April 2015 Public Health Live! Transcript

Moderator Rachel Breidster: Hello and welcome to Public Health Live!, the Thursday Breakfast Broadcast. I am Rachel Breidster, and I'll be your moderator today. Before we get started I ask that you please fill out your online evaluations at the close of today's broadcast. Continuing education credits are available after you complete our short post-test, and your feedback is helpful in planning future programs. We encourage you to let us know what topics are of interest to you, and how we can best meet your needs. As for today's program, we will be taking your questions throughout the hour by phone. Our toll free number is 1-800-452-0662, or you can send us written questions, throughout the hour at phlive.ny@gmail.com. Today's program is Recognizing and Treating Mild Brain Injury. Our guest is Doctor Kenneth Shapiro who serves as the Medical Director for the Traumatic Brain Injury Program at Sunnyview Rehabilitation Hospital in Schenectady, NY. Dr. Shapiro, thank you so much for being here today.

Doctor Kenneth L. Shapiro, MD: Thank you for having me.

M: Now, you have many years of experience in the field of traumatic brain injury, and I'm very pleased that you're here to talk with us. Can you start by just explaining, why is it so important for us to address this issue on the show today?

S: Well, brain injury is sometimes considered to be an injury that is almost invisible in its impact on a person's life, yet it can be extremely debilitating. It can affect a person's ability to work, interact in society, and it's not always obvious. Someone may be behaving in an unusual way, and that could be related to sustaining a brain injury of some sort. Brain injuries do occur frequently, probably more so than people realize. I believe the incidents reported in the State of New York is something along the lines of 400 a day, at least, by emergency room visits. It can be even more frequent than that. But it's definitely a problem that requires some degree of sophistication to recognize and identify it, particularly from a health care practitioner's point of view. So, it's a significant problem.

M: Now, I have heard traumatic brain injury referred to as something called a silent epidemic. Where does that term or label come from?

S: I think, as I alluded to before, you can't always see the impact. So, a patient who sustains a brain injury may not always be aware of it. You know, we talk about different kinds of brain injury in terms of severity, and oftentimes, we're referring to mild or moderate or severe brain injuries, and obviously, with severe brain injuries, sometimes there's greater impact physically and more obvious impairments than are visible to the unsophisticated eye. But even patients who sustain severe traumatic brain injuries, when they recover, the impact on their personality—on their cognitive or thinking skills—is such that they are completely changed human beings; and if you didn't know that person, you wouldn't know that something happened unless you were told.

M: So, what exactly are brain injuries? Can you talk about how that occurs?

S: Well, an acquired brain injury occurs after birth—it's not something that you're born with. Most commonly, we think about trauma -- motor vehicle accidents, sporting accidents, falls. Other types of acquired brain injuries occur as a result of illness. So, stroke is an example of an acquired brain injury—
brain hemorrhage from an aneurism. Toxic causes, such as carbon monoxide poisoning or other secondary results of disease or illness, like cardiac arrest, results in lack of oxygen flow to the brain, and that results in an acquired brain injury.

M: That's an interesting one, because I have to say from my own experience, some of those things I would never have thought of as being related to an acquired or traumatic brain injury.

S: Well, as I said, some are traumatic, others are non-traumatic, but they're still acquired.

M: Now, when we talk about numbers in New York State, and I know you alluded to this a little bit earlier, but how many traumatic brain injuries are we talking about in New York State?

S: Well, some numbers that we've seen from the state point of view, according to ER visits, I think they're talking about something in the range of about 400 a day, but it's probably more, which adds to that silent epidemic thought process, because there may be people seeking help in their primary care physician's office that those aren't reported—those are mostly trauma-related. If you add in the other acquired types—strokes probably being most common, brain hemorrhages and so on—there's probably over 500 a day.

M: So, that really adds up overtime. I mean, those are some pretty startling numbers.

S: Yes. They are.

M: Now, how many total acquired brain injuries occur in New York?

S: Well, as I said, the emergency room reports in the state of New York, we're talking about 400 a day, and then if you add on the invisible part of it is what might be seen in offices. So, when they talk about the 400, we're talking about emergency room visits.

M: Now, are there certain populations that are at greater risk than others?

S: Well, we talk about a bimodal demographic, young and old. So, younger people oftentimes, of course, there's more risky behavior. The traumatic types of motor vehicle accidents, perhaps substance-related injuries, whether related to alcohol or other substance use. And then the older population. People as they get older have a greater tendency to fall, and falling is a very frequent cause of traumatic brain injury. So, the over age 65 and the 18 to 25 age groups are the two peaks, if you look at a distribution over chronology.

M: Okay, now, you alluded to some of the causes when you talked about or how the younger population is at risk, how the older population's at risk, can you talk about what are the leading causes in general of traumatic brain injury in New York State?

