Defense Health Agency

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

"Traumatic Brain Injury and Substance Use: This is Your Injured Brain on Alcohol"

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Operator: Good afternoon and thank you for standing by. For the duration of today's conference, all participant's lines are on a listen only mode. Today's conference is being recorded. If you have any objections, you may disconnect at this time. It is my pleasure to introduce Ms. Angela Basham. Thank you ma'am. You may begin.

Ms. Basham: Thank you. Good day and thank you for joining us for the DCoE Traumatic Brain Injury January Webinar. Traumatic Brain Injury and Substance Use. This is Your Injured Brain on Alcohol. My name is Angela Basham and I'm a regional education coordinator for the Defense and Veterans Brain Injury Center. I will be your moderator for today's webinar. Today's presentation is available for download from the files pod and will be archived in the online education section of the DVBIC website. Before we begin, let us review some webinar details. If you experience technical difficulties, please visit dcoe.mil/webinars to access troubleshooting tips.

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All questions will be anonymous and please do not submit technical or content related questions via the chat pod. We would like to take this time to announce that we will conduct a short poll regarding audio podcast topics at the end of today's webinar. One of the many lessons learned from our 2016 DCoE summit is that our attendees are interested in learning via podcast. Please stay with us at the conclusion of our webinar to provide us your thoughts on topic selections. I will now move on to today's webinar, Traumatic Brain Injury and Substance Use. This is Your Injured Brain on Alcohol. Addiction may significantly exacerbate traumatic brain injury, prevent full TBI recovery and increase the risk for repeat of TBI.

Although addiction and TBI are often discussed separately, the high rate of comorbidity suggest the need to examine TBI and substance use

disorder together. Presenters will explore the complexity and importance of substance use screening among TBI patients and highlight a specific TBI recovery concerns and complications associated with continued substance use for TBI patients. At the conclusion of this webinar, participants will be able to discuss the prevalence of comorbidity between substance use disorder and TBI, articulate specific factors that impact diagnosis and recovery when TBI and substance use disorders are comorbid. Examine the roles of early detection, education and intervention for substance use disorders among TBI patients to improve prognosis for full TBI recovery.

Let's take a moment to meet our speakers. Mr. Ezra Aune is a DVBIC regional program manager at the Naval Medical Center San Diego. He was previously the medical administrative officer at the Naval Center for Combat and Operational Stress Control. He was also the supervisory health care systems specialist, operations officer and the lead senior addictions councilor at the Naval Medical Center San Diego. He received his MBA from National University. Our next speaker is Dr. Lars Hungerford. Dr. Hungerford is a senior clinical research director at DVBIC Naval Medical Center San Diego.

He is a board certified clinical neuropsychologist that previously served at Madigan Army Medical Center and his own private practice. He received his PHD in clinical psychology from Palo Alto University and his MA in clinical psychology at Loyola College in Maryland. Presenters, you may begin.

Dr. Hungerford: All right. Good morning, everybody. We're actually not as red as we look, even though we're getting sun. You might notice that Ezra and I are sitting next to each other and that was done on purpose. Really, what we're trying to do is convey that TBI and substance use disorders because they co-occur so frequently, we need to get away from stovepiping. What I mean by that is a lot of times, so I specialized in TBI and I learned a lot by preparing for this discussion with Ezra here and vice versa and I think what we're trying to do is kind of bridge the gap and create some bridges so I'll let Ezra talk about this agenda.

Mr. Aune: Sure. Thank you. Today, we want to talk about ... if we could advance slide, I don't know if we can do that yet with ... Perfect. I want to talk about the relationship between TBI and substance abuse. Again, treating them not as distinct disorders or problems but when they occur together, that's really the focus of the talk today. What screening and assessment considerations to keep in mind, whether you're screening on the TBI side and want to be aware of the substance use potential issues or whether you're a specialist working on the addiction side and want to be aware of potential TBI issues so to kind of bridge that gap.

What are the effects ... For someone who has had or sustained a TBI, what are the effects of alcohol and other drugs on that patient again who has sustained a TBI? We want to take a look at that. Findings about

substance use after a TBI. What are some findings? What are some recommendations that are clinically appropriate when treating patients who've had a TBI when it comes to their use of substances? We also are going to go over some research opportunities, research questions that we found in our lit review and then our preparation for today's talk. We do have some addiction resources, which some of you maybe less familiar with and then some TBI resources that many of you maybe familiar but we'll offer those up as well.

Just a couple of terms, I think most folks get that TBI is traumatic brain injury but just because we'll be using that one, I did define that. If I do use AOD, if we do use AOD in the talk, that's kind of referencing alcohol and other drugs. I think you'll notice that most of the discussion today centers around alcohol hence the topic title, and that's I think because in our population with active duty, the drug of choice typically is alcohol so a lot of it is going to focus on that. Then, SUD, substance use disorders, kind of a broad term that encompasses the full progression or continuum of addiction, consistent with the DSM-5 from alcohol use disorders, mild, moderate and severe.

A broad term to capture all kinds of substance use disorders or SUD, make it use today so you're aware of what that is. Jumping right in, in the review of literature, it's interesting, we found between 37 and 50 percent of TBI injuries occur while intoxicated. Huge number, a little bit surprising. Some of the studies actually said the number was as high as 70%. We'll talk about this a little bit later on but there is quite a wide range in that number and I think that points back to the way that we're assessing it. How close are we looking but clearly the numbers are quite high of folks who sustain a TBI well into the influence of substances.

Two thirds of those having sustained a TBI have at least a history of alcohol abuse or of high risk drinking. It may not meet diagnostic criteria per DSM-5 but there is something about their drinking that is abuse of the substance or considered high risk drinking. A third of TBI were injured well into the influence of other drugs. Kind of an alarming number but also bear in mind that included in that were prescription drugs. Definitely worth looking at, got a lot of substance use stuff going on with these TBIs and that's kind of the point of today's talk. Lars, I'll let Lars kind of address the issue of military prevalence.

Dr. Hungerford: I think we, as providers need to be particularly vigilant when screening for SUD within the military population in TBI programs or clinics. For example an analysis of over 13,000 service members returning from Afghanistan and Iraq who had a confirmed TBI, they were three times more likely to present with a substance abuse problems. Furthermore, another study, looking at 4,000 British service members, returning from war zones, they were two and a half times more likely to have alcohol misuse. What's interesting is a third study looked at the effects of TBI and it's actually a risk factor for binge drinking even after controlling for PTSD and demographic factors.

The exact reason for the increase in the post TBI drinking is still kind of unknown and unclear. Some postulate that it could be PTSD, it could be multiple deployments, they're young, they're male. However, as I just stated, that one study show that TBI in and of itself when controlling for those demographic factors is a risk in and of itself. We really need to be aware that substance use and particularly alcohol use could be a big problem in our population.

Mr. Aune: Then, looking at the population who are in substance use treatment programs, we noticed kind of an interesting absence of TBI patients in the programs when you consider, how many of these TBIs are sustained well under the influence, some have said, you'd expect to see more of them in actual substance use treatment programs and drilling into why that maybe occurring, some of the ideas in the literature review are that there are program barriers. A lot of the substance abuse treatment programs do require you to be medically clear, got to be ambulatory and so on, mental health, you may have to clear the patient. Sometimes those program barriers may keep patients out of the treatment program.

