miller.} --that provides opportunities--

Ms. {Schakowsky.} --but professional baseball and professional basketball do provide lifetime health insurance for former players. And while I understand the NFL's ADA

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Plan, what could be the reason to not provide lifetime health insurance for former players?

Mr. {Miller.} Well, like I mentioned, all of our programs, all of our benefits, and all of the policies are collectively bargained with the Players' Association, and so the improvements that we have seen as far as care for retired players, whether they be the ADA Plan, as you mentioned, which accounts for any player who suffers from a diagnosis of dementia, neurocognitive benefits, which help players' joint and hip replacements, all of those sorts of things are improvements, and are made available to players should they suffer from those issues, in addition to a number of other practices and programs, including help lines and our Player Care Foundation, the Players' Association has additional programs to help players who are in need at little or no cost, and those programs exist today.

Ms. {Schakowsky.} I yield back.

Mr. {Terry.} Mr. Lance, you are recognized for 5 minutes.

Mr. {Lance.} Thank you very much, Mr. Chairman.

Mr. Miller, the changes that you have made in recent

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1000 years, the rules change, the increased penalties, suspensions
1001 for rule violations, reducing full contact practice days, can
1002 you share with the committee data that you have that this, I
1003 hope, has had a positive impact on concussion incidents that
1004 might encourage leaders at other levels of football?
1005 Mr. {Miller.} Absolutely. The--and we are happy to
1006 share with the committee, you know, some greater information
1007 than I can offer in my oral testimony.
1008 Mr. {Lance.} Certainly.
1009 Mr. {Miller.} But the most interesting number from my
1010 perspective is when you count up the number--all of the
1011 concussions that were diagnosed in games and practices,
1012 preseason in preseason practices, and postseason in
1013 postseason practices, you see a 13 percent decrease year over
1014 year. And--
1015 Mr. {Lance.} Thirteen percent each year? Year over--
1016 Mr. {Miller.} Thirteen percent between 2012 and '13.
1017 Mr. {Lance.} Very good.
1018 Mr. {Miller.} And the emphasis has been on eliminating
1019 the use of the head in the game, and specifically helmet-to-
1020 helmet hits, which are a significant cause of the injury.

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And in those circumstances that we have been able to identify where two helmets collide, we have seen a decrease in the number of concussions by that cause by 23 percent in the past year.

There is a lot more work to be done, and those numbers could change year over year. I don't think anybody should rely upon one year data as some sort of conclusion, but I am happy to go into that further with the committee if you would like to see more of the information.

Mr. {Lance.} Thank you. I think we would, and this is, of course, very helpful, and I hope that the improvements continue.

Mr. Hallenbeck, I believe your testimony indicated that 15 high schools in 10 districts participate in your pilot program last year, and that you are anticipating 500 to 1,000 will participate this fall. And, of course, I would imagine high school football is the football that most of us have experience, either through ourselves or through a child, and in my case, a son, and this is part of the American tradition.

What are your plans for getting more school football

programs at the high school level to participate, and what does your outreach entail, and how do schools across the country learn about your program? I think the purpose of this hearing is multifaceted, and one of the purposes, I would hope, is to inform high schools across the country about your program, as the video indicated, occurs here, next-door in northern Virginia?

Mr. {Hallenbeck.} Thank you. So first of all, one of the common themes we are hearing, of course, is inconsistency, and football probably is the most fragmented of all used sports, and even at the high school level, there are significant challenges there. So what we are trying to strive for through this Heads-up Football Program is consistent teaching, consistent teaching of technique, consistent teaching of terminology, and now getting out to the staunchly independent youth programs as well as now high school programs, the good news is they are actually being responsive. They--their--if it is their superintendents, if there are principals, their athletic directors, they are being asked, as it was mentioned in the video, what are you doing about this.

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Mr. {Lance.} And you are doing the asking, or the parents and PTA's are doing the asking?

Mr. {Hallenbeck.} It is a combination. We are talking to state associations, high school state associations, we are talking to coaches' associations, we are talking directly to coaches, we are working with athletic directors, we are working with parent groups, national PTA is involved, we are looking at every conceivable channel to communicate this program and the importance of changing behavior. And what I am sharing is there has been a very positive response.

That video by itself, and really the reason I decided to show it, has been incredibly influential. In addition, we now have the Big 10, the Pac-12, the Big 12, the ACC, we will eventually have the NCAA, we will have all college conferences involved, every one of their coaches will be involved, with PSA's and things of that nature that help influence high school coaches and high school programs to embrace the Heads-up Football Program and help change behavior.

Mr. {Lance.} Thank you. Let me say that if there is one message I wish to leave this morning in my 5 minutes of

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questioning is that I would hope that all of those involved at your level of football would examine what you are suggesting, because after all, that touches virtually all of the American people, and I commend the panel for its testimony.

Thank you, Mr. Chairman.

Mr. {Terry.} Thank you, Mr. Lance. And I just editorialize, that is why we have NHL Youth Hockey, NFL Youth Football, is because it does seem that it trickles down. Whatever is said at the top, then it gets pushed down to the youth, and so that is--that was by design.

The gentleman from Utah is now recognized for your 5 minutes.

Mr. {Matheson.} Well, thank you, Mr. Terry.

I first want to echo something that Mr. Waxman said in his opening statement. It may sound obvious but I think it is important that we acknowledge. This is a complicated issue. There are a lot of complexities to this, there is a lot we don't know about, brain science, and I think we all could agree that the notion that this is an issue that merits significant investment and research is really something we--

and it is beyond even concussions in sports. We have traumatic brain injury in terms of our soldiers in the field. This is a really important issue that is complicated, and we ought to make sure we approach it in a thoughtful and comprehensive way, so, Mr. Chairman, thank you for scheduling this hearing today.

I was going to ask Mr. Miller, without taking too long, because this is an open-ended question, but could you kind of walk us through the steps, as information and research has brought other--has brought more knowledge to the NFL, how has the League responded, and how have you positioned yourself on these issues to address the issues of concussions? And just if you could walk us through some of the history of how it has evolved within your organization.

Mr. {Miller.} Yeah, I am happy to do it, and thank you for the question.

I think the point that you made that he science has evolved--

Mr. {Matheson.} Um-hum.

Mr. {Miller.} --on neurological issues, certainly neurodegenerative disease, is one that the second panel,

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where there is a terrific expert lineup, can talk to, but we rely on the outside advice of very well known, well respected, probably internationally known neuroscientists to advise us as to what the state of the science is, and how best to go about changing out game to reflect that. And so that is how we ended up adding--creating a unified concussion protocol and return to play protocol for our sideline. That is how we ended up with additional concussion experts on the sideline. This is based on the advice of outsiders who tell us this is the best way to handle your players, this is the best way to treat the game, and this is--if you want a culture of safety, this is what you would do, and we follow their advice strictly and meet with them very frequently.

Mr. {Matheson.} All right. And I notice your title is senior vice president of health and safety policy. Is that position--that has got to be a position that didn't exist 20 years ago, I bet?

Mr. {Miller.} It did not exist 20 years ago--

Mr. {Matheson.} Yeah, so--

Mr. {Miller.} --and I am proud to be in that role, and it is an exciting one.

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Mr. {Matheson.} I know this hearing is concussions, but since you are here, I have to ask you one other question that may be a little different topic.

Over the last few years, I have communicated with the NFL about my concerns about the issue of human growth hormone testing, and I know that is something that was raised in the last collective bargaining agreement effort, and there is an agreement to agree later, but that hadn't always come together as much, and I know this is something that is important to the League.

Can you give us an update on what is going on on testing for human growth hormone?

Mr. {Miller.} Sure. We appreciate the question.

Unfortunately, we don't have human growth hormone testing--

Mr. {Matheson.} Right.

Mr. {Miller.} --yet. The League has been ready, able, willing to pursue it, as you mentioned, since it was agreed upon in the collective bargaining agreement. Unfortunately, our Players' Association has thrown up obstacles, probably fair to say, from or perspective, excuses, for a period of

time. And I think the testing goes to the integrity of the game, certainly. It also goes to the health and safety of the sport.

Mr. {Matheson.} Yeah.

Mr. {Miller.} You don't know where this stuff is coming from. You don't know what--who is giving it to a player or players, and you don't know what they are putting in their bodies, and that is dangerous and it is also the wrong example to set. And so this is an important issue for us, and one that we are sorry has not gotten accomplished yet.

Mr. {Matheson.} Well, that is an important issue to me, and that is why I wanted to raise it. I know that it is not this topic of this hearing, Mr. Chairman, but since he was here, I had to ask the question.

Ms. {Schakowsky.} No, but if the gentleman will yield just--

Mr. {Matheson.} Yeah, I will yield.

Ms. {Schakowsky.} --for one sentence. I think that is why we wanted to have the Players' Association here too because, you know, that was a pretty strong criticism that you just made. It would be nice to have had the players as

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well to respond.

Mr. {Terry.} Well, I will have to now interject. They were asked and they declined.

Ms. {Schakowsky.} Yesterday.

Mr. {Terry.} No.

Mr. {Matheson.} Well, anyway--

Mr. {Terry.} That is not accurate.

Mr. {Matheson.} Well--

Mr. {Terry.} They were contacted before yesterday--

Mr. {Matheson.} I want to reclaim my time--

Mr. {Terry.} --and they still rejected.

Mr. {Matheson.} --for one more question though, if I can. I have one more question for you. Where do you see things going? If--I know when you try to crystal ball, it is dangerous because you never know, but where do see things going in the next 5, 10, 20 years in terms of where technology is going to take us? Do you have some things about looking out on the horizon that we can be looking forward to?

Mr. {Miller.} Yeah, I will give you a specific example. As part of the scientific research that we entered into with

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GE, the world's leader in diagnostics, we set aside what we call innovation challenges, two $10 million pots of money. The first was to promote new ideas on how to better diagnose concussions. There aren't any objective tests now. They are all subjective analyses.

Mr. {Matheson.} Right.

Mr. {Miller.} And we came back--we had people from 27 different countries around the world offer ideas. We eventually rewarded 16 of them so far, biomarkers, blood tests, these sorts of things. And then in addition, we just completed another challenge that echoes around protective ideas, how to protect the brain better. We had more than 40,000 people from 110 countries around the world visit the Web site.

Mr. {Matheson.} Wow.

Mr. {Miller.} We had people from 19 different countries offer ideas on new protective equipment, and we are reviewing those now. And I think that because there is a lot more attention paid to this, and hopefully we are one of the actors that are catalyzing the science, that you are going to see changes in all of these places relatively soon.

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Mr. {Matheson.} Okay. Appreciate that.

Mr. Chairman, my time is up so I will yield back.

Mr. {Terry.} Thank you. The gentleman from Kentucky is now recognized for 5 minutes.

Mr. {Guthrie.} Thank you, Mr. Chairman. Thank you for being here. And, Ms. Scurry, thank you for being here. That, quite honestly, might have been the only soccer game I have ever watched from top to finish. It was--

Ms. {Scurry.} Thanks a lot.

Mr. {Guthrie.} --about the time that my daughter was interested in soccer, so we were watching it--

Mr. {Terry.} No pun intended with the top.

Mr. {Guthrie.} Top to--okay, no pun intended. That went over my head, I am sorry.

But it was--what a great sporting event, and it is one of the great moments, and to be part of that is something special. And I think it was special because it was just so much America. It was the--youthful, you were underdogs, you were grit, determined, and you brought up Brandi Chastain, not I, and maybe a little exuberance, but it was a great moment, and I appreciate you doing that and sharing.

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1252 But what I--I played high school football. That is my
1253 claim to athletic prowess, I guess, which was--but we
1254 practiced football in August, I remember one time, in the
1255 south, 90-something degrees and we are all running water
1256 breaks, we run to the water break and some smart aleck kicks
1257 another guy's foot so he falls, knocks all the water over.
1258 So the coach says, well, if you guys don't know how to handle
1259 that, we are just not going to have water today. So that was
1260 over 30 years ago, and that would never happen anywhere
1261 today. There was actually in Louisville a young man who
1262 passed away on a football field, and the coach went to trial
1263 over it, and turned out he wasn't convicted but--so I think
1264 the awareness and, you know, stuff like what I described in
1265 my youth would never happen on a football field anywhere
1266 today, or at least I hope it wouldn't, but we still have
1267 these injuries. And I think, Ms. Scurry, you talked about
1268 your injury being--it wasn't heading, it wasn't changing
1269 tactics, it was just--in soccer you are wearing cleats and
1270 short pants and a shirt, and somebody hits you in the side of
1271 the head with their knee--
1272 Ms. {Scurry.} Right.

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Mr. {Guthrie.} --and when you look at, I watch a lot of football, of course, then they will have targeting, you know, if you are in college football, you are ejected from the game for targeting. But a lot of the injuries you will see, if the quarterback gets knocked down and somebody runs and their knee hits them on the side of the head. And I don't know how you change those--and how do you deal with that kind of--I know you are trying to do the techniques and tackling and not heading the ball the right way, but just the incidental things that happen because you are playing a sport that we are going 100 miles an hour. Do you have any comments on that, Ms. Scurry?

Ms. {Scurry.} Yes, well, thanks for the question.

That is very relevant actually, because my hit, when I watched it actually last night again on video, it doesn't seem to be a hit that would have taken me out of the game. As it was, I got hit and then there were a few minutes later before I actually ended up coming out.

