The Blast Exposure and Brain Injury Prevention Act (S 2883, 115th Congress) was introduced by Senator Elizabeth Warren (D-MA) on May 17, 2018. The bill aims to address aspects of traumatic brain injury and post-traumatic stress disorder among military personnel.

The first section of the bill would develop a plan to improve research on and development of therapies used to treat traumatic brain injury.
brain injury (TBI) and post-traumatic stress disorder (PTSD). This would include a plan for the Defense Health Agency [13] (within the Department of Defense) to fast-track cooperative research and the development of therapies, and provide recommendations for legislative or administrative action, if necessary. Importantly, this bill does not appropriate any additional funding to study TBI or PTSD.

The second part of this bill focuses on documenting rates of blast exposure [14] in military personnel. The documentation would include the following details: date of exposure, the duration of exposure and the blast pressures, if exposure occurs during combat or training, and if a weapon was the cause of the blast – and if so, what type of weapon.

Next, the bill’s authors tackle the task of reviewing the current guidance on blast exposure during training. Within 180 days of the Act’s enactment, the Defense Health Agency and military departments would be required to both review the firing limits for weapons during training exercises and consider the cognitive impact of exposure over many days in a row, the impact of multiple types of weapons, the feasibility of exposure limits, and the minimum safe distance.

Finally, the bill proposes additional research on improving personal protective equipment to reduce blast pressure or protect against brain injury.

Context

From 2000 to 2018, more than 380,000 [15] service members were diagnosed with TBI. Currently, various agencies and departments offer limited protocols and recommendations for treating individuals with TBI. For example, the Defense and Veterans Brain Injury Center [16] within the Department of Defense offers clinical recommendations [17] for healthcare professionals treating military personnel with mild traumatic brain injury. Likewise, this center offers training [18] webinars, podcasts, and live events regarding the root causes, clinical symptoms, and best treatment options for individuals with TBI.

The Department of Veterans Affairs (VA) is also invested in understanding the symptoms and developing treatment options for TBIs. One of their programs, the Traumatic Brain Injury Model System [19] (TBIMS), represents a collaborative effort to inform and develop evidence-based guidelines for treating individuals with TBI. TBIMS is conducted in coordination with the National Institute on Disability, Independent Living, and Rehabilitation Research [20], within the Administration for Community Living. According to [21] the National Institutes of Health (NIH), $122 million was allocated to NIH-funded TBI research in 2018, and an estimated $114 million will be provided for TBI research in 2019.

Another common disorder experienced by military personnel is PTSD; according to the National Center for PTSD, [22] within the VA, an estimated 11-20% of military personnel [23] who served in Operations Iraqi Freedom and Enduring Freedom have PTSD in a given year. Given the debilitating nature of PTSD, many agencies and departments have focused on bolstering research into understanding and treating the disorder. For example, in 2013 the VA and DOD announced a commitment [24] of $107 million to fund two programs – the Consortium to Alleviate PTSD and the Chronic Effects of Neurotrauma Consortium – to address both PTSD and TBI, with a particular focus on treating veterans and military personnel. The NIH also funds research on PTSD; the Institute funded $107 million for PTSD research in 2018, and is expected to put $100 million toward PTSD research in 2019.

Both TBI and PTSD have captured the attention of the 115th Congress. During the 115th Congressional session, 55 introduced bills mentioned TBI in some capacity. Of those, one bill in particular (HR 6615, the Traumatic Brain Injury Program Reauthorization Act of 2018 [25]) was signed into law on December 21, 2018. HR 6615 [SciPol full brief [26]] reauthorized programs focused on TBIs through 2024 and instructed the Centers for Disease Control and Prevention (CDC) to monitor both TBIs and concussions at the state and national levels. PTSD was mentioned in 719 bills introduced by the 115th Congress; of those bills introduced, 71 were eventually signed into law.