Additionally, the limitations of a screening process. Are we identifying them? Are we referring them? Are we engaging specialist in addiction when we either suspect or identify those issues are present with the patients, are we actually detecting them? Obviously, just because somebody is using alcohol or other drugs, that does not mean necessarily that they meet diagnostic criteria for a diagnosis and/or patient placement into one of these programs. Not to say that everybody that uses substances and has a TBI is necessarily addicted or absolutely needs treatment but taking a look and making sure that we're screening for that, may help get more of these patients that need it into this programs.

Dr. Hungerford: This is a rather busy slide from the CDC and we've made a little bit of an alteration to it that I'll discuss in a little bit but there is a few things that I wanted to highlight. If you take a look up at the top right hand side of your screen, you can see the injury mechanisms. You can read those for yourself but what I'd like to highlight is at the earliest ages and the latest and the elderly, so the very young and elderly falls as a primary indicator or the primary cause of injury. In the middle there, in the different ages, different mechanisms come into play but what I'd really like to highlight is the omission. Where is the alcohol data? Where is the drug data?

The simple answer, there is none. We've super imposed that red box around the top three, the motor vehicle accidents, falls, and assault. That's not from the CDC, that's from us and those are the primary mechanisms of TBI due to alcohol. We believe that this chart should be revised to accurately reflect the contribution of alcohol and drugs on TBI and my cent is those numbers that we saw a couple of slides ago that said 35 to 50 percent, it's my belief that if we were to really start tracking this, it'll probably be significantly higher than that.

Mr. Aune: Now. There are screening and assessment challenges that I wanted to address and they're very specific to the substance using population. There is ... Anybody that's done substance use screenings, I think can attest that there is a real propensity for minimization. I can't tell you how many times in the many hundreds of assessments that I did, that when you ask them about their drinking frequency and quantity, I think it's in a book somewhere. We haven't found it but the answer is two to three drinks, two to three times a week. I've heard that hundreds of times or I'll just have a glass of wine with dinner. That's the other kind of favorite answer.

If we don't dig beyond that, we don't get very far and that's one of the early challenges in doing a good thorough substance use disorder screening is to get beyond what they want to tell you and get more into what's actually happening. The other challenge right on the hills of that is that many of the instruments used to screen for substance use disorders are self report. On their own, they may not be as strong as when we apply additional sources of information, I think which we'll talk about later. Then, further, there is a lot of complexity in doing these screenings when you have comorbid TBI, substance use and other co-occurring mental health conditions present with the patient.

Teasing out what to attribute to what. Anxiety, depression, PTSD was typically our top three and trying to tease all of that out and figure out what are we dealing with and where do we go from here, are big challenges.

Dr. Hungerford: One of the things that we had discussed in preparation for this was you mentioned that the gold standard is a clinical interview and then my question at that point was would you recommend giving sit down clinical interview for substance use or alcohol use for every patient coming in, in the TBI screening program?

Mr. Aune: Yeah. Emphatically no. If somebody is there primarily for TBI obviously, that's going to be the focus and understanding that different specialties have a different focus for why they're doing their particular assessment, the recommendation I think would really more accurately be if you detect something is going on and you can't quite wrap your hands around it, to be ... not be hesitant to make the referral to a specialist who can actually do a substance use screening and devote time and attention to that and use that gold standard so you're not doing the gold standard, you're referring them so that they can get the gold standard of assessment.

Another screening challenge is, it's not on the slide but I think it's worth mentioning with active duty population is that there is really a perceived and strong disincentive for active duty service members to be honest about their substance use because of the believed career impact that may come from stepping forward. I think if we buy into that too much, I think we do a disservice to the patient because we won't make the intervention and we kind of feed into that and think well, let's not take a

look at this because we really don't want to hurt their career. Most of the branches of service, most of the service equivalence do have instructions.

The aim is to make it safe for people to step forward and self refer and/or to get a medical intervention that is not a substance incident. It's not an alcohol related incident and so it's not disciplinary, it's health care. It's not disciplinary, it's a self referral or somebody stepping forward and getting that help because if we don't deal with it now, how do we know it doesn't get worse in the future and become an alcohol related incident since we didn't intervene early. We'd encourage that we help overcome stigma, we talked about stigma with mental health but I want to introduce that we do have stigma still with substance use disorders, where people feel very hesitant to step forward and get help.

Dr. Hungerford: Moving back to one of the points that you made about referring for the gold standard. One of the things that I would recommend also for those involved on the other side of the house dealing with substance abuse injuries, you need to be aware that there is probably a large percentage of your patients that have sustained a brain injury or maybe even had a recent one. It's never a bad idea to kind of reach across and ask for a TBI evaluation. Just kind of doing a quick screen for that and say, "Hey, maybe this is playing a role." Never a bad idea.

Mr. Aune: Yeah, so I wanted to kind of show just a couple of screening incidents that are specific to substance use that seem maybe familiar to many, that's embedded in some of the TBI screenings that I've seen. It is three questions. It is self-report. Also CAGE a quick four question battery. Again, self-report. A MAST, which I've seen embedded in some substance use screening instruments but it's self-report and I think you'll see that all the way down the slide and that's on purpose and that's just to kind of say, these instruments by themselves maybe less reliable or valid than if we corroborate with additional sources of information.

I mean, for example, if we know they came through the emergency room and they had a blood alcohol level, we may want to do a little more exploring than looking at an autopsy and they've answered in a way that makes it look like they don't have any problems with substances whatsoever. Take the time to explore, gently explore inconsistencies in the narrative or in the story or pieces of data that don't line up with what they're telling us. It adds a lot of validity to these instruments and can give us a better picture of what's going on. These by themselves again are all self-report and we know there is a lot of disincentive for them to step forward and be honest on a self-report instrument typically.

Dr. Hungerford: I think your point about looking at the medical records, especially if you have available data from the ER, that's critical. I just had a patient who had a moderate TBI, was punched in the head and his blood alcohol, nearly a full day later was still significant, and then you look at his story and he had over 12 beers and multiple shots. Yet, he's not been referred for any kind of alcohol counseling. Nobody is even broaching that subject

with him and I think that's a real failure on our part from the medical side of the house.

Mr. Aune: Yeah, and I mean, and it's interesting because when you spent ... I spent 12 years doing substance use work and you start to get kind of an attuned gut feeling that there is definitely more going on here and you start to see these pieces of the story that don't add up or they're just highly suspicious in their own right. If they sustain their TBI at 2 o'clock in the morning, he's kind of a good fellow without question, what were they doing at 2 o'clock in the morning, most people are in bed. Those are kind of things that you can begin to explore gently in a way that doesn't arouse a lot of defensiveness to really try to get at the story.

Check those things out and again, if you ultimately don't feel comfortable but you got a gut feeling or something is not adding up, do not be hesitant to make that referral so they can get it looked at more closely. This slide is just kind of an illustration from the perspective that when you do the literature review, a lot of times the terminology that's used isn't very specific. We know that we have mild, moderate and severe TBI but in some cases, the literature simply says TBI and it doesn't reference what kind of severity we're talking about. In the other direction, when it comes to substance use, there is also a continuum there.