S: Trauma, motor vehicle accidents, falls, abuse, you know, people getting into assaults, fights—so, there's abuse and assaults. Falls, motor vehicle accidents, sports, and probably assault would be the most common causes.

M: Okay. Now, we hear a lot about football. I think that's one thing that's a little bit more of a buzz topic right now is the concussion or brain injuries as a result of football, but are there other sports that have high injury rates of concussion or possible traumatic brain injuries?

S: Oh, any sport. I believe there's a slide that we'll show later that will list some of the sports, and some of them may be surprising, but any high-speed collision sport would obviously be a source of brain injury. So, outside of football, there's ice hockey, lacrosse, rugby. Sports that involve balance and perhaps not necessarily being on the ground, such as cheerleading—people may not consider that a
sport, but consider that a gymnastic activity. Cycling is a very high incidence of injury. Cycling, bike accidents occur—these guys are going at a pretty high speed, they can sustain a brain injury as a result of a cycling accident. So, baseball, softball—in the professional sports arena—they're trying to reduce the number of collisions that occur in baseball, which are usually related to collision at home plate between a runner and a catcher. So, they're actually outlawing that in major league baseball.

M: Wow, so, certainly, it can be just about any of the sports we can think of, potentially, have the risk of a concussion or brain injury.

S: Absolutely, yeah.

M: What about the broader spectrum of sports and recreational activities, like different winter sports, horseback riding, these things --

S: Anything that involves motion and the potential for even a fall. So, horseback riding can result in fall. I've treated quite a number of patients with more severe brain injuries at my hospital who have sustained significant brain injuries, brain hemorrhages, required surgery as a result of horse-related accidents, horseback riding. So, I think, anything.

M: But definitely good that we're having this conversation today, because it seems like the risk factors, it's a pretty broad spectrum that we're looking at, and just about everybody probably participates in some activity that has at least some degree of risk.

S: Absolutely.

M: Now, as Dr. Shapiro has pointed out, one of the issues that needs to be addressed is recognizing the signs of concussion early. The Centers for Disease Control and Prevention has developed a series of video segments about this concern and gave us permission to show a couple of these segments today. Let's see them now.

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**Doctor Kevin Gusiewicz, MD:** So, the idea of the helmet, if you think about how the brain might move inside the cerebral spinal fluid that sits inside the cranial cavity, the analogy I like to use is, if you and I were sitting here having an egg toss—and the egg yolk represents the brain, the egg white represents the cerebral spinal fluid that surrounds the brain, and the egg shell represents the skull or the cranial cavity—and 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. And as you catch it decelerates, and that egg yolk is rebounding off the undersurface of the egg shell, much like the brain rebounds off the undersurface of the cranial cavity. So, that movement's going to take place whether or not we put bubble wrap around that egg shell or we put 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 egg shell from cracking, but it's really not able to prevent that movement or manage that energy inside the cranial cavity. So, that's really the problem.

**Video Voiceover:** 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.
M: So, that certainly paints kind of a picture, gives a visual about what you’re talking about. So, now that we understand more about the different causes and the many different causes of traumatic brain injury, can you tell us a bit more about the severity of the spectrum of injury to the brain?

S: Well, we usually refer to brain injuries as mild, moderate, and severe, and oftentimes, mild brain injury is applied to a diagnosis of concussion. In a lot of education that I do, we like to avoid the term mild, because it reduces the implication of the potential complications associated with the injury. Nevertheless, mild, it’s still a common term. All these different kinds of injuries result in a variety of symptomatology. Some patients may just experience fatigue or being more tired, others more irritable. It can be a combination of symptoms: a headache, which can be obvious for many, visual problems, hearing problems, balance problems, and a lot of these things are very difficult to diagnose outside of just asking patients what their symptoms are, and running down a checklist. So, it’s very important to have a very high index of suspicion when you’re inquiring a patient as to what they’re feeling and how that may apply to a brain injury. You know, ultimately, it’s not even just the symptoms, because cognition, which involves thinking skills, is affected by brain injury—even concussion or mild brain injury. And this really can be very disruptive to somebody’s life, whether they’re a working person or whether they’re a student in high school or college. So, it has a significant impact in day-to-day life.

M: So, certainly, as you pointed out, calling it a mild brain injury seems to be a little bit of a misnomer, and so, maybe that’s part of the reason that people don’t pay as much attention or don’t follow up with treatment as much as we might like them to. But can you talk more about what we mean with mild traumatic brain injury?

