



December 2015 Public Health Live Transcript

Identifying and Assessing Mild Traumatic Brain Injury: Guidelines for EMS and Health Care Providers

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This program is called, "*Identifying and Assessing Mild Traumatic Brain Injury: Guidelines for EMS and Health Care Providers*." Our speakers today are Lee Burns, who is the Director of the Bureau of Emergency Medical Services and Trauma Systems at the New York State Department of Health and Dr. Hamish Kerr who directs the Albany Medical Center Sports Concussion Clinic and is the Team Physician for the college. Thank you for joining us.

So Lee, to get us started today, can you talk a little bit about what it is that we hope to accomplish during the hour that we have together?

Lee Burns: Well, today's objectives for the webcast are to inform and enable participants at its conclusion to describe prevalence data on brain injury, identify symptoms of mild TBI, and to recall a prehospital protocol to identify the mild TBI.

Moderator: Okay. So with these objectives in mind, let's paint the picture of what emergency medical services and trauma care here in New York state currently look like.

Burns: Many hospitals in New York State are in the process of going through the verification with the American College of Surgeons Committee on Trauma designation. So, at the end of this whole process, they will be designated as one, two, three, or four level centers in the United States and this is a dynamic time for trauma care in the United States. As a result, it's taken an excellent system and made it even better. When these changes are complete, they should result in even better patient outcomes

throughout the state. The EMS personnel and nurses are an integral part of the whole process and the outcome of traumatic patients.

Moderator: So these factors are likely influencing trauma care overall. As you mentioned, but our focus today is on traumatic brain injury. Brain injuries have been mentioned a lot more in the news and media lately. So, can you explain the term to us, to make sure our viewers and all of us are on the same page?

Burns: Brain injuries are acquired and as they occur after birth and the injuries are as a result of tumors, anoxia or stroke. External forces, traumatic injuries which can be caused by whiplash, blows to the head or body, being shaken, loud blasts such as an explosion, and traumatic brain injuries are a subset of acquired brain injuries.

Moderator: And there are quite a few causes that can contribute to brain injuries. Our focus today is on mild traumatic brain injury. Can you talk about that, what that is?

Burns: Sure. It's TBIs that are categorized as mild, moderate or severe. The majority of TBIs - 75% - are concussions which are considered a mild form of TBI. And the term mild TBI can be a bit misleading, as injuries can have debilitating effects and can last a lifetime, especially when not properly diagnosed or treated.

Moderator: The Centers for Disease Control and Prevention has a series of videos about TBI. Let's see how the brain can be damaged when a person sustains a mild TBI.

So the idea of the helmet, if you think about how the brain might move inside the cerebral spinal fluid that's inside the cranial cavity - if you and I were having an egg toss and the yolk represents the brain and the eggshell represents the skull and the cranial cavity. If we had this egg toss, every time that it leaves my hand and moves through the air to you, it accelerates as it leaves my hand. As you catch it, it decelerates and that egg yolk is rebounding off the underside of the eggshell, much like the brain goes off the underside of the cranial cavity. So that movement is going to take place whether or not we put bubble wrap around that eggshell, or a helmet on the head. Now, that helmet might prevent the skull from fracturing. And the bubble wrap, as we increased our distance during our egg toss might prevent the eggshell from cracking. But it's really not able to prevent that movement, so that's really the problem.

A concussion is a type of Traumatic Brain Injury or TBI caused by a bump, blow or jolt to the head or by a hit to the body that causes your head and brain to move rapidly back and forth. This sudden movement can literally cause the brain to bounce around or twist in the skull, stretching and damaging the brain cells and creating chemical changes in the brain. What you might not know is that these chemical changes make the brain more sensitive to any increased stress or

injury until it fully recovers.

Moderator: So, certainly, I think that video illustrates the severity of what we're talking about today. So can you talk to us about TBI incidents here in New York State?

Burns: Sure. The reported incidents are very high. Based on hospital data sent to the department of health, it indicates that there are 140,000 incidents of TBI that occurred in 2012. That translates to an average of 400 persons a day who may have sustained a TBI. Reported incidence is known to be significantly underreported - as much as 50% -- and don't reflect brain injuries that are treated by urgent care centers, physicians offices or those people who just figure they can walk it off.

Moderator: So even with the high numbers that we are seeing, probably the numbers are even greater is what you're saying.

Burns: Oh, 100% yes.

Moderator: Are there certain people, or groups, at greater risk for TBI?

Burns: Yes. Actually, very young people and older people are at greater risk. Young adults, young adults through age 22, have high rates of injuries as well.

Moderator: Now, what would you say are the leading causes of Traumatic Brain Injury here in New York?

