

LYNDA DAVIS, PhD: Thank you. There are two people in this audience I really want to recognize. 2003 Nobel recipient, Barney Barnum, put a group together for the severely injured marines and sailors. This is before Walter Reed. We wanted to get a new pilot program together that would partnership Social Security, the Veterans Administration as well as D.O.D. We were lost in the woods for a bit. We didn't really know who to contact with Social Security. Thanks to some friends that we had in the Baltimore area, they gave us two really outstanding people that really want to be or should be recognized today, Lester Austin. Could you stand up for a minute, please. Lester? Lester, and Doyle Vans. We can't forget Doyle. Without Doyle and Lester, this hearing could not have been held and I really want to appreciate your efforts in helping us out. Thank you.

COMMISSIONER ASTRUE: Walter?

WALTER KOROSHETZ, M.D.: Thanks very much, Michael. It's a pleasure to be here. I was going to take the opportunity to try to give a very short scientific talk, trying to prevent people from falling asleep. It will be very dry, but there's a couple of points I thought we should get on the table right from the beginning. So as Michael said, I'm the Deputy Director of the NINDS, National Institute of Neurologic Disorders and Stroke. so that institute is responsible for trying to do research that advances the care of people with brain injury, Whether it's due to stroke or whether it's due to head injury, that basically falls in it. and it is our responsibility and we bear the blame for not having better progress out there now. I also am the point person in a center between the National Institutes of Health, Uniformed Services and the military hospitals to develop a center for neuroscience to advance research that will benefit the soldiers at Walter Reed and National Navy, and we're very excited that this will turn a new page and help us to do a lot more than has been done in the past. Now, I think that in terms of my sense of having been a neurologist, taking care of patients with brain injury in the past that, you know, there are basically three main bins, and this is a little bit--you know, it's a little bit gross to kind of do this, but there are, in patients with brain injury who have had experience with brain injury, there are a number of things that happen. One is what's going on in the brain that gets them from the point where they're unconscious and their nervous system is completely non-functioning, to whatever their new baseline level is going to be. We can talk about that in a second. The other thing is that the brain is essential to all your functioning's, whether it's your relationships with other people, whether it's the ability to move your arm, your feelings, your emotions, your energy levels. So when you have a brain injury, you suddenly realize that all the things you've taken for granted for your entire life on how you function, you've been taking for granted, and there's really--we're really much more vulnerable than we thought we were. And that often leads to a condition which we call post traumatic stress disorder, where people have had this major insult and they're not the same afterwards. But that can also occur in conditions that don't affect the brain so it's not specifically a brain condition but brain injury is major traumatic event., So there is a large component of patients who would develop post-traumatic stress after brain injury. Then there is something else about the brain that is worthwhile mentioning, and it's kind of crude and crass, but I guess the easy way to remember it is the brain works on money. That money is a major driver in terms of how the brain works. And that's because of all the things that we do, and if you look into the

brain even in rats, the reward system is intrinsically integrated into everything we do. So there are cases where people have injuries of any sort, not necessarily brain, but any sort where they become completely obsessed with obtaining compensation after their injuries. And that--and so I think that the disability determination is really trying to pick apart those issues. The people who have had injuries who are disabled due to their injuries, whether it's post-traumatic stress disorder or due to the effects of the neurologic condition versus those people who are interested primarily in compensation. Now, the other thing, and I think that that's the hard part that Mike's group has to really try and go after, and that's where the line has to be drawn so that the taxpayer's money is used appropriately and that people are remediated for their disabilities. And particularly the idea now, it's a tricky business sometimes with the brain, but the idea where you can actually pick people who are really clearly, no question about it, disabled due to their brain injury and get that, you know, kind of taken care of quickly, is a huge plus and move forward. The only other thing to say about the brain very quickly is that when you have a brain injury, say, you know, a kid gets hit with a 350-pound linebacker and his bell is rung, so what's happened is your brain is shut down. You may be unconscious for a short period of time. The whole brain is shut down. Then it kind of comes back. Well, in somebody in an auto accident or somebody in Iraq who has got a massive, you know, insult to the brain, the brain shuts down, but there is injury to the brain that doesn't come back very quickly. And it may take years to come back. And there are things that are happening early on, biological processes go on. And then there's this other interesting sphere where people begin to recover. The brain starts to recover. Even in a stroke where half the brain can be completely destroyed, I've seen 20-year-olds where you see them a year or two later and you can't even tell that they've had a stroke, that the remaining part of the brain has made such a huge turn to actually take over for the damaged brain that the patient's function recovers to quite a great degree. Now, we are very bad at predicting that. We can predict the really bad ones and we can predict the very mild ones. But there's a lot in between where we don't really know what the answer is going to be. So it's not uncommon that a patient would leave my neuro intensive care unit on a respirator with a feeding tube, and we would have to say to the parents, well, we have to wait a year to see what happens. And the truth of the matter is some of those people after a year are walking in and talking and joking with the nurses who took care of them, you know, a year before. So the recovery process can be quite dramatic. The recovery process we think when we don't know what determines it, but that's a heavy area of research, but we think that it actually is related a lot to practice and rehab and people actively engaging in processes. The brain, we know from experiments that the brain recovery, when parts of the brain start to take over new functions, they only take them over if there is practice. The use it or lose it theory, that you use that part of the brain for language or motor function or it doesn't really recover. So there is an active engagement on the part of the person to actually get to the recovery plateau that they need to get to. And we're trying to learn much more about that and this heavy, I think, very kind of promising research at the animal level and a little bit now at the human level that's trying to get at this unbelievably dramatic process of recovery where we can try and figure out what we can do to tweak that and really make it better. Right now the major determining factor is the severity of the injury and also the age of the patient. So young people have the best abilities to make recoveries. In stroke, the recovery generally is over three to six months and then it slows

down. In brain injury, as I said, it may be very rapid over a period of a year and not slow down for two years. So there is different rates that we see in these different types of injuries. So from our point of view, I think we have a lot of research to do. The work that we're doing, though, I think is more important if we can incorporate it into the things that Mike and his group do in terms of making real differences to people with not just the dry biology, but, you know, getting the disability payments when they really need them. So we're happy to be here. Thanks.

COMMISSIONER ASTRUE: Thank you. Ellen?

ELLEN EMBREY: I'm here on behalf of the Department of Defense, the health side. I'm pleased to be here. I'm here to learn as much as I am to participate in a shaping, how we can improve our understanding of traumatic brain injury and how we evaluate it in the context of Social Security benefits, disability benefits. Particularly with the wounded Warriors. We do see, well, in the last year there were about 13,000 folks, a little less, who were diagnosed with T.B.I. The problem is the diagnosis issue. It's difficult to identify and diagnose. So disability, of course, is based on a medical record which has diagnosis information in it, and so we're in a do-loop there. So for me this is extraordinarily helpful to have this hearing to learn from experts, to hear testimony of individuals and some nuances that will help us do a better job of taking care of these individuals until our research can catch up. So thank you.

