

**Testimony of  
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Before the House Committee on Veterans' Affairs, Subcommittee  
on Health  
U.S. House of Representatives on "H.R. 1336, The Veterans  
National Traumatic Brain Injury Treatment Act (Rep. Murphy)"  
March 11, 2025**

Good afternoon, Chairwoman Dr. Miller-Meeks, Ranking Member Brownley, and Members of the Subcommittee. Thank you for inviting me to participate in this hearing to discuss H.R. 1336, The Veterans National Traumatic Brain Injury Treatment Act.

This piece of legislation aims to improve the health of our veterans. Establishing a pilot program for the use of hyperbaric oxygen (HBO) therapy for veterans with traumatic brain injury (TBI) or post-traumatic stress disorder (PTSD) could help improve these patients' quality of life. Besides the potential clinical improvement, a VA pilot program would enable veterans to receive HBO in a safe environment. Furthermore, using this pilot program as a means to conduct more research for these indications could serve to improve the delivery of care for not just this patient population but for civilians as well.

Over the course of a lifetime, an average of 7% of veterans experience PTSD with the highest incidence at 29% for veterans deployed in Operations Iraqi Freedom and Enduring Freedom. As an emergency medicine physician, I have cared for numerous veterans suffering from TBIs and PTSD. With my experience in hyperbaric medicine, I think this could be a straightforward implementation of a treatment modality that has already proven its safety for many decades. This legislation has great potential to improve the lives of our friends, families, and neighbors.

I am Dr. Andrew Kozminski, an emergency medicine physician with a specialization in undersea & hyperbaric medicine. I am the current medical director for hyperbaric medicine at University of Iowa Health Care (UIHC) and medical director for the UIHC Wound Center.

One main function as the director of a hyperbaric medicine service is providing safe treatments for patients. The usual population for a hyperbaric medicine service includes patients with complicated chronic wounds, radiation injuries, and cases of acute soft tissue ischemia. Most patients receiving HBO across the country are in ambulatory, non-critical condition. However, many large healthcare systems are treating patients for emergency indications (ie. decompression sickness, arterial gas embolism, central retinal artery occlusion, carbon monoxide poisoning, acute blood loss anemia) and patients who come from intensive care settings with life or limb-threatening conditions like necrotizing fasciitis, crush injuries, or impending compartment syndrome. At the University of Iowa, my team has treated the full spectrum of indications and for patients who are merely days-old to greater than 100 years of age. This range of patient demographics and conditions highlights HBO's relative safety when administered by trained hyperbaric medicine professionals at accredited healthcare facilities.

Since 2018, University of Iowa Health Care has participated and has been a top enrolling site in a phase II adaptive, multi-center, randomized clinical trial called Hyperbaric Oxygen Brain Injury Treatment Trial (HOBIT). This trial aims to determine the optimal dose and frequency of hyperbaric oxygen that is most likely to improve prognosis for acute severe traumatic brain injury patients. As expected for those who

incur a severe TBI, the mechanism of injury can damage any and all organ systems, which can make treating these cases riskier than an average HBO patient. However, despite these critical circumstances, skilled healthcare providers knowledgeable in the specific complications that can arise from a hyperbaric environment have been able to maintain a robust safety profile throughout this trial. In comparison, providing hyperbaric oxygen for ambulatory, non-critically ill patients for chronic TBI or PTSD should be, and is, well within the capabilities of accredited hospital systems across the country.

The 14<sup>th</sup> Edition of the Undersea & Hyperbaric Medical Society's Indications Manual contains a summary of 34 publications--a mixture of case reports, retrospective reviews, prospective and randomized clinical trials from 1985 to 2018, that aimed to examine TBI and the potential role for HBO as a treatment. Adverse events, if reported, are listed in this summary. Neurologic oxygen toxicity and claustrophobia are two such adverse events that might be more prevalent in this patient population.

Oxygen toxicity seizures for the general population are a potential but rare complication of hyperbaric oxygen and is something I educate all of my patients on prior to beginning their treatment course. The Epilepsy Foundation reports 1 in 50 TBI cases result in post-traumatic epilepsy. This does not mean veterans with a TBI and concurrent epilepsy will be unable to receive HBO treatments, only that the treatment profile should be adjusted to account for a potentially lower seizure threshold in patients with known epilepsy or patients that experience an oxygen toxicity seizure during their treatment course. In any case, an oxygen toxicity seizure is a complication that trained hyperbaric medical professionals are well-versed in how to manage and should be able to ensure continued patient safety.