Burns: Falls are the number one cause, followed by vehicular crashes and assaults, which include domestic violence and child abuse cases.

Moderator: Now, with an average of 400 TBI incidents that are reported by hospitals each day, the incidence of TBI, that's an extraordinarily high number. Can you talk more about that?

Burns: It's very, very high and yet it's estimated that another 50% go unreported. This is because reported cases, again, involve hospital encounters only, and exclude the people who go to urgent care centers or their doctor. Or, they just again don't think that it's affected them. And unreported cases are likely as high as, you know, you will see in the following slides.

Moderator: So fall injuries, are they the largest cause of TBIs?

Burns: Yes, based on the hospital data, it indicates that 71,000 TBI incidents that hospitals see are from falls in all age groups. The data also revealed that fall injuries for just children and adults over 65 were nearly 225,000, meaning children and adults over

65 went to the hospital because they fell. And those did not include diagnosis of TBI, so it's possible that those people may have also sustained concussion. And this is three times higher than TBI for all age groups. Again, given the mechanics of brain injury which is what we'll discuss later on, the disparity suggests that concussions really go undiagnosed even in hospitals.

Moderator: Now, is this problem of underreporting or underdiagnosing – is it a problem for other causes of TBI as well, for example, vehicle accidents?

Burns: Yep. We have slides that show the difference between the numbers of occupants in motor vehicle crashes as compared with the hospital data reporting TBI as a result of concussion, and the differences are remarkable. This underscores the need for TBI training across all the health professions and including law enforcement and first responders and students studying and health professions.

Moderator: Absolutely. Now, to gain insight into the effects of concussion on one population of students, we asked Rick Knizak the Athletic Trainer and Concussion Management Coordinator at Shenendehowa School District to share insights about how his district responds to concussed students. His remarks will be followed by a mom's experience helping her daughter recover from a concussion.

Since 2012 in New York State, we have a concussion management law which provides for anyone who is suspected or known to have concussion-type symptoms to be immediately removed and evaluated by a physician. That being said, that law applies to interscholastic sports, but unfortunately not to youth sports. Somebody responding to a potential situation, you would expect different types of injuries, recreationally versus interscholastically, but even though the causes might be different, the signs and the symptoms and the mechanisms are usually the same. From working with middle school athletes, the effects from the concussion are pretty significant. We see kids impacted both inside and outside the classroom - physically, cognitively, mentally. You know, we have a good policy in place here where we really are conscientious about following not only an athlete's return to play, but also a non-athlete's return to just academic or other physical activities. This is probably the biggest area that's evolved over the last couple of years is understanding how kids recover and more importantly how kids recover differently. Each concussion case is really an individual thing. And it can be very subjective in terms of, you know, identifying those types of symptoms. Anybody who is responding to a call for a possible TBI really needs to understand that when you assess somebody, especially a younger adolescent athlete, it's extremely subjective. The information you'll get from self-reporting might not be complete. So I think from an EMS provider standpoint, you do need to understand that you would have to take the lead in a situation involving an organized club sport, much more than you would at the high school

interscholastic sport level. So they would be the primary person to give that person an initial assessment and determine or try to determine the severity of the injury involved.

Tracy suffered a concussion in a basketball game in January of 2005. When Tracy's injury happened, it didn't just happen to her. It happened to the whole family. What a lot of people don't realize about concussions is how serious it can change your life. It's been over 3 1/2 years already, and she's still struggling with dizziness and having problems reading. She's been hospitalized so many times. I couldn't even tell you how many - what we're at, what number we're at in terms of emergency visits and hospital visits. The good news is, three and a half years later, there is progress. So there is hope. But one of the most important things is to educate people so that no one else would need to go through this again. The most important thing that I would ask any parent to consider if they do have a child that has a concussion, or they think may have a concussion, please take a step back and make sure you're doing the right thing for the athlete and for your child. Get them to a doctor right away. Get them help. No scoreboard is that important. No win or loss is that important. We really need to make the right decisions for them. To learn more about concussions, visit the website at www.CDC.gov/concussionsinyouthsports.

Moderator: I think both of those videos certainly helped to paint the picture of what it is that we're talking about here. So can you talk a little bit about different youth sports and concussion rates?

Burns: Sure. As Rick in the video pointed out, sports can be a very positive activity at any age. But ones that are particularly physical raise the risk of sustaining a brain injury. So obviously, highly physically active and aggressive sports or recreational activities increase the risk of concussion. And this holds true even when protective equipment is worn and worn correctly. New York state has a concussion management law that requires schools to presume that a student is concussed when there is a suspicion of a head injury. EMS personnel may be called to attend such injuries, and need to be prepared to assess, treat and transport if need indicates. And advise about these injuries - not every bump or blow to the head really necessarily is a concussion, nor does it require transportation. However, careful assessment is needed to make those determinations and to be sure that somebody has not sustained a mild TBI.