S: Well, we’re talking about the fact that, again, this fits into that invisible epidemic. When someone sustains a concussion, whether it’s in sports with a motor vehicle accident, you don’t see anything initially, even when a person will be transported to the emergency room, they may undergo a CAT scan. CAT scan will be negative, their physical exam is usually non-revealing, and it’s considered to be completely normal. There’s no localized neurologic or muscular abnormalities that you might see in, for example, a stroke, where you’d see weakness on one side of the body. So, you know, the mild traumatic brain injury, it appears to be mild because everything seems subjective. So, it can create a problem, particularly for, you know, I think for the non-specialist.

M: To be able to recognize it and diagnose it.

S: Well, to recognize, diagnose it and ultimately, treat it as appropriately as possible. One thing we talk about with mild brain injuries is probably 80% or so of the concussions resolve within 7 to 14 days, a week or two. Then there’s the other 20%, and so it’s probably that 20% that we’re most worried about, because if all things go well and your concussion resolves within a relatively short period of time, you can go about your life. For a longer recovery time, obviously, it has greater impact your life.

M: Sure. Now, how exactly does a mild traumatic brain injury affect someone? Can you tell us a little bit more about what the symptoms would look like?

S: Well, I guess we’ve alluded to them before. So, if you talk about physical symptoms, there can be pain, but a lot of that is often muscular, because the mechanism of injury involves oftentimes a collision of some kind, but people have headaches. So, you know, headaches would be a physical symptom. Cognitively, which is the thinking skills part, that’s sometimes a little harder to hone in on in a routine
physical exam or even routine questioning. But memory is often impaired, the ability to process information is often slowed, the ability to interpret visual information is often affected, and it's not always understood by the patient or recognized. So, cognitive skills, those visual perceptual skills, balance would be another physical impairment associated with concussion. Emotional changes, some patients after a mild traumatic brain injury might experience real loss of emotional control. We sometimes refer to it as “emotional lability”—one doctor in my community calls it “emotional incontinence”—but the sudden laughing with little stimulation or at inappropriate times, crying uncontrollably almost for no reason, these are not uncommon in patients with traumatic brain injury. Sleep would be another thing, many patients who sustain a brain injury feel tired all the time, but they can't sleep, they're restless, they can't get to sleep. So, identifying these problems and trying to address them. Some you can address through medications, others through therapy, and others through just making sure that the patient takes an adequate period of time to recover so they can regain normal function. So, interviewing a patient is important. Asking the right questions is important. And then they have different diagnostic tools that are available. Some are more sophisticated than others. There's the A.C.E., which I think we'll talk about soon, which is really a questionnaire that delves into potential history and symptoms, which is very helpful in trying to hone in. But I think the most important part in diagnosing a mild brain injury or concussion is having a high index of suspicion.

M: Sure, and so, I think part of that is that there is such a broad spectrum for the symptoms. Can you help us understand a bit more about the mechanisms of a brain injury?

S: Well, we just saw the video, Dr. Guskiewicz, who is pretty renowned in the area of traumatic brain injury or concussion, talked about the mechanism being referred to as an acceleration/deceleration-type injury. A body in motion continues to be in motion until another force acts upon it. So if you're moving at a high speed and suddenly stop, the nature of our anatomy is such that your head sustains a whipping mechanism and your head may fly forward once your body stops. What happens then is your brain shifts inside the skull, and it may bang up against or collide up against the front portion of the skull, and they refer to that as a coup injury. But that doesn't end there, because the brain essentially is bouncing back and forth within the skull. And so, it may bounce back and the rear part of the brain may hit the skull again, and they refer to that as a countercoup injury. There are other forces acting on the brain while it's shifting around inside the skull—we refer to those as “shearing forces,” they're rotational forces transmitted through the brain. And the brain is not a solid body, it's a series of nerve fibers that when forces act upon it, they cause stretching, it can also cause tearing. So, in the more severe, severe brain injuries, we will often see on imaging studies, we will see structural changes, and they refer to it as diffuse axonal injury, but it's that same mechanism that can affect the same nerve fibers, even in a mild brain injury, and cause changes that, as referred to in the little video we saw before, causes chemical changes and heightened sensitivity to more damage, if not addressed.

M: Okay, so, there's certainly a pretty interesting way or there's a lot of different ways that the injury can impact the brain and the going forward and the going backward and the potential shearing. Can you talk a little bit about the physiological changes that occur with a brain injury?

