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CONCUSSIONS IN YOUTH SPORTS:

EVALUATING PREVENTION AND RESEARCH

FRIDAY, MAY 13, 2016

House of Representatives,

Subcommittee on Oversight and Investigations,

Committee on Energy and Commerce,

Washington, D.C.

The subcommittee met, pursuant to call, at 9:34 a.m., in Room 2123, Rayburn House Office Building, Hon. Tim Murphy [chairman of the subcommittee] presiding.

Present: Representatives Murphy, McKinley, Burgess, Griffith, Bucshon, Hudson, Collins, Cramer, DeGette, Schakowsky, Castor, Tonko, Yarmuth, Clarke, Green, Welch, and Pallone (ex officio).

This is a preliminary, unedited transcript. The statements within may be inaccurate, incomplete, or misattributed to the speaker. A link to the final, official transcript will be posted on the Committee's website as soon as it is available.

Staff Present: Leighton Brown, Deputy Press Secretary; Rebecca Card, Assistant Press Secretary; Jay Gulshen, Staff Assistant; Kelsey Guyselman, Counsel, Telecom; Brittany Havens, Oversight Associate, Oversight and Investigations; Charles Ingebretson, Oversight and Investigations; John Ohly, Professional Staff Member, Oversight and Investigations; Chris Santini, Policy Coordinator, Oversight and Investigations; Gregory Watson, Legislative Clerk, Communications and Technology; Jeff Carroll, Minority Staff Director; Ryan Gottschall, Minority GAO Detailee; Tiffany Guarascio, Minority Deputy Staff Director and Chief Health Advisor; Chris Knauer, Minority Oversight Staff Director; Una Lee, Minority Chief Oversight Counsel; Elizabeth Letter, Minority Professional Staff Member; Matt Schumacher, Press Assistant; and Andrew Souvall, Minority Director of Communications, Outreach and Member Services.

Mr. Murphy. Good morning and welcome to the Oversight and Investigations hearing. We are here today to continue the committee's ongoing examination of concussions. This hearing follows an initial roundtable we had in March where we had a constructive dialogue with leading experts in the field about how to address the challenge of concussions.

Today's hearing will focus on youth sports, specifically the areas of prevention and research.

While there's always some risk of injury participating in sports, particularly at a young age, it is shown to have many benefits. The benefit of youth sports participation include better health through increased activity, improved academic achievement, physical skill building and social development, to name a few.

I might add that the number one health risk of youth is increasing rate epidemic proportion of child obesity. We know that that leads to increased adult risk for diabetes, cardiovascular disease, and all sorts of other problems. So we want children to pay careful attention to their nutrition and be active.

While the estimates suggest that more than 30 million children, ages 5 to 18, participate in organized sports each year, and that despite this being the largest population of athletes, this group is one of the most underserved populations when it comes to the level of awareness, prevention, and research related to head injuries, which

brings us to our task for today.

We want to examine what is being done today to reduce the instance of head injuries to young athletes, what policies and guidelines are currently in place to limit their risk of injury? How are these policies developed? And do they go far enough, what educational and training policies exist for athletes, coaches, and parents? How does the large number of disparate leagues, teams, clubs, and recreational opportunities available to young athletes complicate efforts to improve injury prevention?

While youth sports are not nearly as far along as many professional leagues, progress has made in recent years. All 50 States and the District of Columbia have enacted concussion laws and some youth sports, organizations, and leagues, such as Pop Warner Football, USA Hockey, U.S. Soccer, to name a few, have implemented policies to reduce the amount of head contact in practice and games. Others, such as USA Football, provide education and guidance to enhance training and awareness for coaches, parents, and athletes. A number of these groups are represented here today, and I look forward to hearing how their efforts are affecting their sports.

Based on their experience thus far, are we doing enough, and what does the science tell us? The last question is particularly interesting and important. There's a lot we do not know about concussions generally, but pediatric populations, including youth

sports, are severely underrepresented in assisting research, and therein lays the challenge.

The public wants answers that science is not ready to provide. We have much to learn how concussions and repetitive head injuries affect younger individuals, both immediately as well as later in life. Therefore, I'm interested to learn how youth sports, organizations develop, review, and update their policies, guidance or educational efforts in light of the limited but rapidly evolving research about concussions.

We don't know how traumatic brain injury affects our youth, and it makes that much more challenging to protect them. Adding to the challenge, we currently lack any form of protective injury surveillance, including concussions for athletes younger than high school age. Given the large number of athletes, teams, leagues, and other recreational opportunities, this is a daunting task. But if we do not understand the magnitude of the challenge, how different factors such as age, gender, sports, socioeconomic status, et cetera, influence outcomes, how can we be sure we are making the best decision for our kids?

This morning on our first panel, we are joined by two mothers; Ms. Kelly Jantz and Ms. Karen Zegal, both of whom tragically lost their son as a result of injuries sustained while playing youth sports. Ms. Jantz' son, Jake, was a promising freshman athlete at Grandview High

School in Aurora, Colorado, and is the namesake of Colorado's Jake Snakenberg Youth Concussion Act. While Ms. Zegel's son, Patrick Risha, was a star running back at Elizabeth Forward High School in my district and played football from the moment he could pick up a ball. We greatly appreciate your willingness to share your stories as it reminds us why it is so vital that we continue to examine this issue.

Later on our second panel, we will have Dartmouth's head football coach, Buddy Teevens, and representatives from some of the sports organizations, USA Football, USA Hockey, and U.S. Lacrosse that oversee or provide guidance to U.S. sports leagues. We will also hear from practice life pros to learn more about additional options to keeping athletes safe.

Additionally, we have prominent researchers in the field. They will be able to speak to how we can approve research and surveillance, better monitor injuries, and minimize the risk of injury based upon science.

I appreciate all of our panels for joining us this morning. This is an important issue, and your perspectives are important to advance the public dialogue on these complex injuries.

I also want to thank Ranking Member DeGette for her support in this initiative, and look forward to continuing our efforts together in this endeavor.

So I now recognize the ranking member for 5 minutes to deliver

her own remarks.

Ms. DeGette. Thank you so much, Mr. Chairman, for having this follow-up hearing on our roundtable that we held on concussions and brain trauma earlier this year. I am very pleased that we are looking, first, at youth sports through official hearings, because studies have shown that children and teens are more likely than adults to get a concussion, and they take longer to recover.

Athletes at the professional college levels, they can make their own decisions about undertaking the risks associated with certain sports, but we need to ensure that children and their parents have enough data to make informed decisions about participation in youth contact sports. Part of that discussion needs to be the recognition of how valuable these sports are, both for physical fitness and team building, as you so well stated, Mr. Chairman. But I think we also need to have an open discussion about how to make them safer.

I approach this issue, both as a policymaker and a parent. And as I said in the roundtable, I support evidenced-based policy making and am very encouraged that we are having ongoing research to better understand brain trauma. But at our roundtable, the experts said that they are going to have answers about what the protocol should be in 7 to 10 years. And what I said at that hearing is, as a mom, when I'm deciding if my kid is going to play Pee Wee sports, I can't afford to wait 7 to 10 years. By then, they will be in high school, and so we

need to take whatever evidence that we have right now, and we need to figure out for now what we should tell the parents and what we should tell leagues that they should be doing as the best practices as far as we know right now.

For example, at what age should children start playing tackle football? How many times a week should children be engaging in full contact practices? And when they do begin to play, how do we teach them to tackle safely and to protect their heads and the heads of other players? And how do we ensure that coaches are educated in teaching these skills to young players? I'm sure that we can ask other questions in all youth sports, not just football.

I agree that most, if not all parents, would agree that it is better to err on the side of caution. The worst-case scenario would be that we discover later, that some of these safety measures may have been unnecessary. But as a mom, I always want to have more safety rather than less safety, especially when you're talking about our children's brains.

Now, as we implement changes in sports now, this is not a reason to stop researching our gaps in knowledge. We need to understand the long-term effects of concussive and subconcussive injuries; we need to analyze whether the rule changes being implemented are having the desired effects; we need to study how to prevent brain injury in the first place.

I also am interested from hearing in our witnesses on the second panel about the differences they are seeing in girls and boys sports and how the rates of concussion differ. I know that there have been studies suggesting that women and girls report concussions at higher rates than men and boys in similar sports. I want to know about that disparity, and also if there's any disparity about the actual effects on brains.

Both of our panels contain excellent witnesses, and it's so important to have them today. I'm really proud to welcome two witnesses from Colorado. Kelly Jantz, as you heard, tragically lost her son Jake to second impact syndrome in 2004.

And, Kelly, I'm so proud of you, because what you did is you were instrumental in ensuring that concussions are taken seriously in youth sports, and that parents and coaches have the information they need. As the chairman mentioned, in 2012, Governor Hickenlooper signed the Jake Snakenberg Youth Sports Concussion Act into law in Colorado, and we're really proud that you've taken his legacy to that. We really are.

Dr. Dawn Comstock is on our second panel. She's from the Colorado School of Public Health. And like me, a Colorado native. She's one of the leading experts in sports injury epidemiology. Her database gathers information on injury exposure and incidents among high school athletes. She looks at injury patterns like examining the

correlation between neck strength and concussion risk to inform prevention and mitigation strategies. And so I want to thank you, also, Dr. Comstock, for making youth sports safer.

I want to thank everybody who is here today to help us figure this out. And I also really want to say, we want to see sports succeed. I can't let this hearing go by without congratulating the world champion Denver Broncos, for example, which I have season tickets. And I also want to say, as I said before, one of my great sadnesses is that I was unable to persuade either of my daughters to play ice hockey, and they took up dance instead.

But the point is, all -- every child in this country should be safe. We love sports. We want to see sports succeed, but that means that we have to do our utmost to improve player safety and guarantee that participation in sports doesn't mean that you have long-term health consequences.

So I know, Mr. Chairman, you intend to have more hearings. I think this is the perfect place to start. I want to thank you again, and yield back.

Mr. Murphy. Thank you. Go Steelers.

Of course, right now the Penguins are in the playoffs. We wish them the best, too, and all athletes.

I now am going to recognize -- first of all, I want to say the opening statement of Mr. Upton will be included in the record. He

could not be with us this morning, but we're going to recognize Mr. Hudson for an opening statement.

[The prepared statement of Mr. Upton follows:]

******** COMMITTEE INSERT ********

Mr. Hudson. Thank you, Mr. Chairman. I thank you, Chairman Murphy and Ranking Member DeGette, for your focus on this issue. Even as painful as it is to hear Representative DeGette talk about the Broncos, so I want to represent Charlotte, North Carolina, home of the Carolina Panthers. There's always next year.

I would like to thank the panelists for your important testimony today. Your experiences and expertise help the committee better understand the gravity of concussions in youth sports and what we need to do to prevent concussions and the long-lasting effects for future generations.

Unfortunately, pediatric trauma, which concussions and traumatic brain injury is a part of, is the number-one killer of kids. Pediatric trauma has become a particular focus of mine. I've been fortunate to have the Childress Institute for Pediatric Trauma partner with me in examining what we can do to help our children live long, fulfilling lives. Childress Institute was started by my dear friend, Richard Childress' wife Judy, with the goal of discovering and sharing in the best ways to prevent and treat severe injuries in children. The Childress Institute supports a number of pediatric research programs, including the Concussive Care Fund, which funds initiatives prevent and treat injuries in youth and recreational sports. The promising research being done to prevent and treat trauma not only broadly, but also on specific issues like concussions, takes on particular

importance to me as a father of a 7-month-old baby boy. I'm thankful so much awareness is being brought to this issue by discussions like today.

As one trauma surgeon said to me, it's not a life saved; it's a lifetime saved. And I want to also note that my fellow North Carolina Representative, G.K. Butterfield and I are hosting a pediatric trauma briefing with the Energy and Commerce Committee on Tuesday, May 24th. I would encourage anyone who is interested to please attend, and I look forward to today's discussion.

With that, Mr. Chairman, I yield back.

Mr. Murphy. Is there anybody else on our side who have anything they want to add at this point?

Then I now recognize the ranking member, Mr. Pallone, for 5 minutes.

Mr. Pallone. Thank you, Mr. Chairman.

And I want to thank all of our participants for joining us today. Additionally, I would like to thank the chairman for his commitment to this committee's examination of concussions and brain trauma. Earlier this year, we had an initial roundtable on this issue, and at the time I requested to Chairman Upton that we hold a series of hearings on concussions and sports-related head trauma. I propose that we start with an examination of head impacts in youth sports, and I'm gratified that we are here today to discuss this very topic and look forward to

the additional hearings on this important issue.

Parents across the country are concerned about the risk of concussions, and with good reason. I have my own experience as a parent in dealing with my daughter's concussion and deciphering the medical advice provided. It's challenging as a parent to balance the news stories and the results of the latest research against the value of our children's participation in sports, and I can certainly relate to parents' concerns and their confusion about how to make the right decisions for their children.