Moderator: Sure.

Burns: So this slide shows the youth sports with the highest concussion rates. You can see there's certainly a difference in the list for boys and girls. For boys, football leads the way in causing concussions, followed by ice hockey, lacrosse, soccer and wrestling. For girls, soccer leads the list, followed by lacrosse, basketball, softball and field hockey are

top. In regard to TBI among sports and recreation activities, the American Association of Neurological Surgeons has compiled a list of sports and recreational activities with the highest number of emergency department visits for TBI. Interestingly and frighteningly, bicycling leads with over 185,000 injuries followed by football, baseball and softball and basketball. Cheerleading has a high rate of injury as does horseback riding, which causes well over 14,000 brain injuries, followed by golf with over 10,000. This report notes that the incidence is underreported. It is underreported it's suspected to be so by as much as 50%.

Moderator: That's a startling fact to take in. Those numbers are nothing to gloss over. Now, Doctor Kerr, let me turn to you for a bit here. Thank you for joining us. It seems as though TBI symptoms may be fairly subtle sometimes and therefore present a challenge for people to identify, that is correct?

Dr. Kerr: Thank you Rachel, yes. Maybe I should explain my involvement in assessing concussions first. I work as a team physician at Siena College and I also work for USA Rugby. So I'm often field-side, helping identify people that may have had a traumatic brain injury. It's not an easy thing to do when there's a lot of action on the field. And we really do need sort of, methods and evaluation tools to help us with the process. Sports medicine has gained a lot in terms of research in the last few years. This can help us in how we manage other injuries too, such as falls and cycling injuries or motor vehicle accidents. So I think that process can help us to identify these more subtle injuries, because as Lee mentioned, not every jolt in the head is a concussion or a Traumatic Brain Injury. You really do need this careful and correct assessment to ensure that you're identifying people that may have sustained a brain injury. For some people, symptoms may not surface until the next days or weeks later so that's important.

Moderator: So, knowing more about the incidence and causes of Traumatic Brain Injury, can you tell us about the severity of the injury to the brain and the range and spectrum we're looking at?

Dr. Kerr: So we're focused on the mild traumatic brain category, --there are also moderate and severe injuries we really aren't going to talk about. It's 75% of all mild traumatic brain injuries in fact are concussions. And you know, there's a lot of mild traumatic brain injuries that really can cause disabling and prolonged symptoms that can remain lifelong such as in the video we saw of Tracy and her mom.

Moderator: Now, can you describe the symptoms that can occur from a mild TBI or a concussion?

Dr. Kerr: Absolutely. There's really, sort of, three categories of concussion symptoms that we think about. We have cognitive symptoms, we have physical symptoms and often later in the process we'll have emotional symptoms. Symptoms can include the

most common ones such as having a headache, feeling dizzy, being nauseous or vomiting. Intractable vomiting is a concerning feature. Often people are sensitive to light and light will hurt their eyes. Their balance will be off. That's one of the things that we often recognize in the athletic field is someone stumbling around and their balance is off. Not being able to remember information and feeling generally mentally foggy. Those are examples of some of the cognitive symptoms.

Moderator: With all of the different symptoms in mind, and there are more on this slide than even what you just referenced, it seems like using the term "mild" to describe a mild TBI can be somewhat misleading, and Lee alluded to that earlier. So there's no wonder it's misunderstood in terms of how people evaluate the severity of the situation. Can you talk more about that?

Dr. Kerr: Absolutely. There's nothing mild about it. I would say that's entirely correct. And it can be a misleading term. However, it is useful in differentiating from more serious brain injuries such as intracranial hemorrhage and skull fractures and phenomenon such as that. Even mild traumatic brain injury can lead to chronic disability and I think that the CDC website does a very good job of documenting examples of that, and hearing from patients like we heard from the mother in the video.

Moderator: Now, what about when someone sustains multiple concussions, because when we're thinking of athletes, for example, certainly they're not getting hit in the head once. This can happen again and again. Does that put person at a greater risk for brain trauma?