S: Well, there's a variety of metabolic changes, generically metabolic changes. There are neurochemicals in the brain that are released, that when they're released excessively cause abnormal activity in brain cells or nerve fibers. So, that refers to as excessive depolarization or abnormal electrical activity in the brain. Normal cellular function requires a certain amount of energy and a certain number of mechanisms. Often referred to as the ‘sodium potassium pump’ in cellular function, this is disrupted, so normal intracellular and extracellular physiologic balance is not maintained. That alters cellular function and nerve function, so the nerves are not functioning normally. Also, the demand for energy, the fuel
that contributes to all cellular activity and all cellular energetic as, as it were, is glucose or carbohydrate. So, initially, there's supposedly a reduction in glucose demand, but ultimately, there is an increase in glucose demand in order to maintain the mechanisms that have been disrupted, and the general outcome is abnormal cellular function. So, if you remember that the brain, like any other organ system, is made up of cells, there's a lot of cellular disruption that occurs in a brain injury, and a lot of it that can't be seen and can't be measured by simple blood tests either...at this stage.

**M:** Now, would you say that that's the extent of the effects or are there some secondary effects to brain injury to be aware of as well?

**S:** Well, that's when we say damage may be widespread. So, if we're talking about acquired brain injuries in general, if you sustain a brain hemorrhage in one area of the brain as a result of trauma or spontaneous bleed or a stroke, there will be certain primary areas of brain damage that's localized in a particular area. Then the surrounding area, there's secondary areas of brain damage. So, when you think of the secondary areas of damage, you think more about the cellular mechanisms that are disrupted and normalcy can be re-established. Primary areas of damage, depending upon the mechanism, can result in a certain amount of permanent damage. With permanent damage, you get more localized or focal deficits, whether those are neuromuscular or cognitive, will be based on where exactly the injury occurs. Frequently, memory is a major area of impairment after a brain injury, and it's related to both diffuse injuries and focal injuries. But memory is a very important area of damage that occurs not only in acquired brain injuries as a result of trauma, as well as carbon monoxide poisoning or hypoxia are major, major causes of severe memory impairments as a result of different types of acquired brain injuries. So, a person who is exposed to carbon monoxide or more graphically, a person who attempts suicide by hanging themselves and is saved, they may experience severe cerebral anoxia, lack of blood flow to the brain, oftentimes, as they recover, they look completely normal, but they are so amnesic, that they can have this conversation that you and I are having, and five minutes later, when you're talking to them, it's as if they've never had the conversation before. So, that's an example of a very localized cognitive impairment associated with an acquired brain injury that can occur in trauma or other mechanisms.

**M:** Now, with all of these different things that are going on, as you and I are having this conversation, and I'm certainly learning more about brain injury, you would think, if someone thought they might have sustained a brain injury, they would see a physician right away, but that's not often the case?

**S:** No, it's not. First of all, people may not even know that they sustained a brain injury. If you want to look at one of the sports examples, think of just, think of a football game, a high school football game on a Friday night. Goal line stand, last play of the game, big pileup. There certainly was a collision in the game. Once everybody comes climbing out of the pile, gets up and game's over, kid wanders, you know, back to the sideline, maybe feels shaken up, but maybe he feels shaken up just because of exertion. Maybe he doesn't have a headache or anything, just feels a little tired. You know, this is Friday night. Saturday, the kid takes it easy all day, rests, hangs out, maybe feels a little tired, but he had a rough game, big game, doesn't recognize it. By the time we go back to school on Monday, the kid's just sleepy and tired. He doesn't know why. In that scenario, let's say the kid's just, “I'm tired, I can't concentrate in class.” So, they go to the nurse. The role of the nurse there would be, well, okay, this kid plays football – does he remember anything from Friday night? The kid may not even be able to tell you what did or didn't happen. But if you had a high index of suspicion, you could pursue sort of a diagnostic procedure to clarify and determine, maybe this kid had a concussion. So, yeah, it's challenging, and there's, you know, a variety of methods to assess that.

**M:** Sure. Now, so, I think one of the bigger problems is that people can sustain these injuries and they don't even realize it. So, what are some of the things that physicians can do? Because certainly, that
would create difficulty. I mean, you said the nurse, if she's aware that the kid plays football, might say, “Oh, you had the game on Friday night.” But in general, this must create some difficulty for physicians trying to diagnose something that the patient doesn't even realize has occurred.

S: Yes. But that's a situation I'm talking about. If you have a low threshold for diagnosis, a high index of suspicion, and you start asking people, whether it's a 62-year-old guy comes in, and you know, says “I'm just feeling tired lately,” then the primary care physician will do their usual work-up, but the guy keeps complaining of symptoms like this—you know, I just don't feel like myself, I'm tired, I'm irritable—pursue it further. Well, have you had any accidents? Did you have a car accident? When you were putting logs in the fireplace, did you stand up and bang your head on the, you know, on the mantle. Any of these types of scenarios can result in a concussion. That's probably why it's silent and invisible. But if you pursue that further, you can conclude that somebody had a concussion. Now, in a scenario where a primary care person may not feel that this is their area of expertise, I, being a specialist, often recommend making use of specialty services to pursue this further. And there are ways of doing it [that go] beyond a mini mental status exam. The standard kind of mental evaluation that most primary care docs may use is not sensitive to concussion. So, unless there’s clearly a memory aspect to the person's symptoms.