Again, someone could simply be a user of substances or a casual drinker or so forth but drinking responsibly, as opposed to substance or alcohol misuse which is different or they could be diagnosable for the DSM-5 as a substance use disorder either mild, moderate or severe. They could appear at any one of these places and this is really just to illustrate when assessing for both, there is a severity index sort of in both directions and obviously, the clinical impact to the patient is significant depending on where they are in both directions. Taking the time to assess that and find out where they are in both directions, can be a little bit complex but the literature doesn't always capture that.

Then, again, pointing back to the complexity, I mentioned, with TBI substance use disorders and co-occurring disorders, what's what? Obviously, some of the symptoms with these particular groupings are unique but some overlap and overlap significantly between PTSD, substance use disorders, anxiety disorders and substance use disorders. To be able to tease this out, it may take a certain amount of sophistication and looking and taking the time to really find out what you have on your hand. This is just kind of to illustrate, again, sometimes, there are symptoms isolated to particular disorders and sometimes, they overlap and it takes a good look to try to isolate what's going on.

Dr. Hungerford: This next slide really highlights that so in our clinic we get approximately 50 to 60 consults a month and very rarely do we get something, where it's a singular, very clear injury history. A lot of times it's kind of vague and furthermore symptom reports are vague and encompass many of the things that you see on your screen. This slide really should raise a big red

flag for every provider that is dealing with TBI patients because what we have here is almost ... it's 100% overlap. Just because I'm working in a TBI clinic and my patient was referred for TBI, that doesn't really necessarily mean that the problems that they're having are TBI related.

They could be substance use, they could be alcohol, they could be drugs, they could be a number of other factors that are outside the scope of this, such as PTSD, depression, sleep, all the other factors that we're not going to talk about here but the inverse is also true. For those that are working with substance use disorders in those clinics, we need to be aware that there is a large majority of people that are in those programs have had or potentially had a TBI and that needs to be stuffed out. This is particularly relevant for individuals who have had adolescent brain injuries. A thorough history is really warranted so when you're doing your intakes, you want to ask, child abuse, right? That's a big one.

If you've had an injury as a child or an adolescent that could set off some permanent changes in the brain that ultimately lead to difficulties with executive dysfunction which can wreak havoc on a person's cost-benefit analysis when it comes to alcohol and substance use. Either they're doing ... they're not doing an effective analysis and really the negatives are far outweighing the positives but they're not really capturing that because their brain isn't working properly. When your brain is healing a lot of resources are being utilized in recovery, alcohol sensitivity has, at that time is increased, it tends to have significantly more robust effect on the injured brain.

In other words, somebody that was, used to be able to drink six beers in a setting or 12 beers in a setting. They're not going to be able to do that. One beer could potentially have the effect of three, which leads to my second point which is drinking alcohol can lead to motor coordination difficulties which could in turn lead to a fall and a subsequent head injury. Injuries incurred during the healing process can have a compounding effect which can lead to long term difficulties, impairments and deficits. Then, lastly, we need to understand that alcohol reduces the seizure threshold.

Everybody has a seizure threshold and typically ... and kind of give a dramatic example to my patients, if I were to sit in my office here and drink two liters of vodka and smoke a carton of cigarettes, if I'm still alive, the likelihood is pretty high that I'm going to bust through the seizures threshold and I'm going to be having a seizure. Now, when you have an injured brain, that seizure threshold is reduced and alcohol can further reduce that and so you're really at risk for seizure of fall and then a subsequent head injury with alcohol or drug abuse. Not only that, but alcohol and drugs can interfere with anti-epileptic medications and reduce their efficacy which then in fact can lead again to a seizure, fall and subsequent head injury.

Because the alcohol is essentially a toxin that crosses the blood brain barrier, it has a capacity to impede recovery from brain injury. There are a few theories underlying the mechanisms involved in the alcohol's effect on neurocognitive functioning and mood. The first one I'd like to talk about is the neuroinflammation cycle. This is pretty incredibly fascinating and very complicated. Essentially, we know that TBI causes inflammation through a number of mechanisms. Adema, Gliosis and proinflammatory cytokine expression. We also know that alcohol increases proinflammatory cytokines and causes neuroinflammation. Alcohol is also increased due to inflammations.

If you have an inflamed brain, we know from the animal models that alcohol intake is increased and then associated with reductions in spontaneous tegmental dopaminergic neurons. We don't really know the specific network that's involved. It's likely due to known components of the alcohol rewards system such as the dorsal and ventral striatum, the ventral tegmental area, the prefrontal cortex and the amygdala. Essentially how this works is neuroinflammation can be both the cause and consequence of alcohol use and TBI can kind of establish a vicious cycle of greater alcohol intake, driven in part by neuroinflammation, leading to increased inflammation and then more drinking.

It's this vicious cycle between inflammatory process, increased drinking, increased inflammation, more drinking. The second thing that I'd like to talk about is the dopamine disregulation hypothesis. There is substantial evidence from animal models that TBI can disregulate the midbrain dopaminergic system and contribute to the chronic, cognitive and behavioral deficits that we typically see in TBI. For example, problems with reasoning, attention, memory, and executive dysfunctions and these are functions that are subsumed by dopamine rich areas such as the prefrontal cortext and the striatum. We also know that hypofunctioning dopamine system is a major risk factor for alcohol use.

When taken together we have this potential for a perfect storm of substance abuse and use following a TBI. There is relatively low clinical evidence for TBI mediated impairments of dopamine physiology in human beings but there is a wealth of information in the animal models. Furthermore, there is significant evidence in a literature that shows improved cognitive functioning, improved mood functioning and decreased alcohol intake, following interventions targeting dopaminergic dysfunction. Using methylphenidate and amantadine hydrochloride in humans is shown to be beneficial for those things. However, we need to have a lot more human subject research to be able to verify these and further the science.

Further effects on alcohol use and TBI includes depression, sexual dysfunction and interactions with medications. Alcohol is essential nervous system depressant and could exacerbate depression in individual's who have sustained a TBI, who are already at risk for depression in the acute phase due to left prefrontal cortex and deep left

frontal areas in the brain. Then also, more remotely, when you're having a reintroduction into your life due to loss of functioning, adjustment to deficits, a realization that you're not going to be able to get back to doing what you do. Also, sexual functioning can be impaired which can lead to difficulties in your marriage or your relationship which can also lead to depression.

Then, obviously, there is medication effects. It's pretty clear, we don't want our patients to be mixing alcohol with opioids of psychotropic medication. I mean, I think that's pretty clear, most people know that. It goes beyond that, I think what we really need to be looking at is when our patients are coming back and saying, "Hey, doc. The medications that I've been prescribed, they're not helping me, they're not working." That should raise a real red flag and we should really start to think, "I wonder what's going on here." First off, is the patient taking the medication? That would be the first question I want to know. Then, if they are, are they using any kind of alcohol or substance that could be potentially interacting or negating the effectiveness.

Really, what I would recommend at that point is doing some kind of lab work and do a tox screen to see what medications or substances are on board that we can more accurately find out what's going on.

Mr. Aune: Yeah, knowing the risk and the comorbidity, the prevalence of this TBI patients that have substance use disorders, it continues to highlight the need to really appropriately assess it and I think one of the big questions is, as we talk about substance use, and we talk about the fact that that's kind of a continuum, it's a progressive disease, I think we'll talk about that later but I want to emphasize that, once we start talking about what we call addiction, we're not talking about rational behavior. People that seem rational in every other way can do very irrational things when it comes to being addicted to substances.