Dr. Kerr: This is a particular interest of mine in the sports medicine field. I try and conduct injury prevention and I think if we could prevent people from having multiple injuries, that would be ideal. Unfortunately, that's not what happens. Once you have had one brain injury, you are more likely to get another. And unfortunately, repeated injury seems to make you more susceptible, whether that's because of some balance disorder you might have or whether there's some neurochemical change in your brain that makes you more sensitive to further trauma. So it's important that we recognize concussions because if an initial concussion is recognized, maybe we can – as the medical profession – can intervene and prevent multiple injuries. So that's really something that I like to do. Among youth athletes, for instance, if you have had a concussion, you're probably three or four times more likely to have another concussion.

Moderator: Wow, okay. Now, to better understand how brain injuries vary in types and seriousness, can you tell us about the mechanism of a brain Injury?

Dr. Kerr: Sure. I think Kevin Guskiowicz did a nice job of explaining it in the video and it really sort of leads us to understand there's acceleration and deceleration going on in the brain. You can sustain a trauma and that will result in the brain moving inside the

skull. The brain slams against the surface that it's nearest to. We call that a Coup injury. Where the blow occurs. There's then a rebound called a Countercoup injury that will cause the brain to collide with the opposite side of the skull and that can result in trauma. There can be shearing and rotation involved in the internal structures in the brain. We have come to understand that the angular and rotational acceleration is probably more important in those shearing injuries. And that may be more of the problem in terms of preventing these type of injuries, is being able to diminish rotational acceleration in the brain.

Moderator: Now, from your description, I mean, talking about the brain, which is a pretty important part of us, - talking about slamming and shearing, words like that, I mean, those are strong words. So painting that picture, it's no wonder that even a mild TBI can cause serious injury to a person.

Dr. Kerr: Absolutely. You know, we've come to understand more and more about what's happening at a cellular level in the brain after the injury and the neurochemistry is altered. There are neurotransmitters that are firing when they shouldn't that result in these symptoms and the effects of a concussion. So there's more and more understanding being developed in that realm. There's a recent National Institute of Health report on concussion in sports which has helped with that process. And, you know, we really have come to understand that even with a mild injury, there are these new chemical alterations that last for days and weeks.

Moderator: Well, thank you. Now, Lee, I'm going to turn back to you again for a minute and, with all of these symptoms in mind, and with the severity of what it is we're discussing, can you walk us through what emergency medical service personnel, physicians and nurses should be looking for in terms of trying to identify signs of mild TBI?

Lee Burns: Yes. There are four steps in - and adhering to the steps can help indicate whether a brain injury has occurred and how severe it is. The steps will also help, you know, in determining whether, you know, again from the EMS perspective, the provider should, you know, do what they do best and that is, you know, size up the scene, be sure the patient or patients are safe. Do an initial assessment, you know - airway, breathing, circulation, establish a level of consciousness. Obtain their initial set of vital signs and then determine the Glasgow Coma Scale rating, um, their systolic blood pressure and respiratory rate. If they reach special levels as indicated on the slide, then the person should be transported to the highest trauma center available in their area.

Moderator: What if there's no trauma apparent to the EMS or the nurse or the physician, what would be the next step?

Burns: In that instance, the next step would be to try to figure out if the person lost consciousness for 30 minutes or less, as well as whether they remember the initial injury – you know – before the injury, just after the injury. Do they have an altered state of consciousness? Have they had any altered state of consciousness in the last 24 hours? And what is their current Glasgow Coma Scale?

Moderator: So, that would be Step Two. What happens in Step Three?

Burns: In Step Three, it is important to assess the mechanism of injury and the energy impact. In adults, a fall of greater than 20 feet will generally result in a greater impact than a fall from a standing position. But let's say a person falls off a ladder and was able to catch themselves and another part of their body hits first and they can break their fall. The mechanism and energy of the impact to their head may be less than a person who essentially falls from the standing position and their head is the first thing that contact the ground. So the fall from a standing position may be a more severe injury than a fall from a ladder, in terms of a TBI, and this explains why it's important to assess both the mechanism of the injury and the energy impact for the concussion.

Moderator: In addition to falls, we talked about vehicle accidents being one of the leading causes. Certainly the New York State DMV has many reported vehicle accidents. Can you talk about that?

Burns: The occupants should be assessed for all kinds of injuries – neck injuries, whiplash, among symptoms that may indicate a concussion, at a minimum. And also, certainly with vehicles and air bags, the air bags are hitting the patient, although, you know, they're helpful and reduce injury but they're also coming out and hitting the patient in the head. So even if the air bag is deployed, the patient should be assessed for a concussion.

Moderator: Now, there's another step as well. Can you talk about Step Four?