Mr. {Guthrie.} Wow.

Ms. {Scurry.} There really--there wasn't even a foul called, actually. So that is part of the problem, right.

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Sometimes a hit is a glancing blow, and it doesn't even really seem to be anything that is a big deal, but I think for me, my main focus is what is done after a hit occurs. And to keep children and young players off the pitch after a blow occurs to assess them, and then determine whether they are ready to go return to play or not. I think that is the key for me and why I am speaking out about this, because I have been around the country talking to different organizations, and I am finding that kids are getting concussions, five, six, seven, in a very short period of time, because they are returning to play too soon, and that is where I think a lot of the awareness and education can help.

Mr. {Yarmuth.} Well, thank you.

And, Mr. Miller, with that, I mean it--like you are--and you should do everything you can to stop the head-to-head and so forth, but it seems--because they will play them on TV over and over, this is when somebody gets injured and they are out, and their--like a knee of the lineman hits--somebody like John Runion hits the side of somebody else's--I mean it is just incidental, but I guess you are right, the--it is--

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you can't really prevent that from happening, but it is how you react to how that happens. Is that--

Mr. {Miller.} Well, I think that is, excuse me, I think that is right. The--one of the recommendations made by the Fourth International Concussion Conference in Zurich was to look at the playing rules of the game. And in our case, we have done that, and I know other sports have done that as well, so you create the best possible situation.

Mr. {Guthrie.} Um-hum.

Mr. {Miller.} In a contact sport, there will be injuries, and there will be, you know, hits to the head, and those problems will occur. And so where there--where that happens, we want to make sure that we are treating them appropriately, and so that is where the focus shifts from prevention to appropriate treatment.

Mr. {Guthrie.} Well, thank you. And I am about out of time. I just want to say, Ms. Scurry, I was sitting on the edge of the couch, leaning and moving as they were shooting against you, and hopefully you felt my assistance and were able to help us both together win one for our team, right?

Ms. {Scurry.} Absolutely.

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Mr. {Guthrie.} Thank you very much. And I yield back, Mr. Chairman. Very good job and I am glad to meet you.

Ms. {Scurry.} Thank you. You too.

Mr. {Terry.} Thank you, Mr. Guthrie. Now the gentleman from Maryland is recognized for 5 minutes.

Mr. {Sarbanes.} Thank you, Mr. Chairman, and thanks for the hearing, and thanks to our panel.

Mr. Hallenbeck, I had a quick question about whether the school districts that you have been working with that have been implementing this, has that affected the like liability policies that they maintain as a jurisdiction? In other words, is there any trend towards they may be getting pushed by the insurance industry, for example? So in other words, insurer would say, well, previously, I would have provided liability coverage to your school district based on these measures or assurances that the district mad with respect to how it is conducting its sports program, but now that there is this program that enhances the safety of students and young people, we want to see that you have implemented that in your district or else we are not going to provide the policy coverage, or we are going to charge you a higher

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premium. I mean you can look at it the other way. You get a discount off of your premium as a school district because you have implemented these kinds of measures. And I ask that because I think that increased awareness of some of the risks from these sports injuries may lead to pressure in terms of liability on school districts. And you will get some that may choose, based on the premium that gets charged, that--to push the program out because they don't want the liability that comes with it.

So I was just curious whether the--your program has--whether you are aware of that kind of effect from the program, or more generally aware of kind of how the liability concerns intersect with some of these safety efforts that are underway.

Mr. {Hallenbeck.} So thank you for the question.

At the high school level, we are literally on the front, you know, one yard line marching down the field. And I will mention that we are having very positive conversations with the State of Maryland right now about participating in Heads-up Football across the entire state.

But--so we have a lot to do there. We have not seen

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anything from a liability concern, insurance concern. With Fairfax County, we worked very closely with all their schools and their school district about those issues, but they told us, and we checked ourselves, they felt they had the appropriate coverage. However, to your point, at the youth level, we are absolutely seeing insurance--the insurance industry at large, and really the largest Provider of casualty and liability insurance, step forward and actually stated that if youth football leagues participate in the Heads-up Football Program, they would receive a discounted program, and a more comprehensive coverage. So we are absolutely seeing a positive response by the insurance industry, which, of course, has its merits.

Mr. {Sarbanes.} Thank you. I yield back.

Mr. {Terry.} Mr. Ogrean, do you have--are there any insurance liability issues at USA Hockey?

Mr. {Ogrean.} There are plenty of insurance liability--yes, Mr. Chairman, there are plenty of insurance liabilities, and I think unlike USA Football, for example, which is much more decentralized than are we, our participants are all insured by us as a national organization. So whether it is

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player accident insurance or whether it is catastrophic insurance, whether it is liability and even D and O for all of our leagues, all of that is part of what our members pay us a membership fee for.

Those claims, or those premiums, rather, are obviously based upon the number of claims. And so that is another business reason why it is in all of our best interests to try to come up with every technique, every practice, every policy that we possibly can to make our game safer. The number one reason, of course, is the safety of the human beings playing our sport, but there are good business reasons for all of us to want to do everything possible to make the game safer.

Mr. {Terry.} Thank you.

Mr. Kinzinger, you are recognized for 5 minutes.

Mr. {Kinzinger.} Thank you, Mr. Chairman. Thank you for your leadership in holding this hearing, and to all of you, thank you for being here and bearing through a bunch of politicians. I appreciate it.

I appreciate the diverse panel that has gathered here, and the important insights you guys are able to provide on the prevalence of concussions in sports.

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According to the CDC, 175,000 sports-related concussions impact youth athletes each year, and I think today's hearing has been very constructive in helping us to move forward on understanding that and alleviating it.

I have read much about the legislative action taken across the United States to pass concussion laws. In my home state of Illinois, similar legislation was passed in 2011 to require that education boards throughout the state work with the Illinois High School Association to adopt guidelines that raise awareness of concussion symptoms, and ensure students receive proper treatment before returning to the team. In addition, it is encouraging that professional sports leagues and teams are taking steps to address concussions not only in their own ranks, but also working with collages and youth links to--leagues to bring attention to the issue.

Last year, the Chicago Bears, go Bears, kicked off a pilot program to provide certified athletic trainers at three high school stadiums during Chicago public school football games. Such high profile initiatives are important to combatting this issue, and I applaud the Chicago Bears for their leadership.

Again, I find these steps to be promising, but we are still confronted with staggering numbers of youth being impacted by sports-related concussions.

I would like to ask just a few questions, maybe not take all 5 minutes, maybe I will.

Let us talk about the equipment issue in terms of--I will ask each of you to respond.

Where are we at today in terms of what kind of equipment is being utilized to protect, versus maybe where we were a few years ago, what kind of advances are yet to be made that you think we are on the cusp of making or that we should make, and then is this backed by medical science? Is that what is--is that going into this idea?

So, Mr. Daly, I will start with you and I guess whatever you want to put into that subject would be great.

Mr. {Daly.} Well, thank you for the question.

It is a very important issue, obviously. It is a--the equipment issue is a very important issue, and something we are focused on jointly with our Players' Association. We have a protective equipment subcommittee that is part of our Joint Health and Safety Committee. So we look at all aspects

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of equipment and how they--particularly as it relates to head injuries, how we can improve equipment, and perhaps reduce the amount of head injuries we have. We have passed some rules over time with respect to some of the equipment we had seen develop over the years with hard padding, both in the shoulder area and the elbow area, and those potentially causing head injuries. So we have mandated padding over those--of those areas areas of a player's equipment.

The helmet issue is a difficult issue, particularly in hockey, in terms of preventing concussion, and one of the things we are looking to work with our manufacturers on is research in terms of dealing with the rotational forces that can cause concussions, particularly in a sport like hockey, and whether a helmet can be designed to deal with those more effectively than it currently does.

Mr. {Kinzinger.} Thank you, sir.

Mr. Ogrean?

Mr. {Ogrean.} I think Mr. Daly answered the question pretty well for our sport. There is a great deal where we rely on the National Hockey League to be the leader, and a lot of what they do is of benefit to us in a trickle-down

fashion, but as I mentioned in my opening testimony, we do have a Safety and Protective Equipment Committee of 40-year standing. They do look at a variety of issues. The facemask, for example, is something that is mandatory--

Mr. {Kinzinger.} Okay.

Mr. {Ogrean.} --in youth hockey. It is not in the National Hockey League, though the shields for incoming players are now a standard.

Mr. {Kinzinger.} I am going to have to cut you off just because of time. Mr. Miller?

Ms. {Ogrean.} That will be fine.

Mr. {Miller.} Sure. Football helmets were designed to prevent against skull fractures, and they do a fabulous job of that. They were not designed to protect against concussion, and so that sort of technology or design, I know that the helmet manufacturers are working on it. We are not there yet, and the League is doing what it can to inspire that, especially with our partnership with GE and Under Armour, to get new ideas around that. And the other thing we do is we do regular helmet testing in concert with our friends at the Players' Association, so that we can inform

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our players of which helmets are working best.

Mr. {Kinzinger.} And, Mr. Hallenbeck, or, Ms. Scurry, you guys?

Mr. {Hallenbeck.} Yeah, I would just--trickle-down effect again is important there, and the only thing I would add is we are working now closely with the Sport and Fitness Industry Association and their new football council, so we are getting insight from them, and working together on how we can improve things.

Mr. {Kinzinger.} Thanks. And, Ms. Scurry?

Ms. {Scurry.} As you know, we don't wear equipment in our--

Mr. {Kinzinger.} Right.

Ms. {Scurry.} --sport, but I do want to commend your state for their Illinois Youth Soccer Association is taking a real lead in concussion awareness. I actually just did an event in Chicago just last weekend--

Mr. {Kinzinger.} Okay.

Ms. {Scurry.} --for the Association, and talking about concussions. And so your organization is doing a great job.

But in terms of equipment for my sport, we don't really

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have anything right now that is widely used, but hopefully in the future there could be something to help.

Mr. {Kinzinger.} Great. Thank you. Mr. Chairman, I will yield back.

Mr. {Terry.} Gentleman from West Virginia is recognized for your 5 minutes.

Mr. {McKinley.} Thank you, Mr. Chairman. I had to slip out for another meeting and--but--so I--maybe some of these questions have been asked, but if you could help me out on this a little bit, it would--one is, is there anything that we can learn from the Defense Department with concussion injuries that we are hearing from when we talk to our troops that come back? I am just wondering if there is some way that we are all talking to each other? If you could help out on that.

Mr. {Miller.} I--

Mr. {McKinley.} Mr. Miller?

Mr. {Miller.} Yeah, I am happy to take that question. We are very proud of our relationship that we have fostered over the last couple of years with the U.S. Army and specific memorandum of understanding that went back a couple of years

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that covers a variety of different things.

We have gotten current and retired players together with returning active service members to talk about cultural issues. What is it about football or what is it about the military that makes it very difficult for somebody to remove themselves from play, or, certainly in the case of the military, from a battle. We found a great deal of reticence on behalf of both populations, sort of a shared reticence to remove themselves from their comrades or teammates. And it instills a question as to how you get somebody to talk about, to tell their teammate or to tell their colleague, hey, you don't look right, you should get off the field. And so we have learned a lot from that.

And let me just add briefly as well, we meet regularly with the Army to talk about the research that they are doing from a scientific perspective. We share our agenda, we share the ideas that we have, and they do with us as well, and it has proven to be a very cooperative and beneficial relationship thus far.

Mr. {McKinley.} Okay. The other--anyone else want to add to that, about our military?

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The second question has to do with, states have Workers' Compensation programs to deal with the various disorders and injuries. Black lung in my state, it is treated in a way that people don't have to take legal action to get help through the Workers' Comp program. Is that something that would be of benefit here in this program for injuries? We have a--a friend of mine has spent quite a few years in litigation with the NFL over this matter, and just thinks it is so--such a cumbersome--and we also have an east coast hockey league team in our city, and we see so many injuries, and we hear some--from some of the players and coaches about that injury. We just--is there a time that we should have a Workers' Comp program for brain injuries? Should that be included in something?

Ms. {Scurry.} If I--

Mr. {McKinley.} If they don't--they are not required to follow litigation to get help.

Ms. {Scurry.} If I may. My case actually is a Workers' Comp case. I have gone through Workers' Comp to get the different doctors, to see different techniques that will help me, and that is part of my situation and part of the reason

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1588 why it has taken so long because every time something is
1589 suggested or recommended, I have to go back to the insurance
1590 company to get permission to do it, and sometimes it takes a
1591 hearing to get everything moved forward. So maybe
1592 streamlining that somehow would be of great help.
1593 And also in your previous question you talked about how
1594 can we help the military service people who have TBIs. For
1595 me, one of the best things I think would help is more of the
1596 psychological side and testing depression and anxiety and
1597 panic attacks to make sure that each person who comes back
1598 from the military who has a TBI gets help in that area, the
1599 emotional side of it, not just the physical. That would be
1600 very helpful, I think.
1601 Mr. {McKinley.} Okay, thank you. Any other thoughts?
1602 Mr. {Daly.} Well, Workers' Compensation laws are really
1603 different jurisdiction by jurisdiction, including for us in
1604 Canada where professional athletes are specifically excluded
1605 in most Workers' Compensation law, but it is certainly a
1606 mechanism that an increasing number of our former athletes
1607 are using in cases where they have debilitating injuries from
1608 their playing careers.

