

**Prepared Statement**

**of**

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**REGARDING**

**THE CURRENT STATE AND FUTURE AIMS IN TRAUMATIC BRAIN INJURY-  
RESEARCH, DIAGNOSTIC TESTING AND EVALUATION, AND TREATMENT**

**BEFORE THE**

**SENATE ARMED SERVICES COMMITTEE  
SUBCOMMITTEE ON PERSONNEL**

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Chairman Tillis, Ranking Member Gillibrand and members of the Subcommittee – thank you for the opportunity to discuss the Department of Defense’s efforts regarding traumatic brain injury (TBI). I am honored to testify alongside my esteemed colleagues from the Department of Veterans Affairs. I would also like to thank you for your sustained leadership and support of our nation’s service members, veterans and their families, and especially those dealing with complex issues related to TBI. Your investments in TBI research have led to important advances in care and a greater understanding of where future research should be targeted.

The Military Health System’s overriding mission, centered on readiness, is to ensure a medically ready force and this includes our management of the TBI Pathway of Care within the Department. Since 2000, more than 370,000 Service members were diagnosed with at least one TBI, of which more than 80% of those were mild TBI, also known as concussion. The vast majority of TBI’s are diagnosed in non-deployed settings and are caused by training incidents, motor vehicle crashes, and falls. Concussions, which often lack obvious visible injury, have potential to impact the readiness of the force, which is why the Department continues to emphasize and focus on advances in concussion diagnostic testing and evaluation, treatment, and research.

### **TBI Diagnostic Testing and Evaluation**

The Department’s approach to evaluation and treatment of TBI at the point of injury promotes Service member’s health by facilitating rapid identification and recovery, reducing the chance of another concussion before the Service member has healed from the first one, and decreasing secondary injury. DoD’s mandatory screening programs,

outlined in policy, promote early identification of Service members with concussion to ensure effective treatment for the physical, cognitive, and emotional effects of the injury. Medical screening, triggered by Service members involved in a potentially concussive event; leads to medical evaluation. Examples of potentially concussive events include being within 50 meters of a blast event, being in a vehicle associated with a blast event, collision or rollover, sustaining a direct blow to the head, repeated blast exposures or any instance where an event leads to an evaluation directed by a Commander.

The Department is aggressively leveraging new and emerging research to better identify Service members with a suspected head injury and identify Service members who are unlikely to recover in the anticipated timeframe of a few days to weeks. In addition, the Department is actively pursuing new technologies that can detect intracranial mass lesions, abnormal cerebral physiology, and other signs of brain injury, to objectively inform point-of-injury care for these Service members. Technology is being developed and some assessment tools have been FDA-cleared for combat medics and corpsmen that will enable them to make the best clinical decisions for injured Service members, allowing them to diagnose, assess and treat Service members closer to the point of injury and to provide prolonged field care in an austere environment. These include portable devices to measure brainwave patterns, physiological determinants, autonomic dysfunction, environmental sensors and portable neurocognitive assessment tools.

### **TBI Treatment**

We know that, after a brief period of rest, a concussed individual can begin a gradual and progressive return to pre-injury activity. The vast majority of individuals who sustain a concussion improve clinically. Due to rapid natural recovery seen after injury and no FDA-approved pharmacotherapy for mild TBI, medication use for acute concussion is based on management of symptoms. Emerging technology may begin to provide insight into treatment response. The Department continues to aggressively pursue advances in TBI treatment, allowing Service members to return to the battlefield, and importantly, to lead rich, fulfilling lives post-injury. Novel interventions for symptomatic mild TBI are under study and selectively used in some of our intensive outpatient programs, including neurofeedback, biofeedback, computer-based cognitive rehabilitation, transcranial magnetic stimulation, and non-invasive electrical stimulation devices.

