



**Defense Centers of Excellence for Psychological Health and Traumatic Brain Injury
Webinar Series**

“Advancement of Traumatic Brain Injury Research and Clinical Care in the Department of
Defense”

November 16, 2016 12-1:15 p.m. (ET)

Operator: Please continue to stand by. Your conference call will begin momentarily. As a reminder, today's conference call is being recorded. All lines will be in listen only mode for the duration of today's conference. If you object to the recording, please disconnect your line at this time.

Dr. Livingston: Good afternoon ladies and gentlemen. We will begin our program now. If I could have everyone's attention, please. My name is Scott Livingston and I am the director of the Education Division for the Defense Veterans Brain Injury Center. It is my pleasure to welcome you all here today for our monthly TBI webinar. Today is a special occasion as we award the Dr. Deb Warden Lectureship, which recognizes an individual for outstanding dedication, leadership, and commitment to advancing medical science and clinical care, and to improving the health, safety, and well being of those with traumatic brain injury. This year's award recipient is also today's webinar speaker, Dr. Lou French.

Before Dr. French presents today, just a couple of general announcements. We want to recognize a couple of distinguished guests who are with us today, Lieutenant General Retired Schoomaker is up here in the front row. Lieutenant General Schoomaker is a former United States Army Lieutenant General who served as the 42nd Surgeon General of the United States Army, and Commanding General, United States Army Medical Command. We also have, a few rows back, Sergeant Major Colin Rich. Sergeant Major Rich is a highly decorated and trained senior enlisted soldier with the special forces rangers, with multiple deployments to hot spots throughout his career. Sergeant Major Rich's [comment 00:02:50] deployments include Panama, the Gulf War, three tours in the Balkans, two tours in Afghanistan, one tour in Iraq. He will be offering some remarks a little bit later. We also have here with us Dr. Deb Warden and her husband, in whom the Lectureship is named in her honor. You'll be hearing more about the lectureship and Dr. Warden a little bit later, as well.

All right. Moving into just some webinar details before we get started, because we do have a virtual audience of over 400 people participating in addition to our live audience here at the National Intrepid Center of Excellence. If any of our virtual attendees experience any technical difficulties during the webinar, please go to the dcoe.mil/webinars to access troubleshooting tips. For our virtual attendees, please feel free to

identify yourself to other attendees via the chat box, but refrain from marketing your organization or products. Then, just some other general webinar details, for those who wish to obtain continuing education credit or a certificate of attendance and who meet the eligibility requirements, must complete the online continuing evaluation at the conclusion of this webinar. You can visit the website for that, which is dcoe.cds.pesgce.com to complete that continuing education evaluation, and to download or print your certificate of completion and certificate of attendance.

Continuing education is awarded through our continuing education provider with the defense centers of excellence to a number of groups that I just went through quickly there. Question and answer session for our virtual attendees will be open throughout the webinar this afternoon, and again, if you're experiencing any technical questions or content-related questions, you can submit questions via the Q&A pod located on the screen. All those questions will be anonymous, and we ask not to submit technical or content questions on the chat pod itself. Today's presentation is titled, "Advancement of Traumatic Brain Injury Research and Clinical Care in the Department of Defense." I'm going to turn things over now to Captain Greenhalgh, who is the Director of the National Intrepid Center of Excellence, to introduce our speaker today, and award recipient, Dr. Lou French. Dr. Greenhalgh?

Capt Greenhalgh: Well, thank you Dr. Livingston, and welcome, everybody, to our wonderful facility here. The National Intrepid Center of Excellence, NICoE, Walter Reed, Bethesda. It's great to see the room used for many purposes, but this is one we're particularly proud of. It's been wonderful getting to know Dr. French as friend and colleague here at the National Intrepid Center of Excellence, but knowing that his history with traumatic care, brain injury care, goes well beyond the three years that I've been here, it's always wonderful to hear him talk with groups like this on his experiences in caring for this population. I'm very much looking forward to his talk. I congratulate him on his receiving this award. I'll say I got all dressed up for this today, but a lot of things going on today, but this is obviously something we're very proud of, and again, very happy to have you all here, happy to have Dr. French presenting, and look forward to this lecture. I'd like to introduce my friend and colleague, Dr. Lou French.

Dr. French: Hi. Thank you all for coming. I give a fair number of talks, and I've been particularly nervous about this one, just to be honest with you all. I think that's been related to the fact that I was so honored by this, and it means so much to me. Dr. Warden, Debbie and I worked together for a long time, and when I was really first learning about traumatic brain injury, she was one of the people that shaped my knowledge, mentored me in the way to interact with patients, the way to understand the impact of traumatic brain injury on individuals. I feel particularly proud to be asked to do this. My talk today is wide ranging, and I want to talk a little bit about history and a historical perspective about this, and then move on, a bit, to some of the things that are happening now that I think are particularly important and relevant. Because I am interested in history, you will see a

bunch of things as we go through. The first thing there, that is from ... There was a newspaper that was published at Walter Reed, and it was published for about 10 years, sold on the streets of Washington. This was from the front page in 1918, the the staff and patients published this.

Just sort of a wonderful quote there, that was right there, and it said, "My lad, you have shown the will to win the war, now show the will to win the battle of life." I think it's really a nice quote, because what it talks about is the responsibility of the military healthcare system to provide care for people that have been injured in the serviced of our country, but it also sort of positions them, and shows what our responsibility is about shaping the future of people after that. People have to go on for, sometimes, another 70 years or so of their lives, and we have to think about their life in all sorts of domains after that. Just in the theme of talking about Dr. Warden for a second, I want to mentioned three different things here, which I think for anybody that had some connection with Debbie, probably they have some really good memories of things that she taught them and impacts that she had on the system, but I want to just point out three of those. One of them is this one at the bottom, here, and this has to do with this graph. Dr. [Blyberg 00:10:03], who was involved in this too, is in the audience.