When I use the word addiction, I typically think of substance use disorder or alcohol use disorder, moderate or mild but really, more particularly, the behavior is that compulsion to drink or use where they've lost control of it, they're using it even though they've got every reason not to. What typically happens is then they begin to want to hide it because they're ashamed and stigma attached to it. They're not really being honest. It's not that they're intentionally lying. It's just that they're ashame, they've lost control of it. There is stigma, there is a very real fear about what happens if people find out. As a result of the addiction, we can't figure out whether or not progressing in their TBI recovery.

There is this elephant in the room that we're not asking about potentially which could be that they're still drinking. They're drinking to go to sleep, to help deal with their PTSD. They're drinking and they're not telling us about it and we're not sure why they're not progressing or why the depression maybe worsening. Again, sometimes it's there but we're not asking, we're not quite seeing it and we're expecting them to be honest

and we're expecting to be rational and they're neither because they're addicted and they're ashamed to talk about that. Again, that's for the corroborating of different sources of information and we sort of mentioned it earlier.

The medical record review that you mentioned absolutely, if we can get spousal involvement, if we have the ability to do that and get additional information, that way if you got emergency room or other access to information about the referral incident itself or how they sustain the TBI really thoroughly exploring that information can help weave together a more accurate narrative, realizing the patient is not trying to lie but they've got some reasons to not tell you the truth and if you're compassionate and can reach out and get the story, you can intervene earlier on.

Dr. Hungerford: I just wanted to jump in and address of the points that you made. When you talk about they have every reason not to drink and yet they still do it. That was one thing that also came up in the literature review is that part of ... when talking about this neuroinflammation cycle and the dopaminergic hypo functioning, the part of the brain that's processing that cost benefit analysis is really impacted or potentially impacted so maybe there could be a physical or neurological component to they're not being to really do that cost-benefit analysis, to an effective degree so they're not realizing that, "Hey, this is causing me all kinds of trouble. I still can't stop."

There is an addictive component but there also could be perseveration that could be more of TBI so I think yeah, this discussion and what we're doing and modeling in this talk is two people really collaborating to come together and figure out, "Okay it's not one or the other, it's both."

Mr. Aune: Yeah, I think that's really important. An interdisciplinary talk. One of the thing that's interesting in the literature review as well is ... what emerges is this interesting window of opportunity which I'll get to in a minute but what we observe is that right after a TBI, for some reason and there is some guesses at what that is, substance use rates actually decline for a short period of time. It doesn't last forever and unfortunately. This is chalked up to acute factors, hospitalizations, dealing with injuries and so on and so forth. We do initially see this is what we call a refractory period where there is a reduced consumption of substances.

Again, unfortunately, it's not long before they return to their pre-injury use ... patterns in use, and quantities. This maybe a real window of opportunity. This maybe the chance to intervene. We know it's a good idea for them to protect their brain as their brain heals from the TBI and this is probably the best opportunity for us to have that conversation, get the information that we need and do a good job assessing and then make those interventions so that they can deal with the substance use issues but also so that they can make real gains in their brain injury recovery process as well.

Dr. Hungerford: I think it's important to mention as well. I'm not sure if we address this but premorbid drinking history, definitely has the potential to impact the post traumatic drinking. If you're a heavy drinker before, the likelihood is that you're going to be a heavy drinker afterwards and maybe even heavier due to some of the factors that I was talking about. The window of opportunity essentially comes about from a couple of different things. One, a lot of times, if we're dealing with moderate and severe TBI patients, most likely they've had a near death experience and so there is a reflection on their life as well. It's almost like a new year's resolution, where it's like, let me take a look at my life and things that I can do better.

Maybe I should cut down on my drinking. The other thing is, hopefully, if they're seeing providers that are knowledgeable, they're getting advice that says don't drink, you're in the acute recovery period, you should not be drinking. Initially, they heed that advice. That's a real time to target intervention when they're primed and ready to go.

Mr. Aune: Yeah, and so kind of hitting at timing and the timing of interventions. I think if you've not worked in around the dictions much or often, one of the models I felt really helpful in my training was to compare substance use disorders to another disease, type two diabetes as a progressive disease that does have a genetic component, environmental components and behavioral components and I think sometimes people feel like, well, because they're drinking, it's their fault and don't kind of buy into the idea that it's a progressive disease and again, in the military culture, sometimes, they're seeing as the derelict service member that's just having behavioral issues and just needs to wise up and grow up.

Sometimes we're talking about addiction or a disease or a substance use disorder that really needs intervention and if we don't make that intervention, it's not going to get better on its own. It's going to progress. Sure there is a behavioral component but there are other factors, because not everybody that drinks heavily in their early 20s develops addiction and yet some do develop a disease of addiction and again, the earlier we intervene they can make those lifestyle changes to put this in remission and live a happy healthy normal life but if we don't make that intervention we can expect it to get worse and the consequences obviously gets worse as well.

Dr. Hungerford: The point that you made about stigma earlier on is a big one and I think that we on the provider side of the house, if we feed into that and don't address it, we're really not doing ... we're not doing our service members justice because we can ... like you said, if we intervene earlier, we can actually help this person so they don't get to the stage where they get a DUI or they get into a fire, drunken disorder within it, then they're all of a sudden facing disciplinary action or potentially administrative separation or something like that.

Mr. Aune: Right, so in essence, it's actually better for it to be an early intervention that looks more like a self referral/medical referral and waiting until that

turns into one of those serious incidents where lives could potentially be at risk but certainly careers would be at risk, on so many friends that makes sense to intervene early.

Dr. Hungerford: Exactly. Okay. I'm going to go ahead and skip this slide. I've talked about the neuroinflammation cycle and the dopaminergic disregulation and the things on this slide. We'll go ahead for the next one.

Mr. Aune: Yeah, so, plenty of people, during that refractory period, have made a decision to remain sober from substance use, sober from alcohol to let their brain heal and/or they identify, they really did have a substance use disorder and wanted to get into recovery. Some focus groups, we looked at focus groups who said, these are the things that were helpful for us and looking back, what was it that helped us turn the corner and remain sober and help our brains heal from TBI. Here they are, themes, you've heard this before in this talk. Early detection and treatment, making those interventions early on by detecting it and making those referrals.

They also said educating, even if not clinically indicated as prevention. Taking the time to educate people on what's those risks are, how they could really set their brain injury recovery back and what problem drinking looks like. This is a high risk, very, very high risk population for substance use disorders by virtue of typically the age, the military population and we also know now the increased risk of those having sustained a TBI for developing substance use disorders. Additionally, support groups that address not just substance use disorders, not just TBI, not just combat exposure, not just for example PTSD but we do have support groups, AA meetings, 12-step groups or other types of groups.

In San Diego we've got something called Triple Threat. These are groups that deal with ... they invite people that have multiple challenges going on and people seem to relate better when it's not just isolated to one issue that they're dealing with but finding people they can relate to that have a multiple things going on at the same time.