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Mr. {McKinley.} So would you--so what was the--what was your recommendation then? You are saying yes?

Mr. {Daly.} Well, I--again, I--

Mr. {McKinley.} --we should be pursuing looking at that, or--

Mr. {Daly.} --I guess what I would say is, I think it is generally available to our former athletes currently, the Workers' Compensation protection.

Mr. {McKinley.} I guess there--maybe that some of what we are hearing is differently from that, that is why I want to raise it, but thank you for your comments about that.

I yield back the balance of my time.

Mr. {Terry.} Gentleman yields back. Now Mr. Bilirakis from Florida, you are recognized for 5 minutes.

Mr. {Bilirakis.} Thank you, Mr. Chairman. I appreciate it very much. Thank you very much for holding this very important hearing, and I wanted to specifically thank Ms. Curley--Curry--Scurry for really speaking out. I really appreciate it. It makes so much of a difference, and thanks for your sacrifices. You are going to make a real difference in kids' lives.

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I also want to ask--I want to get back to the protective gear, the helmets, what have you. And how does the youth, and we can ask all of you, how does the youth helmet, the protective gear, compare as far as safety, quality, to the NFL and NHL? I mean what--can you give me an opinion on that?

Mr. {Hallenbeck.} So I am certainly no expert on exactly how that compares, other than--I mean my understanding is they--there obviously is NOCSAE the standard bearer and they set the standards, and certainly all the helmets out there have to pass that standard, and I think the manufacturer, if they were sitting here, would say they go above and beyond that. How it compares to an NFL helmet, I think generally speaking, the youth helmet is lighter but the padding and so forth is appropriate. I am not--I don't want to suggest I am defending them. I don't know the exact details. I know it is sufficient based on standards and so forth. Many of the kids though, I mean the players, youth players, I mean by 10 and 11 and 12 years old, they are transitioning into what might be considered, you know, certainly high school or adult helmets, so they are getting

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the best available.

And the other thing I would add is, certainly I do--I am aware that the technology is improving in helmets and shoulder pads, and football equipment generally is definitely improving.

Mr. {Bilirakis.} Mr. Miller?

Mr. {Miller.} Sure. We worked in a--on a program with the Consumer Product Safety Commission, our Players' Association, and some others recently that we would put money towards reconditioning helmets--older helmets for youth leagues. Certainly, the leagues that have, you know, budget constraints, as many do, probably don't get around to updating their helmets or what they call reconditioning them frequently enough. And so we put a fair amount of money into that program in coordination with the CPSE. I know Scott, USA Football runs an equipment grant program as well. So--addressing those needs. We know that a new helmet is better than an old helmet. We know a reconditioned helmet is better one--than one that hasn't been. Most important of all is that those--that coaches learn how to fit the helmets. That is going to be the number one safety piece to the equation as

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it relates to kids. And so we are aware of these issues and we are trying to make a difference there as well.

Mr. {Bilirakis.} So your--in your opinion, the youth helmet or the high school helmet is not as safe as the NFL, but you do have a program to help. Is that correct?

Mr. {Miller.} Yeah. I don't know about the--

Mr. {Bilirakis.} The quality might not be as good.

Mr. {Miller.} I don't know about the comparative safety of the helmets.

Mr. {Bilirakis.} Okay.

Mr. {Miller.} I suppose that is probably a question that--

Mr. {Bilirakis.} Can I talk to you about this--

Mr. {Miller.} Of course.

Mr. {Bilirakis.} --particular program--

Mr. {Miller.} No question.

Mr. {Bilirakis.} --to help out, because I know for parents where the kids play high school football, and the parent will purchase a better quality helmet for their child, and, you know, I am concerned about the kids that don't have the, you know, the parents don't have the money, you know, to

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purchase that, and it is so very important. So I would appreciate working--

Mr. {Miller.} Happy to.

Mr. {Bilirakis.} --with you on this.

Mr. {Miller.} Every kid deserves the proper equipment.

Mr. {Bilirakis.} There is an existing grant program out there. I would like to hear about it. And then also if I-- can I hear from the Hockey as well--

Mr. {Ogrean.} Sure.

Mr. {Bilirakis.} --NHL?

Mr. {Ogrean.} At the youth level, I think the helmets are just as good as the National Hockey League, the only difference is size. They have to be certified by the Hockey Equipment Certification Council. There is a 3-year expiration date on every helmet. You can't use a helmet that is more than 3 years old.

Mr. {Bilirakis.} Very good. NHL wants to--

Mr. {Daly.} Yeah. No, I would echo--I would first echo Mr. Miller's comments that, you know, helmets in our sport as well are principally designed to prevent skull fractures. They're not principally designed to prevent concussions, and

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sometimes they can disperse force in a way that does prevent concussion but that is not their principle purpose. We also have regulations that we make available to our equipment managers and our players with respect to frequent replacing of helmets. So each player is essentially asked to replace his home helmet at least once a season, and his road team helmet at least two times a season, because we are worried about aging effects and degradation that accompanies travel requirements for our team. So frequent replacing of helmets is a priority for our league as well.

Mr. {Bilirakis.} Are their coaches educated? I mean do they know which size fits the child? Have they been briefed on those particular issues, because that is so very important? Youth sports, hockey and football.

Mr. {Ogrean.} They are. I agree with Mr. Miller that it is a big difference-maker, you know, in the helmet doing its job, but it is a pretty fundamental part of what a coach has to do to make sure the players on his team all have the proper equipment and are wearing it in the right way.

Mr. {Bilirakis.} Very good, yeah. Sir, would you--

Mr. {Hallenbeck.} And I would just add--

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Mr. {Bilirakis.} --like to comment?

Mr. {Hallenbeck.} Yes. I would just add that it--that is a cornerstone of our Heads-up Football Program--

Mr. {Bilirakis.} Very good.

Mr. {Hallenbeck.} --equipment fitting, because, frankly, at the youth and high school level, we have found they don't know how to properly fit equipment, so it is a very important element within the program.

Mr. {Bilirakis.} Thank you very much for including that. As far as, you know, the youth--of course, the NFL Hockey stars, what have you, baseball, basketball, they are looked up to by our children, as you know. Do you all have programs where you can speak--that speak, you know, maybe go to the schools, football players, what have you, professional football players, go to the schools and speak on these particular issues?

Mr. {Miller.} Yeah, one of the--and our active players are, by and large, terrific at this topic. One of the elements that we included or offered up to USA Football as part of their Heads-up Football Program was actually what we call an ambassador. So for leagues that were early adopters

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of the program, they would get visits and consultation with a retired NFL player.

We are trying to encourage our clubs, with great success by the way, they have really done a terrific job of embracing in their communities the youth leagues and others, and so that they are around the facility more, that they interact with coaches, trainers, and certainly players, which obviously bring--the star quality of it brings attention to it, which was part of the motivation in the first place. But we have found retired players thrilled to participate, and really active and helpful to the end that you suggest.

Mr. {Terry.} All right, gentleman's time has expired.

Mr. {Bilirakis.} Thank you.

Mr. {Terry.} So if any of you want to answer that question, you will have to do it by writing.

And brings me to the point that--you have a question, I am sorry. Recognize the gentlelady from Virgin Islands.

Dr. {Christensen.} Thank you. And thank you, Mr. Chairman. Sorry I am late, I was at another hearing downstairs.

Mr. Miller, I would like to ask you this question. Many

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tens of thousands of helmets are used every year that are more than 10 years old. I understand that the NFL participated in a program initiated by the Consumer Product Safety Commission by donating money that would go towards new helmets for youth football players in low income communities, and I really want to commend the NFL for this initiative.

Of course, it is going to cost a lot more money to get to the point where virtually all kids around the country who play football no longer wear old helmets that are likely degraded or obsolete. I am pleased to know of your donation to the CPSC initiative, because it strikes me as an acknowledgement that wearing an old helmet when playing football is not advisable. A statement from the NFL that would be very influential. We have also heard that reconditioning those under 10 years old is important to ensure the proper foam density, and that other degraded parts of the helmet are replaced.

So I wanted to ask you the following questions for a yes-or-no answer. We--I guess that is why I am sitting in Chairman Dingell's seat. We realize that many issues are subject to negotiations, but can the NFL commit to supporting

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prohibiting helmets on the field that are over 10 years old?

Mr. {Miller.} In the youth space? You are talking specifically about youth football, prohibiting helmets that are--

Dr. {Christensen.} Yes.

Mr. {Miller.} --older than 10 years there? I, you know, I plead not enough familiarity with the issue. I know that there are a couple of states who have taken that step, and we would be happy to work with you to pursue it. The prime place that, as you mentioned, that we work within in promoting new or refurbished--

Dr. {Christensen.} Well--

Mr. {Miller.} --helmets is with the CPSC or through USA Football, who has a grant program as well, but--

Dr. {Christensen.} So the first question is committing to supporting prohibiting helmets on the field that are over 10 years old. Could you commit to the supporting of policy position that helmets more than 10 years old present an unacceptable safety risk? That is the position that is taken by most of the helmet industry.

Mr. {Miller.} If that is the position of the helmet

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industry, I would see no reason why we would have a concern with that. That sounds appropriate.

Dr. {Christensen.} Riddell and Adams strongly recommend that their helmets should be discarded after 10 years. Can the NFL commit to supporting a policy position recommending that helmets be discarded after 10 years?

Mr. {Miller.} We would certainly support the helmet companies and how they advise people to use their products.

Dr. {Christensen.} We have also heard stories of players using beat-up lucky college helmets, or adjusting their helmets by perhaps removing some padding in the helmets for comfort. Will the NFL commit to support a policy position that all players should wear helmets that are reconditioned properly?

Mr. {Miller.} Well, all of our players have choices in which helmets they use, as long as they pass the NOCSAE, the certification by these standards. And so that is something that is a point of discussion with our Players' Association, and players have to use helmets that pass the standard. So I--

Dr. {Christensen.} And that means--

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Mr. {Miller.} --we are happy to support that.

Dr. {Christensen.} --that they were reconditioned properly, and they had the appropriate padding?

Mr. {Miller.} Sure. The NFL players' helmets are reconditioned regularly, is my understanding, and our equipment managers work with the players to make sure that their helmets are in good working order.

Dr. {Christensen.} Thank you, Mr. Chairman.

Mr. {Terry.} Thank you very much.

[Recess.]

Mr. {Terry.} All right, why don't have our witnesses take their respective places? Okay, if we could have everybody take their seats. And as you are settling in, this is, pun intended, the more heady part of our hearing today where we are dealing with neuroscience and medical research and physics, well, physics when Dr. Gay gets--arrives.

So panel two, I will introduce you from Mr. Cleland on down. Mr. Cleland is the Assistant Director, Division of Advertising Practices at the Federal Trade Commission. We have Ian Heaton, Student Ambassador for the National Council on Youth Sports Safety. And if I might editorialize, I think

Jan did a great job of juxtaposing a face of TBI and concussions on each panel. And Ian, as a high school lacrosse player, is that face for the more scientific-based panel. So thank you, Ian, for taking your day away from school. I know how tough it is to be pulled out of school and come testify before Congress. Just like a normal high school student. Then Dr. Robert Graham, Chair, Committee on Sports-related Concussion in Youth at the Institute of Medicine. Dennis Molfese, Ph.D., Director, Center for Brain, Biology and Behavior at the famed University of Nebraska. Then--thank you, doctor. Then Mr.--Dr. James Johnston, Assistant Professor, Department of Neurosurgery at the University of Alabama Birmingham. Star of screen, Dr. Tim Gay, Ph.D., Professor Atomic, Molecular and Optical Physics, University of Nebraska. Gerard Gioia, Ph.D., Division of Chief Neuropsychology, Children's Medical Hospital. And not quite up to the level of University of Nebraska, we have the Harvard Medical School. That is just humor. Professor of--

{Voice.} Ha ha.

Mr. {Terry.} Yeah. Professor of Psychiatry and Radiology at Brigham and Women's Hospital, Harvard Medical

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School. Thank you for being here for a very impressive and esteemed panel of scientists and experts.

And, Mr. Cleland, we will start. You are now recognized for your 5 minutes.

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^STATEMENTS OF RICHARD CLELAND, ASSISTANT DIRECTOR, DIVISION OF ADVERTISING PRACTICES, FEDERAL TRADE COMMISSION; IAN HEATON, STUDENT AMBASSADOR, NATIONAL COUNCIL ON YOUTH SPORTS SAFETY; ROBERT GRAHAM, CHAIR, COMMITTEE ON SPORTS-RELATED CONCUSSIONS IN YOUTH, INSTITUTE OF MEDICINE; DENNIS L. MOLFESE, PH.D., DIRECTOR, CENTER FOR BRAIN, BIOLOGY AND BEHAVIOR, UNIVERSITY OF NEBRASKA LINCOLN; JAMES JOHNSTON, ASSISTANT PROFESSOR, DEPARTMENT OF NEUROSURGERY, UNIVERSITY OF ALABAMA-BIRMINGHAM; TIMOTHY GAY, PROFESSOR OF ATOMIC, MOLECULAR AND OPTICAL PHYSICS, UNIVERSITY OF NEBRASKA-LINCOLN; GERARD GIOIA, PH.D., DIVISION CHIEF, NEUROPSYCHOLOGY, CHILDREN'S MEDICAL HOSPITAL; AND MARTHA SHENTON, PH.D., PROFESSOR OF PSYCHIATRY AND RADIOLOGY, BRIGHAM AND WOMEN'S HOSPITAL, HARVARD MEDICAL SCHOOL.