COMMISSIONER ASTRUE: Okay On my far right are two members of my staff. the first one is David Rust, the Deputy Commissioner for Retirement and Disability Policy. I'm going to ask David and then Judge Griswold after that to just talk briefly about what our statutory charge is. And it might explain for some of the people in the audience why we're going to be asking certain types of questions that might not seem pertinent, but we are trying to fit this into our statutory charge and our responsibilities. So if you could talk about that briefly, David.

DAVID RUST: Very briefly, the Social Security Act requires us to make--to provide disability benefits to those people who are so severely impaired that they're unable to do any work in the national economy for which they are qualified by education or prior work experience. We don't have a percentage of disability. We don't have partial. We don't have temporary. It's a very high bar for severity of the impairment rendering a person unable to work in the national economy. And so the question-- it's kind of an alert to our witnesses today. The area we're always interested in is are there ways to more accurately and more objectively measure the function, the degree to which the function is impaired by the stroke, by the injury, so that we have a somewhat more objective basis upon which to make that decision. It's a very difficult decision. It's a very litigious area. I believe that 95% of all the lawsuits against the Social Security program are against the disability program. And I think at one point, I don't know how many those cases number but they number in the tens of thousands at any given time. So it's a very contentious issue. It's a very complicated issue from a policy point of view; we are always looking for ways to have better measurement of that impairment and its impact on a person's ability to work.

NANCY GRISWOLD: I'm Judge Nancy Griswold. I'm here representing the Office of Disability Adjudication and Review and the Office of the Chief Administrative Law Judge. I want to start out, I was raised right next to Barksdale Air Force Base, and so being on base is a very warm spot for me. So I want to take the opportunity to thank servicemen and women for their variety of services that they perform for us on a daily basis. And I think certainly in return for that we want to be able to serve them when they are in need. We are challenged at the ALJ level now simply by volume of claims that we have coming in, and we're working very hard to improve the level of service that we're able to provide. I am very pleased to be here as a part of this hearing because I think that the traumatic brain injury area is a very difficult one to adjudicate. I've heard some of the medical experts speak just briefly about the challenges in diagnosis, and those challenges are also apparent when it comes to adjudicating claims because we do base our decisions on the medical information that we have. So getting good medical information is critical to us, and being able to get it as early as possible also. As David said, we do base our decisions on a total disability. I come from a Workers' Comp background where they do have percentages of disability, and I know that the V.A. also has that, but that is not our system. We work on inability to do any sort of work in the economy for which, as David said, a person is qualified by age, education and experience. And so it is a high threshold, and the sooner we can get the medical information, the documentation, the better able we are to make a proper and timely decision. So that is our goal.

COMMISSIONER ASTRUE: Great. Thank you, Judge Griswold. I'd now like to ask the first panel to come forward and to keep things moving along I'll introduce them as they're coming forward. We have Dr. James P. Kelly, Chairman of the Traumatic Brain Injury Subcommittee of the Defense Health Board for the U.S. Department of Defense. He's also with the Department of Neurosurgery at the University of Colorado. We have Nancy Hogan, Associate Executive Director for Veterans Benefits, Paralyzed Veterans of America. We have Dr. Carla Sarno, Chief Psychiatric Consultant, State of Maryland, Disability Determination Service. and we have Katherine Helmick, Director of Clinical and Educational Affairs for the Defense and Veterans' Brain Injury Center. Welcome and thank you to all of you. And I think the plan is we're going to start with Dr. Kelly.

JAMES KELLY, MA, M.D.: Commissioner Astrue and panel members, participants from the floor and guests, thank you for this opportunity. This is a really special event in my career. Those of you who have worked diligently to get traumatic brain injury on the radar screen, here it is, and we'll do our best to advise and to answer your questions this morning. And I plan on spending the day with you. What I'd like to do, as we go, is paraphrase for you what I wrote in the first tab in your binder is some information that I put together in advance. The caveat to that is that I did it, and as a result there are spelling errors in it. [Laughter] And I can't blame my own dyslexia, but it's the problem of the brain observing what it has done with the blinders that we all have under those circumstances. So I'll point those out if that need be. But I'd like to make some opening comments first. And just to try to give a sense of the dimension of the problem that we're addressing. Traumatic brain injury is a leading cause of death and disability in the United States and worldwide. Upwards of 1.4 million Americans sustain a traumatic brain injury in the United States each year. Around 50,000 individuals die just of the traumatic brain

injury. 235,000 are hospitalized. 1.1 million are treated and released from emergency departments in this country. It's estimated that about 75,000 individuals have new neurological disability as a result of traumatic brain injury. With more than 5 million, roughly 2% of our population, currently living with lifelong or at least prolonged needs for assistance with even activities of daily living. We are being asked to comment on the ways we can determine who early on in the course of medical care for traumatic brain injury will be disabled such that they will be unable to return to work for at least 12 months. While vocational rehabilitation assessment is our best way of evaluating a given individual's ability to perform work-related tasks, this is best done further down stream from the acute injury. And there are some opportunities for us to predict earlier that outcome in at least certain cases. But I'd like to paraphrase also authors that have written I think quite eloquently about their own research, and one comment is by authors Seamus and others. There appears to be a complex interaction between pre-morbid characteristics, who that person was beforehand, injury factors, meaning severity of the injury, length of unconsciousness, things like brain stem contusions, anatomical injury that we can see, the related post-injury impairments that that person exhibits and environmental factors in traumatic brain injury which influence return to work outcomes in ways that make prediction difficult often. Injury severity and lack of self-awareness, the individual's inability to perceive the problems that they have, appear to be the most significant indications of failure to return to work. Those two are the theme throughout the research that I was able to glean. Even at the mild end of the spectrum, though, we are able to make some general comments and predictions, at least in terms of return to work roughly six months out. One study in particular showed that there's a 90% probability of low post-concussion symptoms or full ability to return to work if these conditions are met: the individual -- and it has to be all of these conditions -- the individual has more than 11 years of formal education. early in the course of that concussive care there was no nausea or vomiting even in the emergency department. there was no other bodily injury. And as we'll hear from our military experts, that's often not the case;, that there is bodily injury other than the concussion in a war-time setting. /and the fourth being low levels of pain early in the course of that injury care. So if those criteria are met, there is roughly, predictably in this study at least, 90% probability of low likelihood of post-concussion symptoms to be persistent and ultimately full return to work opportunity. It turned out in that same study that the things that I've used as a neurologist, especially in the sports setting, such as witnessed loss of consciousness or duration of post-traumatic amnesia, were not useful predictors of the ability to return to work under those circumstances. I would like to talk a little bit about what others have shown and certainly my experience has been with relation to severe traumatic brain injury. Many of you know that we lost Professor Brian Jennett just earlier this year in 2008, the co-author of the Glasgow coma scale and the Glasgow outcome scale and hundreds of journal articles on traumatic brain injury. And a true giant in our field. Using the Glasgow coma scale, a simple reliable measure for neurological function for an individual all the way through severe traumatic brain injury with coma and mild traumatic brain injury with a concussive injury, what we're able to see is that there is general consensus in the neurological community, in the neuro trauma community, that a mild traumatic brain injury is roughly a 13 to 15 on that scale. Moderate traumatic brain injury is the middle range, nine to 12, and severe traumatic brain injury, three to eight. Under those circumstances, that offers an