Burns: This step focuses on our special populations. The CDC Field Triage Guidelines specify several actions which are included in the New York State BLS EMS prehospital protocols and fall under step four of the Prehospital Assessment. These populations include children, pregnant women at 20 weeks or more and sadly, speaking for myself, persons aged 55 or over (I'm suddenly in a special population). Also, people who are on anticoagulant medications or have bleeding disorders and can experience rapid deceleration so that rapid transport without delay is required, and they should be taken to a hospital equipped for a timely and thorough diagnosis like a trauma center.

Moderator: How should an EMT or medical provider make their judgement in these kind of cases?

Burns: Having good judgment is vitally important, but using the CDC 2011 Field Trauma Triage Guidelines, what the American College of Surgeons are quoted - the pre hospital trauma system is driven by the goal of getting the patient to the right place at the right time. So it's important not to over-triage when is when a minimally injured person is transported to the higher level of care, but the flip side is, not to discount the patient when, you know, there may be a severe injury and they're transported to the lower level of trauma center or to a general hospital that's not equipped for such patients. Time is really an issue. So an individual who may have been under triaged and transported to the lower level of care will then have to be diagnosed and then transported to a trauma center. So all that takes a lot of time.

Moderator: Absolutely. Now, what if none of the criteria that you referenced before exists, then what happens?

Burns: Well, the next step is to look for the following signs and symptoms and if they're present, transport the patient to the highest trauma center possible within the defined system. The assessment is crucial and brings to mind the case of Natasha Richardson, who was the actress who died of a brain bleed. She was skiing with her family, and basically, fell from a standing position on a beginner's slope. The EMS and the ski patrol were called and they assessed her. They correctly recommended she be taken to the hospital for further examination. She was wearing a helmet. She declined and returned to her hotel room. Her family noticed her condition worsen and by the time the ambulance was called for the second time, she had a diminished level of consciousness. And she was declared brain dead upon arrival at the local hospital. So it's important to carefully assess if a patient has, you know, their condition is deteriorating. I think it's important even though when you think about that particular situation, you know, the providers really did try and impress upon her and her family the importance of being seen by a physician. So it seems, you know, a seemingly innocent or exigent injury can lead to a devastating brain injury.

Moderator: Absolutely.

Burns: So persons with any symptoms of mild or moderate severe trauma should be transported to the emergency department and don't waste time. That's a message both to EMS as well as parents and patients.

Moderator: Absolutely. And I think, you know, just from a personal standpoint, it is the sort of thing that you think, "Oh, it was only, ...", you know, I was recently in a car accident. They asked me okay, I was fine - I was hardly going. And then I started to work on this show and I thought I should have gone to the doctor because people generally are unaware of a mild or moderate brain injury. What do you think is the most important recommendation?

Burns: Just simply if there's any doubt if it's a TBI or not, seek medical attention. Have the EMS take you to the trauma center. I know the take-home message for mild TBI is really, "When in doubt, have it checked out."

Moderator: Now, if the injured person hasn't met any of the criteria, we have discussed so far, then what happens?

Burns: Well, then you assess for other physical or cognitive or emotional symptoms, determining their presence, either by observation or interviewing spectators or family members. You know, some of those things may manifest themselves in dizziness, light or noise sensitivity, hearing impairment or processing speed, meaning they're having trouble getting their thoughts together. And the patient may feel mentally foggy. So the physical symptoms, you know, reported to you will be, "Gosh, I have a headache. I'm dizzy. I feel like I'm going to vomit." Fatigue, blurred vision, lighter noise sensitivity, and, again, hearing impairment. And some of the cognitive symptoms include amnesia, difficulty with attention, concentration or memory. And again, processing speed, executive control, judgment and feeling mentally foggy. And then also, which from a prehospital perspective we don't often consider, some of the emotional symptoms which include anxiety, agitation, depression, irritability, impulsivity or aggression.

Moderator: Now, to review what you have covered, what are the questions that should be asked?

Burns: Well, if – you know, maybe the first question is, "Do you remember ever hitting your head or having a blow to your body before?" And if the answer to that question is "Yes," if you remember hitting your head, "How many times has this happened?" And if the answer is more than once, there's an increased risk that this injury is more serious than outwardly appears and may require transportation to a trauma center.

Moderator: So, now what happens – because I imagine this is something that people come up against is that you ask the questions and as a medical personnel you believe that this person should be transported to the trauma center, as you just finished describing. The patient refuses transport. Then what happens?