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^STATEMENT OF RICHARD CLELAND

} Mr. {Cleland.} Yeah, the green light is on. Can you--is it better? Thank you.

I am Richard Cleland. I am assistant director for the

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Division of Advertising Practices at the Federal Trade Commission's Bureau of Consumer Protection. I am pleased to have this opportunity to provide information about the actions we have taken over the past few years with respect to concussion protection claims; claims that implicate serious health concerns, especially those potentially affecting children and young adults are always a high priority at the Commission.

The Commission strives to protect consumers using a variety of means. First and foremost, the Agency enforces Section 5 of the Federal Trade Commission Act, which prohibits deceptive and unfair acts or practices. In interpreting Section 5, the Commission has determined that a representation, omission or practice is deceptive if it is likely to mislead a consumer acting reasonably under the circumstances, and it is material that it is likely to affect the consumer's conduct or choice decision about a particular product at issue.

The Commission does not test products for safety and and efficacy; it does, however, require that an advertiser have a reasonable basis for objective claims conveyed in an ad. The

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Commission examines specific facts of the case to determine the type of evidence that will be sufficient to support a claim. However, when the claims involve safety--health and safety, the advertiser generally must have competent and reliable scientific evidence substantiating that claim.

As awareness of the dangers of concussion has grown, sporting goods manufacturers have begun making concussion protection claims for an increasing array of products. These include football helmets and mouth guards, but also include other types of products.

In August 2012, the Commission announced a settlement with the makers of Brain Pad mouth guards. The Commission's complaint alleged that Brain Pad lacked a reasonable basis for its claims that the mouth guards reduced the risk of concussions, particularly those caused by lower jaw impacts, and falsely claimed that scientific evidence proved that the mouth guards did so. The final Order in that case prohibits Brain Pad from representing that any mouth guard or other equipment designed to protect the brain from injury will reduce the risk of concussions, unless the claim is true and substantiated by competent and reliable scientific evidence.

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1946 In addition, the Commission sent out warning letters to
1947 nearly 20 other manufacturers of sports equipment, advising
1948 them of the Brain Pad settlement, and warning them that they
1949 might be making deceptive concussion claims about their
1950 products.
1951 The FDC has monitored the--these Web sites, and is
1952 working with them as necessary to modify their claims on
1953 their sites, and in some cases, ensure that the necessary
1954 disclosures are clear and prominent. Commission staff
1955 continues to survey the marketplace for concussion reduction
1956 claims, and alert advertisers who are making potentially
1957 problematic claims of our concerns, and of the need for
1958 appropriate substantiation for such claims.
1959 Commission staff also investigated concussion reduction
1960 claims made by three major manufacturers of football helmets;
1961 Riddell Sports, Incorporated, Schutt Sport, Incorporated, and
1962 Xenith, LLC. In these matters, the staff determined to close
1963 the investigations without taking formal action, by which
1964 time all three companies had discontinued the potentially
1965 deceptive claims or had agreed to do so. Those cases are
1966 discussed in greater detail in the Commission's written

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testimony.

The Commission plans to continue monitoring the market for products making these claims, to ensure that advertisers do not mislead consumers about the product's capabilities or the science underlying them. At the same time, we are mindful of the need to tread carefully so as to avoid inadvertently chilling research, or impeding the development of new technologies and products that truly provide concussion protection.

The Commission appreciates the committee's interest in this very important area, as well as the opportunity to discuss our Agency' effort to ensure that the information being provided to consumers, in particular, to the parents of youth athletes, is truthful and not misleading.

Thank you.

[The prepared statement of Mr. Cleland follows:]

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Mr. {Terry.} Thank you. Now, Ian, you are now recognized for your 5 minutes.

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1986 ^STATEMENT OF IAN HEATON

1987 } Mr. {Heaton.} Chairman Terry, Ranking Member
1988 Schakowsky, and members of the subcommittee, thank you for
1989 the opportunity to share my story today.
1990 My name is Ian Heaton, and I am here as a student
1991 ambassador for the National Council on Youth Sports Safety.
1992 I am also a senior at Bethesda Chevy Chase High School in
1993 Bethesda, Maryland.
1994 I was a sophomore playing in a high school off-season
1995 lacrosse game when I sustained a serious head injury which--
1996 that we later discovered was my third concussion. Until
1997 then, I did not appreciate what a great life I was living. I
1998 got good grades in challenging classes, played high school
1999 lacrosse, was working on my second degree black belt in
2000 martial arts, had a job I loved teaching taekwondo, performed
2001 at my school's jazz ensemble and combo, and had an active
2002 social life. It was over in a split second.
2003 My concussion left me with only 5 percent of normal
2004 cognitive activity, and I was almost immobilized.

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2005 I have spent 2 1/2 years recovering, and, at times, have
2006 ever wondered if I would ever get that life back. It has
2007 been a long, slow process.
2008 At first, all I wanted to do is sleep. Noise, light and
2009 even moving my eyes caused headaches and nausea. I was
2010 enrolled in the Children's Hospital SCORE Program, that Dr.
2011 Gioia will describe later, where I received ongoing cognitive
2012 evaluation and treatment for symptoms.
2013 After missing school for 2 weeks, I tried to go back but
2014 was unable to function. The frustration of trying to focus
2015 on lectures, moving through the pandemonium of the halls, and
2016 the constant sensory bombardment made a normal school day
2017 impossible. However, through my school, I eventually
2018 enrolled in a home teaching program, and with the help of my
2019 tutors and family, was able to complete my semester
2020 coursework at my own pace. I finally returned to school in
2021 December, but was still far from recovered.
2022 I have spent the 2 1/2 years since my concussion slowly
2023 regaining organizational skills, the ability to learn and
2024 retain information, and, most important, my personality.
2025 During this time, my friends and family learned to recognize

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the signs that meant I needed to shut down from any kind of mental or physical activity for a day or two. These relapses were particularly tough and discouraging, and meant that I had to drop a class and miss a band trip to Chicago, among other things. The worst was when I had a crash and could not go to my first concert, the Red Hot Chili Peppers. The friend I gave my ticket to really owes me.

The spring after my injury, I was medically cleared to return to sports, but made the hard decision that I would not play lacrosse or other intensive sports again. I know that a lot of people recover and return to play, but the possibility of another concussion means I could lose everything again, just like that, and not come back the next time.

I now look at my recovery as something that has made me stronger, but I know that I am one of the very lucky ones who had the resources and medical attention I needed, and a school system that is aware of concussion issues and provided an unusually high level of support.

It is not over yet. My recovery continues, but my outlook is positive and I am excited about the future as I prepare for college. I am thinking about becoming a high

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school math or science teacher.

I now have a hard question. What can be done to create a safer sports environment, and to ensure that when injuries do occur, the support for a full recovery is available? We can't just do away with youth sports. I have played baseball, travel soccer, and league and high school lacrosse, and being on those teams not only gave me a healthy outlook, it taught me important lessons.

Sports are one of the best parts of growing up and becoming a strong adult. They teach us that if we work hard, we will become skilled and proud of our accomplishments. They teach us how to be part of a team, to have pride and success, and learn the lessons of defeat. They teach us that sometimes we have to quit thinking of ourselves and think of the good of the team. For these and many other reasons, I hope that steps can be taken so that future young athletes have these opportunities.

There are two important things I think would make a big difference. The first is to change the cultures of hitting hard to take out a good opponent, rather than playing to win through skill, and brushing off injuries to get back into the

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game. While better equipment may decrease injuries, it is coaches, parents and players who have to back away from the need to win at all costs, or fear the losing status on the team when out for an injury, to be willing to recover fully before returning to play. It will take a while, but if youth and professional sports are to survive, these attitudes must be embraced.

Second, when injuries do occur, we must have a way for qualified personnel to quickly assess injuries on the field, have players get immediate attention, and then support recovery through schools and medical institutions. These are the things that were done for me, and are the reason I have been able to return to normal.

As a student ambassador for the NCYSS, the message I hope to give young athletes is this. You think you are invulnerable. You take risks and brush off injuries because you think you will recover quickly from anything happens. You won't. Don't be a hero, especially when it comes to your head. It is the only brain you will have, and your personality is who you are. It is not worth a couple of seasons of glory to lose the opportunity of a lifetime.

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Thank you.

[The prepared statement of Mr. Heaton follows:]

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Mr. {Terry.} Very good. Dr. Graham, you are recognized for 5 minutes.

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^STATEMENT OF ROBERT GRAHAM

} Mr. {Graham.} Thank you very much, Chairman Terry, Ranking Member Schakowsky.

My name is Bob Graham. I served as the chair of the Institute of Medicine, Sports-Related Concussions in Youth Study. As you have my testimony before you, and I think copies of the study itself, I will just try to take these minutes just to give you a summary.

The Institute of Medicine is part of the National Academy of Sciences, which is chartered by the Congress to provide advice to the Congress and to the Executive on various scientific issues. We were specifically empaneled to look at the evidence about the causes and consequences of concussion in youth and military, the state of concussion diagnosis and management, the role of protective equipment, and sports regulation.

We had 17 members on our committed. We worked in 2013. Dr. Molfese, who will follow me, was a member of that committee, and we came with just six recommendations. The

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2113 first was that the CDC needed to establish a better mechanism
2114 for national surveillance to comprehensively capture the
2115 incidents of concussions. You have heard a number of figures
2116 this morning about the concussions in one sport or another.
2117 We know what the incidence is where they are measured. We do
2118 not know what the incidence is in sports where they are not
2119 measured, or where they are not more closely watched. We
2120 need to have that baseline to really know the degree to which
2121 we have a problem, and as we take corrective measures, the
2122 success rate that we are having in making an impact on
2123 decreasing the incidence of concussions.
2124 So, number one, we need better surveillance, we need
2125 better epidemeality. Number two, a couple of recommendations
2126 related to research. We need the NIH and the DOD to look
2127 more specifically at what metrics and markers are for
2128 concussions. How do you assess the severity of a concussion,
2129 how do you find diagnostically whether or not an individual
2130 has had a concussion. Right now, it is largely based upon
2131 observation, on self-report, but are there some physiologic
2132 markers that could be used to give us better documentation
2133 that a concussion has actually occurred, perhaps without the

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2134 individual knowing it or without it being observed.
2135 Secondly, we need the NIH and DOD to look at more carefully
2136 and longitudinally at the short- and long-term consequences
2137 of concussions. We have heard testimony in this panel, the
2138 prior panel, individuals that have had one or more
2139 concussions, what are the long-term sequella of an individual
2140 or multiple concussions. That gives us some sense about not
2141 only, again, the epidemiology of the problem that we are
2142 dealing with, but what treatment and interventions may be,
2143 and what rehabilitation may be.
2144 Fourth recommendation was to the NCAA and the National
2145 Federal of State and High School Associations to look at age-
2146 appropriate techniques, and roles and playing standards. And
2147 again, your first panel talked a little bit about that,
2148 mostly at the professional level, but can you change the
2149 manner in which the sport is practices, and the rules of
2150 engagement in the sport that may decrease the risk of
2151 concussion. There was one example from the hockey area where
2152 they had changed the level where they allowed body-checking,
2153 and felt that they saw a decrease in concussion. We think
2154 that that same sort of examination should take place at the

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2155 college and the elementary and high school level to see
2156 whether or not that can have the same impact.
2157 The fifth recommendation had to do with a better study
2158 of what the role may be for protective equipment. And again,
2159 your first panel talked a lot about that. The committee had
2160 a number of questions about that. Our committee found that
2161 there was very little evidence that helmets protect against
2162 concussions. And there is a lot of data in that, and I think
2163 some of the other panelists will be talking about that. You
2164 may come away with an equivalence degree in physics this
2165 morning. It is a complicated issue, but there are a number
2166 of suggestions. You know, we certainly did not recommend you
2167 don't use helmets. They do protect against bone injury and
2168 soft tissue injury, but the suggestion that a helmet itself
2169 may decrease the incidence of concussion, the evidence does
2170 not appear to be there to us, and we think that the NIH and
2171 DOD, again, have a role in looking more specifically at what
2172 we may be able to do related to the biomechanical
2173 determinates and protection against concussions.
2174 And then our final recommendation had to do with the
2175 topic which has come up frequently, and that is changing the

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culture and the way concussions are viewed. This is a significant injury. Athletes need to be encouraged to report, to take themselves out of the game. Coaches and parents need to be encouraged to say, for your own protection, you need to be removed and give yourself a chance for recovery.

Thank you very much.

[The prepared statement of Mr. Graham follows:]

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Mr. {Terry.} Thank you. And then, Dr. Molfese, you are recognized for your 5 minutes.

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^STATEMENT OF DENNIS L. MOLFESE, PH.D.

} Mr. {Molfese.} Thank you, Chairman Terry, Ranking Member Schakowsky, and members of the subcommittee for this opportunity.

If we could have the slides. Go to the next slide. Yeah. So I think the earlier group talked about a number of--if you can go ahead and put that on Power Point. A number of sports where the rate of concussion is particularly high. There are, of course, differences in rates for men and women, and Dr. Gay will talk about some of that in terms of weaknesses of women's necks relative to their--men's necks, and how that puts them perhaps at more risk for concussion.