And there is compelling research to suggest that the effects of repeated head trauma, even those received during one's youth, can accumulate and cause serious consequences, and these consequences can stem from injuries once considered minor known as subconcussive hits, or repetitive hits to the head. Purdue University Research is led by one of our witnesses today, Dr. Tom Talavage, found significant structural changes to the brains of high school football players, even among those who were not diagnosed with a single concussion. And what is particularly troubling is that these changes persist at even 12 months later, suggesting lasting damage. Many other studies have documented an association between subconcussive hits and changes in brain chemistry, decreased brain functioning, and behavioral changes. A recent study by a group of researchers at Boston University found that exposure to hits, regardless of whether a concussion occurred,

is Associated with a higher likelihood of mood disorders, like depression. Researchers have also repeatedly found evidence of the linkage between head impacts and CTE, a devastating degenerative brain disease.

CTE has been found in former athletes as young as 25 years old and in adults who never played football beyond the high school level. And there remain a number of unanswered questions about what risk factors make individuals more susceptible to these debilitating conditions. We also need to understand what happens in the brain when it's hit, and how many hits trigger these neurological effects. And while there is still research that needs to be done, that should not be an excuse for inaction. What is not in dispute is the association between head trauma from contact sports, such as football, and lasting brain damage in degenerative decisions, such CTE. Even the NFL publicly acknowledged this link at this committee's roundtable back in March.

Some researchers in this field suggest that we should, quote, "wait on the science before making changes to the rules of youth sports." And I respectfully disagree. We cannot ask children and their parents to wait 10, 15, or 20 years for the science to catch up before we take measures to make sports safer. We need to be asking questions right now and implementing the appropriate rule changes.

The science has raised enough red flags about the dangers of

repetitive head trauma that I think it is incumbent upon those who organize and promote youth contact sports to take every effort to make the games as safe as possible. And earlier this month, the subcommittee ranking member, Ms. DeGette, Mr. Green, and Ms. Schakowsky joined me in sending letters to collegiate and youth football leaders. We asked them to explain what rule or policy changes they are considering to address the risks associated with both concussive and subconcussive hits. And I expect that we will have a response by May 25th. And I commend Pop Warner for announcing yesterday that it would ban kickoffs in games starting this fall.

I also look forward to hearing today from other youth sports organizations about what they are doing for their individual sports, and whether additional measures need to be considered.

And last, Mr. Chairman, I want to express my deep thanks to both Kelly Jantz and Karen Zegel for joining us today. I can't even imagine the losses you and your families have experienced.

Thank you for your willingness to share your experiences with this committee. We can learn from you as we pave a path forward to better protect our kids. And thank you, again, to all our witnesses for their contribution and for helping us with our comprehensive review of concussions and head trauma.

I hope we can all continue to work together to find the best ways to address this significant public health issue to protect our

children. I yield back.

Mr. Murphy. The gentleman yields back. I ask unanimous consent that members' opening statements be introduced in the record.

And, without objection, the documents will be entered into the record.

[The information follows:]

******** COMMITTEE INSERT ********

Mr. Murphy. Now, I would like to introduce the witnesses for our first panel for today's hearing. We are going to try to get through their testimony before votes.

The first witness on today's panel is Ms. Kelly Jantz. Ms. Jantz, the mother of Jake Snakenberg. Jake passed away after suffering from second impact syndrome. Following her son's death, Ms. Jantz has become a dedicated activist, committed to raising awareness of concussions in youth sports. We thank Ms. Jantz for preparing her testimony and look forward to her insights on these matters.

I also want to welcome Ms. Karen Zegel. Ms. Zegel is the president of the Patrick Risha CTE Awareness Foundation. The Foundation was created in memory of her son, Patrick Risha, who I enjoyed reading about during his football career. He passed away after suffering from CTE.

Thank you, Ms. Zegel, for your testimony today. We look forward to your comments.

So you two are aware that this committee is holding the investigative hearing and when doing so has the practice of taking testimony under oath.

Do either of you object to testifying under oath? Seeing no objections, the chair then advises you that under the rules of the House and rules of the committee, you are entitled to be advised by counsel.

Do either of you desire to be advised by counsel during your

testimony today?

Neither one does. In that case, would you mind, please, rising and raise your right hand, and I'll swear you in.

[Witnesses sworn.]

Mr. Murphy. Both answered affirmatively, and you are now under oath and subject to the penalties set forth in Title 18, section 1001 of the United States Code.

I will ask you each to give a 5 minute summary of your written statement. There will be light in front of you which will be red when that time is up.

STATEMENTS OF KELLI JANTZ, MOTHER OF JAKE SNAKENBERG AND CONCUSSION ADVOCATE; AND KAREN KINZLE ZEGEL, MOTHER OF PATRICK RISHA AND CHRONIC TRAUMATIC ENCEPHALOPATHY (CTE) ADVOCATE

STATEMENT OF KELLI JANTZ

Mr. Murphy. You can begin, Ms. Jantz. Turn the microphone on and bring it very close to you if you don't mind. Thank you.

Ms. Jantz. Chairman Murphy, and Ranking Member DeGette, and members of the subcommittee, good morning and thank you for this opportunity to provide testimony on the important issue regarding youth and youth-related sports concussions.

I commend you and your colleagues on the work of this committee to shed light on this critical issue. My name is Kelli Jantz, and I'm the mom to Jake Snakenberg. My son was your typical all-American boy, devoted to sports, his friends, and our family. Jake was often referred to as our social butterfly in our family. He had a big heart and genuinely cared for those in his life. He had a joy about him that others could not resist. His big brother summed it up best when he said Jake drank up life like it was pouring from a fire hose. He gave 110 percent in everything, especially sports.

On September 18th, in 2004, Jake got up at 6:15 in the morning

in anticipation of his freshman football game. He loved football and all it offered; the physical challenge, the spirit of competition, and probably most of all, the friendships that were involved. He was particularly excited about playing in this game, because he had been held out of a few practices because the week prior, he had suffered an injury where his arms and hands went numb and tingly. What he described to us sounded like maybe he had tweaked his neck or strained his neck. He hadn't lost consciousness; he didn't see stars. You wouldn't have associated it with a major type of injury. He didn't report to his dad or me and any headaches during the week, though his friends had said that after that injury, he had complained of some headaches. Regardless of that, he was able to return to practices and meet the required number of practices to play on the game day.

In warmups on the 18th, Jake took a really hard hit that really appeared to shake him. He noticed me looking on and waved me off to let me know he was okay. When the game began and he lined up for a play, right before the snap, Jake stumbled forward. A whistle was blown, and they called a penalty, and flag was thrown. And Jake got up and started to come to the sideline, and then stumbled and went down again, and he never got back up again. He was unconscious, and 9/11 was called immediately, and a life flight was dispatched to the football field. Jake was airlifted to Swedish Medical Center where a neurosurgeon advised us that Jake had could suffered a head injury,

and steps were being taken to decrease the swelling in his brain. He told us that Jake may never play football again, and would likely have a long recovery. But he followed that statement with, if Jake survives this injury. Tragically, Jake didn't survive. It was determined that Jake had suffered second-impact syndrome, a condition leading to rapid swelling of the brain from more than one concussion. It's a phenomenon unique to young brains.

It was likely that Jake had suffered a concussion the previous week. Subsequent hits during practice and warmups, though not associated with the concussion, had a compounding effect and continued to further injury his already compromised brain.

Since Jake's death, I have made it my mission to continue to raise awareness of the consequences of concussion in youth sports. Following Jake's death, Dr. Karen McAvoy developed the REAP Project, which was adopted by a Rocky Mountain hospital for children and is made available to the Colorado Department of Education. This program deals with all youth concussions, regardless of the cause, meaning not just sports-related concussions, as any concussion can directly impact a student's learning ability.

I've had the opportunity to support REAP Concussion Management Program, which is being adopted by other States through helping distribute the REAP manuals funded by the Jake Snakenberg Memorial Fund.

Looking at the wealth of research on the consequences of youth concussion and the rapidly evolving advances in concussion management, we would be remiss and, actually, it would be irresponsible not to take every possible opportunity to develop measures to protect our youth from the devastating disabilities and potential death resulting from these types of injuries.

To help -- excuse me. I think, actually, in closing, these children are our future, and it's our responsibility as parents and coaches, teachers, medical professionals, policymakers, and the community as a whole to make sure we do all we can to support the necessary culture change to make youth sports as safe as possible, and protect our children as well as to provide appropriate treatment and assistance should a concussion occur.

I want to thank you, again, for addressing this critical issue and allowing me to participate in the hearing today.

Mr. Murphy. Thank you.

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[The prepared statement of Ms. Jantz follows:]

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Mr. Murphy. Ms. Zegel, you can go for 5 minutes. Thank you.

STATEMENT OF KAREN KINZLE ZEGEL

Ms. Zegel. Chairman Murphy, Ranking Member DeGette, and members of the committee, thank you so much for inviting me to speak today. My son, Patrick Risha, was a hometown hero in high school football. I'm going to cry.

He grew up in an area that measured the worth of a man by his prowess and heart on the football field. He started just south of Pittsburgh, and with the Elizabeth Forward Youth Leagues when he was 10-years-old. He was not gifted with size or speed, but nonetheless, worked hard to become a great player and through that, achieved his dream to go to an Ivy League school. It is that work ethic and perseverance in a collision sport that ultimately killed him.

Patrick took his own life at the age of 32, but actually, we have come to know CTE took his life. Patrick never played in the NFL. Patrick was like millions of children before and after him that just played for fun and success in life. But throughout high school, prep school, and Dartmouth College, our sweet, tough, young running back received enough subconcussive blows to his head to essentially seal his fate. When he died, a newscaster friend of the family suggested he might have CTE. I had never heard of CTE before. I've had heard

about NFL players having brain injuries and concussions, but I never dreamed it could affect a player at the college level.

When Patrick's autopsy revealed he had widespread CTE, I was in shock and horror. How many other players like Patrick are there out there? How many other families are dealing with a loved one gradually becoming unwired, with no clue what is happening? Not every grieving family has a newscaster friend saying the words CTE.

For the sake of American families, this has to change. And we are grateful this committee is conducting this hearing to learn more about the disease, and the impact on families and on our society.

Personally, I worried about Patrick becoming paralyzed, but I thought the chances were extremely small, and I thought he had so much to gain from playing.

If I had known the repeated tackles my son endured were slowly killing him, I would have stopped it. No family wants their child to suffer a disease that causes him to lose his mind slowly, and with such anxiety and loneliness. Yet, every day, parents are signing their kids up for youth collision sports. These parents don't understand the horror they may face with their child. Parents need to be told the truth.

The human brain is much more fragile than we ever imagined. The brain doesn't heal the way skin and bones do. Traumas could be very well permanent. For thousands of years, men have fought in arenas for

sports and entertainment. Somehow we seem to have evolved to a point where we're now willing to put children into arenas to tackle each other for sport. We put them in the equivalent of cheap Halloween costumes to emulate their NFL heroes. We ask them to be tough little warriors. That's what our family did, and we were so proud when Patrick carried his team to victory.

Sadly, we lost an amazing young man before he ever had the chance to live his life, and gifted and promising young children like Patrick all over this land are winning battles on the sports field, but sadly losing their chances for a happy, healthy, productive future.

Patrick's tragic end was not an isolated incident. Parents need to know that one in three players may develop CTE. Soldiers coming home and ex-amateur collision athletes are being diagnosed with PTSD, ADHD, anxiety, depression, drug addictions, anger issues, et cetera, when, in fact, they may have CTE.

When I see a guy on TV hitting his wife, shooting his friend, or going on a high-speed car chase, I wonder if maybe he played one too many football games. People need to know that this invisible disease is more common than we know, that it can develop in youth, high school, and college levels of collision sports. Families need to know what the causes and symptoms are, and how to address the disease.

This has been hidden in plain sight for much too long. It was this realization that prompted us to form the Patrick Risha CTE

Awareness Foundation and the Web site, stopCTE.org. We also created a brochure, Flag Until 14 to help parents understand the key issues of CTE.

Heading the ball has recently been eliminated from youth soccer. Checking in hockey has been eliminated in youth leagues. Yet, over 2 million children are still putting their precious brains at risk in tackle football. The urgency of this problem is beyond measure. I wish we would have known the truth 25 years ago.

There are those out there who would prefer parents didn't know about CTE. They will obfuscate the issue with unreasoned arguments. We've heard a few, like you can get a concussion riding a bike, or you're turning our warriors into pansies, or do you want them to sit and play video games for the rest of their lives? When you have lost your son to CTE and you understand how it is caused and how prevalent it is, these arguments are hurtful and, in my opinion, keep children at risk.

We see CTE as a human tragedy of immense proportions, and we need the help of everyone in this room and beyond. We all now have the duty to save children and families. CTE is 100 percent preventable. We need to remove repetitive head trauma from youth sports. To do anything else is to be complicit to the problem, knowing more families will suffer the pain we personally endure every day.

Thank you very much.

[The prepared statement of Ms. Zegel follows:]

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******** INSERT 1-2 ********

Mr. Murphy. I thank both for that moving testimony. I think I'm just going to ask you one question. And that is, you mentioned that Patrick began playing football at age 10 and continued on. Do you know if his coaches, anybody working with the teams, had any specialized training to recognize, or be aware of concussions and injuries and discussed with his teammates? Do you know if there's any of that training?

Ms. Zegel. At that time, I knew most of the coaches personally, and I would have to guess no. I mean, we're going back a ways before people starting talk about concussion.

Mr. Murphy. Even on the collegiate level, too? Even on the college level, too?

Ms. Zegel. At the college level, as a parent, I was never informed of anything like that.