Dr. Hungerford: Yeah, I think it's interesting that this particular slide and one of the thoughts that comes up for me is that, there is a probably a big difference between severity of the injury, right? If we're dealing with somebody with a moderate to severe injury, going through support group or 12-step program, it's likely to be a lot more challenging because they're going to have likely some physical and cognitive limitations, versus somebody that's just is dealing with a mild TBI or maybe multiple mild TBIs. I'd be curious to hear your thoughts on what would be your thought as far as dealing with these types of groups in a more moderate or severe group.

Mr. Aune: Yeah. That's the next thing about these support groups is that, that's what they're there for. The motive is pretty unanimous in these groups that people are trying to get help and I think sometimes initially, the unique ... people's different unique aspects kind of can cause them to not engage in the group or not seem or feel helped by the group until they sort of

realized well, there maybe some differences but there certainly are a lot of similarities. When I was closed to these groups and referring folks to these groups, during kind of the early Iraq and Afghanistan conflicts, when we started to see some of these folks come back with PTSD, another co-occurring disorders and we would stop sending them into these meetings.

Initially, they walk in and see a bunch of old Vietnam veteran folks in these groups and that, "Well, I'm not like them and they're not like me," and there was, this sort of what's unique and it was really an incredible moment when some of these groups began to realize, look, they're not going away. By the way, this older generation really has something to offer to the younger generation and vice versa. You saw a lot of this, beginnings of the bridging of gaps where people realized, "Hey, it may have been a different conflict and we maybe from a different generation but let's help each other." Really incredible, these support groups and the amount of support people draw from them.

There is maybe hesitancy to get involved in the beginning but just encourage them to keep an open mind and keep their ears open to see what they might be able to get from these groups. Obviously, 12-step programs, if you're not familiar, AA, NA, these are free. They are by nature anonymous, the things they share here and there stay on the room and so there is a certain amount of safety to that. Again, they're free and they're typically available everywhere. We'll give you ... Later on, I think we'll give a website where you could find these or direct them to find some of these meetings to get plugged into. Obviously, a sober support group. Kind of making a change in their group is huge.

If they were doing heavy drinking before and they want to make the change and they continue to hang out with the drinking buddies and the same people, their chances of success go down markedly. If they surround themselves with other people that really want to stay sober and move forward, that can be a huge help and again, that was from focus groups. They're the ones reporting that, that's what was helpful and so I just passed that on to you. Some takeaways, I think that are important is there is no safe level of alcohol nor obviously recreational drug use that we would want to recommend as clinically appropriate for a TBI patient.

In my early substance use career as a brand new councilor, I was really proud of myself because I had a patient who was ... he was diagnosed, this is under DSM-4 but he was diagnosed alcohol abuse. He started talking about wanting to be a responsible drinker. We put together a responsible drinking plan. I was really proud of myself on the first treatment plans. I walked into my clinical supervisor's office and he looked at me and said, "He's 19, how do you responsibly break the law?" It was a big learning lesson for me about what's clinically appropriate and what's not. At the end of the day, not saying people won't drink at all.

I'm not saying people won't have a glass of wine with dinner but we wouldn't want to stand behind that as clinically appropriate if they have a TBI. We really want to recommend that they abstain really and give their brain the space and the time that it needs to heal up appropriately. In the literature review, kind of one of the other takeaways is that there is this increased risk of dependence or of another TBI for a good six months after that TBI that we're dealing with. They have an increased risk of that progression of the disease to happen more rapidly, where they could find themselves having a severe substance use disorder for all the reasons that we mentioned throughout the talk.

Additionally, the medications that are common in this population, whether it's for the TBI, whether it's for some of the mental health, whether it's PTSD, anxiety, depression, whether it's seizure medication, just again, the medication regimen typical in this population, you add alcohol or rather drugs to that mix and you're just making it very dangerous and very complicated. That's another reason we would want to shy away from that and recommend abstinence. Then of course, we know as we mentioned that using substances significantly slows or prevents the healing of the brain after a TBI. As primary, we want to make sure we give them a chance to heal up correctly.

Dr. Hungerford: To add on to that, so alcohol in TBI patients, even at social levels, has been shown to impact ... negatively impact auditory above potentials and as well as neuropsychological performance on executive functions. Over and above beyond what we see with TBI patients who abstain from alcohol. Essentially what we're seeing is that alcohol is exacerbating any deficit that you might have from a TBI. It's almost like it's making worse and then again, like you mentioned, you're definitely at increased risk for a seizure, potential fall and another head injury which can be compounding as we mentioned before.

Mr. Aune: Again, I mentioned this a bit ago but the importance of education. If you can weave education and again, knowing your population and weaving that in is important, early detection and treatment. One of the things interesting is the residential PTSD program here in San Diego for active duty. It happen to be in our same building at the substance use clinic and the director came to me and said, "You guys are a co-occurring program and that you deal with substance use disorders and now, you're also kind of weaving into the treatment program in the mental health piece." He said, "I just understand my patient population for the PTSD folks that are here for residential treatment to be so at risk."

He said, "I sent them all to AA meetings, even if I can't diagnose them, I just want to make sure that they understand that you're at risk." Again, understanding the population and making sure they get the education, that they know that this is a risk factor for them and that we gently approach that and keep an eye on it. Additional prescription medication risk, in the addicted and TBI population. By this, I'm kind of wanting to address that if you have patients who have addictive disorders, there are

medications that we want to take a look at that may really not be appropriate for them to be prescribed. If they've got an addictive past or addictive kind of potential, there are certain medications we may want to think twice before we would prescribe them.

Dr. Hungerford: Another point of that is that opiates in particular have the ability or the propensity to either obscure or exacerbate cognitive problems in TBI patients. Really to minimize those as much as possible, we see a lot times ... a lot of times, if you have a moderate or severe TBI, you've got multiple other injuries so broken bones or lacerated organs what not. You come on opioid medication or pain medications which can obscure the underlying kind of cognitive problems and the patient attributes all the cognitive problems that they're having to the medication and that it's not until months and months later when they're off the medication and realized, "Wow, I still actually have all these cognitive problems." The other thing is if you have somebody with cognitive problems and then give them opiates, it could definitely make them worse. I think it's important to acknowledge.

Mr. Aune: Yeah. The other thing very helpful in treating folks with substance use disorders is really embrace the model of the disease of addiction. Substance use disorders are disease, I emphasize that because kind of in the military community, it really a lot of times gets characterized as just behavior immaturity, derelict sailors or soldiers and marines that are just immature and doing dumb stuff and unfortunately a lot of times that ... unfortunately, it adds to the stigma. It certainly makes it hard for people to step forward and self refer, if it somehow means, I'm just having performance problems and nothing else or I'm immature and that's all that is. To understand that it's a progressive disease, normalize that, try to take the stigma away and make it safe for people to step forward, it's a health condition and we've got treatment, we've got assessment and we can take care of it. It's really helpful to opening the door so people will get the help that they need.

Dr. Hungerford: With regards to featured research, there are several things here. One of the things we really I think need to do when we highlighted this in the CDC slide is to really get a good look at the true epidemiology of substance use and substance use disorders among the TBI population. I don't think that we're doing a real disservice to the impact that these problems have on TBI and I think that if we really fully understood the complexity and the proportion of how many of these patients are coming in with substance on board, when they're injured, I think we may have a renewed focus and highlight treatment for that. The other thing is we really want to look at factors promoting and inhibiting substance use so that goes back to doing more research with this neuroinflammation cycle and the dopaminergic hypothesis.