Next slide. Concussion accounts for, in the United States, roughly about 75 percent of traumatic brain injuries. It is a brain injury. There is damage to the brain. There is the discussion about whether it is permanent or temporary. In the military, the rate is 77 percent. So it turns out that youth sports are a good model for also looking at concussion in terms of the military. And, in fact, most of

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the military concussions occur in situations most like they do with the rest of America. Some certainly occur in theater, but majority occur outside of theater in accidents like we all are sort of prone to experience.

Next slide. If we look at brain injuries overall, there are estimates--these are all estimates, of course, and they vary across the literature, but we are looking at somewhere probably in the neighborhood of about 4 million traumatic brain injuries per year in the United States. Severing part of that is that our birth rate in the United States is also roughly about 4 million. This does not count other ways that children are exposed to head injuries. Perhaps a disciplining, irate parent who slaps a child, that creates rotational movement that can, in fact, produce a concussion. Those, one would suspect, are largely unreported.

Recovery generally is fairly quick, usually within anywhere from a few hours to a few days. Some will persist to 2 weeks, even perhaps out to 6 weeks, but roughly about 20 percent seem to persist beyond that time.

Next slide, please. This is a slide just on some data that we have under review, but it will give you sort of a

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2227 sense. These are data recorded using brain electrical
2228 activity. So basically, you have a net of 256 electrodes
2229 that fits on the head in about 10 seconds or so. And we
2230 present a series, in this case, a series of numbers. One
2231 number at a time. All the college athletes had to do was
2232 simply say whether the number they currently see matches or
2233 does not match a number that occurred two positions earlier.
2234 And on the left side, those orbits, those circles you see,
2235 the colored circles on the left for match and non-match,
2236 those are imagines of the brain electrical activity on the
2237 scalp recorded from those electrodes, between 200 and 400
2238 milliseconds. So 2 tenths to 4 tenths of a second after the
2239 number appears. So the schematic on the right shows you the
2240 head position. So it is a very rapid brain response. For
2241 those athletes who have no history of concussion, we see a
2242 very clear difference in the electrical activity for the
2243 match versus the mismatch. A lot of yellow and green in the
2244 top left orb, and in the bottom we see red and various shades
2245 of blue from the front of the head to the back of the head.
2246 On the right though, these are individuals who have a
2247 concussion history of 1 to 2 years earlier, not current, and

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2248 yet at 200 to 400 milliseconds, their brains cannot
2249 discriminate whether those two numbers are the same or
2250 different. They ultimately get these tasks correct, but it
2251 takes them roughly 200 milliseconds longer. That is 20
2252 synapses. So the processing speed is slow. And after 2
2253 years, one might suspect that is a permanent change.
2254 The next slide, I think that--yeah, so in terms of
2255 critical scientific gaps, some of these we do what Dr. Graham
2256 talked about, you know, how does concussion affect the brain
2257 in the short- and long-term. We really don't have much
2258 information about that. What is the dose requirement, Dr.
2259 Graham talked about that, to produce a concussion, post-
2260 concussion syndrome, CTE, how can we reliably, objectively
2261 detect when the brain is injured, and when, importantly, it
2262 is fully recovered. We have no ways to do that. Lots of
2263 individual differences from one person to the next. We think
2264 there are genetic factors involved, but there could also be a
2265 concussion history that a person may not really think they
2266 have. How many of us have bumped our head getting in and out
2267 of a car. So we have a quick rotational movement, and that
2268 could produce perhaps a concussion. And then how does the

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brain recover from TBI. And then finally, how we improve and recover--accelerate recovery. We really have no scientific basis for any of our interventions.

Thank you.

[The prepared statement of Mr. Molfese follows:]

********** INSERT I **********

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|

Mr. {Terry.} Thank you. Dr. Johnston, you are now recognized for 5 minutes.

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|

^STATEMENT OF JAMES JOHNSTON

} Mr. {Johnston.} Hi, Chairman Terry, Ranking Member Schakowsky, and members of the committee. Thank you for inviting me to testify before you today, alongside this illustrious panel about our experience in Alabama following the passage--

Mr. {Terry.} Could you pull the microphone a little closer?

Mr. {Johnston.} Is that better? Is that better?

Mr. {Terry.} Yes.

Mr. {Johnston.} Following--our experience in Alabama following the passage of concussion legislation, as well as the work we are currently doing at the University of Alabama Birmingham to improve sports safety.

As in the State of Nebraska, youth sports and youth football are an extremely important part of our culture, and as a result, we take the safety of our children very seriously as well.

As well known to the committee, the problem of

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2296 concussion has gained prominence over the past decade thanks
2297 to important research and advocacy work done by scientists,
2298 physicians, and public health professionals at many centers
2299 across the United States, and through the work of public
2300 officials highlighting this research. Of significant
2301 concern, recent studies have identified potential long-term
2302 health consequences including depression, chronic traumatic
2303 encephalopathy and other neurodegenerative diseases
2304 associated with repeated impacts.
2305 While college and professional football gets the most
2306 media attention, it is important to keep in mind that greater
2307 than 70 percent of all football players in the U.S. are under
2308 14 years of age. Any effort directed at improving safety in
2309 football and other impact sports will need to address these
2310 youth athletes.
2311 Parallel to enacting of Alabama's concussion law in
2312 2011, as in many states, the Alabama State Concussion
2313 Taskforce, Children's of Alabama, and Think First Alabama,
2314 initiated a statewide concussion education and awareness
2315 program, and it worked. In that first year, we observed a
2316 500 percent increase in referral of youth athletes referred

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2317 to the Concussion Clinic at Children's of Alabama, a trend
2318 that has held steady since that time with about 350 youth
2319 athletes seen every year.
2320 To optimize care of this rapidly increasing patient
2321 population, we developed a multidisciplinary protocol, it is
2322 in my Appendix 1, following the Zurich Consensus Guidelines,
2323 athletes were evaluated by physicians with expertise in
2324 concussion, kept out of sports or school until symptom-free,
2325 referred for neuropsychological testing when appropriate, and
2326 supervised in a gradually return to play and/or return to
2327 think program. A formal study performed in 2012 demonstrated
2328 that establishing this program resulted in significantly
2329 better concussion care and decreased institutional resource
2330 utilization.
2331 Even though these efforts have certainly resulted in
2332 improved recognition and treatment of concussion in Alabama
2333 and in other states, we believe that much remains to be done
2334 in order to prevent sports-related brain injury in the first
2335 place. Given the difficulty of delineating a specific
2336 concussion threshold, as has been said previously, using
2337 existing helmet accelerometer technology and other subjective

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2338 ways of evaluating athletes, researchers have begun to widen
2339 their focus from concussion to correlating cumulative impact
2340 exposure over time, with changes in advanced MRI imaging
2341 techniques and neuropsychological changes, even in the
2342 absence of clinically diagnosed concussion. Animal models of
2343 subconcussive impacts have also demonstrated problems with
2344 complex spatial learning, cognitive impairment, and, as is
2345 seen also in football players, compared with single impact
2346 controls and those who have not had these injuries.
2347 Though definitive conclusions about threshold for impact
2348 frequency hit counts cannot be drawn from these early
2349 studies, it has become clear that subconcussive impacts, that
2350 is, those impacts that don't result in concussion, also play
2351 a role in cumulative brain injury over time and need to be
2352 studied.
2353 Recent studies of youth players by researchers at Wake
2354 Forest suggest that a significant portion of young players'
2355 head impact actually takes place during practices, and the
2356 largest impacts happen to take place during those practices,
2357 a lot of time doing outdated drills, like Oklahoma Drill or
2358 Bull in The Ring, that are supervised by well-meaning but

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2359 untrained coaches. Emulating top level collegiate programs,
2360 which don't do these practices and these drills, teams like
2361 the University of Alabama, Ivy League and others, the Alabama
2362 High School Athletic Association recently published
2363 nonbinding guidelines to limit full contact hitting practices
2364 to twice per week. I believe this type of intervention is
2365 complimentary to the stuff that USA Football is talking
2366 about, about techniques, not just the techniques of hitting
2367 but also the number of hitting practices per week, as well as
2368 what drills are going to be done during practice. Pop Warner
2369 has instituted similar guidelines to this, but again, that is
2370 a small section. Limiting the frequency of hitting at
2371 practices as well as the type of drills would have a large
2372 effect on safety, significantly decreasing the cumulative
2373 impact exposure for every youth football player in America.
2374 It has also become clear that football helmet standards
2375 currently defined by the National Operating Committee for
2376 Standards in Athletic Equipment must be updated to reflect or
2377 improve understanding of the etiologies of concussion. It is
2378 clear that both linear impact and rotational acceleration
2379 play a role in concussion pathophysiology, and only linear

2380 impact is studied by the NOCSAE system, which was from a
2381 skull fracture tolerance model developed in the 1960's.
2382 We believe that having multiple other--a more complete
2383 picture of the impacts that are seen in the football field
2384 are necessary in order to come up with meaningful standards.
2385 In collaboration with the University of Alabama Football
2386 Program, engineers at UAB, led by Dean Sicking, previously of
2387 the University of Nebraska, and the developer of the safer
2388 barrier for NASCAR and IRL have recently developed a robust
2389 video analysis system to analyze impacts, and then recreate
2390 them in a purpose-built lab.
2391 In conclusion, the passage of concussion awareness
2392 legislation, community education, and recent advances in our
2393 understanding of head impact exposure in youth athletes have
2394 all improved the overall safety of impact sports, and that we
2395 are recognizing concussions more frequently, however, much
2396 work remains, specifically in concussion education, and
2397 drafting of policies to limit head impact exposure for youth
2398 athletes in contact sports. As part of this push to a
2399 multifaceted approach to a complex problem, I believe the
2400 development of new helmet standards is also crucial for the

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development of safer helmets.

Mr. Chairman, thank you for the opportunity to testify.

[The prepared statement of Mr. Johnston follows:]

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|

Mr. {Terry.} Thank you. Dr. Gay, you are now recognized for 5 minutes.

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^STATEMENT OF TIMOTHY GAY

} Mr. {Gay.} Thank you, Chairman Terry. I would like to thank the subcommittee for inviting me to testify today.

I am speaking to you as a football fan who happens to be a physicist. My main professional interest in the game is the understanding of how protective equipment works and how it can be improved.

Today I wish to consider several aspects of football that are problematic as far as concussions go, and how we might move forward to make the game safer.

American football is an inherently violent sport. That is one of the reasons we love it. That is one of the--the forces encountered in football can be huge. Consider a big hit between a running back and a linebacker at full speed. We can show, using Newton's Second Law, that the force each player exerts on the other exceeds 3/4 of a ton. This is why football is called a contact sport.

Two players who collide at full speed, helmet to helmet, are experiencing the same force to their heads that one of

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2426 them would feel if he had a 16 pound bowling ball dropped on
2427 his helmet from a height of 8 feet.
2428 Medical knowledge of concussions is in its infancy, but
2429 we know one thing for sure; forces to the head and neck cause
2430 concussions, and we have just how--we have just heard how big
2431 these forces can be. Here is another problem. They are
2432 getting bigger.
2433 Since 1920, the average weight of pro linemen has
2434 increased almost 60 percent, to just over 300 pounds. At the
2435 same time, these players have gotten about 10 percent faster.
2436 Combining the factors of speed and mass to calculate kinetic
2437 energy, the energy available to cause injury, we find that
2438 the amount of energy dumped into the pit at the line of
2439 scrimmage on any given play has almost doubled since 1920.
2440 In exact opposition to this trend is the fact that players
2441 are shedding their protective gear. Thigh and kneepads that
2442 used to be centimeters thick, now bear a remarkable
2443 resemblance to teacup doilies. Horse collars, popular with
2444 linemen of my generation, have gone the way of the flying
2445 wedge. Modern football helmets are technological marvels,
2446 but players choose them not for their collision cushioning

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ability, but for how cool they look.

Another problem is the poor state of our medical knowledge. While I am not competent to explain these issues, I think it is safe to say that a room full of head trauma physicians will not agree on the details of what concussions are, or what causes them. This means that the diagnosis and treatment of concussions has a long way to go. As our understanding of these issues improves, we may find that injury rates due to the increasing energy of the game and the wholesale shedding of equipment have increased faster than we thought.

Finally, football is big business, especially at the college and professional levels. When monetary forces manifest themselves as they do in, for example, bounty programs and illegal doping to improve performance, the game becomes more dangerous.

What are the solutions? We need better equipment, but this can get tricky. For example, it is apparent that adding more energy absorbing foam to the outside of a helmet will lower the force delivered to a player's skull. This has been tried in the past. The problem is that the added padding

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2468 increased the helmet diameter, as well as its coefficient of
2469 friction, meaning that the opposing player can exert a lot
2470 more torque on your head. Nonetheless, several companies
2471 today are proposing the same basic padding idea for youth
2472 football, for whose players the risk of collisions to the
2473 head is almost certainly greater. The use of the Star System
2474 for rating helmets, and the Hit System for monitoring
2475 collisions to a player's head, represent important first
2476 steps toward improving football safety for a variety of
2477 reasons that disregard players' safety, they are largely
2478 ignored.
2479 Our understanding of the physiological and
2480 epidemiological issues related to concussions must be
2481 improved. There is now an understanding in the NFL and at
2482 the college level that significant research in this area is
2483 needed. Several of the members of this panel, including my
2484 colleague from Nebraska, Dr. Molfese, are leading cutting-
2485 edge efforts in this area.
2486 Finally, some incremental rule changes and more
2487 stringent enforcement of existing rules are needed. In my
2488 opinion, some of the new rules regarding targeting, peel-back

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blocking, and definition of a defenseless opponent, are making players more hesitant on the field. These rules may, thus, actually, increase the risk of injury. Rule changes should be studied and possibly reversed.