opportunity to depict the variety of the injury at the time in the paramedic's hands, in the emergency department, in the neuro I.C.U., where I and others on the panel today practice. That gives us at least some indication of the nature of the problem and the level of severity that guides our treatment and the intensity of the services provided. The scales for the most part that are used, such as the Glasgow outcome scale, tend to be fairly gross measures of outcome, and we need much more fine-tuning as to what the outcomes are so that we can then link them better to a predictable injury issues and characteristics earlier on. neuro imaging in this country helps us a great deal in this regard. Early use of C.T. scans, CAT scans, which are essentially computerized X-ray studies, helps guide the determination of the need for neurosurgery, the opportunities to perform even life-saving procedures, and offers prognostic information in many cases. For instance, some studies have shown that contusions, hemorrhagic bleeding within the brain at the locations of the temporal lobe or within the brain stem, carry with them much worse prognosis in the long run, especially with regard to vocational outcome. One of the things that I've had the opportunity to do in my career is to work with professional and elite athletes, and there are criteria even then for their ability to return to that kind of work that they must meet. And the very first in my mind is that they must be symptom-free both at rest and with physical or cognitive exertion. The next is that a detailed neurological examination must truly be normal, and those are all the areas of sensation, coordination and motor power and so forth. An MRI scan, not just a CAT scan, but an MRI scan of the brain must be normal, there is no evidence of traumatic brain injury in the tissue itself. And that neuro cognitive assessment or better yet detailed neuropsychological assessment must be normal. It is not always realistic that everybody who has a traumatic brain injury is going to get that kind of assessment. But I think if we shoot for that, if we look at that as at the mild end of the spectrum, the standard that we should expect for assessment and determination of ultimate outcome, I think that that's at least a good place for us to start. We know about neuro imaging. We know about severe brain injury, and some of those as Dr. Koroshetz indicated are somewhat easier for us to consider. I think that the bigger dilemma for us is really putting together who that person is and their coping mechanisms plus the milder end of the traumatic brain injury spectrum that really causes us a lot of concern at present.

COMMISSIONER ASTRUE: Thank you. I forgot to say that in terms of procedure, I'm going to take all the witnesses together and then we're going to save the questions for the end because I think we've tried it different ways, and I think it's actually useful sometimes to get two different angles on the same question. So we'll move now to Nancy Hogan.

NANCY HOGAN: Mr. Commissioner, members of the panel, ladies and gentlemen, my name is Nancy Hogan. I am the Associate Executive Director of the Veterans Benefits department at Paralyzed Veterans of America, Veterans Service Organization. And I appreciate the opportunity to join you today to share the experiences of paralyzed veterans within the Social Security disability claims process. P.V.A. is a professionally chartered veterans service organization representing veterans with spinal cord injury and/or dysfunction. We have a network of international service officers throughout the United States, most or many who are located in V.A. medical centers and other offices

throughout the nation who, primarily, their responsibility is to assist veterans with disabilities and claims before the Department of Veterans Affairs. Let me state at the outset that P.V.A.'s service officers, while predominantly handle cases of veterans with spinal cord injury or disease, also handle cases of other disabled veterans. While your hearing today is concerned with the identifying and implementing compassionate allowances for Social Security disability benefits for adults and children with brain injuries, I can say that in many instances of spinal cord injury, it's accompanied by a traumatic brain injury of some degree. Although I cannot speak specifically on brain injuries, nevertheless, I will describe what usually happens when a severely injured veteran comes through one of the paralyzed veterans service officers' doors and applies for benefits which he or she may be entitled to before the Department of Veterans Affairs. Service members with catastrophic injuries are typically processed through the many major poly trauma centers situated around the nation. This will in almost all cases be the system through which service members with severe traumatic brain injuries are also processed. Alternatively, veterans with spinal cord injuries will come through one of V.A.'s spinal cord injury centers where there are now 24 located in the V.A. medical system. At these facilities the veterans will have a chance to assign their case to a veteran service officer like a Paralyzed Veterans of America Service officer or the Department of the Disabled American Veterans and many of the other ones that are out there. And in some instances we will also assist in filing a claim for Social Security benefits. Now, you did ask by the time a wounded warrior files for SSDI, is the V.A. health care system, typically their primary health care provider. And if the wounds are severe enough, this is usually the case. Because of the longevity of the rehabilitation. What's more, the Department of Defense and V.A. have begun transitioning paper medical records to electronic medical records informing us it would make it easier to transfer information from the military to the V.A. system. Now, these electronic records should be available upon a service member's discharge from the military and entrance into the V.A. health care system. At the time a spinal cord injured veteran comes to one of P.V.A.'s service officers to apply for benefits, that service officer usually takes the application, develops the claim and submits it to the V.A. and they also may help in completing the SSDI application and submit that with the developed medical evidence before the Social Security Administration. Most veterans with spinal cord injuries are rated at the V.A. at 100% And our service officers on occasion but rarely have difficulty in getting these individuals SSDI benefits in a timely fashion, although it does happen. I can share with you some of the experiences of our service officers who report significant time loss in processing claims with the V.A. and with Social Security. If a veteran starts out at Walter Reed, usually once they're stabilized, if their wounds are severe enough, they'll be transferred to a V.A. facility. If their S.S.A. claim is started at Walter Reed, then the paperwork may have to catch up to them depending on where they are located to do their follow-up. So that can... or they can somehow encounter a delay because of that. If they don't have a representative, then they're at the mercy basically of the backlogged system as it is, and there is usually only one person at the V.A. who handles FOIA requests. So if the Social Security Administration is trying to get information from the V.A., they're limited in the resources of the V.A., basically. One positive piece of news about Social Security that we appreciate is that Social Security seems to accept V.A. ratings in granting benefits more so than the V.A. accepts Social Security ratings. So unfortunately

because P.V.A.'s resources are limited, we can't offer the same representation before Social Security that we had done once in the past. And we usually only do it because of our limited resources for the spinal cord injured veterans. And so the other catastrophically disabled veterans don't have the resources at least from us. In those circumstances, the NSO will usually refer that veteran to the nearest Social Security office or to a nonattorney-client representative. This means they are at the mercy of getting the paperwork from the two different systems to help develop their claim. We have been led to understand that Social Security has begun to assign representatives to the V.A. medical centers and other facilities on a regular schedule in an effort to speed along the S.S.D.I. application process for the wounded warriors. Paralyzed Veterans of America would certainly welcome more specifics of that program because it would give our service officers more information in helping disabled veterans. Thank you.

COMMISSIONER ASTRUE: Thank you. Dr. Sarno?