Policy History

No previous versions of this bill were found.
The Science

Learn About the Science

Post-Traumatic Stress Disorder (PTSD)[27]

Science Synopsis

The CDC defines TBI [29] as a disruption to the normal function of the brain caused by any injury to the head. TBI can range from mild (i.e. a change in consciousness or mental state that is brief) to severe (i.e. memory loss or a prolonged state of unconsciousness). Most servicemembers [15] who are diagnosed with TBI fall under the mild category and return to full duty within seven to ten days. A 2014 document [30] from the Defense and Veterans Brain Injury Center outlines a six-stage progressive return to pre-injury activities (Table 1) to guide primary care providers in treating mild TBIs among military personnel. If the TBI suffered by an individual is not the first within a twelve-month period, additional precautions are taken to ensure the proper level of care is provided.

In the past, TBI was primarily associated with blunt force trauma [31] but current research [32] indicates that the “blast wave” [33] from explosions can also cause TBI. Blast pressure (i.e., pressure caused from a shock wave that is over normal atmospheric values) can result from the use of battlefield improvised explosive devices (IEDs), firing artillery, and other heavy-caliber weapons, all of which are used quite regularly in training service members. Exposure to blast pressure can cause the brain to move in the skull and damage the brain at a subcellular level. However, there is currently limited data [34] on service members’ exposure to blast pressure, which limits the ability of researchers and clinicians to make any meaningful connections and therefore, solutions.

Scientific Assumptions

- TBI is associated with trauma from explosives and blast pressure waves (Section 2 (b)): A number of peer-reviewed research articles since 2010 indicate that there is a connection between blast wave exposure and TBI.
- Improved personal protective equipment will reduce the incidence of brain injuries resulting from blast pressure waves (Section 2 (d)): A report from the Center for a New American Security Protecting Warfighters from Blast Injury [35], indicates that there are models and experiments suggesting that improved helmet designs could reduce brain injuries as a result of blast pressure.

The Debate

Scientific Controversies / Uncertainties

There are many uncertainties surrounding treatment for TBI. Currently, the military follows a "progressive return to activity [17]" policy in which the patient takes some time to rest before gradually returning to normal activities depending on the severity of the injury. However, a 2014 study [36] indicated that there are a variety of ways that TBI can be treated, including cognitive behavioral therapy [37], medications, and dietary supplements. Importantly, the study found deficiencies with the return to activity protocol, but there is still too much uncertainty around therapy for TBI and insufficient data to indicate a strong alternative to the protocol.

Like the uncertainties around proper treatment protocols for TBI, clinicians and researchers are not in complete agreement over effective treatments for PTSD [38], either. Given the lack of knowledge for the underlying causes of PTSD, treatment instead focuses on individual symptoms that the individual presents with, often as described by the Diagnostic and Statistical Manual of Mental Disorders [39] (DSM-V). A frustrating lack of success for treating individuals with PTSD has led some to
propose new, revolutionary treatments for the disorder including the use of magnetic resonance therapy \[^{[40]}\] or currently illicit drugs including ketamine \[^{[41]}\], 3,4-methylenedioxymethamphetamine (MDMA) \[^{[42]}\] – which is currently in a phase three clinical trial – and medical marijuana \[^{[43]}\].

The authors of S 2883 hope to address these discrepancies and lack of consensus around the treatment of TBI and PTSD by spurring a cross-agency effort to increase research on effective therapies for treating these disorders.

**Endorsements & Opposition**

- Senator Elizabeth Warren (D-MA), press release \[^{[44]}\], May 18th, 2018: "We know that many servicemembers exposed to blasts during combat and training later experience long-term brain injury. We need to better understand how to prevent and treat blast exposure in order to give our servicemembers the care they need and deserve."
- Senator Joni Ernst (R-IA), statement \[^{[45]}\], May 22nd, 2018: "As a grateful nation, it is our job to ensure the safety and health of our men and women in uniform as they defend our country. The Blast Exposure and Brain Injury Prevention Act addresses the serious threat posed by TBI in combat and in training, and will provide the Department of Defense with greater guidance to treat, but most importantly prevent, TBI."

**Potential Impacts**

- Elizabeth Warren (D-MA), document \[^{[46]}\]: "The Blast Exposure and Brain Injury Prevention Act of 2018 would improve research on traumatic brain injury, speed the development of therapies to treat TBI, and strengthen the Department of Defense’s capacity to track and prevent blast pressure exposure."

**Status**

S 2883 was introduced in the Senate on May 17, 2018, and referred to the Committee on Armed Services \[^{[47]}\].

**Recommended Citation**


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