It is my belief that a return to the level of padding worn in the 1970s would make the game significantly safer. More thorough doping rules should be developed and actually enforced. The NFL season should be reduced to 14 games, and the college season returned to 11. Finally, more stringent requirements regarding when a player with a concussion can return to the game need to be implemented.

These are my thoughts for your consideration. Thank you for your attention and your valuable time.

[The prepared statement of Mr. Gay follows:]

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|

Mr. {Terry.} Thank you for your valuable time.

And, Dr. Gioia, I appreciate you being here. You are recognized for 5 minutes.

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^STATEMENT OF GERARD GIOIA, PH.D.

} Mr. {Gioia.} Yes. Thank you, Chairman Terry, Ranking Member Schakowsky, and members of the subcommittee. I appreciate the opportunity to speak on behalf of the safety of our children in this country.

So I am a pediatric neuropsychologist at Children's National Health System here in Washington, DC, and the director of the SCORE Concussion Program. I am a clinician, a researcher, and a public health educator. Today I would like to take my time to focus my comments on the importance of public health education for youth concussion, using my expertise as a clinician and a researcher, and I have worked for the last decade with the CDC on their Heads-up Concussion Program materials.

We all know, and I think Ian said it just perfectly, that sports and recreation provide important developmental opportunities to enrich the lives of our youth. They teach life lessons. But we have to balance those incredible benefits of sports participation with careful attention to

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2526 safety issues, and science must drive our action-oriented
2527 approach.
2528 Concussions are serious injuries to the brain that
2529 threaten the development of our youth. In an attempt to
2530 protect our youth, we now have laws in all 50 states and the
2531 District of Columbia, all with the good intent of protecting
2532 our student athletes through rules for educating coaches and
2533 parents, and removing suspected concussions, and not allowing
2534 them to return until properly cleared. All states including-
2535 -include the high school at this level, but only 15 out of
2536 those 51 include youth sports. So less than 1/3 are looking
2537 at the majority of athletes.
2538 In preparing for this testimony, I was posed with an
2539 important question and challenge within youth sports. With
2540 concussion awareness now at an all-time high, are youth
2541 sports teams and organizations, and parents, more aware but
2542 still not sure what to do about it. And the simple answer to
2543 that question, with my experience, is yes. Many coaches and
2544 parents are not equipped to know what to do with a suspected
2545 concussion. Mechanisms to teach active recognition and
2546 response to every coach and parent are inconsistent and

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2547 limited in scope. The health and safety of youth athletes is
2548 largely in the hands of coaches and parents at the youth
2549 level. They need medically-guided training and early
2550 identification of concussion and protection. Coaches and
2551 parents must receive training and action-oriented concussion
2552 recognition and response. Awareness isn't enough, and they
2553 have to be prepared properly.
2554 We know that, as you have heard, repeated concussions
2555 present the greatest challenge to our youth. So our greatest
2556 challenge is really the universal consistent and effective
2557 implementation of these 51 laws so that we can prepare those
2558 coaches and parents to know what to do, and have the tools
2559 with which to do it.
2560 At Children's National Health System, over the past 10
2561 years, our SCORE Program has delivered hundreds upon hundreds
2562 of action-oriented parent and coach concussion education and
2563 training program, using the Heads-up materials from the CDC.
2564 We have learned much about the community needs and how to
2565 deliver the message. So we deliver scenario-based training
2566 where we present to coaches and parents an actual situation,
2567 and what they must do to recognize and respond. This is all

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2568 very, very important as we put these responsible adults in
2569 place.
2570 You have heard about some important other kinds of
2571 activities and good examples of head-safe action, head-smart
2572 action, such as USA Football's Heads-up Tackling Program,
2573 where coaches are educated in concussion recognition and
2574 response, but also taught techniques that we believe can
2575 improve taking the head out of the game, but we have to go
2576 further in all youth sports. We do not have a coordinated
2577 universal strategy at this point for action-oriented,
2578 solution-driven methods to recognize and respond to these
2579 injuries. We have the tools, we have many of the programs,
2580 but we do not at this point have the delivery mechanism to do
2581 that. So we have to build also on active partnerships
2582 between youth sports organizations and medical care systems.
2583 Concussions are complicated. They are not simple. We are
2584 not asking parents and coaches to be clinicians and to go out
2585 and diagnose. We have willing teammates, as you have heard,
2586 through USA Football, U.S. Lacrosse, USA Hockey, USA Rugby
2587 and other organizations, but we need to build those
2588 partnerships, we need the help of the professional sports

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leagues, as you hearing from the NHL and the NFL and the sports manufacturing world, to team with us. We also need a quarterback ultimately to make this happen. We have to leverage the efforts of other organizations like the National Council on Youth Sports Safety, the Youth Sports Safety Alliance, The Sarah Jane Brain Foundation's PABI Plan, all of this is important for us to do. So we need, obviously, funding to do that to move forward.

Can we move from awareness to action? Yes, we can. Concussions are serious injuries that threaten our youth, but we do not need to be scared away from that, we do not need to avoid developmentally appropriate participation in sports activities. What we need to do is focus on how to teach recognition and response, and our country needs a good universal mechanism to implement community-focused youth concussion solutions, and we believe that that can help children ultimately as they enjoy the benefits of sports.

Our SCORE motto applies here. It says, play hard, play safe, but play smart.

Thank you.

[The prepared statement of Mr. Gioia follows:]

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2610 ********** INSERT L **********

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|

Mr. {Terry.} Very good. Dr. Shenton, you are now recognized for your 5 minutes.

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^STATEMENT OF MARTHA SHENTON, PH.D.

} Ms. {Shenton.} Thank you. I want to thank Chairman Terry, Ranking Member Schakowsky, and members of the subcommittee. I am honored to be here today.

My focus is going to be on radiological evidence of both concussion and subconcussive blows to the head. And if I could have the next slide.

What is known is that mild traumatic brain injury is common in sports injury, and when we are talking about a single mild TBI, about 80 percent get better, between 15 and 30 percent go on to have persistent concussive symptoms, as have been described today.

What is most concerning though are what has been called chronic traumatic encephalopathy and other neurodegenerative disorders, and that is the second one where it is repetitive mild traumatic brain injury that we are really concerned with. And the clearest evidence comes from postmortem studies.

If I could have the next slide? Here is a postmortem

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2632 slide. This is Ann McKee's work that shows how protein in
2633 the brain, and those are the brown areas that show up. And
2634 this is in a case of a retired professional football player
2635 who had symptoms, and was presumed to have chronic traumatic
2636 encephalopathy, which was confirmed at postmortem.
2637 Next slide please. Now, here are four individuals, A,
2638 B, C and D. What is interesting here, and this is work by
2639 Goldstein, it shows that blast injury and repetitive brain
2640 trauma look the same at postmortem. So we have a military
2641 person at 45 with one close-range blast injury, a 34-year-old
2642 with two blast injuries, an amateur football player at the
2643 age of 18 with repetitive concussions, and then a 21-year-old
2644 with subconcussive blows to the head only.
2645 Next slide please. So what is known? We have gone over
2646 the first two. The third is mild TBI is very difficult to
2647 diagnose, and that has been a really serious problem because
2648 if you use conventional CT and conventional MRI, you are not
2649 likely to find differences or abnormalities in the brain, and
2650 so many people have said there is no problem then. The
2651 problem is the correct advanced tools have not been used
2652 until more recently. And now with advanced neuroimaging, we

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2653 are able to both diagnose and move towards prognosis and
2654 hopefully intervention. Advanced neuroimaging techniques
2655 such as diffusion imaging, which we have been using in our
2656 laboratory, show radiological evidence of brain alterations
2657 in living individuals with mild TBI. And so if we can detect
2658 this early, and we can perhaps then look at underlying
2659 mechanisms and characterize what is going on in order to come
2660 up with preventative measures.
2661 Next slide please. So this is a study from our group,
2662 looking at hockey players from university hockey players in
2663 Canada. And the bottom line is over on the right. The first
2664 is at preseason and the second is at postseason. The red
2665 dots are three individuals who had concussion during play,
2666 from preseason to postseason. And the increase is increase
2667 in extra cellular water in the brain, which is not a good
2668 sign.
2669 Next slide please. We also looked at brain matter,
2670 looking at cortical thinning in the brain, and that is the
2671 cortex where neurons are in the brain. And this is a study
2672 in former professional football players who were symptomatic
2673 when we looked at them. And what we found was that there is

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2674 cortical thinning compared to age-matched normal controls.
2675 What is most concerning, however, is that blue line that
2676 shows that the cortical thinning accelerates with age,
2677 whereas the red line, our control group, where it is almost
2678 completely flat. And this suggests that cortical thinning
2679 may indicate abnormal aging and a risk for dementia that we
2680 can see right now in living individuals.
2681 Next slide please. Now, this is a study that we did in
2682 Germany with elite soccer players, and we selected them
2683 specifically for not having a history of concussion, and not
2684 having any symptoms whatsoever. And what we found was,
2685 compared to swimmers--professional swimmers, there was a huge
2686 difference between the two groups, with the controls on the
2687 left and the soccer players on the right. Almost a complete
2688 separation between the two groups, with an increase in what
2689 is called radial diffusivity, which is a measure of damage to
2690 myelin in the brain.
2691 Next slide please. So what we don't know; why do
2692 concussive and subconcussive trauma result in some and not in
2693 others. Another question we don't know is why do some
2694 develop neurodegenerative disease while others do not. What

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are the predisposing factors. Is it exposure or genetics involved, because not every football player, not every soccer player, not every hockey player who plays and gets hit to the head ends up with these neurodegenerative diseases, which is what, I think, people are most concerned with.

And next slide. So what we need is diagnosis to detect brain injury early. We have imaging tools now that are sensitive, widely available, and can be applied in vivo, prognosis to follow recovery and degenerative processes. So we need to follow recovery and degenerative processes in order to predict who will have a poor outcome, and who will have a good outcome. And knowing that, we might be able to intercede with treatment to halt the possible cascade of neurodegenerative changes.

And finally, just in summary, next slide. Sports concussion leads to alterations of the brain's white and gray matter. Advanced neuroimaging is sensitive to detect brain alterations following concussion and subconcussive brain trauma, and the impact over time in--is important. We need longitudinal studies to identify different stages of recover, and being able to pick out ahead of time what is going to

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lead to a poor outcome so that we can intercede.

And finally, some measures of safety, such as rules for returning to play are needed following observable evidence of brain trauma.

Thank you.

[The prepared statement of Ms. Shenton follows:]

********** INSERT M **********

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|

Mr. {Terry.} Thank you. Very impressive testimony from everyone, and I was even impressed that you all stuck to the 5 minutes, pretty close.

Now, I am going to go back to Dr. Molfese because I think your testimony and Dr. Shenton's kind of juxtapose each other here very nicely.

So part of what your research is doing is finding that baseline of the new athletes that enter University of Nebraska. So your--is this allowing you to detect the injuries earlier that there may have been some pre-existing subconcussion, how do you do--how are you identifying that, what is it telling you, and what are you then--what is the university doing to implement some level of protections?

Mr. {Molfese.} Well, one of the major changes we have seen, and I think this is occurring across the field now, is the effort to get pre-concussion data. So basically, more and more schools are moving to assess student athletes prior to the start of the season, and that certainly is what we are doing. And then should a player be injured, and they are identified through trainers or the medical team. One of the

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2743 weaknesses here is that the players do not always self-
2744 identify, and so we have run across that a number of times in
2745 our testing, or we will pick up something on our test the
2746 trainers and the medical team didn't know about simply
2747 because the player didn't disclose. And then we also try to
2748 test somebody else who plays a similar position, and--but has
2749 not been injured, and they act sort of as a game control over
2750 the course of a season. And generally, what we are finding
2751 is both effects that occur across the season and just our
2752 normal players who have no history of concussion being
2753 identified, their brain speed of processing does change over
2754 the 4 to 5 months of training and the season, but then with
2755 the players who are--who do experience a concussion, we see,
2756 in terms of brain electrical activity, again, the slowdown of
2757 about 200 milliseconds. That is four times faster than the
2758 slowdown you see in Multiple Sclerosis, for an example, for a
2759 contrast. So clearly, the brain has changed the way it is
2760 processing.
2761 We are just now moving to start intervention programs
2762 with the players that we identify. There is some data out
2763 there with Alzheimer's--early Alzheimer's that suggest

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working memory-type tasks may--even a week of intervention, shows a 4 to 5 week gain--continual gain in improvement, and so we are trying to see if we can see some of that occurring.

Mr. {Terry.} Thank you.

Dr. Gay, in regard to concussions, though many times it is not a direct blow, but coup contra coup, it is being hit so that the head is going back and forth, and the brain is sloshing around.