M: And also, I think it would be important to be aware that sometimes the patient might be showing up, you know, the Monday after the football game, which would be, within seven days of the injury, but somebody might be coming in even later than that, too, right? I mean, it could be a month later, two months later that they're finally showing up to try to address some of these symptoms, right?

S: That's absolutely true. Then there are other secondary problems that are brain injury-related that could be showing up later, particularly with the older population. The incidence with subdural hematoma is of concern because it is one that one doesn't realize early on and it could result from an infinitesimal kind of traumatic event that somebody doesn't pay attention to. And two or three months down the line, the patient's getting tired and sluggish, but maybe also losing control of the left side of their body or their bowel and bladder. Sometimes this becomes more obvious and you get a patient right to an emergency room where they'll have an imaging study that will define the problem. But in answer to your question, the fact that somebody can hit their head and not even seek medical attention for a problem that might be related to being hit in the head or sustaining brain injury can occur at any time after the event. And it's not always a couple days. It could be a couple of weeks or a couple of months.

M: Okay. So, it's important to know all the different symptoms of the potential injury as well as whether there was an injury. Can you talk more about how the symptoms of a traumatic injury might affect someone?

S: Okay, so, we talked about thinking skills and we talked about memory. And again, going through that checklist, we talked about cognition, physical emotion, personality, things like that, so, you're asking the patient a series of questions about how they feel, how they're interacting with the world. If there's somebody who's working, are they able to work as they normally do? Are they having trouble working? Are they having trouble reading? Are they having trouble focusing in conversations and reading text? Are they getting headaches when they're on the computer or watching television? These are all the kinds of symptoms that you need to pursue in questioning your patient. And then again, with a reasonable level of suspicion, you can draw a conclusion that a person has had a concussion, and if you direct your treatment plan towards that, you can enhance their recovery.
M: So, can you give us an example of an issue that might be caused by a brain injury and what you would suggest to address the problem?

S: Okay. We didn't talk about it before, but light sensitivity is one. So, reducing exposure to light, using appropriately polarized lenses to reduce glare. That's somewhat helpful but essentially, most of the symptoms that you experience as a result of a concussion, what we want to do is avoid them—so, that's one example. Noise sensitivity's another. So, you want to try to be in a quiet place. So, think of, you're kind of taking a person with a concussion, and the immediate picture is you put them in a cool, dark, quiet place, you know? Turn the lights down, don't make too much noise, put on the sunglasses. Avoiding the noxious event is important because ultimately, rest is one of the most important interventions for a concussion or any brain injury. This is a way of reducing stress, because these are stressful experiences that people have when, you know, when it's light sensitivity, they don't want to go out, the noise sensitivity—even just multiple people talking is stressful, results in irritability and bad behavior. Some of that emotional lability may be kicked into action and somebody may start behaving in a way that's not typical of them when they're exposed to too much noise or too much light, so on and so forth. So, removing the hurtful event is kind of a generic concept.

M: When it's something like, okay, sensitivity to light, sensitivity to noise, we remove or try to minimize the light, minimize the noise. What about other symptoms, like with trouble thinking, something like that? How do you -- how does your treatment address that?

S: Well, the treatment initially – and if we're putting this more in the category of concussion or mild brain injury – is rest and avoiding strenuous activity. So, you may, in interacting with a patient, you want to give them a little more time to get their thoughts out, you want to take things slowly, you want to review things carefully. It's not so bad if you're giving a patient instructions to write down what you want them to do. Keep it simple, though, you know, straightforward. So, adjusting to maybe slowness of thought or memory problems is one thing. But again, that's your interaction. The intervention is more, okay, you've sustained a concussion, we need to make sure you have restorative sleep, because that's the most important way of healing, of normalizing those metabolic derangements that we alluded to earlier in our discussion. So, rest and being able to get restorative sleep. If they're tired during the day and want to take a nap, they should be taking a nap, they shouldn't be going to work or school. It's not something that you gut it out. You're not a wimp if you don't work because you've had a concussion and nobody can tell that you've had a concussion. You can tell that you've had a concussion.

M: Sure, sure, and I think that's a really good point to make. Finally, can traumatic brain injury affect a person's ability to read? Is that another concern?

S: Sure. I mean, it depends upon what part of the brain is affected, and it certainly can affect reading, reading comprehension, even the ability to read or produce words. That's a very localized function in the brain. The ability to read and comprehend information can be affected by a concussion or a more severe or more localized acquired brain injury.

M: Now, with all the information you've shared so far today, what can clinicians in the community do with all of this information?