This was a research study that was done up at West Point, and it was looking at boxers at West Point, and how they recovered from concussion. I think this was a particularly meaningful paper, because it did a couple of things. It was one of the first, I think, really systematic studies of concussion in the Department of Defense, but it ended up really influencing a lot of the things that happened in the years after that. When we started working on the in-theater guidelines, this was information that we drew on heavily. I think it was a very influential paper in a lot of ways. The paper that you see at the top, this "Military TBI During Iraq and Afghanistan Wars," it was published in The Journal of Head Trauma Rehabilitation. As near as I can tell, I think probably the second most reference article about traumatic brain injury during the wars in Iraq and Afghanistan. It's been cited over 700 times in the literature, and I think it's had a meaningful impact. Even if you read the abstract, there's all sorts of things in there. It brings in blast, it brings in issues around sports concussion, it brings in issue around post-traumatic stress disorder, it brings in issues around families and communities, all the things that are still very important for us, and things that we continue to think about.

The last thing is a chapter from this textbook, "Textbook of Traumatic Brain Injury." On a more personal level is that this was the first edition of this book, and there was a chapter that Dr. Warden did on there about post-traumatic stress disorder and traumatic brain injury, and the relationship between the two of those. For me, that was a piece of work that really opened my eyes to a lot of things, and was a very influential first look into an area which I had not thought about in that depth before, and really shaped some of my research career after that.

Having problems moving along here. Although in recent days, I think, people have been critical of some aspect of globalism, I'm going to talk about a global approach to things here. These are not English, as you can see. Some of this literature is from Eastern Europe, published in languages there, from Scandinavia, from Asia, and from Europe. These are all DVBIC materials. These are DVBIC materials around military concussion. I think this is illustrative of the penetration that the work that the United States Department of Defense has done around concussion, and the DVBIC has done around concussion, to make sure that our allies around the world have been able to benefit from some of the work that we've done. To get to this point has been a bit of a struggle, and I want to talk a little bit about how we've moved that way, but I think this is quite telling, that we can look at this and see the influence all around the world. That influence is not just on education, and when we talk about combat casualty care, there have been dramatic advances in that also, and the treatment of concussion early on.

From a research standpoint, there are a number of large studies that are supported by the DoD to look at issues of traumatic brain injury and how those influence people, and how that changes over time, the Army Stars program, the TED program, Center for Neuroscience and Regenerative Medicine, and efforts still ongoing with DVBIC, and the DVBIC 15 year study. I'm going to go back, now, to the beginning of the 20th century. People who've heard my talk before have heard me talk about Ancient Sumeria and helmet design, and things like that. I'm not going to go back that far this time, but I want to go back to 1900. On the left, here, you see the primary causes of death for people in the United States. Then, current, on the right, here. What you don't see is much about neurological conditions. Number 10, down there, you see convulsions, but you don't see anything on there about traumatic brain injury, you don't see any things about injuries or accidents, really, not suicide, not all of this stuff that you see over here on the right. As a matter of fact, you have to get down to about 14 or 15 on there to get to accidents as the primary cause of injury.

When you do look at accidents and you drill down to that, number one was heat or sunstroke, two was railroad injuries, three was drowning, burns, fractures. Nothing on there about brain injury, nothing on there about that. It just wasn't part of the zeitgeist. It wasn't what people were thinking about in terms of this. It really took, I think, World War I to change that, and I think people started thinking a bit more about the implications of this. This is a picture of people on their accession into the Army in World War I. They're taking the Army Alpha or Beta test, which was a cognitive test. There was a realization then that how you function intellectually made a difference in terms of how you could fight, or how you could do your military duties, and things like that. They administered this broadly to people to see what their intellectual functioning was like. It's not so different than what we're doing today with pre-deployment cognitive testing and the ANAM. The roots of what was happening now, with this, were around quite a long time ago. If we look at all sorts of

things about what we do now, we do find the foundations of them in things that happened earlier.

Now, this is a little different era, this is actually World War II on the left, but that is an evacuation train that they used to bring service members to definitive hospital care. Just today, there was a realization that the quicker you got people back for a definitive level of care, the better off they would be. Research was an important component of things in the past, and there was a sense that you needed to do research on functioning in order to provide the best level of care. Again, a World War II area picture. That's Alexander Fleming down there, standing up, who discovered Penicillin, so that's the Army captain down there, who ... I'm blanking on his name. Rosen ... It'll come to me in a second. He's the one that developed ... A Walter Reed doctor, a photo at Walter Reed. He developed a formulation which was beeswax and an oil, that was a peanut oil, that was the emulsion that was used to put the Penicillin in so that you didn't have to get Penicillin shots every four hours. This was the first longstanding ... Again, a medical corps officer, O3, from Walter Reed, who was fundamental in promoting military-relevant research.

If we think about something like the occupational therapy that goes on today, again, has its foundations back in things that we were doing at Walter Reed in the World War I era. This is the greenhouse and the horticulture that was there on post. This fellow up here on right actually became a famous silversmith after the war. His work was quite well renowned. The picture on the upper left, I've never been able to puzzle out what the guy in the funny hat up there, what's happening with that, exactly, but nonetheless, a place where they were doing occupational therapy interventions.