You mentioned going back to 1970s type of equipment, and Tom Osborne likes to talk about the neck roll that--describe to me what you mean by 1970s equipment, and how it may actually reduce concussions.

Mr. {Gay.} Thank you, Mr. Chairman.

Yeah, the neck roll, what I call a horse collar, is really a piece of equipment that has disappeared from the game. And it does an important thing, it essentially immobilizes the head. So if concussions are incurred by the rattling of the brain back and forth, especially from a blow to the side, the horse collar will substantially damp that down. To my knowledge, there is--there are no epidemiological studies of that being effective, but I just

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can't--my personal opinion, even though I am ignorant of--largely ignorant of medical science, is that if you immobilize the head, that is going to solve a lot of the problems, especially with these rotational hits. Yeah.

Mr. {Terry.} Dr. Graham, does that make sense?

Mr. {Graham.} I think whether or not the horse collar would have that effect, I don't know, and, of course, our committee was based purely on science and, you know, reviewing the literature, but I think the principle is, you want to find ways to minimize the linear and rotational forces that come into effect with a blow to the head, and whether you can do that by equipment, whether you can do that by change in play, you know, that is what you have to do to decrease the evidence--the incidence of concussion.

Mr. {Terry.} Thank you. I only have 11 seconds left, so I will yield back and recognize the Ranking Member, Ms. Schakowsky.

Ms. {Schakowsky.} You know, in addition to the science, so much talk has been about culture, and it seems to me that that is very important. So a change in the culture means not only managing head injuries when they occur, but also

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2806 encouraging safer play to reduce the risk of head injuries.

2807 So, Mr. Heaton, you spoke about the need to change the,

2808 I am quoting from your testimony, ``the win at all cost''

2809 attitude among players and coaches. What would you tell

2810 teams to help them change that attitude, both within

2811 themselves and teammates, and perhaps more challenging, in

2812 coaches?

2813 Mr. {Heaton.} Thank you. Well, frankly, I would

2814 actually encourage the coaches to stress this as much as

2815 possible, as well as the parents, because the coaches and the

2816 parents are there to help us learn how to play these sports

2817 correctly, and if they can emphasize not having to worry

2818 about winning to the point where you get hurt, then it will

2819 trickle down to the players, and then the players become

2820 coaches, and then it is this never-ending cycle of teaching

2821 and making sure that the players know that winning is not the

2822 most important thing. It is--it--you know, it feels great to

2823 win, but I would much rather lose than have another

2824 concussion.

2825 Ms. {Schakowsky.} Clearly, you were aware because of

2826 the severe consequences of the brain injury, but do you think

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that youth athletes understand what those symptoms are?

Mr. {Heaton.} Yes. I think it is getting better, indeed, especially in my school. I mean they are--you know, we emphasize making sure that you know the symptoms of concussions, and I feel like it is spreading as well, but I--

Ms. {Schakowsky.} Let me ask Dr. Gioia that too.

Mr. {Heaton.} Okay.

Mr. {Gioia.} Yeah, I--certainly, at this point, the education programs are also being directed toward the athletes, and quite honestly, about 5 years ago, maybe 6 years ago, there was a study that showed that that was the number 1 reason why athletes were not coming out of the game, because they didn't know how to tie together the symptomatology. It wasn't simply that they didn't want to lose playing time, but they didn't know what they were dealing with in themselves.

Ms. {Schakowsky.} Right.

Mr. {Gioia.} But we also believe that athletes and teammates need to watch out for each other, because the concussed athlete themselves may not have the wherewithal to know that they aren't right, and yet their teammate right

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next to them oftentimes does. So there is a responsibility within that team to take care of each other, and that is an important focus.

Ms. {Schakowsky.} And that goes to culture as well.

Mr. {Gioia.} Yes, absolutely.

Ms. {Schakowsky.} Yeah. Yeah.

Dr. Shenton, please explain a little bit how advanced neuroimaging works, and describe the types of changes in the brain your lab is able to detect that traditional imaging can't, and also some of the types of neuroimaging used by your lab have been a significant part of the research on diseases like Alzheimer's and schizophrenia. Why are the same imaging techniques appropriate for research on these diseases and research on sports-related brain injuries?

Ms. {Shenton.} Okay, I have a slide, which is just at the end of my slides, that just explains in one slide diffusion imaging, which I think would help out here.

Ms. {Schakowsky.} The one I--the one slide I really didn't understand was--did--was it comparing swimmers with--

Ms. {Shenton.} With soccer players--

Ms. {Schakowsky.} Right.

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Ms. {Shenton.} --but I was going to go through--

Ms. {Schakowsky.} All right, go ahead.

Ms. {Shenton.} --and just show you--

Ms. {Schakowsky.} Okay.

Ms. {Shenton.} --why diffuse external injury is important because the injury that happens in the impact to the brain is generally a stretching of the cables in the brain, which is really the white matter, and it is--for example, the corpus callosum is the largest white matter track in the brain, and so you get sharing. And this doesn't show up on tradition CT or MRI. In fact, the first mild TBI conference I went to, no one showed a brain. And I looked to my colleague and I said why would no one show a brain. And he said because everyone knows that you can't see anything on the brain. And I said, but then nobody is using the right tools here.

And this is just a very simple principles of diffusion imaging. If you look on the left, this is ink that goes on a Kleenex. It goes in all directions, and that is called isotropic diffusion. If you look on the right, it says anisotropic diffusion. So you are dropping ink on newspaper,

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and newspaper has fibers so it restricts the water. And this is the same principle that is used quantitatively to look at the brain, so that, if you are in CSF, it is very round, and it is isotropic, the--everything goes in the same direction. If you are looking at white matter, you are restricted in 2 directions, and so you can measure how--what the integrity is of white matter fiber bundles in the brain. And that is what you need to look at in mild TBI.

Now, if you have someone come in with a moderate or severe brain injury, you don't need this kind of technology.

Ms. {Schakowsky.} Uh-huh.

Ms. {Shenton.} They are going to just be put into neurosurgery, and they are going to do an operation. It is these very subtle brain injuries that aren't recognized using conventional imaging, where you can recognize it if you use something like diffusion imaging. And we have shown over and over again now that you can see--and it is not just our group. Starting in 2003, people started using diffusion imaging because it is the most sensitive imaging tool that exists today to look at diffuse external injury, which is the major injury in mild TBI.

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2911 So what needs to be done now is to look at acute injury,
2912 and see what predicts outcome, like do acute injury at 72
2913 hours, at 3 months, at 6 months. Can we then predict,
2914 knowing that what happens at 72 hours, if you have a--we have
2915 someone in our lab that is trying to separate water that is
2916 outside the brain versus--outside cells versus in cells. If
2917 you can predict from 72 hours, then you can go back and say,
2918 okay, maybe we want to put in anti-inflammatory medications
2919 if this is a neuroinflammatory response.
2920 We don't know enough right now. The only way to know is
2921 to do these longitudinal studies, and follow over time using
2922 very sophisticated imaging technology, in my opinion. Once
2923 you know, you can diagnose. Once you diagnose, you--
2924 Ms. {Schakowsky.} So this could be very promising--
2925 Ms. {Shenton.} Yes.
2926 Ms. {Schakowsky.} --not only for our athletes, but our
2927 returning veterans and--
2928 Ms. {Shenton.} Yes.
2929 Ms. {Schakowsky.} --applied eventually to schizophrenia
2930 or Alzheimer's?
2931 Ms. {Shenton.} Well, actually, we have applied--I am

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primarily schizophrenia research, that is--

Ms. {Schakowsky.} Okay.

Ms. {Shenton.} --what I have done for 30 years before I became a TBI researcher in 2008. And we have a measure of--called free water based on imaging--this kind of imaging that shows that early on at the very first episode of schizophrenia, you see fluid around all of the brain that is free water, it is like the--isotropic, but in just the frontal lobe, you see it more restricted to tissue--inside tissue. And this is a brand new technique that was developed by a Fulbright Scholar that is in our lab from Israel. And so--

Ms. {Schakowsky.} Okay, I am going to have--

Ms. {Shenton.} Okay.

Ms. {Schakowsky.} --to say thank you--

Ms. {Shenton.} Fair enough.

Ms. {Schakowsky.} --because--it is very promising.

Mr. {Terry.} Two and a half.

Ms. {Schakowsky.} Thank you.

Mr. {Terry.} Yes, thank you.

Gentleman from New Jersey is recognized.

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Mr. {Lance.} Thank you, Mr. Chairman.

Dr. Johnston, you stated that many sports-related concussions still go undiagnosed, and I would like to know why, in your opinion, that is the case, and how can we improve that in our state laws, and also the involvement of coaches and players and PTA's, areas where we need to have improvement?

Mr. {Johnston.} Thank you for the question.

I think I would echo what has been said by others on the panel. It is on. It is on. Sorry. I would echo what has been said by others on the panel, that I think that a lot of it has to do with recognition. Obviously, people are very good at recognizing when someone gets knocked out on the field, but, of course, that is a very small percentage of all concussions, and I think that as our understanding of all the various symptoms that can go with concussion have arisen, it becomes incumbent upon us to improve the quality of the education that we give to our coaches, players, trainers, officials, about the symptoms of concussion. I think that that is the main reason. I--my sense is that, in general, the culture, at least speaking for the State of Alabama, that

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all the coaches that I have come into contact are believers, they are not, you know, purposefully hiding, you know, kids and putting them back in knowing they have concussions, but I think that sometimes it is hard to recognize, especially when young athletes don't tell you how they are feeling, and other issues which I guess were brought up with the importance of teammates being involved with diagnosing these players so they can be pulled and appropriately evaluated.

Mr. {Lance.} How close, in your opinion, are we to a better design for helmets?

Mr. {Johnston.} I think that we are at the very beginning. I think that we have been using a standard that has not changed for 40 years, that was designed for skull fractures--

Mr. {Lance.} Yes.

Mr. {Johnston.} --that has served its purpose, and I think that many investigators around are working to improve the quality of the standards to include linear and rotational acceleration, as well as other important aspects of impacts. And just like the automotive industry did 30 years ago with, once you start ranking cars with safety ratings, the market

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2995 can be relied upon for manufacturers to improve their helmet
2996 designs to improve their sales. So I think that is the stage
2997 we are at. I think standards are an important part of the
2998 equation.
2999 Mr. {Lance.} Thank you.
3000 Dr. Gay, in your testimony, you have discussed the fact
3001 that there is a numerical rating system for a helmet's
3002 impact, I think it is designed at Virginia Tech, the Star
3003 System, and you have called it the best tool we have for
3004 analyzing the merits of various helmet systems.
3005 Can you briefly explain how the numerical scoring system
3006 works?
3007 Mr. {Gay.} Yes, thank you, Mr. Vice Chairman.
3008 Basically, it involves a test where you drop the helmet
3009 from a given height, a varying height, to the side, to the
3010 front, to the back. It tries to simulate the kinds of
3011 impacts that a football player would actually experience, and
3012 numerical scores are given to the maximum acceleration that
3013 the NOCSAE head inside the helmet feels for these given
3014 drops, based on a, in my opinion, fairly crude initial model
3015 of what causes concussions. There is no effect to take into

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3016 account rotation, there is no effect of temperature, and, in
3017 my opinion, the reproducibility is not as good as one would
3018 like, having tried to do examples of these kinds of tests in
3019 groups that I have been involved with.
3020 So I think it is a good first start. It is the best we
3021 have right now. I think it needs to be paid attention to,
3022 but there is a lot of room, a lot of room for improvement.
3023 Mr. {Lance.} Thank you, Dr. Gay.
3024 And finally, Ian. How old are you and what grade are
3025 you in?
3026 Mr. {Heaton.} I am 18 and I am a senior.
3027 Mr. {Lance.} And does that mean you will be going off
3028 to college in the autumn?
3029 Mr. {Heaton.} Yes--
3030 Mr. {Lance.} And--
3031 Mr. {Heaton.} --I will.
3032 Mr. {Lance.} And do you know yet where you will be
3033 attending college?
3034 Mr. {Heaton.} I am going to Elon University in North
3035 Carolina.
3036 Mr. {Heaton.} In North Carolina. My congratulations to

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3037 you, and my condolences to your parents on the cost of higher
3038 education in this country. It is a great school. I have a
3039 goddaughter who is a freshman there. That means she is a
3040 little older than you, but I will be happy to introduce you
3041 to her.
3042 And let me say, I am very proud of your testimony, and I
3043 could not have done what you have just done when I was 17 or
3044 18, and certainly, I think the nation has benefitted by your
3045 outstanding testimony.
3046 Mr. {Heaton.} Thank you.
3047 Mr. {Lance.} Thank you.
3048 Mr. {Terry.} Gentleman from Mississippi, you are now
3049 recognized for 5 minutes.
3050 Mr. {Harper.} Thank you, Mr. Chairman. And thank each
3051 of you for being here and sharing your expertise on what is a
3052 topic that we are really just--I think only really learning
3053 about, as it has been in the news for several years, but it
3054 is, I think coming to the forefront. And your work and your
3055 information, your testimony on the record here today I think
3056 will be beneficial to us.
3057 As a parent of a 24-year-old young man with Fragile X