S: Well, you know, I think we've talked about it a little bit and if you don't mind my repeating myself, low threshold for diagnosis, high index of suspicion and conservative treatment. So, conservative treatment is, think concussion until proven otherwise. And sometimes I think the best model for that is the sports concussion mode, because you know, we're dealing with a highly active population, and you're removing them from a lot of activity in order to enhance healing so they can get back to a normal life. So, again, you know, high index of suspicion. Realizing that symptoms may not occur for a couple days or a
little longer after the injury and some of this is related to the metabolic derangements, which are in flux. I've seen some young athletes recently who didn't seem to have much in the way of symptoms 48-72 hours after their injury and a week later were much worse. So, you have to realize that this is still a clinical phenomenon that is in flux, depending upon the time scheme, and that it may take quite a while to improve. And then you want to be able to figure out how to make the diagnosis. You know, there is one tool that we refer to here as the acute concussion evaluation tool—that is a tool for primary care practitioners. It gives you what looks like a nice checklist of symptoms as well as questions to ask that can help you delve into the process. So again, this is index of suspicion, but the acute evaluation tool, the ACE, is something that I think is available for free to primary care practitioners, and I believe that there will be some information here that will be provided to the watchers and listeners so they can access it.

M: Now, how is the ACE, or the accuse concussion evaluation tool, how is that organized or what information does it ask the clinician to record?

S: A lot of the information that it asks you to record is related to the history and the symptoms, and there's a complete checklist of, you know, on the ACE they look for risk factors as well. But I think when you talk about risk factors, if you're always—if you're maintaining a high level of suspicion, the risk factors can be for anyone. It could be falls, it could be bumping into the wall, it could be having a car accident, it could be something falling off a shelf and hitting you in the head. You sort of have to run through that. But I think the ACE helps put that into a nice, compact list that could help primary care-type people to address those possibilities, to help them with concluding that a patient may have had a concussion.

M: Sure. So, let's move ahead a little bit and break down the different sections. Looking at section "A." The clinician will go through this with a patient, how does the form start? I mean, is it a checklist on the injury?

S: Well, it looks to identify the cause of the injury, which, again, if you have a high index of suspicion, you're going to ask enough questions to determine whether or not something has indeed happened. If you're talking about cognitive assessment, you're looking at whether a person has memory skills or not. Sometimes they can tell you that they feel like they're more forgetful than they used to be. That's not impossible, but you can test for that in your interview with the patient by doing simple memory testing—asking them to remember a series of words, giving them a few minutes and having some conversation, jumping back and saying, do you remember these words? But things like seizures, they're not that common, but it is part of the ACE assessment. I can tell you, patients don't know if they've had seizures. Unless they've been told. So, and if somebody has had a seizure and has been told that they had a seizure, that should kick in a red flag that says that you need to get some more detailed evaluation and that perhaps something more serious has happened. It's not beyond the realm of possibility that with a brain injury that shows nothing on a cat scan that someone can have a seizure. It can be related to that brain injury and does not necessarily mean that they have a seizure disorder. But you know, these—and this would be also why if you're running through a tool like the ACE and you're picking up on information like this, I would encourage making use of specialists.

M: Absolutely. So, moving on to section "B" of the ACE, the symptom checklist, is there a way to check for the impacts of the injury, and how does that section work?

S: It's a checklist I'm sure a lot of primary care people are familiar with. So, a pain checklist, where patients rate their pain with scores and this gives you a series of symptom. And you give them a score,
and the higher the score, the higher your index -- you know, the higher it should kick in your concussion rate are and get it working.

M: Okay. So, we record kind of what the injury description is. We record what my symptoms are, and then the next sections of the tool—let's say I'm your patient. What would you do next once we've gone over the injury I've sustained the symptoms I'm experiencing?

S: Well, okay. You've had a concussion, as I've said before, the most important thing is to get you to rest and be able to get what we would call restorative sleep. That's assuming you can sleep, I would recommend some medications, and I avoid narcotics, I avoid hypnotics and benzodiazepines initially. Serotonin-enhancing medications are helpful. I use a medication called trazodone. There are over-the-counter medications that can be used like melatonin. Anything that helps the patient start to get to sleep, would be one form of an initial intervention. Secondly, we talked about removing from offending activities. Well, if you're tired and you can't concentrate, then you can't go to work. So, taking a person out of work is another intervention, if there are visual issues, there are some rehabilitative techniques that can be helpful, depending upon what the diagnosis is. But there are any number of recommendations you want the patient – the most important is to determine that this person has had a concussion, they do need to be removed from normal activities until they start improving.

M: Okay. So, now, once you've done all of that, is there a concrete prescription, so to speak, for someone with a traumatic brain injury?