Burns: Well, should the symptoms be present, it's the responsibility of the EMS providers to do all that they can to impress upon the patient and family that they should be seen by a medical professional. They need to, you know, essentially, discuss this with the patient, review the signs and symptoms. Provide the patient with the Brain Injury Symptom Wallet card that we have samples of, inform them of the importance of brain rest after injury. Document the incident thoroughly on a prehospital medical record. And then, if they continue to refuse treatment or transport, document their refusal. I think the health department's Brain Injury Program printed these great wallet cards, and they're available. The first printing was sent to the EMS community for use

in their ambulances. And should they come across somebody who absolutely refuses to seek medical attention, as part of their refusal process, providing them with this wallet card is really important. Because the card goes through all of the signs and symptoms. And it really is – it's small, but it is very effective at educating the patient and family about what might have happened.

Moderator: And those are available for folks?

Burns: They are. The card – again the card was developed by the TBI grant program with the New York State Health Department. It's the handy dandy wallet sized card.

Moderator: Which is great.

Burns: It is. The handy dandy little card trifolds, and, for myself, I have a bale of them for my ski patrol to hand out should anybody come in with a head injury. But again, the card lists signs and symptoms. If you see these things, you should seek medical attention.

Moderator: Fantastic. Thank you. Now, Doctor Kerr, I'm going turn to back to you. The GSC scale is an integral part of the assessment. Can you talk more that?

Dr. Kerr: Yeah, the concept we need to remind ourselves of is that brain injuries can evolve over time. If we think back to the Natasha Richardson case, for instance, there was a change there from someone that was initially well to someone that was profoundly unwell. And what's important is that people can evaluate a patient in a structured way over time and repeat the same assessment the same way, so that you can see that change in status and deterioration. It may also be that there are different people who may be conducting the evaluation, so it's really important that everyone involved follows the same process.

If we think about the different components of the Glasgow Scale, there's an initial assessment looking at the response of the eyes. We can see on the slide that most people should have spontaneous eye opening. So they would score four on this scale. If they don't have spontaneous eye opening it's up to the first responder to try and interact with the person to see if they respond to voice, in which cases they respond to voice. If they don't respond to voice, you apply pressure and that's a stimulus that we could score two. If that's no response, you score one. So the first part is the eye response. That takes a few seconds to initiate. Then we go on to a verbal response.

The verbal response and the eye response are particularly relevant for less severe injuries, whereas the final component of the Glasgow Coma Scale, the motor response, tends, to affect people who are more severely injured. Verbal response – we expect people to obey simple commands. And that scores six on this scale. The verbal response

is orientation. So they score five on the verbal response scale. If someone is asking if they're oriented, they seem confused, they would score four. If they are unable to really talk to you and are only just muttering words then they score three on the scale. If there's not even words that are able to be deciphered, that's even less of a score. That's, you know, like a two for sounds. And if there's no verbal response it's a one. So you can see that the verbal response is a five and the eye opening response is a four. I guess my personal recommendation in regards to the scale is that it's really important to be able to look at it, and it is on many of the data sheets that EMS providers will have. Because it's difficult to remember this stuff when you are on the sidelines trying to evaluate people.

Moderator: And did you want to talk more about the motor symptoms?

Dr. Kerr: The motor part is certainly something that can be affected with the more severe injury. The ability to obey commands scores six, and then differentiating types of movement, if somebody is not able to obey a command. For instance, if you're able to apply pressure in the ridge above the eye, that would result in the patient reaching and localizing to that and trying to stop you doing that. That would be the localizing response which would score five. The other responses are sort of more profound brain injured patient responses to stimulus. And with the application of pressure to the super orbital ridge, for instance, they may flex and, you know, that's an abnormal response. If they extend to the stimulus, then that's an even more of an abnormal response and only scores two. These are really kind of primitive reflexes that the human body will conduct with a stimulus after a brain injury. And being able to differentiate one from the other can really help you to see this deterioration. So that's the motor response part.

Moderator: So once a patient is assigned a score on the scale after assessing the three different components? What does the score indicate?

Dr. Kerr: The initial component of determining the score is trying to differentiate those who have had a mild injury from those with a moderate or severe injury. Someone that's, you know, unconscious and is not really responsive has much greater likelihood of a more moderate to severe brain injury. So we can see on the slide that those with a mild traumatic brain injury would score, probably, 13 or more on this scale. The moderate injury would have a score between nine and twelve. Those with a severe injuries, less than eight.

Moderator: Now, in your opinion, how helpful has the Glasgow Coma Scale been in helping EMS to identify and respond to mild TBI

Dr. Kerr: Well, I'm a bit biased - I don't know if you can see my tie but I graduated from the University of Glasgow, so I think the Glasgow Scale is a useful and helpful tool for the reasons I have described. It can be conducted the same way by different providers

or the same provider over time. That's really the important concept here is that you need to be able to recognize deterioration in the scale over time. So the scale appears in the back of the patient care report, used in NY by EMS providers. It's available on many apps on your phone. So it's very useful. It does take some practice. I think it's a useful thing to go through as an in-training and not just reviewing it here, but actually trying to conduct this type of scale can help you to be able to do it when you're in a circumstance under pressure and evaluating a patient.