Mr. Murphy. Okay.

Ms. Zegel. I mean, that would have been nice to know then, but, no.

Mr. Murphy. Ms. Jantz, can you answer that, too? Any training you thought the youth coaches had to recognize, be aware of anything with concussions or head injuries?

Ms. Jantz. Not back in 2004 when Jake experienced this. Even -- I mean, Jake's stepfather and myself were both medical professionals, and while we understand, you know, obviously, hitting

your head is a bad thing, we certainly didn't have the background that we have now where you would have the opportunity to truly, you know, step back and look at it. Perhaps he would have been pulled and not played the next week. So I think that in those times, we did not have that, and now we have an opportunity to make sure that coaches and the people who are involved with our kids have all that information.

Mr. Murphy. Thank you.

Ms. DeGette.

Ms. DeGette. Thank you. Just following up on the chairman's questioning.

Ms. Jantz, I've been given this brochure. I think probably your Foundation was involved in helping put this together. Is that right? And it's called, REAP, Remove/Reduce, Educate, Adjust/Accommodate Pace by the Center for Concussion at the Rocky Mountain Hospital for Children. And it really goes through a lot of information for educators and parents.

Ms. Jantz. Yes.

Ms. DeGette. It's a wonderful piece. I'm wondering, is this distributed? What do folks do with this?

Ms. Jantz. Well, we have a used that. It is distributed and available. We've made it available to school districts, to various groups, actually, I like to say anybody who I can get to listen, I will be happy to give that to. And it's a comprehensive, and it's a, you

know, way of managing concussions, and it's community-based. And it's got a section for parents; and it's got a section for medical professionals, and it has a section for the students and teachers. So everybody has a different piece in this.

We're not with our kids 24 hours a day.

Ms. DeGette. Right. And, Ms. Zegel, you also have formed a foundation, an advocacy foundation. And I'm assuming that you've also been working to get information like this out to parents, educators, coaches?

Ms. Zegel. Right. Our current goal is -- we're working with medical examiners and coroners on one end, trying to get them to recognize the disease if they are presented with a drug overdose, or suicide, or something like that. Then on the other end, we're trying to get -- push for parents to have informed decisions that flag football is fun and -- and it could be a lot of very famous football players never played until high school.

Ms. DeGette. And you've got your brochure right next to you?

Ms. Zegel. Yeah, my daughter made that up.

Ms. DeGette. Your daughter made that? That's wonderful. Mr. Chairman, thank you so much.

Ms. Zegel. Thank you.

Ms. DeGette. And I would ask unanimous consent to put both of these brochures in.

Mr. Murphy. Without objection, that's a great idea. Thank you.

[The information follows:]

******** COMMITTEE INSERT ********

Ms. Zegel. Thank you.

Ms. DeGette. Thank you for coming.

Mr. Murphy. Without objection. We want to thank our first panel. They have just called votes, so what we are going to do, we are going to take a break. Vote. I think we have three votes. We will do that as quickly as congressionally possible. We will come back. This will give the panel and opportunity to sit down and be ready. As soon as that last vote, I ask members to be back here immediately. We'll get going, because our goal is to finish this hearing before the second set of votes. So we will work on that.

Thank you, we will be recessed until votes are ended. Thank you.

[Recess.]

RPTR HUMISTON

EDTR ZAMORA

[10:46 a.m.]

Mr. Murphy. Could our witnesses please take their seats?

All right. Thank you. We're going to get moving right away because we know we've got another vote series and we'd like to all give you the opportunity to testify. So I'd like to introduce the witnesses of our second panel for today's hearing.

We have Mr. Eugene Buddy Teevens to lead up our second panel. He has been head football coach at Dartmouth College since 2004, where he has implemented a policy of noncontact practices. I believe, Coach, you also were a teammate of the famous coach from Harvard University named Tim Murphy. He's my twin.

Next, we'd like to welcome Dr. Andrew Gregory. Dr. Gregory is here as a member of the Medical Advisory Committee for USA Football.

Mr. Kevin Margarucci -- did I say that correctly? -- of USA Hockey. Mr. Margarucci has 20 yours of experience as a certified athletic trainer and now serves as the manager of player safety at USA Hockey.

Next, we welcome Mr. Steve Stenersen. Mr. Stenersen has served as executive director and now president and CEO of USA Lacrosse since 1998.

Next, we welcome Mr. Terry O'Neil. Mr. O'Neil is the founder and CEO of Practice Like Pros, whose mission is to educate high school coaches on alternative practice regiments.

Next, Dr. Dawn Comstock, who is an associate professor at Colorado School of Public Health and one of the Nation's leading experts on high school injury surveillance.

And finally, I'd like to introduce Dr. Thomas Talavage.

Mr. Talavage. Close enough.

Mr. Murphy. Is that close enough? What is the correct? Say it.

Mr. Talavage. Talavage.

Mr. Murphy. Talavage. I'll get it right.

Professor at the Weldon School of Biomedical Engineering at Purdue University. Dr. Talavage is also the founding codirector of Purdue's MRI facility and a part of the Purdue Neurotrauma Group.

Thank you to all the witnesses for being here today. I look forward to having a productive discussion.

You're all aware that the committee is holding an investigative hearing and when doing so has the practice of taking testimony under oath. Do you have any objections to testifying under oath?

Seeing no objections, the chair then advises you that under the rules of the House and rules of the committee, you're entitled to be advised by counsel. Do any of you desire to be advised by counsel during your testimony today?

And seeing no comments on that, then in that case, would you all please rise, raise your right hand, and I'll swear you in.

[Witnesses sworn.]

Mr. Murphy. Thank you. All witnesses have answered in the affirmative. And so now you're all under oath and subject to the penalties set forth in Title 18, Section 1001 of the United States Code.

I'm going to ask you all to give a 5-minute summary of you're written statement. Please pay attention to the lights in front of you because we are on tight time for that.

Mr. Teevens, you're now recognized for 5 minutes. Coach, go ahead. Make sure your microphone is turned on and you pull that mike as close to you as possible, almost touching it. Thank you.

STATEMENTS OF BUDDY TEEVENS, HEAD FOOTBALL COACH, DARTMOUTH COLLEGE; ANDREW GREGORY, M.D., MEMBER OF MEDICAL ADVISORY COMMITTEE, USA FOOTBALL, AND PEDIATRIC SPORTS MEDICINE, VANDERBILT UNIVERSITY MEDICAL CENTER; KEVIN MARGARUCCI, MANAGER, PLAYER SAFETY, USA HOCKEY; STEVE STENERSEN, PRESIDENT AND CEO, US LACROSSE; TERRY O'NEIL, FOUNDER, PRACTICE LIKE PROS; DAWN COMSTOCK, ASSOCIATE PROFESSOR, DEPARTMENT OF EPIDEMIOLOGY, COLORADO SCHOOL OF PUBLIC HEALTH; AND THOMAS TALAVAGE, PROFESSOR, SCHOOL OF ELECTRICAL AND COMPUTER ENGINEERING, WELDON SCHOOL OF BIOMEDICAL ENGINEERING, PURDUE UNIVERSITY

STATEMENT OF BUDDY TEEVENS

Mr. Teevens. Thank you, Mr. Chairman. I'd like to thank Kelli and Karen for their testimony as well. I think it underscores the importance of the committee.

Voice. Can you bring the mike closer?

Mr. Teevens. Closer?

As I mentioned, I'd like to thank Karen and Kelli for their stories, and I think it underscores the importance of the committee and your task.

My name is Buddy Teevens. I've been a college football coach for 35 years. I've coached in the Ivy League, the SEC, the PAC-10, the

Big Ten, Conference USA, and the Yankee Conference. During the course of summers, I work with all age groups, peewees right through high school-age kids.

And football is a very special game. The life lessons with all the team sports, things people learn, the friendships they make, the experiences they have. I love the game of football, but I love my players more.

And looking at concussive head injury through the course of time, I was -- 5 years ago, I made the decision that we were going to eliminate tackling from our practices, in-season practices, spring practices, pre-season practices. And the guarantee I make to parents is their son comes to Dartmouth, they will never tackle or be tackled by another Dartmouth football player for their 4 years.

Now, making that decision, I wasn't 100 percent sure I was doing the right thing. I worried about my players. Was I putting them at a competitive disadvantage? Was I preparing them fully for games? It was not a popular decision amongst my staff. It went from complete ridicule, to disbelief, to condemnation in some parties.

I was convinced, however, I did a lot of research on it, that the way that we teach tackling was not the way that we tackle in games. And what I looked at, at length, was our defensive tape and how we actually tackled. And then we tried to replicate that tackling practice that we saw in games against pads, fitting them against other

players without going to live concept, tackling sleds. We developed at Dartmouth, with the Thayer School of Engineering, a mobile tackling device, which has been quite beneficial in terms of actually replicating a moving target.

With that, we actually tackle, I would say, more than anybody else in the country. Each of my players annually, 800 -- or 500 to 800 tackles per year, but never one against another human being. The only time our guys tackle are 10 games per year during the course of the season.

What's happened is our injury reduction has been phenomenal. Missed tackles, which we chart aggressively, dropped 50 percent the first year that we went to this nontackling process. And people ask me why, and it's, quite simply, the skill of tackling, we practice more than we did when we were tackling live. It's a shame, but in our sport, the most injurious act, tackling, is the one that's practiced the least because of the fear of the risk of injury.

So by putting our guys in a position to tackle with regularity, and this was unanticipated, we've become much more proficient at executing the act of tackling. You hear an awful lot about rugby tackling. I think football is a different sport. Shoulder tackling is a thing that we do preach. We don't talk about the head other than say take it completely out of contact points. And it's like riding a bike. You don't just throw someone on a bike and let them start to

figure it out. There's a process, training wheels and so on, support from parents. I do the same thing with our football players.

A lot of folks ask me, well, can you do that at different levels? Without question. People look at the NFL, and I use them as a model. They hit less than anybody in the world and their concussive results in practice are probably some of the best. We've gone from a football team that struggled at times to we're a championship team. We've won 17 games in the last 2 years, Ivy championship this year, and we had zero defensive concussive head injuries this season. And it's all a process of how you present to your players. The buy-in has been appreciable. It's been wonderful from a recruiting standpoint.

Can other people use it? And I speak nationally with this. Prep school, Pop Warner school, youth football, they'll say, well, how do you teach someone that's never tackled a human being? Well, it's a crawl, walk, run. Start with pads and progress forward. And I fully believe at any level that the approach we take -- and I'd like to kick on a video right now, if I could. I think I've got time. And this will demonstrate more accurately than I could with words how we actually practice tackling.

[Video shown.]

Mr. Teevens. We tackle literally every day that we practice and we put people in a position to execute the things that they would do on game day. A tackle's different from position to position. A

defensive lineman will not execute the same skill set that a defensive back will. And we've actually broken it down to levels of tackling, planes of tackling, and then repetitions that we have. The end result is we play at a very high level. We've been very, very successful and we've been very, very safe.

[The prepared statement of Mr. Teevens follows:]

******** INSERT 2-1 ********

Mr. Murphy. Thank you very much.

I now recognize Dr. Gregory for 5 minutes.

STATEMENT OF ANDREW GREGORY, M.D.

Dr. Gregory. Chairman Murphy and members of the subcommittee, my name is Dr. Andrew Gregory. I'm a pediatric sports medicine specialist at Vanderbilt University Medical Center. I'm a fellow of both the American Academy of Pediatrics and the American College of Sports Medicine, as well as a member of USA Football's Medical Advisory Committee. I am not a USA Football employee, nor do I receive any compensation for being on the committee. I'm also a parent of an 18-year-old daughter who's a soccer player. Thank you for the invitation to testify on USA Football's behalf.

In short, USA Football is the sport's national governing body and a member of the U.S. Olympic Committee. It is an independent nonprofit organization. We create resources and direct programs establishing standards using the best available science, educating coaches, parents, and athletes. Our programs are endorsed by more than 40 organizations spanning medicine and sport, including the American College of Sports Medicine, the National Athletic Trainers' Association, and the American Medical Society for Sports Medicine.

I'd like to highlight three elements of how USA Football addresses

player safety. The first of that is education. We train more youth and high school football coaches combined than any other organization in the U.S. Education is the core of our Heads Up Football program, which we're going to highlight. This is delivered through online courses and in-person clinics. There are six educational components of this program, which you can see listed on the slide: Concussion recognition/response, heat preparedness and hydration, sudden cardiac arrest, proper equipment fitting, and then tackling and blocking techniques.

More than 6,300 youth leagues and 1,100 high schools nationwide representing about a million young athletes enrolled in Heads Up Football in 2015.

The second element is research. USA Football advances player safety by commissioning independent research. According to a 2014 youth football study encompassing more than 2,000 players, leagues that participated in the Heads Up Football program showed a 76 percent reduction in all injuries during practice, 38 percent reduction in all injuries during games, 34 percent fewer concussions during practice, and 29 percent decline in concussions during games.

A subset of this group showed that players and leagues enrolled in Heads Up Football had two to three fewer head impacts of 10 Gs or greater during practice, which may equate to more than 100 fewer impacts in a season.

On the high school level, Fairfax County Public Schools has reported a 43 percent decline in football-related concussions since 2013 for 3,000 players since implementing Heads Up Football, and a 24 percent decline in overall football injuries.