Even the idea of celebrity visitors. President Harding, down here, coming to Walter Reed. The picture on the left is fascinating to me. That was a picture around World War I era, again, where they brought in some Indian chiefs from out West to come in to visit the patients and the staff there, which, again, is the predecessor of a more recent visit from our President. Some of the things that we think about as new, exciting interventions that we do have their roots in previous things. Just as the art therapy has been successful, it was found to be successful at Walter Reed in the early ... They taught them both art and sign painting back then. Even the canine therapy that we do now, that was the dog and the son of a Walter Reed commander up there who would go around with the dogs to interact with patients and staff. Again, not so different from what we do today.

Capt Greenhalgh: We're a tobacco free campus.

Dr. French: Yeah. Some of the debates that go on today about the people that we see, and the injuries that they have also had foundations in earlier times. I just want to read to you some parts of this from a paper published in 1915 in the Proceedings of the Royal Society of Medicine. "Private M, age 29, was knocked over by the explosion of a high explosive shell in December,

1914, and remained unconscious for two days. When he regained consciousness, he found that he could not move his right arm or his leg. Power in both limbs soon returned to some extent. Violent, involuntary movements occurred in his left leg. His gait seemed to be so obviously hysterical in nature, and the signs pointing to organic disease were so slight that it was thought that all the systems would probably be cured by suggestion." It talks about ... They hypnotized him, then. Then, the bottom paragraph, "The associated movement of the paralyzed hand, when the normal hand contracts, the slight exaggeration of the left knee jerk, and the tendency to ankle clonus, and above all, the presence of Babinski's second sign indicate that some organic changes have occurred in the brain as a result of the concussion. The complete failure of suggestion to produce any improvement raises the question whether all the symptoms, in spite of their unusual character, may not be organic in origin."

Again, this debate about a single patient, how much of the relative contribution of their presentation is related to the emotional impact of the injury they had, and how much related to the central nervous system change that happened with this person? Predecessor to Colonel [Hogue's 00:21:56] paper on mild traumatic brain injury, and talking about persistent post-concussion symptoms, and this discussion about how much is related [towards 00:22:05] damage to the brain and the injuries that people had, relative to the emotional piece of this, relevant questions that we continue to struggle with. Even to go back, I looked at this, and I'm almost a little jealous of the stuff that they had back in 1914. If you look at this, it's pretty cool. These are things that were available on the Walter Reed campus in 1918. If you look at beekeeping, there in the lower right. Cabinet making, wood carving, rug weaving, even this thing, dynamo-tending. Poultry keeping, all sorts of things here, the layers of things that they had to prepare people for their future life was quite envious. Again, back to this idea that it's not enough just to treat people that you have to think about what's going to happen for them across their lifespan, and have an impact on people's recovery in life.

These are some screenshots that may be a little bit hard to see. The point I want to make, though, is we went through a period when some of this, a lot of this, was forgotten. If you look at the bottom here, this was just a PubMed search I did on concussion and military, and you see a few things here at the bottom from the 1920s, the 19-teens. It skips to 1964, then there's a few here, into the '70s, but there's almost nothing, 50 years of no literature on military concussion that's appearing at all in the scientific literature. Skip ahead a little bit, and this is a search where I looked, again, for military TBIs. You start to see some stuff from the '90s. Not surprisingly, you'll see Debra Warden up here a bunch of times, too. This was some of the foundational stuff that DVVIC was doing in terms of understanding a bit about treatment, understanding a bit about the impact in the military. This is what was there.

Now, there was obviously work that was being done in the civilian sector. There were guidelines that were being published about management of

severe brain injury. There were guidelines that were being published about management of concussion in sports, but those documents were not being directly applied to what was happening in the military. I think that when we talk about DVBIC, one of the real strengths of that organization was to one, recognize the problem when it was emerging, and two, to take those guidelines that existed out there, and try to re-tool them in a way that could be applicable to the conflicts that we were facing. In 2003, this is the first example I could find in the popular press that I think really brought out this more public awareness. This is almost two years after we had gone into Afghanistan ... brought into some public awareness the issues around military service members and the struggles they were having, and how what was happening in the war was different than we had at home, the things that the military system was struggling with, and the VA started struggling with.

If you read this, the amputees that were initially coming in, the experience they had were people that had amputations due to diabetes and other kinds of circulatory issues, a different population than they were seeing. When they tried to apply some of those same things to that, it didn't always work. In some cases it did, in other cases it didn't. This was new information that had to be acquired. From that point on, though, DVBIC was on a role. There was about 3, 4 years when a lot of stuff happened very quickly. I won't go through every aspect of the timeline here, but two things at the top, this screening at Walter Reed of service members coming back, and September '05, the Walter Reed polytrauma video teleconferencing meetings. Those were things that we did at Walter Reed through DVBIC. That's where the assets were. We were trying to change the system as best we could and support what was happening. There were a lot of other places around the system that embraced some of those things at the same time, but while this was happening, DVBIC was starting to gather people together, to draw on those guidelines, to work on the first in-theater guidelines, to develop the MACE, so that there were ways of determining what you do with an individual who gets injured downrange.

There were guidelines about, "What do you do with people once they get back?" There were things like this mild traumatic brain injury pocket guide that came out. There were guides for treating neuro-endocrine dysfunction, management of dizziness, management of visual dysfunction, neuro-imaging following mild traumatic brain injury, complementary and alternative medicine, modalities and interventions. They changed the landscape, and really provided the foundation us to be able to do what we're doing here, now. I'm, obviously, very proud of what we're doing here at the NICoE. I'm not going to say that we're the best anywhere, because there's all kinds of great services that are being provided in the DoD and VA across the spectrum, but I think what we're doing here is a good example of some of the things that can be done.