Moderator: Now, are the recommendations.... are they different for patients with a GCS of less than or equal to 15?

Dr. Kerr: Absolutely. So a GCS of 15 with a combination of other injuries, in that circumstance, EMS personnel know that the patient should be transported within the trauma system and probably need a multidisciplinary assessment as rapidly as possible. If their score is less than 15, or it's still 15 with multiple injuries.

Moderator: Now, what are some other important aspects of using the GSC in the prehospital assessment setting?

Dr. Kerr: I think just documenting what the score is and, you know, making sure that you're tracking that over time. There are so many things involved in our first responders' assessment of a patient. And this has to have a place in that assessment. We all know about the ABCs - Airway, Breathing, Circulation - and the GSC I think is a useful "D" for disability. So that should be something that you conduct repeatedly, any time a patient's status changes, for instance, if they are placed on a spine board, you know, reviewing the scale after that intervention is appropriate. That way, you're tracking that over time, and it's important that its conducted in the same way and that you're documenting the score each time.

Moderator: Excellent. Thank you. Now, Lee, I really like the Doctor's - we have the ABC and adding this on as a "D," that kind of underscores the importance. But I understand the CDC guidelines are not being optimally undertaken. Is that right?

Burns: I think I would agree with that. This has been documented by the American College of Surgeons, and the CDC Field Triage Guidelines are essential. They're included in the NYS prehospital protocols and it's why this training is so very important. It's a constant reminder. Health professionals need to know the proper response to incidents of brain trauma.

Moderator: Now, we have covered a lot of information today between the two of you. So Lee, can I ask you to recap some of the signs and symptoms that folks should be looking for to indicate a possible mild traumatic brain injury?

Burns: Absolutely. The signs and symptoms that indicate emergency care is needed are on the slide, and if you review the left side of the slide, the signs and symptoms include neck pain, worsening headaches, slurred speech, difficulty with vision, difficulty with balance and walking, seizures, increasingly confused or restless state. If you look at the right side of the slide, the follow-up medical care, you know, for a mild TBI may include sensitivity to noise or light, headaches, dizziness, blurred vision, nausea, balance problems and feeling mentally foggy. In all of these cases, the Glasgow Coma Scale should be determined to inform further assessments and decisions. So I think to Dr.Kerr's point, if I establish my initial GSC scale and then the patient – you know, I must document that, and the patient during transport may be re-evaluated. Then once they arrive at the hospital, you provide that information, and the emergency department staff know whether there's a change.

Moderator: Thank you. Dr. Kerr, anything you want to add to Lee's synopsis?

Dr. Kerr: So I think the lessons that we can learn from the process that you need to conduct are very similar in EMS circumstances for the general public and what we do field-side in sports. There's a tool called the Sports Concussion Assessment Tool - it's available online. That has many of the aspects that are required or recommended for urgent transport, such as assessment of balance, assessment of external ocular muscle movement and looking for people that may have those symptoms and conducting those assessments are very useful. It helps our medical staff that are covering sporting events to know when people need to be transported to the hospital and certainly removed from their sporting activity. That's really important. I think that the final point I would make is that we need to recognize that we're not going to be able to diagnose everyone with a mild traumatic brain injury at our initial point of contact. We need to maintain a suspicion of a brain injury and make sure that we follow up with appropriate providers if they're not going to the medical department that day. In sports, we have the phrase, "If in doubt, sit them out." So that if we're not able to diagnose the injury field-side, we can make sure they don't sustain any further injury that day by making sure they're resting from activity.

Moderator: Well, thank you so much. Now, before we take questions from the audience, I want make sure everybody knows that the Brain Injury Wallet Cards referenced earlier can be requested via e-mail, and a list of the references is also available on our website. So make use of those. I'd like to turn to the questions we have gotten from the viewers. The first question says, for minor car crashes, EMS are never called. I can attest to that very recently. Local and state police are called to document the crash. It seems like a large number of people may walk away with a concussion and not be aware of it. Can this training also benefit law enforcement?

Burns: Absolutely. There's no question about it. And in fact, distributing these cards along to local and state law enforcement would be an excellent plan.

Moderator: And I think to that end, of partnering with law enforcement, we have seen – we did a show several months ago about working to reduce heroin addiction, and really seeing public health departments starting to partner with law enforcement agencies has been effective. I think this is another great opportunity to get people who are first responders to these kind of situations who may not be medical professionals – getting them informed. So certainly spreading the word to all of the different communities.