And, finally, we'll highlight innovation. USA Football provides practice guidelines, practice planning tools, and defined levels of contact. You can see the levels of contact listed there on the slide, including air; bag; control, which is a noncontact or nontaking down to the ground drill; thud, which is a controlled drill where you are not taken down to the ground, but there is contact; and then, finally, live action, where you are taken down to the ground.

More young footballers than ever are learning the fundamentals of gradually and appropriately tackling before advancing to full contact. Where USA Football's programs are in place, today's youth and high school football is not the same as what it used to be for your children or what you may have watched.

We'll conclude with a video showing the difference that USA Football and Heads Up Football are making.

[Video shown.]

This is a preliminary, unedited transcript. The statements within may be inaccurate, incomplete, or misattributed to the speaker. A link to the final, official transcript will be posted on the Committee's website as soon as it is available.

[The prepared statement of Dr. Gregory follows:]

******** INSERT 2-2 ********

Mr. Murphy. Thank you.

Now we'll hear the testimony of Mr. Margarucci. You're recognized for 5 minutes.

STATEMENT OF KEVIN MARGARUCCI

Mr. Margarucci. Thank you, Chairman Murphy, Ranking Member DeGette, and distinguished members of the subcommittee. It's a privilege to be here today on behalf of USA Hockey to discuss the issue of player safety.

USA Hockey takes safety as a top priority and always has and has been one of the leaders in safety among youth sports entities. The safety starts with our leadership and goes on down to the rest of our organization, from our president, Jim Smith; our executive director, Dave Ogrean; our chief medical and safety officer, Dr. Michael Stuart, from the Mayo Clinic in Rochester, Minnesota; the chairman of our Safety and Protective Equipment Committee, Dr. Alan Ashare from the St. Elizabeth's Medical Center in Boston. He chairs a committee that has been around for some 40 years, which guides our board in making safety policies for our sport.

The USA Hockey Foundation yearly awards grants in the area of injury prevention and research with ice hockey injuries. Recently, I was hired as manager of player safety, a full-time position at USA

Hockey, which further shows a commitment to safety in our sport.

And, finally, we've had the Hockey Equipment and Certification Council, which was urged to be formed by USA Hockey in 1978. This is an independent body which studies the equipment that manufacturers produce and makes sure that meets the standards for protection in ice hockey.

When we look at prevention, we start with our rules enforcement. We have a very strict officiating education program, which involves online modules for refs at every level, classroom work, and on-ice clinics. At every level, once officials are working, they are supervised, mentored, and given feedback, and shown videos of proper rule enforcement to make the game safer.

We have implemented stricter penalties, with emphasis on boarding, charging, checking from behind, and head contact. In 2009 and 2010, our rule book focused on the standards of play and emphasis on body checking. In 2011, our executive board ruled to make a rule change which increased the legal age of body checking in our sport from 12 and under level to the 14 and under level. This decision was based on a lot of scientific research, not only on player skill development, but also safety and injury risks between those age groups.

In 2009, USA Hockey created the American Development Model. This model is an age-appropriate skill development and training based off of research of long-term athlete development.

Our coaching education program has been a gold standard in youth sports for years. In 2011-2012, there became online required modules for our coaches, which include concussion awareness and recognition in all those modules for the age-appropriate levels.

Within this structure, we've published a checking the right way for youth hockey, which is an age-appropriate progression of skills required to properly body check in the game of hockey. It starts with skating, and is always focused on attitude, ethics, and respect for the sport and your opponents. It goes from skating, positioning and angling, stick checking, body contact, and then body checking.

Heads Up, Don't Duck was a program initiated by Dr. Ashare in 1995. This was followed in 2010 by our Heads Up Hockey program. Both programs, the emphasis is playing the game with your head up, especially when coming in contact with the boards, goalposts, or opponents; keeping your heads out of taking and giving a body check; do not check from behind; and a library of skills and drills to teach these to our players.

We educate our members constantly through information available on our Web site; electronic communications through newsletters to our parents, players, coaches, officials, which often have concussion awareness and education materials in them. USA Hockey will start publishing an electronic newsletter specific to safety in the fall of 2016.

Currently, the Mayo Clinic sports medicine is doing research to identify objective testing to identify those athletes with potential concussion using blood biomarkers, sideline EEGs, and the King-Devick Test. And this study is funded by our USA Hockey Foundation.

Finally, on the treatment side, we have a comprehensive concussion management program available to all of our associations, which is the minimum standard for any USA Hockey program to follow. And the biggest message in this is when in doubt, sit them out.

Thank you for allowing me to speak here today on this important topic of player safety and concussions.

[The prepared statement of Mr. Margarucci follows:]

******** INSERT 2-3 ********

Mr. Murphy. Thank you, Mr. Margarucci.

Mr. Stenersen, you're recognized for 5 minutes.

STATEMENT OF STEVE STENERSEN

Mr. Stenersen. Good morning, Chairman Murphy, Ranking Member DeGette, and distinguished members of the House Oversight and Investigation Subcommittee of the Energy and Commerce Committee. My name is Steve Stenersen and I serve as CEO of U.S. Lacrosse, the sports Maryland-based national governing body.

Our nonprofit organization has proactively led and funded many sport-specific prevention and research initiatives that have resulted in a number of interventions in the areas of rules, equipment, and education. We also participate actively in the efforts of numerous national collaborations focused on reducing injury risk in youth sport, which I have referenced in my written testimony.

Lacrosse is the oldest sport native to the North American continent. Native American play was first documented by Jesuit missionaries in the 1600s. Modern rules for lacrosse were first adopted in the late 19th century, but two distinctly different versions of the sport for men and women evolved in the first half of the 20th century. Lacrosse has experienced an unprecedented surge of popularity in recent years, in part due to the formation of U.S.

Lacrosse as the sport's first national governing body in 1998.

U.S. Lacrosse established a Sports Science and Safety Committee when the organization was formed, and that committee is comprised of prominent medical and research professionals representing a variety of specialties, as well as representatives from a number of multisport organizations. We've been described as one of the most proactive sports organizations in the country relative to our commitment to injury prevention, and we were recognized for our efforts in that regard last May through the introduction of a congressional resolution, H.R. 267.

Our Sports Science and Safety Committee prioritizes and oversees research initiatives, recommends interventions to the U.S. Lacrosse board of directors, and leads the development of educational initiatives intended to reduce injury risk and directed to coaches, officials, players, and their parents. My written testimony includes references to the published research and safety interventions U.S. Lacrosse has led.

We also have invested significantly in the development and deployment of the sport's first standardized coaching/officiating curricula. Unfortunately, public focus is too often directed at equipment interventions, which are less effective in preventing injury than assuring that players are properly taught and games are properly officiated. Among the biggest challenges we face is convincing youth

leagues and State high school associations that requiring our standards for lacrosse-specific coach and official education is fundamental to a safer and more enjoyable playing experience.

The prevention of lacrosse-related concussion has been a particular area of focus for U.S. Lacrosse, and we've committed considerable time and resources to concussion education, research, and prevention. The benefits of playing youth sports are well documented. And while lacrosse is considered to be relatively safe compared to other sports and activities, serious injuries, such as concussions, occur.

There is much we have learned about the nature of concussion in recent years, particularly the critical importance of recognizing symptoms and removing children from play until cleared by a medical professional trained in concussion management. We've also learned that no piece of protective equipment on the market today can prevent a concussion; that the mechanism of injury is different from sport to sport; and in the case of lacrosse, different in boys lacrosse than girls lacrosse.

We've learned that the injury and its recovery can be a very different experience for girls than boys, which demands further focus and study. And we've learned that increased sport specialization at younger ages is increasing the number of injury exposures for young athletes and contributing to increases in overuse injuries on developing bodies.

Perhaps most importantly, we've learned that the vast majority of children who experience a concussion can recover fully if their injury is recognized quickly and they receive proper care.

Concussion remains a significant health concern in youth sports and it will remain a priority for U.S. Lacrosse. Accordingly, we'll continue to invest in research that helps us learn more about the mechanism and frequency of the injury in both boys and girls lacrosse in order to advance educational, rule, and equipment interventions most effective in reducing injury risk.

Thank you for the opportunity to share my thoughts on this important issue, as well as your efforts to increase the health and wellbeing of our Nation's young athletes.

[The prepared statement of Mr. Stenersen follows:]

******** INSERT 2-4 ********

Mr. Murphy. Thank you, Mr. Stenersen.

Mr. O'Neil, you're recognized for 5 minutes.

STATEMENT OF TERRY O'NEIL

Mr. O'Neil. Mr. Chairman, thank you.

Mr. Murphy. Would you put your microphone on, please? Is it on? There should be a light. And just pull it as close to you as possible.

Mr. O'Neil. So, Mr. Chairman, we'd like to begin, if we may, with a sound bite, 30 seconds from Dr. Ann McKee, which follows on many comments heard earlier this morning. Dr. McKee is one of our colleagues. These were her comments 2 months ago during your roundtable.

[Video shown.]

Mr. O'Neil. "Immediately," Mr. Chairman, a word we heard this morning as well, and that's our middle name: immediately.

Let me begin by saying here's where we started with our chase for immediate results. The National Football League, 32 teams, 2,000 players, as you know, practicing for 5 months in regular and postseason. There were 271 total concussions in the NFL this last year, 271. Question: Not in the games, but in practice, how many concussions do you think on NFL practice fields last season? Answer: Eight, because they've learned how to practice. Those eight

concussions in a universe of 271 represents 3 percent.

So now the big question. What is that number in high school football, do you think? What percentage of high school football head trauma occurs on the practice field? Sixty to 75 percent. The worst, most shameful statistic in all of football, and this is the reason we're in business. This is the reason why a number of Hall of Famers, at no appearance fee, chase around the country with us; among them Warren Moon, Anthony Munoz, Tony Dorsett, Mike Ditka, showing high school coaches on video how to practice with less contact. These men do this generously because they believe this is the future of football.

So let's quantify our recommendations. We're going to show you how they practice in the pros.

[Video shown.]

Mr. O'Neil. This is called full-speed-to-contact practice, which means they run the play full speed to get the timing, the pacing, the choreography of the play, but at the last moment, the moment of imminent contact, rather than tackle, they break away from each other. It's football ballet, as you see it here.

Here's Dartmouth College.

[Video shown.]

Mr. O'Neil. You'll see a pass down the middle. A safety in practice here could light up this receiver with a perfectly legal hit, but it's his teammate, so at the last minute, he veers away from it.

He'll save that tackle for Saturday. Okay?

In the NFL, Cleveland Browns, watch number 22 in white here. He'll track this play full speed. Everybody stays on their feet, because only bad things happen when you go to the ground. He tracks the ball carrier, but at the moment when he might tackle, he stops and let's the ball carrier continue. 48 in brown, lead block here, one of the most vicious hits in all of football. What's he do, 48 in brown, he comes -- he identifies the player to be blocked, he comes to him, sinks his hips and just lays his hands on him. And what about this defensive back in the shadow? Is he going to tackle on a Wednesday or a Thursday? No. He did everything to put himself in position except make the tackle.

Seattle Seahawks, same thing. Are they going to tackle a teammate in the middle of the week or save it for Sunday? They save it for Sunday.

Contrast that now with high school football. Here's a high school scrimmage. A quarterback has four teammates with their hands on him. Are they going to hold him up, wrap him and hold him up, or take him to the ground? This has been a good practice exercise for everybody involved. We've learned a little something from it.

Let's go back to the quarterback. Did we take him to the ground or wrap him up and hold him? We took him to the ground and broke his wrist. Totally needless.

At this same high school in Connecticut, a young man named Cody Gifford played, son of Frank and Kathy Lee Gifford. Frank was a colleague of mine at ABC Sports many years ago. Cody actually made the team at USC as a walk-on. You can't believe how proud his father was. My son, Liam, also played at this same high school. He's now a backup quarterback at Tufts.

Frank Gifford and I used to talk about this frequently, and one day we sat and we put together the composite injuries in high school between our two sons, the concussions, the fractures, the knee ligaments. How many of those 10 major injuries do you think occurred in games and how many in practice? Two in games, eight in practice. Utter madness, Mr. Chairman.

So what do we recommend to rectify the problem? We are the only organization of the five national organizations who operate in this space that's committed to an immediate abolition of contact football below the age of 14 and ninth grade. We want to convert those leagues to flag. No contact until ninth grade.

Once in high school, no full contact in spring, summer, and off season; 3 hours total in preseason; 30 minutes a week during the season.

Mr. Murphy. We're going to have to wrap up so we can continue on.

Mr. O'Neil. How does this compare to the other major organizations operating in this space? National Federation of High

Schools and USA Football, which operate in concert, allow three times as much contact as we do, Pop Warner four times as much contact as we recommend, and the NCAA six times as much as we recommend.

[The prepared statement of Mr. O'Neil follows:]

******** INSERT 2-5 ********

Mr. Murphy. Thank you. And during questions, if there's other conclusions you want to make, we'll -- we're way over time.

Dr. Comstock, you're recognized for 5 minutes.

STATEMENT OF DAWN COMSTOCK

Ms. Comstock. Thank you, Chairman Murphy. It's an honor to be asked to testify before this committee, particularly representing Colorado's School of Public Health at the University of Colorado Anschutz Medical Campus as a -- under Congresswoman DeGette's in her State.