We have a range of services. We want to touch people if they get medically evacuated and show up on the inpatient side. We want to

determine, "What needs do they have?" We want to move them through our care system in the way that they need, whether they need an intensive treatment program like our four week intensive outpatient program, whether they're going to need ongoing services for years, like we do in our outpatient services, whether they need a quick diagnostic evaluation for us to get as much stuff as we can in as short a period of time, or if we need to address cognitive dysfunction in people. We need to have a range of services that address the range of needs for people out there. We can't do everything. We rely on our partners, we rely on the VA, but we want to make sure that in our armamentarium we can address the majority of problems that might occur here.

Some people might [stay 00:29:37] to the science talk at [USUS 00:29:40] a few weeks ago, and I've seen some of this, but I want to talk about a couple of slides here. This slide that the CDC put out, this slide that the CDC put out, and this slide, which DVBIIC has put out. Now, these three slides are kind of ubiquitous. You go to TBI talks all around, and you see those slides. Quite appropriately they're there, but I think by focusing on these slides, you miss something. I want to go through them one by one, here. The first one, the CDC. This is talking about the impact on lives related to traumatic brain injury. This is talking about TBI as a public health problem. 52,000 deaths annually, 275,000 hospitalizations, et cetera. Okay. What is 52,000? This is Galveston, Texas, where people can walk on the beach, go to amusement parks, go fishing with their dads, population of Galveston, Texas is right about 52,000. This would be like this city being wiped out every year, or a city like it. It starts to give you a sense of what this means in terms of individuals.

Next slide talks about \$60 billion in lost productivity in the year 2000, almost 20 years ago now, so it's even more. What is \$60 billion? It's hard for us to think about. \$60 billion would pay for college tuition for half of all the students in the United States, universal preschool for three or four year olds. If you stack the money up, it'd be a stack of dollar bills 4,000 miles high. You could buy all the major league baseball teams with \$60 billion. This is the frightening one to me, Halloween costumes and candy in the US for the next 7 years. We spend about \$60 billion every 7 years on Halloween in the United States, but huge amounts of things. I think, when you start to look from this perspective, you start to get the sense of the impact of this. When we look at the numbers of people that had traumatic brain injury, 352,000, both CONUS and OCONUS, 290,000 mild. The good news is most of those people get better, but not everyone does.

When we think about mild traumatic brain injury, it's not a benign injury in some cases. If we look at two ... The next two slides are data from the Iran report, and they were talking here about TBI, depression, PTSD, but an individual with any one of these conditions is more likely to have other psychiatric problems, and to attempt suicide. Suffering from these conditions can impair personal relationships, disrupt marriage, aggravate difficulties with parenting, and cause problems in children, extend the cost

of combat experience across generations. This is looking at just mild traumatic brain injury, and the percentage of people that had these things on the left after they got this diagnosis of mild traumatic brain injury. Not insignificant numbers of people diagnosed with mood disorders, alcohol dependence, and all sorts of other things after this diagnosis of mild traumatic brain injury. Not a complete cause/effect relationship, obviously. There's a lot that goes into these things, but again, argues that when someone gets diagnosed with a mild traumatic brain injury, you have to think about the comorbidity conditions and the effect that this is having on their life.

Our 15 year study, I'm going to spend a bit of time on this today. Our 15 year study has an important component about family caregivers. Up here on the screen are quotes from people that we saw in the study who were in this care giving role, mostly spouses, but some parents, and what they have experienced since their loved one has been injured. If you look at these, it's intensely sad. "You become their watchdog, like, "Okay, I'm going into this restaurant to check it out. If there's any weird looking people, we're going to have to leave." What's going to happen? Something is going to set him off. We're just waiting for the ball to drop, so it's like anxiety all the time. I become less active, just don't exercise like I used to. I'm feeling more lethargic. I'm tired and run down all the time. I don't sleep. I'm always worried about someone else in the house except my own sleep and pain. I wish that there was more active support for caregivers, emotionally I am full of many unanswered emotions. I become very depressed, partly due to my emotions being suppressed. I even was suicidal at one point. It seems that one to two days per month, he is capable of managing himself, but the following 28 days are mixed with emotions anywhere from selfish and childish behavior to overbearing, violent outbursts."

The 15 year study that we're doing has a number of different components. In the interest of time, I'm not going to talk extensively about all the components of those, but there is a careful examination of some old data that we've collected. There is a prospective portion of this, and there is a portion looking at family caregivers. The work that we're doing in this study is not focused solely on the DoD and the services that are provided here, and what's done well and what's done poorly, but looking at people as they move through the system over time, touching the VA and the DoD, and other parts of the civilian care sector. I'm focusing a little bit on some of the data I'm going to show you, some brand new data that we just analyzed from the caregiver study here, a little bit. This was looking at, again, the family caregivers, mostly spouses, but sometimes parents. There's a lot here, and I just want to show you ... I'm going to talk through some parts of this because there's a lot of information on these things.