We have another question: Can the speakers address why they think this hasn't gotten more press and attention from the policymakers? The CDC calling it an epidemic would seem to elevate the importance?

Dr. Kerr: From my perspective, I *do* think this is getting the media's attention. And, you know, week to week, we are sent e-mails and articles that are alerting us about brain injuries, particularly in sports. Obviously from the data that Lee's done a great job of reviewing today, there's falls and more vehicle accidents and child abuse that are just as important as sports, but sports gets the media attention. So I do think there's precedent for us to be reviewing the laws and the administration. And, you know, I think there has been change. Rick Knizek mentioned the 2012 law in New York State, making sure that people playing youth sports in high school are assessed by someone with a medical background. Unfortunately, that's a very limited part of the population. There are so many kids out there playing travel sports that don't have anything to do with the high school. So we could do with further legislation to make this more universal. I think there are nationwide - there's a big kind of focus on head injuries. We have the movie "Concussion" coming out in a few days. So, I'm sure this will remain a hot topic and hopefully we can use that to enforce change. I think education is the number one key feature here. We need to make sure that, like you mentioned, not just the medical profession, but the lay public, need to understand about head injuries and how they're assessed so that the police officers, our fire staff and anyone that's out there in the community wanting to help can know how to assess people.

Moderator: All right. I'll try to get one more question here. Can you tell me more about brain rest?

Dr. Kerr: Brain rest is a hot topic too. There was a great paper that came out last year in the journal Pediatrics suggesting that brain rest is perhaps overrated, but an initial concept is that cognitive and physical rest are really important after a head injury. So for at least a few days after an injury, people should understand that they shouldn't continue to partake in physical activity and should probably rest from cognitive activities too. For kids, they should likely have a couple of days off from school. I think our emergency departments around the state do a pretty good job of giving that recommendation. But if people don't go to the emergency department and are really just assessed by the first responder, then that's perhaps an important added piece of

advice. I don't know if you agree with that, Lee?

Lee: I do. It's also one of the recommendations on the card.

Moderator: If someone has sustained a mild TBI in an auto accident, what do you recommend as an after-care regime? Should the MRI records be reviewed and others produced in the ER? Should a specialist be following the case?

Dr. Kerr: A little bit of a tricky question. I think, you know, the usual process is EMS or the first responder, whether or not someone is evaluated in the emergency department, they're often referred to the primary after that. And I think the primary care provider's job is to decide whether to see a specialist. I think, you know, that makes the most sense. If the emergency department really needs someone specialized to be involved, they'll make that decision in the emergency department. But a majority of patients will follow up with the primary care doctor, and imaging is sometimes necessary but that's on case by case basis.

Moderator: Okay. We have time for one more question: Are there guidelines for school-age children to return to school after a concussion? For example, how long should they be out of school, refrain from doing homework?

Dr. Kerr: That was addressed in the paper I mentioned in Pediatrics. The conclusion really was probably a few days off of school are good for you, but if you take more than a week off, then that might have a deleterious effect. So school is our kids' social life. It's important they're not missing out on that more than they need to. My practice is to really try and keep people out of school for a few days the first week after an injury, but the second week get them back to half days. Some kids just can't attend school at all. It's too much stimulus, it's too noisy and too bright and they get jostled around in the hallways. For them, they need a period of time to be cared for at home. Even then, patients being cared for at home can do a couple of hours of work of some type. We try to keep them up with schoolwork as much as possible. I think having a program at your school is ideal. Recognize it's an ideal circumstance where they have an entire committee that determines that. Not all school districts have the resources of Shenendehowa, so I do spend quite a bit of time trying to discuss what different places can do to help their children who have had head injuries.

Moderator: Thank you both so much for all the information you shared with us today. I think this is incredibly valuable to our community.

Burns and Dr. Kerr: Thank you.

Moderator: And thank you very much for joining us today. Please remember to fill out your evaluations online. Your feedback is always helpful to the development of our

programs and continuing education credits are available. To obtain nurse continuing education hours, CME, CHES, or general education credits, visit www.phlive.org and complete an evaluation and the post test for today's offering. The New York State Department of Health will provide EMS credit hours for EMS providers. Additional information on upcoming webcasts and relevant public health topics can be found on our Facebook page. Don't forget to like us on Facebook to stay up to date. This webcast will be available on demand on our website within two weeks of our show. Please join us on January 21, 2016, for our next program, focused on: Parkinson's Disease – the Importance of an Interdisciplinary Approach for Identification, Treatment and Patient Support. I'm Rachel Breidster. Thanks for joining us on Public Health Live!