S: Trying to make it concrete for the individual. So, some of the things I go over with them, one is sleep. I'm a specialist. I'm also fortunate that I work in a comprehensive facility, so I have a lot of support at my disposal. I have psychologists to really address significant cognitive impairments as well as to measure them. I have therapists who are trained in brain injury and vision rehabilitation. As well as balance and vestibular rehabilitation. So, I make use of these different services, which is why I would encourage, if people are having problems and they're not resolving spontaneously, that you go ahead and make use of a referral of a person who may have more experience and access to more tools in terms of treatment and intervention for those patients. So, again, just to review, limiting physical activity, you know. For the kid in school, no sports, no school until they start improving. For the worker, no work and no running to the gym every night until they start improving. Good nutrition, you know, stay well hydrated, drink plenty of fluids. Well-balanced diet, those typical things, and then as they improve, you gradually resume activities.

M: Sure. Don't just dive right back into everything.

S: Right. New York State public high school athletic administration a couple years ago in New York State finally established some mandates that define the process of returning to activities after a concussion and they also defined the fact that a physician should be the one who's guiding that process as well. So, it's important to gradually resume activities. The example in the sports model, again, is that when you have physical and cognitive recovery, the patient/stUDENT/athlete can, returning to school and athletic work, return in a gradual increase of athletic activity, beginning with aerobics, gradually increasing the intensity of work and then stepping up to at least a series of increases in, if you're in a collision sport, collisions in a practice environment, scrimmage environment, and then allowed to return to competition.

M: Now, you're talking a bit there about the school and the student athlete, and that's something that I think we hear a lot about is concussions on youth in school. Can you talk briefly about some of the issues that students with brain injuries face?
S: Well, again, they can't concentrate, so they shouldn't be going to class. It's also the situation where when the kid's home with the flu for a couple, maybe a couple of weeks, say can we send homework home? Yeah, okay, you can do that. With a brain injury, we don't want that. So, we're telling people to be in complete physical and cognitive rest. And it's maddening enough for everybody, but think of it in your 15-year-old boy who, you know, may play three different sports. So, they're out of school. They can't—we don't want them texting, don't want them watching TV. We don't want them going on the computer. We don't want them talking to their friends on the phone. We don't want them hanging out with their friends and yakking at the same time. Like we said at the beginning, put the sunglasses on, turn the noise down, turn the lights off. That's what you want to do, and when you are trying to do that with a teenager, it's tough.

M: Absolutely. Sounds like it would be quite a challenge.

S: Yes, and sometimes it may be even more challenging for the parents than for the students, at least initially. You know, ultimately, you want—if a student is missing a prolonged period of school, as they finally improve, you need to coordinate the process of reintegration of not only their academics, but their athletics. And again, that often falls under the supervision of someone with more of a psychology background, which, again, people who work in an institution like myself, a comprehensive rehab facility, you know, the psychologists actually put together what they call a 504 plan. So, the educational system is required to accommodate the student.

M: Excellent, that's good to hear. Now, we're about to hear one parent's experience with the recovery of their child, a student athlete who sustained a concussion from basketball. In this case, it's been a slow road to recovery, one that some students face when sustaining even a mild traumatic brain injury. Let's take a look.

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Linda: 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 just how serious it can change your life. It's been over 3 1/2 years already, and she is 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 numbers we're at as far as emergency visits and hospital visits. The good news is, 3 1/2 years later, there is progress, so there is hope, but one of the most important things is, 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.

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M: Well, certainly getting the word out about brain injury is very important, and I know there are some resources that are available through the New York State Department of Health to help do that, can you talk about some of these resources?

S: One of the resources was developed by the New York State Department of Health and their TBI Grant Program, and they developed this little card here, which is something that people can keep in their wallets. What it does is it basically helps you focus in on a lot of the things we've been talking about
today. It includes information on symptoms, things to look out for that could increase your index of suspicion as to whether or not somebody has had a concussion. So, this is a useful tool, whether it's for clinicians, parents, children of older folks. So, it's a valuable thing just to keep everybody sensitized to the possibility.

M: Absolutely, and these are available on the New York State Department of Health's website, if you search "traumatic brain injury." Very helpful little tri-fold that's got more information about if you suspect you might have an injury, where to go, what to do about it, even if it's not in the immediate, maybe a few days later you start to think about it. Now, we recently spoke with Lee Burns, Director of the Bureau of Emergency Medical Services at the New York State Department of Health, about the reason New York State developed these wallet cards. Let's take a look.