In blue, you have people up here that self-identify based on a scale that we give, whether they have a high caregiver burden, and people that have a lower caregiver burden up there in the white. Down here are a bunch of domains. What you end up seeing is that there are ... The point I

want to make about this is that there are one, a lot of people that report high burden over time, and those people are suffering some distress, and the higher their burden is, the more distress they're having. Okay. That's the only point I really want to make about that one. Again, more numbers up here, a little confusing. I just want to point out a couple of things on this. If you look at the colors here on the left, they will highlight those things that have been identified by people as being most influential in this sense of feeling burdened. "What characteristics of the system, or themselves, or their loved one, that have caused them the greatest difficulty?" You see up here, actually, the highest, with the highest effect size, is anxiety, anxiety in the individual they're caring for, their loved one. The more anxious the loved one is, the more difficulty they report. That's the single thing that they report the greatest difficulty with.

There's other kinds of behavioral stuff here that you see, too. Certainly, depression spikes up there, irritability, inappropriate behavior in social situations, influence that feeling to a large degree, but also some systemic issues. Navigating the medical and benefits system, managing medical appointments, all influence things heavily. I will tell you, though, that a lot of the stuff that we see up here that we assessed all has a contribution to one degree or another, and you can see any of these things, that there were significant difference in most of these areas between people with high burden and low burden, and the things that they identified. We looked at this a little different way, and some of these are slightly different populations. Again, I want you to just focus on the two colored line graphs, the two colored aspects of this. These are, essentially, people that were asked about the changes in their burdens over time, at four different time points. "What did your loved one need when they were an inpatient in the hospital, when they got sent home, in the past three months, and then more recently?" There's a second time point that we asked them about that.

What you see here is blue is the need for help, and tan is that they received help. The first thing that you see is there's a gap between what people feel like they need and what they really get. What you also see is that when people are in the hospital, they have a high need, but it's a little closer to being met, and as time goes on, you might say the system fails them. It becomes a larger gap between what their needs are and what they're getting from the system. That extends itself over time. This is guidance to provide emotional support. This is about how good they can be as a caregiver. Again, need for help up here, and what they actually received. There's some good news out here at the tail end of this, that things start to come to kind of a state of equilibrium, but in the beginning, huge gaps. People are saying they're wholly unprepared to provide the services that are needed, and they can't anticipate it, they don't know what needs to be done.

Again, same thing here. Finding out about programs and services, huge gap between what they feel like they need, and what they get. Again, as time goes on, that evens out a little bit, they're getting somewhat help

here, which is a good news thing, but early on, despite the fact that they are in the hospital here, they're not getting much, and then as they go home they're getting even less help than they were before. That protective environment of the hospital becomes reduced, and they get less. Navigating the medical system. Again, need for help and the fact that they receive help. As time goes on, there's this dip down here in terms of what they're getting, but you see the steady decline from leaving the hospital and getting services to going home, while the need maintains a steady need over time. Out of pocket expenses, these are people that said they had no out of pocket expenses and no financial burden associated with this. The silver, significant financial burden. Somewhat of a burden, blue. No burden, or just a slight burden. I think in many cases, that's not as big an issue for some people as the other things. The system is doing an okay job with some of that.

Medical health. This is talking about the health of the service member. What we've got is we've got these changes over time, again, and emotional health, and then looking at this slightly differently. This, we then asked them to talk about their kinds, asked these caregivers to talk about their kids, and "How are they doing with stuff?" The first time point here is pre-injury, at the point of deployment, and this has been demonstrated in other studies, too, that the effects of deployment have an impact on the family, regardless of whether or not someone gets injured. What you're seeing here are people that are talking about the grades of their children, behavior, medical needs, emotional needs, and social needs of their kids. Some problems here, in approaching the 10 to 30 percent of the kids having these problems. At the point that their dad or mom gets hurt, huge spike up here. Fortunately, when we get out a couple of years post that, it tends to get back to baseline, a little closer to that, but never quite normalizes, as far as we can tell. These injuries that are having so much of an impact on the individual are having an impact on the family, too.

With all the progress we've made, there is still a long ways to go. If you look in clinicaltrials.gov, there are 18,321 cancer protocols that are recruiting subjects right now. There are 106 concussion protocols open, 418 PTSD protocols open, 430 related to TBI more broadly, across the spectrum of severity. I could find less than 10, it looks like maybe six, maybe seven, related to TBI and the impact on the family, and about half of those, two or three of those, were looking at actual interventions for the family, ways to intervene, to help loved ones manage this burden. We've got a way to go with this.

To wrap up, I think that as a system, we should be really proud of the momentous progress that we've made in the last 15 years in terms of caring for these service members who deserve so much from us. What I don't want to have happen is that as wars wind down, that we forget the lessons that we learned. We don't want to see that gap like we saw between World War I and now, where there's no research done and people are forgetting. We got [camba 00:46:42] casualties into the hospital this week, and we need to remember that these things are

happening on a continuous basis. We need to maintain our knowledge, our readiness, and need to have good organizations that are providing the right kind of care and the right kind of research. Thank you very much for listening. [crosstalk 00:47:07].

Dr. Livingston: [inaudible 00:47:16] Thank you very much, Dr. French, for your excellent presentation. We will wrap up the formal webinar presentation in the next few minutes here, moving on to the question and answer session for our virtual attendees. If you have any questions for Dr. French, please submit them now via the Q&A pod located on the screen. A couple of housekeeping things related to the continuing education piece, and then we'll turn it over for question and answers to our live audience here. For those seeking continuing education credit, after today's webinar, please visit dcoe.cds.pesg.com to complete the online continuing education evaluation, and to download or print your CE certificate or certificate of attendance. The online CE evaluation will be open through Wednesday, the 30th of November. To help us improve future webinars, we encourage our virtual attendees to complete the feedback tool that will open in a separate browser on your computer. An audio recording and edited transcript of the closed captioning will be posted to the website at dvbic.dcoe.mil/online-education in approximately one week. Feedback.