I'm here today because I run the National High School Sports-Related Injury Surveillance Study. I've done so for the last 11 years. In effect, I've dedicated my entire career to trying to improve high school athletes' safety, not because I'm a policymaker or a clinician, but because I collect the data that's needed to drive informed, evidence-based decisions. I want to share just a few examples today and describe why those are so important.

This first slide shows some high school RIO data, just simple concussion rates over time. You can see that concussion rates were stable for a few years before dramatically increasing, in fact, doubling between 2008 and 2012. They've leveled off in recent years.

Understanding trends over time like this is crucially important

both so that we can evaluate the magnitude of the problem, but also so that we can determine which interventions may, in fact, be effective and which ones may not. Only long-term surveillance information can provide this data.

This next slide shows that some of the information I heard a little earlier that, you know, we don't want to wait to try to do intervention work because we don't want to wait for the years and years it takes to collect the data; we don't have to wait. I intentionally put just 1-year worth of high school RIO data up here to show you that, even with one year of surveillance, we can look at patterns and trends across sports, across genders, across type of activity. And this is just the tip of the iceberg.

I capture up to 300 variables on every concussion that's reported to my system. I can literally tell you when, why, where, how, and to whom each concussion occurred. This data can drive evidence-based intervention efforts.

And I and many other researchers in the United States have the drive, the desire, the resources, technological and methodological, and the experience to be able to do this work at the youth level, just as it's currently being done at the collegiate and high school levels. What we don't have is the funding.

Injury surveillance can also demonstrate positive outcomes as well; very important. This slide shows that we've actually had a big

success when it comes to managing high school athletes' concussions. In the 2007-2008 academic year, 30 percent of high school athletes diagnosed with a concussion returned to play in less than 7 days, which is a violation of accepted return-to-play guidelines. And disturbingly, 8 percent returned to play the same day they were injured. That's unacceptable.

Look at how things have improved. Last year in 2014-2015, less than 10 percent of all athletes returned to play within 6 days, and less than 2 percent returned the same day they were injured. This is the result of prevention; not equipment prevention, but education and regulation prevention. Effective prevention in public health, we talk about three legs of a stool. Equipment is one piece in terms of concussion, but educating individuals and providing good, strong policy based on evidence are the other two legs.

I would love to come away from the efforts of this committee, incredibly important efforts, with the ability to do this work at the youth level. Currently, no one can give you this type of data for children playing sports who are younger than high school age. That's a travesty. We've got to protect our children who are playing sports because we want them to play sports.

I'm not against sports, not even against contact sports. Despite my appearance, I played rugby for 13 years. Yes, I'm only 4' 11". I played rugby for 13 years. I appreciate the fact that participating

in sports is a very important way that children can incorporate physical activity as part of a daily, healthy lifestyle.

We need everyone sitting at this table and our policy representatives, like the distinguished members of this panel, to work together to drive evidence-based prevention practices now. We don't want to wait for 30 years to learn about long-term consequences of concussion. That's secondary and tertiary prevention. We need primary prevention. I already know that concussions are bad for us. I want to keep kids from being injured in the first place.

Thank you.

[The prepared statement of Ms. Comstock follows:]

******** INSERT 2-6 ********

Mr. Murphy. Thank you very much, Doctor.

Now, Dr. Talavage, you're recognized for 5 minutes.

STATEMENT OF THOMAS TALAVAGE

Mr. Talavage. All right. Thank you very much, Chairman.

So I'm Thomas Talavage. I'm a professor of electrical computer engineering and biomedical engineering at Purdue University, founding codirector of our MRI facility. I've been a member, in recent years, of the NCAA's Task Force on Concussions and I'm a member of the Scientific Advisory Board for the NCAA-DOD CARE Consortium. And I'm also one of the founding members of the Concussion Neuroimaging Consortium, which is a multi-institutional effort to bring together the researchers who have a history of publishing and doing research in the area of concussion and traumatic brain injury together to solve many of these problems. I serve for the Purdue Neurotrauma Group as our specialist in neuroimaging, and I'm also the lead PI for the Purdue College of Engineering's preeminent team on engineering healthier brains.

As a rabid sports fan of the Pittsburgh Steelers and the Pittsburgh Pirates and the father of four very, very active young children, this is an issue that is very near and dear to my heart and has been for a long time.

As a part of the Purdue Neurotrauma Group, I just wanted to summarize really quickly that our goals and our proposal into the future is to achieve safer participation in youth sports. Our goal here is to make sure that more children can participate in sports more frequently without really risk of injury, or at least a reduced risk of injury to something that is acceptable to us, such as riding a bicycle or playing baseball or playing basketball.

Our goal is to achieve the same through the education of athletes, parents, coaches, and health care providers regarding the risks of not only concussive, but also subconcussive injuries through engineering-based improvements in protective equipment, through modeling and appropriate preventative methodologies that allow us to monitor exposure to head injuries and the risk of head injuries, and, finally, through techniques such as have already been described with improved training of athletes.

Through the past 7 years, our pioneering study has been engineering based as following the model illustrated on the slide, where we're applying structural health monitoring, a technique developed from basic materials and basic structures in our everyday world, whether they be planes, bridges, automobiles, where you essentially do nondestructive evaluation, you document that a material is in good health before you continue forward with its use, and as that material starts to exhibit some sort of change, you effect either

repair, or in the case of some materials, you allow them to rest, allowing them to recover.

This methodology has been applied now, as I said, for 7 years in the study of high school girls playing soccer and boys playing football. And our study, though, applying this methodology began like most of the other studies in this domain, where our real initial effort was to understand why some kids got a concussion and some kids didn't. But what we discovered very rapidly and has essentially driven our research since that time is that, in truth, many of the children who we think are not injured are, in fact, showing changes in their physiology, changes in their brain that are strongly suggestive of underlying brain injury.

And what's really critical is that not only are athletes who are supposedly healthy, who do not have signs of a concussion, who are not diagnosed or even examined by their team's athletic trainer or their team's physician as having a concussion, will look abnormal in this manner for up to 5 months after the season, which means that they may be spending 8 to 9 to 10 months of the year in an abnormal state.

So while we already know ahead of time that it's never a good idea to hit your head, the question now becomes how long is it that these athletes are injured and what can we do to prevent that injury in the first place? So our study has, as I've already mentioned, been going for 7 years, and if we are able to find funding some time in the future,

we will continue to study, ideally later this year.

I only wish to be working from this methodology with the goal being that if we understand how inputs, in this case mechanical inputs of heads being hit, whiplash events from the body being hit and the head snapping to the side, snapping forward, or rotating abruptly, will allow us to understand how each of those events affects the brain. Then we can go back and now correctly develop protective technologies, helmets, that will in fact prevent concussion rather than merely skull fracture. We can develop appropriate methodologies for identifying when an athlete should skip a practice, because clearly we want the kids to miss practice, not the games, and that's obviously what the kids want. And we will also then be able to evaluate whether or not recovery has been truly complete. Can we actually document that an athlete who has been pulled and is getting ready to return to play looks healthy enough that it makes sense for them to go back into play?

So with that, we really feel, as the Purdue Neurotrauma Group and as myself as a researcher in engineering, that most of these changes can be made with no cost to the enjoyment of the game, but they are very likely to improve the freedom or the comfort to engage in these activities without any substantial consequences beyond those associated with other noncollision sports, such as baseball, bicycling, or whatever. And we really feel that the science is far enough along, that these changes should be made now rather than to wait

any more time such that 30 million kids every year are exposed to potential injury. There is no reason not to act.

[The prepared statement of Mr. Talavage follows:]

******** INSERT 2-7 ********

Mr. Murphy. Thank you, Doctor.

I do want to recognize -- I'm going to start off with some questions here and let the members know that we're going to try and continue this. There will be one vote at some point. We're going to try and continue on and roll through that vote. So we'll just start.

I do want to recognize in the audience, we have Nick Lowery, Nick the Kick, right, played for the New England Patriots, the Jets, and the Chiefs. Good to have you here today. Thank you for your interest in concussions.

Also, Shawn Springs from the Ohio State, also the Redskins, Patriots, and Seahawks. I think you were the number one pick for the Seahawks, Pro Bowl. Both of you played Pro Bowl. Thank you for your interest also in concussions.

And a former colleague, Phil the Doc Gingrey, is here as well. We appreciate you coming back. I do want to say he didn't make the Georgia Tech team, but I do understand you drove the mascot car, the Ramblin' Wreck. So it's nice to know your skill sets were seen where they were placed by Georgia Tech. It's a good thing.

All right. I now recognize myself for 5 minutes.

This goes to Dr. Gregory, Mr. Margarucci, and Mr. Stenersen. From the perspective of a youth sport organization, what are the greatest needs in terms of research related to concussions and player safety? Can you comment on those?

Dr. Gregory. Sir, for clarification, the greatest needs?

Mr. Murphy. Yes.

Dr. Gregory. So my first response would be to agree with Dawn Comstock that we have these databases in college and high school and we don't have them in youth sports. And so establishing a database for youth sports injury, I think, is imperative.

Mr. Murphy. Mr. Margarucci, do you have a comment on that?

Mr. Margarucci. Yeah. I would echo Dr. Gregory's statements, that we do need to have a database of injuries that are occurring in our youth sports so we can make these decisions. And it's hard -- we don't want to wait for the future, but we need to start, I think, gathering some of this information right now.

Mr. Murphy. Mr. Stenersen?

Mr. Stenersen. I would agree. I mean, each of us as sports is trying to do our best to fund research to our nonprofitabilities, but we need greater resources here to be able to drive that research into the youths' play area.

Mr. Murphy. So along those lines with research, do you encourage coaches? Is there a way to help coaches and teams also keep track of their own database? This also, I assume, Coach Teevens too, that coaches keep track of their own data to see what happens at their own coaching style as a comparison. Would any of you like to comment on that?

Mr. Stenersen. Well, I would say, and Dr. Comstock probably has a word here, but the challenge with that is the quality of the data that's collected. And unless it's collected well and consistently, which coaches, generally speaking, are not want to do, then we're concerned about having flawed data.

Mr. Murphy. Dr. Comstock, do you have a comment on that?

Ms. Comstock. Yes, I agree. We are concerned about the quality of the data, and that is directly correlated to who's reporting the data. At the high school and the collegiate level, we rely upon certified athletic trainers, certified athletic trainers, to report this data to us. However, I and others have been investigating ways that we could modify our surveillance systems to enable either a parent or a coach who is trained appropriately and appropriately motivated to be able to report, perhaps not 300 variables per injury, but at least enough variables that we could drive forward a lot of these discussions.

Mr. Murphy. And, Coach Teevens, you did record, you did look for specific data.

Mr. Teevens. Through the conference in general overseas and each medical team within the institutions report back. So it's --

Mr. Murphy. And that's helpful to give the feedback, then, along those lines?

Mr. Teevens. It is. You see where you stack up to some other teams in your league.

Mr. Murphy. Okay. So let me ask the panel too. How significant is the issue of athletes not reporting concussions? So if they themselves have symptoms, but they're not giving that information on. Can you comment on that? Who would like to comment?

Dr. Gregory?

Dr. Gregory. Yeah. So I can tell you at all levels that is an issue, that the problem's being knowing what the symptoms of concussion are, and then if you report it to somebody, that person knowing what the symptoms of concussion are. So I do think that what Dawn showed with that data, that concussion rates are actually coming back down, I think is a result of education of coaches, athletes, players on what the signs and symptoms of concussion are.

Having said that, I don't think we can stop there. We have to continue those efforts so that everybody is aware of that.

Mr. Murphy. Anybody else want to comment on the player?

Yes, Dr. Comstock.

Ms. Comstock. Yes, sir. Actually, that same graph that showed the doubling of concussion rates between 2008 and 2012, our high school athletes didn't suddenly become twice as fast, strong, and vicious. The years preceding that, there were concussions occurring that just went undiagnosed, unrecognized. So the increase in the concussion rates, I think, truly reflect the great deal of education that's been done by individuals on this panel as well as groups like CDC and CIPC,

the National Federation of State High School Associations, to make sure that when a concussion occurs, it is recognized --

Mr. Murphy. So it may not have been that prior to that increase that concussions weren't occurring, it's just they were just getting reported?

Ms. Comstock. Exactly.

Mr. Murphy. And that means educating the players as well as the importance of doing this.

Ms. Comstock. Yes, sir. And the parents and families and -- you know, the parents of these young athletes. It's important to educate them as well.

Mr. Murphy. Do you see this as an ongoing problem with regard to injuries that this is working or you still have a ways to go?

Ms. Comstock. Well, I think the fact that that curve has seemed to have peaked and leveled off, I think it actually is an indication, coupled with the last slide that I showed that shows how much better we're doing at managing concussions. I think both of those speak very highly to the success that we have had to date in educating parents, coaches, athletes, policymakers about concussion. We still have further to go, particularly in the younger groups.

Mr. Murphy. Thank you.

I'll yield now to Ms. DeGette for 5 minutes.

Ms. DeGette. Thank you so much, Mr. Chairman.

I want to take a look at some of the science that's out there. And by the way, it was really an excellent panel with everybody giving a great perspective.