Anecdotally, I have treated many patients with claustrophobia or hesitancy about receiving treatment in a confined space. Some patients find wearing an oxygen mask or hood to be bothersome. I can imagine within a patient population suffering from traumatic combat experiences, there will be some qualifying patients who refuse treatment because of the confined environment. Anxiolytic medications can be administered safely by trained professionals to help these patients receive HBO. In a worst-case scenario, a patient would need to be removed from a hyperbaric chamber mid-treatment. Aborting a treatment does not pose any increased risk of physical harm to a patient and would not keep them from continuing with other forms of therapy for their condition.

It is important to comment on the possibility of complications during an HBO treatment not only to provide a complete picture of the risks and benefits but to further highlight the importance of trained hyperbaric medicine professionals being the ones to administer these treatments for our veterans. As TBI and PTSD are not currently covered indications by insurance companies in the United States, there are desperate patients who seek HBO treatments at health clinics or "health spas" --businesses that

claim to offer life-altering HBO treatments at low prices for off-label indications. In my experience, these “health spas” do not adhere to the same level of safety as hyperbaric services within major hospital systems, nor might they even provide correct HBO doses or treatment profiles. Just this past January, a 5-year-old child was killed in Troy, Michigan at one of these businesses from an explosion. Reportedly, the mishap is still under investigation, but in my opinion, it is likely a result of insufficient training and or lax safety measures. I do not want our veterans or any person to seek treatment for TBI or PTSD in health clinics that place patients in danger. Establishing a pilot program for veterans will enable them to get treatment at fully accredited institutions where they can be cared for by true medical professionals.

Unfortunately, treatment options for TBI and PTSD leave a range of 15-50% of patients without benefit after current standard intervention. The medical community strives to improve this outcome with more research and clinical trials. This legislation will help in this continued effort.

My participation in the ongoing HOBIT trial--testing the effect of HBO on acute, severe TBI—encompasses the extent of my personal experience in treating TBI or PTSD with HBO. As mentioned, these conditions are currently off-label and thus classified as experimental. I look to the lead investigators in my field and the research they have completed to derive my opinion on whether HBO has potential for providing relief for patients with chronic TBI and PTSD.

HBO holds promise as a treatment for these conditions as it elevates oxygen tension in the blood and damaged tissues which helps promote neuroplasticity in the acute setting of injury. For chronic TBI cases, it has been found that HBO can improve cellular metabolism, reduce cell death and oxidative stress and enhance mitochondrial function. These mechanisms aim to promote neuronal repair and regeneration. The Brain Injury and Mechanism of Action (BIMA) trial, published in 2016, demonstrated improved post-concussive symptoms, PTSD, cognitive processing speed, sleep quality and balance function by 13 weeks after 40, 60-minute HBO sessions at 1.5 ATA. Unfortunately, these improvements did not persist beyond 6 months. More studies have also shown clinical improvement in their HBO intervention groups while others have mixed results and would likely provide clearer answers with more patient recruitment and better long-term follow-up.

Most recently, Dr. Lindell Weaver, a leader in my field, and his team published their most recent study last month, “A double-blind randomized trial of hyperbaric oxygen for persistent symptoms after brain injury.” This study included brain injuries, both TBI and non-TBI, making the findings more generalizable across patient populations with different mechanisms of injury. Participants were divided either into an HBO treatment group or a sham group for the first phase of the trial. The treatment group received 40 HBO sessions at 1.5 ATA within 12 weeks. 13-week follow-up showed improvements in

cognitive test scores—similar to what was seen in the BIMA trial--for both sham and HBO groups. These improvements were maintained at 6-months only for the HBO group. The second phase of the trial offered another 40 HBO sessions to all trial participants. At final follow-up, 3 months after the last treatments were given, patients who received 80 HBO treatments had greater neuropsychiatric improvement compared to their results after 40 sessions. The initial sham group, patients who received only 40 treatments, showed neuropsychiatric improvements similar to the treatment group in the first phase of the trial.