CARLA SARNO, M.D.: Good morning, everyone. My name is Dr. Sarno, and I am a chief psychiatrist, psychiatric consultant with the Maryland Department of Disability Determination Services. I've been with the agency going on ten years, and I review and render psychiatric decisions on psychiatric claims, which include military casualty cases. These decisions are based on medical evidence gathered by the disability examiner in the agency. Maryland is in a unique position in that we are in close proximity to Walter Reed and Bethesda Naval Hospitals. Since January 2006, we have received 347 military casualty claims which include O.I.F. and O.E.F. claimants. Out of the 347 cases, we transferred 56 to other D.D.S. agencies across the country due to the fact that the soldiers or vets were transferred to other hospitals outside of our jurisdiction and further development was required in those cases. We currently have 37 military casualty cases pending in our agency. Military service casualty cases are flagged as such by our field office representatives and forwarded to our agency. Once in our agency, the case is developed, decided and follow what are called TERI or terminal illness procedures, which means they are giving the highest priority and expedited through the system. the military casualty cases are assigned and maintained and developed by a designated unit of disability examiners that have been trained on post-traumatic stress disorder and traumatic brain injury. And one supervisor oversees that particular unit. When a military casualty case is to be reviewed due to psychiatric allegations, these cases are assigned either to a psychiatrist or a psychologist who has experience working in the V.A. system or has had specific training in trauma disorders. Decisions are typically completed based on the medical evidence in the file. Rarely do we send these claimants to outside providers for psychiatric or psychological consults. Every bit of medical evidence and information is used in the file to make a determination. Notes from the internist, the neurologist, the psychiatrist, the psychologist, nurses and social workers are all considered in the assessment of the claimant. Currently we are now seeing more traumatic brain injury prescreening tests for cognitive assessments as part of the record, such as the brief test of attention, trail-making tests, and subscale through the Wechsler Adult Intelligence Scale III and Wechsler Memory Scale III, which have been really invaluable. In addition, information from family members are absolutely essential. Sometimes this information is part of the V.A. medical evidence of record, and other

times we have had to request that our disability examiners contact the families. Family members and friends often pick up a problem before the claimant does. In cases involving post-traumatic stress disorder, the soldier can minimize the difficulty they're experiencing or may not pursue treatment because they are concerned about how this condition will impact their military career. Family and friends provide crucial information regarding daily functioning. This third-party source often documents in the mild traumatic brain injury and post-traumatic stress disorder cases irritability, isolation, nightmares, avoidance behaviors, sleep difficulties, excessive alcohol or illegal drug use, domestic violence, and poor ability to persist or complete tasks. There are times when decisions by our agency can be delayed. Decisions can be delayed because records are slow to reach our agency. Disability examiners report it is very difficult to obtain current in-patient and outpatient records from Bethesda Naval Hospital. It usually requires two to three attempts. Walter Reed has been a bit faster, but response time has not been consistent. Despite having field office representatives and liaison contacts in Bethesda and Walter Reed, records are still difficult to obtain. Decisions can also be delayed due to Social Security Administration policy requirements, in particular if a claimant has experienced a traumatic brain injury the claimant is not severe enough to meet our listing or disability criteria requirement, the case needs to be held for a total of six months and reassessed at the end of that time. If the claimant has gotten worse, the case will usually be allowed, or if the claimant continues to progress, the case will be denied. Traumatic brain injury cases can be either allowed under the neurologic listings, the 11.00 epilepsy and CNS vascular accident or the psychiatric listings, 12.02, organic mental disorders. The neurologic listings are very specific and require seizures be present more frequently than once a month, in spite of at least three months of prescribed treatment, significant and persistent disorganization of motor function into extremities resulting in sustained disturbance of gross and dexterous movements or gait and station or sensory or motor aphasia resulting in difficulties with speech or communication. If the medical consultants cannot allow for the neurologic listings, these cases usually involving mild traumatic brain injury come to the psychiatric side of the agency to be reviewed under organic mental disorders. Several examples of mild TBI cases and the importance of third-party information are as follows in these cases: I reviewed a case of a 23-year-old man with the allegation of traumatic brain injury, hearing loss, and chronic neck pain. The field office representative noted the claimant was anxious, he had a difficult time reading the forms, questions needed to be repeated over and over due to hearing difficulty, and he was very distracted by any movement in the office. This claimant had a history of completing one year of college and was in the U.S. military as a marine from November 2003 to October 2007. He was assigned to an explosives unit and it was this unit's job to remove explosives from the road or from any location. Per the military hospital record, the claimant was reportedly exposed to over 300 IED blasts. In April of 2007, he was exposed to a 100-pound blast which threw the vehicle 45 meters. He experienced loss of consciousness. He recalls vomiting an hour after the incident for 20 minutes. He was returned to the United States in June 2007. On return, the claimant complained of significant problems with memory loss. He was unable to retain detailed information beyond 24 hours. On psychological testing his response time was extremely delayed. In September 2007, he was diagnosed with cognitive disorder, not otherwise specified, head injury, post-concussive syndrome, hearing loss, torticollis, visual impairment and

adjustment disorder with anxious mood. Third-party activities of daily living or information gathered from the family indicated the claimant had difficulty recording information after a half an hour. He needed post-it notes to prompt him to do an activity. He was nervous, anxious, loud noises made him freeze. He experienced occasional angry outbursts over insignificant things. He continued to experience nightmares and the family needed to manage his money. Obviously he was allowed under our psychiatric listing of 12.02, organic mental disorders. Another example of how general observations and medical personnel and family members are extremely helpful are as follows: I reviewed a case of a 21-year-old man with the allegation of a gunshot wound to the left eye, post-traumatic stress disorder, traumatic brain injury, problems walking and memory difficulties. The young man had completed 12th grade and was employed by the U.S. military from June 2004 to July 2007. He was an infantry soldier. While in Iraq he sustained a gunshot wound to the head and was exposed to an IED in early April 2007. The evacuation report noted that the claimant was extremely anxious during the exam. He apologized repeatedly for his perceived poor performance on preliminary psychological testing. The results of the psych testing indicated the claimant was functioning in the impaired range in the areas of language, auditory and verbal memory, short and long-term delayed recall. Psychiatric notes reported the short-term memory loss he displayed... in addition to short-term memory loss, he also displayed somewhat evasive behaviors, apathetic mood, blunted affect, unable to remember what he did yesterday, however he still was reported to have good insight into his condition and his judgment was intact. A full neuropsychiatric evaluation was recommended in three months. The claimant had sustained an intracranial hemorrhage and subarachnoid hemorrhage and the records further indicated he had been exposed to frequent blasts while in Baghdad from mortars or IEDs. The claimant was transferred to the VA medical center for acute rehab in late April 2007. What is interesting to note, the claimant denied or minimized his symptoms, in particular anything that potentially implied a psychiatric component. In fact it was difficult for the psychiatrist to see the claimant, since the family would block access to the patient, reporting he was asleep. The claimant denied to the staff nightmares, disturbing dreams, or flashbacks of any of the attacks, but the nursing staff was essential in this case. The nursing staff on the unit noted the claimant was having difficulty falling asleep, staying asleep, took frequent naps and was taking longer to remember things that he had done in the recent past. He also had poor eye contact and could not recall what he ate yesterday. The family was advised and educated regarding post-traumatic stress disorder. Further down the road in June of 2007, the V.A. notes documented that this particular claimant was occasionally experiencing irritability and feeling annoyed. The parents reported to our examiner via phone contact that they did all the cooking, cleaning, and assisted with managing his money. They finally acknowledged their son's difficulty with short-term memory and provided a great deal of structure for their son on a daily basis. This particular case was allowed with a short diary of 18 months, although the medical evidence was just short of the 12-month requirement of a medically determinable impairment. An allowance was determined based on a combination of factors: short-term memory deficits and the need for ongoing support from family members. His condition also met the listing of 12.02, organic mental disorders. Third party ADLs can describe claimants with mild traumatic brain injury as needing reminders, they take longer to do things. They're easily confused, irritable, they get easily frustrated or agitated. They have