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3058 Syndrome, I particularly appreciate the work that you do at
3059 the Children's Hospital, you, Dr. Gioia, you, Dr. Johnston,
3060 but this is--in preparation for this, I had some discussion
3061 with some parents back home, and the interesting discussion
3062 is I had several friends who have daughters playing youth
3063 soccer, and they have--they--a number of them reported an
3064 increase in the number of concussions suffered by young
3065 ladies playing youth soccer. You know, we seem in the news
3066 to always associate it with NFL, and helmet-to-helmet
3067 contact, and concussions and things that we see on the field
3068 of play, but it is--it appears in every--everything we do in
3069 life, every sporting event, there is that danger and that
3070 risk. That is why, I think, what you are doing with the
3071 Think First Alabama, Dr. Johnston, is--the preventive part of
3072 it is how do we educate our players and coaches, parents, and
3073 perhaps the--using the teammate approach, it may be--the
3074 safest thing may be to have the backup position player be the
3075 one to report for the first teamer when they need to come
3076 out, you know, that might get them off the field. But thank
3077 each of you for your work.
3078 And, Dr. Johnston, educate just a little bit on what is

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3079 a subconcussive impact? What does that mean, and how
3080 important is that when addressing concussion diagnoses, and
3081 should subconcussive impacts affect rules of game and play,
3082 and if so, how?
3083 Mr. {Johnston.} Yeah, so I think that the definition of
3084 a subconcussive impact would be all those other, the 99.9
3085 percent of impacts that happen that don't result in a
3086 concussion, meaning a diagnosed concussion. And as has been
3087 pointed out previously, the rub with concussion is the
3088 diagnosis part. If you look at some of our historical
3089 studies about rates of concussion in different sports, it is
3090 very variable, and a lot of that has to do with who is
3091 diagnosing it and, you know the, you know, males versus
3092 females, whether or not men are more likely to report or less
3093 likely to report symptoms. But I think that a subconcussive
3094 impact is all those other impacts that we have found more and
3095 more information with the important imaging that has been
3096 done in Boston and other places, that even these
3097 subconcussive impacts have results in terms of anatomic, you
3098 now, structural changes in the brain over time.
3099 So I think that the subconcussive impact needs to be

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3100 addressed in terms of lessening the overall cumulative impact
3101 load that every player has. Football is kind of the most
3102 obvious thing--
3103 Mr. {Harper.} Right.
3104 Mr. {Johnston.} --in terms of player practices and how
3105 many player--how many practices a week children should be
3106 able to do hitting and whatnot, but I think that has
3107 applications for all sports.
3108 Mr. {Harper.} Okay, thank you.
3109 And, Dr. Molfese, if I could ask you a question. Just
3110 for clarification first, if I could ask, the 77 percent of
3111 military that--
3112 Mr. {Molfese.} Yes.
3113 Mr. {Harper.} --that figure, is that how many of TBI
3114 cases have suffered concussions, or is that 77 percent of all
3115 military? I wasn't quite--
3116 Mr. {Molfese.} That is of traumatic brain injuries--
3117 Mr. {Harper.} Okay.
3118 Mr. {Molfese.} --75--77 percent are concussions, mild
3119 TBIs.
3120 Mr. {Harper.} I gotcha, okay. And can you tell us more

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3121 about the sideline imaging work that you are doing? You
3122 know, is this practical, is this something that we can expect
3123 to see rolled out to sidelines across America to diagnose our
3124 athletes, and perhaps how about onto battlefields to diagnose
3125 our warriors?
3126 Mr. {Molfese.} I think it is very possible. We have
3127 actually already published a paper just this last year in
3128 2013, where we took one of our EEG systems and recorded on
3129 the sideline of a field. The biggest challenge for us in
3130 making it practical is to get the processing time down. At
3131 this point, it takes us an hour. If we can get it down to 5
3132 minutes, then I think we can sell it to the coaches, because
3133 they are the ones really that are going to determine.
3134 And I guess at this point, given all the other issues,
3135 the common tests we use right now are like the SCSI 3 and the
3136 impact, which are some neuropsych assessment tools, sort of
3137 questions to the player, and they have to reflect and they
3138 may be a little foggy because of the concussion, but these
3139 tests don't have any predictability or reliability after 2
3140 days post-injury. That is our big problem. It doesn't
3141 predict recovery time, it doesn't predict the severity of the

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injury, and so on. So these biomarkers that we all are talking about are really the critical things that we are hoping are going to be much more reliable, more predictive.

Mr. {Harper.} Thank you very much. And thank each of you for being here.

And I yield back.

Mr. {Terry.} Thank you. And, generally, this would end, but we all have so many questions, we are actually going to do a second round, and plus the bells aren't going to go off for at least another 7 minutes. To--and Jan does have a conflict, and she has given us approval that she is going to leave, but she trusts us to ask legitimate questions.

Ms. {Schakowsky.} But let me just really thank this panel, the previous panel as well, but the intensity now of the scientific research and then its application to the playing field, and actually so many other fields, I really want to thank you for telling us what is going on. And I also did want to thank Ian Heaton for coming here today. I think it is important to have people like Briana and Ian to tell their stories, and give us a face to the importance of this. I want to thank the FTC too for making sure that false

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3163 claims aren't made, but this is so important, so appreciated,
3164 and then we will have to figure out where it leads us, but it
3165 certainly has informed us. Thank you.
3166 Mr. {Terry.} Yeah. I would agree with every word of
3167 that.
3168 So this is a question to you, Dr. Molfese, and Dr.
3169 Shenton, and it dovetails into what the gentleman from
3170 Mississippi was talking about as well, but are the symptoms
3171 of a concussion or TBI uniform enough so that it is possible
3172 for early detection or developing a checklist for a coach or
3173 a parent to be used, you know, by non-medical? We will start
3174 with you, Dr. Shenton.
3175 Ms. {Shenton.} No. The symptoms--
3176 Mr. {Terry.} Well, that was easy.
3177 Ms. {Shenton.} The symptoms overlap with depression and
3178 PTSD, and that has been a real problem. In fact, there was a
3179 paper published in The New York--in The New England Journal
3180 of Medicine that said when you remove the effects of
3181 depression, and you remove the effects of PTSD, mild TBI
3182 doesn't exist. And that is a real disservice, and it used to
3183 be that people would claim that when people came in

complaining that they still had symptoms from hitting their head, since there was no evidence from conventional MRI or conventional CT, they said go see a psychiatrist. So it was really not appropriate at all, because there is at least a small minority of people who have mild concussion who go on to have symptoms, and they can go on for months, for years, and then they can clear up. So that is separate even from CTE.

What you need is radiological evidence for diagnosis, the same way you would want to know values of a blood test for cholesterol or a broken leg. And I think we are moving in that direction, and that is what we need is the hard evidence--

Mr. {Terry.} Okay.

Ms. {Shenton.} --because the symptoms are too nonspecific.

Mr. {Terry.} All right. Dr. Molfese?

Mr. {Molfese.} There are actually studies published looking at the number of symptoms, and a wide variety of a number of symptoms people will report. There is no data that indicates whether somebody reports lots of symptoms versus a

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few symptoms, that that has any relation to how long they are going to recover, how serious the injury is, how great the impairment is--

Mr. {Terry.} Right.

Mr. {Molfese.} --unfortunately.

Mr. {Terry.} So can we get to the point where a seventh grade coach--the seventh grader takes a big hit, that there is a checklist, per se, that the coach could use to determine if that kid should go back into the game?

Mr. {Molfese.} Well, I think in general, there certainly are guidelines out by the CDC and others that list concussion symptoms. And so I think the general bias at this point is if the individual reports any of these symptoms, that they should be pulled, because we do know that if--there is data to indicate that if you do have a concussion, and then you start playing again before the symptoms resolve, the likelihood of even death is much greater.

Ms. {Shenton.} Um-hum.

Mr. {Terry.} All right.

Mr. {Molfese.} Not to mention further significant concussion that is going to take longer to recover.

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Mr. {Terry.} All right. So this one is for Dr. Johnston and Dr. Gioia.

One of the debates that is occurring in the State of Nebraska right now is you have a child, all right, a high school student or--that suffers a concussion during a game. So it has been diagnosed. What do you do next? Right now, the thought is you keep him home or her home, dark, no electronics. That is kind of the norm. There is a discussion whether that is appropriate or not, or to what length.

What is--what do you know? What would you recommend?

Mr. {Johnston.} Well, I will tell you about how we handle things in Alabama, and I think a lot of what we do is based on the CDC Guidelines and the Zurich Guidelines, which is that once a--an athlete is diagnosed, they are removed from the field of play, and then they are evaluated. We use the SCAT, which is the sports concussion assessment tool, which is a sideline-based assessment. We also use it afterwards as well. It has kind of a quick mini inventory of neurological exam and neurocognitive function. And then when children have symptoms that persist, you know, obviously,

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3247 they don't return to any sort of play or even an escalation
3248 of activity until their symptoms have completely resolved.
3249 And then those children who have persistent symptoms lasting
3250 beyond the 1 to 2 weeks are then referred to
3251 neuropsychologists, like Dr. Gioia, and a traumatic brain
3252 injury program.
3253 So I guess I would defer to you for--
3254 Mr. {Terry.} What would you recommend--
3255 Mr. {Gioia.} Yeah.
3256 Mr. {Terry.} --Dr. Gioia?
3257 Mr. {Gioia.} Yeah. This is a big question at this
3258 point. This really comes to what is the best treatment for
3259 this injury. And let me just say, the field is moving on
3260 this one, and the recommendations that we make, and I have
3261 written several recent papers on this, is that in that acute
3262 stage of symptoms, probably the first few days, maybe for
3263 some a little bit longer if there is a more severe number of
3264 symptoms, is that they really reduce their activity,
3265 cognitive and physical. But what you want to be doing though
3266 is start to increase that activity over time. So we don't
3267 black box kids until they are asymptomatic. That has a lot

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of likely negative effects on kids, obviously, being removed.

So what we do is we initially shut them down, restrict them, then we gradually start to bring them back into school and into physical activity, but that has to be individualized based, again, on the severity of that symptom presentation. And that is where we are right now. We need a whole lot of research to really help validate that.

Mr. {Terry.} Thank you. And, Mr. Lance?

Mr. {Lance.} No questions.

Mr. {Terry.} Gentleman from Missouri gets to ask another question.

Mr. {Harper.} Mississippi.

Mr. {Terry.} Mississippi.

Mr. {Harper.} No, I was just looking down.

Mr. {Terry.} Yeah, I thought you were Billy Long.

Mr. {Harper.} That hurt. That hurt. Thank you, Mr. Chairman.

And a couple of questions that I would have. One would be, if we are looking at this--Dr. Gay, if I may ask a question?

Mr. {Gay.} Yes, sir.

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Mr. {Harper.} In your testimony, you state that football players at the elite levels are shedding equipment to increase speed and mobility.

Mr. {Gay.} Yes.

Mr. {Harper.} The decision of which helmet to wear is their own, and that player often chooses a helmet's looks, shape, feel, perhaps, over its collision cushioning ability or safety features.

Do some positions require different levels of collision cushioning, and if so, would you recommend a special helmet for specific positions that would meet all current safety standards?

Mr. {Gay.} Yeah, the--that is a great question.

Currently, there are no position-specific helmets being made. I think the helmet manufacturers try to do the best they can for everybody. I would say that, not to belabor the point, but I think for linemen, where you typically get no severe hits but a lot of subconcussive blows, that horse collar is crucial. I wouldn't recommend that a wideout wear a horse collar. That--that is--that would really affect the quality of the play.

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It is an interesting point because, certainly, some players might tend--and this is why I am an advocate for the Hits System. It will give us much more detailed information about which positions get hit where. One could envision, if we have a large database, then improving helmet design to react to the information we got from that--those kinds of--that kind of information.

Mr. {Harper.} Okay. Dr. Graham, if I could ask you. How much money has been spent on sports concussion research, and where is most of the funding coming for for that research?

Mr. {Graham.} That, unfortunately, was not an issue that our committee looked at, nor would we have had the resources to, you know, to pull it out.

Mr. {Harper.} Sure.

Mr. {Graham.} But, you know, clearly, you can identify some research that is being done in the federal sector that applies to this, but the private research that may be done by the sports leagues, by the manufacturers of equipment themselves, I don't know any good way to quantify that for you.

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Mr. {Harper.} Gotcha. All right. Well, look, I appreciate everybody being here, and it is a very important issue. We love our children going through sports, we love to watch it, and we don't want anybody being hurt that shouldn't be hurt. And so, hopefully, this increased focus will lead to better research, better safety equipment, detection, and, of course, prevention.

So thank you very much. Thank you, Mr. Chairman. I yield back.

Mr. {Terry.} Thank you, the gentleman from Mississippi.

Mr. {Harper.} Thank you.

Mr. {Terry.} And I just want to thank--this was truly an all-star panel of medical experts and physics. And much appreciated, Ian. Thank you.

And so that does conclude our hearing for today.

Now, for our witnesses, we, whether we showed up or not, have the right to send you a question, and it is called a written question. We have about 14 days to write those and submit them to you, and I appreciate a couple of weeks, not over, you don't have to do it right away, but at least if you can get them back to us, if there are any, within about 14

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days.

And I just, again, want to thank you for coming out here and providing some very, very valuable testimony for us.

And we are adjourned.

[Whereupon, at 1:29 p.m., the subcommittee was adjourned.]