We also want to develop tools for assessment and for treatment with these individuals that have comorbid TBI and substance use disorders. Furthermore, I think it's really important, it's not on this slide but we need

to be asking more detailed information about adolescent TBI and we talked about this before we got started this morning. Adolescent TBI is strongly associated with increased risk for substance use disorders. In animal models, juvenile mice with TBI had a spontaneous increase in alcohol intake and it was most strongly found in the female mice which is interesting. The good news however is that's potentially reversible. Putting these mice in an enriched environment not only alleviated the increased spontaneous alcohol intake, it also normalize brain derived neurotrophic factor gene expression.

It's also important to note that rat models show binge drinking in adolescence permanent alters dopaminergic signaling. What I mean by that is ... what happens is when adolescent rat is exposed to binge drinking, later on in life when they're adults and they drink, they have a blunted dopaminergic signaling and they tend to drink a lot more. I think doing a detailed analysis and kind of restrospective alcohol use history can be really important in dealing with these patients.

Mr. Aune: That would definitely be consistent kind of that gold standard of not just again, a self-report instrument but really gathering a history in addition to those corroborating sources of information but yeah, as part of the thoroughness of substance use assessment, absolutely a thorough history of the substance use, of all the substances because there maybe other ones kind of lurking as well. Some resources for addiction, we did look at these instruments the CAGE four questions, the MAST, the audit, the SASSI. These are instruments that you can get for screening purposes. There are also kind of anonymous self-assessments that a person can do. There were times that we just couldn't get it.

I wasn't sure they were telling the whole story. I wasn't sure they were ready to be honest. I would send them to www.alcoholscreening.org and it's a website they can go get honest about their drinking with the website and it will tell them a little bit about their drinking and how it compares to other people's drinking. It's kind of a little sanity check for them about what they're doing with their alcohol use. Then, maybe schedule another appointment with them after that and see what they learned and see if they're really kind of ready to take a look at it or not. Whatever they can do to get honest with themselves I think is the beginning for them to get honest with other folks as well but to make that safe for them to do that, aa.org. I think na.org is the other one.

If they're looking to go to a meeting, they can get on that website, type in their zip code or their address and typically find one within walking distance, that's convenient for them to go to. Usually kind of have to nudge them to keep an open mind. As I said, they're going to find some differences with folks in those meetings but if they're listening for similarities, a lot of times, they'll hear them and they may find the support that they need. Referring for further assessment or treatment, I recommend getting to know who would you reach out to? If you had

somebody, do you know who would you call, who would you reach out to get that specialty assessment?

Good number to have on speed dial or at least at hand so you can get that done if you don't feel comfortable digging in yourself and feel like they could get a second look and then in a system that you're not sure how to refer them to a treatment facility, a treatment, should be indicated or you're just kind of grasping where do I send them, depending on your health care system SMSA is a free service. It's a federal program that would help locate a treatment facility and arrange that so that's another service that's federally funded that you can use. Then of course TBI resources and probably familiar, DVBIC has a website, DCoE. I think these are also over on the links portion and afterdeployment.org is a wealth of resources as well for these service members.

Additionally brainline.org, some of the information came from there and CDC does have a traumatic brain injury page, if you're not aware. Lots of data compiled there, that's very useful. We use some of it for the talk as well today. I think that's the end of the talk. I don't know if we will ride into questions but we'll kick it back to moderator for what we do next.

Ms. Basham: Thank you Mr. Aune and Dr. Hungerford for your presentation. If you have any questions for our presenters, please submit them now via the Q and A pod located on the screen. As we wait for questions to be submitted, let me bring your attention to a TBI research review, recently developed by DVBIC's research division on the topic of misuse and abuse of alcohol after TBI. It is available on the DVBIC website at dvbic.dcoe.mil/tbi-research-reviews. This reviews summarizes and describes relevant scientific literature, addressing alcohol use disorder after TBI. Data from both civilian and military or veteran studies are conflicting regarding the impact of TBI on subsequent risk of alcohol misuse or abuse.

However, alcohol use is typically lower during the first year after injury then prior to injury. The long term impact of TBI on risk of alcohol use disorder or alcohol misuse is unclear. Additional control studies are needed with sample sizes large enough to enable statistical adjustment for demographic and other factors. It is now time to answer questions from the audience. If you'd not already done so, you may submit questions via the question pod located on the screen. We will respond to as many questions as time permits. Question one, how do you recommend overcoming military service member's hesitancy to be honest about their substance use?

Mr. Aune: Yeah, I'll tackle that one, this is Ezra. Making it safe, normalizing it as a medical condition, as opposed to kind of the stigma flavor that you get when it's dealt with as sort of derelict military behavior, I think is kind of the way I phrased it earlier. Helping them ... guiding them through the fact that it's likely to get worse if there is not an intervention and then it really will and could have career implications which are less likely to be the

case early on, specially self-referral. Encouraging people to self-refer and if needed, engaging the command in the process of self-referral, most commands have either a SACO, a DAPA, an ADCO.

Some kind of a specific collateral duty, typically, aboard their commander at their command deck can help them, walk them through a self referral process and help them understand that because it's a self referral that's not going to be adverse ... it's not going to adversely impact their career. There are exceptions to that I think. When you talk about air traffic controllers and certain specialties within the military, they do take it very seriously for obvious safety reasons. Again, there is this risk analysis that has to be done if it gets worse, it really ... then it becomes a safety issue anyway. Definitely exploring gently in a non-condemning, non-judgmental tone. Helping them understand early really is better both for their career and for safety and so on. Hopefully, that answers the question.

Ms. Basham: Thank you, next question. Who is qualified to diagnose TBI?

Dr. Hungerford: I think that's a great question. In my opinion, I really think that because it can be pretty complicated and can mask a lot of things, I think primary care providers do a reasonable job. In the mild end of the spectrum, moderate and severe, it's very easily diagnosed. If you come in moderate to severe, you're going to go through the hospital and the ER and you're going to get treated. On the milder end of the spectrum, there could be a lot of psychological overlay and I think neuropsychologist in particular are uniquely qualified to parse out the psychological factors, the injury factors. We can do an evaluation to find out if there are any neurocognitive deficits or weakness.

To more directly answer the question, I think that there are a number of people that can adequately diagnose TBI from primary care providers, nurse practitioners, neurologist, specially trained psychologist, I think it depends on the training and education of the individual.

Ms. Basham: Following up on that, there is a subsequent question. What are your thoughts on vet centers diagnosing and treating TBI and SUDs?

Dr. Hungerford: Are we talking about VAs?

Ms. Basham: I think it's vet centers specifically but you could answer with regards to VA as well.

Dr. Hungerford: I'm a little bit of lost as to, what do you mean by vet center? Again, I think that it comes down to the training and experience of the individual. What I've seen unfortunately with people that don't understand the complexities of TBI, they reflexively jump to TBI is the cause of all the problems and don't look at comorbidities. That's kind of what I was getting at on that one slisde where we looked at all the different symptoms, that occur in TBI and that occur in substance use disorders. We could easily add another

panel to that with those same symptoms and look at PTSD, depression, insomnia, any host of other injuries.