difficulty organizing themselves and their surroundings and they can be impulsive. With post-traumatic stress disorder, claimants are reported to have difficulty with driving, going to crowded areas such as the mall or grocery store, they have an exaggerated startle response, they cannot sleep or stay asleep. Claimants have difficulty trusting people or their symptoms are brought on by certain triggers such as smell, sounds or visual cues. Oftentimes these symptoms are very similar to post-traumatic stress disorder and mild TBI. It's very difficult to tease out which is which or if they're inextricably linked. In summary, our examiners in our agency at Maryland, when they were asked what improvements they would like to see in military casualty cases, the overwhelming response was to be able to obtain records with more ease and efficiency. A caseworker's name or number from the in-patient or out-patient department would be helpful to the examiner to have an actual contact person to follow up with if more evidence was needed or if evidence was never received. The psychiatric and psychological consultants find the prescreening measures for TBI valuable, although certainly not complete. It at least provides us with some sense of the patient's cognitive functioning, along with serial mental status exams. What are very important in disability case development are the psychiatric longitudinal history and the third-party activities of daily living. There are times when these conditions do not necessarily meet our minimum time requirement of 12 months, but based on the overall information received by the agency and the severity of the condition, we are at least able to make educated decisions that are fair and in the best interest of the claimant.

COMMISSIONER ASTRUE: Thank you. Katherine?

KATHERINE HELMICK: Thank you for the opportunity to discuss traumatic brain injury. Is this on? My name is Katherine Helmick, the Deputy Director for Clinical and Educational Affairs at the Defense and Veterans Brain Injury Center. I'm a nurse practitioner by training, -- [inaudible] for 12 years. My background has been in the intensive care unit setting and mainly with severe traumatic brain injury patients, and I came to the Defense and Veterans Brain Injury Center approximately four years ago and began learning more about the military traumatic brain injury issue. Sorry. Is this better? Okay. Sorry about that. Did you get all that or do I need to repeat it? Okay. I'm good. So I wanted to just take a couple moments to talk about both patient populations that are umbrellaed under the traumatic brain injury label. And traumatic brain injury, we've discussed some about the mild traumatic brain injury patients as well as the severe traumatic brain injury patients. I wanted to take a second to discuss each of those different patient populations all umbrellaed within the traumatic brain injury rubric. Traumatic brain injury can be based on the Glasgow coma scale, which Dr. Kelly eloquently described, using the Glasgow coma scale of 13 to 15 for mild traumatic brain injury patients. We've also discussed there have been some clinical challenges related to the diagnosis of mild traumatic brain injury. This is based on the fact that the definition or diagnosis of mild traumatic brain injury is based on an injury event. In sustaining that injury event you had to have incurred an alteration of consciousness or mental status. So the diagnosis is actually made at time of injury. Which is why it's so difficult for many of us in this room when you see the patient many months or many years after the time of injury. This has been particular challenge to our V.A. colleagues who many times do see

the patient after the injury event. In addition, the patient that is injured in theater, many times does not have that collateral information that you do receive in a civilian setting when you have, let's say a Friday night football game and someone is injured and goes down with a concussion. Many folks witness the event and are able to report exactly what happened. Unfortunately we don't have that same luxury on the battlefield when we talk about concussions or mild TBIs sustained in the battlefield environment. In addition with the mild TBI population, we're really looking at two different populations. Some are medically evacuated, which Dr. Sarno described. Some patients that were injured on the battlefield and actually went and received care and were medically evacuated out of theater to receive medical access and receive care. However, there is also a patient population by which... that are incurring sustained traumatic brain injury, and those are folks that go on a normal 12-month deployment, come home after deployment and go through the normal post-deployment health assessments and are found to have had sustained a traumatic brain injury while they were in theater. Some continue to have symptoms from that concussion, but they did not seek medical access while in theater for various reasons I won't go into now. But many times we have two different patient populations even within the mild TBI. Some that we have meticulous records on that can account to the best of their knowledge what happened during the traumatic event while they were in theater, but one of the inherent pieces of traumatic brain injury is memory loss and amnesia around the event. So we really are many times put behind the eight ball, if you will, as it relates to getting an adequate history on the injury characteristics defined from battlefield injury. That's one issues we face. We have both of these populations, medically evacuated patients that are found to have mild TBI as well as post-deployers who come home after their tour of duty and are found to have sustained a mild TBI and then seek out care in out-patient settings. The mild TBI population in the military runs anywhere from about 75% to 90% of all the TBI we see in the military. The rest of the 10% to 25% are moderate, severe and penetrating traumatic brain injury patients. So I'm going to leave mild for a second and talk about the severe traumatic brain injured population, which also poses significant challenges when it comes to prognostic indicators after traumatic brain injury. There was a document that came out in 2000. It was the second edition of the guidelines for the management of severe traumatic brain injury produced by the Brain Trauma Foundation that attempted to start to look at prognostic indicators after severe traumatic brain injury. There were five areas they looked at to decide how well a patient would do after severe TBI. These five indicators had to do with age. We know people that are younger do fare better than people who are older. And the cut-off age was about 60. Sorry for any of those of you over the 60 mark today. But less than 60 was the age group. Hypotension, folks that had decreased blood pressure at time of injury was also a negative poor prognostic outcome variable. CT scan features, when looking at what the CT scans results were and looking at the presence or absence or compression of the basal cisterns on a CT scan was also informative of prognostic value. In addition, the pupillary response on time of injury posed prognostic validation as well as the initial Glasgow coma scale score. There were five different variables listed as helping to give us some prognostic indicators. Unfortunately there is a disconnect or not the synthesis that we would desire between the neurosurgical literature looking at Glasgow outcome scale, which Dr. Kelly mentioned, and the more in-depth comprehensive evaluations you need looking at functional outcome many times that you

receive from physical medicine and rehab disciplines and rehab docs. So we do need to do a better job at trying to synthesize those disciplines so we can look at outcome. The Glasgow outcome scale GOS is usually looked at three to six months after injury. We're well aware there's quite a bit of trajectory of recovery after severe traumatic brain injury. It can happen well after the six-month mark. I think that's it. Thank you.