Dr. Talavage, your work examines high school football players as well as high school soccer players. Can you tell us, from your research, about the head impacts from contact sports and how they impact head injuries?

Mr. Talavage. Yes. So what we've observed through our 7 years of study is that when the athletes take large amounts of blows per week, whether they be of a modest size, such as 10 G or above -- 10 G just as a reference, if you just stand up and drop down into your chair, you will generate roughly 10 times the force of gravity acceleration on your head.

So when players are taking numbers of 60 to 70 blows per week in football, for example, then those male athletes tend to start showing alterations in their brain physiology that are suggestive of either damage to neurons or at least some sort of impairment in the way information passes around your brain, and ultimately results in you being able to respond to a question or to answer a task or to achieve a target on a game or particular activity.

For our female soccer players that have been in our study, they do not take quite that number of blows, but one of the things we have observed is that they get hit pretty much every day. So in the State

of Indiana, high school football is able to practice 2 days per week plus have a game. Soccer, there is no restriction. They tend to practice 5 to 6 days per week.

So we do find that not only are there changes from the actual raw number of blows, how frequently they're getting hit, but there strongly appears to be a consequence of how much time off are they given, which would suggest that there are natural repair mechanisms that we can exploit. And I believe that when we have these reduced contact cases, we are in fact benefiting our athletes.

Ms. DeGette. Thank you. We had a forum in this committee in March, you heard us talking about it, and at that forum, there were some researchers who suggested that we don't have enough science to act on this issue, and they said we should wait till there's more research. What's your response to this line of questioning? Very briefly.

Mr. Talavage. I don't believe that.

Ms. DeGette. And that's because you actually have scientific research?

Mr. Talavage. We have now about 16 papers in publication and we are working now with several other institutions around the country, including Penn State University, Northwestern University, Ohio State University, Michigan State University, and University of Nebraska to publish work that shows that there are, in fact, changes in the brain

when you --

Ms. DeGette. If you wouldn't mind getting that data to this committee, that would be very helpful for us in our investigation.

Mr. Talavage. Be very happy to.

Ms. DeGette. Thank you.

I just want to ask you a couple of questions, Dr. Comstock, about gender differences in concussions and head trauma. The surveillance data you collected shows that girls soccer has one of the highest rates of reported concussions among high school sports. What do we know about gender differences in concussion rates? Are girls more likely than boys to get concussions?

Ms. Comstock. Yeah. That's a million dollar question, if you will. We first reported in 2007 that in gender-comparable sports, so sports that both boys and girls play by the same rules, using the same equipment on the same fields, sports like soccer and basketball, girls have higher concussion rates than boys. That's now been replicated by other researchers in other populations.

What we don't know at this point, people are working on the question, is, is it a biophysiological problem, are girls somehow --

Ms. DeGette. Right.

Ms. Comstock. -- different --

Ms. DeGette. Right.

Ms. Comstock. -- and are they really sustaining more injuries,

or is it a sociocultural issue? Because we don't have a definitive objective diagnostic test for concussions, we're reliant on self-reports, and young female athletes may be more likely to report it when they're experiencing signs and symptoms.

Ms. DeGette. But do we need to get more data?

Ms. Comstock. Well, we already have the data that's consistently shown this gender difference. We do --

Ms. DeGette. But what do we need to prove it, then?

Ms. Comstock. So this is one case where surveillance data isn't enough. We do need more detailed research to try to determine are there biophysiological differences or is it a sociocultural issue.

Ms. DeGette. And, Dr. Talavage, you're nodding your head yes, you agree.

Mr. Talavage. Yeah. I mean, this is exactly what the intent of our type of study is. If we can understand how the brains are changing, we can determine whether or not it takes less to do it.

Ms. DeGette. And you've got girls and boys?

Mr. Talavage. We have girls and boys, 5 years --

Ms. DeGette. Now, Dr. Comstock, I'm almost out of time. I just want to ask one more question.

Ms. Comstock. Yes, ma'am.

Ms. DeGette. You say that there's no data for -- there's no surveillance for under high school ages. Do you think this is

something that should be instituted so that people like you can get that data to see exactly what's going on?

Ms. Comstock. Yes. I would love to do it. I'll give you the name of ten other researchers that can. This is imperative.

Ms. DeGette. Who should set it up?

Ms. Comstock. My work has not been federally funded. I've had nine different funding sources in 11 years of surveillance. The NCAA funds their own system. I think it should be a Federal effort, but I don't care if it's a joint effort of every one of these organizations of youth sports. Somehow we have to get it done.

Ms. DeGette. One has to do it.

Ms. Comstock. We have to get it done.

Ms. DeGette. Thank you very much. Thank you for coming.

Mr. Murphy. Thank you.

Just to remind members that votes are called. We're going to continue to roll through.

Dr. Burgess, you're recognized for 5 minutes.

Mr. Burgess. Thank you, Mr. Chairman. I thank the panel for being here this morning.

Coach Teevens, can I just ask you, I mean, your testimony, when I read through it last night, it was like, wow, this is a revelation, and it seems so obvious. Once you understand that, oh, my gosh, this is a repetitive injury, so you're not repeating the injury during

practice, and so the only contact is on game day. But that must have been kind of a hard decision to make, because, I mean, when I was a kid growing up, it was always repetition, repetition, repetition, practice, practice, practice. Remember the old commercial? So what --

Mr. Teevens. When I announced it to my coaching staff, they were waiting for the punch line. They thought I was kidding. But I put enough time and effort into it. I thought it was the appropriate approach to reduce injury with my players.

Mr. Burgess. And you feel now -- of course, you, what, 5 years into this, you feel you have --

Mr. Teevens. It's made a decided difference in the way that we practice, the safety. Peripheral injuries have dropped as well, just the confidence. My frontline guys practice through the course of the season. Defensively I had two players miss games this year. One had a high ankle sprain, and at our discretion we kept him out. Another had a lacerated kidney, a leg whip, a freak incident, he missed five games. That was it.

So the regularity and the players -- and I tell them, the rules of the game are get the guy on the ground; not injured, get him out of the game, get him on the ground. And you can teach that skill set. And we just -- we practice it extensively, and I think we do a very good job, understanding it's an injurious -- there's a risk playing

the game, and we can minimize the risk.

Mr. Burgess. Let me ask you this, and maybe you -- and I'm sorry I wasn't here for your testimony, but when you go back and look at your record prior to instituting this program and in the years since, is there a marked difference?

Mr. Teevens. We were 0 and 10, 2 and 8, and we ended up the last two seasons 8 and 2, and this past year 9 and 1.

Mr. Burgess. So you've become remarkably better as a coach in that time?

Mr. Teevens. Yes. Appreciably better, appreciably so.

Mr. Burgess. Well, that's, again, fascinating story. It seems so obvious when you look at it. Okay. Repetitive injury; we're going to reduce the risk by reducing the repetition, then -- I, you know, certainly want to thank you for --

Mr. Teevens. Quite simply, the more you hit, the more you get hurt.

Mr. Burgess. I want to thank you for bringing that --

Mr. Teevens. Thank you, sir.

Mr. Burgess. -- to the committee today. I don't -- I mean, again, I don't know that I was aware of that. I don't know how I would have been aware of it.

Mr. O'Neil, I wanted to ask you, because, you know, when I first started reading your testimony and Practice Like the pros, and I

thought, oh, my gosh, that would be dangerous, wouldn't it? Because, I mean, those are the guys that really -- dreadful stories you read about people who actually try to hurt each other in a game. But you had the observation with watching a practice that you said it was almost like a ballet. Is that -- do I understand that correctly?

Mr. O'Neil. Yes, sir, it is, in that, as we pointed out with the video, the players execute every aspect of the play in rehearsal for Sunday until the moment of imminent contact, at which point they break away from each other and pat each other on the back.

In the high school level, the proof of the efficacy of this is in the State of Wisconsin, the only State that is adhering to our standards at this point, put the standards in 2 years ago for the 2014 season. The University of Wisconsin Medical School did a study that year, the results published last October. Wisconsin high school football cut its concussions by more than half simply by adhering to our standards. That's a -- that is a breathtaking number in our business, to cut your concussions by more than half in 1 year. The quality of Wisconsin football has never been better, the players are fresh and ready to play. It is the high school model of what Mr. Teevens is describing at Dartmouth.

Mr. Burgess. And has there been sort of widespread acceptance of that in the high school level?

Mr. O'Neil. I'm glad you asked. Coach Teevens and I went to the

Wisconsin high school clinic about 7 weeks ago in Madison. Because of these restrictions and because the coaches need to know how to practice with less contact, we had enormous attendance, more than 125 coaches. And the greatest followup that we've experienced in our 30 clinics around the country, more than half of those coaches asked for copies of our videos so that they could take them, show them to their staffs, show them to their players, and teach their players in the 30 minutes, just 30 minutes of contact per week in practice, how to practice like pros or like the Dartmouth Big Green.

Mr. Burgess. You know, I can't help but observe that Emmitt Smith won "Dancing With the Stars" a few years ago, probably based on that same concept. Because weren't some pro players using essentially dance moves and ballet moves to improve their performance?

Mr. O'Neil. They were. And, Congressman, this -- this approach of less contact in the pros actually dates way back to Bill Walsh at the 49ers in the 1980s, and has been refined and developed by his disciples along the way to a point where so many college players look forward to entering the pros in order to avoid the carnage of 90 minutes, twice a week, full contact in college practice, and instead practice the way the Dallas Cowboys have for many years.

Mr. Burgess. Thank you very much.

Thank you, Mr. Chairman. I yield back.

Mr. Murphy. I thank you.

I now recognize Ms. Schakowsky for 5 minutes.

Ms. Schakowsky. First of all, I want to thank the moms that were here. I want to thank Kelli Jantz and Karen Kinzle Zegel.

Mr. O'Neil, you showed that video of Dr. Ann McKee answering my question at that --

Mr. O'Neil. Yes, ma'am.

Ms. Schakowsky. -- at that roundtable. And I wanted to focus on CTE, because I think very little focus has been on the subconcussive brain injuries. And as she said, it's about limiting the head injury that occurs on every single play of the game at every single level of the game. And I followed up that question to Jeff Miller of the NFL, he's the chief person for health and safety, and said, what do you think? Is it -- is CTE linked to football? And he said, "Yes, certainly."

And little did I know that this was a kind of explosion that happened outside, outside that room, and even has started some conversation about what is the future of football? Is there a future for the kind of football that we play?

So there's been a lot of talk about concussion, but I wanted to ask now more about CTE. So, Dr. Talavage, what does your research indicate about the effect that routine hits sustained by high school football players and younger have on brain function, even though they don't rise to the level of concussion? What about CTE?

Mr. Talavage. So at this point, the linkage to CTE is a little

bit nebulous from our -- coming from our end. Obviously, from Ann's end, where you're able to look and see that individuals who have experienced larger numbers of hits over their career and over their lifespan tend to have more deficits and tend to be more likely to evidence CTE, as per brain banks, I think there's at least good circumstantial evidence for there to be a clear linkage between the total exposure and the total amount of brain stress that's accumulated from getting hit repeatedly day after day after day, year after year.

Within our own athletes, though, what we can at least identify is that our athletes spend probably 5 to 8 months of the year in what appears to be a state of almost chronic inflammation. And when you have chronic inflammation, we know in the rest of the body that's a bad thing in the context that the cells are not able to eliminate waste, they're not able to bring in nutrients to keep those cells healthy.

And so if what we're seeing is, in fact, proven to be true in our continued study, that we do have a level of chronic inflammation essentially for 5, 8 months of the year, then we are definitely putting our athletes at risk of precisely the types of biochemical processes that are going to lead to CTE.

RPTR GENEUS

EDTR ROSEN

[11:46 a.m.]

Mr. Schakowsky. Is there any test for CTE before an autopsy after death?

Mr. Talavage. There are several imaging methodologies that propose to identify the presence of Tau biomarkers within the body, but there's nothing that has yet been confirmed.

Mr. Schakowsky. My understanding is the kind of subconcussive events have to do with the brain inside the skull, and has virtually nothing to do with helmets?

Mr. Talavage. So a helmet can, in fact, absorb energy, and it would be very easy, in fact, to improve helmet designs, but the companies aren't terribly interested in it at this point. Their goal is to meet the standards. The standards that are set forth are to prevent skull fracture and death on the field, which is clearly a goal, which they are very effective, but they do nothing to prevent concussion at this point in a meaningful sense. Energy absorption would reduce the amount of energy that reaches the brain. If you reduce the amount of energy that reaches the brain, you are going to reduce the amount of torsion, pulls, stress, compression on the cellular tissue. And if you do that, you will, in fact, start to see a reduction in the

consequence of subconcussive hits. You should see a reduction in the observation of concussion, and you should, in the long term, see the reduction in the situation such as CTE.

Mr. Schakowsky. Dr. Comstock, you don't think that kids under what age should be playing tackle football?

Ms. Comstock. That's actually -- I've never made any recommendation.

Mr. Schakowsky. Oh, I thought you said something about it.

Ms. Comstock. Yeah. I am aware of other researchers that have given exact cut points.

Mr. Schakowsky. Did someone on the panel say that?