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Lee Burns: My name is Lee Burns, Director of the Bureau of Emergency Medical Services in the New York State Department of Health. The card was developed through a federal grant. The intention is to provide the cards to the regional EMS councils who will provide them to their agencies and providers so that they will be available in ambulances, and should the EMS providers or somebody they suspect has a head injury, they can hand them a card. The card provides excellent information, and it's a good resource, both a reminder for the health care provider as well as something for the person who may have sustained the head injury or their family to use as reference to kind of keep an eye on them after the fact. People don't believe that you can be injured when you fall off your bicycle because it doesn't have a motor, it wasn't going very fast. People don't believe that you can be injured because you bumped your head on a kitchen cabinet, and you know, our heads are very fragile, our brains are very fragile. There's not a lot of space. There are over 500 brain injuries brought into hospitals every day. Again, even the most minor head injury can result in severe injury. And I think we underestimate the numbers of head injuries because people say, well, I just bumped my head, you know, I'll sleep it off. It's not just the tragic brain injury, you know, from multi-trauma, but even the smallest thing.

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M: So, earlier in the program, we showed some videos that were available from the CDC, and they have other resources available as well to assist doctors and even coaches, parents, first responders. How do you think these tools could be helpful to a team that's responding to a traumatic brain injury?

S: Well, the Heads-up Program has information that helps educate individuals with regards to a lot of the issues we've been talking about today, and I think that's a reasonable resource. That's been available from the AMA and the CDC for quite a few years. And I think there's some information that you guys might have here that viewers can pick up on. So, that's useful information. I think a lot of the information in this kind of program, the Heads-up App, is a lot of the information that we've discussed today.

M: Sure, sure, and as you indicated, all of the resources that are shown on the slides are available if you go to our website, www.phlive.com. All of the handouts and the slides from this show are available to print out, and they list those resources on them for you. We also want to point out there, the state resources as well, the New York State Education Department has Guidelines for Concussion Management. And the New York State Department of Health and Brain Injury Association of New York State has several resources available as well, and those will be posted on our website for today's program. Now, Dr. Shapiro, as we come to the close of our program today, and we're going to take a few questions from our viewers, but is there a main message that you want people to walk away from this program with?
S: I think recognizing that brain injury is not uncommon, that it may be occurring in previously not thought of places. It's not imaginary, it's real. That brain injury, particularly concussion, which is the mild form that we talked about, probably the most invisible form, is truly the result of a physiologic disruption of brain function, and that so far as we know now, the best way to get healing and maximize recovery is to get as much rest as possible, that's the most important. And then, if a person is a primary care person and the process is not moving as quickly as they suspect, avail themselves of specialty services, whether they be neurologic from a neurologist, physical medicine rehabilitation, my specialty, but people who have some exposure to brain injury, and perhaps more availability or recognition of availability of supportive services for the patient.

M: Excellent, thank you. And we have time for probably just one question, maybe two. The first question I have here is how can physicians be more proactive with their patients or communities to reduce the number of TBIs that occur?

S: Well, I don't know how they can reduce the number of TBIs. We're trying to enhance the understanding is that they do occur. Some of these things are accidents. I had one patient who has repeatedly bumped her head on the trunk of her car and continually re-concusses herself. So, the intervention there would be saying, you know, look before you stand up! So, you know, it's hard to say how the community prevents brain injuries when we're seeing they're incidents that can occur sometimes beyond a lot of people's control.

M: So, maybe even just being aware that it can happen in any number of means. So, being aware of bumping your head and your surroundings and things like that that maybe people don't even think of as a risk factor for a brain injury.

S: Well, that's right. So, again, we kind of bounce right back to that high index of suspicion, low threshold for diagnosis. So, the recognition is important, and that recognition will allow you to provide some intervention that's meaningful, and hopefully, helpful and productive for the patient.

M: So, I think we have time for one more question, and I've got one here that says, what is the one thing that you wish physicians will do after seeing this broadcast?

S: Have a high index of suspicion and a low thresholds of diagnosis.

M: Alright. I think you've made a really clear case throughout the show of why that's so important, given the wide range of ways in which this can occur and the wide range of ways in which symptoms may or may not manifest and the timelines during which they may not manifest. It seems that's certainly the best approach we've got.

S: So far, yes, I think so. And I think from being involved in this area for 25 years now, I think the last five to ten years we're far advanced from where we were when I first came out of training.

M: Well, thank you so much for all of the information that you've shared with us today. I think most folks who are viewing today are probably very far advanced from where we were when we started this program. So, thank you for being with us today.

S: Thank you.

M: 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 your continuing education hours, CME and other credits, visit www.phlive.org, and complete an evaluation and the post test for today's offering. Additional information on upcoming
webcasts and relevant public health topics can also be found on our Facebook page. Don't forget to like us on Facebook to stay up to date. This broadcast will be available on our website within two weeks of today's show. Please join us for our next webcast on May 21st, focused on *Making Fall Prevention Part of Primary Care*. I'm Rachel Breidster. Thanks for joining us on "Public Health Live!"