I find the outcomes of these trials to be promising. More work needs to be performed to better understand the long-term efficacy of HBO for TBI and PTSD in the distant years following treatment. HBO dose and treatment frequency could also be further investigated, though 1.5 ATA is more neuroprotective in a population with higher incidence of seizures. For TBI and PTSD, HBO should still be performed in conjunction with frequent, specialized brain injury rehabilitation.

In conclusion, this piece of legislation aims to improve the health of our veterans. Establishing a pilot program to provide HBO therapy for veterans with TBIs and PTSD could help improve these patients' quality of life, open safe medical environments to receive these treatments, and continue to provide insight on how best to construct and administer treatment courses in the future.

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Summary:

Good afternoon, Chairwoman Dr. Miller-Meeks, Ranking Member Brownley, and Members of the Subcommittee. Thank you for inviting me to participate in this hearing to discuss H.R. 1336, The Veterans National Traumatic Brain Injury Treatment Act.

I am Dr. Andrew Kozminski, an emergency medicine physician with a specialization in undersea & hyperbaric medicine. I am the current medical director for hyperbaric medicine at University of Iowa Health Care (UIHC) and medical director for the UIHC Wound Center.

This legislation aims to improve the health of our veterans. Establishing a pilot program for the implementation of hyperbaric oxygen (HBO) therapy for veterans with traumatic brain injury (TBI) or post-traumatic stress disorder (PTSD).

As an emergency medicine physician, I have cared for numerous veterans suffering from TBIs and PTSD. With my experience in hyperbaric medicine, I think this could be a straightforward implementation of a treatment modality that has already proven its safety for many decades. This legislation has the potential to improve the lives of our friends, families, and neighbors.

I want to comment on the potential for increased likelihood of oxygen toxicity seizures in this patient population as 1 in 50 TBI patients develop post-traumatic epilepsy. However, an oxygen toxicity seizure is a complication that trained hyperbaric medicine professionals are well-versed in how to manage and should be able to ensure continued patient safety throughout a treatment course. Trials I will mention even utilize a protective pressure of 1.5 ATA, which should reduce the likelihood of this complication. However, is an important reason to create a pilot program through the VA health system as this program would provide a safe option for patients seeking treatment for what is currently an off-label indication. Without this program, desperate patients may find themselves at the mercy of popular "health spas"-- businesses that might not have adequately trained staff, use correct treatment profiles, and at times pose serious risk to their clients.

The lead investigators in my field and the research they have completed on the utility of HBO for chronic TBI and PTSD show promise for improving health outcomes for these patient populations. For chronic TBI cases, HBO has been found to improve cellular metabolism, reduce cell death and oxidative stress and enhance mitochondrial function. These mechanisms aim to promote neuronal repair and regeneration. The Brain Injury and Mechanism of Action (BIMA) trial, published in 2016, demonstrated improved post-concussive symptoms, PTSD, cognitive processing speed, sleep quality and balance function by 13 weeks after 40, 60-minute HBO sessions at 1.5 ATA. Unfortunately, these improvements did not persist beyond the 6-month follow-up.



In February 2025, Dr. Lindell Weaver, a leader in my field, and his team published their most recent study, "A double-blind randomized trial of hyperbaric oxygen for persistent symptoms after brain injury." This study showed similar results to what was observed in the BIMA trial for both sham and HBO groups at 13 weeks, but here the HBO treatment group maintained the neuropsychiatric benefits at 6 months. A second phase within this trial offered another 40 HBO sessions to all participants. At final follow-up, 3 months after the last of the second round of HBO treatments were given, patients who received 80 HBO treatments had greater neuropsychiatric improvement compared to their results after 40 sessions. The patients who received 40 treatments total also showed neuropsychiatric improvements compared to their baseline scores but less improvement than their counterparts who received 80.

In conclusion, I find the outcomes of these clinical trials to be promising. Establishing a pilot program for the VA to provide HBO therapy for veterans with TBIs and PTSD could help improve these patients' quality of life, open safe medical environments to receive these treatments, and continue to provide insight on how best to construct and administer treatment courses in the future.