Mr. O'Neil. I did, Your Honor -- Ms. Schakowsky. Our organization is the one in five national organizations operating in this space that believes strongly that grade school boys and girls should play flag football exclusively, and that contact football should start in ninth grade with a transitional phase in seventh and eighth grade where in shorts and T-shirts, boys who intend to play in ninth grade begin to learn how to tackle and how to block using the state-of-the-art in tackling technique called Sea Hawks tackling pioneered by the coaches, Pete Carroll and Rocky Seto of the Seattle Seahawks; Mr. Seto, being one of our leading supporters and a fellow who tours with us and had made a number of videos for us.

Mr. Schakowsky. Now, there's been a good deal of pushback after

Jeff Miller made his -- his comment, Jerry Jones, the owner of the Dallas Cowboys, you know, has absolutely disregarded that. There's actually been some mocking of that, and this idea of the conduction between manliness and football, I think, is really concerning. And I wanted just to ask -- let's see. I had a couple of other questions.

Dr. Gregory, I am particularly -- you know, if once all the -- well, let me ask you before my time runs out. That USA Football's guidelines limit full contact practices to four times a week, but I note that this represents more contact practices than at current higher levels of football, such as the college level and even in the NFL.

So, you know, given all this evidence about repeated hits to the head, why hasn't USA Football taken steps to further limit full contact practice for young children?

Dr. Gregory. So the question is a good one, in that we recognize that tackling causes injuries. If you look at data that we do have in youth football --

Mr. Schakowsky. My time is up. So why haven't you?

Dr. Gregory. So what we have instituted is ways of trying to decrease the number of hits that there are. The concern is if you take it away completely --

Mr. Schakowsky. What about the four times a week?

Dr. Gregory. -- if you take it away completely, you still have

to learn the skill. At the youth level, we don't have the resources that you have at the high school or college level to teach the skill. That's what we're trying to do is teach the skill to learn how to tackle appropriately gradually over time. That is the goal, to do it well, to protect your head.

Mr. Hudson. [Presiding.] Thank you.

At this time, I'll recognize myself for 5 minutes to ask questions.

Mr. O'Neil, thank you for the work you do. I appreciate the information you gave us today. You advocate that children under 14 should not be permitted to tackle, and should be limited to high school athletes. How do we assure that young athletes learn proper tackling techniques so when they do enter game situations, that they are not going to resort to distinct or more dangerous tackling, head down, whatever the case may be? If they don't get that practice when there's -- contact is not as hard as it would be later, is there a concern of them internalizing those techniques?

Mr. O'Neil. If staff would, possibly, allow me to queue up a 17-second video clip --

Mr. Hudson. Sure.

Mr. O'Neil. -- of Rocky Seto, which is number 24 on our agenda here.

Coach Seto knows -- Coach Seto is the guru of tackling. He and

Pete Carroll had devised this system in Seattle that has become the standard in just 2 years, introduced 2 years ago in the spring. They put out three videos. And as I say, Coach Seto tours with us.

No, it's not that. It's a -- as I say, number 23, Rocky Seto tackling in shorts. Just to answer your question, Mr. Hudson, is what we recommend in seventh and eighth grade, is rather than hitting each other, these boys need to learn in shorts and T-shirts. They need an introduction to weight training. They need some strengthening of their necks, which I think all the scientists here would agree is important in preventing concussion. They need to learn how to wear the pads and be ready with this gradual run-up to ninth grade to be prepared without the many, many collisions involved in youth contact football.

As we heard from Dr. Ann McKee so eloquently 2 months ago, it's the cumulative head trauma that causes brain injury. And you don't want to start that at age 5, which is permissible, according to some of the organizations represented here today, boys of 5 years old playing contact football is, in our minds, quite surprising.

Any luck, Jake?

Mr. Hudson. We'll look at the video after.

Mr. O'Neil. I will be happy to show it to you, Mr. Hudson.

Mr. Hudson. Thank you.

So are there examples of cases where young kids have not had

contact, have been until they reach high school age where they have been successful and --

Mr. O'Neil. Thank you for asking. Tom Brady, Eli Manning, Peyton Manning.

Mr. Hudson. I've heard of those folks.

Mr. O'Neil. Archie Manning has waxed eloquently in The Washington Post here just a few years ago. I think his phrase was, God, what a great game flag football is.

My son, a quarterback at Tufts University, would not be playing college football if he hadn't played flag instead of contact. It taught him everything he needed about reading defenses, making decisions, making good throws, all the teamwork, all the character building. Believe me, those who suggest that those qualities can only be developed in contact football have not heard my younger son and his teammates in the back seat of the car, as I drive them around, recounting their victories in flag football 4 and 5 years ago.

The highlight of their athletic careers, they were already made football fans for a lifetime. They wore the NFL Jersey in playing flag. They came out of it healthy with an experience that has -- has made them the young men they are.

Mr. Hudson. Great. Thank you for that.

Coach Teevens, do you have any thoughts on this, just in terms of if you wait until you are older to start learning tackle techniques,

is that going to be a problem?

Mr. Teevens. If it deprives people of an opportunity, they are still going to catch up real quickly. One of nine kids, six boys, we all played football in high school, and that was it, and all had fairly successful careers. There are a litany of people that have gone on. I don't think it's absolute. The big thing is it to educate. If they are going to play a young age, educate them properly, start slowly and make sure that you deprive them of as much contact as possible.

Mr. Hudson. Thank you for that.

Dr. Gregory, you have anything you want to share on this?

Dr. Gregory. I'll only add in that I think if you are going to take the contact away, that the education piece on how to tackle is imperative, and that is the challenge for us in youth sports without the resources. I will also add that USA Football administers the largest flag football league in the country, and so, we are proponents of flag football. It isn't USA tackle football; it is USA Football, which is all inclusive. And so, I think it's important that we promote flag football as well.

Mr. Hudson. Thank you.

Let's go back to Mr. O'Neil. You organization is trying to change the culture of high school football advocating this limited contact, more akin to what's being used at the professional level. Is your testimony -- or in your testimony, highlight the fact that only

one State has adopted your standards so far? In light of the successful outcomes in that State, have others expressed interest?

Mr. O'Neil. It's a good question, Mr. Hudson. What we need is more participation from the State governing bodies around the country. And the word is traveling. We find that when the State governing body gets behind it, as happened in California 2 years ago, a piece of legislation passed there for the first time in any State limiting contact on the practice field.

But they invited us out for a tour. Coach Seto of the Seahawks, Coach Teevens, Anthony Munoz, Warren Moon, we hit four cities in 2 days, and we had enormous participation because the CIF, which governs athletics in California, made it mandatory for every State -- for every coach in the State. So we saw 1,200 coaches in 2 days. We are going to Alabama in July, same thing occurred there.

A very enlightened State, an executive director who understands, has made our clinic, after seeing us last year, mandatory for every coach in the State. So we will greet a ballroom full of more than 1,000 coaches in Alabama on July the 20th.

Mr. Hudson. Great. I've got 15 seconds. Any opposition you've received? You want to briefly describe that?

Mr. O'Neil. Oh, absolutely. I've dragged Coach Teevens to places where there were 450 coaches at a convention, and at our session, 20 showed up, and the other 430 were standing out in the hallway saying

that they didn't want to hear it right now. Absolutely. It's not like we're having raging success. It's very mixed around the country, and will be until, as I say, until the State governing bodies at least give us a hearing and mandate that all the stakeholders, not just the coaches, come into the room and hear what we have to say and see it on video. When they do, we almost never fail to convert.

Mr. Hudson. Great. Thank you.

At this time, I'll recognize Mr. Pallone for 5 minutes for any questions he may have.

Mr. Pallone. Thank you. Earlier this year, the Ivy League received significant press attention for their move to eliminate tackling during regular season practices. And the league now has no contact practices during the regular season, as well as strict rules about the amount of contact and practice during the spring and preseason. So I wanted to ask Mr. Teevens -- if I'm pronouncing it correctly -- you implemented these changes at Dartmouth several years before they were adopted by the Ivy League. What motivate you to reduce the amount of contact in your practices, and what was the initial reaction when you proposed those changes?

Mr. Teevens. Well, the injury rate was the stimulus, and we just had too many guys going down, like what's the story, concussion, all that type of thing resurfacing, and it just struck me we can do this in a better way, watching what we did during research on tackling, and

we started to do it. It was not well received. Still not well received by an awful lot of people. I did make a recommendation through Robin Harris at the Ivy level, and it was a 5-minute discussion. All of the coaches that played against Dartmouth, they know how we played, they know how effectively we tackle, and the vote was unanimous. It was progressive in mindset to say Hey, this is the direction we should travel.

Mr. Pallone. And how have the rates of head injuries changed since you implemented these no-contact policies? Have you seen any other benefits?

Mr. Teevens. Five years ago, I was, like, most programs in the country, maybe 15 to 20 during the course of the year, and this past season we had two -- two preexisting situations, both young men that can no longer participate. Our defense, which was nationally ranked, had zero concussion this year. Spring practice last 2 years, if my numbers are correct, we've had zero in spring practice, and that's similar to concussion season in college football.

Mr. Pallone. Great. In your opinion, are full contact practices necessary to ensure success on game day and for athletes' future careers?

Mr. Teevens. No, I don't believe so. To the point of imminent contact, you can do everything you need to; you can replicate tackling styles on bags and pads and with sleds, and I really believe and I tried

to convince high school coaches of this as well. You can do it at any level. I've got a 3-year-old grandson. I have him tackle pads off the side of the couch, and see he gets it. And I think that, again, crawl, walk, run, mindset can introduce skill sets that would be helpful down the road, but don't have to be practiced live that frequently.

Mr. Pallone. Now, given the research, do you think that engaging in full contact practices three, four, five times a week bear significant risk for young athletes?

Mr. Teevens. Without question. The more you hit, the greater -- the greater the risk of injury. And by just eliminating, we've seen that, quite frankly, in all aspects of our game; shoulders, necks, backs, arms have diminished appreciably, and it's made up a better football program.

Mr. Pallone. Well, thank you.

I wanted to ask Mr. O'Neil. We've seen many different rule changes being implemented across sports, across leagues, across States. There has been some criticism that these rule changes upset the integrity of the game. What do you think about the recent announcement that Pop Warner is eliminating kickoffs and kick returns? Will that prevent brain injuries, in your opinion?

Mr. O'Neil. Good question, Mr. Pallone. My reaction is this is Pop Warner's way of saying that grade school boys are not capable, physically, of playing the game the way it's designed. This is -- they

are making our argument. They are making the argument that these boys should be converted to flag football until they reach a physical maturity at 14 or 15 to play the game the way it's structured. We advocate no basic changes in the game. We also say, there will not be any further rule changes that we don't believe that will make the game noticeably less dangerous. The game is the game. We don't advocate any major change to it, but we do say very strongly, boys in grade school are not nearly prepared to play it the way it's designed, the way adults play it. And, therefore, both boys and girls ought to be playing flag football until boys make a transition, if they choose, to play contact in ninth grade.

Mr. Pallone. So just so I understand, you're not recommending -- you don't think any other changes would better protect the kids other than if they continue with the present play?

Mr. O'Neil. Mr. Pallone, it won't be football if we continue to strip away the kick return, the punt return, the three-point stance, there are any number of proposals out there. We are opposed to all of them. We think that those are ways -- likewise, heads-up tackling, heads-up tackling is an attempt to somehow sanitize the very difficult, very physical act of tackling. It can't be done. Tackling is tackling. Rocky Seto's Seahawks' tackling defines it exactly as it's done, and should be done, at the three levels of football where the game should be played. If boys can't tackle the way the technique was

designed, they shouldn't be playing contact football; they should be playing flag until such point as they are ready physically to play.

Mr. Pallone. I thank you.

Mr. Hudson. I thank the gentleman. At this time, I'll recognize my colleague from Virginia.

Mr. Griffith. Thank you. Thank you, Mr. Chairman.

I do apologize. I took my jacket off and over ran to vote, ran back in the rain, and I got wet. So I took by jacket off. I do apologize for that.

Mr. Hudson. You're forgiven.

Mr. Griffith. Mr. O'Neil, my boys are 8 and 10. My 10-year-old tried to tackle football. When my 8-year-old was 7, he played flag. It's not available for him now. Have you all done some studies here? In all your testimony, have you done some studies on how many kids, because they are not ready to do tackle, actually drop out of the sport?

Mr. O'Neil. It's a very -- we haven't, sir, but it's a very, very good point. Football loses any number of good candidates for the fact that we throw these boys in unprepared physically at a young age.

There is a sound bite -- I'm now adding sound bites that I would like to play for you when we finish. But I have one minute of John Madden, my former colleague at CBS, the coach and broadcaster. He tells a story wherein his son coached ninth grade football at a school in California for 15 years. And John said to him, if you take a boy

who did not play contact youth football, and he's a pretty good athlete, match him up against the boy who did play contact football through grade school, how long would it take the boy who did not play to catch up with the skills of the boy who did? Joe Madden, his son, said to him, One week. One week it would take him to catch up to what supposedly had been learned by a youth contact player those 8 years that he took all that head trauma from age 5 to 13.

Mr. Griffith. And I appreciate that.

I am going to have to move on.

Dr. Comstock, I was intrigued with your testimony about young women have more concussions than young men. Do you find that to be true? Do you have an -- is that true through all age groups, middle school, high school, and college?