COMMISSIONER ASTRUE: Thank you. I think I'm going to abuse the privilege of the chair for just a moment and make one observation before I go into a couple of questions. Something that a number of the witnesses have testified or touched upon I think is important, and I want to underscore it. Probably the biggest source of error and delay in our system comes from chasing medical records and having incomplete medical records. When we started the program in the 1950s, that wasn't a big issue for us. The disability program was conceptualized largely as an early retirement program for blue collar males, people who looked a lot like me who lifted something that they shouldn't, and the files were generally like this, very thin, as recently as 1983 when I reviewed my first disability file. But that's changed dramatically. The notion of disability has exploded. We do children now. We do people from all walks of life. As the Supreme Court points out from time to time, we run the largest system of justice in the world. We get about 2.6 million applications a year, and about 20% of those end up getting appealed in a legalistic process. And it's not just that the volume has changed and that the nature of what's considered disability has changed. It's that the medical records are so much more extensive. We get so many more allegations that disability is based on four, six conditions or diseases, often a combination of both physical and mental. So the chasing of the medical records, think about this for 2.6 million people a year in what until recently was a totally paper process, is an administrative nightmare. And you can see why it would cause delay and error. We've moved as rapidly as we can to be fully electronic internally. We're pretty much there at the state level for the first two levels. We're almost there on the appeals level, and one of the things that will be a great blessing, not just for veterans but for everyone, is if we can move, have these easy large-scale transfers of medical records when people apply. We're working now to coordinate with the D.O.D. and V.A. and they've been very helpful. The faster we can move those initiatives along the better it will be. And we're working large medical center by medical center, provider group by provider group around the country to try to make sure that we instead of chasing individual records, talking to clerks that don't understand HIPAA, talking to people who aren't motivated to supply the records, if we can work out these fast and easy transfers of medical records, not just for veterans but for everyone, the system will be a lot faster and a lot more accurate, and if there is anyone out in the room that can do anything to help us with that, then we would be very grateful. I wanted to start asking principally Dr. Kelly but happy to take views from anyone else, when you talk about the Glasgow scale, one of the things we've been trying to do lately is we are on a big effort to update our medical listings generally. We've often waited way too long to update them. One of the things we started doing lately is looking at objective scales and saying that people that exceed a certain level or are below a certain, we're going to presume are going to be disabled. We did that recently for severe liver disease, hepatitis, cirrhosis, pretty much anything to do with severe liver disease. And taking a scale and if your meld score is 22 or more, we're basically presuming you don't have the stamina to meet our functional work test. Is there

any way to look at the Glasgow scale and possibly say that if your Glasgow score is sufficiently severe that we might be able to make the same sort of presumption that we do for liver cases?

JAMES KELLY, MA, M.D.: I think what we have to take into consideration here is that it's not just a snapshot. It's actually when in the course of that individual's injury and recovery that particular Glasgow coma scale score really is taken. So for instance on a football field, an individual could have a Glasgow coma scale score of three, which is a very low level, and still have just a concussion, a mild traumatic brain injury with rapid recovery and emerging from that low level of true coma. If, in fact, the Glasgow coma scale is for three weeks out, that's much more indicative of a more severe injury, provided that there aren't medications being given to produce the coma, which often is the case where in intensive care there are other reasons we might want to reduce the level of function. But if, in fact, it's from the brain injury and it's a prolonged low level GCS, that's a much different picture than what the paramedic sees or even someone in the emergency department sees. And so what we really need is at least some course of time and not just that snapshot number. For the most part the categorizations of brain injury, mild, moderate and severe that are internationally used, those are post-resuscitation scores. That's the score in the emergency department after the individual has often been intubated, so that there is ventilatory support. They have IVs running and their cardiac functions are normal and they don't have the hypotension that Kathy Helmick talked about as one of the predictors of poor outcome. Once the individual is stabilized from a cardiac and pulmonary standpoint, then that Glasgow coma scale score has some meaning, but it's actually much more meaningful the longer out we take it, because things change over time. What we really need is a window of time to make a determination. Even then it's days, perhaps even weeks before we can truly prognosticate. I'm not sure and the literature supports the idea that even the post-resuscitation Glasgow coma scale is not as predictive an outcome as we would like for it to be.

COMMISSIONER ASTRUE: So let me... so I'm fashioning David Rust's work to-do list for after the hearing. Conceptually might it be possible if we took a time period two months, three months and took Glasgow scores, snapshots at two different periods of time significantly far apart, and if both scores were lower than a certain amount, then perhaps something that looked like that we might be able to create a presumption that the person would not be able to function in the work environment.

JAMES KELLY, MA, MD: I'm not sure that's been done, but there is some logic to that. There is a span of time of observing and serial monitoring of that individual both with GCS and with amnesia scales and so forth that are much more useful to us in prognosticating the longer out we go.

COMMISSIONER ASTRUE: Okay. I don't want to hog the floor. Would someone else like to question?

DAVID RUST: Are you going to ask the rest of the panel members to comment on whether or not there's a –

COMMISSIONER ASTRUE: They're welcome to. Anything on the Glasgow score? No? I have a couple more questions, but I was going to hold off and let other people ask.

DAVID RUST: Then I would say if not the Glasgow score, are there other scores or combinations of scores like a cognitive test and some other imaging or some other way of determining the extent of the injury that combined might give us greater insight into the person's ability to do meaningful work? CARLA SARNO, MD: Unfortunately, we can't get complete or comprehensive neuropsychological testing. It's absolutely cost prohibitive to be able to do that. Sometimes some of the scores that we get on the soldiers or vets that are coming back, their I.Q. scores and their memory scores are within the normal range, however, their response time is exceptionally slow. And that fits in with our persistence, pace and concentration on the PRTF and the MRFC. We were able to think about what I call the 7-11 combination. Are they able to do eight hours a day five days a week without taking undue breaks. There are some cognitive tests that I had mentioned in my statement that the V.A. is doing in prescreening that are very helpful. But it really is, and I'm a big supporter of Carl Jung, the Gestalt. It is the entire picture that needs to be taken into account in these cases There is no one test, cognitive assessment that's going to tell me yes or no. It really is the big picture.

UNIDENTIFIABLE VOICE: Is there a relationship between the frequency of trauma and the severity of trauma? In other words, if a person has had 15, 16 exposures, can we say that's a more severe trauma than one?

JAMES KELLY, MA, MD: I'll take a stab at that. The scenario in which we understand that question best is in professional boxers. And the answer there is the longer you box professionally, the smaller your brain gets. It's not how many times you were rendered unconscious. It's not how long you had been rendered unconscious or even if you had been rendered unconscious. There is simply a correlation between length of a professional boxing career and atrophy, premature atrophy of the brain. So probably even at the mild traumatic brain injury end of things, the spectrum, perhaps even in what people commonly call sub concussive injury, where there is not the mental status alteration that Kathy Helmick was talking about that we look for at the acute event. Even then there may be disruption of neurological function that then is cumulative, and some of the work by John Pavalshock here in Virginia and others suggests they can create animal models that with mild traumatic brain injury there is loss of axon the slender projection from the nerve cell body. The axon damage can be extensive, even with a mild traumatic brain injury model of injury application. So if, in fact, there is cell damage that can be seen with a relatively mild brain injury, perhaps there is that cumulative damage which predisposes... so a previous injury predisposes to additive injury with another that occurs. One finally can be thought of as reaching a threshold beyond which any additional injury is really truly magnified. We have redundancy of the brain and resilience largely, but there seems to be some point in time with multiple injuries beyond which an individual is now injured and looks much worse than one would have anticipated with just one injury or under different circumstances.

UNIDENTIFIABLE VOICE: Thank you.