There are a lot of factors that play when somebody has a mild TBI and is still having lingering symptoms, specially after three months. Once we get into the chronic phase, what is sometimes deemed the miserable minority, then I think it needs to be bumped up to somebody with some specialty training and who really understands the complexity of these issues.

Mr. Aune: Similarly, someone who's either not comfortable or not experienced really digging into the substance use history to get the full narrative together, realizing the patient may not be the most accurate source of information and has some hesitancy doing that, may really also want to refer to a specialist that's really experienced doing that. Kind of with, I think the default, you said what the default stance is for somebody that isn't familiar with TBI, I think on the addiction side, people tend to believe the patient a lot and don't check out the inconsistencies in the story and they miss a lot of detail and they won't make the intervention that should have, could have been made.

Ms. Basham: Thank you. Next question is, does the lack of cost-benefits still occur when sober or after use?

Mr. Aune: I'm sorry, could you repeat that?

Ms. Basham: Sure. Does the lack of a cost-benefit, I believe to the patient still occur when they are sober or after they stopped using?

Mr. Aune: Okay, yeah, I think that's relating back to the question of the potential neuroinflammation and the dopaminergic hypoactivity. It depends on where that's coming from. Yeah, I mean, if that's essentially what we ... if the person has an impaired frontal lobes, so their executive function, their planning, organizing, executing, their abilities to reason things out, if that's impaired, then yes, that would likely continue. However, it would not likely be as severe as if they're still actively using. I think you see some improvement but if it's really truly neurologic or brain injury related, then it's still going to linger after the fact.

Ms. Basham: Great. Next question. Does the length of time from the injury matter for risk of alcohol abuse?

Mr. Aune: Well, we do know that the risk is increased within that first six month window, after that we don't ... Yeah, so I guess that's the way to answer the question is this. For the first six months, we then increase risk of it progressing into a substance use disorder.

Dr. Hungerford: I think also, and this is just my own kind of clinical expertise speaking and not based off of research findings, is that, I think when you have somebody with a more significant injury, they are potentially at more risk,

the longer they get out from their injury because they kind of start to return to their life a little bit more. Maybe they're not as sheltered by their family or loved ones who are taking care of them. Maybe they're like, "Well, you know, they told me not to drink for a year but I can have a beer now. It's been a year." Then, they start kind of resuming their activities. I have seen that clinically. I don't have any empirical evidence necessarily to support that but I have seen that clinically.

Ms. Basham: Okay. Next question. What is the prevalence of pre-TBI substance use disorder when looking solely at the service member population?

Mr. Aune: Yeah, I'm assuming we're talking about people who have not sustained a TBI when we say pre-TBI. It's a great question. The question I think then lends itself to how much substance use is happening in the military and how much of it is getting picked up. Does it get picked up because it's actually happening or does it get picked up because there is an alcohol related incident or in the case of drugs, it gets picked up on a drug street. Anecdotally, it's very prevalent but I don't know if anybody actually has the numbers of how many service members are abusing substances or have actually developed even potentially an undetected substance use disorder. I can say that, substance use treatment programs are busy. They've been in business for a long time.

What we did see is ... Here is, I tracked the data, about 88% of the folks that ended up in rehab were for alcohol and around 12% had either alcohol and drugs or were drugs. About 12% has a drug component to their addictive behavior and 88% were alcohol. Alcohol is clearly, by a strong majority is the drug of choice in the military.

Ms. Basham: What about medical marijuana use? Is it as damaging as alcohol post TBI?

Dr. Hungerford: That's a fantastic question and unfortunately, I don't really know the answer to that. I would say any that psychoactive or essentially drug abuse would be having a negative impact. I don't know under what condition would a person be on medical marijuana post TBI. I would need a little bit more information on that.

Ms. Basham: The next question is if you've observed differences in women with TBIs and substance use.

Dr. Hungerford: That's a great question. Yes, women tend to have worse outcomes than men. Like I referenced in the animal studies with these adolescent TBIs, there was age and gender effect in that ... when there was an injury in adolescence, really only the female mice had this spontaneous uptick in alcohol intake which I found very interesting but overall, yes, there is more and more highlight on gender differences in TBI and I know there are some current and ongoing investigations into that. I think DVBIC is involved in some of that as well. I know Dr. Jacey Billy had presented on

that at one point. Yes, there are differences and I think that the outcomes for females are worse in that particular scenario.

Ms. Basham: There is a question about the role of harm reduction in treatment options.

Mr. Aune: I was hoping that when we come up. Ezra here. Interestingly, unless it's changed, it's been a few years since I worked in a rehab but the navy had taken a pretty strong stance against harm reduction. Harm reduction for any, that doesn't know ... anybody that does not know is sort of a stance of, we may not be able to get them to abstain and engage in recovery but if at least we could get them to reduce their drinking, to reduce the harmful effects of drinking then we want to pursue that course. It kind of lends itself to a motivational interviewing approach where we meet the patient where they're at and try to help them be honest about what they're willing to do and what they're going to do with their drinking.

It make sense I think sometimes clinically to meet them where they're at and try to work from there. That's where the stance of harm reduction comes from. I think the problem sometimes in the military community is if we know we have a diagnosed substance use disorder and the person has a severe substance use disorder and it really is clinically appropriate for them to abstain from alcohol altogether and engage in a recovery program, they're kind of have a walking safety issue from the military's perspective because they feel like it's a matter of time before there is another problem and I think that's typically why they take a stance against harm reduction.

Clinically, it doesn't make sense to engage them where they're at and try to help them, if they have a TBI. You do want them to be honest with you about what their doing and what they're willing to do but I think sometimes it has to be contextualized within what's truly clinically appropriate for their TBI and for their substance use disorder which I think we want to rest on the side of abstinence. If they keep coming back and saying, I'm not able to, it seem like I'm still drinking then I think it's worth exploring to see if more treatment is indicated or if they're just not willing but you do want to keep them honest with you. Sorry for the long answer but it's a great question.

Ms. Basham: What are your thoughts on mindfulness based recovery?

Dr. Hungerford: Yeah, that's a good question. I think that mindfulness is fantastic and we have a mind body medicine program here that is very highly allotted by the patients that go through it and I think the people that buy in to the philosophies and actually go through the program, I think have really good outcomes and one of the things that I'm actively looking at is looking at outcomes on other TBI metrics for people that go through the mind body medicine program versus those that don't and then further looking at healthcare utilization following that. In my opinion, yeah mindfulness based programs are excellent.

Ms. Basham: Next question. Did your lit review include any information on comorbid sleep disorders and severity of co-occurring PTSD avoidance symptoms.

Dr. Hungerford: That's a great question and I think those are hugely important factors and no. We were really kind of myopic here, looking at TBI and alcohol but those factors absolutely are critical to look at in any TBI program. In my experience, I've been doing this for a long and seen multiple thousands of soldiers, sailors, marines and seals. I would say sleep is probably the number one problem. It's very, very infrequent that we see patients that don't have some sort of sleep problem being obstructive sleep apnea or either on set or maintenance insomnia. That's a great question and those things definitely need to be addressed.

Ms. Basham: Great. Next question. Do you know of any research on cog rehab for TBI that looks at how substance use disorder affects the benefits from treatment?