The chat function, again, for our virtual attendees, will remain open for an additional ten minutes following the presentation to permit our attendees to continue to network with each other. A couple of announcements of some upcoming events, the next DCOE traumatic brain injury webinar will be occurring on the 8th of December. The topic, as you see on the screen there is "Return to Duty following Mild Traumatic Brain Injury, Lessons Learned from Sports Concussion Management." The next DCOE psychological health webinar will be held on the 15th of the December, and the title you see there is "Evidence based Management of Suicide Risk Behavior, a Guideline Perspective." We hope both our in person attendees who are interested in those topics will register, and our virtual attendees who are interested in participating in those webinar sessions coming up will go to our website and register for those, as well.

A real short announcement, the 2016 Association of Military Surgeons of the United States national meeting is coming up in just a few weeks, here locally, for those in the National Capital Region. Registration is still open, so we encourage you to ... If you haven't registered already, please go to the AMSUS website and check out the preliminary program and register for that event. At this point, we have time for some questions for Dr. French, before we get on to the awarding of the lectureship? Any questions for Dr. French? I'm going to step aside to allow him back to the podium to answer your questions.

Dr. French: Captain Greenhalgh?

Capt Greenhalgh: This is not a plant, I just came up with this myself. As a primary care physician, it's truly remarkable to come to a program like this, and there

are others around the country, as you've alluded to, where they do a great job of taking care of the worst of the worst, and those that are really struggling long term. Do you think we do a good enough job, though, for those majority that we say will get better on their own? Truly, it's not on their own, if somebody has a head injury, whether it's mild concussion or mild TBI, they'll still seek care. Most of the time, they'll still seek care. Do you think we do a good enough job at the primary care level, understanding and managing those that we keep saying will get better on their own? Could we do better to maybe increase the number that will get better on their own, or at least get better more quickly?

Dr. French: It's a good question. I have a couple different thoughts about that. You're right. Though that majority of people do get better, there's some people that don't, and there's some people that can go off the tracks for reasons we don't have good control over. In some cases, there are things that we can do intervene early on that may have beneficial long term effects. That may be fixing headaches, or fixing sleep, or other kinds of things, too, that are important. I would say that one of the unfortunate things that has happened in the military care system is that with the fact that we build up such a really good TBI care system, that I think in some ways the primary care folks have been very willing to say, "I'm done with the case," sooner than they probably should. That happens with, I think, internists, family practice docs, emergency department docs. They may try one agent for headache, or something like that, and then they go, "Well, this is too much trouble for me. We've got a great TBI care system in the DoD. Why don't we just move the person on to the next level of things?"

I think that what you end up have happening, then, is that the primary care docs, who are very capable at managing lot of these things, don't end up getting the practice or the training, or other kinds of things that would keep them sharp in that area, and the rest of the system gets sort of unbalanced in that. No, I agree with you. There's a strong role for that. People need to remember that these injuries are ... for the most part, people are going to do well. There are circumstances about the injury type, about the person, about the circumstances, that may influence that outcome from that, and I think that in some cases we need to do the things initially that we know have been proven to be useful, provide educational interventions, talk about expected course of recovery, and then provide a little monitoring to see how people do over time to make sure that they're not having an adverse outcome in some way. Yes, sir.

Gen. Schoomaker: Lou, if I might make a few comments? [crosstalk 00:53:49].

Dr. French: Yes. Absolutely.

Gen. Schoomaker: First of all, one of the reasons I really wanted to come today, and I appreciate your invitation, and I appreciate your review of the long history of much of this, was to do honor to Deb. I can tell you, as the Commanding General of Walter Reed Classic, as many of us call it now, the [new 00:54:12] Walter Reed. There's Walter Reed Classic and there's

Walter Reed, [new 00:54:16]. At the outset of the wars, especially viewing our darker times in '06, '07, Deb and the DVBIC were really kind of an army of one that came to get questions answered. You were remarkably helpful for me and my colleagues. One of the things that we all ought to remember is that people look at history through a straw, through a very focused, very limited perspective, and with the benefit of looking back, let's just [inaudible 00:54:57]. It's very hard to recreate, for many people who weren't there. You were there, Deb was there, certainly. Jamie was there. Deb was there. Many of us were here ... how chaotic and how [conflated 00:55:11] all of these issues were [inaudible 00:55:12].

The one thing that I can remember most that we were trying to sort out, and Deb was extraordinarily helpful with, was first of all, "How do we separate these many systems that seemed overlapping?" Charles' work ultimately helped us quite a bit with that. One thing we did notice was that over time, almost everybody got at TBI diagnosis. You wait long enough, even if you meet them at the flank side, or even go in theater, we discover that if you follow them two or three years later, if it sounds like they should have been in an environment of getting a TBI, even if they didn't at the time, then they're labeled with this, and so it made it very hard for us. Deb was extraordinary helpful in looking back at her long history of managing TBI, to [say 00:56:04], "These are some of the mechanisms I think are there, and some of the mechanisms I don't think are there."

I still remember your sitting in my office and saying, "You know, the 600 or so patients I've looked at, I can't think of a single one, and maybe one," and I can almost remember the patient she described, "where isolated pure blast may have explained why they had a traumatic brain injury. Almost everybody else had something fall on them, thrown at them, they've thrown up against somebody," and on and on and on. That helped quite a bit, because then it kind of took the monster out of the closet, that we're not dealing with something that transcends physical reality, so to speak [inaudible 00:56:44]. Then, we had the problems of, "How do we diagnose this? How do we prevent and mitigate it, and how do we manage it, and how do we prognosticate it?"