ELLEN EMBREY: I have a question. It relates to the whole person. With invisible mild T.B.I. that seems to be actually more severe than mild, there is emotional, social impacts. There's the inability to manage one's self without assistance, which may or may not get better. The question would be, this is not something that's generally documented in a medical record, and so the question would be: is this a reasonable thing to ask a doctor to do when they're seeing a patient of this type.

KATHERINE HELMICK: I mean, yes, I think it's reasonable to look at functional measures, but I think historically we've put a lot of the functionality on our case workers and our case managers, So probably the richest database of looking at functionality and were they able to drive themselves and go to the store and get a list and pick out what groceries they need. Were they able to handle their finances and they didn't just buy a new car with money they didn't have. Those are the type of rich pieces of information that we usually obtain through case management, patient follow-up, when they're out of the bricks and mortar of the military treatment facility and moved on to their home setting or to their original duty station. It makes sense that this could be part... more part of the isolated physician encounter and look at more functional outcomes. In the context of the physician encounter, it's usually very much based on the treatment plan, compliance with medications, are the medications working for you, et cetera, but adding that functional component and actually trying to get a better textotomy of functionality, especially with the mild T.B.I. population, I think would very much add to the field.

ELLEN EMBREY: The icd9 codes are being evaluated to move to icd10, which should we hope help us understand traumatic brain injury and their different severities through diagnostic coding. Do you have any comments on that that would help to influence this panel?

KATHERINE HELMICK: Yes, actually, we've done a lot of work with icd9 codes and icd10 codes as we look at surveillance efforts for traumatic brain injury. Beginning about 24 months ago, we've been trying to grabble with the scope of the problem of traumatic brain injury in the U.S. military. This has brought us to assignment at looking at icd9 codes clearly so we can pick the right one. You're probably well aware that there isn't a T.B.I. code one and you pull it out and it serves all purposes. So the revisions for the icd10 coding is going to help us because it's going to provide more granularity to the severity of injury, the late effects after traumatic brain injury according to the clinicians Gestalt on whether they believe these are at try attributional, is this related to the injury event, et cetera. I think this will go far in an automated fashion, which is many times what we need to look at the specific late effects after traumatic brain injury and also help us to classify the severity of the brain injury looking at the indices that we've already talked about to include the Glasgow coma scale.

JAMES KELLY, MA, MD: If I could just add to that, one of our opportunities now is to look at how to get the diagnostic and statistical manual of psychiatric disorders to talk about the same things that the icd code system is talking about. and there are some people

looking specifically at that because they tend to be in separate orbits right now and use not only different numerical systems, but they don't even use the same concepts in some ways. You need to get people talking about the same things and sharing ideas about the brain and its mental, cognitive, emotional, behavioral functions. In the same way so we're really understanding what happens to the person.

ELLEN EMBREY: The Department of Defense and V.A. have been collaborating to do just that over the last 18 months or so. And they've actually submitted a proposal to the group that evaluates that. I guess there was a hearing in November, October? I guess we'll get a decision in March.

NANCY GRISWOLD: At some point in the process we're dealing with residual function, residual capacity, and it seems that in these cases function is very much a moving target. How early can a meaningful assessment of some sort of long-term functioning be made?

JAMES KELLY, MA, MD: It depends on the severity of the injury first and foremost. So, for instance, it's possible within general terms to make that determination during an in-patient rehabilitation hospitalization stay, but often that's months long and certainly weeks. It's not as long as it used to be. Those of us who have been around... we're now discharging people from in-patient rehabilitation at the time they used to come to us from the point of injury. And so it's a different world now with pressures to get people out of the system as quickly as possible. On the other hand, during that span of time, much more sophistication is now available in terms of determining what that individual's capacities are and the moving target you're talking about is influenced by the rehabilitation efforts that are also becoming more sophisticated. And so since the job is not just assessment for the person who is actually asked to do the assessment, it's make the person better, the moving target is what we want. It's what we're trying to create. We're trying to improve the functioning. So predictability is much less on the mind of the individual we're asking to make that call than is how to get that person better. So the system as we have it right now, at least in medical rehabilitation and the neurological clinical sciences is not so much aimed at answering that question as it is maximizing function. And so not uncommonly what happens is a snapshot is made early on that is way off base as to where things end up. Just as one quick anecdote, one of the co-authors of the term persistent vegetative state stood in the doorway of a patient who was thought to be in vegetative state a few years back and pronounced that person will stay like that forever. Four years later that young man wrote a letter from his medical school class where he was at to that Professor saying how wrong he was. And that's an individual who had coined the term vegetative state. I think all of us need to look at what science is evolving, learning from neuro imaging and other opportunities as they evolve because we've all been wrong. And we need to get better at this.

COMMISSIONER ASTRUE: If I could ask a follow-up to Judge Griswold's question I think focusing with Dr. Sarno, you mentioned in your testimony that under our current rules for a number of the close calls we set them aside for six months and then we review them. As you work with these standards over a longer period of time, are you

comfortable with that six months? Do you think that that's a long time to be waiting if you're waiting not only for benefits but potentially to know you're going to have Medicare? Should we think about reviewing these cases every three months? Every four months? Is the six months, are you comfortable with that, having used that in practice, or do you think we ought to think about something different?

CARLA SARNO, MD: If they're impaired we certainly allow them under the six-month rule. If they're not meeting or equalling our listing, then we have to hold the case. Usually if we hold the case for six months and they weren't allowed previously, it's because they're typically getting better. Am I comfortable with it? At the present time, yes. Are examiners comfortable, no because they have to hold on the cases for quite a long time and caseloads build up. But the times that I've had to hold cases, it's usually because I'm probably sitting on a denial, a person is not going to be allowed and we're making sure they're not going to be allowed. They're usually getting better at that point.

DAVID RUST: Okay. When you're working with a patient, Dr. Kelly do you think in terms of what the patient or what the person can do or what they can't do? Do you think in terms of how the disability limits them? Which side do you approach it from?

JAMES KELLY, MA, MD: The fun part for me is a lot of the people that we work with don't consider themselves disabled at all. It's a term we use for all the reasons we're talking about. They look at what they're able to do and have the cheerleading squad as the therapy group around them cheering them on with every new thing that happens that's good. And disability is less the discussion and concern. When we start the evaluation very early in the process, we're looking at what the nature of the problem is, what really happened to the brain. That matters. It's not just a black box. We have much more information for detailed assessment and neuro imaging now than we had years ago. So we need to know what those deficits are. It is a disability thinking process at that time. What are we facing? What is this person going to need, how are we going to provide that? And so under those circumstances, that thinking has to happen at the evaluation stage in order to plan where we're headed. Thereafter, it becomes a march towards improvement, which focuses on abilities and maximizing abilities as best that we can. So both things go hand in glove. There are different points in time and often the rehabilitation role at least is engaged in taking care of people with disabilities to help them with ability.

KATHERINE HELMICK: I agree with what Dr. Kelly has mentioned, really looking at the glass as half full instead of empty and moving towards victories. A lot of times in severe population, the family dynamics are so grateful that their loved one is even here because they spent a lot of time in I.C.U. There was a lot of touch and go. You're dealing with neurosurgeons. That's never a good sign from the practice standpoint. [laughter] No harm here. I know we've got one. So you know, in terms of first life and death and beating that and then moving on to recovery, it is really a glass-half full. In my experience, especially with the severe T.B.I. population, I think folks move towards the recovery paradigm. We're not talking about what they can't do. We're talking about what victory they were able to do and as they recover with their strong family support. I wholeheartedly would concur with Dr. Kelly.