Dr. Hungerford: Not specifically but I think we addressed this earlier on in the talk that essentially if you're actively using, you're basically stifling the recovery process and potentially exacerbating any cognitive deficits that are currently there. Again, with these neuroinflammation cycle and the dopaminergic hypo functioning that we're talking about, that's also exacerbating ... it's actually exacerbating each other. I think we could confidently say without specifically addressing cog rehab but I think we can confidently say, that yes, if you're actively using substances then that is going to impede progress.

Ms. Basham: Here is a follow up regarding the neuro information. Specifically, how that inflammation affects other ... how does it affect other medical diagnosis or symptoms and where would you refer people to find more information about that?

Dr. Hungerford: That's a great question and I think you stomped me. I don't have a good answer for that. I think that again, these are kind of early stages and a lot of the information that's come from that is beyond the theoretical stage but they're in animal models and I think more research needs to be done before that's really stuffed out. I went with the question but I was finished speaking.

Ms. Basham: Here is a question from a social worker that asks, how do I combat resistance from medical providers in working with folks who have TBIs and substance use disorder?

Mr. Aune: Okay, I'm going guess that we're talking about ... the providers are the ones with the resistance. Okay, so I'm going to guess we're talking about sort of ... we'll call it maybe hesitance to further explore. It maybe was having a sit down discussion and really kind of wrap everybody's mind around addiction as a disease and the fact that it is progressive and really kind of get on the same page, about what the consequences of not intervening and not assessing are when you compare it with what the

potential consequences are of doing the thorough assessment and making those interventions. I think it's, I would kind of echo my own talk to say that it doesn't get better on its own if we don't make those interventions.

It's very short term thinking to think that if we ... for lack of a better term, sweep it under the rug now that it's going to go away. We know that it gets worse. We know that consequences become more severe not less severe and so maybe having a conversation about that and getting on the same page about what we're going to do if patients that we suspect have both TBI and substance use disorder so we're doing that thorough assessment.

Ms. Basham: All right, next question, regarding post TBI alcohol use. Is it important to not use alcohol or drugs only for a few months. How long should we recommend they stop using alcohol after TBI.

Dr. Hungerford: That's a great question. First off, it's a complex answer and it depends on the severity of the injury. For example, if we're dealing with a moderate to severe, no. I mean, I don't think there is any hard and fast, "Hey, these are the guidelines." However, my typical go to is to say, "Okay, is it worth it for you to drink alcohol, have a fall and injure your brain and end up permanently disabled? Is alcohol worth it for you to do that?" With a moderate to severe, I typically have patients abstain for about a year. If they've had any history of post traumatic seizure then really you abstain indefinitely.

I think when you have a patient asking you when can they start drinking again after having sustained a moderate or severe TBI, that probably should be a trigger for you to get them over to a professional, like Ezra was talking about. You really want to start quarrying why that's so important to them. Not that drinking in and of itself is bad but that should start to have you asking some further questions for more detailed information.

Mr. Aune: I would also add since you mentioned at large that the TBI severity is a factor here, that the pre-TBI substance use and the substance use up until the TBI, the severity of that is also a factor. I've seen a very seductive trend with folks who treat substance use disorders. Remember, many of them end up in substance use treatment centers there because they had a crisis. They had an incident, they were referred, they typically were not self-referrals. Either their wife said, they were leaving them. Their husband said, they were leaving them. They were about to lose their career so there were some very real consequences. Many of them would love to return to drinking.

I think the problem is if they are ... if they've had that lost of control or a compulsion to use and they look more like they're addicted to the substance. Time isn't going to take that away and when I say there is this seductive trend, what I mean is, in a co-occurring environments, and so

here we are talking about TBI and substance use disorders together. There is this thinking that the substance use disorder is not primary and if we solve the other issue, then we can go back to drinking. We say it a lot with PTSD. They know that their drinking is not helping their PTSD and they end up in a treatment program, trying to get better from PTSD and substance use.

In their heart of hearts, they want to believe, that once they take care of their PTSD they can go back to drinking and low and behold, because addiction as a disease is progressive, they find out that their drinking gets worse and worse and worse even if the TBI seems like it's gotten better. I guess that's ... To kind of compound what Lars was mentioning, is we're not out of the safe zone. We're not exactly safe just because we've put some time behind us. The severity and the nature of the relationship with alcohol or other drugs has to be considered.

Ms. Basham: All right guys this is our final question. How long should you wait to do a neuropsych evaluation once the patient is in a substance use program?

Dr. Hungerford: That's a good question. I think it depends on a number of different factors. It depends on the level of severity of the injury. It depends on the level of abuse of substances. I would want them to have gone through and be stable. Really, when we're doing a neuropsych eval, we want to rule out as many compounding factors as possible so that we could get a really good look at what their neurocognitive functioning is. For example, if I had somebody who is a chronic alcoholic and also has a brain injury, I'm going to want to get them stabilized, not drinking, get through the recovery phase of that before I look and I'll probably wait three months before I look at them. Same thing if they had chronic insomnia. I'd want to look at that. Hopefully, that addresses that.

Ms. Basham: Thank you presenters. Any final thoughts?

Dr. Hungerford: Real quick, I see somebody was asking about justice involved veterans and if we feel that TBI is a case for that and I see, she'd asked this a couple of times so I wanted to really quickly address that. Yes, it's a little bit of field from what we're talking about here but absolutely TBI can be an issue and I think what we have is we have veterans courts at least here in San Diego. We have a Veterans Court and Dr. Cynthia Boyd was heavily involved in TBI, anger aggression in that and active duty military. I do think that's important to look at and can be addressed, needs to be addressed.

Ms. Basham: All right. Thank you again to our speakers, Mr. Aune and Dr. Hungerford. As a reminder, after the webinar, please visit dcoe.cds.pesgce.com to complete the online CE evaluation and download or print your CE certificate or certificate of attendance. The online CE evaluation will be open through Thursday, January 26th, 2017. You may download today's presentation from the files pod on the screen or at the DVBIC website, dvbic.dcoe.mil/online-education. An audio recording and edited transcript

of the close captioning will be posted to that link in approximately one week. DVBIC always tries to produce exciting cutting edge ways to ensure we continue to offer educationally sound, scientifically astute information for our attendees.

As mentioned earlier, we would like your thoughts on topics for future audio podcast. First let me explain what an audio podcast is. Audio means, you hear someone speaking and podcast is a combination of the two words, iPod and broadcast. The podcast is a digital pre-recorded audio file. These files can be downloaded from the DVBIC website to various multimedia platforms, i.e. Apple, Android or Microsoft. Podcast will be 10 to 15 minute episodic series of specifically vocalized content. Please take a moment to choose your favorite topics from the list provided. Thank you for your contribution to our planning efforts. Finally, to help us improve future webinars, we encourage you to complete the feedback tool that will open in a separate browser on your computer now.

The chat function will remain open for an additional 10 minutes after the conclusion of the webinar to permit attendees to continue to network with each other. The next DCoE psychological health webinar Transforming Anger, Proven Strategies is scheduled for February 23rd, 2017 from 1 to 2:30 p.m. Eastern Time. Thank you again for attending and have a pleasant day.

Operator: This concludes today's conference. Thank you for participating. You may disconnect at this time. Speakers please stand by for the post conference.