I sense we're still in our infancy with answering some of those questions, and as I've said in other [quora 00:57:01] like this, it's really promising to be on the leading edge, now, of emerging neuroscience and imaging, and functional imaging, that's going to allow us to do those, as well as an open-mindedness about how we're going to approach managing and include some of these more far-fetched now ... then far-fetched ideas of energies directed across the brain. I'm still concerned that we still have a clinical diagnosis, principally, of this disease. You all were extraordinarily helpful in that. I'm still very concerned that what Jamie Grimes went over to Afghanistan to help us with, which was to start managing TBI just as we would on the sports field, at the point of injury, rather than to wait to [inaudible 00:57:49] it until we get back.

Dr. French:

An emphatic recovery.

Gen. Schoomaker: Pardon me?

Dr. French: An emphatic recovery.

Gen. Schoomaker: An emphatic recovery. Right. I think that's great. It's still our biggest challenge, and I think until we reach a point that culturally we can do that, and practically, we can do that, we're going to continue to be under the burden of concussive brain injury.

Dr. French: Thanks, General Schoomaker. Great comments. I think that there's a lot of work that's being done that's very good that I think continues to try to tackle these questions and provide some answers. In what I was talking about today, and some of the data I presented at the end, I was focusing on a certain segment of the research that we're doing, and the human aspect of this. I think we've just as equally focused on the harder science piece of this. We have things on blood-based bio markers, and neuro-imaging, and other things that we're doing too, to try to help answer some of those still fundamental questions about that. I think one of the points I want to make is that the answer to this is not going in a single direction, I think. We have to look at this in the broadest way. You're right. We have to continue to press on on some of these areas.

Some of what we did wrong, I think, in the beginning, was ... You're right. We can identify that more, now, given the perspective of time. I remember when I was at [Launchdool 00:59:32], and they had first instituted their screening for people, and they were so ... They had been told that this was the thing to do, that you needed to do the screening there. They had brought in everybody. They just didn't have enough staff, so they had the chaplains doing TBI screening, they had other kinds of people too, because they sort of corralled in whoever they had. I think the fault was, at that time, that this is a funnel. It's better to make an error of commission than an error of omission. If you diagnose a person with TBI, at least you'll flag them as needing care further down the care stream, but if you miss them, they potentially will not get the services that they need. Those people that go labels attached to them that ended up being incorrect.

Gen. Schoomaker: Can I make one other kind of political announcement?

Dr. French: Absolutely.

Gen. Schoomaker: It still baffles me why the right hand of the DoD works to preserve brain function and prevent concussion, and the other hand continues to sponsor or at least turn a blind eye to things like combatives and cage fighting, and things like that. I still carry the Solider Magazine that has a fellow with almost a bear fist hitting another guy in the head in a cage fight, at the same time I was getting beaten up as to why we couldn't prevent TBI. I think that says something very fundamental about our schizophrenia, [inaudible 01:01:14] psychiatrists about, about how they do [that 01:01:18].

Dr. French: Yes.

Cmdr. Biery: Hi. Commander John Biery, I'm [inaudible 01:01:22] sports medicine. I just happened to stumble into the meeting, so I'm really [grateful 01:01:28] to have come down. I [was 01:01:31] at a concussion respiration care center in 2012 to 2013, and then I was the Navy's Wounded Warrior Safe Harbor medical officer for the last two years, so I've been travelling with the [inaudible 01:01:44] athletics group, and working with the wounded warriors [inaudible 01:01:47] from all the services in those [inaudible 01:01:52] athletics events. One of my questions on your data that you presented on families and the individuals in those two points in time is the gap between their need for assistance and the assistance they receive.

At that first point, it seemed like it was maybe a wider gap than maybe later, maybe it was just a visual representation, but how much of that ... You mentioned system failure that created a certain amount of our lack of expectation of understanding of what families really need in the system, but then, also, how much of that is just [fatigue 01:02:26] on their part, that they just stopped asking, because they weren't getting the answers that they needed, or the people were stopping acknowledging that the need continued to exist? That's what I got a lot of, the guys that really still had significant issues, but they were just tired of going back. "I needed surgical evaluations, but we couldn't pry in with a crowbar to get in to see the surgeon. We'd get excuse after excuse. We can't get an appointment [for 01:03:00] this and that."

It really just came to, "I'm just so tired of going to the doctor's." Most of them had stopped taking their meds that may have been helpful, maybe they weren't. It's hard to say, but they were just tired of the whole thing, so they were just [inaudible 01:03:13] and leaving. [inaudible 01:03:16]. They were just living with the discomfort and symptoms. They enjoyed coming to the wounded warrior events because it's back in their element. They were back with people there [were 01:03:26] peers, friends that they developed, and it was that sense of belonging again, a sense of purpose. [inaudible 01:03:31]. What's [inaudible 01:03:35] that? Where are you [crosstalk 01:03:37]?

Dr. French: Great question, and I need to preface my remarks by saying ... Those data that you saw, we just analyzed last week.

Cmdr. Biery: Okay.