DAVID RUST: We're always looking at how we pose the question to the doctors in terms of assessing what the patient's residual function and capacity is because we have a certain sense that we ask the question one way and it's different than the way the doctor approaches his or her patients.

ELLEN EMBREY: There's a perception that early intervention improves functionality outcome in the long run. So the determination of disability or not would enhance the financial resources that would be available for an individual to get that kind of rehabilitation. I understand the pressure of wanting to diagnose or to make the judgment early. Are there, for those of you on the panel that are familiar with the ongoing research, do you see any promising technologies or imaging capabilities that would help inform an earlier assessment of disability that meets the criterion for Social Security?

JAMES KELLY, MA, M.D.: There is new research level neuro imaging technique so far as best I can tell not used clinically but very close called diffusion tensor imaging, which is an M.R.I. technique that when done properly is very difficult to do. It can actually demonstrate a loss of anatomical area within tracts of the brain that are connecting one part of the brain to the other. So it's white matter tracks where these long projections actually are residing and hooking up brain networks. It's a very sensitive test, and if, in fact, it's shown to be what we think it's going to be, it very well may end up being the diagnostic test we use to determine diffuse injury within the brain that we can't see other ways. And so I think that diffusion tensor imaging has great promise in that regard. When that happens in the span of time, I think after a brain injury still needs to be worked out, there are many things that have to happen acutely to the individual in intensive care and so forth where it's impractical to be getting a test like that. But I think that that sort of imaging and perhaps others will be useful in the near future.

KATHERINE HELMICK: I think, I just want to make a comment about F.M.R.I. or functional M.R.I. studies where you are able to perform a cognitive test while the person is in the M.R.I. scanner. You can see how hard an individual who has sustained a traumatic brain injury has to work to activate areas in their brain to complete whatever executive task is being asked of them. So there is exciting work being done. It's in the research paradigm. It's not normal clinical practice at this point, but it is providing evidence on how much more exertion, if you will, cognitive exertion it takes compared to normative controls to figure out math problem or to sort through how to put your clothes on in the morning, those kind of things. So that's some exciting work most notably coming out of Dartmouth. I guess I can say that. It is very exciting when you look at cognitive performance and how much exertion it really takes. Because you would suspect that someone without a brain injury would exhibit the same type of performance and activate the same areas to the same level as somebody that's not injured. So in some circumvented ways, it's able to tell us about injury. There is also some promise looking at biomarkers and cerebral spinal fluid, as well, and then the whole area of neurocognition and computerized testing and how that may be fruitful to help us, especially with pre-deployment baseline testing, which is something that the Department of Defense has just initiated within the last year. So getting pre-deployment

neurocognitive performance tests prior to injury and prior to post-deployment status may help us, which I'm sure is probably a rich source for folks to know, what was it like beforehand? So we are getting those answers.

COMMISSIONER ASTRUE: That's very timely. I was just going to ask about that. I've seen some examples where people have made in general remarkable comebacks from a brain injury or a cerebral hemorrhage but where the main deficit over time seems to be related to language, the ability to communicate, the ability to understand, and to be able to go along for periods of time. And then all of a sudden there will be a lapse. Can you talk to me, anyone on the panel, about what sort of state of the art is for being able to assess the ability to communicate and understand and how we ought to be thinking about that vector for making decisions on functionality?

JAMES KELLY, MA, M.D.: There are -- within the assessment team, there are people who have carved out that niche, if you will. And those would be the neuropsychologists and the speech/language pathologists. Oftentimes, at the mild traumatic brain injury end of the spectrum, we don't have those individuals readily available at the severe end where they're in the institution; they're at the military hospitals or the VA system for instance or in the many rehabilitation institutions around the country. And that aspect, that high level of human function then is their focus. And, in fact, that part of it can be the lingering disabling feature for individuals for whom that is the nature of the problem. And if in fact -- one of the things that you see in the literature, if in fact there is anatomical injury such as a contusion in the brain, that carries with it a specific added risk of -- or prognostic likelihood of additional trouble, regardless of where it is in the brain. But if it's in a language center, it's particularly problematic for the understanding comprehension or the fluency and the production of language and so forth. Very specific neurobehavioral syndromes, which is where behavioral neurology started in this country was based around focal injury to the brain, little strokes or areas where a tumor had been removed. And that's how we learned largely how human brain works and what it does. And so now if we take it, a traumatic brain injury and have anatomical injury superimposed on it such as contusion or, in fact, stroke, which we'll talk about later today, that can be devastating. And if it's in the language function area, that by itself is often the one thing that prohibits return to work functionality more than anything else.

KATHERINE HELMICK: Just a quick follow up on that, most of the language deficit you see in the more severe TBI patient, if we take the TBI and really look at mild traumatic brain injury and severe, the mild traumatic brain injury population, what you mostly see in terms of cognitive deficits are more attention, memory, delayed recall, executive function, visual/spatial deficits, not as much in the language sphere. And many times that's because they don't have those neuropathological lesions that Dr. Kelly was talking about. So you find the more aphasic or language blocks, if you will, language salad we call it sometimes, with the more severe type of brain injured patients. But the real problematic cognitive part for the mild TBI patients tend to be more in the memory, concentration, easily distracted, and the visual/spatial pieces, having problems reading, having problems reading and comprehending what they just read, which of course, is

very significant, both in your everyday living as well as if you're on a mission and you're trying to do some work in the military.

COMMISSIONER ASTRUE: I think we've got time for one more question before we take a short morning break. So what's the final question?

DAVID RUST: Dr. Sarno, from these discussions that we've had in the last ten minutes or so, are there things that would be helpful to you as an adjudicator for cases?

CARLA SARNO, MD: One of the things -- we have, actually, a speech language pathologist on staff at Maryland DDS. However, with way the regulations are written now, she cannot complete the rtf more Maryland relay cases. She does indeed fill them out for child cases. And she can only do allowances. In which case, if she denies a case, it has to be seen by the psychiatric pool or medside. But all of this is very good information. And I particularly am impressed with your information. I've got to talk to you later. [laughter] But we pretty much -- everything that's been stated, we know about. We've been doing training within the agencies. And I've been on the military casualty work group. And it's very interesting to hear that other agencies have developed, on their own the same system that we have, that each of these cases are reviewed by someone who have specific experience in the VA system and or have had trauma disorders experience, that they are doubly reviewed, each of these cases, specifically if the case is a denial, and each of the cases, particularly at the Houston agency, has developed the same type of system that Maryland did on its own. So I don't know if I'm necessarily answering your question. But this information is, obviously, very helpful. And we do continuing education in the agency about traumatic brain injury, in particular mild, because that seems to be where the problem has been.

COMMISSIONER ASTRUE: Thank you. With that, I would like to ask for a hand for our panel. This has been terrific. And we're very grateful for this. [applause] We're going to reconvene promptly at 10:50 or I will be in trouble with my staff. Thank you.