Ms. Comstock. So in the age groups that we have, good surveillance data, it has been consistent, both with my data and other good surveillance systems, so across slightly different populations and the high school and collegiate age group. We, in the middle school and younger age group, we only have very small studies of like one league or one school district. Based on those, it appears it's also so on the underage groups, but we don't have national data to answer that question.

Mr. Griffith. I appreciate it. I'm sorry we have some limited time here.

Mr. Stenersen -- I apologize for my pronunciation -- U.S. Lacrosse has invested in the development and deployment of the sports first standardized coaching and officiating education curricula. In your testimony, you observed that properly trained coaches and officials are the most effective interventions for players' safety. Is that conclusion based, at least in part, on the changes you've seen in injury rates since deploying the curriculum?

Mr. Stenersen. In part, yes. But it's -- it's more based on kind of our fundamental belief that if you can't teach a sport correctly, and according to the rules, the outcomes are going to be not what you want.

So -- and I would add that part of the challenge we see that hasn't been mentioned yet is in youth sports such as soccer and lacrosse and ice hockey, I think we are seeing a significant privatization of the sport, which means that kids are playing more frequently, more games, at younger age levels. And that privatization in sports specialization is compounding this concern in our sport.

Mr. Griffith. Okay. I appreciate that. You also mention that one of the biggest challenges is getting youth leagues in State high school associations to buy in to your standards. Why do you think this is a challenge? If you can be quick, I would appreciate it.

Mr. Stenersen. Culture and tradition.

Mr. Griffith. Okay. And I have to tell you, the good news is

my 16-year-old daughter had a concussion this year, and they pulled her out for about 2 weeks. And, you know, she got it playing lacrosse.

Mr. Margarucci, I've only got a minute left. Is there something you haven't had an opportunity to touch on that you'd like to? Because by the time I get a question out, the time would be up.

Mr. Margarucci. No.

Mr. Griffith. Would you agree with these folks that the more we can do to train folks on how to do it right and how to do the checks right or the hits right --

Mr. Margarucci. Yes. We have a lot of that built into your coaching education, the checking progression and everything like that already, which we've had.

Mr. Griffith. And do you have the same buy-in difficulties that Mr. Stenersen indicated he was having?

Mr. Margarucci. Yeah, to a degree. Not all high school associations, hockey leagues, are governed by USA Hockey, and so we don't have any influence there.

Mr. Griffith. Right.

Mr. Margarucci. So, again, there's no uniformity, sometimes, amongst those leagues.

Mr. Griffith. And there is a lot of privatization, not only do you all have that, but Mr. Stenersen mentioned that, and my 8-year-old is also playing youth lacrosse, and that's completely outside the city

rec league any of the high schools or any of the school systems. It's a private institution.

Listen, I came back because I thought this was an extremely important hearing. I appreciate all of your testimony, and we'll continue to work on this. And I yield back, Mr. Chairman.

Mr. Hudson. I thank the gentleman. At this time, I'll recognize Mr. Tonko for 5 minutes.

Mr. Tonko. Thank you, Mr. Chair. And I appreciate all of our witnesses being here today and having this panel of expert witnesses is a good opportunity to have dialogue on how we can further enhance the safety of youth sports.

I would like to ask some questions about changes to rules governing contact, especially for kids.

And, Dr. Gregory, you are here as a member of the USA Football's medical advisory committee. What can you tell us about the guideline changes USA Football has made to make the sport safer for young athletes?

Dr. Gregory. Well, as you're probably aware, there are practice guidelines now in place to limit contact, which has, as part of the heads-up program, shown good evidence of decreasing injury, and that is limiting contact to 30 minutes per practice, no more than four practices a week, and no more than 2 hours in total length of practice.

So, decreasing the number of potential hits, which has been shown

to occur by limiting the amount of time.

Mr. Tonko. Thank you. And it's my understanding that USA Football does not operate its own teams?

Dr. Gregory. That is correct. So we can only make suggestions to the leagues that are underneath us. The same problem that all youth sports have. We want these leagues to follow our recommendations, but we can't enforce them.

Mr. Tonko. So, in other words, there's -- it's just a recommendation? There's no way to implement those guidelines?

Dr. Gregory. There's no way to enforce it. We've got to get buy-in, just like what my other colleagues have talked about here. By showing them that it works, get buy-in from these youth coaches.

Mr. Tonko. And, Dr. Gregory, have you been monitoring the rate of injuries, particularly head injuries since implementing these changes?

Dr. Gregory. So in the three areas that we showed with the dataless youth football study, the Fairfax County information here, and in South Bend, Indiana, the programs that implemented the heads-up football, which is the educational proponent and the practice limitations, all injuries, head injuries, all went down in both practice and games.

Mr. Tonko. Do you have any -- do you know anything more than that, other than dropping in --

Dr. Gregory. Well, I gave the numbers already, but I can give them to you again.

Mr. Tonko. Okay. No, just as long as the committee has them --

Dr. Gregory. Yes.

Mr. Tonko. -- that will be fine.

And we have heard from Coach Teevens about his success at Dartmouth in eliminating contact practices and from Mr. O'Neil about practice like pros advocacy for additional rule changes to reduce contact, particularly for young players. The whole Ivy League has now eliminated contact practices, and the NFL allows only 14 contact practices over the 18-week regular season.

Dr. Talavage -- did I say that correctly?

Mr. Talavage. Talavage.

Mr. Tonko. Talavage, I'm sorry. What do these measures, like reducing the number of contact practices and giving players longer rests between such practices do for players, in particular, what is the effect as it relates to the brain?

Mr. Talavage. The more time off they have, the more opportunity there is for the body's restorative practices to repair any damage that's occurred from being hit. So the more time you can give them off, the less likely they are to be impaired, the less likely they are to be injured in the future.

Mr. Tonko. Thank you.

And, Dr. Gregory, given what the science is telling us, why has USA Football not considered stricter rules or guidelines to reduce or eliminate contact for young players?

Dr. Gregory. So what I will tell you is that what has been demonstrated, both at Dartmouth and then high school level, is it's fairly new, and I would say it's very compelling, and the challenge is can we replicate this at the youth level without the resources that they have at the collegiate and high school level? And that's the difficulty. And, again, we can make recommendations; we can't enforce it. So for us, we have to make sure that if we make a recommendation like that, that we back that up by understanding that it can be implemented if we recommend it. And that's -- that's what we need the resources to do.

Mr. Tonko. And yesterday, Pop Warner announced that it would eliminate kickoffs and kick returns to reduce head injuries. It will also reduce contact practice time from 33 percent to 25 percent.

Dr. Talavage, do you think these measures will be effective at reducing head injuries for kids?

Mr. Talavage. They are a good start. We'll say that much. The main issue, I think, just to tie back to one quick comment from before, is that eliminating one or two or three or four big hits per game isn't going to have a terribly substantial effect. I'd be more excited about the reduction in the contact practice time.

Mr. Tonko. Okay. So those are -- those would be the first additional changes that you would encourage?

Mr. Talavage. Yes.

Mr. Tonko. Dr. Gregory, is USA Football considering similar measures?

Dr. Gregory. Considering -- say that again.

Mr. Tonko. Is USA Football considering similar measures as those introduced by Pop Warner?

Dr. Gregory. Well, so one of the things that's pretty clear is this is an evolving game, so this is definitely up for consideration. And rule implementations like this would be looked at and studied and see if -- if it does, indeed, have the same effect to youth that it has at other levels.

Mr. Tonko. Thank you.

Finally, earlier this month, committee Democrats sent a letter to Scott Hallenbeck, executive director of USA Football, about how the organization is ensuring the safety of young football players in addressing the risk posed by both concussive and subconcussive hits. We have asked for a response by May 25th.

Dr. Gregory, can you confirm that USA Football will provide the committee with a response by that date?

Dr. Gregory. I can confirm that. Thank you.

Mr. Hudson. Thank you.

Mr. Tonko. With that, I yield back.

Mr. Hudson. Thank you, sir.

At this point, we'll recognize Ms. Clarke for 5 minutes.

Ms. Clarke. Thank you, very much, Mr. Chairman.

I thank our ranking member. I thank our witnesses for bringing your expertise before us today.

I'd like to talk about the change in culture. As we approach the issue, we have to address sports culture and the attitude of toughness. For a long time, kids have watched their idols deliver the hardest hits on the field and get the most fights on the ice. As we make changes to play and practice, we also need to ensure that that permeates the culture of sports as well.

Look, my first question, Mr. Teevens, is do you believe that players are convinced of the importance of reporting concussions?

Mr. Teevens. I think they are getting there. I think it's incumbent upon the coaching staff to make players aware that it's okay for coaching staff members, says, Hey, you tough guy, the old school mind set, players may not respond if it's opened and it's okay, culture sports it, they will report.

Ms. Clarke. Okay. And do you believe that the coaches and the medical staffs at the higher levels of play take concussions seriously?

Mr. Teevens. I think they do. I think coaching profession is conservative, and a lot of guys that have played less than 5 years ago,

or started coaching 5 years ago or greater, they grew up in a time when you didn't self-report; you didn't know about concussive head injury, and a lot of people teach what they were taught as players. That's part of the culture that needs to change. It's a different time.

Ms. Clarke. There needs to be a disruption.

Do you think that we have been successful in spreading that message?

Mr. Teevens. Not as successful as we need to be, and the broader the better. Again, limiting the injury is -- it's what we're all about.

Ms. Clarke. Mr. O'Neil, the same questions. How can we convince players and coaches to report concussions and treat them seriously?

Mr. O'Neil. Ms. Clarke, it's a great question. And I'd say this to you, when we do our clinics around the country, we have quantified the 19 cases of suspected second impact syndrome that you heard about earlier this morning. We tell those stories in detail with video of the players involved. We tell the stories of catastrophic injury in an effort to scare straight through the coaches these young boys who need this information.

I show my son's concussions as an example. I showed how he lied about his symptoms, did everything to stay on the field. Only when confronted with an impact test that showed he had failed the cognitive

efficiency index test, only then did he admit that, yes, he was suffering a concussion and he was going to have to miss 3 or 4 weeks of play.

It is a huge problem still in high school football, and we think it's a subject about which we need to be direct with players. We tell these stories to the coaches, and we give them the video. We encourage the coaches to tell the players the story of what catastrophic injury can be in their lives if they don't report, self-report, and self-diagnose.

Ms. Clarke. Many kids try to model their behavior after the athlete they revere. We need to ensure that the athletes at the highest level of play, college and pro, are sending the right messages about taking brain trauma seriously.

So, Mr. Teevens and Mr. O'Neil, what can the college and professional athletes and leagues do in carrying that message forward?

Mr. Teevens. I think the coaches would have to drive that message. I say frequently, unless we change the way we coach the game, we won't have a game to coach. And putting into place -- we have an MVP, a mobile virtual player tackling device, that has been tremendous, because we now replicate a moving target at no risk of injury to the player tackling it. Steps like that.

The players will follow the direction of the coaching staffs, and I think coaching to coaches is absolutely critical to get our message

across.

Mr. O'Neil. Ms. Clarke, what's effective for us is when we take these Hall of Famers around the country, Warren Moon tells the audience, he suffered his first concussion at the age of 7 on a practice field in California, needlessly, not in a game, in a practice at the age of 7, and tells his personal story about hiding symptoms and then coming to a recognition later in his career how foolish that was.

We take Anthony Munoz around, and he tells a story of playing for a coach in Cincinnati who wanted to hit and hit and hit every single day, even the day before games on a Saturday. They're hitting each other in goal lines and short yardages drills before a Sunday game. Then he said we had a new coach, and that coach took our approach, which is virtually no contact during the week. And he said, we won both ways, but he said I sure felt a lot better and my teammates did, too, in that second approach, which is so much more effective.

Ms. Clarke. Any of you have any comments about what you think the fans should be requiring of this sport?

Mr. Teevens. I think fans should be aware of it as well, and it's not gladiatorial, it's we have someone's child who is playing the game, and understand some of those big hits. The rules of the game don't dictate taking people out of play by -- by force and injury. It's just get them on the ground. And if there is understanding that long term, people can be in jeopardy if we don't change the way we approach the

game.

Dr. Gregory. The other thing I would add is that the media, which is on ESPN, the hits of the week, are not good hits, if you ask us. Right? That's what's being shown as a highlight. That's not the goal. We've got to change that.

Ms. Clarke. We have to change the culture, then, that requires that everyone that is participating and reveres this game.

With that, I yield back. Thank you, Mr. Chairman.

Mr. Hudson. I thank the gentlelady. I ask unanimous consent that the Institute of Medicine, National Research Council report entitled "Sports-Related Concussions in Youth Improving the Science, Changing the Culture" be introduced into the record.

Without objection, the document will be entered in the record.

[The information follows:]

******** COMMITTEE INSERT ********

Mr. Hudson. I also want to do another promotion of the briefing that Congressman Butterfield and I are hosting on pediatric trauma, May 24th. Encourage all my colleagues and any interested parties to attend that briefing.

And, in conclusion, I would like to thank all of you, witnesses, and the members who participated in today's hearing. A very important issue. I think we've gained a lot of insight today.

I remind members they have 10 business days to submit questions for the record. I ask all witnesses to agree to respond promptly to those questions.

With that, the subcommittee is adjourned.

[Whereupon, at 12:20 p.m., the subcommittee was adjourned.]