Dr. French: We're still struggling with understanding those, to some degree. I will say a couple things about it. I think the point you make is probably a valid one, and I think it's probably having an impact on what we see here. I'm also quite conscious of the fact, and back to General Schoomaker, every time I think I ended up down in his office about some problem, it was inevitably ... When we looked at the case, it was about when someone was moving from one care platform to another. They had gone from the

Walter Reed to the VA for a while, and come back, or moved somewhere, and those transitions are always problematic. People don't get the services quickly enough in terms of what they need, or somebody slips through the cracks in some way. I can't help but believe every one of those time points is illustrative of those change in environment that put people at risk. I think there's a lot of things that could be playing a role in this, and I think as we go on more ... We have a lot of data which I didn't show, and a lot of the focus group work which we did with these people, so I think that we will be able to get some clearer answers as time goes on, but very valid point. Yeah.

Cmdr. Biery: It would just be super useful, [targeted 01:05:07] to somebody about [their 01:05:09] information to primary care, because that's where they're all ending up is in primary care, and [they've 01:05:16] got 80 other things. Usually that, "I don't want to get into such and such doctors appointment," is that, "Oh, by the way, you're 25 minutes into a 15 minute appointment and you [crosstalk 01:05:22]." It's hard to answer those kinds of questions because those are usually the [inaudible 01:05:27] answers.

Dr. French: Absolutely.

Cmdr. Biery: Very challenging.

Dr. Livingston: Well, thank you again, Dr. French. We're now going to move on to the presentation of the award. I would ask if Colonel Geoff Grammer, Ms. Kathy Helmick, and Captain Walt Greenhalgh, if you could come forward, please. I'll ask you if you'll [inaudible 01:05:56]. It's now my pleasure to introduce Ms. Kathy Helmick, the deputy director for the Defense and Veterans Brain Injury Center, who is going to say a little bit about Dr. Warden and the Lectureship that is named in her honor.

Ms. Helmick: Thank you, Dr. Livingston. It's my pleasure to join Colonel Grammer and Captain Greenhalgh to recognize the recipient of this year's award. Let me first just tell you a little bit about the Debra L. Warden Lectureship. It was established in 2007 to acknowledge Dr. Warden's six years of service, serving as the District National Director from 2001 to June of 2007. Dr. Warden is a board certified neurologist and psychiatrist, and a profession of neurology and psychiatry at the Uniformed Services University of the Health Sciences. During her tenure at DVBIC, both wars in Afghanistan and Iraq were launched.

Besides a commitment to research and education, the central mission of DVBIC became caring for those who had sustained traumatic brain injury, and alerting the Pentagon to the frequency and morbidity associated with concussion, especially related to blast-related injuries. During her time at DVBIC, the MACE, which is the Military Acute Concussion Evaluation, was developed, and remains the platform by which the NCAA and the NFL use for sideline evaluation to this day, and there were many other key activities. Dr. Warden assess DVBIC's cumulative success by reports from active duty friends of her son, who relate that the services currently

take concussion extremely seriously. We are so please to have Dr. Debbie Warden and her husband, Neil [Epstein 01:07:48], with us today. Thank you so much for attending. [crosstalk 01:08:02].

Dr. Livingston: Colonel Grammer will now present the award to Dr. French. The award reads, "This award is presented to you in recognition of your leadership and untiring efforts in advancing traumatic brain injury clinical care and research in the military health system." Please join me in congratulating Dr. Lou French.

Col. Grammer: All right. I am very mindful of the time, so I'm going to try to be brief here. First off, I'd like to thank Dr. Livingston and his team for arranging this wonderful gathering. I also want to thank Captain Greenhalgh and the NICoE for hosting this event. It's another great example of all of us in the TBI field working together. Dr. French, terrific presentation. I do have two coins to give out. I'm going to give credit to these to Colonel Hinds, who was the previous director. He ordered these and he imparted them to me to give out as needed, so I have two of these, which, essentially has the pillars of research education and clinical care on them, and then the other side's got the seals for everyone. One of these goes to Dr. French. Thank you for your service to DVBIC. The other one goes to Dr. Warden.

Okay. What's amazing to me are the titans in the room. Dr. Warden, you created a program that was cool before we knew what cool was. DVBIC has had a partnership with the VA even before people said we should start working with the VA. The NFL, the NCAA, have taken their guidance of how to manage TBI from the work that you have done. The dialogue that we have in this country is because you have caused a paradigm shift in the way that we think about head injury. It is hard being a pioneer, because there are critics to that. When I was in high school and college doing sports, getting a head injury was just part of growing up, it didn't really mean much. Trying to convince people that this is actually something, not only should we be invested in trying to research, but actually invest resources in treating means that you have to overcome critics, you have to convince people. You've got to be an advocate, and it's hard to be one of the first advocates, so I applaud you for your courage to bring forward this program. You and Dr. French, and others have created history.

Years from now, people will look back upon the DoD and these wars and study how we created the TBI programs that we have today. It will be your work that they look at, that they learn from, and that they honor. It truly takes an amazing vision to identify the needs that we have in the out years, and you did it. One of the great honors is leaving a legacy. We all hope leave an indelible mark on what we do. As a guy that's getting ready to retire, I think about that a lot, and you have definitely left a permanent impression upon that way that health care is delivered in this country, and I think you for that. This wonderful presentation is really a commemoration of your work and your efforts to us. I'm honored here to

stand up here and thank you for that, and thank you, Dr. French. Thank you, everyone.

Dr. Livingston: Okay. This concludes our event for today. We ask you to please join us in congratulating Dr. French out here in the foyer. We have a very large cake in your honor. Thank you. [crosstalk 01:12:32].

Operator: Thank you for your participation on today's conference call. At this time, all phone participants may disconnect.