### **TBI Research**

The DoD designed and cultivated a gap-driven TBI research portfolio that includes a full spectrum of knowledge and materiel solutions covering prevention, diagnosis and treatment, and long-term studies capturing the natural progression of TBI.

Priority areas for research include precise TBI classification, biomarkers, improving diagnostic capabilities from the point of injury to the post-acute period, symptom presentation and treatment response to novel treatments, long-term effects of TBI and understanding sex differences in TBI. The Department is studying innovative technologies such as portable devices to measure the brain's electrical activity,

environmental sensors, portable neurocognitive assessment tools and other concussion evaluation systems.

The Department has sustained efforts to track the long-term effects of TBI. At the request of Congress, several large, longitudinal research programs are underway including the “15-Year Longitudinal Studies” to understand the long-term effects of TBI on service members and veterans and the needs of injured Service members’ caregivers. Some of the findings highlight the need to reduce fractured health care delivery and to promote the utilization of existing programs that support caregivers. The second, “Improved Understanding of Medical and Psychological Needs in Veterans and Service Members with Chronic Traumatic Brain Injury,” or “IMAP,” make it clear that comorbidities, such as PTSD, acute stress, and sleep disruption, complicate TBI recovery and create a need for a complementary suite of mental health and rehabilitation services for effective TBI treatment.

The Department is conducting state-of-the-science research as part of the National Research Action Plan, which coordinates execution of research priorities with other federal agencies including the Department of Veterans Affairs and the National Institutes of Health (NIH). One of several large-scale portfolios researching the relationship between TBI and neurodegenerative conditions is the Chronic Effects of Neurotrauma Consortium (CENC), a DoD and VA collaboration exploring the long-term effects of combat-acquired mild TBI. Additionally, the DoD-National Collegiate Athletic Association Grand Alliance targets collegiate athletes, including those at the military

service academies, and leverages critical academic partnerships to more rapidly amass information on acute concussion assessment and return to activity strategies.

To support the coordinated collection of large data sets across the entire TBI research field, DoD and NIH developed and maintain the Federal Interagency Traumatic Brain Injury Research (FITBIR) informatics system to enhance the speed of knowledge translation to best clinical practices.

### **Issues affecting future policies**

DoD is focused on the hard problems of comorbidity and diagnostic clarification, because these issues inform return-to-duty determinations, administrative dispositions including misconduct proceedings or separations, and medical disability findings downstream. We have found that TBI is a complex disorder that can present with a wide range of cognitive, behavioral and physical deficits. Epidemiological studies inside and outside of the TBI portfolio are ascertaining why TBI often presents with duty-limiting conditions such as PTSD, depression, substance use disorders, chronic pain and suicide risk.

We are beginning to understand social determinants and outcomes in TBI. We know that functional deficits and impaired psychological health interact to influence employment instability in the years after TBI. Disruption in activity can lead to lower satisfaction. The Army Study to Address Risk and Resilience in Soldiers is characterizing TBI's possible contribution to our suicide problem. Interaction between mental health and TBI research portfolios helps us to "know what we know," so we can

rehabilitate more Service members who present with complex symptomatology and, just as important, tailor policy toward appropriate and humane dispositions of Service members with TBI.

### **Way ahead and conclusion**

As we look to the future of TBI research, we wholly appreciate that the human brain represents the most complex organization of living structure in all of biology. I was struck, during my four years of service on the NIH advisory council for the National Institute of Neurological Disorders and Stroke, how wide-ranging and organized the national brain research portfolio is, with superb differentiation of expertise and research scope between agencies. This investment will pay returns.

The current state of MHS TBI care is supported by a robust pathway of care that leverages a network of advanced TBI centers with coordination by the Defense and Veterans Brain Injury Center. Synchronization of evaluations, treatments and outcomes provides opportunities for rapid translation of research findings to enhance clinical care. With your continued support, I am confident that our research discoveries, clinical innovations and relentless focus on readiness will continue to bear fruit in the years ahead. I look forward to answering your questions.